FEASIBILITY STUDY

Kinston
US 70 (Bypass) Intersections
with NC 11/55 (King St) and US 258 (Queen St)
Lenoir County

U-2821

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

Thomas E. Devens, P.E.
Highway Planning Engineer

Mohammed B. Mustafa
Highway Planning Engineer

3/24/93
Date

Whitmel H. Webb, III, P.E.
Head of Feasibility Studies

Feasibility Study

Kinston
US 70 (Bypass) Intersections
with NC 11/55 (King St) and US 258 (Queen St)
Lenoir County

U-2821

I. GENERAL DESCRIPTION

This is a feasibility study for intersection improvements of US 70 Bypass with US 258, and NC 11/55 in Kinston (See Figure 1). This study recommends a signal re-timing at the intersection of US 70 with US 258 (Queen Street); and at the intersection of US 70 with NC 11/55 (King Street), an additional right-turn lane on US 70 eastbound with accompanying signal revision is recommended. Estimated cost is $190,000 ($20,000 for signalization, $40,000 for right-of-way, and $130,000 for construction).

A feasibility study presents recommended cross sections for improvements, general alignments of improvements, and estimated cost of construction and right-of-way. This study attempts to identify any potential environmental, permitting, or other observed issues which deserve consideration in the planning and construction stages. This study is not an exhaustive environmental investigation.

II. NEED FOR PROJECT

US 70 is a major regional route which connects the Piedmont to eastern North Carolina. In the Kinston area, US 70 is heavily utilized by through traffic, commuters, and businesses. Summer months bring about a substantial increase in through traffic traveling to and from coastal Carolina areas.

The 1992 average daily traffic (ADT) for the studied section of US 70 Bypass ranges from 22,000 to 24,800 vehicles per day (vpd). Two intersections in particular, US 258 and NC 11/55, have been experiencing congestion and excessive delays (See Figure 1).

US 70 Bypass is a Major Thoroughfare in the mutually adopted 1981 Kinston Thoroughfare Plan, and is classified as an Urban Principal Arterial in the Statewide Classification System. US 258 (Queen Street) is designated as a part of the "Lofton's Spoke" bicycle route.

In the studied area, US 70 Bypass is a four-lane highway with 12-foot shoulders, divided by a 32-foot median. Right-of-way width is 200 feet. Land adjacent to US 70 is fairly undeveloped due to low-lying areas associated with the Neuse River. Undeveloped lands near the intersections are fairly flat, and land parcels have direct driveway access to the highway.

Although traffic volumes on US 70 Bypass have been increasing, future through traffic volumes on the existing US 70 Bypass are expected to decrease substantially when the new southern bypass of Kinston (Project R-2553) is constructed (See Figure 1). Project R-2553 is currently scheduled to begin right-of-way acquisition in 1999. Therefore, a relatively inexpensive solution is needed, which will satisfy traffic demands until the new bypass is built.

Project R-2235 includes widening US 258 to a four-lane divided highway from NC 24 in Richlands to US 70 Bypass (See Figure 1). However, US 258 is already a divided highway at its southern approach to this intersection. Therefore R-2235 may not require any geometric or signal improvements at this intersection.

At the intersection of US 70 Bypass with US 258, four conflicting movements are critical for capacity (See Figure 2). Afternoon peak hour volume of the through movement on eastbound US 70 is 478 vehicles per hour (vph). Through traffic on westbound US 70 is 444 vph. On US 258 southbound, the through volume is 385 vph and the left-turn volume is 598 vph. Capacity analysis indicates that current level of service (LOS) is unsatisfactory only because of timing of the existing traffic signals. With current traffic counts, a LOS C is obtainable by a signal re-timing. No geometric improvements are necessary.

The intersection of US 70 Bypass with NC 11/55 has five critical movements in the peak hour (See Figure 3). Southbound NC 11/55 has 882 vph through, and 317 vph right-turn movements. Westbound US 70 has 639 vph through. Eastbound US 70 has 898 vph through, and 615 right-turn movements. Capacity analysis indicates that the current level of service is F, primarily due to the high right-turn volume on US 70 eastbound. Retaining the existing geometry, a signal re-timing will not increase the level of service. However, if an additional right-turn lane is added to US 70 eastbound, or if the existing right-turn lane is converted to a free-flowing lane, the intersection LOS will increase to D. Further increase in LOS is only possible by providing additional through lanes on both highways.

