STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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GOVERNOR

DIVISION OF HIGHWAYS
P.O. BOX 25201, RALEIGH, N.C. 27611-5201

GARLAND B. GARRETT JR.
SECRETARY

March 15, 1996

MEMORANDUM TO: Mr. Frank Emory Jr., Member, Board of Transportation
Mr. Peter Pappas, Member, Board of Transportation
Mr. B. G. Payne, P.E., Division Engineer, Division 10
Mr. C. W. Leggett, P.E.
Mr. W. H. Webb, P.E.
Mr. J. M. Lynch, P.E. (6) Attention: Roberto Canales, P.E.
Congestion Management Engineer
Mr. J. B. Williamson
Mr. H. F. Vick, P.E. (2)
Mr. D. R. Morton, P.E.
Mr. G. T. Shearin, P.E.
Mr. M. R. Poole, P.E.
Mr. A. L. Avant (2)
Mr. J. D. Lane
Mr. T. A. Peoples, P.E.
Mr. L. K. Barger, P.E.

FROM: David G. Modlin, Ph.D., P.E. David Modlin
Head of Feasibility Studies

SUBJECT: Feasibility Study # U-3413, Charlotte, University City, Roadway Capacity and Traffic Circulation Improvements, Intersection of Harris Boulevard (SR 2665) and Tryon Road (US 29), Mecklenburg County.

Our staff has completed a feasibility study for the subject proposed project. This brief analysis suggests improvements that would be logical if the project were to be funded. A copy of our report is attached for your information.

DGM/joa

Attachment

cc: Dr. L. R. Goode, P.E.
Mr. B. G. Jenkins, P.E.
Mr. W. J. Watson, P.E.

FEASIBILITY STUDY

Charlotte
University City
Roadway Capacity and Traffic Circulation Improvements
Intersection of
Harris Boulevard (SR 2665) and Tryon Road (US 29)
Mecklenburg County
U-3413

Prepared by
Program Development Branch
Division of Highways
N. C. Department of Transportation

William J. Watson

William J. Watson, P.E.
Highway Planning Engineer

David G. Modlin, Jr.

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Head of Feasibility Studies

2/28/96
Date

Charlotte
University City
Roadway Capacity and Traffic Circulation Improvements
Intersection of
Harris Boulevard (SR 2665) and Tryon Road (US 29)
Mecklenburg County
U-3413

I. GENERAL DESCRIPTION

This preliminary study describes several measures aimed at improving roadway capacity and traffic circulation at, and in the vicinity of, the intersection of Harris Boulevard (SR 2665) and Tryon Road (US 29), at University City in Charlotte. The Study Area is shown on Figure 1. The following improvements were studied:

A. Intersection Improvements at Tryon Road & Harris Blvd.

1. Widen the Harris Boulevard approaches to Tryon Road, widen Harris Boulevard, on the east side, between Tryon Road and the ramp to the shopping center in the south quadrant, widen Tryon Road for a distance of approximately 1,600 feet (490 m) on both sides of Harris Boulevard. The resulting intersection will provide 3 exclusive through lanes on each approach, 1 exclusive right-turn lane on each approach, 3 exclusive left-turn lanes on each Harris Boulevard approach, 2 exclusive left-turn lanes on each Tryon Road approach, and 3 lanes exiting the intersection on each leg. The intersection is expected to operate at Level of Service (LOS) D in the 2020 design year. The total cost for construction and right-of-way is estimated to be $ 4,100,000 as follows:

Construction:	$ 2,900,000
Right of Way:	1,200,000
Total Cost:	$ 4,100,000

2. As an alternative to the improvements described above in item 1, construct an Urban Interchange at the intersection of Harris Boulevard and Tryon Road. Post, Buckley, Schuh & Jernigan, Inc., consulting engineers, identified the need for an interchange at this location in their Area Traffic Study Final Report published in 1994. This interchange is shown of Figure 2. This design carries 3 through lanes in each direction of travel on Harris Boulevard under Tryon Road. All turning movements occur at the Tryon Road level, under traffic signal control, as shown

on Figure 2. The signalized movements are estimated to operate at Level of Service (LOS) C in the 2020 design year.

