

# Charlotte I-485 Interchange Land Use and Transportation Analysis

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## Activity

Flexible/revised local design standards

## Implementing Agency

Mecklenburg-Union Metropolitan Planning Organization (Charlotte, North Carolina area)

## Summary

In 1998, the Mecklenburg-Union Metropolitan Planning Organization (MUMPO), in the Charlotte, North Carolina metropolitan area, conducted a study analyzing existing and proposed interchanges for the partially built I-485 beltway around greater Charlotte. The effort to mitigate impacts of beltway construction required increased and enhanced coordination between land use and transportation planners to jointly study and develop coordinated land use and transportation plans in interchange areas. The study proposed measures to improve connectivity and quality of life in communities surrounding proposed beltway interchanges, and influenced future coordinated land use and transportation planning in the region. Recommendations for redesigned interchange areas promoted improved traffic operations and more efficient use of transportation investments.

## Link to Livability

Highway interchanges present an opportunity to mitigate significant community impacts, such as noise pollution and traffic congestion, and to identify opportunities to maintain neighborhood connectivity and preserve access. Thoughtful planning can (1) maintain interchange areas as corridors that support adjacent communities, (2) provide pedestrian and bicycle options, (3) offer access for residents to nearby destinations, and (4) manage traffic flow at the interchanges to limit the need for roadway capacity additions.

## Context and Background

The I-485 Beltway was constructed to accommodate increased traffic from growing residential, industrial and retail areas in the outer areas of the City of Charlotte and surrounding municipalities. Because Charlotte is also a major trucking and distribution area, the beltway provides additional options and linkages to improve the efficiency of goods movement. MUMPO identified a need to coordinate land use and transportation planning at the interchange areas along the partially constructed beltway to maintain access, mitigate noise and traffic from the highway, and focus development to support the needs of the community.

## Detailed Description

In 1988, the North Carolina Department of Transportation (NCDOT) began construction on I-485, an outer beltway around Charlotte and four smaller municipalities (Matthews, Mint Hill, Pineville and

Stallings). The beltway was designed to support the growing population and reduce traffic congestion in urban areas. In 1998, concerned about potential undesired impacts to local communities in the interchange areas, MUMPO initiated a study of land use and transportation plans around each of the interchanges. The study focused on issues including: (1) traffic congestion at interchange areas; (2) development compatibility with existing communities; (3) noise pollution; and (4) presence of pedestrian and bicycle connections. The study also assessed whether the planned number of interchanges was appropriate for the length of the beltway and types of communities – the 65-mile beltway was planned to have 35 interchanges.

The study focused on land use plans, transportation plans and proposed developments within a one-mile radius of each interchange. Transportation plans included the existing conditions of roadways that connect or would connect to I-485, and local roadway, bicycle, and pedestrian networks. MUMPO also conducted extensive public outreach to obtain feedback in each community to better understand local needs.

The analysis provided specific land use and transportation recommendations around each interchange (including the removal of some of the interchanges), as well as general recommendations related to the following topics:

1. Bicycle and pedestrian accommodations – on roadways and on bridges
2. Internal connectivity between developments near interchanges
3. Streetscape improvements to integrate areas into local communities, especially at the pedestrian scale
4. Access improvements to nearby developments and “landlocked” properties – specifically, provision of service roads and appropriate land subdivision processes
5. Local ordinances to help mitigate visual and noise impacts of the beltway
6. Lighting improvements around interchanges and ramps to support motorized and nonmotorized safety.

Recommendations focused on preserving or improving quality of life for existing communities around the built or planned interchanges. Interchange area planning typically proscribes high intensity development at the site of the interchange, with limited consideration for nonmotorized access, internal connections between adjacent communities, or access management through and around the interchange. The study challenged these conventions by concentrating development centers further from the interchange itself, thereby increasing opportunities for multi-modal transportation and helping to mitigate impacts of noise, pollution, and traffic congestion. The study proposed placing land uses that require a high level of access farther away from the interchanges to improve safety and multi-modal opportunities; uses not requiring as much access would be located closer to the interchange. These strategies help to protect the capacity of the beltway and the interchange, thereby extending the useful life of the investment. The study also proposed design elements such as screening and landscaping to mitigate noise pollution and improve the aesthetics of the areas adjacent to the

interchanges. Figure 1 illustrates some of the recommended treatments or components included in the study.



Figure 1 Interchange recommendations examples | I-485 Interchange Analysis, 1999

## Application Examples

### Albemarle Road: Focus on accommodating development and mitigating impacts

The Albemarle Road interchange highlights successful cooperation between the MPO and municipalities to meet local needs, while ensuring appropriate development and adequate roadway improvements. MUMPO originally recommended a low intensity residential development in the area around the Albemarle Road intersection; however, the community was interested in higher intensity use, such as retail or industrial facilities. MUMPO and the local community worked together to finalize a new area plan, which included a hospital campus. The hospital developer contributed to a new access road to mitigate increased traffic flow into the area that would have negatively impacted nearby residential areas. In this case, development around the interchange area was thoughtfully planned to contribute to the sustainable economic development of the town, while preventing unwanted traffic congestion in nearby residential communities.