During the period from January 1, 1989 through December 31, 1991, a total of 55 accidents were reported at the intersection of US 70 Bypass and US 258. This resulted in an accident rate of 152 accidents per 100 million vehicle miles. No fatalities were reported. Most prevalent accident types were rear-end (47%) and angle (26%) collisions. During the same period at the intersection of US 70 Bypass and NC 11/55, a total of 70 accidents were reported at the intersection of US 70 Bypass and US 258. This resulted in an accident rate of 194 accidents per 100 million vehicle miles. No fatalities were reported. Most prevalent accident types were rear-end (36%) and left-turn (24%) collisions.

III. RECOMMENDATIONS

It is recommended that existing traffic signal at the intersection of US 70 Bypass and US 258 (see Figures 1, and 2) be re-timed to increase the efficient control of current traffic volumes and critical turning movements. It is also recommended that a second right-turn lane be added to the US 70 Bypass eastbound approach to the NC 11/55 intersection (see Figures 3 and 4). The estimated cost is as follows:

Signal re-timing (US 70 Bypass and US 258)	$ 20,000
Add second right-turn lane (US 70 Bypass and NC 11/55):	
Right-of-way	$ 40,000
Construction	$130,000
Total	$190,000

Two alternates were considered to improve the geometry of the intersection of US 70 Bypass and NC 11/55. Alternate 1 is the recommended improvement. Alternate 1 adds an additional right-turn lane to eastbound US 70 Bypass (See Figure 4). Alternate 2 converts the existing right-turn lane into a free-flowing acceleration lane which merges with southbound NC 11/55 (See Figure 5). Alternate 2 is $460,000 more expensive than Alternate 1.

Alternate 1 (Recommended):

Alternate 1 recommends the addition of a second right-turn lane eastbound US 70 Bypass at the intersection with NC 11/55 (See Figure 4). This improvement will require a 12-foot travel lane with curb and gutter. Length of the lane is approximately 550 feet. Minimum additional right-of-way width required is 20 feet. The corner islands dividing US 70 Bypass and NC 11/55 from the Exxon station are to be reconfigured to accommodate the additional right-turn lane.

Total cost of Alternate 1 is estimated at:

Right-of-Way	$ 40,000
Construction	$ 130,000
Total Cost	$ 170,000

Medium utility costs are expected.

Alternate 2:

Alternate 2 utilizes the existing right-turn lane on eastbound US 70 Bypass by converting the lane into an unsignalized, free-flowing right-turn lane onto NC 11/55 southbound (See Figure 5). The lane consists of a 12-foot travel lane with curb and gutter. Additional right-of-way width (without access control) required to accommodate the new lane varies from 25 to 45 feet, depending on the required earthwork. The radius of the free-flow lane allows a 20 mph design speed. A 700-foot acceleration lane is required to increase speed to the NC 11/55 speed limit of 55 mph, with a 300-foot taper section. The acceleration lane has a parallel entrance onto NC 11/55. The corner islands separating Exxon from US 70 Bypass and NC 11/55 are to be reconfigured. A new island is required to channelize and separate the free-flow lane from NC 11/55. The two existing islands dividing Exxon from US 70 eastbound would be joined together as one island to prevent Exxon customers from exiting directly into the free-flow lane.

Total cost of Alternate 2 is estimated at:

Right-of-Way	$ 410,000
Construction	$ 220,000
Total Cost	$ 630,000

The right-of-way estimate is based upon no control of access. Medium utility costs are expected.

