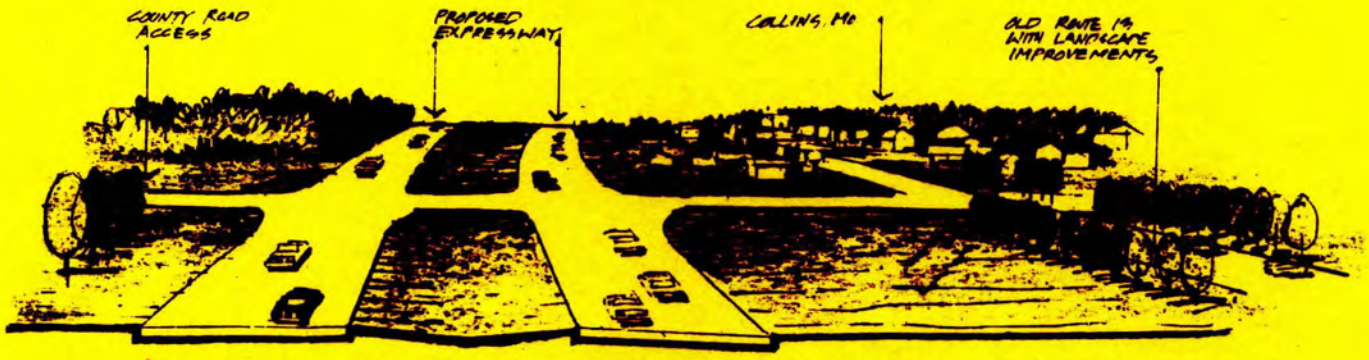
MoDOT

HC
107
.M8
R68
1993

llins Route 13

LOCATION STUDY



March, 1993

CENTENNIAL ENGINEERING, INC.

A MORRISON KNUDSEN COMPANY

Property of
MoDOT TRANSPORTATION LIBRARY

TABLE OF CONTENTS - VOLUME I

I. INTRODUCTION 1
Study Purpose and Location 1
History of the Project 1
Need for the Project 4
Project Process and Schedule 5

II. EXISTING SOCIAL, ECONOMIC AND ENVIRONMENTAL FACTORS . . 7
Introduction 7
Economic Conditions 7
Land Use/Prime Farmland 11
Paleontological, Historical, & Archaeological Resources 11
Noise 13
Hazardous Waste Sites 14
Threatened and Endangered Species 16
Floodplain, Drainage, Wetland, and Water Quality 16
Geologic and Soils Investigations 18

III. HIGHWAY SYSTEMS 19
Introductions 19
Highway Access 19
Highway Design Features 20
Highway Traffic 20
Highway Safety 24

IV. PUBLIC INVOLVEMENT 26
Introduction 26
First Public Meeting 26
Second Public Meeting 27
Third Public Meeting 27
Location Public Meeting 28

V. ALIGNMENT ALTERNATIVES AND RECOMMENDED ALIGNMENT . 29
Introduction 29
Initial Alternatives 29
Final Alternatives 36
Cost Estimates 42
Economic Analysis of Alternatives 42
Environmental Analysis of Alternatives 47
Conclusions 54
Recommended Alternative 56
Conceptual Plans and Profiles 59

LIST OF FIGURES

Figure 1-1 Study Location 2
Figure 1-2 Study Area 3
Figure 2-1 100-Year Floodplain 17
Figure 3-1 Typical Roadway Section 21
Figure 3-2 Historical Traffic 22
Figure 3-3 Seasonal Traffic 22
Figure 3-4 Traffic Variation by Day 23
Figure 3-5 Traffic Variation by Hour 23
Figure 5-1 Alternative A-1 30
Figure 5-2 Alternative A-2 32
Figure 5-3 Alternative A-3 33
Figure 5-4 Alternative A-4 34
Figure 5-5 Alternative B-1 35
Figure 5-6 Alternative B-2 37
Figure 5-7 Alternative C-1 38
Figure 5-8 Alternative A-5 39
Figure 5-9 Alternative B-3 41
Figure 5-10 Noise Impacts (No Build) 50
Figure 5-11 Floodplain Impacts 53

LIST OF TABLES

Table 2-1 Demographic Characteristics of the Collins Area 9
Table 2-2 Economic Characteristics of the Collins Area 10
Table 2-3 Noise Abatement Criteria 14
Table 3-1 Three Year Accident History 25
Table 5-1 Estimated Construction Cost Alternative A-5 43
Table 5-2 Estimated Construction Cost Alternative B-3 43
Table 5-3 Estimated Construction Cost Alternative C-1 43
Table 5-4 Estimated Right-of-Way Acquisitions/Land Use 48
Table 5-5 Comparison of Alternatives 58

VOLUME II

(Available at Missouri Highway and Transportation offices in Joplin and Jefferson City, St. Clair County Library, and Collins Fire Department.)

Economic Analysis
Phase 1 Environmental Audit Report
Geotechnical Investigations Report
Hydrology Report
Noise Impacts Report
Public Hearing Transcript (01/21/93) and Comments
Response to Public Hearing Comments

I. INTRODUCTION

Study Purpose and Location

State Route 13 is part of the major thoroughfare between Kansas City and Springfield, Missouri. The Missouri Highway and Transportation Department (MHTD) is in the process of improving this roadway between these two major cities. This report is concerned with expressway improvements of Route 13 and an interchange at U.S. 54 at the town of Collins, located 48 miles north of Springfield (see Figure 1-1). The total length of the section of roadway studied for this report is approximately three miles and includes a connection with U.S. Route 54, a major east-west roadway (see Figure 1-2, Study Area).

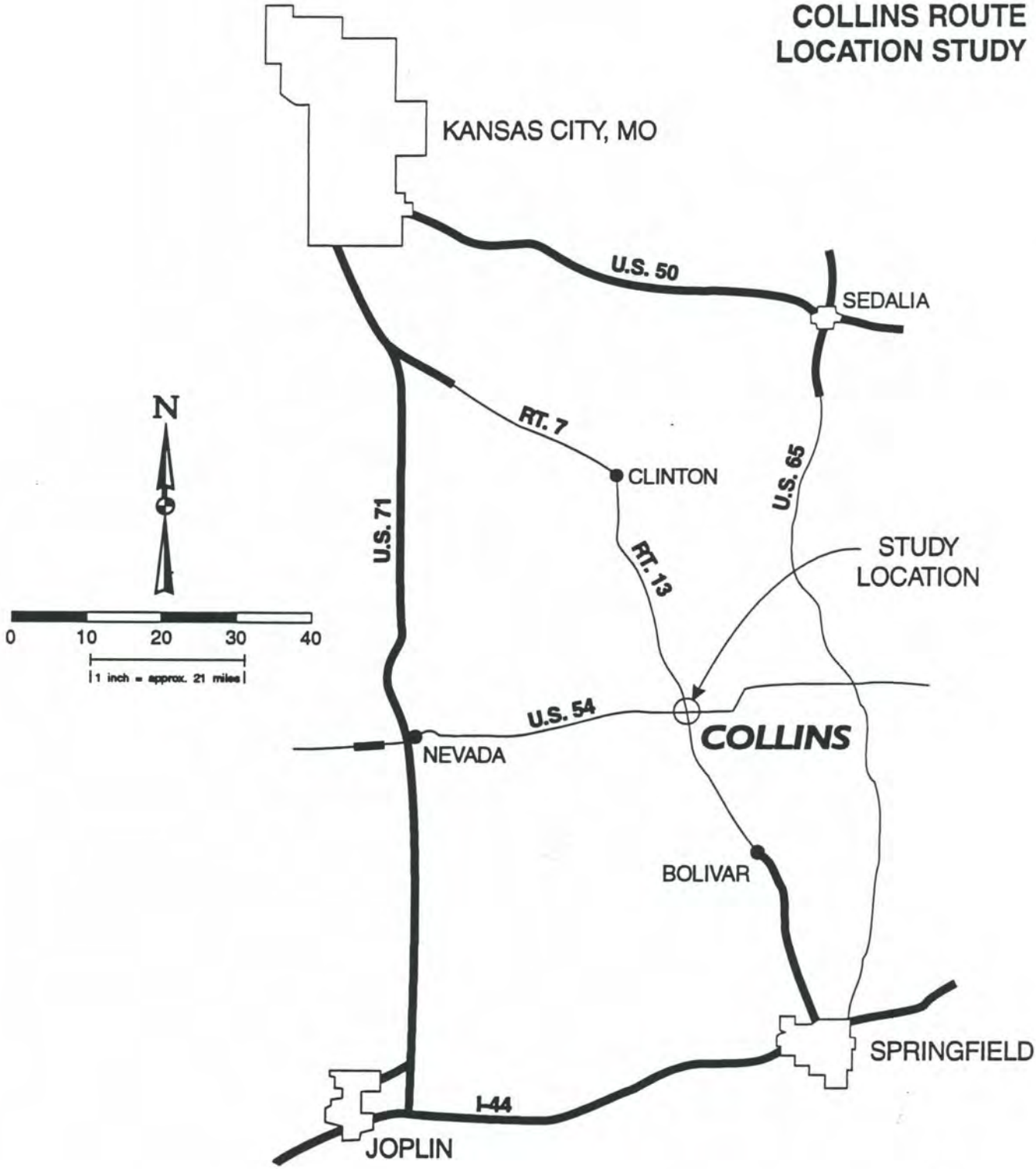
History of the Project

Because of increasing public demand for improved roadways and transportation services, Route 13 has been proposed for widening improvements for almost 20 years. In 1974, widening was considered as part of a route feasibility study for a corridor from Kansas City to Brunswick, Georgia, passing through Springfield, Missouri. This was one of ten routes nationwide designated for this feasibility study as defined in the Federal Aid Highway Act of 1973.

In 1987, Proposition A provided for funding of Route 13 improvements. The entire route from Clinton to U.S. 54 was included as an expressway type facility. Also, Route 7 from Clinton northwest towards Kansas City was included as an expressway type facility. Route 13 from Bolivar south to I-44 in Springfield had previously been constructed as an expressway type facility.

On April 1, 1992, the first stage of a new 6 cent gas tax went into effect along with increased Federal Funds, funding the 15 Year Road and Bridge Program. This program includes improving all remaining sections of Route 13 from Clinton to Springfield. For the section from U.S. 54 to Bolivar, this program involves upgrading to an expressway in conjunction with a freeway right-of-way. Other sections of Route 13 including the section from Bolivar to I-44 in Springfield are to be upgraded to freeway status.

The major difference between a freeway facility and an expressway facility is local access. A freeway type facility allows local access only at interchanges (grade separated with controlled ramps), such as are used along interstate highways. An expressway type facility includes interchanges at major highways but allows limited access at most county roads, major city streets, or other significant access points. Both types of facilities are designed for the through movement of people and goods in a safe and efficient manner.



LEGEND

4-LANE ROADWAYS

MAJOR 2-LANE ROADWAYS

FIGURE 1-1
STUDY LOCATION

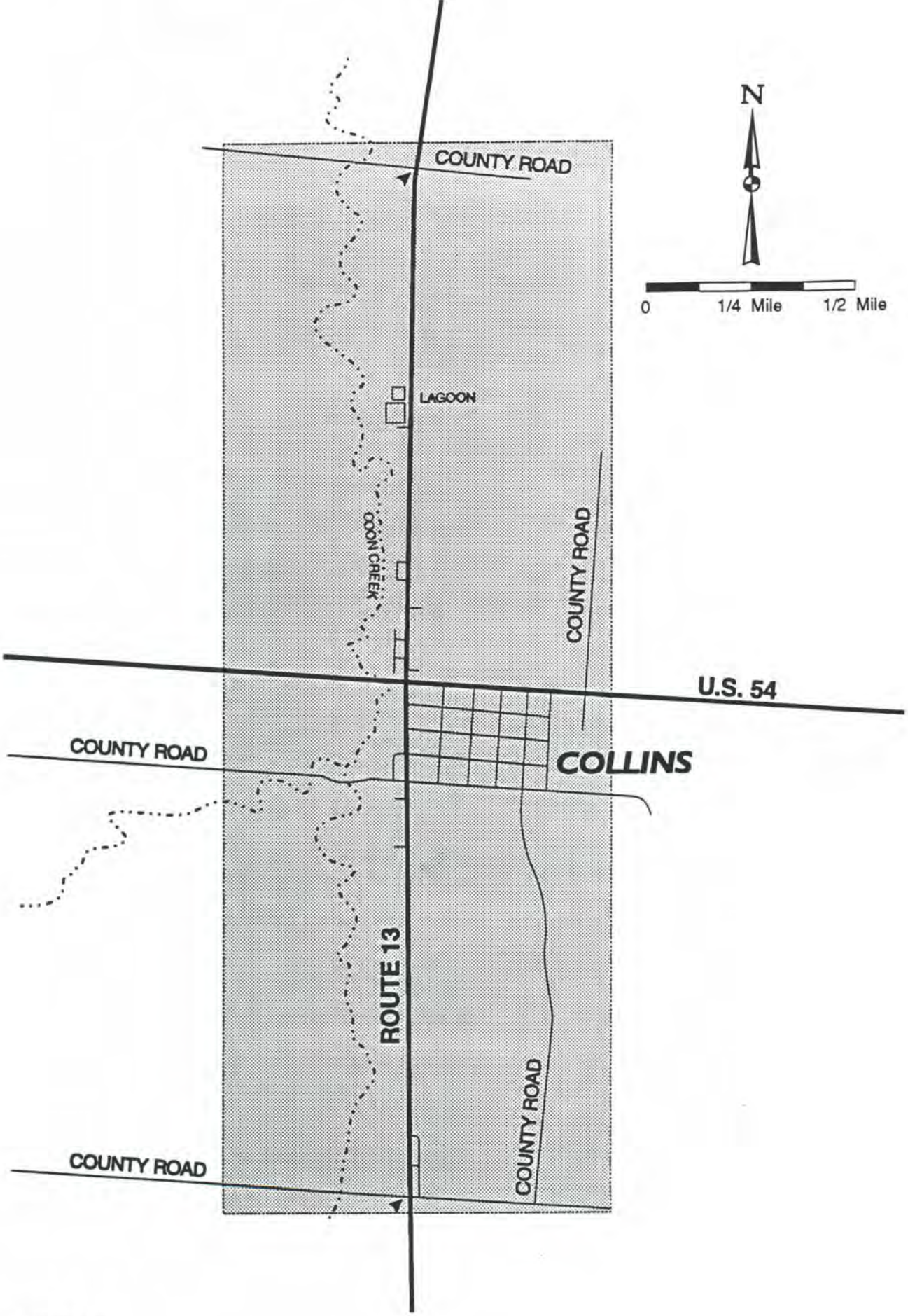


FIGURE 1-2
STUDY AREA

Safety is a primary consideration when designing these types of roadways. A freeway is safer than an expressway because of fewer points of conflict. A freeway also has a greater vehicle carrying capacity because it has fewer access points than an expressway.

The section of Route 13 discussed in this report will be built as an expressway. Both the Proposition A project list and the 15 Year Road and Bridge Program list show this as a four-lane expressway design. In 1991, MHTD prepared a reconnaissance report for an expressway design on Route 13 for St. Clair County. This Route 13 Reconnaissance Report included an interchange at U.S. 54. On September 6, 1991, the Missouri Highway and Transportation Commission gave *tentative* location approval of the "red line" alternate as recommended by the Reconnaissance Report. The "red line" included a new alignment of a section of Route 13 that bypassed Collins approximately 1,500 feet west of town. Concern about the effects this new alignment would have on the town of Collins was raised following the completion of the St. Clair County Reconnaissance Report. To address and study this concern, MHTD hired Centennial Engineering, Inc. to conduct the study documented in this report.

Centennial subcontracted parts of the study to other firms specializing in certain work tasks. Hood Rich, Inc. was hired to prepare ownership and right-of-way maps, identify utilities, and estimate right-of-way costs. Midwest Research Institute was retained to prepare an economic study of roadway alternatives. Southwest Missouri State University Department of Archeological Research was selected to do a paleontological, historical, and archeological resources environmental study. Palmerton and Parrish, Inc. was hired to perform geological and hazardous waste investigations.

Need for the Project

A safe and efficient highway system provides the backbone of commerce and industry in the United States. Social benefits accruing to the public, both as users and nonusers, include such effects as improved accessibility and freedom of choice, reduced congestion leading to less irritability and stress, and better health and safety. Other social benefits are reflected in improved interaction and communication, which serve to strengthen community values, to increase social contacts, and to improve the effectiveness of comprehensive land use planning. Highways are beneficial on population distribution and change, as reflected by age, race, and socioeconomic status. Highways have a noticeable impact on public and private community services and strongly affect settlement patterns.

Nationwide, economic benefits realized from highway improvements are reflected most strongly in economic growth and development, which are stimulated through improved accessibility (reduced travel time and operating costs), more employment and income, and economies of scale. They contribute to functional interdependence among cities, between cities and rural areas, and among regions. Many of these direct benefits are transferred to highway nonusers in the form of increased land values. Local economies may or may not realize these economic

advantages depending on land use access and other factors. This is discussed in more detail in Chapter V of this report.

Other direct economic benefits include reduction of accidents, injuries, and fatalities and their associated costs. Studies have repeatedly shown that the traffic accident rate is lower on modern expressways and freeways as compared to uncontrolled access highways. The separation of opposing traffic lanes, the ability to handle large volumes of traffic at higher speeds, the elimination of major intersections and stops, and the control of access have all contributed to this achievement. Operations effects of highways are exhibited in the form of reduced congestion and energy savings as well as improved efficiency in all kinds of public services.

Kansas City and Springfield are the first and third largest metropolitan areas in Missouri. An improved highway link between these two major cities is important to economic development, increased productivity, and improved accessibility for the State of Missouri. As the Missouri Highway and Transportation Department is responsible for addressing these transportation issues in the State of Missouri, they have made this roadway improvement project a priority and have provided for the means of funding it. Not to address this significant link would be detrimental to the economic climate of the State and to the public in general.

Traffic increases on Route 13 are expected to continue to grow. Existing conditions on Route 13 often cause long queues (or backups) where passing becomes limited due to high volumes of opposing traffic. Attempts to pass are considerably more dangerous due to the high volumes of opposing traffic. As traffic increases, average speeds will become slower as congestion increases. The high percentage of trucks on Route 13 (20% estimatd by MHTD) emphasizes the need for a facility designed for longer distance travel and for more room to pass and minimize potential head-on accidents.

An important component of this project is to address the concerns of the local community of Collins. Unfortunately, large projects which are good for society are not necessarily good for some individuals or groups. However, careful planning, communication, and coordination can minimize unwanted effects as much as possible. The purpose of Centennial's work is to minimize the effects to the community by exploring various alignment alternatives, freely discussing them with the local citizens, improving the alternatives with local input, and recommending an alignment alternative which addresses the need for the project while minimizing the impacts.

Project Process and Schedule

The construction of a major highway project requires a lot of thought, coordination, and time. Many steps are required in this thorough and extensive process. Highway projects are usually documented in extensive system-wide planning studies or identified through significant need. Based on preliminary studies, funding availability, reviews, and approvals, reconnaissance studies are

often prepared. Depending on the scope of the project, environmental documentation may be required. Following this study and formal approval of the route location, remaining efforts include final environmental studies, preliminary design, final design, right-of-way acquisition, relocation assistance, advertising and award of contract, and construction. All of these tasks will involve extensive coordination and require numerous approvals.

The Collins Route Location Study consists of defining initial roadway alignment alternatives and preparing preliminary environmental studies and cost estimates, then refining the alternatives and documenting the results in this route location report. The process includes extensive coordination in defining the selected alternatives with the public, as well as public officials and affected agencies. The roadway alignment alternatives must meet the design standards for a 4-lane divided expressway with an interchange at U.S. 54.

The project began with a public kickoff meeting on July 23, 1992 in Collins. This initiated the public involvement program, as well as the data collection and inventory stage. Following the kickoff meeting and the data collection and inventory stage, alignment alternative studies involving technical studies, environmental studies, and public input were begun. In coordinating input from the public, MHTD, affected agencies, and technical requirements, the initial alternatives were refined and screened. Following preliminary investigations, six alternatives were considered. Three were eliminated after the second public meeting leaving three for comparison for final review and anlayses. The alternative recommendation documented in this report is the result of all the coordination and technical studies conducted to date.

II. EXISTING SOCIAL, ECONOMIC AND ENVIRONMENTAL FACTORS

Introduction

Collins begin as a part of Washington, one of the original townships formed when the county was organized in 1841. It remained a part of that township until 1872 when it became Collins in honor of Judge William Collins of the county court. Collins was founded as a railroad facility, and by 1899 it had a population of 650 and continued to grow for several years. The region in general has not thrived since the Depression. Railroads are no longer important although the creation of Truman reservoir has maintained tourism. The city of Collins provides services along U.S. Route 54 and State Route 13, while the area around it depends on cattle raising and farming.

Improvements to Route 13 will affect some social, economic and environmental aspects of the Collins area. The remainder of this chapter describes the existing environmental, economic, and social conditions of the community and the surrounding area. The following factors were evaluated to determine affects on local conditions:

- Economic Conditions
- Land Use/Prime Farmland
- Paleontological, Historical, & Archaeological Resources.
- Noise
- Hazardous Waste Sites
- Threatened and Endangered Species
- Floodplain, Drainage, Wetland and Water Quality
- Geological and Soils Investigations

Economic Conditions

An economic study of the project and the Collins area has been prepared (Collins Route 13 Location Study Economic Study, December 1992, Midwest Research Institute MRI). This report can be reviewed at MHTD in Joplin or Jefferson City, or at the St. Clair Library in Osceola or the Collins Fire Department. The following section is condensed from the MRI report of the existing economic conditions.

Collins, Missouri in 1992 is a small city with a population of 134 located in the southeast corner of St. Clair County which has a population of 8,500. The economy of the Collins area is driven by retirement income, other transfer payments, and income from service industry employment. Approximately 57 percent of personal income is derived from investment income (interest, dividends, and rent) and transfer payments (primarily Social Security) in St. Clair County. The high average age of the people in the county is indicative of an economy dependent on these forms of retirement income. Manufacturing and agriculture employment and income are important basic industries, but generate

very little of the area's income. In Collins, significant income is generated by tourism/travel related businesses that serve visitors to the area and travelers along Route 13 and U.S. 54--primarily income generated by eating and drinking establishments, food stores (including convenience stores), and gasoline sales.

Table 2-1 provides a brief demographic overview of the area. In general, St. Clair County is characterized by low population density dispersed in small to medium sized rural communities. Collins is one of the smaller communities in the area, although there are smaller communities (populations of 25 to 100) located off the major highways. The high average age indicates the area has the same problem of retaining young people that many rural areas experience. Population growth in nearby counties varies, with Benton, Cedar, Henry, Hickory, and Polk counties experiencing population growth during the 1980-91 time period ranging from 1 to 20 percent. Bates, St. Clair, and Vernon counties have experienced population declines during the same time period ranging from 1.4 to 4.9 percent. Effective buying income (EBI) per capita is $10,199 which is only 74 percent of the statewide per capita EBI of $13,825.

Much of the immediate Collin's economy is particularly dependent on highway travelers for income. There are five restaurants in or near the community located on the Route 13 corridor.[1] In addition, there are six gasoline filing stations, four antique shops, one grocery, and one automotive parts store in Collins. All of these businesses report significant sales from highway travelers with the restaurants and antique shops reporting 90 percent of sales from highway travelers, the auto parts store reporting 60 percent of sales from travelers, the fuel stations reporting 60 percent of sales from travelers, and the grocery reporting 20 percent of sales from travelers.

Businesses in Collins were interviewed in September 1992 and indicated visibility and access from Route 13 were important. Most businesses indicated that sales would decline by as much as 50 percent if visibility and access were diminished by highway improvements. None of the businesses indicated they could sustain such a loss of sales and still remain in business. Although local customers are an important source of sales, it is travelers that provide the profit margins necessary to remain in business.

Table 2-2 gives a general overview of the area's economic base divided into agriculture, manufacturing, and service industries. Agriculture is an important basic industry for the region, but very little of the activity is reliant on extensive transportation infrastructure. It therefore would benefit only marginally by improved highways. Manufacturing is very sparse and is concentrated in communities with excellent to fair highway infrastructure, the principal communities being Bolivar (Polk County), Clinton (Henry County), and Nevada (Vernon County).

