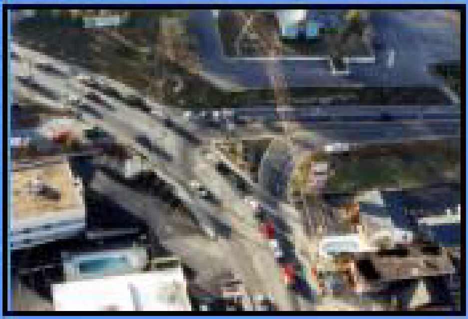
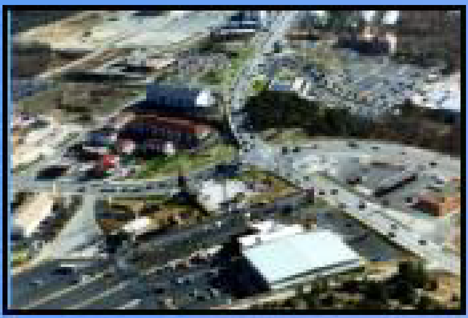
Branson Comprehensive Transportation Plan

Final Report





Prepared by the

LARKIN GROUP

In Association with

Wilbur Smith Associates

November 2001

TABLE OF CONTENTS

CHAPTER 1 STUDY INTRODUCTION

Transportation Project Development Process 1-1
Comprehensive Transportation Plan Process 1-1
The Study Area 1-3
Phase I Results 1-5
Easy Implementation 1-5
Projects That Can Be Constructed For Less Than $250,000 1-5
Projects That Can Be Constructed For More Than $250,000 1-6
Phase II Evaluation Concept 1-6
Local Community And Public Involvement Summary 1-7

CHAPTER 2 EXISTING CONDITIONS

Land Use And Travel Characteristics 2-8
Roadway Characteristics 2-8
Regional Traffic Model 2-10
Types Of Models 2-10
Model Input 2-12
Methodology 2-12
Model Validation 2-14
Traffic Projections 2-14
No Build Analysis 2-15
Known And Committed Projects And Developments 2-15
Between Route 248 And U.S. 67 2-15
Along Gretna Road And Vicinity 2-17

CHAPTER 3 ROADWAY ALTERNATIVES

Discussion Of Strategy And Area Constraints 3-18
Preliminary Alternatives 3-18
Preliminary Opinion Of Probable Costs 3-22
Traffic Projections 3-25
Benefit/Cost Analysis 3-25
Identification Of Benefits 3-25
Travel Time Savings 3-25
Vehicle Operating Cost Savings 3-30
Accident Cost Savings 3-33

Benefit/Cost Discussion.......... 3-36

CHAPTER 4 MANAGEMENT ALTERNATIVES

Route 465 Signage Plan Review 4-40
Impact Of Current Signage Plan For Sb Route 65.......... 4-40
Potential Improvements To Current Plan 4-40
Signage For Exits At Route 248 4-41
Other Issues.......... 4-41
Access Management Recommendations.......... 4-41
Purpose.......... 4-42
Background.......... 4-42
New Projects Versus Retrofit Projects.......... 4-43
Roadway Classification System For Access Management 4-43
General Guidelines For The Branson Area.......... 4-43

CHAPTER 5 RECOMMENDATIONS AND IMPLEMENTATION

Description Of Recommended Improvements.......... 5-46
Combined Traffic Impacts And Analysis 5-61
Traffic Volumes 5-62
Travel Efficiency.......... 5-63
Benefit/Cost Ratio 5-64
Detailed Plan, Profile And Opinion Of Probable Costs 5-64
Citywide Traffic Circulation Plan.......... 5-65
Funding Of Improvements.......... 5-65

APPENDIX

Preliminary Plan and Profile Sheets..........66

EXHIBITS

CHAPTER 1

Exhibit 1–1 Transportation Project Development Process.. 1-2
Exhibit 1–2 Comprehensive Transportation Planning Process 1-3
Exhibit 1-3 Project Study Area.. 1-4