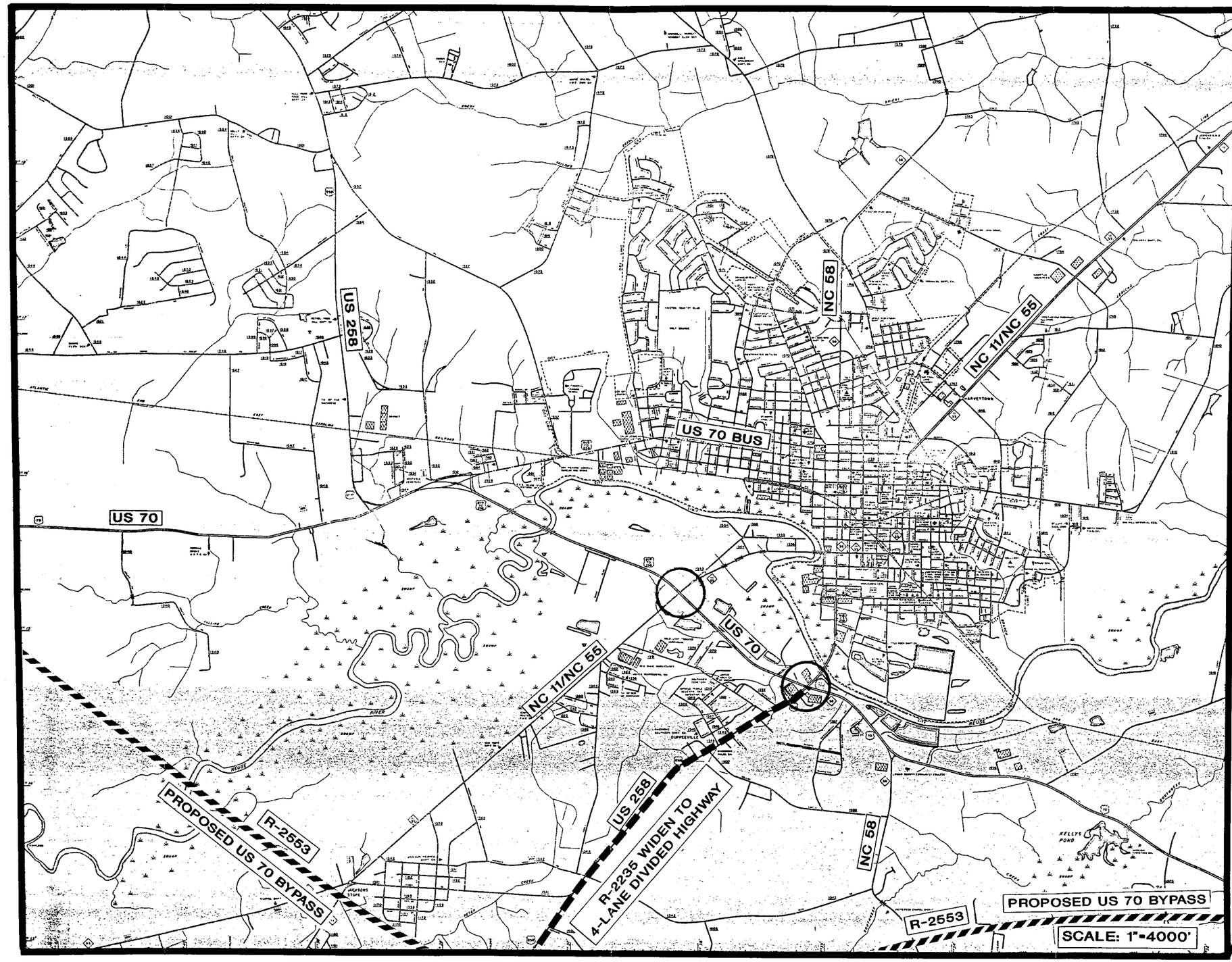
Alternate 2 was rejected for several reasons, cost being the primary consideration. Another reason to avoid a speed-change lane is due to access control in the area. The land adjacent to the lane is undeveloped, cleared, flat land that appears to be above the local floodplain. The land is a prime site for a shopping center or a commercial/industrial development. Drivers accelerating on the free-flow lane will be looking over their left shoulders as they merge with NC 11/55. Drivers exiting from the developed site to NC 11/55 have a much increased probability of being struck from the side. Full control of access would alleviate this problem, but the cost would be prohibitive.

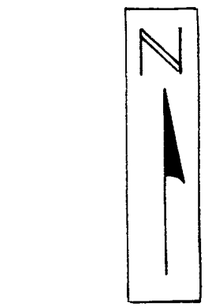
Land damages on Alternate 2 also are greater. The speed-change lane and taper section will require removal of a gasoline pump at Speedway, located approximately 1000 feet south of the intersection. The island reconfiguration at the intersection prevents Exxon customers from safely re-entering US 70 Bypass. Therefore, business disruption to Exxon will be significant. Finally, neither alternate seems to improve capacity better than the other. Alternate 2 does not appear to have any advantages over Alternate 1, yet is $460,000 more expensive.