[1] The restaurants are: Smith's, Peggy's, Valley Farm, Howard B, and Bryants.

TABLE 2-1. Demographic Characteristics of the Collins Area

1991 DATA

Counties	Population	Median Age	Effective Buying Income Per Capita[a]	Population Density[b]
Bates	15,100			
Male	7,286	36.4	$10,280	18
Female	7,814	40.1		
Benton	14,100			
Male	6,901	43.3	$10,125	20
Female	7,199	46.3		
Cedar	12,100			
Male	5,724	40.7	$9,825	25
Female	6,376	44.7		
Henry	20,100			
Male	9,621	36.5	$11,020	29
Female	10,479	41.1		
Hickory	7,400			
Male	3,628	49.7	$9,420	19
Female	3,772	50.5		
Polk	22,400			
Male	10,942	32.3	$9,615	35
Female	11,458	35.7		
St. Clair	8,500			
Male	4,067	40.3	$10,355	13
Female	4,433	44.6		
Vernon	18,900			
Male	8,903	34.9	$10,475	23
Female	9,997	37.4		
TOTALS	118,600			
Average For Area	57,072	39.3[c]	$10,200	23[d]
Male	60,434	42.6[c]		
Female				

SOURCE: Demographics USA 1992, Sales & Marketing Management Magazine: New York, 1992.

a Effective Buying Income is income after taxes and required fees; represents income potentially available consumer expenditure.

b Population density is measured in persons per square mile.

c Arithmetic mean of the ages for the eight counties.

d Arithmetic mean of the population densities for the eight counties.

TABLE 2-2. Economic Characteristics of the Collins Area

1989 DATA

Counties	Employment	Income ($)
Bates		
Agriculture[a]	1,294	3,750,000
Manufacturing	364	4,741,000
Services	1,755	20,254,000
Benton		
Agriculture[a]	885	3,283,000
Manufacturing	357	4,662,000
Services	1220	12,631,000
Cedar		
Agriculture[a]	910	3,585,000
Manufacturing	716	9,901,000
Services	1,202	12,931,000
Henry		
Agriculture[a]	1,005	3,023,000
Manufacturing	1,469	15,251,000
Services	3,475	45,950,000
Hickory		
Agriculture[a]	587	1,723,000
Manufacturing	91	1,023,000
Services	392	3,216,000
Polk		
Agriculture[a]	1,613	6,035,000
Manufacturing	872	9,464,000
Services	2,817	36,294,000
St. Clair[a]		
Agriculture	782	3,184,000
Manufacturing	73	541,000
Services	914	8,104,000
Vernon[a]		
Agriculture	1,251	3,082,000
Manufacturing	1,285	27,298,000
Services	3,141	42,736,000

SOURCE: County Business Patterns 1989, U.S. Dept. of Commerce, Bureau of the Census:Washington, D.C., 1991.

a Number of employees for agriculture is estimated from the number of farms in the county in 1987; does not include employees with agricultural service businesses such as grain elevators. Agriculture income data is 1984 data.

Service industries are the largest source of employment and earned income.[2] This reflects the strength in retail trade due to travelers and tourists (at area lakes) and the strength of health care due to the high median age of the area's population.

The area's economic base will benefit from continued improvement in the highway infrastructure. However, most of the benefits will be to the larger communities that have a manufacturing and agricultural services base. Smaller communities that are unable to capture income from travelers or unable to encourage retirement development will probably experience continuing population decline.

Land Use/Prime Farmland

The area around of Collins is mainly composed of cultivated hay fields and pasture. Light forest exists mainly along parts of Coon Creek and field edges. A cedar glade exists just north of town on a thin-soiled hill side that has been modified by past agriculture and bulldozing. Business in Collins is service oriented along Route 13 with several restaurants, service stations, and antique shops. The residential area is mainly east of Route 13 behind the commercial establishments. Much of the area around Collins depends on cattle raising.

Information from the Soil Conservation Service indicates that the majority of land in the Collins area could be classified as prime farmland. While much of this land is being used for farming purposes, the area along Coon Creek is mostly timbered. Several other fields are used for pasture only.

Paleontological, Historical, & Archaeological Resources

The Southwest Missouri State University Center for Archaeological Research conducted a paleontological, historical, and archeological resource study for this project (An Intensive Cultural Resources Survey of Proposed Highway Relocation Routes at Collins, St. Clair County, Missouri, 1992). The following is a background of existing conditions in the area.

During the period from 3000 to 1100 years before present (B.P.), Woodland tradition societies lived in small hamlets and practiced horticulture in the vicinity of Collins. Woodland settlements often were located on terraces of small streams and rivers. Burials often were in mounds on nearby bluffs. During the Mississippian period (1100 to 300 years B.P.), people of four separate cultural traditions occupied parts of what is now Missouri. Three of these traditions–Mississippian, Oneota, and Caddoan–are represented in the area by artifacts at small open sites, burial mounds, and rock shelters. Typically, Mississippian period sites range from small extractive locations to large villages, though the latter is lacking from the Osage River Basin (Collins area).

[2] Earned income is distinguished from investment income and transfer payment income. It represents income from wages. The largest source of income for the area is investment and transfer payment income.

No population lived in the region during the late 1600's, though almost certainly protohistoric peoples passed through the region as they traveled along the Osage River or along the divide between the Pomme de Terre and Sac rivers. By 1700, the Osage tribe was established on the upper Osage River in modern-day Vernon County. During the 1700's, bands of Osage hunters and European traders continued to pass though.

After 1794, portions of the Osage began to resettle in modern-day Kansas and Oklahoma. The last Osage village within Missouri was abandoned in 1823; treaties in 1808 and 1825 extinguished Osage claim to the area, though small bands returned to hunt and fish until the 1840's. By 1820, Shawnee, Delaware, and Kickapoo Indians had moved into southwestern Missouri, but their occupation was limited. Most lived in a string of settlements along the James and White Rivers, but some camps may have been along the Osage River. The first Anglo-Americans, often-moving hunters and traders, closely followed. After 1830, the remaining refugee Native Americans were forced out, and permanent Anglo-American settlers slowly trickled into the area and spread. The first known in what would become St. Clair County, Jacob Coonce, built a cabin in 1831 or 1832.

As part of this study, an intensive cultural resources survey was completed on areas that will be potentially impacted by relocations of Route 13. A literature review and records check with the Archaeological Survey of Missouri and cultural resource files, Mark Twain National Forest revealed that two sites are known to be close to the project area. However, neither of these two sites is impacted by any of the alternative alignments.

Systematic shovel testing at 25-meter intervals and visual survey resulted in eight isolated finds, of which three were prehistoric and several were abandoned buildings. None of these are eligible for nomination to the National Register of Historic Places. Additionally, one small historic site located on a low terrace of an intermittent stream was the location of a brick kiln. Its eligibility for nomination to the National Register of Historic Places is indeterminate.

A series of low, earthen mounds west of Coon Creek along the original state alignment that had received media attention were carefully examined with concerned citizens present. Nothing of significance was found. These mounds had long been considered as being of cultural origin by area people. These mounds are not unique to the area. Several isolated mounds occur along Coon Creek and another dozen or so are in a field to the north. Since the extent of the mounds halts along field/property lines, almost certainly many other mounds existed at one time, only to be leveled by farming. The only preserved features are those that appear in hay fields, pastures, and light forest, zones that would have little or no plowing.

The mounds are dissimilar to regional burial facilities in their shape, construction, composition, setting, and lack of associated artifacts. All evidence indicates that these mounds are of natural, not cultural, origin. Similar mounds occur throughout southern Missouri, the southern plains, the Great Basin, and the Pacific Northwest. Popularly called blister mounds, prairie blisters, and pimple mounds after their typical hemispheric profile, scientists properly call them Mima mounds after the Mima Plains in Washington,

which contains thousands of them. They typically occur in former grassland environments and overlie a layer of bedrock or hard soil. Although Mima mounds are of definite natural origins, scientists still debate about possible causes: seismic waves, differential deposition of sediments due to vegetation, differential erosion, periglacial processes, and even mammal burrowing (Berg 1990, Cox 1984, Knechtel 1952, Olmsted 1963, Scheffer 1947). No cultural remains are definitely associated with these mounds.

Noise

A noise study was performed to assess the noise level impacts of the Route 13 widening project through Collins, Missouri. This study included the following tasks:

- Definition of noise abatement criteria and identification of noise sensitive land uses.
- Analysis of existing noise.
- Prediction of future noise levels.
- Discussion of results.

Guidelines defining noise abatement criteria have been established by the Federal Highway Administration (FHWA) for the upper limits of acceptable traffic noise levels for various groups of activities (see Table 2-3). These levels represent a balance between what may be a desirable noise level and an achievable noise level, as measured in hourly equivalent sound level Leq(h). The Leg(h) is the is hourly noise level measured in dB(A) which represents the average of noise level fluctuations over the hour. The criteria levels of 67 dB(A) for residences and hotels/motels and 72dB(A) for commercial businesses are used for the Collins study area. It is noted here that a noise level increase of 10 dB(A) is perceived by most people as doubling the noise level.

The prediction of noise is done using the FHWA's most current computerized noise prediction model, STAMINA 2.0. The program evaluates the noise energy produced by traffic in a segment of roadway based on the volume, speed, and type of vehicles using that roadway. The noise impacts can be assessed for receivers at different locations and elevations. Noise reductions provided by barriers between the roadway and the receivers can also be evaluated.

The STAMINA 2.0 program was used to create a model of the existing traffic noise conditions. The traffic volumes used were based on peak hour volumes for 1992. No receivers within the study area which were evaluated exceeded the criteria (67dB(A), residences; 72dB(A) businesses) as established by the Federal Highway Administration.

TABLE 2-3

Noise Abatement Criteria
(Hourly A-Weighted Sound Level - Decibels (dB(A))

Activity Category	Acceptable Levels	Description of Activity Category
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significants and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Picnic areas, recreation areas, playground, active sports, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (exterior)	Developed lands, properties or activities not included in Categories A or B above.
D	N/A	Undeveloped lands.
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: Federal Register, Volume 47, No. 131, July 8, 1982, Rules and Regulations.

Hazardous Waste Sites

Palmerton and Parrish, Inc. conducted a study to identify potential relocations of hazardous materials in the project area (Phase 1 Environmental Audit for Route 13 Location Study, Collins, Missouri, November 24, 1992). This report can be reviewed at MHTD in Joplin or Jefferson City, and at the St. Clair County Library in Osceola or the Collins Fire Department. Almost all of the commercial development in Collins is along Route 13. There are several facilities located in the study area which could contain hazardous wastes sites. This section identified those sources.

1. **Empire District Electric Company** operates an electrical substation near the southern end of Collins on the west side of Route 13. It is possible that this site contains PCP oils.

2. **Missouri Highway and Transportation Department** operates a maintenance facility immediately north of the electrical substation. Fuel tanks related to this site include a 1,000 gallon gasoline tank removed in 1991, a 560 gallon kerosine

tank closed in 1978, a 560 gallon diesel tank closed in 1989, and a 1,000 gallon above ground gasoline tank installed in 1985.

3. **Valley Farms Mini Mart** is a service station facility located north of the MHTD maintenance facility. Three large above ground storage tanks are located in a concrete spill containment dike and two large tanks have no spill containment dike. A small above ground storage tank, possibly used for storage of waste oil, is also located at this facility and has no spill containment dike. Four other large tanks were previously located on the site.

4. **Harris's Gas and Crafts** is a service station facility located on the east side of Route 13. There are two above ground fuel storage tanks at this facility, enclosed by a concrete spill containment dike.

5. **Mike's 66 Service** is a service station facility located in the southeast corner of the intersection of U.S 54 and Route 13. Fuel storage at this facility is by three above ground storage tanks and three underground storage tanks. Two of the above ground storage tanks are for the storage of diesel and the third is for the storage of gasoline. These do not have a spill containment dike and do not meet current EPA criteria.

6. An abandoned service station is located on the south side of U.S 54 approximately 250 feet west of Route 13. This former service station was reportedly abandoned when improvements were made to U.S. 54 approximately 30 years ago. No hazardous materials were observed in this area and it is not known how fuel was stored at this facility or if the tanks have been removed.

7. **Smitty's Conoco** is a service station facility located on the west side of Route 13 north of U.S. 54. This facility has four above ground fuel storage tanks. A concrete spill containment dike has been constructed around all four tanks but there is no bottom.

8. **Country Trader Antiques** is a retail sales facility located on the east side of Route 13 north of U.S. 54. The only hazardous waste concern observed at this facility was the presence of approximately 100 Fifty Five (55) gallon drums. It is not known if these drums were cleaned on site or brought to the site already cleaned.

9. **Bubba's Liquor and Mini-Mart** is a service station facility located on the west side of Route 13 near the north end of Collins. Fuel storage is provided by four above ground tanks and spill containment is provided by a soil dike.

10. **City of Collins Waste Stabilization Pond**. The City's wastewater collection and treatment system was constructed in the late 1980's. According to the Missouri Department of Natural Resources (MDNR) personnel, the City has had some difficulty meeting the discharge requirements of their National Pollutant Discharge Elimination System (NPDES) permit.

Additional hazardous waste concerns in the study area include household waste dumping and the high volume of truck traffic in the area. Household waste dumping and burning of household wastes was observed behind several businesses and residences in the site area. However, once removed, most of these wastes would not effect the ground.

There is a considerable amount of truck traffic along the existing Route 13 and U.S. 54. Truck parking is provided at several of the service stations and restaurants in the area to attract the business of truck drivers. Although no records of past releases were reported by the Collins Fire Department or State and Federal agencies, there is always the possibility of hydrocarbon and hazardous wastes releases in areas with high volumes of truck traffic.

Many of the buildings in the study area were constructed prior to the ban on asbestos-containing building materials and are likely to contain asbestos. Before considering demolition of any structures, an inspection by a person with specialized training should be performed to determine if special handling is required.

Threatened and Endangered Species

The Missouri Department of Conservation staff examined map and computer files for federal and state threatened and endangered species and determined that no sensitive species or communities are known to occur within the project area. Specific on-site inspection to verify their absence or existence should be conducted before construction of any roadway alignment.

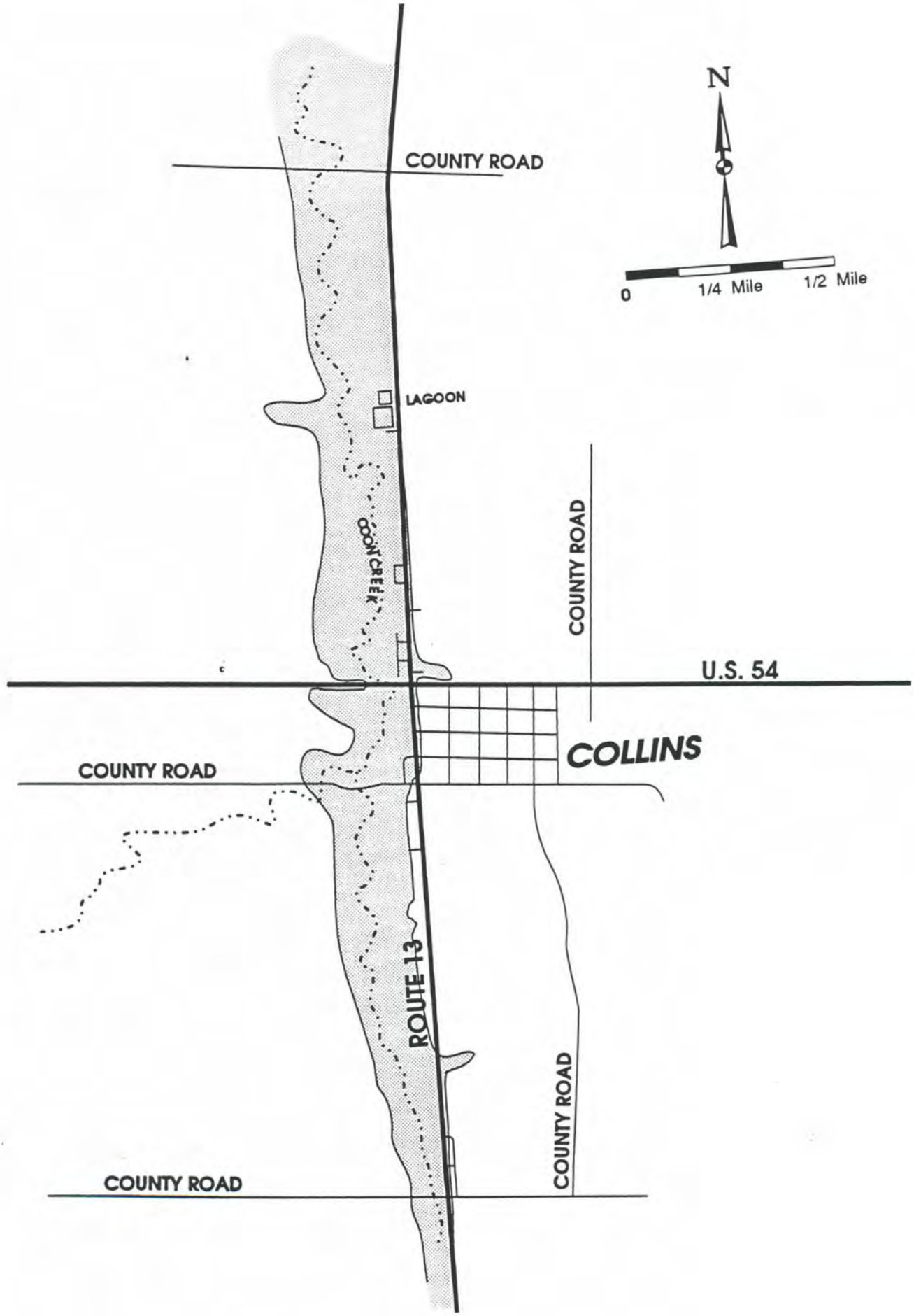
Floodplain, Drainage, Wetland, and Water Quality

Generally, the drainage in and around Collins, Missouri flows east to west toward Coon Creek, which parallels Route 13 on the west approximately 200-400 feet away. Several pipe and concrete box culverts cross Route 13 to convey the runoff to the creek.

The majority of the runoff generated in the project area comes from pasture and woodlands watersheds with the Town of Collins representing about 5% of the total.

No wetlands or soil types indicating possible wetlands have been identified by the Soil Conservation Service or the Army Corps of Engineers within the project area. However, limited wetlands were identified within the Coon Creek Channel during construction of a box culvert on U.S. 54 just west of Collins. Wetlands within the Coon Creek channel are very possible within the project area.

The hydrologic analysis was done for 50- and 100-year average flood frequencies depending on location of the structure and size of the watershed. The approximate average 100-year floodplain is shown in Figure 2-1.



100 YEAR FLOODPLAIN
FIGURE 2-1

Geologic and Soils Investigations

Palmerton and Parrish, Inc. performed a geologic and soils investigation for this project (Geotechnical Investigation for Collins Route 13, Collins, Missouri, November 30, 1992). This report can be reviewed at MHTD in Joplin or Jefferson City, and at the St. Clair County Library in Osceola or the Collins Fire Department. This study includes the identification of any geologic features which may impact location of the alternatives and to characterize the geotechnical or soil conditions along the proposed alignments.

Geologically, the Collins area is located above Pennsylvanian age channel deposits, according to record information which are underlain in turn by Pennsylvanian age shale of the Riverton formation. No significant geologic features such as faults or caves which might impact highway location or design were identified during the literature search or during the field investigations.

Geotechnically, the predominant shallow soil types along the alignments include the Summit Silt Loam, the Hartwell Silt Loam, and Verdigris Silt Loam. Based on existing boring information Shale bedrock was encountered from 11 to 12 feet near the intersection of U.S 54 and Route 13. Shallower rock was generally encountered at higher elevations in other past borings.

The water table in the site area is most prevalent at a depth of 6 feet or greater. Coon Creek in the project area could create difficulty in preparation of subgrade soils and the placement of embankment fills.

III. HIGHWAY SYSTEMS

Introduction

A safe and efficient highway transportation plan requires different roadways that provide for the distinct stages which are involved in making a trip. These stages include higher speed movement of through traffic, collection and distribution of traffic, access to highways, and termination (or the end of trips). Each of the stages of a typical trip is handled by a separate roadway facility designed specifically for its function. Because these distinct stages and roadway facility types are based on the total amount of traffic volume, freeway and expressway travel depends on higher speed traffic movement. Local Streets and minor roads serve the access function with a lower priority to serving traffic movement.

A prominent cause of highway obsolescence is the failure to suitably design each of the different trip stages with appropriate facilities. Many existing problems occur at intersections between public roads and traffic-generating facilities when the roadway facilities are not properly designed.

Highway Access

Control of access is an important consideration in the safe and efficient use of highways. Proper control of access not only improves the safety, operation, convenience, and welfare of the motorist using the highway but can help foster the orderly development of the communities and property abutting the highway.

Route 13 is intended to provide a high degree of mobility and serve longer trips. Therefore, it should provide for higher operating speeds and conditions. Since movement, not access, is the principal function, access management is essential in order to preserve capacity and safety. On an expressway, access is managed so the roadway achieves the movement function yet allows limited access to the facility. At low volume crossings, at grade intersections are allowed when safety and traffic considerations on the expressway are met. Many factors are considered in access management and in the design of at-grade intersections including driving habits, ability to make multiple decisions, driver expectancy, decision and reaction time, vehicle speeds, accident experience, sight distance, speed change lanes, conflict areas, and geometric features.

Major highways such as U.S. 54 are accommodated with grade separated interchanges to provide access to the expressway (Route 13). If capacity, function, and safety needs are met, at-grade intersections can be allowed at lower volume county roads and major city streets. Right-in/right-out access can be, and generally are, allowed at private and commercial driveways and main city streets. However, if safety requirements are not met, these access points cannot be allowed. Such is the case in the vicinity of interchanges. No direct local access can be allowed within the interchange area as many potential conflict areas exist. Within interchange areas, drivers do not expect local access, drivers are faced with more decisions, roadway capacities are lower and many vehicles

are accelerating and decelerating in speed change lanes. This condition particularly affects the area near U.S. 54 including much of Collins.

Highway Design Features

The standards set forth by the Missouri Highway and Transportation Department (MHTD) Roadway Design Manual require this four-lane divided expressway to maintain a 60′ median (including 6-foot inside shoulders) at all access points with two 12-foot travel lanes and shoulders in both directions. A typical section is shown in Figure 3-1. Drainage ditches are required in some areas, where the ditch centerline is located in a minimum of 26 feet from the outside travel lanes.