CHAPTER 2

Exhibit 2-1 Branson's Major Attractions.. 2-9
Exhibit 2–2 Model Flow Matrix...2-11
Exhibit 2–3 Branson Area Traffic Network 2-13
Exhibit 2-4 Existing and No Build 2020 Traffic Volumes 2-16

CHAPTER 3

Exhibit 3-1 Universe of Alternatives...3-20
Exhibit 3-2 Year 2020 Traffic Volumes...3-26
Exhibit 3-3 Vehicle Hours Saved by Alternative...3-29
Exhibit 3-4 Vehicle Mile Travel Savings..3-32
Exhibit 3-5 Discounted Accident Savings 3-38

CHAPTER 5

Exhibit 5-1 Recommended Alternatives...5-48

TABLES

CHAPTER 3

Table 3-1 Preliminary Roadway Alternatives 3-21
Table 3-2 Recent City Roadway Construction Projects 3-22
Table 3-3 Previously Studied Alternatives..3-23
Table 3-4 MoDOT Cost Factors 3-23
Table 3-5 Preliminary Opinion of Probable Costs..3-24
Table 3-6 Traffic Volumes for Each Alternative...3-28
Table 3-7 Vehicle Hour Travel Savings 3-30
Table 3-8 Vehicle Operating Cost Savings..3-33
Table 3-9 Assumed Accident Rates by Highway Type...3-34
Table 3-10 City of Branson Accident History..3-34

Table 3-11 Accident Cost Assumptions 3-35
Table 3-12 Discounted Accident Savings (2000$) 3-36
Table 3-13 Maintenance Assumptions 3-36
Table 3-14 Benefit/Cost Summary 3-39

CHAPTER 4

Table 4-1 General Guidelines 4-44
Table 4-2 Warrants for Left-Turn Lane 4-45
Table 4-3 Length of Turn Lanes 4-45

CHAPTER 5

Table 5-1 Recommended Projects 5-49
Table 5-2 Combined Impacts on Congestion 5-62
Table 5-3 Measurements of Effectiveness for Year 2020 5-63
Table 5-4 Vehicle Time, Operational Cost and Accident Cost Savings in 2020 .. 5-64
Table 5-5 Accident Rates by Roadway Types 5-64

Chapter 1 Study Introduction

Plagued by delays and congestion described as "a parking lot" during the peak tourist season, Branson's transportation problems are distinctive in several respects, including extreme terrain constraints and a tourism-based traffic flow pattern that is unique in the nation. To address the transportation deficiencies in the region, the city of Branson decided to develop a long-range comprehensive transportation plan to guide their efforts in improving traffic flow.

The goal of the transportation plan was to develop a roadmap tailored to the unique characteristics of Branson that can be used both immediately and over the course of the next 20 years. The comprehensive transportation plan was divided into two different work tasks or phases. The results of Phase I provided a list of recommended improvement projects that could be implemented immediately. Those projects that could not be implemented immediately were then evaluated in more detail in Phase II. Phase I was completed in late 2000. A report and executive summary documenting the results were developed at that time.

Phase II of the transportation plan was to develop a long-range transportation plan for Branson. The purpose of this plan was to determine the transportation facility needs over the next 20 years. This report summarizes the evaluation process and results of Phase II. The results of this plan will then be incorporated into the city's land-use plan and approved by the city council.

Transportation Project Development Process

Exhibit 1-1 displays the typical transportation project development process. The process begins with the on-going regional transportation process, the comprehensive transportation plan. The transportation plan establishes the transportation objectives for the region. Those objectives are then implemented through a detailed process involving environmental screening, project design, right-of-way acquisition and finally construction.

Comprehensive Transportation Plan Process

The purpose of a comprehensive transportation plan is to evaluate various investment strategies from a broad perspective, to determine which alternative improvements best address specific transportation needs. As displayed in **Exhibit 1–2**, comprehensive transportation plans follow a structured process that begins with the identification of transportation issues, proceeds through the development and evaluation of alternative solutions and concludes with the selection of a series of preferred alternatives. Public involvement activities are integrated at each stage of the process. The preferred alternatives may then be recommended for adoption into the long-range plan and proceed into detailed engineering and environmental study.