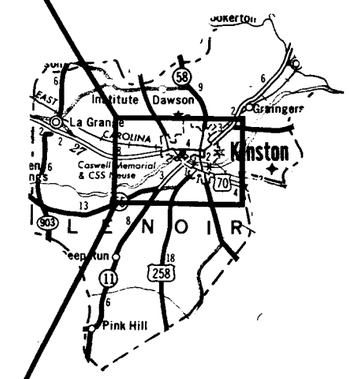
IV. OTHER COMMENTS AND CONCERNS

An ecological screening was not conducted for this study. However, no significant impacts to are anticipated.

No business or residential relocations are expected. No public parks are known to be affected.

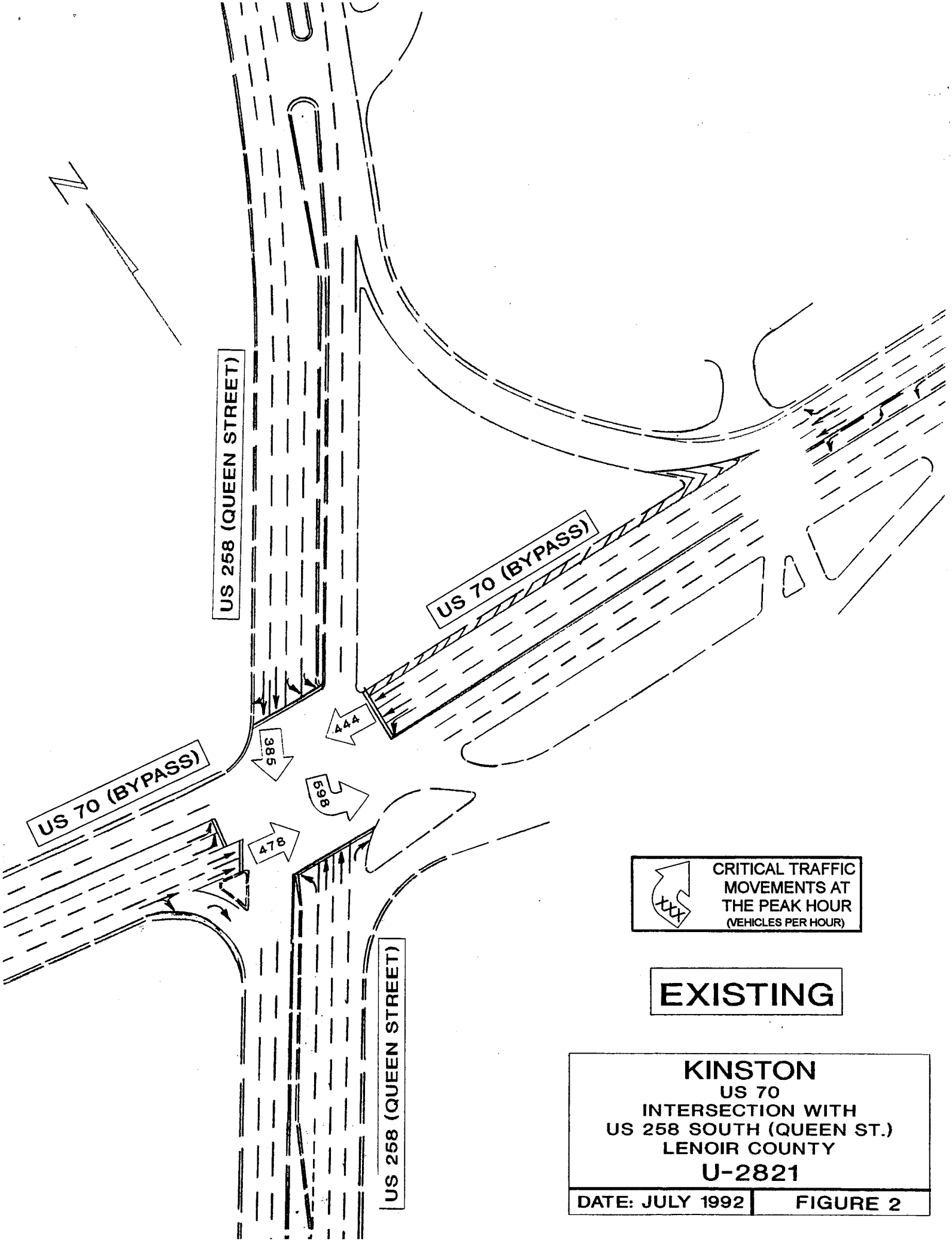






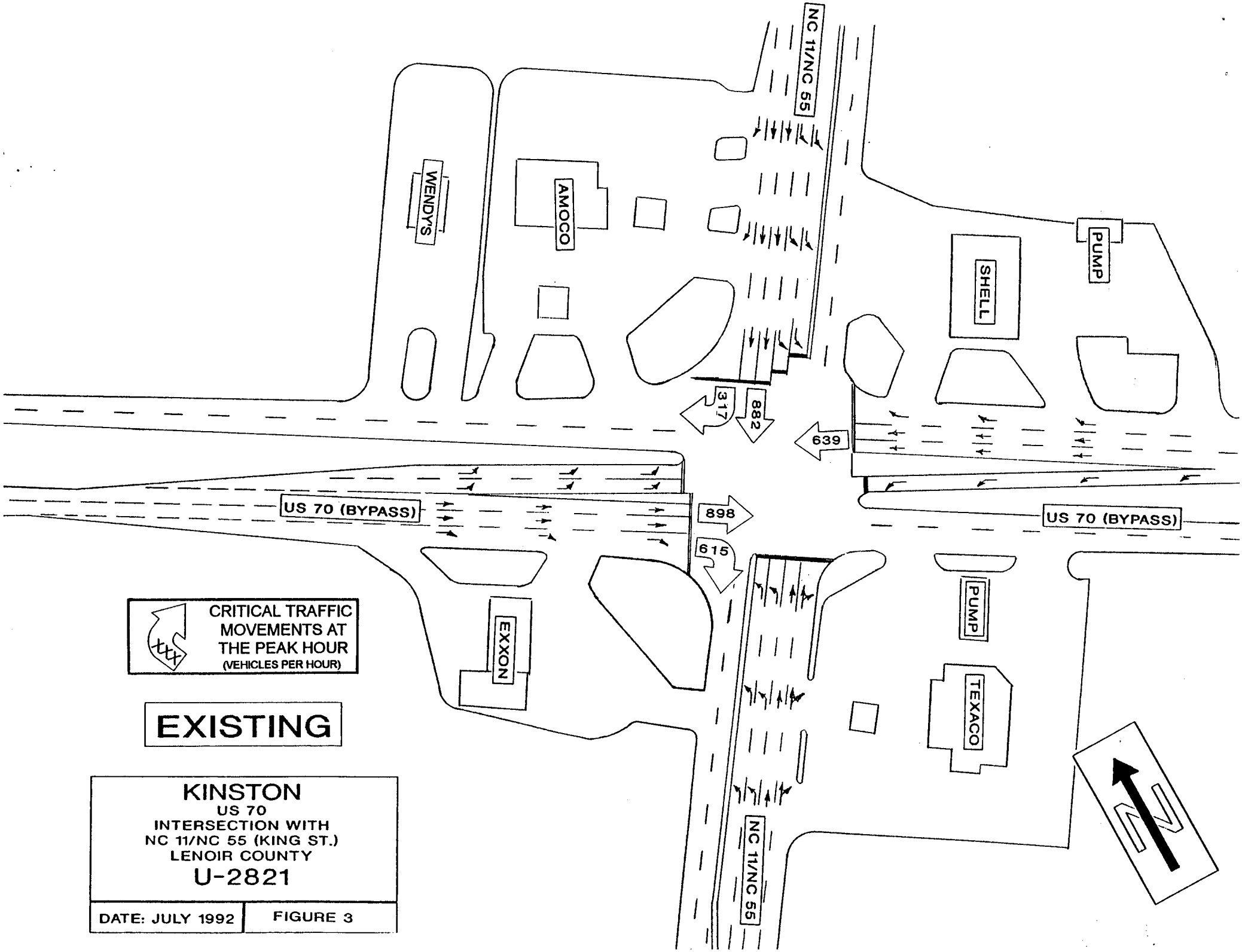
KINSTON
US 70
IMPROVE INTERSECTIONS WITH
NC 11 AND US 258 SOUTH
LENOIR COUNTY
U-2821