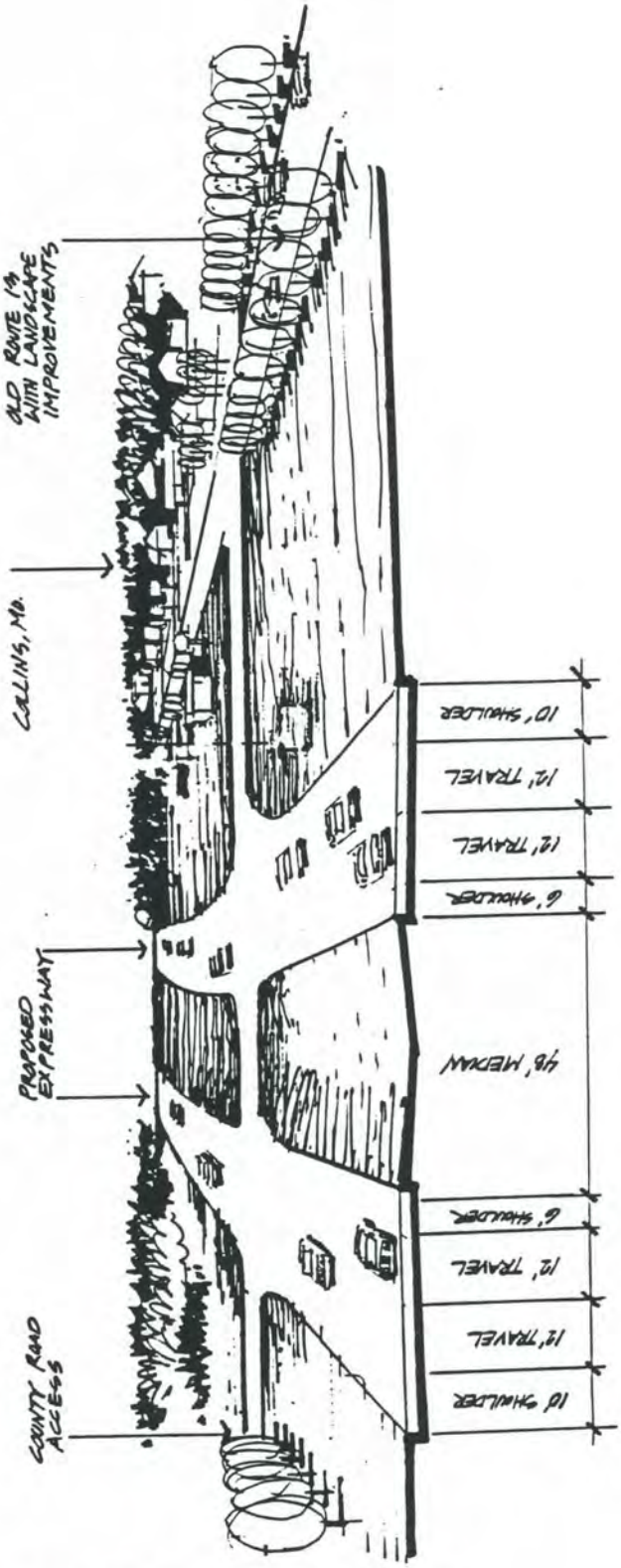
The standard expressway design speed is 60 mph and a standard maximum grade of 3%. Crest and sag vertical curves are based on stopping sight distance for the design speed of 60 mph. Because the expressway is designed as a four-lane facility, the maximum for horizontal curvature is based on a design speed of 70 mph. Chapter IV of the MHTD Design Manual documents a maximum horizontal curvature of 3.75°.

The standards for the acceleration and deceleration lanes at ramp junctions are specified in the 1990 American Association of State Highway and Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets. For ramps at grades of 2% or less, these standards require acceleration lanes to be at least 910 feet long for an entrance speed of 30 mph onto a 60 mph facility. Acceleration lanes from a stop condition onto a 60 mph facility are required to be 1,170 feet long. Deceleration lanes are to be at least 430 feet for an exit speed of 30 mph from a 60 mph facility and 530 feet for a stop condition. Acceleration and deceleration lanes should have 300-foot and 240-foot tapers respectively. All design features of the alternative alignments have been designed to satify these expressway standards.

Highway Traffic

The current average daily traffic and traffic trends on Route 13 can be approximated from an automatic traffic counter located at Lowry City, north of Collins. This automatic traffic counter produces very good count information as it counts all day, every day. Several traffic characteristics including existing traffic, historical traffic, seasonal traffic, traffic variation by day, and traffic variation by hour can be obtained from this information and is generally applicable to Collins due to the close proximity.

Historically, traffic on Route 13 has increased as land use and travel demands have increased regionally. Historical traffic counts on Route 13 show that since 1971 average daily traffic has increased from 5,010 to 7,290 in 1991 as shown in Figure 3-2. This represents a 45% increase in 20 years.



TYPICAL ROADWAY SECTION
FIGURE 3-1

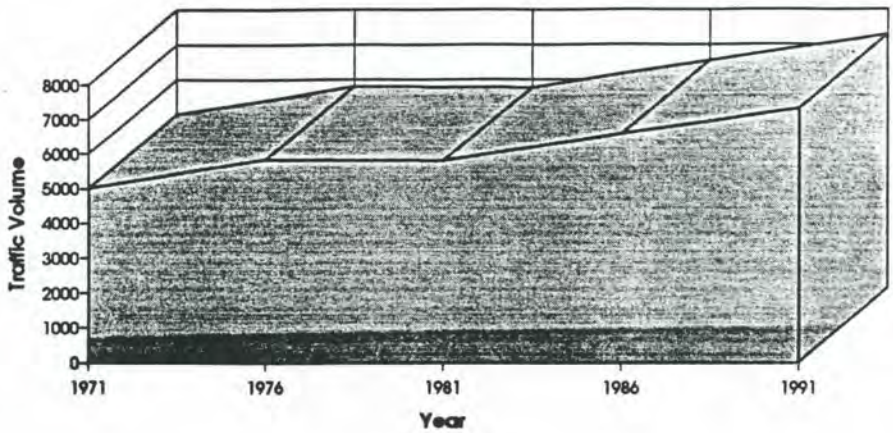


Figure 3-2
Historical Traffic on Route 13

Average daily traffic ranges from a low of 4,980 vehicles per day in January to 8,490 vehicles per day in July with an overall average of 7,290 vehicles per day as shown in Figure 3-3. During August of 1991, Friday and Sunday were the two busiest days with 10,750 vehicles per day on average. Tuesday and Wednesday were the least busy traffic days with 7,280 vehicles per day on average as shown in Figure 3-4. The busiest time of day on average was from 4 PM to 5 PM with almost 600 vehicles per hour on Route 13 in the Lowry City area as shown in Figure 3-5. Trucks make up approximately 20% of the total traffic volume.

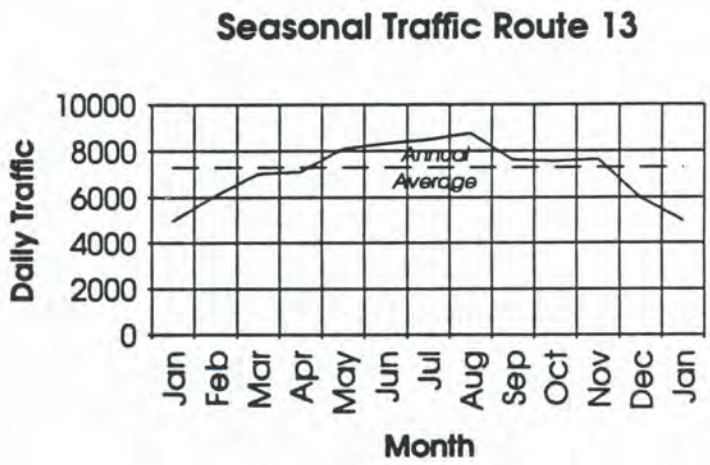


Figure 3-3

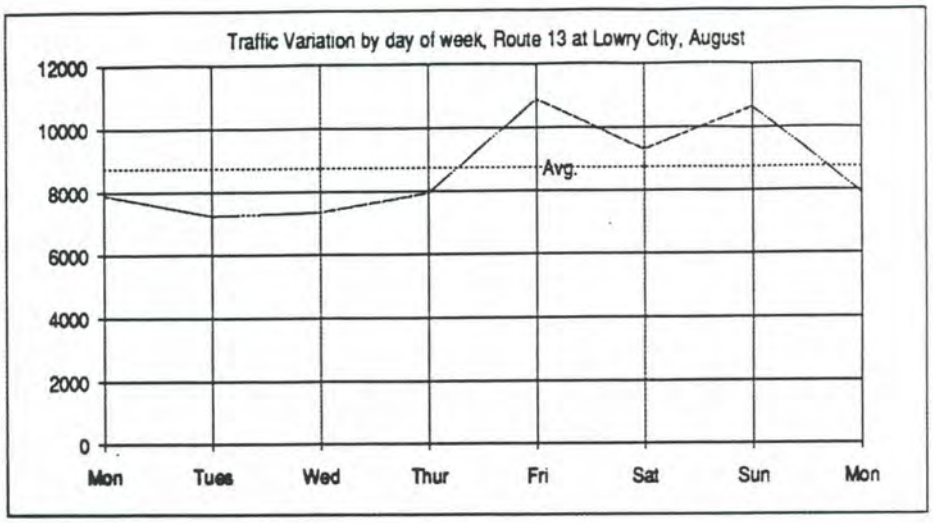


Figure 3-4

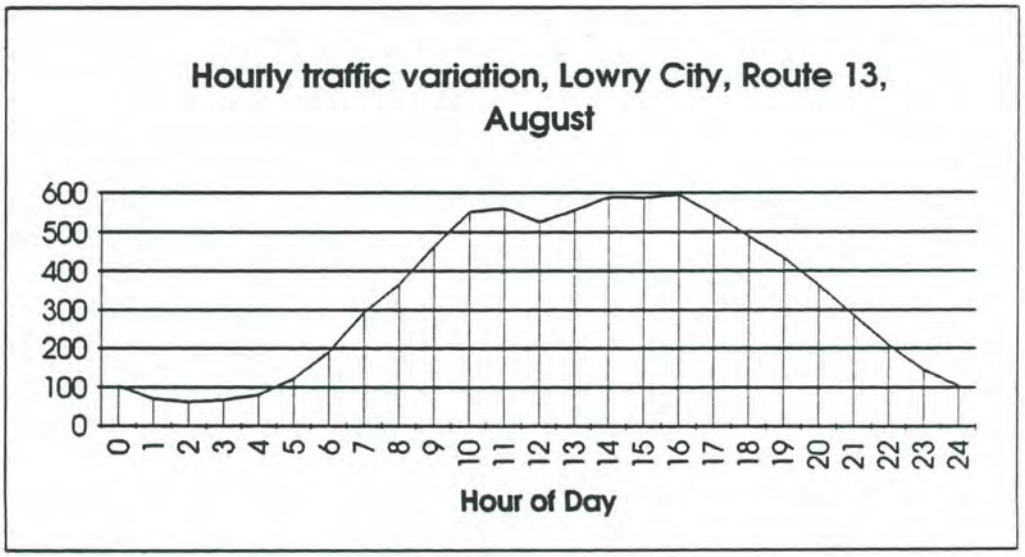


Figure 3-5

The Missouri Highway and Transportation Department has also forecasted traffic on both Route 13 and U.S. 54 based on past trends, projected land use in the area, regional economic growth, and general vehicle use trends. Forecasted traffic volumes for Route 13 just south of Collins show 7,300 vehicles per day in 1995 and 12,700 vehicles per day by 2015. Forecasted traffic volumes for U.S. 54 show 3,600 vehicles per day east of Collins and 4,100 vehicles per day west of Collins by 2015.

Highway Safety

One of the most important design goals for highway improvements is the design of a safe highway. This important factor must be carefully considered in both the geometric design and access control for highways. While few existing highways possess all the requirements for the ultimate in design characteristics, new construction should strive for the safest highways possible given the often conflicting highway needs and existing constraints.

Since the primary purpose and function of Route 13 is to provide a high degree of mobility and serve longer trips, design standards addressing safety must reflect that. This includes adequate shoulders, minimum design speed, maximum roadway curvature, and limited access. Studies have shown that access plays an important part in highway safety. One study concluded that "(1) access control has the most powerful accident-reducing effect; (2) without access control, four-lane highways have higher accident rates than two-lane facilities".[3] This study and other publications[4,5] also note that increased access control decreases accident rates.

Existing accidents on Route 13 and U.S. 54 for a three-year period for the study area are shown in Table 3-1. The study area includes a three-mile section of Route 13 centered at the U.S. 54 intersection and a 1-mile section on U.S. 54 centered at the Route 13 intersection. No fatal accidents were reported during this period, 12 injury related accidents were reported, and 33 property damage only accident were reported. The largest concentration of these accidents occurred at the U.S. 54/Route 13 intersection where 14 of the 45 accidents occurred. The next largest concentration of accidents occurred just north (approximately 500 feet) of the U.S. 54/Route 13 intersection where 4 accidents occurred, 3 involving injuries.

[3] Guidelines for Medial and Marginal Access Control on Major Roadways, National Cooperative Highway Research Program Report 93, Highway Research Board, 1970.

[4] Accident Rates as Related to Design Elements of Rural Highways, National Cooperative Highway Research Program Report 47, Highway Research Board, 1968

[5] A Policy on Geometric Design of Highways and Streets, 1990,page 84, American Association of State Highway and Transportation Officials.

Table 3-1
ROUTE 13 AND U.S. 54 3-YEAR ACCIDENT HISTORY
(06/01/89 to 05/31/92)

	Route 13 (1.5 miles south of U.S. 54 to 1.5 miles north of U.S. 54)	U.S. 54 (0.5 mile west of to 0.5 mile east of Route 13)
ACCIDENT TYPES		
Moving Vehicle Collisions	24	8
Out of Control (1 car)	7	2
Pedestrian or Animal	3	1
TOTAL	34	11
ACCIDENT SEVERITY		
Property Damage Only	23	10
Injury	11	1
Fatal	0	0
TOTAL	34	11
ACCIDENT CONDITIONS		
Adverse Conditions (snow, wet)	10	3
Normal Conditions (dry)	24	8
TOTAL	34	11

IV. PUBLIC INVOLVEMENT

Introduction

It is important that the public and any affected interests are included in the planning of important projects. This helps to ensure that all relevant information, issues, and concerns are included in the planning and problem solving process.

One of the goals of this project was to include input from the public into the problem solving process. To this end, there were numerous opportunities for local citizens, business owners, highway users, public agencies, and other affected interests to provide input into this project. The methods that were used to allow input included holding public meetings, sending out newsletters, holding small group and individual meetings with interested people, and providing information for display within the town.

First Public Meeting

The first public meeting for Centennial's work was held on July 23, 1992 at the Lions Club building/firehouse in Collins, Missouri. The purpose of the meeting was to present the engineering consultant, Centennial Engineering, to the public, define the scope of the project and invite public input. Approximately 70 people attended the meeting, representing both the public and private sector. Many of the questions raised at this meeting caused lively discussion of the issues and all helped to broaden and clarify the scope of concerns the public had with this project. Some of the major concerns identified at the meeting consisted of:

- How businesses in Collins along Route 13 would be impacted?
- What are the traffic volumes on Route 13 through Collins?
- Where will the four lane improvements be located?
- How would the businesses and town have access from the four lane roadway?
- Will the four-lane improvements be an expressway or a freeway?

Following this meeting numerous small group and individual meetings were conducted with many of the businesses and some of the residents in town. These meetings were set up by actively soliciting input and by staffing an office at the Union State Bank in Collins the day after the public meeting. A decision of the expressway/freeway status was made by the Chief Engineer of MHTD following this meeting. This project is to be designed as an expressway, not freeway.

The information obtained in the first public meeting and the subsequent public contacts was used to help generate initial alignment alternatives and begin addressing the many issues associated with the project.

Second Public Meeting

The second public meeting was held in the form of an open house on Thursday, September 17th from 4 PM to 7 PM at the Collins school gymnasium. The open house format enabled everyone ample time to examine the alternative route locations and other information collected to date on the project. Representatives from Centennial Engineering, the archeology subconsultant, the economic study subconsultant and MHTD were available to answer questions and receive input. Additionally, self addressed, prestamped envelopes with comment sheets were provided for subsequent input to be given. Approximately 40 people signed the attendance list and approximately 15 other people reviewed the exhibits without signing in. Eleven comment sheets were received following this meeting.

As a result of the comments received at and following this meeting, a new alignment which was largely a result of citizen input and comment was prepared. Other slight modifications were made to other alternatives, and three of the alternatives were eliminated. The result was four alternatives which address safety and capacity requirements and best address the concerns of the many public interests.

Third Public Meeting

The third public meeting was held on Thursday, November 19th from 3 PM to 7 PM at the Collins school gymnasium. This was again an open house type format with numerous exhibits displayed for easy veiwing. Representatives from Centennial Engineering and MHTD were available to answer questions and receive input. Again, self-addressed, prestamped envelopes with comment sheets were provided for subsequent input to be given. Approximately 75 people signed the attendance list and approximately 10 other people reviewed the exhibits without signing in. The meeting received local (Osceola) newspaper coverage and Springfield television coverage. 16 comment sheets were returned during or after the meeting.

The large majority of comments received were supportive of the recommended alignment. A few people felt the bypass alignment was the best alignment for traffic and a few people wanted the road built as soon as possible. Two of the attendees requested a formal public hearing to present their comments publically to ensure that their comments are heard. A formal public hearing was scheduled for January 21, 1993 at the Collins school gymnasium.

Location Public Hearing

A location public hearing was held on Thursday, January 21, 1993 at 7 PM at the Collins school gymnasium. The purpose of the public hearing was to obtain input to help the Missouri Highway and Transportation Commission make an informed decision and allow citizens to express their views and concerns.

A short presentation was made by Centennial Engineering reviewing the alignment alternatives considered. No changes were made to the recommended alignment shown in November and no new information was presented. This was followed by six citizens making comments for the record. An additional eight comment letters were received following the public hearing.

After the public hearing was completed, an open question and answer period was held. Approximately fifteen people asked questions during this time which were answered by project representatives. Approximately 65 people signed the attendance list.

Comments received during and after the meeting indicated a preference for the A-5 alignment (discussed in Section V). Other comments included suggestions for design changes, requests to delay the project, other alignment recommendations, general concerns, and a request to meet directly with the MHTD decision makers. The official transcript of the meeting is included in Volume II of this report. Volume II also includes comments received following the meeting and responses to all comments made as part of the public hearing.

Copies of Volume II, which includes all comment sheets or letters returned following the meetings and hearing, can be reviewed at MHTD in Joplin or Jefferson City, and at the St. Clair County Library in Osceola or the Collins Fire Department.

V. ALIGNMENT ALTERNATIVES AND RECOMMENDED ALIGNMENT

Introduction

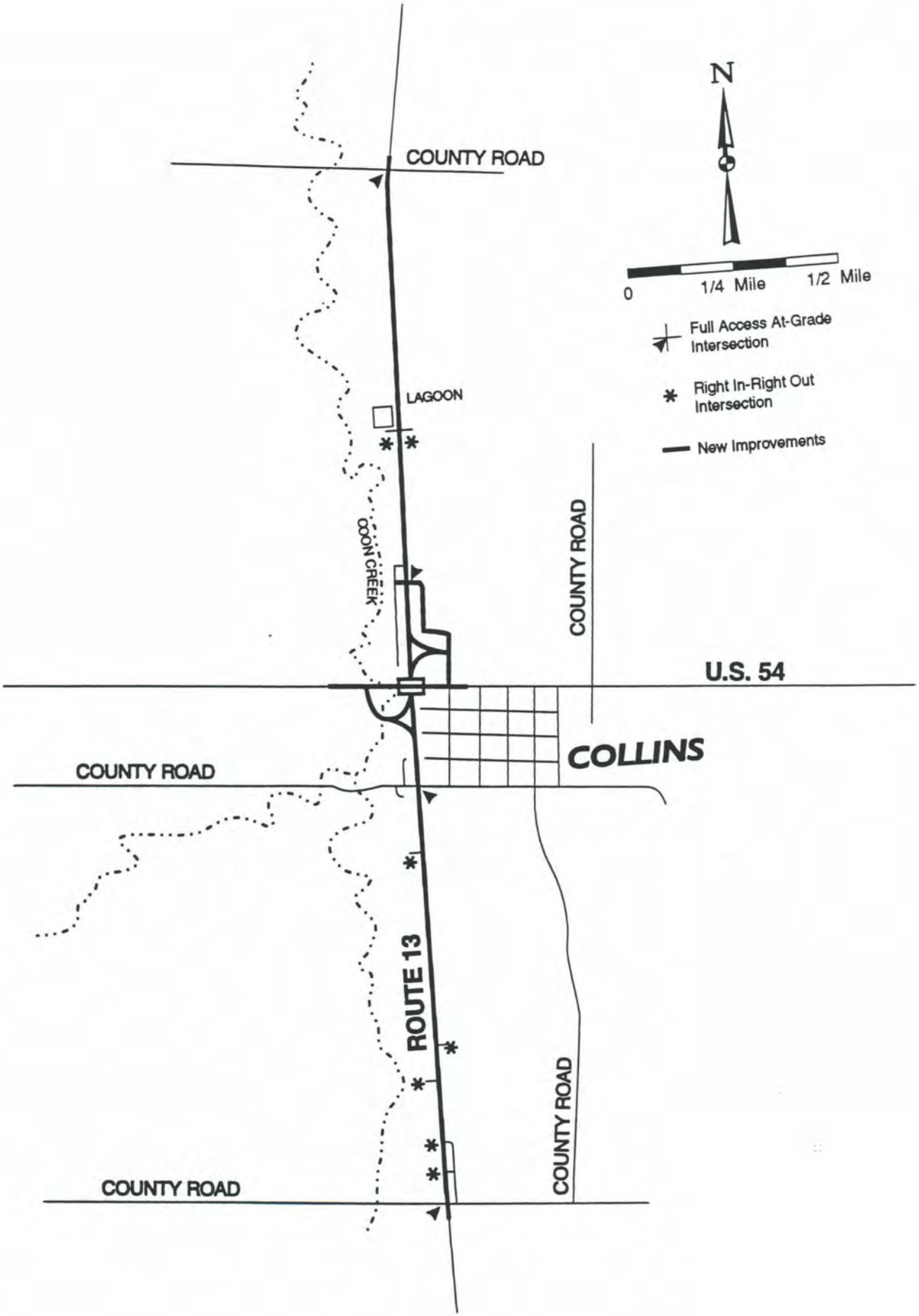
The process of determining an alignment recommendation involves reviewing all reasonable and feasible options, determining how well these options satisfy the needs of the project, modifying the options and keeping the best options until only one remains. As discussed in Chapter III, the four-lane expressway facility includes a 60 foot median between travel lanes, interchanges at major highways (U.S. 54), a 55 mph posted speed limit, and limited access control.

Initial Alternatives

Options that were eliminated early from further study included a route east of the existing Route 13, a route west of the original Reconnaissance report alignment, a full diamond interchange in the middle of town, relocating U.S. 54 to a new location outside of town, and bridging the town along or near the existing Route 13 alignment. All of these would create severe disruption or very high costs. Other options which were considered but eliminated due to safety concerns included reducing the median width, and various types of unconventional interchange configurations with U.S. 54.

Following the first public meeting, several alignment alternatives were prepared based on public input, ongoing technical studies, MHTD design standards, and previous studies. These alignments included three which went through town, two that just bypassed town to the west and the original State alignment presented in the Reconnaissance report which bypassed the town approximately 1500 feet to the west. These alignments were intended only to represent possible options and to encourage both public and agency input. The three initial alignments through town are labeled A-1, A-2, and A-3. The two near bypasses are labeled B-1 and B-2 and the original State alignment is labeled C-1. These alignments are discussed below.

Alternative A-1 - Double Loop Thru (see Figure 5-1) uses the existing alignment through Collins. South of Collins the new alignment adds two southbound travel lanes across a 60' median to the west of existing Route 13. A driveway is provided at the substation and a full median break and left turn bays are provided at the county road just south of Collins. Access from Route 13 to the MHTD facility is moved onto the county road 200' west of the new alignment. Local access is sealed off north of the county road due to the interchange and access standards. Gas pumps at the Valley Farms Mini Mart on the west side of the expressway, north of the county road are taken. Access to U.S. 54 is provided by loop ramps on the southwest and northeast corners of the interchange. The SW ramp crosses Coon Creek requiring a box-culvert at this location.