Exhibit 1–1
Transportation Project Development Process

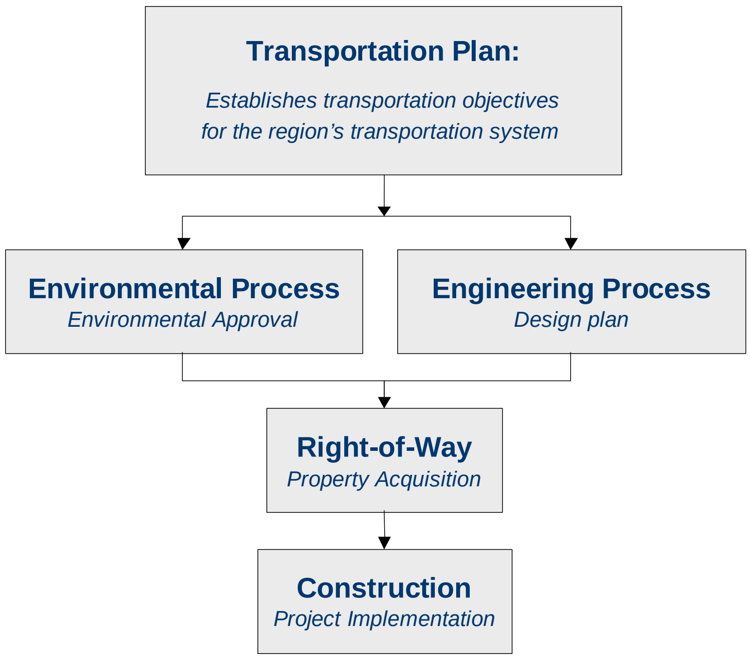
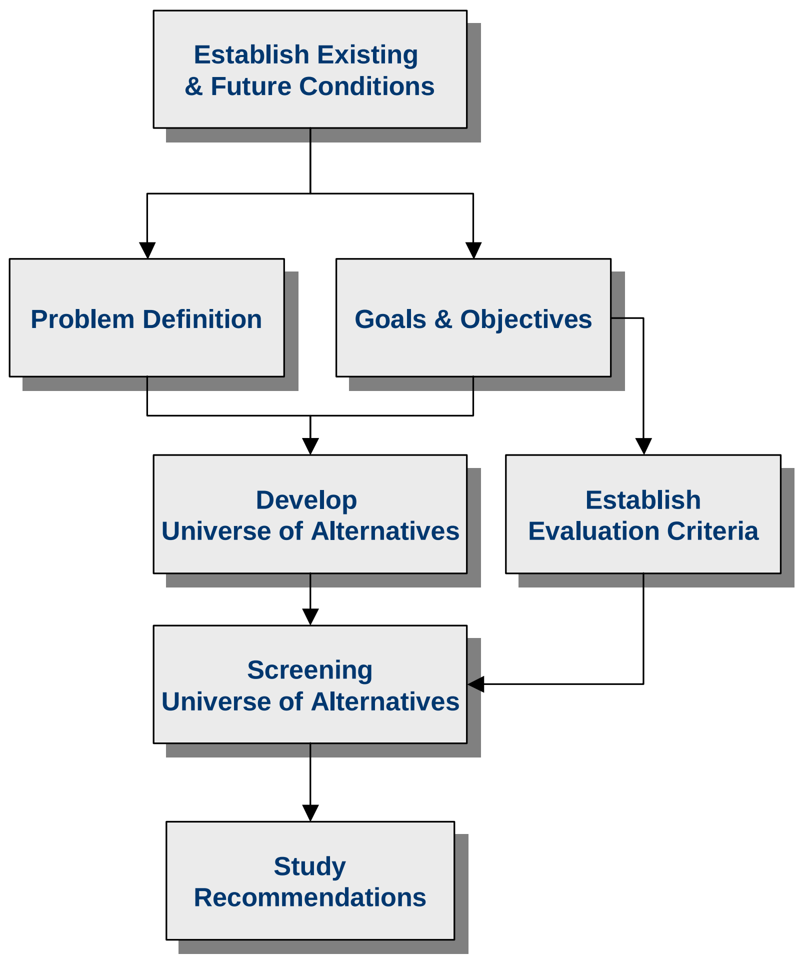