Construction:	$ 12,800,000
Right of Way:	400,000 * (WJW)
Total Cost:	$ 13,200,000

3. Remove the traffic signal at the intersection of Harris Boulevard and University Executive Drive. Only right turns should be allowed into and out of University Executive Drive and the shopping center entrance opposite it. Removal of this signal will enhance traffic flow under the computerized traffic signal system described in Item 4 below.

Estimated Cost..... $ 5,000.00

4. Incorporate the existing traffic signals on Harris Boulevard & Tryon Road into a closed loop, computer controlled, coordinated system. A numerical analysis of the improvement in traffic flow that may result from this system is beyond the scope of this study, but a reduction in the average delay per vehicle on the order of 10 to 20 percent can be expected. These intersections are shown on Figure 1 and the traffic signals are indicated by blue dots.

Estimated Cost..... $ 280,000.00

B. New Roads to Improve Circulation and Access

Construct the following roads to increase traffic circulation within and between the four intersection quadrants. These roads are shown on Figure 1.

1. In the west quadrant, between McCullough Drive and University Executive Drive, construct a 2-lane curb and gutter facility, 28 feet (8.5 m) wide from face-to-face of curbs. The roadway length is approximately 800 feet (244 m). This road will improve traffic circulation within the quadrant. The estimated design year (2020) Average Daily Traffic (ADT) for this road is 4,000 vpd. The total cost for construction and right-of-way is estimated to be $ 800,000 as follows:

Construction:	$ 300,000
Right of Way:	500,000
Total Cost:	$ 800,000

2. In the east quadrant, between Tryon Road and Campus Road, construct a 2-lane curb and gutter facility, with 14-foot (4.2-m) wide lanes to accommodate bicycles, and a 16-foot (4.9-m) wide raised median. The roadway length is approximately 3,400 feet (1040 m). This road will improve

traffic circulation between quadrants and will serve as a major entrance for the University of North Carolina at Charlotte. The estimated design year (2020) ADT for this road is 6,200 vpd. The total cost for construction and right-of-way is estimated to be $ 3,150,000 as follows:

Construction:	$ 2,400,000
Right of Way:	750,000
Total Cost:	$ 3,150,000

3. In the east quadrant between the new entrance to UNCC proposed in item 2 above, and the driveway to University Memorial Hospital, construct a 2-lane curb and gutter facility, 28 feet (8.5 m) wide from face-to-face of curbs. The roadway length is approximately 800 feet (244 m). This road will improve traffic circulation between quadrants and will serve to improve access to and from University Memorial Hospital. The estimated design year (2020) ADT for this road is 2,000 vpd. The total cost for construction and right-of-way is estimated to be $ 850,000 as follows:

Construction:	$ 550,000
Right of Way:	300,000 * (WJW)
Total Cost:	$ 850,000

4. In the south quadrant, between Tryon Road and Harris Boulevard, construct a 4-lane curb and gutter facility, 52 feet (15.8 m) wide from face to face of curbs. The roadway length is approximately 2,200 feet (670 m). This road will improve traffic circulation between quadrants. The estimated design year (2020) ADT for this road is 8,000 vpd. The total cost for construction and right-of-way is estimated to be $ 2,430,000 as follows:

Construction:	$ 1,500,000
Right of Way:	930,000
Total Cost:	$ 2,430,000

II. NEED FOR PROJECT

The purpose of this project is improving roadway capacity and traffic circulation at, and in the vicinity of, the intersection of Harris Boulevard (SR 2665) and Tryon Road (US 29), at University City in Charlotte. The study area is shown on Figure 1. The project was requested by the Charlotte Chamber of Commerce. This project is in an area of rapid growth. This growth is expected to continue due to the proximity of the University of North Carolina at Charlotte, University Memorial Hospital, University Place Shopping Center, and available development property.