ALTERNATIVE A-1
FIGURE 5-1

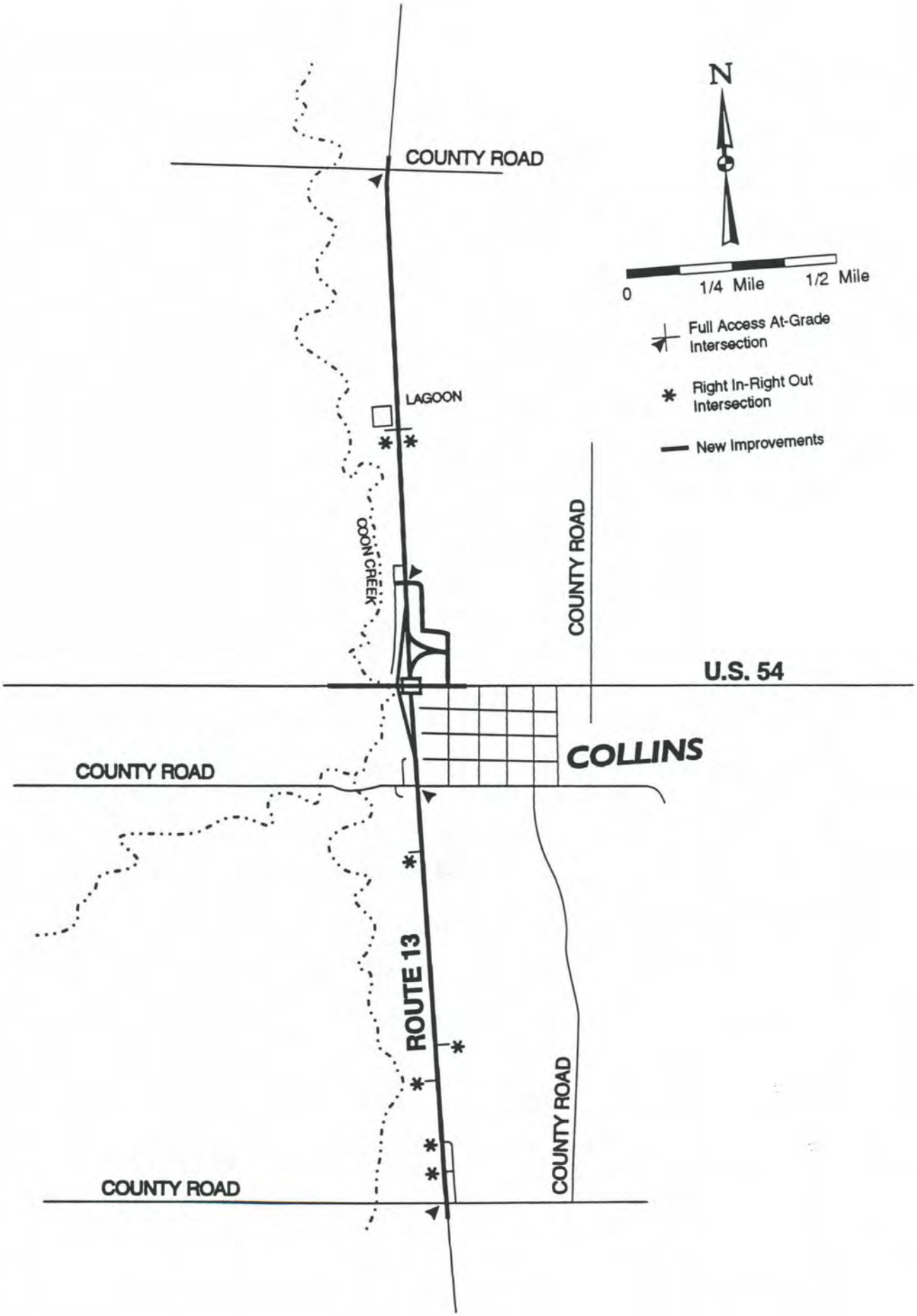
The NE ramp is connected to a frontage road at a T-intersection off of an extended Second Street to the north of U.S. 54. The frontage road provides full access to Route 13 at a point near Bubba's Mini Mart. The expressway has been shifted west placing the southbound lanes onto the existing alignment. Left turn bays provide frontage road access to the east and west. Right -in/Right-out access is provided for the SB lanes at Bubba's Mini Mart.

Alternative A-2 - Half Diamond Thru (see Figure 5-2) follows the same layout as Alternative A.1. The change is a half diamond interchange on the west side of Route 13. Because of the space taken up by the ramp in the northwest corner of the interchange, a retaining wall is required to hold the fill away from the commercial bank located in the adjacent lot. A frontage road to the west of the existing Route 13 provides access to the businesses in the NW quadrant. The loop ramp on the NE side is identical to Alternative A.1.

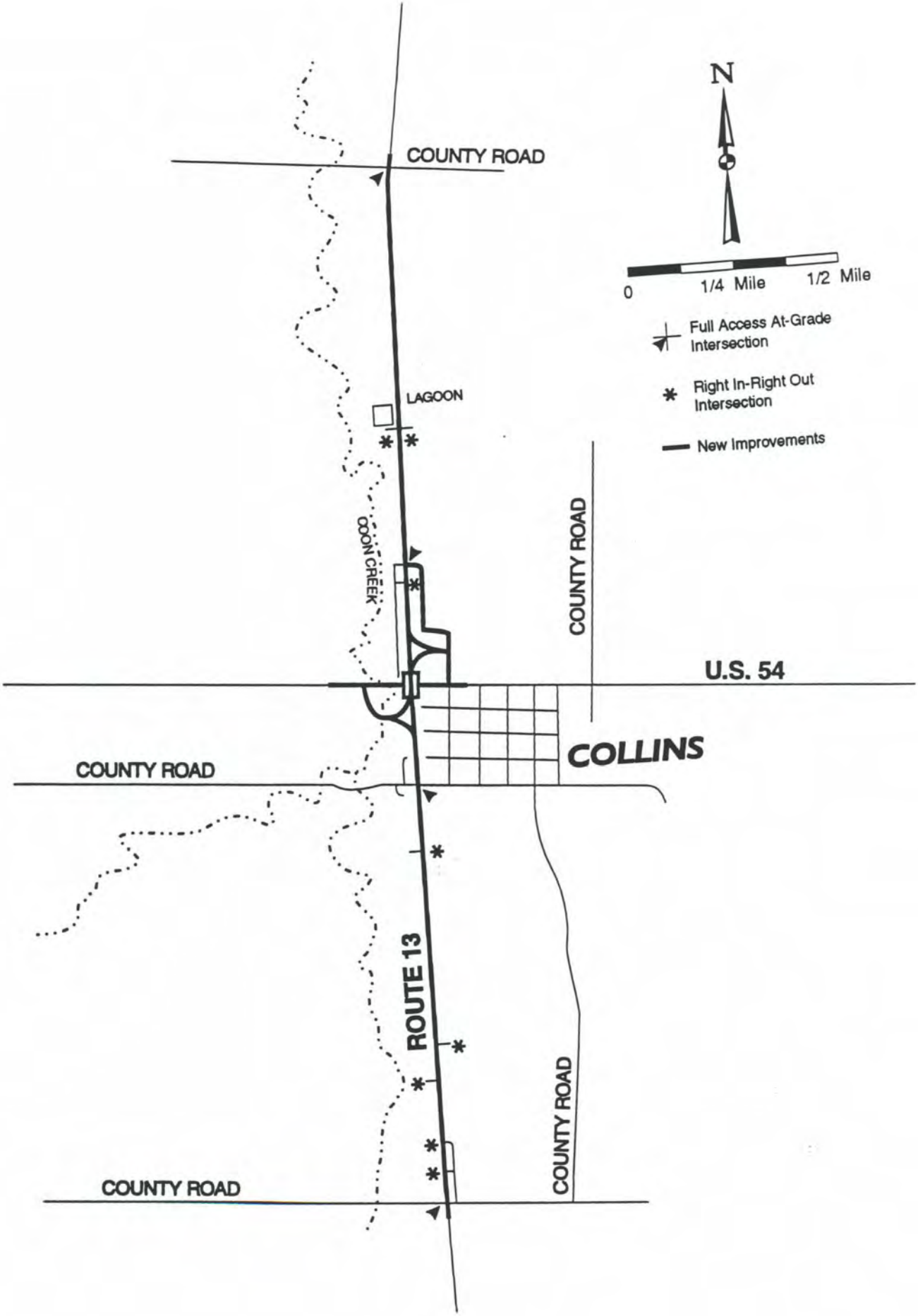
Alternative A-3 - Route 13 over U.S. 54 (see Figure 5-3) follows the same alignment as Alternative A.1 with the exception that Route 13 passes over U.S. 54. The layout of the interchange is identical to the double loop in Alt. A.1, however, a frontage road is added at the west ramp junction on the north side of U.S. 54. The frontage road provides access to the businesses located in the NW corner of the interchange. The frontage road from the NE ramp and the new frontage road are joined by a median break at an existing driveway at Bubba's Mini Mart where Route 13 comes to grade. Left turn bays are provided for both sides of the expressway.

Alternative A-4 (see Figure 5-4) is based on public suggestions following the public open house on September 17, 1992. This alignment adds two SB lanes across a 60' median to the west of existing Route 13 south of Collins. At a point 1200' south of the county road the alignment is shifted to the west approximately 90' taking the MHTD maintenance facility and two businesses. Access is provided for the county road with left turn bays in both directions. The existing Route 13 is used as a frontage/access road south of U.S. 54 and is separated from the relocated Route 13 by a 30' median. Access to U.S. 54 is provided by loop ramps on the southwest and northeast corners of the interchange. The NE ramp ties directly into an extended Second Street and the SW ramp ties into a frontage road identical to the one described in Alt A.3. A median break is provided at an existing driveway at Bubba's Mini Mart where the frontage road is continued across Route 13 to the east. Left turn bays are provided for both sides of the expressway.

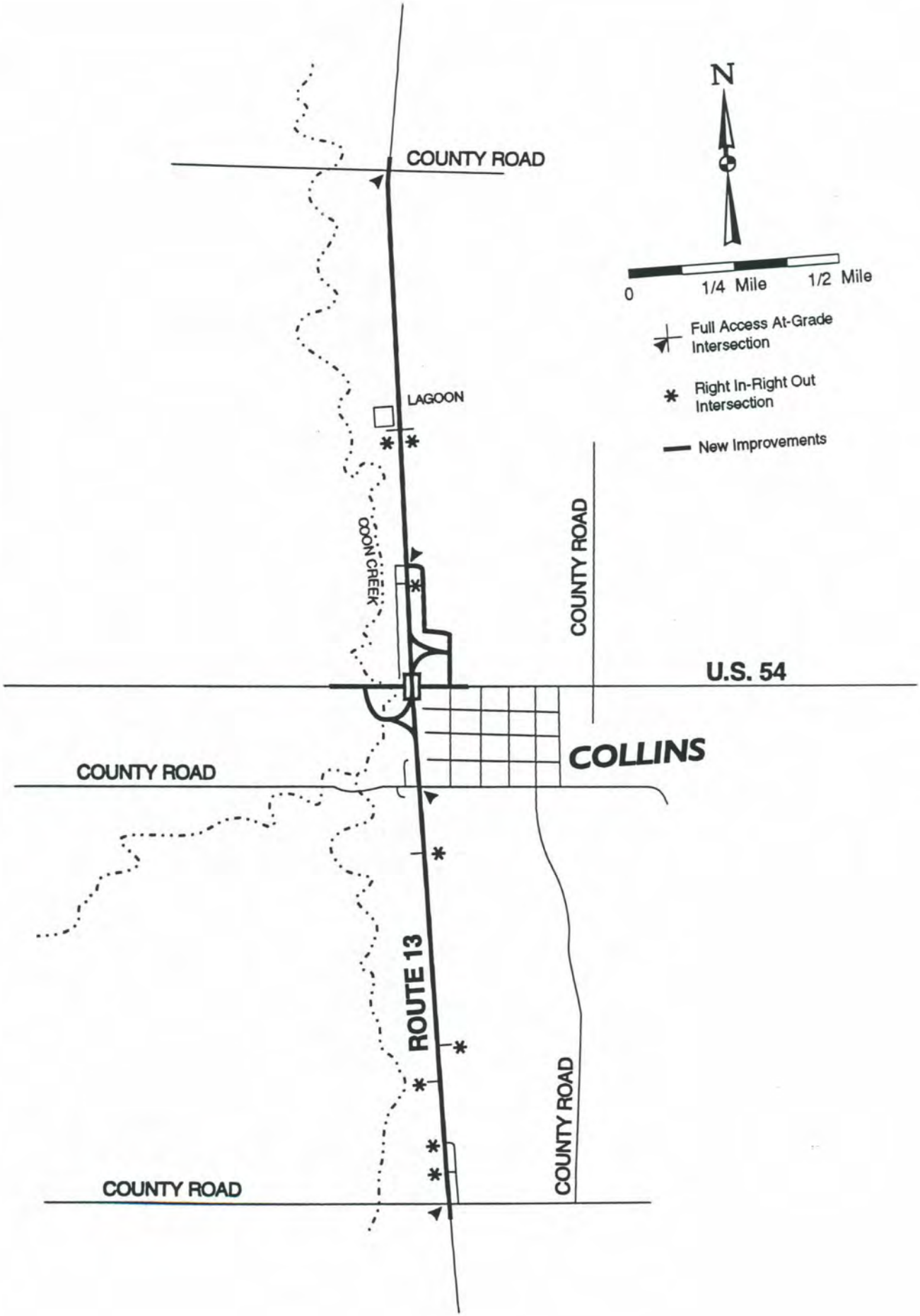
Alternative B-1 - Double Loop Creekside (see Figure 5-5) creates a by-pass to the west of Collins. The northbound lanes follow the existing alignment and are separated from the southbound lanes by a 60' median. The new alignment diverges from the existing alignment 2400' south of the county road shifting to the west 650'. The new Route 13 crosses Coon Creek and then passes over U.S. 54, 650' to the west of the existing Route 13. The alignment then crosses the creek once more before tying back into the existing Route 13, 3100' to the north of U.S. 54.



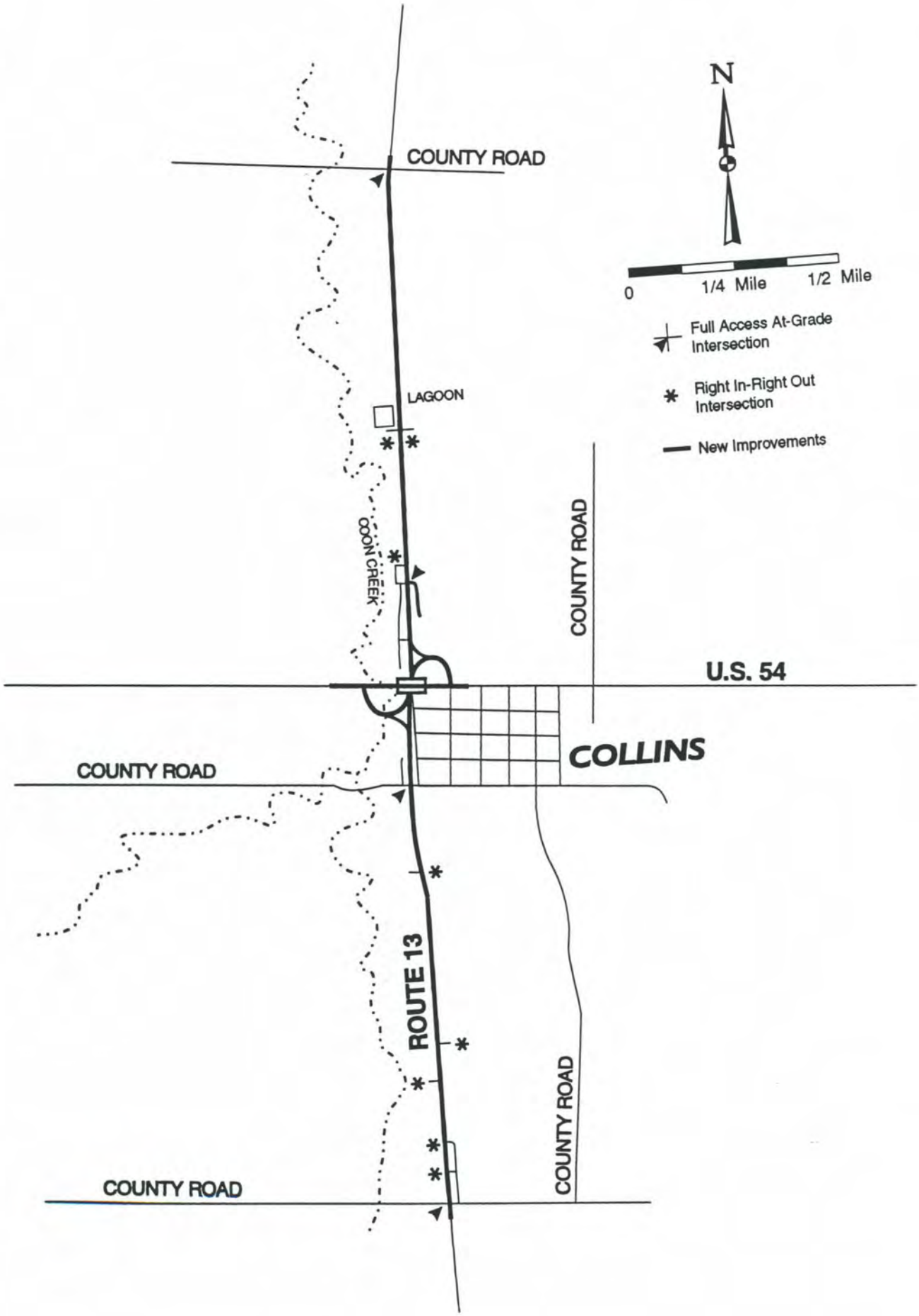
ALTERNATIVE A-2
FIGURE 5-2



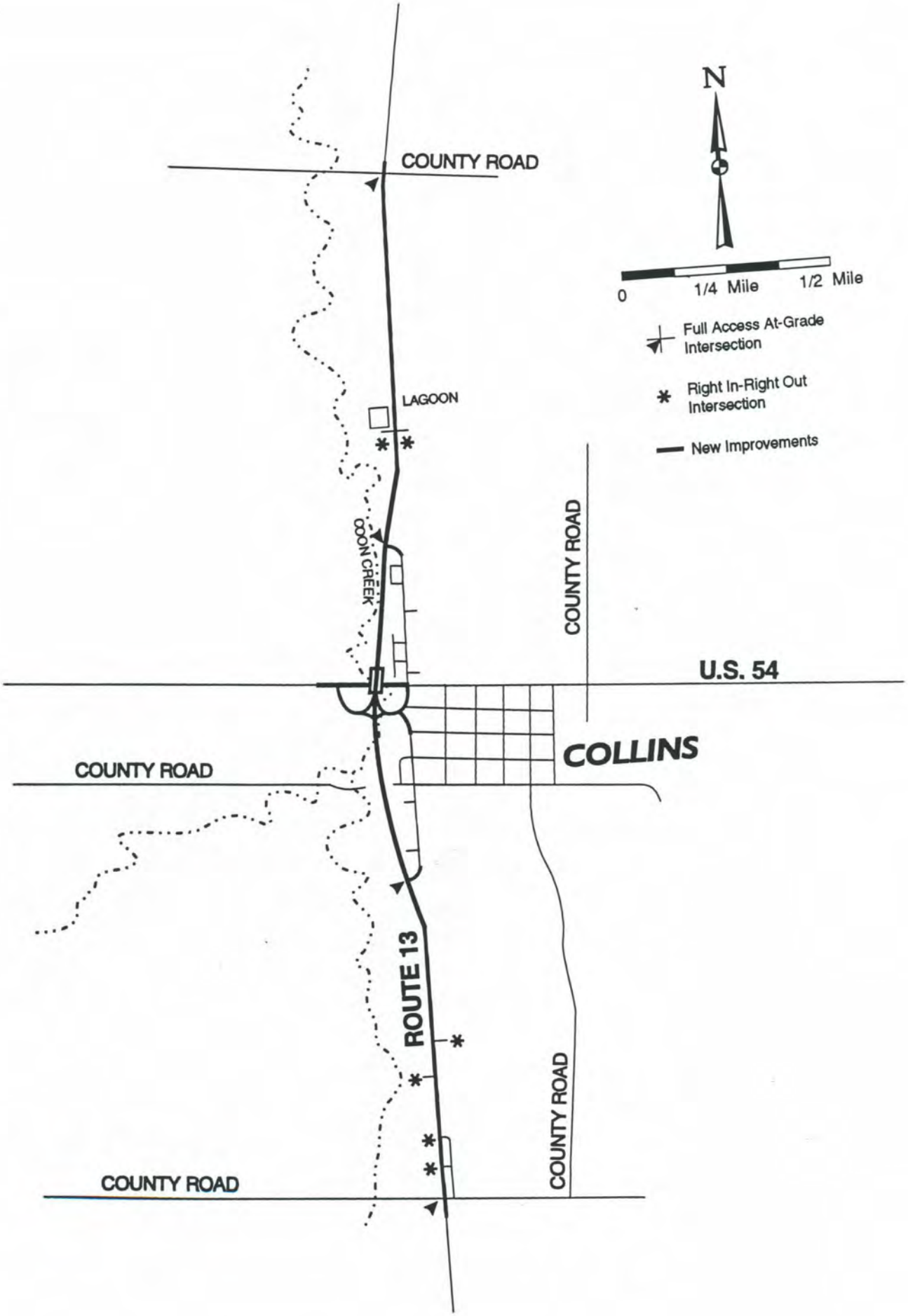
ALTERNATIVE A-3
FIGURE 5-3



ALTERNATIVE A-3
FIGURE 5-3



ALTERNATIVE A-4
FIGURE 5-4



ALTERNATIVE B-1
FIGURE 5-5

At this point the alignment is shifted to the east to allow the southbound lanes to follow the existing Route 13. Access from the new alignment to U.S. 54 is provided by double loop ramps 600′ south of U.S. 54. The east side ramp provides direct access to U.S. 54 crossing the creek once. The existing Route 13 is bent westward to form a T-intersection with the east loop. The west side ramp provides access directly from the proposed Route 13 to U.S. 54. Full access to the new alignment of Route 13 is also provided at two points off of the existing Route 13; 1400′ south of the county road and immediately north of Bubba's Mini Mart. The new alignment requires extensive relocation of Coon Creek to the west of the proposed Route 13.

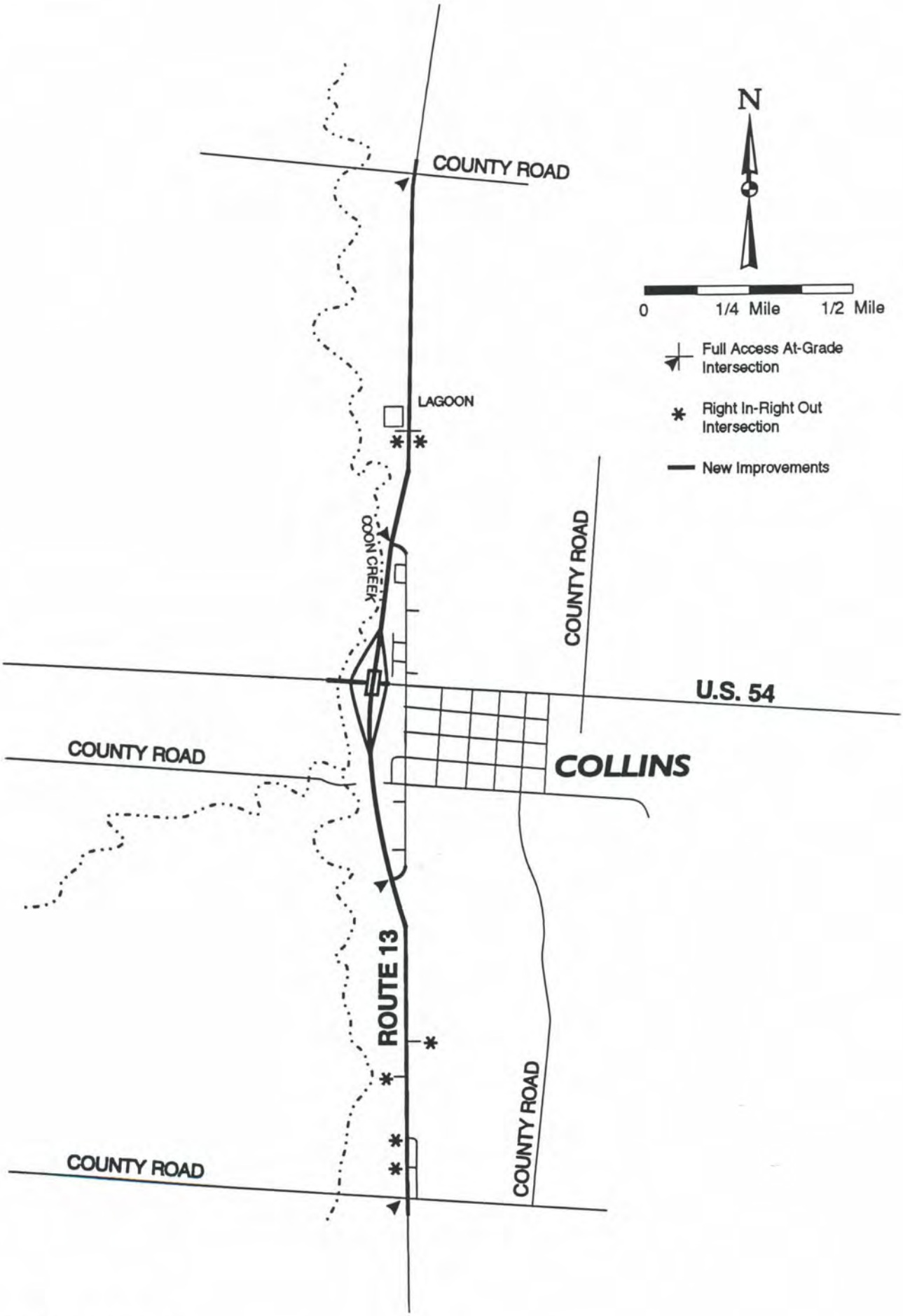
Alternative B-2 - Full Diamond Creekside (see Figure 5-6) follows an identical alignment to alternative B.1, but access to U.S. 54 is a typical diamond-type interchange. Access to Collins is provided by U.S. 54 and the full access points at the sites identified in the B.1 alternative. The extensive relocation of Coon Creek is also very similar to alternative B.1.