### **Mallard Creek Road: Focus on connectivity**

The interchange at Mallard Creek Road will be one of the final interchanges constructed on I-485, and is scheduled for completion in 2014. The initial interchange design prompted complaints from local residents whose access would have been blocked by the highway. MUMPO addressed this issue by proposing a series of strategies to enhance connectivity and maintain access for existing neighborhoods. The first suggestion was to change the design of the interchange itself, to improve efficiency and require less roadway right-of-way. Other recommendations included further study of necessary transportation improvements between the interchange and surrounding developments, developing alternative access routes to surrounding neighborhoods that would otherwise be cut off by the interchange, and further studying possible amendments to existing land use, transportation and transit plans in the area based on growth pressures. These approaches improve the operations of the interchange and the network, while also addressing key community concerns.

### **Bicycle and pedestrian access: Focus on changes to local and State regulations**

Maintaining access for bicycles and pedestrians to cross interchanges or connect to the adjacent neighborhoods is a high priority. MUMPO has long been a leader in North Carolina in nonmotorized transportation. The study recommended requiring sidewalks on all locally owned bridges to accommodate pedestrians and ensure connectivity for all neighborhoods, and encouraged NCDOT to add bicycle lanes and sidewalks to the interchange bridges. Based on study recommendations, NCDOT added extra width to bridges along surface streets over I-485 to include bicycle safe railings and shoulders for future sidewalks. These recommendations are consistent with current guidance from the U.S. Department of Transportation regarding bicycle and pedestrian accommodations.

## **Lessons Learned**

### **Coordinating land use and transportation planning lays the groundwork for innovation.**

The I-485 Interchange Analysis process raised the level of coordinated land use and transportation planning in the region, laying the groundwork for more recent innovations. For example, coordination for this study set the stage for establishment of the City of Charlotte's Connectivity Program, which focuses on preserving and creating linkages for motorized and nonmotorized access within and between new developments. Linking land use and transportation planning has also been critical in planning for the regional light rail transit system. In general, the City of Charlotte and MUMPO try to integrate land use and transportation in all key activities, focusing on transportation infrastructure in areas of anticipated development, pedestrian accessibility, and transit opportunities and needs.

### **Adopting regional approaches to interchange area planning yields many benefits.**

Another success from the study process has been a new regional approach to interchange area planning that challenges previous conventions. Instead of automatically assuming high intensity development built near the interchanges, drawing automobile traffic from the highway, the study highlighted the need to consider existing uses and individual neighborhood needs. In many cases this resulted in

concentrated development away from the interchange to promote accessibility and reduce traffic congestion. The recommendations also helped to preserve and encourage bicycle and pedestrian access throughout the interchange areas, thus improving safety and increasing travel options for neighboring communities.

### **Using the interchange development process enabled the agency to balance many needs.**

The interchange development process provided opportunities for MUMPO to guide appropriate future development and mitigate negative impacts, while working within the context of the market dynamics. Approaching the recommendations through the lens of supporting market dynamics and being good stewards of the public investment helped to gain support for the planning process. This was important in a region that tends to focus less on controlling development, and more on ensuring that it meets community goals and that negative impacts are mitigated.

### **Delayed construction presents challenges to coordinated planning.**

In the years since the interchange study was completed, MUMPO has learned an important lesson about the challenges that delayed construction can present to coordinated planning. Regardless of the reason for the delay, it is sometimes difficult for municipalities to adhere to a plan that is largely centered on infrastructure or development that has been significantly delayed. Without a guarantee that it will in fact be built, some communities may choose to take advantage of new opportunities that are not consistent with the original plan. At the Prosperity Church interchange, for example, significantly delayed interchange construction and development pressures have prompted the need for a new area plan, reflecting local changes since the original plan was developed in 1998. This case highlights the importance of linking land use and transportation in plan implementation, in addition to plan development.

### **Integrating land use and transportation planning optimizes the functional and operational capacity of the transportation system.**

The interchange study process highlighted the importance of integrating land use and transportation planning in optimizing the functional and operational capacity of the transportation system. The location, selection, and intensity of land uses strongly influence traveler behavior. Understanding the land uses from the beginning can help to determine and plan for the appropriate transportation infrastructure, reducing the need for expensive modifications in the future. One of the key components of the study was to place the appropriate uses next to interchange areas and develop connected street networks, thereby protecting the public investment in the new beltway and the interchange. These measures manage and protect the capacity of the new infrastructure, reducing the need for future widening or other costly modifications.

## **For Further Information**

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### **Websites and Publications:**

I-485 Interchange Analysis  
[http://www.mumpo.org/PDFs/I-485/I-485\\_Interchange\\_Analysis.pdf](http://www.mumpo.org/PDFs/I-485/I-485_Interchange_Analysis.pdf)

Domestic Scan Tour II Report Integration of Land Use and Transportation Planning: Lessons Learned from the Second Domestic Scan Tour  
<http://www.planning.dot.gov/Documents/DomesticScan/domscan2.htm>