Harris Boulevard is classified as an Urban Freeway/Expressway in the North Carolina Statewide Functional Classification System, and is a Major Thoroughfare on the Charlotte - Mecklenburg Thoroughfare Plan. Tryon Road is classified as an Urban Other Principal Arterial in the North Carolina Statewide Functional Classification System, and is a Major Thoroughfare on the Charlotte - Mecklenburg Thoroughfare Plan. Land use along both roads within the project limits is commercial, office, and institutional type development.

Harris Boulevard, within the project limits, is a two-way, median divided facility. The existing right of way is 200 feet (61 m) wide. The eastbound approach to the Tryon Road intersection provides 2 exclusive left-turn lanes, 2 exclusive through lanes, and 1 exclusive right-turn lane. There are 3 westbound lanes exiting the intersection. The westbound approach to the Tryon Road intersection provides 2 exclusive left-turn lanes, 2 exclusive through lanes, and 1 combination through-right-turn lane. There are 2 eastbound lanes exiting the intersection.

Tryon Road, within the project limits, is a two-way, median divided facility. The existing right of way is 120 feet (36.6 m) wide. The southbound approach to the Harris Boulevard intersection provides 1 exclusive left-turn lane, 2 exclusive through lanes, and 1 exclusive right-turn lane. There are 2 northbound lanes exiting the intersection. The northbound approach to the Harris Boulevard intersection provides 2 exclusive left-turn lanes, 2 exclusive through lanes, and 1 exclusive right-turn lane. There are 2 southbound lanes exiting the intersection.

The Average Daily Traffic (ADT) estimates for Harris Boulevard for the years 1996 and 2020 are 42,000 vehicles per day (vpd) and 57,000 vpd respectively. The ADT estimates for Tryon Road for the years 1996 and 2020 are 24,000 vpd and 47,000 vpd respectively. The 1996 and 2020 turning movement counts for the Harris Boulevard - Tryon Road intersection are shown on Figure 3. Level of Service (LOS) estimates for the existing intersection (no improvements), the widened intersection, and the Urban Interchange, based on 1996 and 2020 traffic, are shown in the table on Figure 4. The estimated improvement cost is also shown in Figure 4.

During the three year period beginning June 1, 1992, and ending May 31, 1995, there were 194 accidents reported on Harris Boulevard between I-85 and NC 49. This resulted in a total accident rate of 220 accidents per 100 million vehicle miles (ACC/100MVM). This compares with the statewide average of 348 ACC/100MVM for all urban secondary routes, in North Carolina, for 1994.

There was no fatal accidents reported, but 72 accidents resulted in 124 injured persons. The most prevalent type accidents were Rear End (54%), Left-Turn Road (14%), and Angle (12%). The proposed widening and traffic signal interconnection will reduce the potential for these type accidents.

During the three year period beginning May 1, 1992 and ending April 30, 1995, there were 64 accidents reported on Tryon Road between Clark Boulevard and Clay Boulevard. This resulted in a total accident rate of 152 accidents per 100 million vehicle miles (ACC/100MVM). This compares with the statewide average of 317 ACC/100MVM for all urban NC routes, in North Carolina, for 1994.

There was no fatal accidents reported, but 21 accidents resulted in 34 injured persons. The most prevalent type accidents were Rear End (42%), Ran of Road (19%), and Left-Turn (24%). The proposed widening and traffic signal interconnection will reduce the potential for these type accidents.

III. DISCUSSION OF STUDIED IMPROVEMENTS

Items A1 and A2 described above are alternative improvements with respect to each other, and either improvement will directly increase the capacity of the Harris Boulevard - Tryon Road intersection.

Although the intersection widening (Item A1) is less costly than the Urban Interchange (Item A2), it provides only a LOS D and is approaching LOS E. Also, Item A1 requires triple left-turn lanes on both Harris Boulevard approaches and dual left-turn lanes on both Tryon Road approaches to the intersection. Item A1 also requires significantly more right-of-way than the Urban Interchange.