Alternative C-1 - Full Diamond West (see Figure 5-7) is the same alignment as the original MHTD reconnaissance report alignment. This is a typical diamond-type interchange with U.S. 54. The alignment leaves the existing Route 13 approximately 500′ south of the truckstop south of Collins. The alignment is shifted 1500′ to the west. Access into Collins is provided by U.S. 54, and connections to the existing Route 13. These connections are located 900′ north of the truck stop and 1100′ south of the county road, north of Collins. Outside the interchange area, right-in/right-out access is allowed at all existing private and commercial driveways including the truck stop south of town. Full access is allowed at County roads.

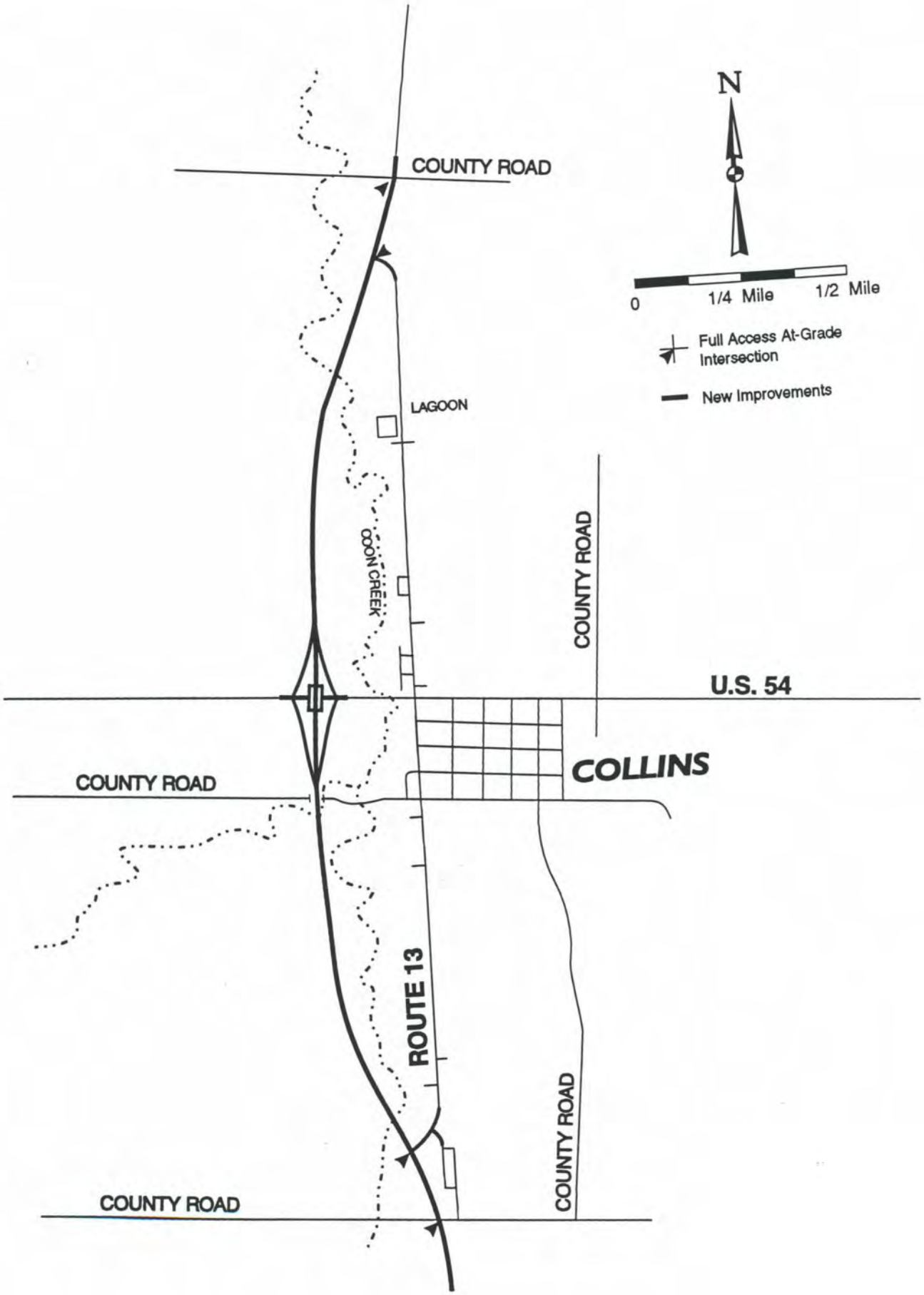
Final Alternatives

As a result of the 2nd public meeting, additional public input, and agency input, the initial alternatives were revised and relabeled. This resulted in three final alternatives which represent the best features of different routes. One alternative generally goes through town, one is just west of town and the third is the original State Reconnaissance report alignment further west of town. These alternatives are discussed below.

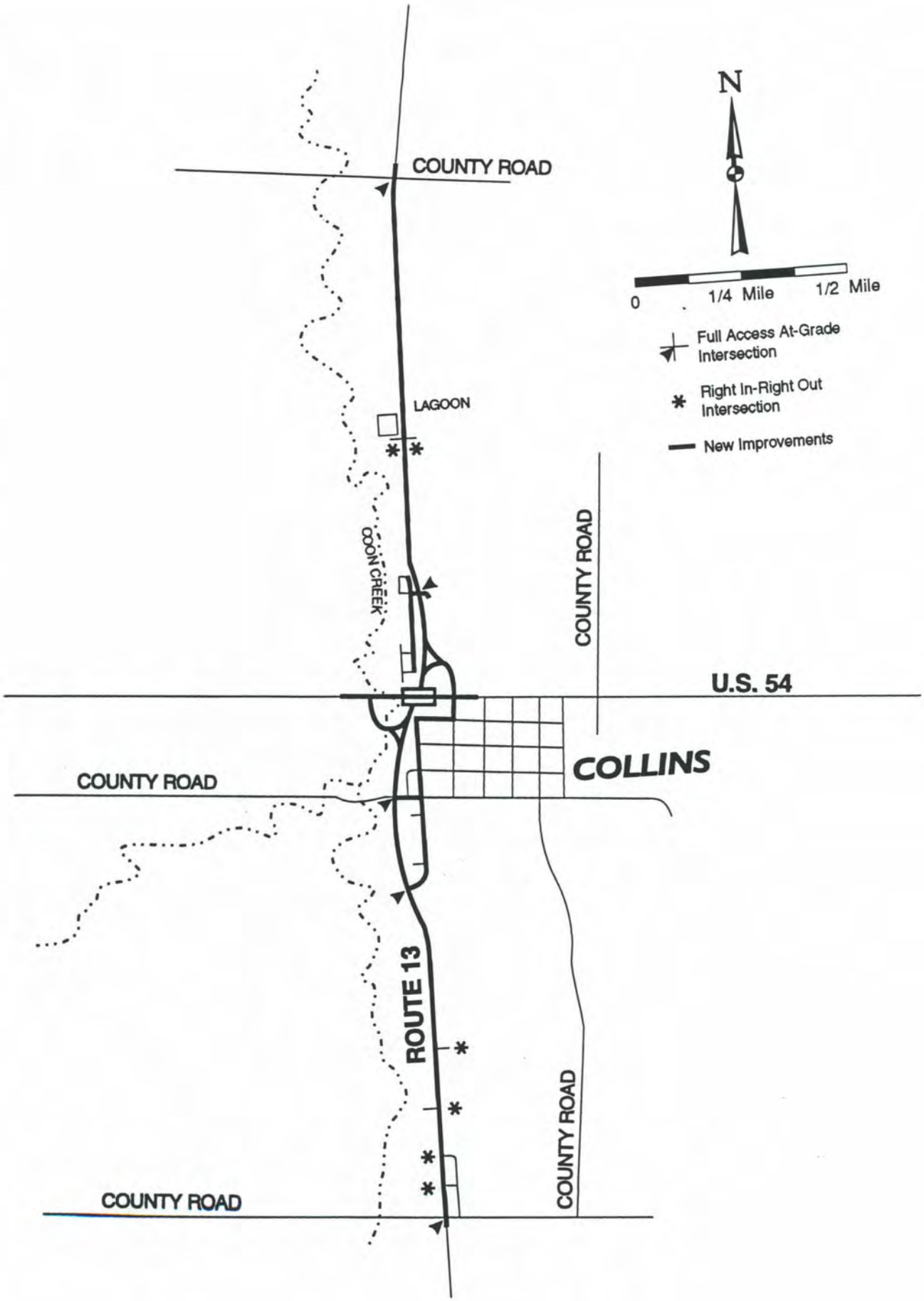
The A-5 alignment shown in Figure 5-8 uses the existing Route 13 in town as a frontage road as much as possible. From the south, the new alignment veers west just behind the existing Missouri Highway and Transportation Department (MHTD) maintenance facility and the Valley Farms Mini Mart and Restaurant. Two residences would be relocated in this area. North of Valley Farms Restaurant, the new alignment would swing east across the existing Route 13/U.S. 54 intersection. North of U.S. 54, the alignment is just east of existing Route 13 which is used as a frontage road. After passing Bubba's Mini Mart, the alignment would tie into the existing Route 13 alignment. North of U.S. 54, two businesses would be relocated. To allow for town access, a continuous turn lane is provided through town so that turning traffic does not seriously affect through traffic.



ALTERNATIVE B-2
FIGURE 5-6



ALTERNATIVE C-1
FIGURE 5-7



ALTERNATIVE A-5
FIGURE 5-8

Because local access is not allowed within the interchange area, in-town access is limited primarily to two full intersections located just outside the interchnage area. An additional access to town is located south of the MHTD maintenance facility and several access points are located on U.S. 54. Outside the interchange area, right-in/right-out access is allowed at all existing private and commercial driveways including the truck stop south of town. Full access is allowed at County roads.

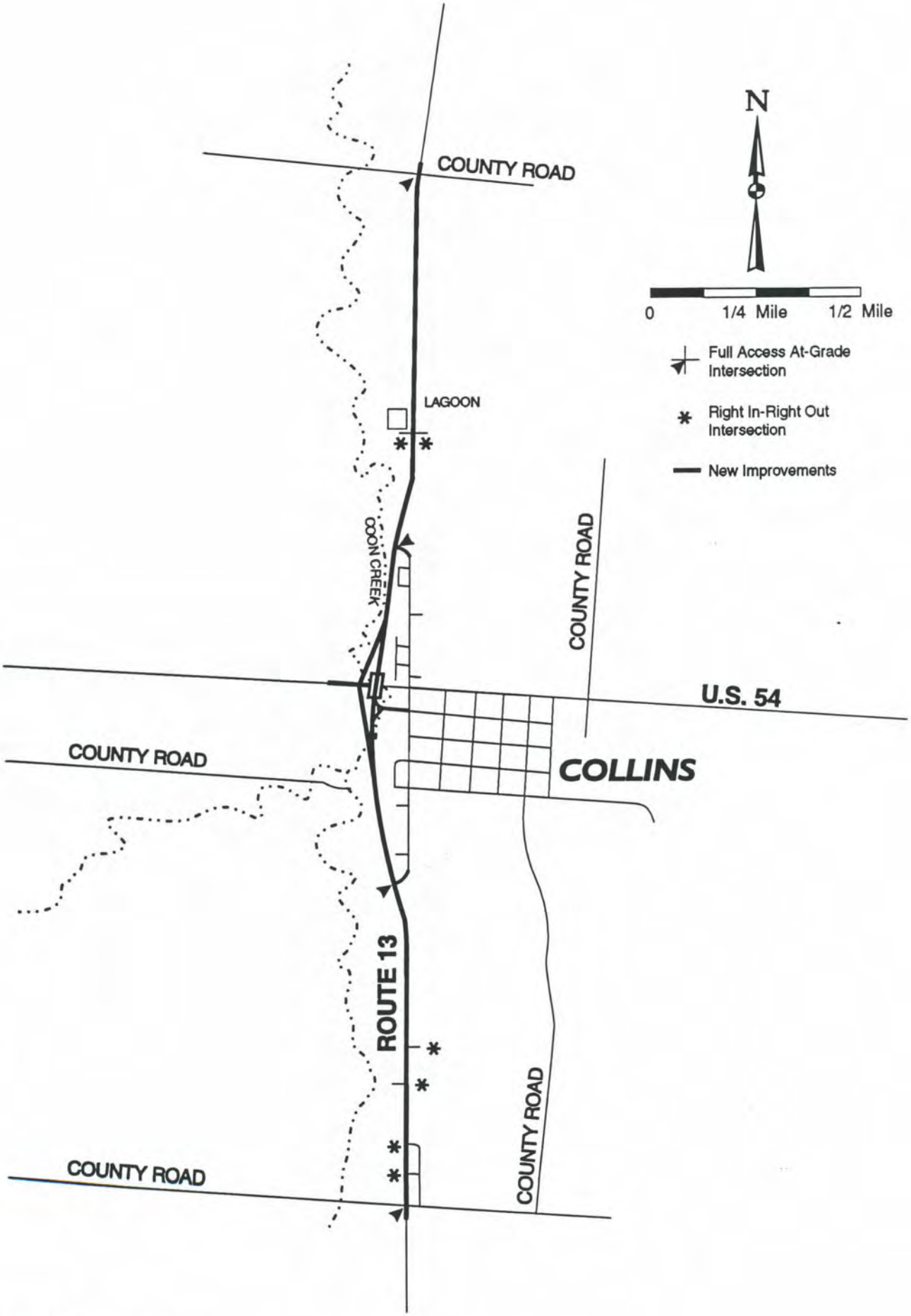
This alignment replaces Alignments A-1, A-2, and A-3. All three of these alignments provided poor access to existing businesses south of U.S. 54 since there was no frontage road and these businesses had to be accessed from the town side. Additionally, access to businesses north of U.S. 54 was limited. Embankment as a result of Alignment A-3 also created a large physical barrier separating town east of Route 13 from town west of Route 13. While visibility to town was good, access was not with these three alignments.

A fourth alignment, A-4 was suggested by citizen input and is similar to Alignment A-5 except that instead of relocating the two houses behind Valley Farms Mini Mart and Restaurant, the alignment would relocate the Valley Farms Mini Mart and Restaurant as well as the MHTD maintenance facility. This alignment was revised based on additional citizen input to produce alignment A-5. The A-5 alignment shown in Figure 5-8 is very similar to a plan prepared by and supported by many of the businesses along Route 13 in town.

The B-3 alignment as shown in Figure 5-9 is a combination of the B-1 and B-2 alignments. The northbound loop ramps for the U.S. 54 interchange are the same as the B-1 alignment ramps and the southbound diamond ramps for the U.S. 54 intersection are the same as the B-2 alignment. This combination of ramps provided the best access to town.

However, Route 13 access to town is still limited because of the interchange. In addition to the interchange ramps, access is primarily limited to two full intersections located outside the interchange area. Outside the interchnage area, right-in/right-out access is allowed at all existing private and commercial driveways including the truck stop south of town. Full access is allowed at County roads.

The C-1 alignment didn't change. It was not supported by public input or by town businesses. However, it does provide the best level of service to the travelling public and provides the safest highway to the travelling public. It is therefore an option that must be considered and included for comparison purposes. This alignment has been shown previously in Figure 5-7.



ALTERNATIVE B-3
FIGURE 5-9

All three of the final alternatives described above have advantages and disadvantages. None of them satisfy all of the issues and concerns associated with this project. However, they are the best alternatives which are available based on extensive technical studies and public input. The remainder of this chapter discusses various components of these alternatives and addresses the impacts associated with each. Based on the benefits and impacts associated with each alternative, a preferred alignment is presented.

Cost Estimates

Preliminary estimates of construction and right-of-way costs for the three final alternatives are presented in Tables 5-1, 5-2, and 5-3. Construction cost estimates were derived from 1991 cost indices of the Missouri Highway and Transportation Department and other sources. Unit costs were based on average bid prices and identifiable pricing trends.

Construction costs for the three final alternatives are $6.2 million for Alternative A-5, $6.7 million for Alternative B-3, and $7.9 million for Alternative C-1. The construction costs include all utilities, grading and drainage, surfacing, and bridge work. The preliminary right-of-way costs are greatest for Alternative A-5 ($0.65 million) as it is aligned through town, followed by Alternative C-1 ($0.37 million), and the least cost for Alternative B-3 ($0.16 million).

The overall total cost for each alternative includes construction and right-of-way costs, plus an estimated cost increase of 20% and an engineering and contingencies increase of 10%. From the total cost estimate, the least cost alternative is $8.8 million for A-5, followed by $9.0 million for B-3, and $10.9 million for C-1.

An important item to note about the cost estimates is that part of the construction cost is the responsibility of Collins. This results from the requirement that all relocations for utilities on state right-of-way (R.O.W.) must be paid for by the utility owners. Since part of Collins water and sewer system is located within State R.O.W. and will be relocated depending upon the alignment constructed, Collins must pay for these relocations. The estimated cost to Collins for relocating utilities within State R.O.W. is approximately $60,000 for Alternative A-5. The B-3 and C-1 alignments do not relocate utilities on State R.O.W. and therefore have no construction cost to Collins.

Economic Analysis of Alternatives

An economic impact analysis of the proposed Route 13 improvements through Collins, Missouri was conducted by Midwest Research Institute (MRI). The following section is taken from the MRI report of the analysis. This full report can be reviewed at at MHTD in Joplin or Jefferson City, and at the St. Clair County Library in Osceola or the Collins Fire Department.

Table 5-1
Alignment A-5 Estimated Costs

	Utilities	Grading & Drainage	Surfacing	Bridge	Total Constr.
	$95,000	$1,649,000	$3,613,000	$840,000	$6,197,000
Estimated Cost Increase	20%				$1,240,000
SUBTOTAL					$7,437,000
Engineering & Contingencies	10%				$744,000
SUBTOTAL					$8,181,000
Right-of-Way					$650,000
TOTAL COST:					$8,831,000

Table 5-2
Alignment B-3 Estimated Costs

	Utilities	Grading & Drainage	Surfacing	Bridge	Total Constr.
	$20,000	$2,611,000	$3,387,000	$680,000	$6,698,000
Estimated Cost Increase	20%				$1,340,000
SUBTOTAL					$8,038,000
Engineering & Contingencies	10%				$803,000
SUBTOTAL					$8,841,000
Right-of-Way					$162,000
TOTAL COST:					$9,003,000

Table 5-3
Alignment C-1 Estimated Costs

	Utilities	Grading & Drainage	Surfacing	Bridge	Total Constr.
	$0	$3,202,000	$4,144,000	$600,000	$7,946,000
Estimated Cost Increase	20%				$1,589,000
SUBTOTAL					$9,535,000
Engineering & Contingencies	10%				$954,000
SUBTOTAL					$10,489,000
Right-of-Way					$368,000
TOTAL COST:					$10,857,000

The analysis consisted of a general economic base analysis of the area to determine the basic industries for Collins and the area and an analysis of how different highway alignments and designs would impact the businesses in Collins. The first part of the analysis required a simple review of the levels of employment and income by industry for Collins and the surrounding area.[6] The second part of the analysis consisted of the application of a simple model shown in Equation 1 below:

$$S_i = S_e (P_l + \alpha P_t + \beta)$$

where,

S_i = Sales after highway improvements.
S_e = Existing sales before improvements.
P_l = Percent of sales from local customers.
P_t = Percent of sales from travelers.
α = Percent of sales retained after improvements.
β = Factor to represent sales from increased average daily traffic count after improvements.

Sales data and customer data were collected via interviews with Collin's businesses and from secondary data sources. α was estimated based upon interviews and field observations of similarly by-passed cities along Route 13, as well as literature reviews of regional/economic development and transportation literature. β was estimated passed upon projected average daily traffic count (ADT) growth estimates for Route 13 using Equation 2:

$$\beta = 1 - (C_e/C_i)$$

where,

C_e = Existing number of customers; measured from interviews.
C_i = Customers after highway improvements estimated by:

C_i = (C_e/Current ADT) * Projected ADT

The following discusses the impact model results (results of Equation 1 application). Highway improvements that decrease the visibility of businesses from major highways and increases the difficulty of accessing the businesses will result in lost sales. The highway improvements considered for Route 13 along the Collin's corridor will decreases both visibility and access and may result in

[6] The surrounding area was limited to the eight county area of Bates, Benton, Cedar, Henry, Hickory, Polk, St. Clair, and Vernon Counties. These are the counties contiguous with St. Clair County in which Collins is located.

declining sales and loss of businesses. The results indicate that the impact on sales (dollar volume) will be negative to Collin's businesses unless the average daily traffic count grows sufficiently to offset losses due to decreased business visibility from the highway and increased business access inconvenience.

The purpose of this economic impact analysis was to determine the economic impact of proposed Route 13 improvements along the Collin's corridor. Three proposed highway alignments were analyzed. All alignments were assumed to be four lane expressways designed for non-stop, 55 mph traffic. The alignments are:

1. The original Missouri Highway and Transportation Department proposal to by-pass Collins on the west side of town with an interchange at the 13 and 54 intersection. This alignment has been labeled as the C-1 Alternative (See Figure 5-14).

2. Centennial Engineering's proposed by-pass alternative that runs directly adjacent to Collins on the west (the tight by-pass) with an interchange located near the center of town (north bound traffic will enter Collins by the current Valley Farm restaurant and south bound traffic will enter Collins from the west on U.S. Highway 54). This alignment has been labeled as the B-3 alternative (See Figure 5-13).

3. Centennial Engineering's proposed alignment alternative based on citizen input along the existing roadbed with Highway 13 at grade and Highway 54 overpassing Highway 13. Access to restaurants would be via the existing Highway 13 which would act as a frontage road. Access to the frontage road is at the north and south end of town. This has been labeled by Centennial Engineering as the A-5 alignment (See Figure 5-12).

The economic impact analysis was performed using Equation 1. Data for the analysis was derived primarily from the interviews. The interviews and tax records indicated that there are approximately $6,000,000 in gross annual sales in Collins generated by the restaurants, fuel stations, grocery store, antique shops, convenience stores, and auto parts store. Sales volume has been slowly growing during the 1980's due to increasing traffic volume and efforts by the businesses to attract customers. The interviews indicated a high percentage of sales from travelers with an average of 80 percent of sales from travelers (nonlocal customers excluding regular customers living in the area).[7]

[7] MRI believes the estimate of sales from travelers is high. On-site observations indicated a substantial local trade during all meal times (breakfast, lunch, dinner); this was estimated by wait-people being on a first name basis with the customers. However, there was not a reliable method within the projects budget constraints to create an independent estimate of nonlocal customers. Also, the percent of customers who are travelers is believed to exceed 50 percent and the model is not overly sensitive to this parameter so the interview estimate of 80 percent was used.

The percent of sales retained after improvements (α) was estimated between 50 percent and 70 percent of business retained after the by-pass following interviews with business representatives from by-passed towns. Selection of values for α are estimates by MRI over the range of 50 to 90 percent of sales retained. Alignment C-1 was assigned a value of 50 percent for α since it decreases business visibility and access the most. Alignment B-3 was assigned a value of 70 percent, since it is very similar and would retain a significant degree of business visibility and access convenience. Alignment A-1 was given a value of 60 percent, since business visibility would be virtually identical to existing conditions but business access convenience would be greatly reduced. Alignment A-5 was given a value of 65 percent since business visibility would again be virtually identical to existing conditions but business access convenience would be greatly reduced.