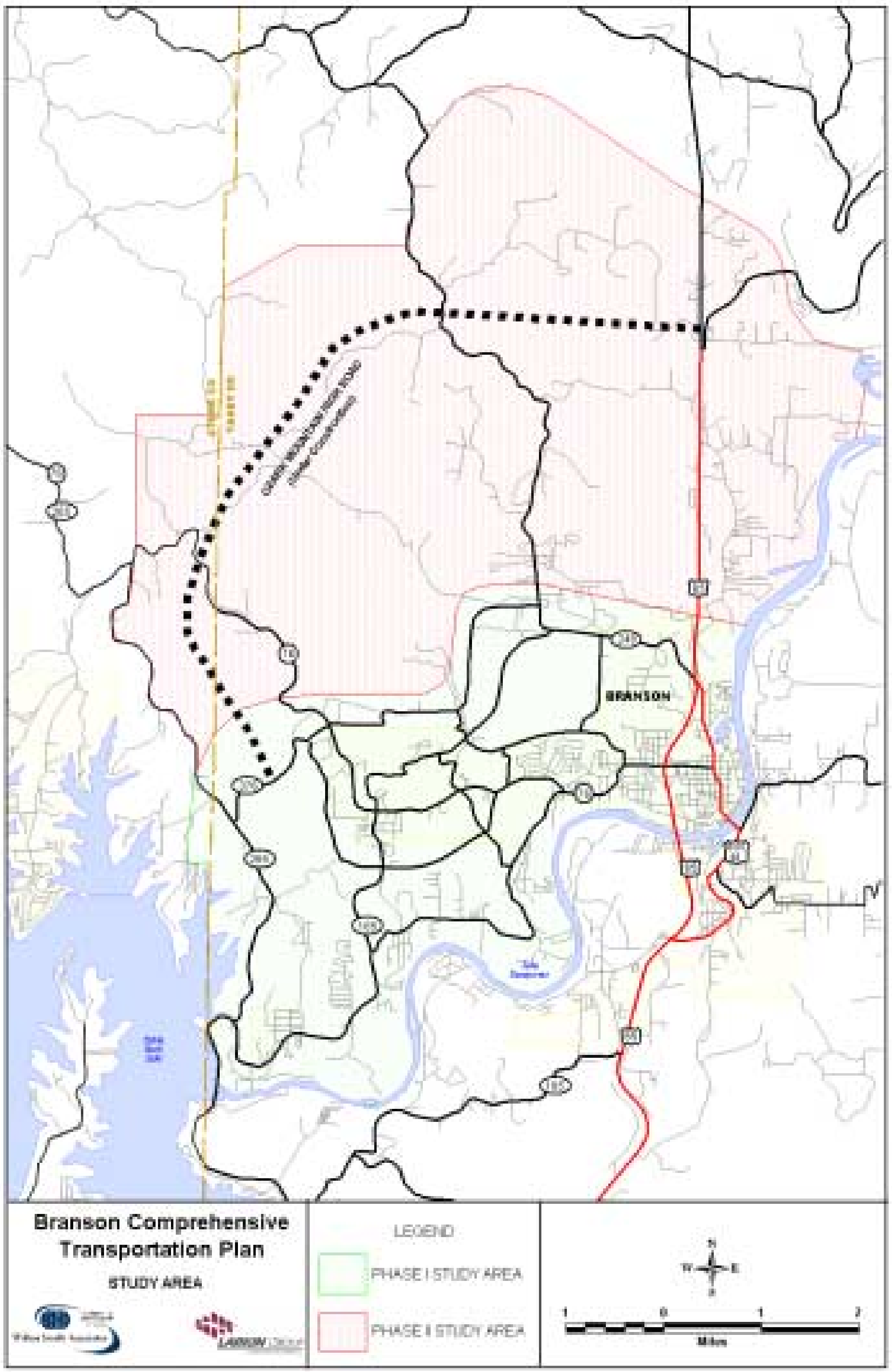
Exhibit 1–2
Comprehensive Transportation Planning Process