The Urban Interchange (Item A2) is more costly than the intersection widening, however it provides a high LOS C, thus being more of a long term improvement than Item A1. The Urban Interchange allows the through traffic on Harris Boulevard to flow uninterrupted in keeping with the Freeway/Expressway designation of this facility. Figure 4 is a table comparing the LOS and cost of Items A1 and A2.

Items A3 and A4 above (traffic signal system and signal removal) are stand-alone improvements that will improve traffic flow on Harris Boulevard and Tryon Road whether implemented alone, with either item A1 or A2 above, or with any of the 4 new roads described in item B above.

The 4 new roads described in item B above will enhance access within and between the 4 intersection quadrants, but

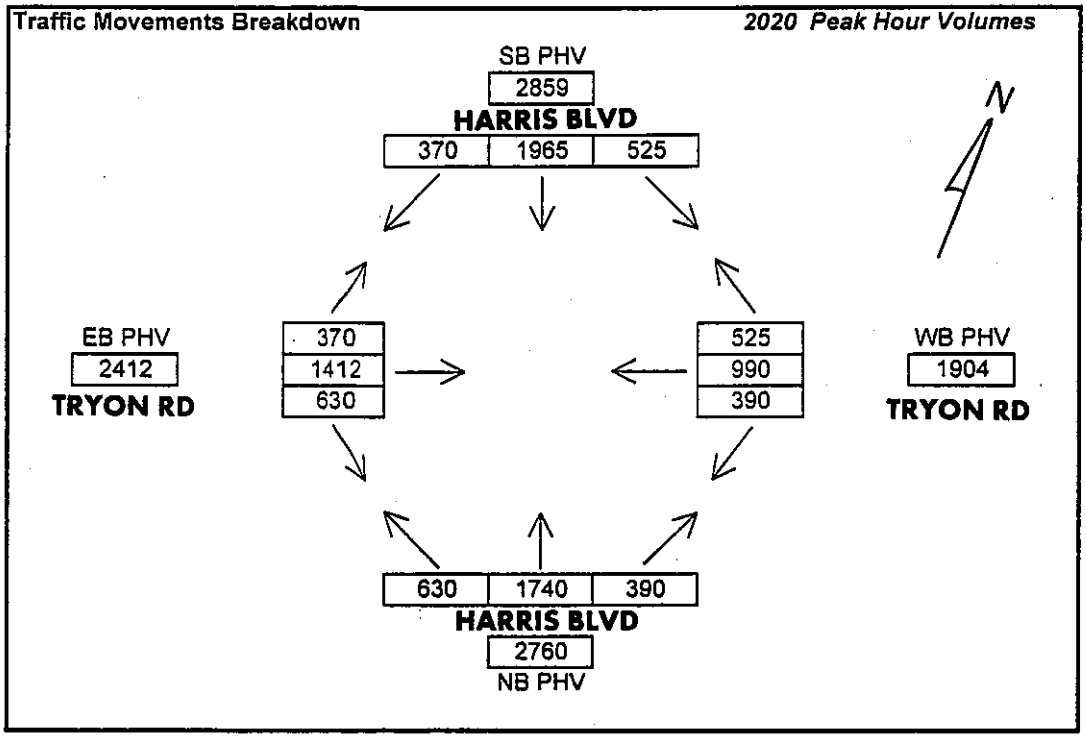
do not directly increase the capacity of either Harris Boulevard or Tryon Road. Whether or not they will relieve Harris Boulevard or Tryon Road of traffic is uncertain.

IV. OTHER COMMENTS

An environmental screening was not conducted for this study. No historic properties or endangered species are anticipated. Some wetlands may be encountered where new roads are constructed in the south and east quadrants.