Sales from increased average daily traffic counts after improvements (β) were estimated as described in Equation 2. The estimated number of non-local customers (based upon the interviews) was estimated at approximately 650 customers per day with the number of customers varying depending upon the day of the week. The existing average daily traffic (ADT) was rounded to 7,000 and three projections of ADT were estimated; 8,000, 10,000, and 12,000 resulting in β estimates of 0.1, 0.3, and 0.4 respectively. The forecast of 12,000 ADT corresponds to the year 2015 traffic forecast for Highway 13.

Sensitivity analysis was conducted on varying levels of α and β. The percent of sales retained after improvements (α) was varied between high, moderate, and low estimates by varying α in increments of 20 percent above (the low estimate) and below (the high estimate) the originally set values (the moderate estimate). Sales from increased average daily traffic counts (β) was varied as indicated in the previous paragraph.

The results of the anlaysis show that Alignment B-3 consistently produces positive growth in sales given moderate ADT growth projections. This alignment retains the visibility of the businesses. Moreover, this option adds approximately 200 to 500 yards to the driving distance for accessing the businesses and therefore is not significantly more inconvenient than the existing condition. Few highway travelers are unfamiliar with modern highway interchange ramps and would not likely consider them a major inconvenience. The impact of this option will probably be positive if ADT growth occurs moderately and the percent of sales retained after improvements (α) does not drop below 50 percent.

The percent of sales retained after improvements (α) is expected to be above 50 percent because business visibility will be retained and access will be only slightly less convenient. However, the visibility will be altered. Currently, travelers's view of the businesses are of the front of the businesses. Alignment B-3 will change the view so that travelers view the backs of the businesses. This may have an effect on the travelers appraisal of the businesses and may result in some travelers avoiding the businesses. The businesses will definitely have to change signage so that signs are visible from the by-pass, and they may want to improve

the facades of the back of their businesses so that solid waste disposal, empty crates, etc. are not visible from the by-pass.

Another concern regarding Alignment B-3 is the impact of new businesses wanting to locate directly off the interchange. If ADT growth is substantial, potential investors may be interested in locating convenience stores, truck stops, restaurants, etc. at the new interchange. Outside investors might capture substantial portions of the existing market resulting in failures among the existing businesses. Already this potential exists with the rebuilt truck stop and new restaurant south of Collins. Existing businesses may want to consider rebuilding at the interchange improve highway access and enhance visibility.

Alignment C-1 would likely result in declining sales due to decreased business visibility and access. This alignment will greatly diminish visibility (the businesses would not likely be visible from the by-pass). Businesses would have to rely on high-quality signage to attract travelers. This alignment will probably result in greatly diminished sales and consequent loss of business. Only very high ADT growth would offset lost sales resulting from this option.

Alignment A-5 provides a frontal view of Collins' businesses, but at the same time it does make access slightly more inconvenient, especially for Peggy's Restaurant, the downtown, Valley Farm's Restaurant, Howard B. Restaurant, the Sinclair station, and the Kerr McGee station. In addition, south-bound travelers will find accessing Smiths, Bubba's, etc. more difficult. Local and area residents may find A-5 annoying because it makes moving from the businesses north of highway 54 to the businesses south of 54 more difficult.

If sales decline due to the highway improvements, then one or more of the businesses will likely close. The profit margins of restaurants are normally very small (less than 5-10 percent) and the interviews revealed that this is the case for the Collin's restaurants. Profits are necessary for long-term business survival and travelers are believed to be providing the breakeven sales necessary for Collin's restaurants to be profitable. Likewise, interviews with the other businesses indicated very small profit margins.

Environmental Analysis of Alternatives

An evaluation of impacts of the alternative improvement proposals for Route 13 was conducted for those environmental factors which were identified as possible concerns. These concerns included paleontological, historical, & archaeological resources; traffic noise; floodplain, hydrology, wetland, and water quality; wildlife, geology and soils, land use, and hazardous wastes. In this section, the No-Build Alternative (no improvements or construction) is used as a basis for evaluating the impacts resulting from construction of the three Build alternatives including the recommended alternative.

Land Use/Prime Farmland

Soil types in the Collins area indicate that all three alignments are located in areas that can be classified as prime farmland. However, much of this land is currently not used for farming purposes especially adjacent to Coon Creek, near drainage ditches, by field edges, or within Collins. Additionally, many existing fields are used for pasture. Total estimated right-of-way acquisition for the three alternatives are shown in Table 5-4. The C-1 alignment requires the most right-of-way (85 acres) and currently used prime farmland (53 acres). The B-3 alignment requires an estimated 40 acres of new right-of-way of which 15 acres is currently used prime farmland. The A-5 alignment requires an estimated 34 acres of new right-of-way of which 17 acres is currently used prime farmland.

Table 5.4 - Estimated Right-of-Way Acquisitions / Land Use

ALTERNATIVE ALIGNMENT

	A-5	B-3	C-1
Agricultural/Prime Farmland	17 ac.	15 ac.	53 ac.
Pasture / Woodland / Other	11 ac.	25 ac.	32 ac.
Commercial / Service	4 ac.	0 ac.	0 ac.
Residential	2 ac.	0 ac.	0 ac.
TOTALS	**34 ac.**	**40 ac.**	**85 ac.**

Paleontological, Historical & Archaeological concerns

The following section is based on the Cultural Resources Study done for this project by Southwest Missouri State University Center for Archeological Research. All three final alternatives, A-5, B-3, and C-1 will have no effect on significant paleontological, historical and archaeological resources. No cultural resources were found within the proposed A-5 alignment during an extensive cultural resource survey completed on areas that will be potentially impacted by relocation of Route 13 at Collins. Several scattered isolated historic and prehistoric finds did occur within the proposed B-3 and C-1 alignments but are ineligible for listing on the National Register of Historic Sites. A field of mima mounds that purportedly were burial facilities were carefully examined. They are of natural, rather that cultural, origin. Furthermore, no prehistoric artifacts could be positively associated with them.

One site, a small industrial historic kiln site, was located close to the C-1 alignment but shouldn't be affected by it. It's eligibility for the National Register of Historic Sites is undetermined. If this alignment was chosen, and more specific location studies determined this site could be impacted, a Phase II investigation

should be initiated to evaluate whether this site is eligible for nomination to the National Register of Historic Sites.

Noise

As discussed in Chapter II, a noise study was performed to assess the noise level impacts of the Route 13 widening project through Collins, Missouri.

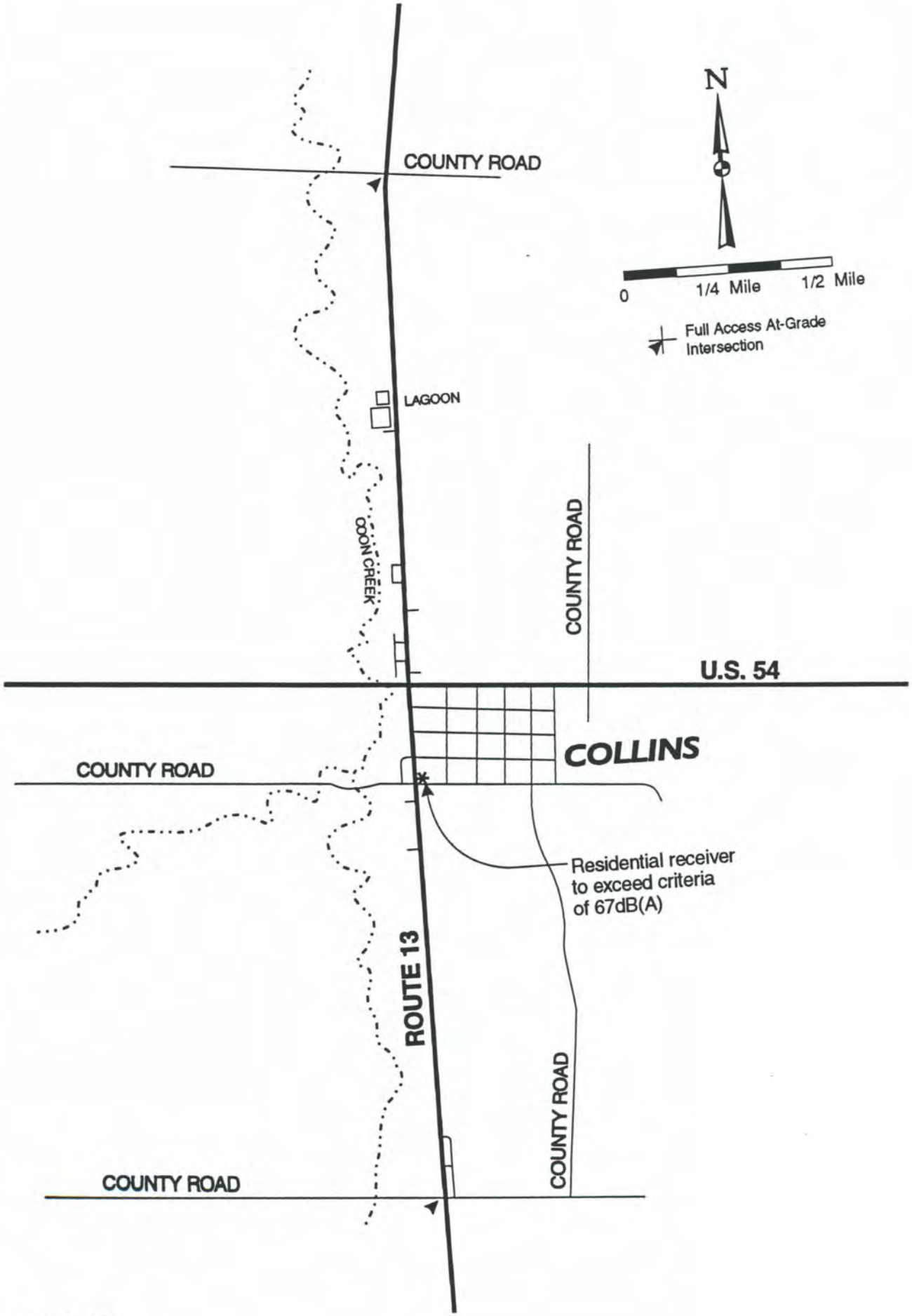
Guidelines defining noise abatement criteria as established by the Federal Highway Administration (FHWA) for the upper limits of acceptable traffic noise levels for various groups of activities as shown in Table 2-2 in Chapter 2. These levels represent a balance between what may be a desirable noise level and an achievable noise level.

For the noise models evaluated, eight (8) receivers were located at various locations where impacts were most likely to occur. All receivers were modeled at five feet above ground elevation and at a reasonable distance from the roadways (Route 13 and U.S. 54).

The FHWA STAMINA 2.0 program was used to predict future traffic noise levels. The do-nothing option provided no increased capacity for Route 13 or U.S. 54, but modeled the increased traffic volume on the existing roadway section for the year 2015. Because of the increased traffic (nearly double), the noise level is increased an average of 3 dB(A) at each of the eight receivers. The noise abatement criteria is violated at only one receiver (located east of Route 13 at the south end of town) where the noise level of 69.3 dB(A) exceeds the allowable 67.0 dB(A) for residences (see Figure 5-10).

For the A-5 alignment, five additional receivers were added along Route 13 to identify a noise envelope within which the noise abatement criteria for residences would be violated. Using predicted traffic volumes for the year 2015, the analysis revealed no violations for seven of the eight original receivers. The receiver in violation was located at a business which will be taken in this alternative. The envelope for which the noise level exceeds 67.0 dB(A) extends approximately 200′ to either side of the centerline of the new alignment for Route 13. There are no residences existing within this envelope, which are not being taken by the A.5 alignment.

As was done in the analysis of alternative A.5, new receivers were added for the B-3 alignment anlaysis to identify a noise envelope within which noise levels would be violated for residences. Ten new receivers along Route 13 were added to the model; five at points just before the grade increase over U.S. 54 begins and at five points at the increased grade. Predicted traffic volumes for the year 2015 were used. None of the original eight receivers exceeded the limits established by the FHWA. The noise envelope for the new alignment of Route 13 extends approximately 200′ to either side of the proposed centerline. No residences or businesses currently exist within this envelope.



NO BUILD
TRAFFIC NOISE IMPACT
FIGURE 5-10

For the C-1 alignment, five new receivers were included in the model in addition to the original eight. As before, traffic volumes for the year 2015 were used for the model. Noise abatement criteria were met for all of the original eight receivers. The noise envelope for the C.1 alignment extended approximately 200' to either side of the proposed centerline. No residences or businesses currently exist within this noise envelope.

The results of the noise analysis were based on currently available design criteria and information. Noise levels at the various receivers were predicted by the FHWA noise analysis model STAMINA 2.0. The conclusions from the analysis are:

- There are currently no violations of the FHWA noise abatement criteria, either residential or business, for the existing traffic volumes.
- The do-nothing alternative roughly doubles the noise energy level reaching the eight receivers, however, only violates FHWA criteria at one location.
- The A.5, B.3 and C.1 alternatives do not violate FHWA criteria at residences or businesses not being taken by the respective alignments.
- The noise envelopes for the A.5, B.3 and C.1 alternatives extend approximately 200' to either side of each alternatives' respective centerline.

Hazardous Waste Sites

According to a letter received from the Missouri Department of Natural Resources (MDNR), there are no listed hazardous waste sites in the City of Collins and there are no current investigations in the area. According to a private database research which researches State and Federal records, including the Comprehensive Environmental Recovery, Compensation and Liability Inventory System (CERCLIS), there are no sites in the study area.

Above ground storage tanks are regulated by the Missouri Department of Agriculture Division of Weights and Measures. According to personnel with this department, there have been no reported spills in the study area and there are no significant compliance problems with the above ground storage tanks in the study area. Underground storage tanks are regulated by the Missouri Department of Natural Resources. According to personnel with MDNR, the only underground storage tanks located in the study area are located at Mike's 66 Service. Underground storage tanks were formerly located at the MHTD maintenance facility, but these tanks have reportedly been removed.

Facilities which could potentially impact the A-5 alignment include the Empire District Electric Company, the MHTD maintenance facility, the Country Trader Antiques, and 2 residences behind Valley Farms Mini Mart and Restaurant (possible asbestos). Facilities which could potentially impact the B-3 alignment

include the Empire District Electric Company, the abandoned service station and Bubba's Liquor and Mini-Mart. None of the facilities would impact the C-1 alignment.

Threatened and Endangered Species

Examinations of map and computer files for federal and state threatened and endangered species have shown that no sensitive species or communities are known to occur within the project area or along any of the proposed alignments. All alignments would be considered equal in this respect. The lack of records, however, does not mean that such species or communities do not exist on within the project area. Only an on-site inspection could verify their absence or existence. Correspondence with the Missouri Department of Conservation confirmed this information.

Floodplain, Hydrology, Wetland, and Water Quality

The alignments proposed affect various elements of the Coon Creek ecosystem and floodplain by varying degree, depending on alignment.

Generally, all alternative alignments will require permits for sections 401, 402, and 404 of the Clean Water Act (Public Law 95-217).

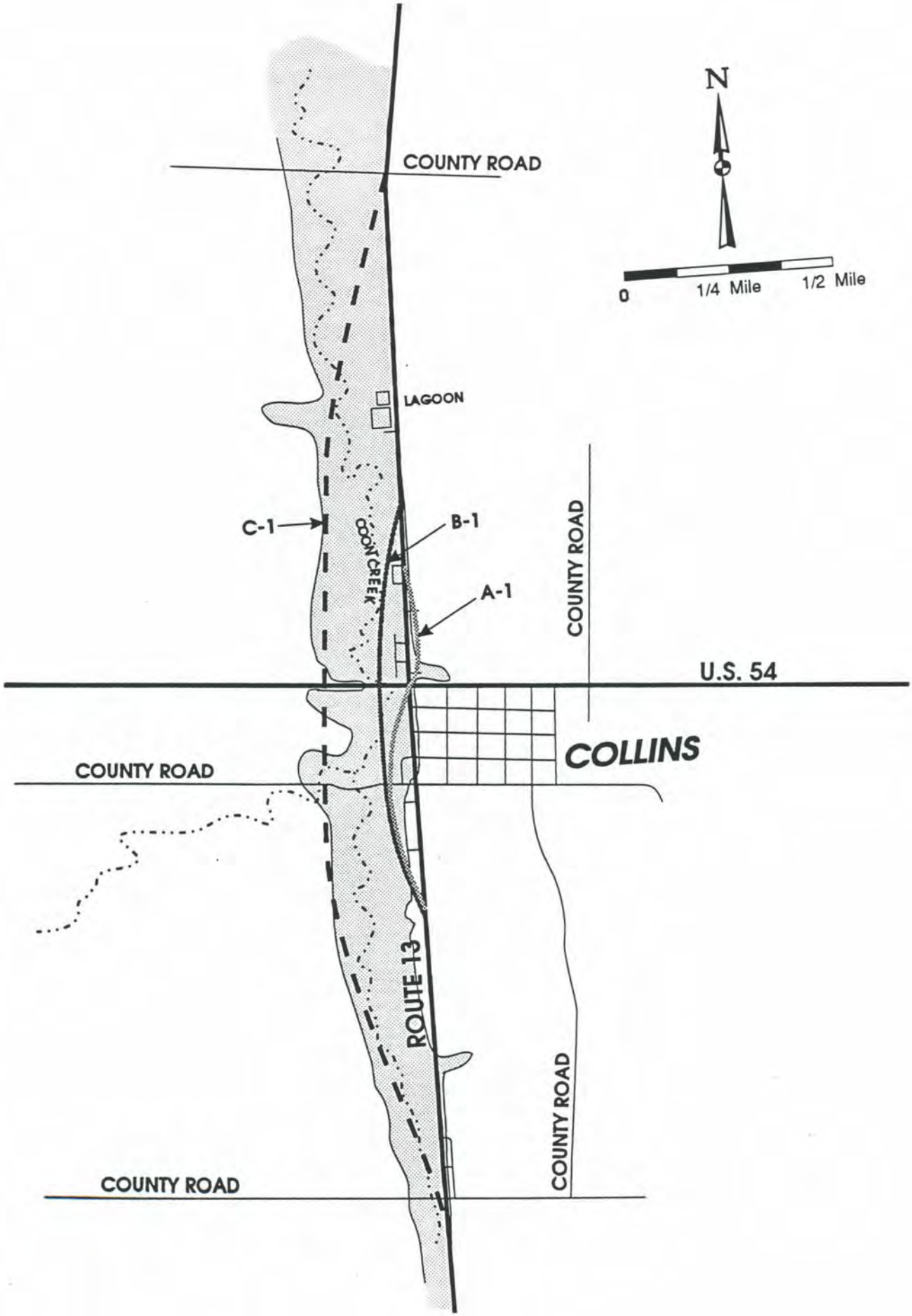
The 401 permit is a companion permit with the 404 permit issued as a Certification of Water Quality for issuance of the 404 permit. Any construction in the Coon Creek alignment will affect the extent of the 404 permitting process.

The 402 permit involves the groundwater discharge as a result of possible dewatering taking place during the construction process, specifically in the Coon Creek area. Construction of structure foundations in the low areas will require some method of dewatering the construction area. The following summary reviewed the estimated degree of impact on the possible wetlands:

Alternative	*Impact*
A5	Minimal
B3	Major
C1	Moderate

Wetland delineation for the 404 Permit may have an affect on the final alignment, depending on the extent of wetlands affected. The Corp of Engineers may not approve the project if an alternative alignment is available with less impact on the wetlands.

The floodplain for Coon Creek is also affected by some degree from all alternatives (see Figure 5-11).



FLOODPLAIN IMPACTS
FIGURE 5-11

Alternative A5 has minimal impact with only one structure located in the creek area.

Alternative B3 affects the floodplain on either side of Route 54 requiring a major channel relocation for approximately 3,000 linear feet. The actual area delineated by the 100-year flood will be less as a result of better hydraulic properties of the new channel versus the existing creek bed.

Alternative C1 also has moderate affect on the floodplain with two locations encroaching into the creek areas. One area is on the east branch of Coon Creek, while the other area is almost a mile north of Route 54.

Geologic and Soils

From the standpoint of geological considerations, all alternatives are essentially equal. From a geotechnical (soils) standpoint, the A-5 and B-3 alignments are fairly equal. In both cases the subgrade soils are poor and will require considerable work to provide adequate support for pavement subgrades. However, the necessity for the placement of several feet of fill to protect against flooding along the B-3 alignment may, as a bi-product of fill placement, produce a better subgrade if the borrow area is selected from higher topographic areas and if it contains a fair amount of chert fragments which will produce stability. The C-1 alignment still has the problems with the Coon Creek area that the A-5 and B-3 alignments have but the soils further west of the creek should be somewhat better in providing support for pavement subgrades.

Conclusions

There are many factors which must be considered before recommending an alternative. These include the need for the project, safety, capacity, community concerns, access, environmental concerns, economic concerns, and costs. The Missouri Highway and Transportation Department (MHTD) is obligated to the people of the State of Missouri to provide the best transportation system possible. This involves providing a transportation system that is safe, efficient, and recognizes local and regional concerns. While the Route 13 expressway is intended to provide a high degree of mobility and serve longer trips it must allow for local access and address environmental impacts and concerns.

In terms of safety and capacity alone, the C-1 alignment is the best alternative. It provides a high speed facility with a minimum of interference from at-grade intersections which both reduce capacity and reduce safety. The worst alternative in terms of safety and capacity alone is the A-5 alignment because of the more numerous access points and the increased decision points for the travelling public.

In terms of the local economy and local access, the A-5 alignment is the best alternative. By providing good visibility to businesses in town and providing more access than the other 2 alternatives, local access and the local economy is

maximized. The C-1 alignment would be the worst due to the very limited visibility and less access opportunities.

In terms of environmental concerns, different alignments are best based on the particular environmental concern. In regard to Paleontological, Historical, and Archaeological resources, none of the alignments would affect any significant sites. However, the C-1 alignment would split an existing century farm (in the same family for over 100 years). From a highway noise standpoint, none of the alignments would exceed the Federal noise level criteria at either residences or businesses. However, in general, the A-5 alignment would create more noise in Collins than the B-3 alignment, and the B-3 alignment would create more noise in Collins than the C-1 alignment.

From a floodplain, hydrology, wetland, and water quality viewpoint, the A-5 alignment would produce the fewest impacts, since Coon Creek is avoided with this alignment. Alignment B-3 would produce the most impacts since Coon Creek would require several relocations, box culverts and possible removal or relocation of wetlands. The C-1 alignment requires box culverts over Coon Creek, but minimal possible wetland disturbance and some channel relocation. None of the alignments would affect critical wildlife habitat of any threatened or endangered species. No other significant wildlife habitat has been identified. The geologic soil conditions would most likely be best for the C-1 alignment, as it is on more stable soil. Both the A-5 and B-3 alignments are on poor subgrade soils. However, the necessity for the placement of several feet of fill to protect against flooding along the B-3 alignment may, as a bi-product of fill placement, produce a better subgrade if the borrow area is selected from higher topographic areas.

The C-1 alignment would affect more acres of prime farmland than either of the other two alignments. Both the A-5 and B-3 alignments affect relatively few acres of prime farmland. Several potential hazardous waste sites have been identified in the project area but none have been identified as actual public health hazards. Actual testing may be required of any affected sites before construction. The A-5 alignment has the most potential hazardous waste sites, followed by the B-3 alignment and then the C-1 alignment. No other significant environmental concerns have been identified.

Since the need for the project identifies an expressway and not a freeway type facility additional consideration must be given to local access. The function of an expressway is designed to provide more access than a freeway. Likewise, safety issues should be appropriate for an expressway design. Typical expressway facilities allow both interchanges and at-grade intersections to co-exist using limited access control. Intersections must be minimized but their safety can be improved by providing adequate acceleration and deceleration lanes so that turning traffic is not involved in the mainline traffic lanes. Given these considerations, it is felt that any of the three alternatives as shown meet the project need to provide a safe and efficient roadway given the facility type.

From the viewpoint of local access and the local economy, the C-1 alignment would not be acceptable due to the loss of visibility and reduced access to businesses in town. Alternative B-3 provides visibility of the town and also adequate access to the town. Alternative A-5 provides the best visibility and best access to town and would allow for the greatest economic returns for business owners in Collins.