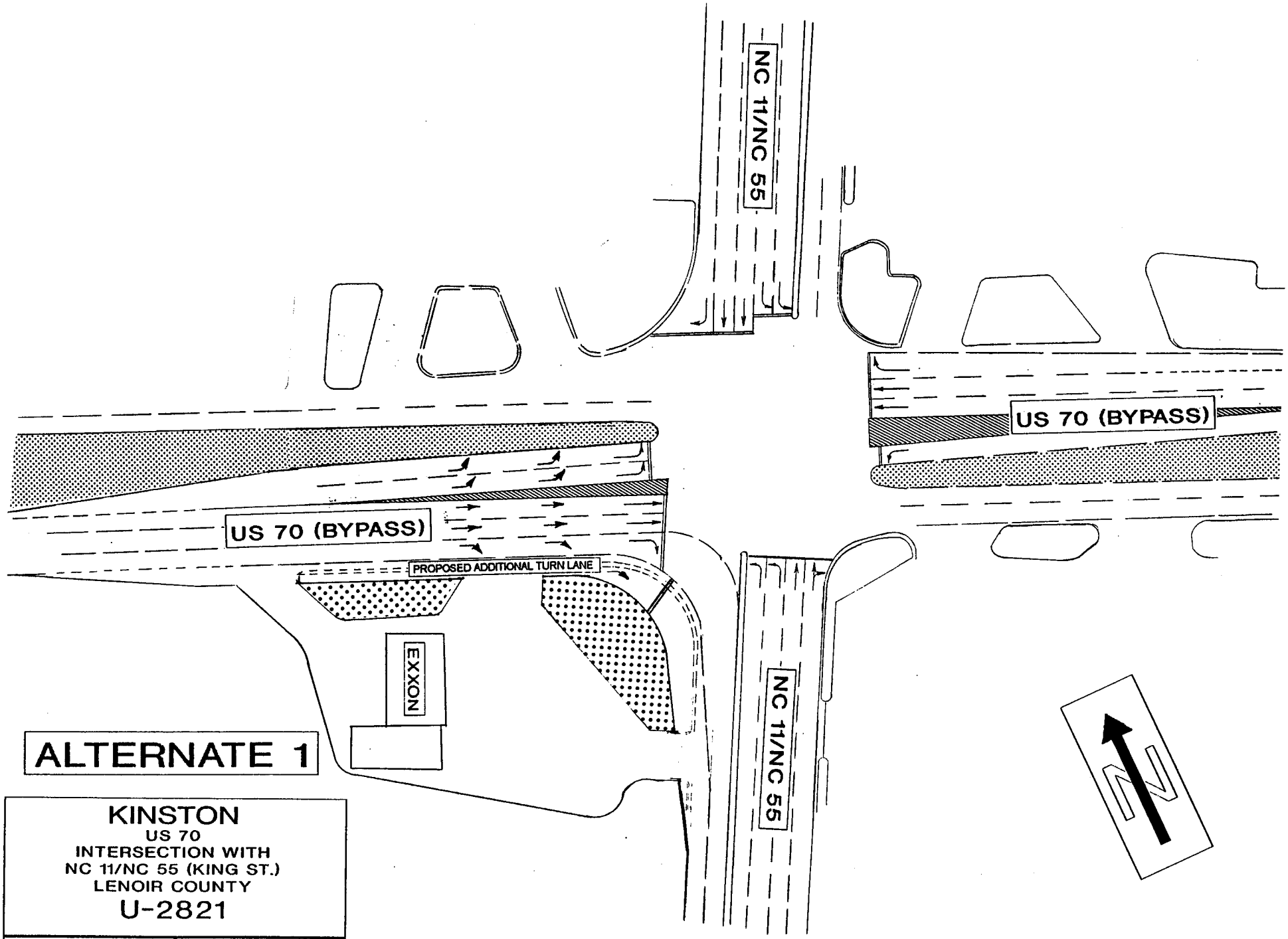
DATE: JULY 1992	FIGURE 1



KINSTON
US 70
INTERSECTION WITH
US 258 SOUTH (QUEEN ST.)
LENOIR COUNTY
U-2821

DATE: JULY 1992	FIGURE 2

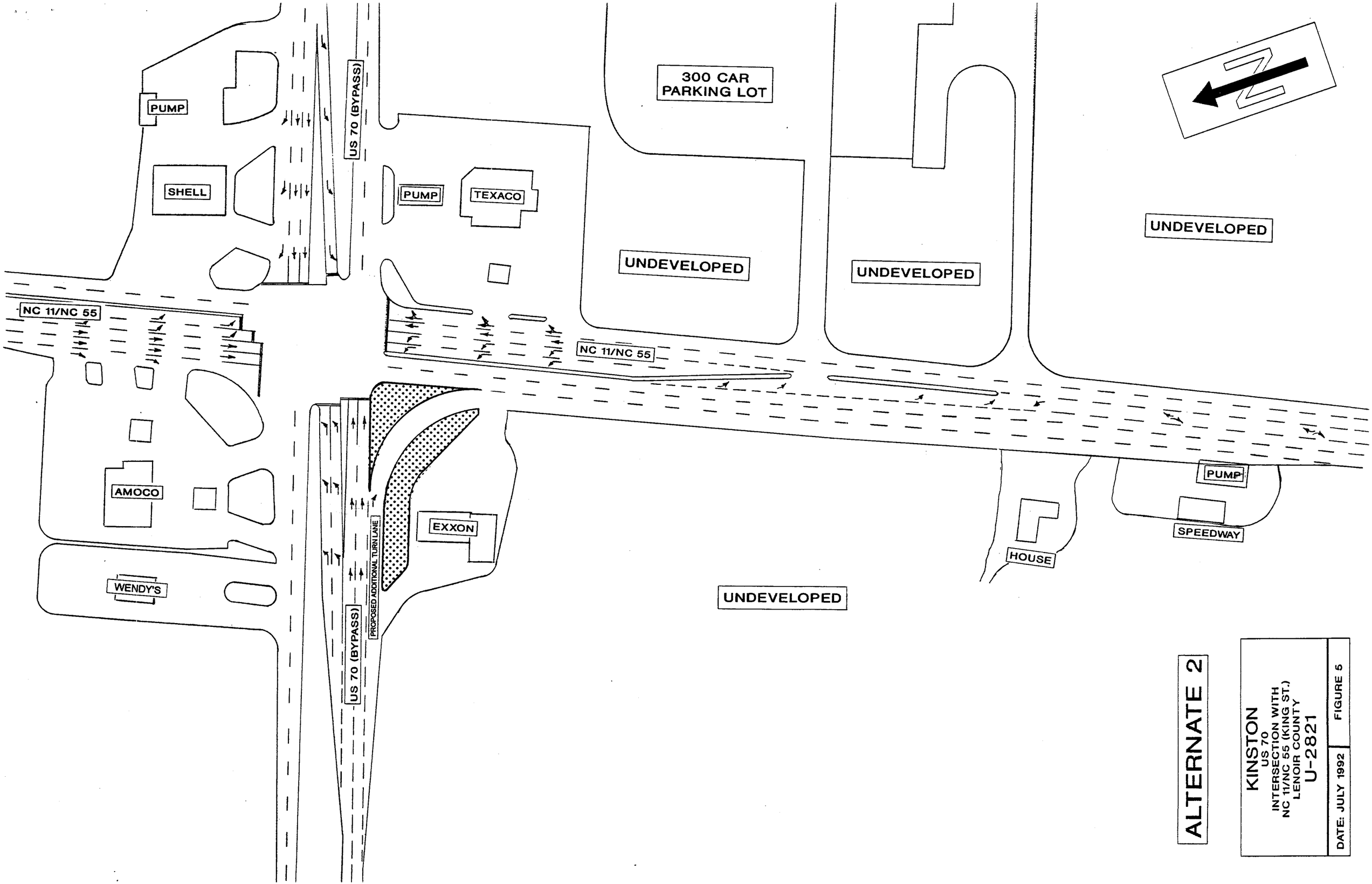

NC 11/NC 55
WENDY'S
AMOCO
SHELL
PUMP
317
882
639
US 70 (BYPASS)
898
US 70 (BYPASS)
615
EXXON
PUMP
TEXACO
NC 11/NC 55
CRITICAL TRAFFIC MOVEMENTS AT THE PEAK HOUR
(VEHICLES PER HOUR)
EXISTING
KINSTON
US 70
INTERSECTION WITH
NC 11/NC 55 (KING ST.)
LENOIR COUNTY
U-2821
DATE: JULY 1992
FIGURE 3



ALTERNATE 1

KINSTON
US 70
INTERSECTION WITH
NC 11/NC 55 (KING ST.)
LENOIR COUNTY
U-2821

DATE: JULY 1992	FIGURE 4



ALTERNATE 2

KINSTON
US 70
INTERSECTION WITH
NC 11/NC 55 (KING ST.)
LENOIR COUNTY
U-2821

DATE: JULY 1992

FIGURE 5