A special bicycle accommodation, in the vicinity of the UNCC campus, was identified for this project by the Office of Bicycle and Pedestrian Transportation. This need will be met by the wide lanes proposed for the new road in item 5B above.

FIGURE 3. 2020 & 1996 ESTIMATED PEAK HOUR TURNING MOVEMENT VOLUMES.



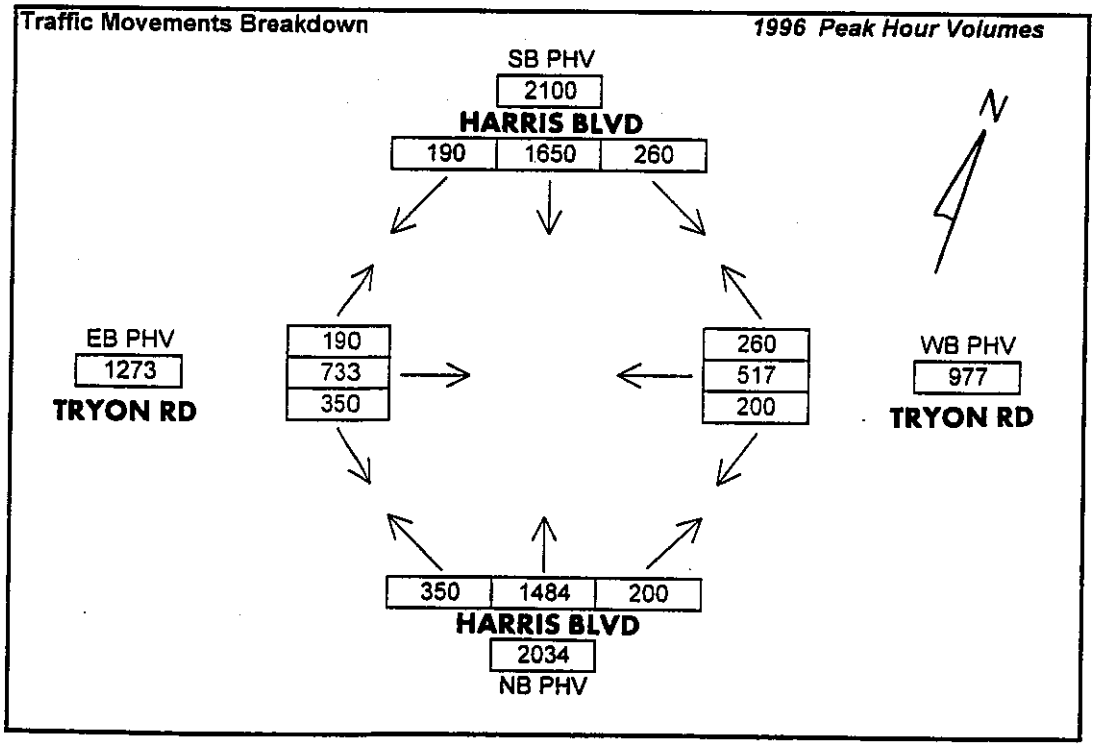
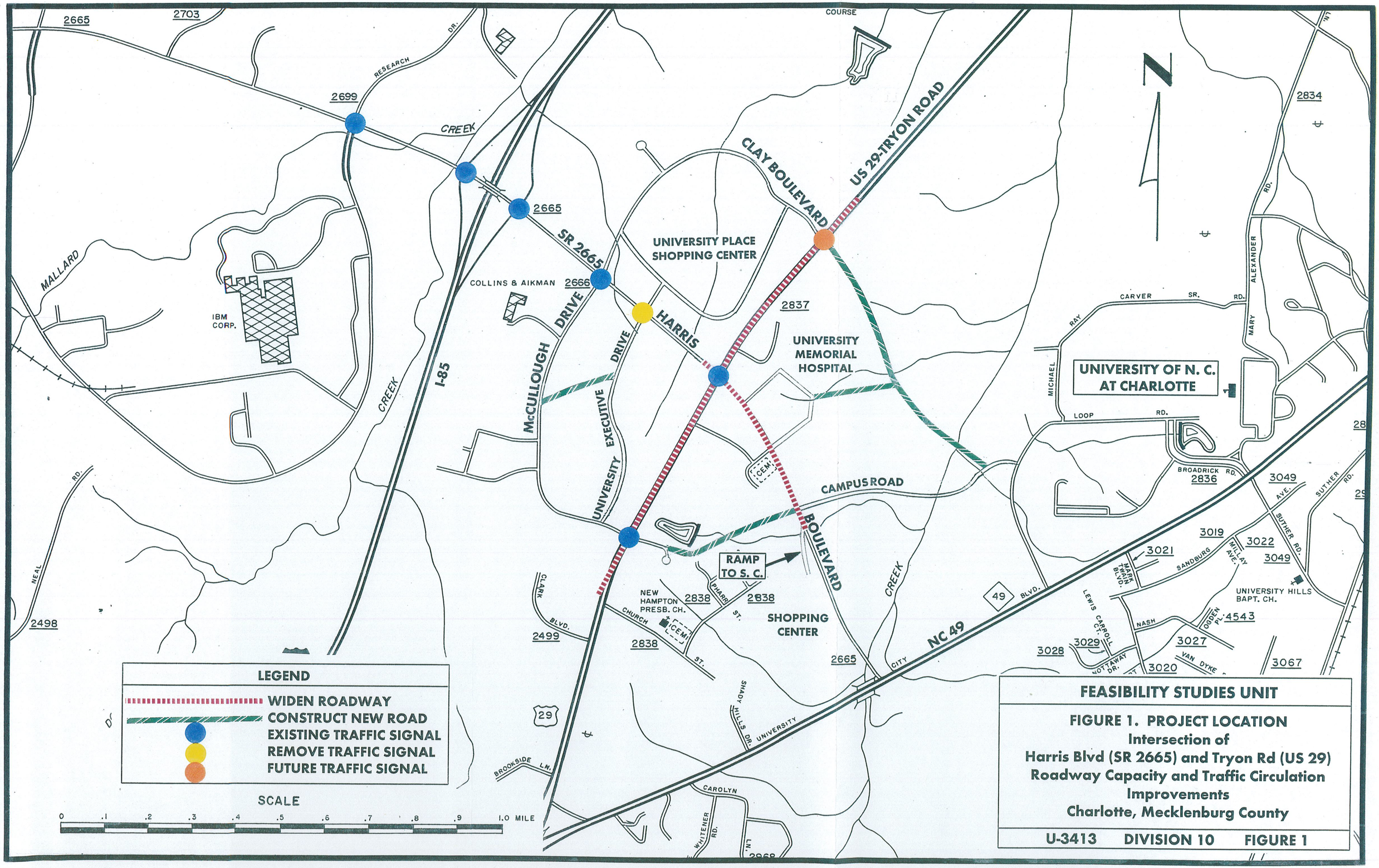