The Study Area

The Branson Comprehensive Transportation Plan study area encompassed a 50-square mile area around Branson. The perimeter of the study area was Branson's Urban Services Boundary, as illustrated in **Exhibit 1-3**. The general limits of the study area include Lake Taneycomo to the south and east, Route 265 to the west, and approximately 0.5 miles south of Route 160 to the north. This study area was used for both phases of the project.

Exhibit 1-3
Project Study Area



Alternatives Development and Evaluation Process

Several alternatives had been identified and evaluated in previous studies and were incorporated into this process. There were also alternatives that had been planned for by local developers. Some of these previously studied or planned alternatives were modified based on suggested changes from the city staff. Finally, the study team added alternatives based on the analysis of existing and future conditions. Each of the preliminary alternatives fit within one of the following categories:

- Connections in developed areas
- Widening of existing routes
- Connections in undeveloped areas
- Bridge crossings

Phase I Results

The Phase I report on existing conditions for the city of Branson's comprehensive transportation plan identified several improvements that would benefit the area in the short-term and help the city to maximize the efficiency of the current infrastructure. Improvements to the signing plan were recommended as well as several intersection improvement projects. The following is a list of the improvements recommended as a part of Phase I.

Easy Implementation

- Signal timing optimization
- Colored route signing modifications
- Theater parking operations
- Protected/permissive left-turn signals
- Show Time adjustments
- "Do Not Block Intersection" traffic ordinances
- Ramp for southbound Route 65 to Route 248 sign improvement
- Ramp for southbound Route 65 to Route 76 sign improvement

Projects That Can Be Constructed For Less Than $250,000

- Overlap right-turn signals
- Signal coordination
- Route 76 (Main Street) and Business Route 65 intersection improvements

Projects That Can Be Constructed For More Than $250,000

Although each of these intersections can be improved for more than $250,000, the full benefit will not be realized unless the entire group is completed.

- Group 2 – The following set of signals should be signal interconnected, in addition to the following:
  - Roark Valley Road at Shepherd of the Hills Expressway – modify signal to include an exclusive overlap right turn signal and an eastbound right-turn lane with 300 feet of storage.
  - Gretna Road and Roark Valley Road – modify signal to include an exclusive overlap right turn signal and a protected/permissive left turns along with adding/extending turn lanes.
- Group 3 – The following Route 65 and Route 76 signals should be signal interconnected, in addition to the following:
  - Northbound Route 65 at Route 76 – add a northbound free flowing right turn lane and maintain two northbound left turn lanes.
  - Southbound Route 65 at Route 76 – provide for two left turn lanes.
  - Route 76 and Roark Valley Road – add two southbound left turn lanes and provide two eastbound through lanes between Roark Valley Road and northbound Route 65 ramps.
- Gretna Road and Route 76 – modify signal to include an exclusive overlap right turn signal and add eastbound and southbound right turn lanes along with extending the northbound left turn lane.
- Green Mountain Drive and Route 165 – add northbound and westbound right turn lane and extend the southbound left turn lane.
- Shepherd of the Hills Expressway and Route 76 – add northbound right turn lane.

Phase I identified a number of additional improvement alternatives not listed here that merit consideration. Many of these alternatives should be evaluated as a part of a long-range plan due to the high cost of the alternative or the need to incorporate the improvement as a part of the overall series of improvements designed to improve future conditions. These alternatives have been carried forward and evaluated as part of Phase II of the project.