From an environmental standpoint, none of the alignments would create any significant environmental impacts, however the B-3 alignment would require the greatest amount of mitigation. The cost estimates for the 3 alternatives show that the alignment through town (A-5) is the least expensive, followed by the B-3 alternative and then the C-1 alternative. The A-5 alignment would require the town to pay the cost of relocating town-owned utilities on State R.O.W. This would cost the town approximately $60,000.

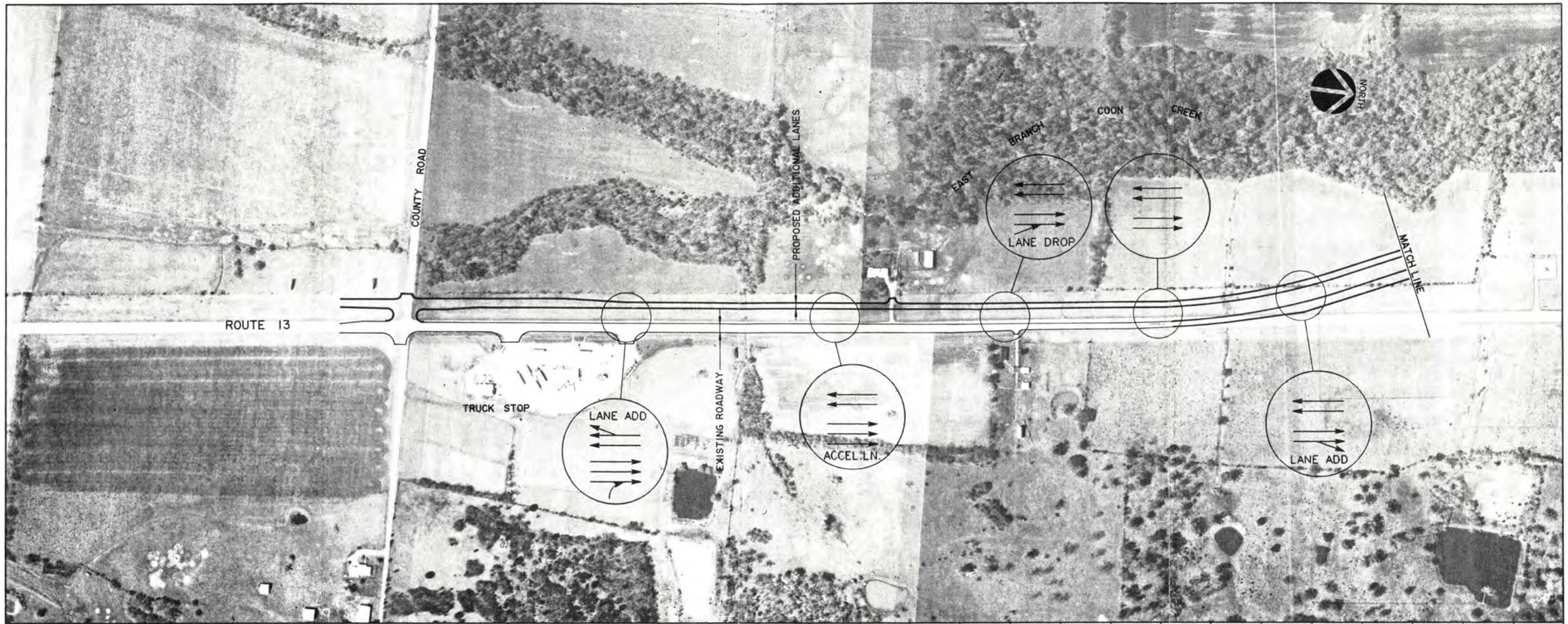
Recommended Alternative

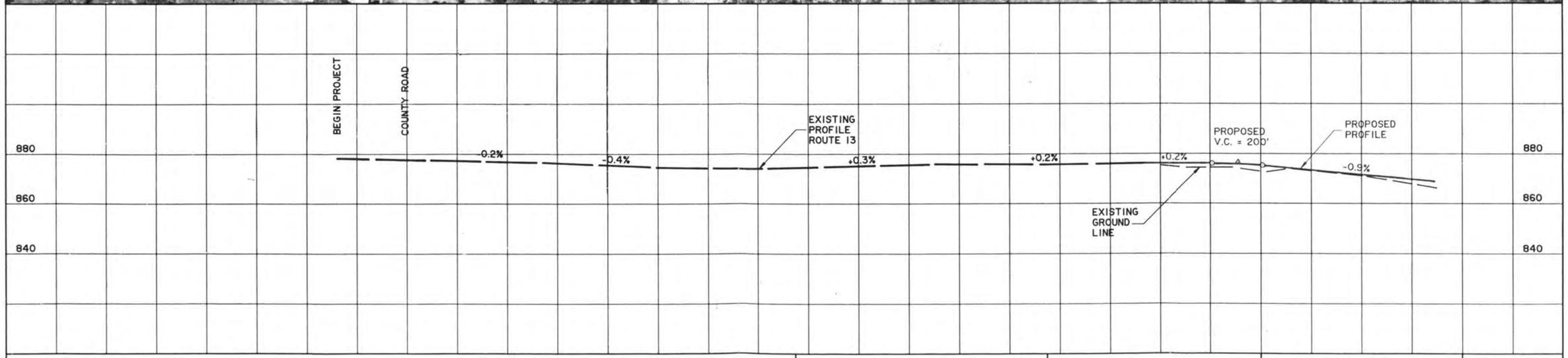
Based on the above factors and evaluation, two of the alternatives are very close in terms of the recommended alternative. The B-3 alternative is considered slightly better in terms of alignment but the A-5 alignment with conditions is the recommended alternative based on its citizen support. The conditions of the A-5 alignment are further enhancements based on public input and business concerns. These conditions include the following:

- No construction would begin on the A-5 alignment through town until the 4-lane Route 13 north of Collins is completed.
- Construction for the Collins segment would not begin for at least 5 to 7 years.
- If major safety problems occur at the U.S. 54/Route 13 intersection before the 5 to 7 year commitment or before 4-lane improvements are completed north of town, Route 13 improvements in Collins could begin sooner.
- Necessary right-of-way acquisition could begin as soon as design plans are completed.
- No new development would occur within the future right-of-way.
- Improvements would include improving and resurfacing the frontage road connection in town (see Figure 5-12 in the next section).
- Tree planting within the R.O.W. within the City limits will be provided. Lighting within the interchange area will be provided in accordance with current lighting practices.

Conceptual Plans and Profiles

Conceptual plan and profile figures showing the three final alternatives discussed in Chapter V of this report are included in this section. These figures are drawn at an approximate scale of 1" = 400 feet and show the existing and proposed highway. The new highway construction is represented by red lines and text. Each alignment alternative consists of three fold out pages. Figure 5-12 shows the recommended Alternative A-3, Figure 5-13 shows Alternative B-3, and Figure 5-4 shows Alternative C-1.





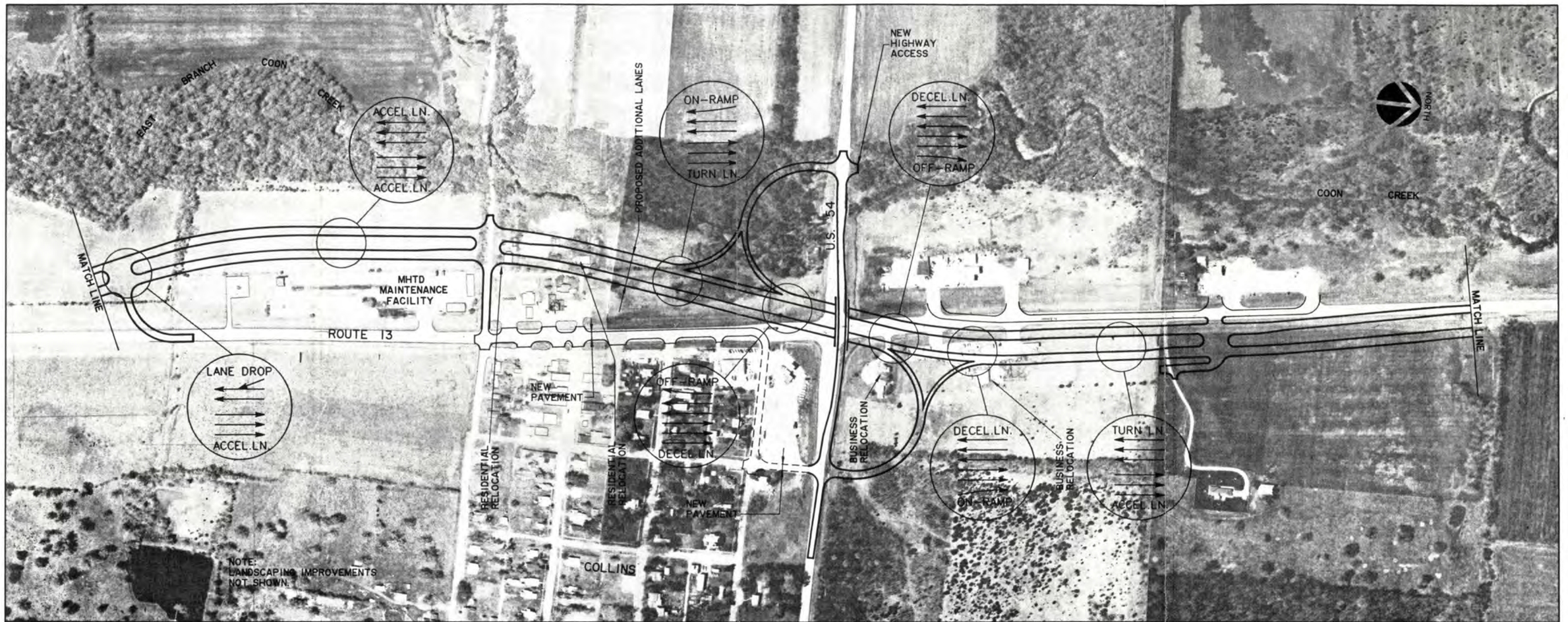
COLLINS ROUTE 13 LOCATION STUDY

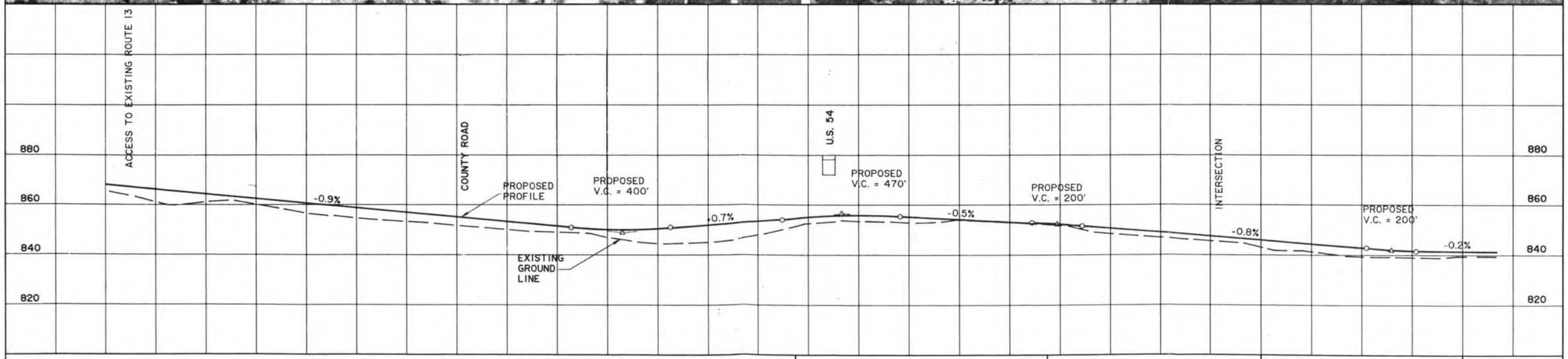
ALIGNMENT A-5

0 100 200 400 600
SCALE IN FEET

CENTENNIAL ENGINEERING INC.

FIGURE 5-12
SHEET 1 OF 3





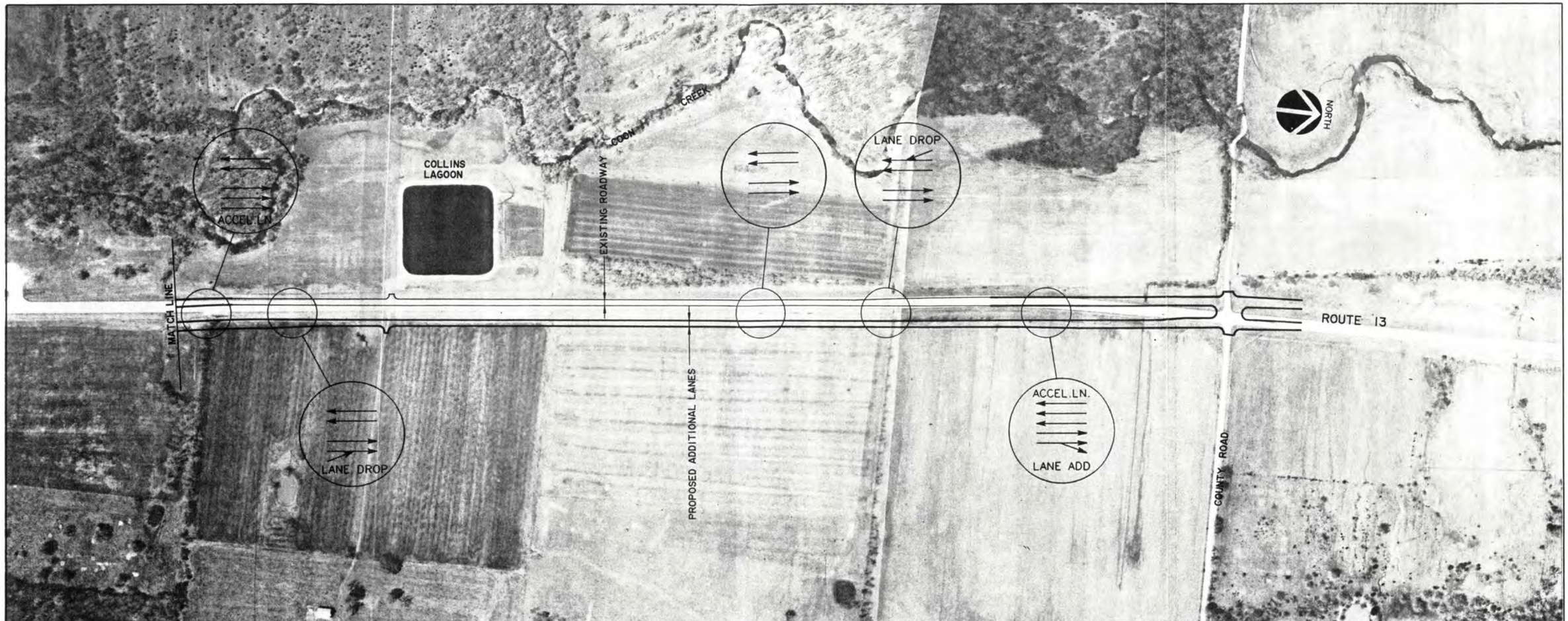
COLLINS ROUTE 13 LOCATION STUDY

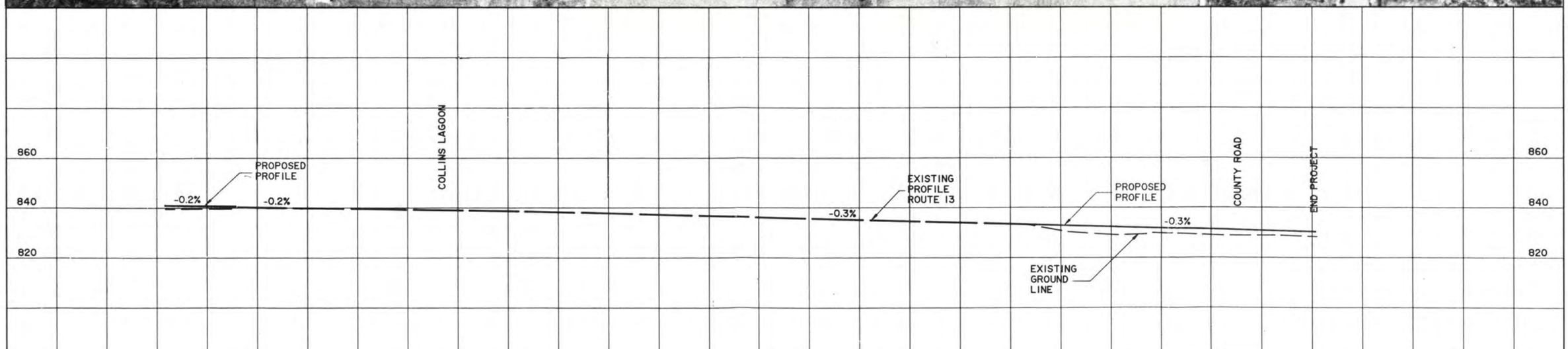
ALIGNMENT A-5

0 100 200 400 600
SCALE IN FEET

CENTENNIAL ENGINEERING INC.

FIGURE 5-12
SHEET 2 OF 3





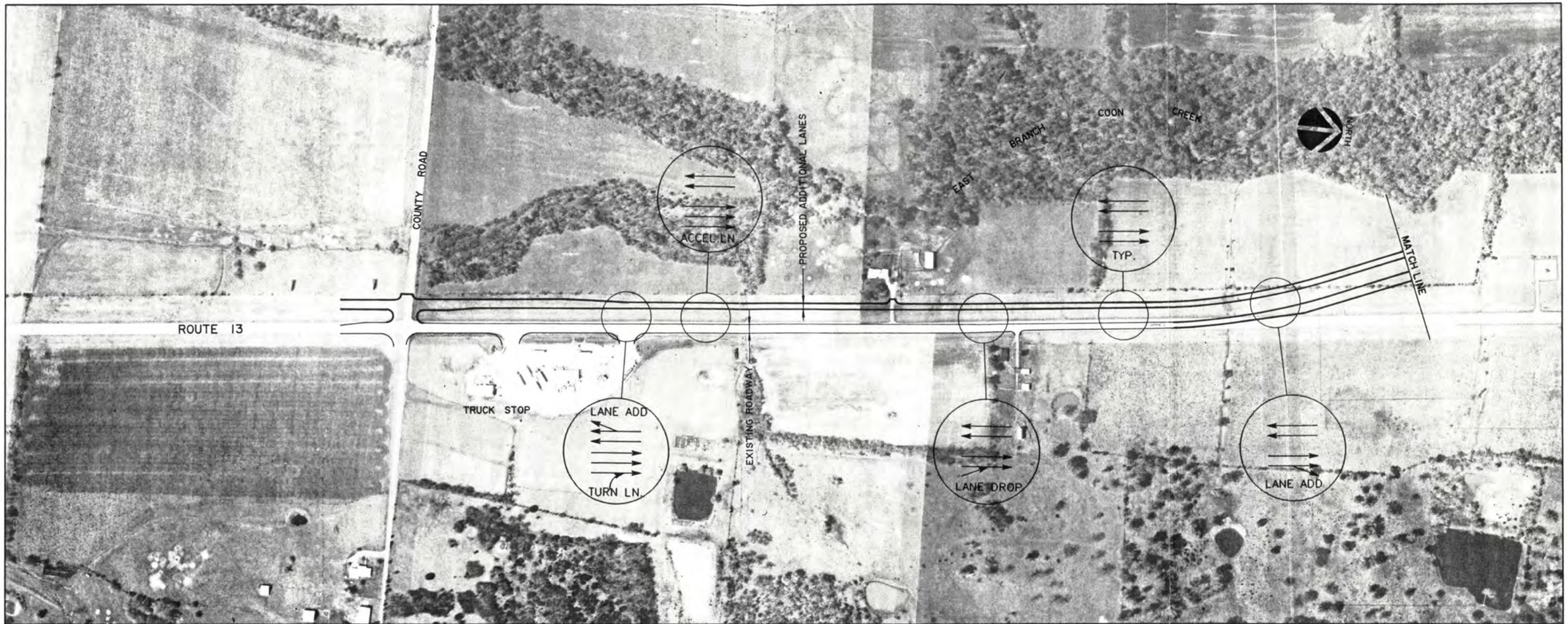
COLLINS ROUTE 13 LOCATION STUDY

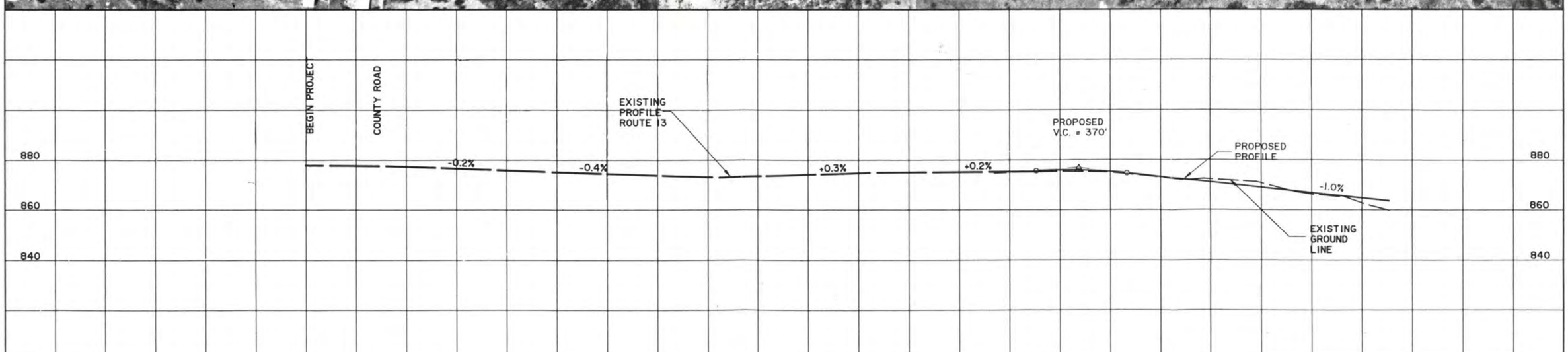
ALIGNMENT A-5

0 100 200 400 600
SCALE IN FEET

CENTENNIAL ENGINEERING INC.