FIGURE 3

FIGURE 4. HARRIS BLVD. & TRYON RD LEVEL OF SERVICE (LOS)			
	EXISTING INTERSECTION	WIDEN INTERSECTION	URBAN INTERCHANGE
1996 VOLUMES	F	C	B
2020 VOLUMES	F	D	C
COST	N/A	$4,100,000	$13,200,000

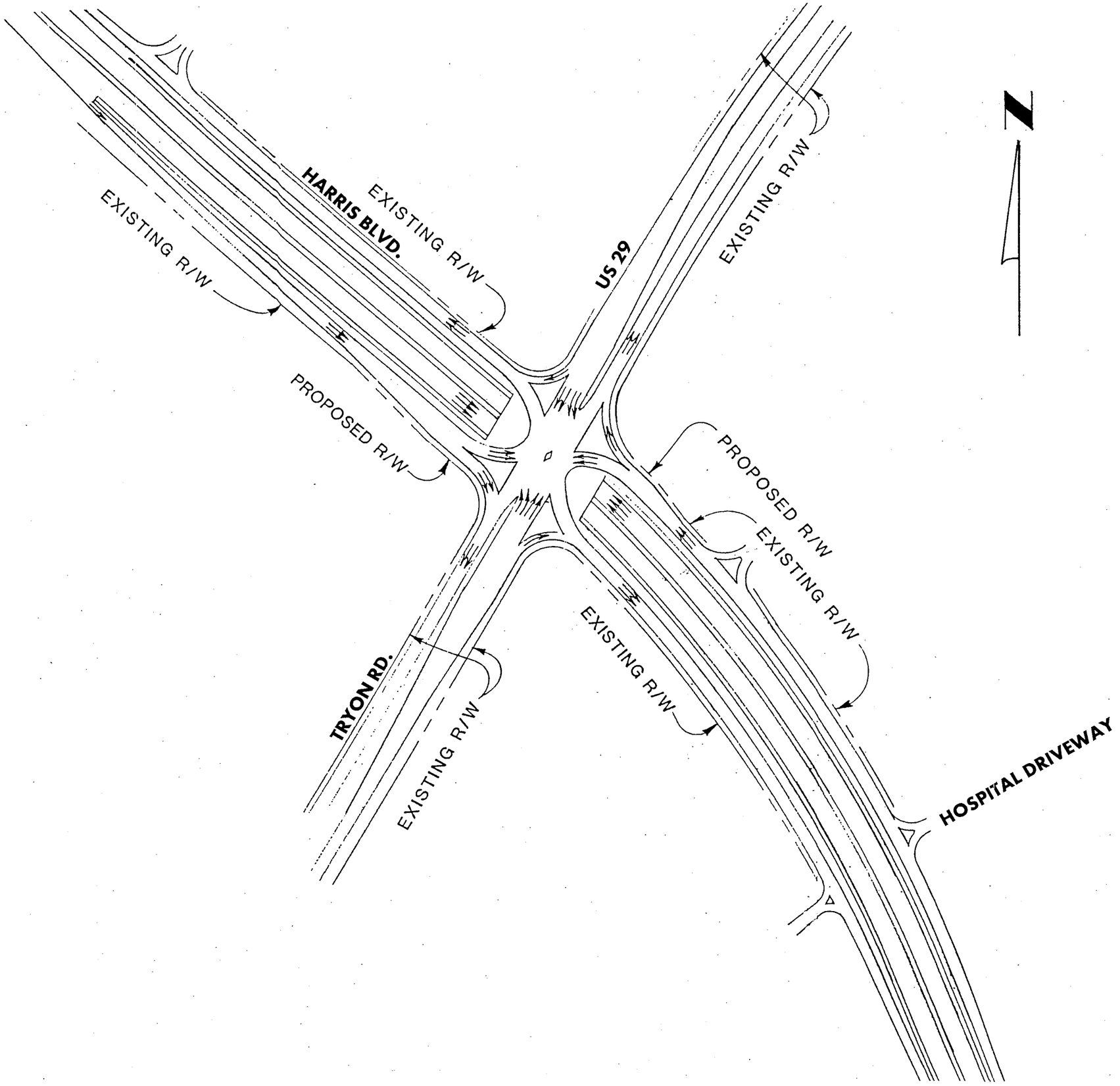
FIGURE 4



FEASIBILITY STUDIES UNIT

FIGURE 1. PROJECT LOCATION
Intersection of
Harris Blvd (SR 2665) and Tryon Rd (US 29)
Roadway Capacity and Traffic Circulation Improvements
Charlotte, Mecklenburg County

U-3413 DIVISION 10 FIGURE 1



FEASIBILITY STUDIES UNIT		
FIGURE 2. PROPOSED URBAN INTERCHANGE Charlotte, Mecklenburg County SCALE 1" = 200'		
U-3413	DIVISION 10	FIGURE 2