Phase II Evaluation Concept

This phase of the study picked up where the Phase I portion of the study left off. After evaluating the existing problems and conditions, the study then evaluated the long-term needs in Phase II—Long-Range Transportation Plan. The results of this study included a list of projects that will benefit the transportation system over the next 20 years. Phase II took a long-range look at the area, planning for the anticipated future conditions. This included projecting future travel demand and planning ways to prioritize the identified projects. The travel demand model was based on projected land-use growth and changes over the next 20 years. The study team coordinated closely with the city planning and development office.

Chapter 2 describes the methods used to model and evaluate the projected traffic conditions in the future. Based on the analysis of the no-build conditions, this report provides preliminary roadway improvement alternatives in **Chapter 3**. These roadway improvement alternatives were screened and prioritized based on a preliminary benefit/cost analysis. Other improvements designed to change travel patterns or encourage a more diverse usage of the roadway network are discussed in **Chapter 4**. Recommendations were made based on the analysis of the impacts, costs, and effectiveness of each of the preliminary alternatives in **Chapter 5**, including the strategy for implementing these improvements.

Local Community and Public Involvement Summary

A key part of this study was to have continuous cooperation and involvement in the process with city staff. The project was coordinated through the city engineering staff through both phases of the project. In addition, the city administrator was kept informed through periodic updates from the engineering staff. Just prior to the public meetings, the study team presented the study results to the city council, city administrator and the mayor of Branson.

On August 16, 2000 the study team held a public meeting at City Hall for presentation of the Phase I results. The meeting lasted from 5 to 7:30 P.M. and had over 30 people in attendance. The meeting was an open format with a formal presentation at 5:30 P.M. The purpose of the meeting was to show the public the improvement alternatives, answer any questions about the alternatives, and collect any additional comments on the alternatives or the study itself. Everyone in attendance was given a handout containing a map of the improvements and a comment form

At the kick-off of Phase II, the study team met with the planning and development office along with members of the local realtor board to discuss future land-use changes and growth expected in the next few years as well as long-term growth possibilities.

Our final public meeting was held on April 12, 2001 to present our Phase II long-range recommended improvement alternatives for public comment. The meeting was from 5:00 to 7:00 P.M. with a formal presentation given at 5:30 P.M. As was the case for Phase I, we wanted to discuss these ideas with the concerned citizens and local business owners to get their initial reactions. The recommended alternatives that were presented were well received with virtually no opposition. Comment cards were again distributed to those in attendance and no comments were received back.

Chapter 2 Existing Conditions

Land Use and Travel Characteristics

Branson, Missouri has a small population of approximately 5,000 people; however, an estimated 7 million people visit Branson each year to enjoy music shows, shopping malls, golf courses, lake activities, and camping. Traffic patterns in Branson are therefore typical of other large travel destinations located in semi-rural areas such as national parks. As displayed in **Exhibit 2-1**, many of Branson's main tourist attractions are located along Route 76 and Shepherd of the Hills Expressway. In addition there are many tourist-related land uses along Route 76 that support the main attractions. These related land uses include shopping centers, museums, mini-golf courses, mini-racecar tracks, and restaurants.