FIGURE
5-12
SHEET 3 OF 3





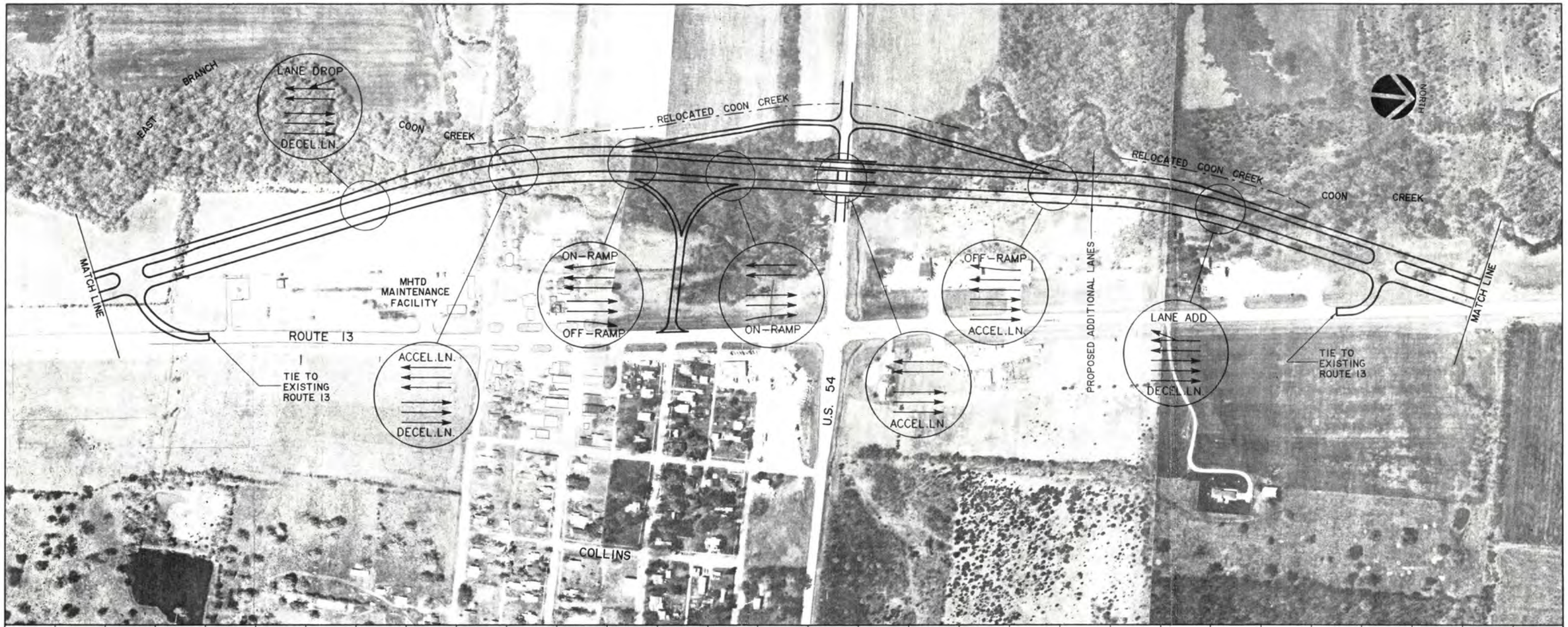
COLLINS ROUTE 13 LOCATION STUDY

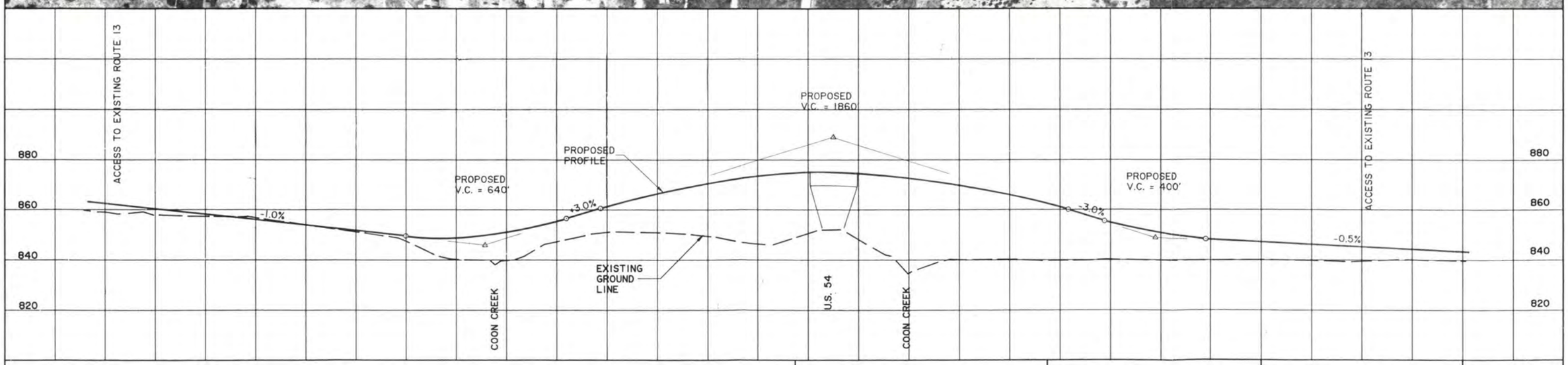
ALIGNMENT B-3

0 100 200 400 600
SCALE IN FEET

CENTENNIAL ENGINEERING INC.

FIGURE 5-13
SHEET 1 OF 3





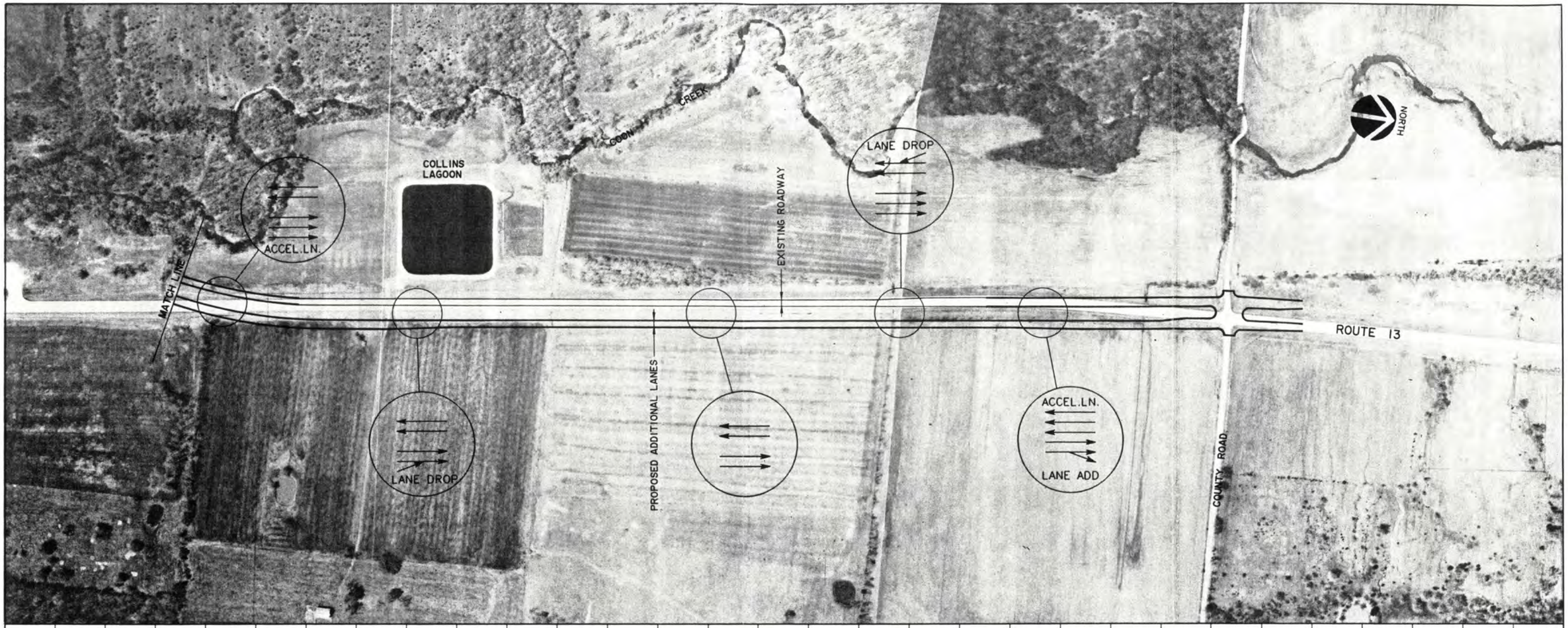
COLLINS ROUTE 13 LOCATION STUDY

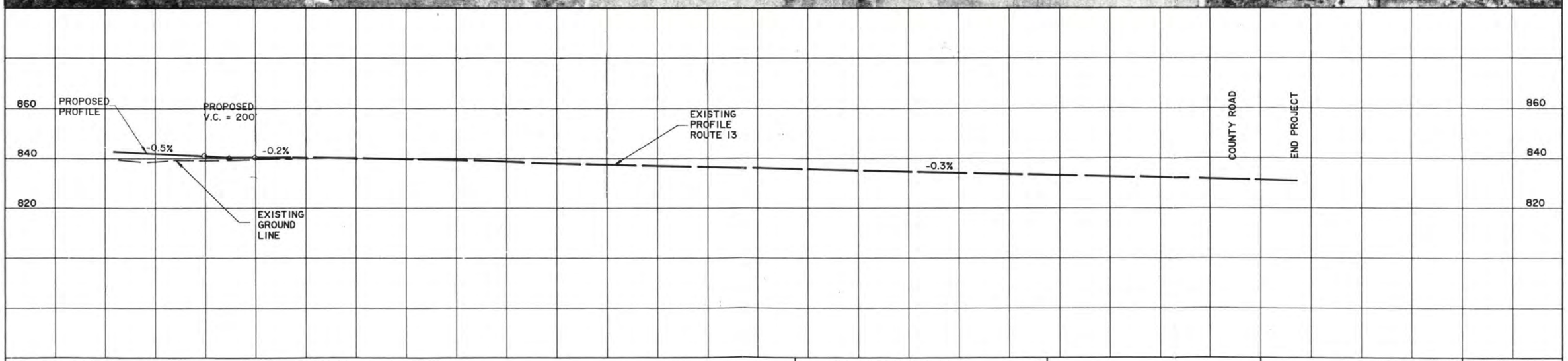
ALIGNMENT B-3

0 100 200 400 600
SCALE IN FEET

CENTENNIAL ENGINEERING INC.

FIGURE 5-13
SHEET 2 OF 3





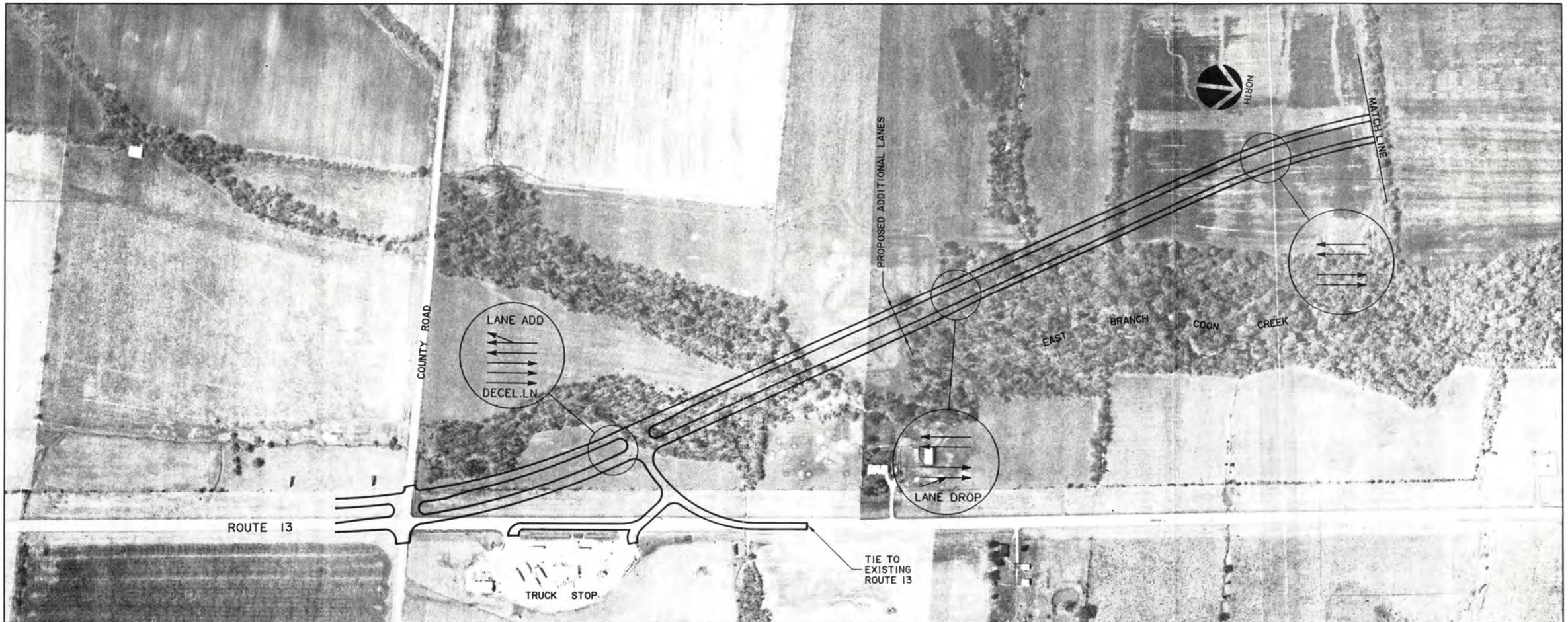
COLLINS ROUTE 13 LOCATION STUDY

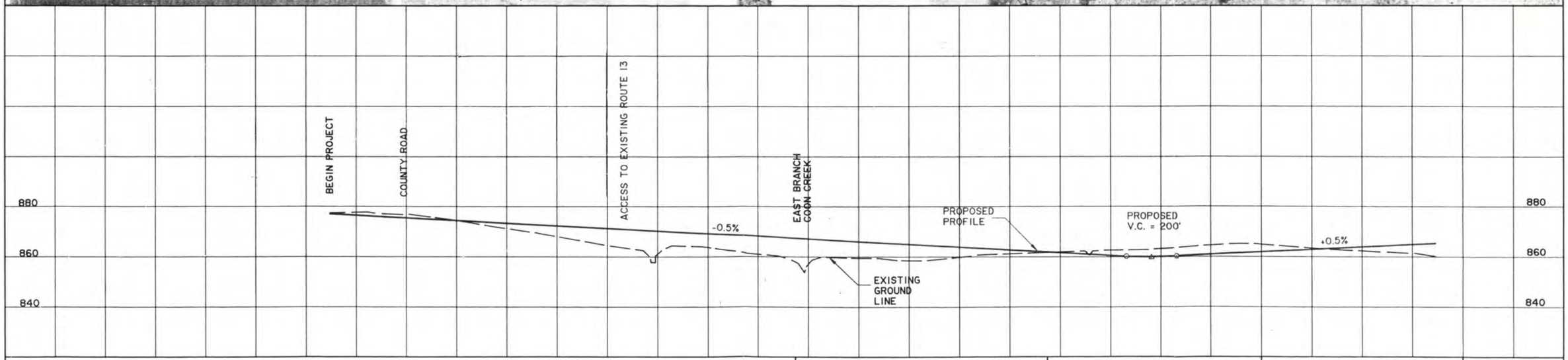
ALIGNMENT B-3

0 100 200 400 600
SCALE IN FEET

CENTENNIAL ENGINEERING INC.

FIGURE 5-13
SHEET 3 OF 3





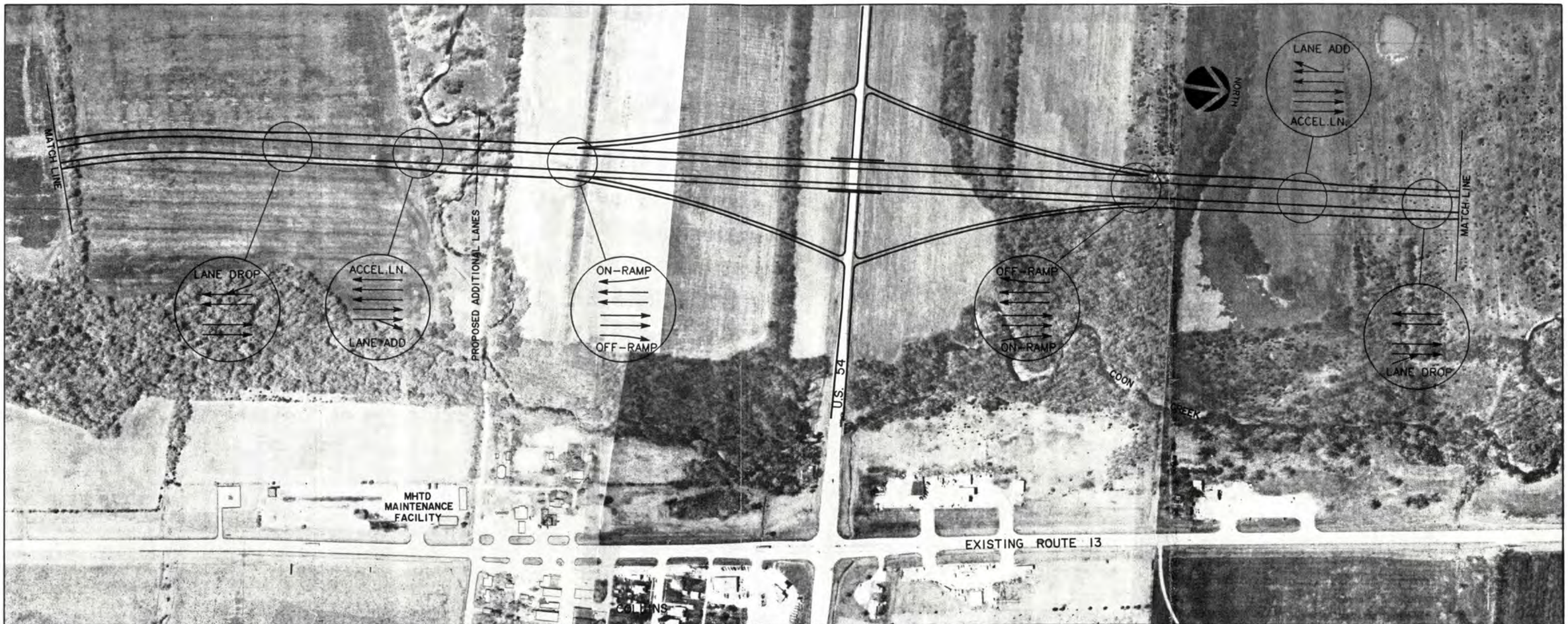
COLLINS ROUTE 13 LOCATION STUDY

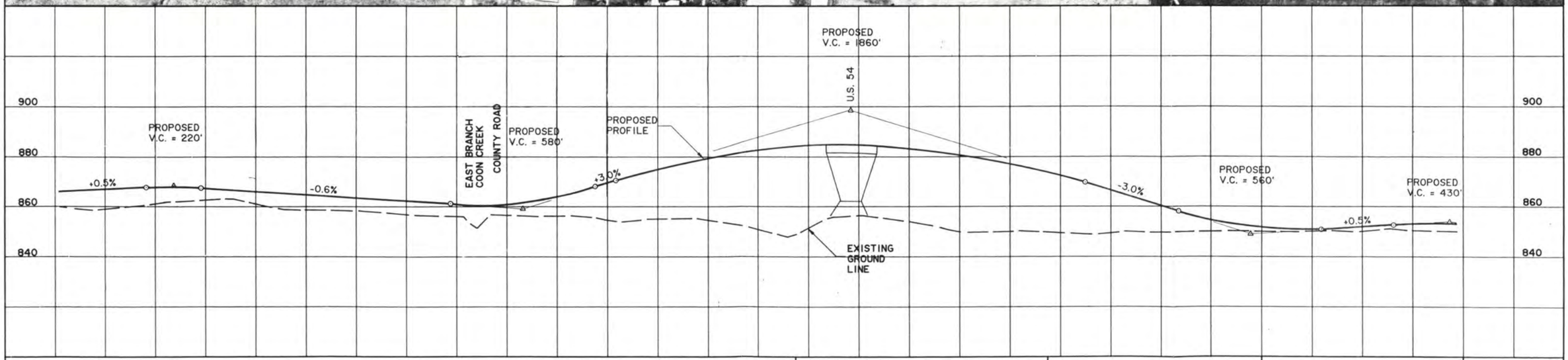
ALIGNMENT C-1

0 100 200 400 600
SCALE IN FEET

CENTENNIAL ENGINEERING INC.

FIGURE 5-14
SHEET 1 OF 3





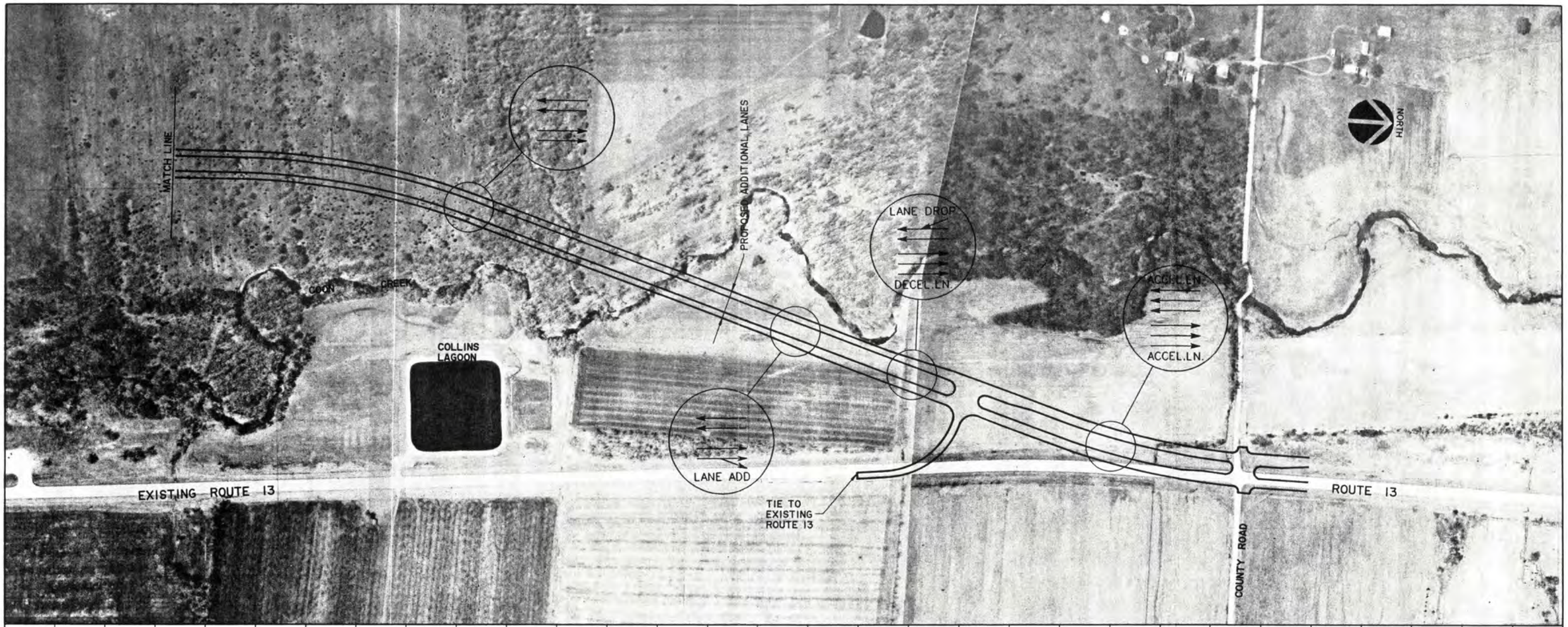
COLLINS ROUTE 13 LOCATION STUDY

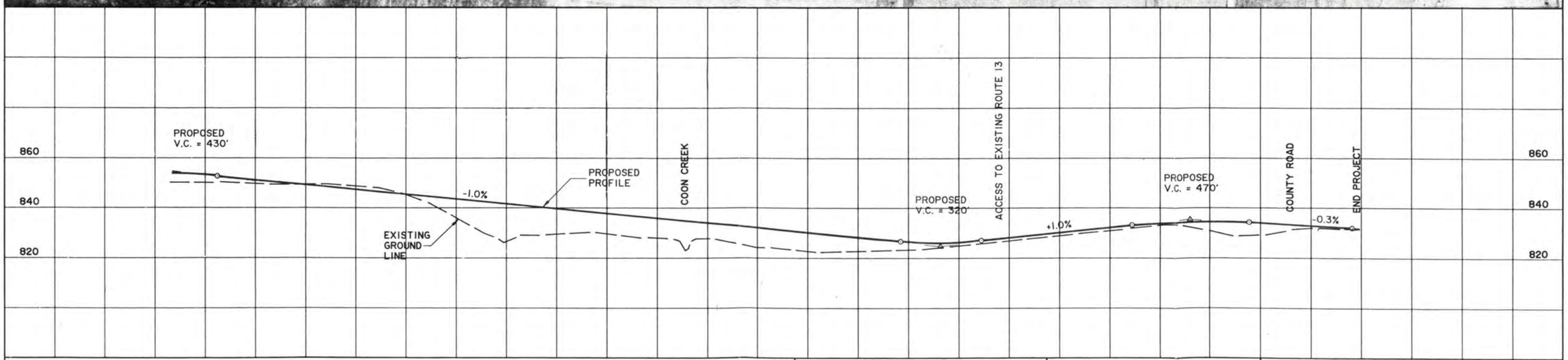
ALIGNMENT C-1

0 100 200 400 600
SCALE IN FEET

CENTENNIAL ENGINEERING INC.

FIGURE 5-14
SHEET 2 OF 3





COLLINS ROUTE 13 LOCATION STUDY

ALIGNMENT C-1

0 100 200 400 600
SCALE IN FEET

CENTENNIAL ENGINEERING INC.

FIGURE 5-14
SHEET 3 OF 3

RD LIBRARY
RD0008856