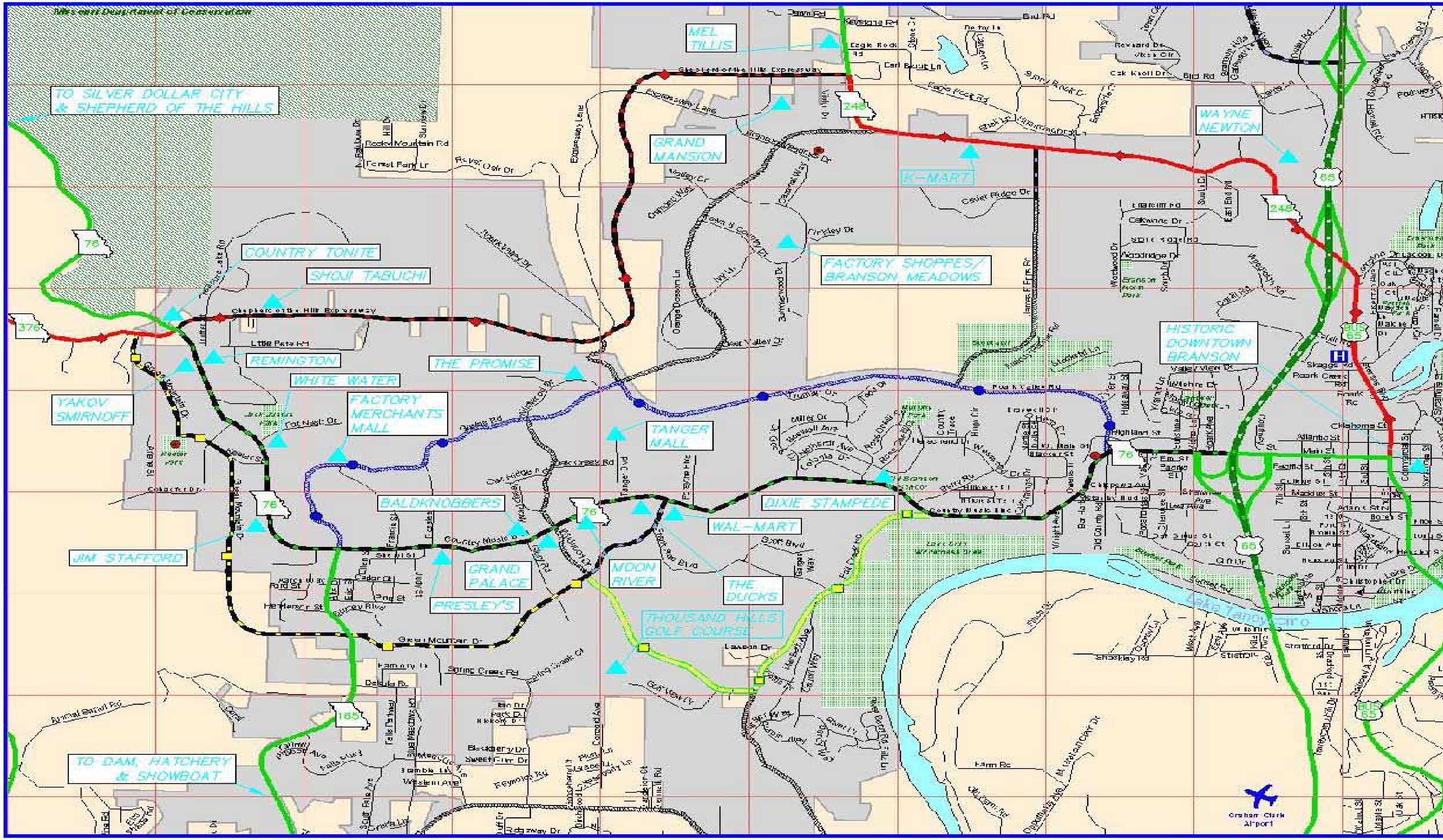
In most cities, travel is oriented toward commuting trips in the morning and afternoon peak hours. In Branson, however, different travel patterns were measured during an evaluation of the existing patterns. Individual entertainment activities and the tourist season itself have great influence on travel patterns, resulting in Branson displaying the following travel pattern characteristics:

- Traffic typically peaks on the weekend.
- Weekday traffic is typically only 80 percent of the volume likely to be experienced on the weekend.
- In the summer, traffic is 10 to 15 percent higher than volumes in fall and winter.
- Peaks in the traffic volumes throughout the day correlate with the show schedules for the theaters on Route 76.

Roadway Characteristics

The Branson area has an extensive system of local and state roads that connect the main attractions and points of interest. The study team collected a detailed inventory of all of the major roadways in the area during Phase I of the study. This inventory included details such as roadway widths, shoulder widths, overall driveway spacing, speed limits, and other pertinent information. This inventory was also used during the second phase of the study for forecasting future traffic and land-use patterns.

Exhibit 2-1
Branson's Major Attractions



Outside of Branson, most of the roadways are rural, two-lane highways that lack paved shoulders. The main north/south route in the area is US 65 and Route 76 is the primary east/west road in the area. Within the city limits, most roadways are two-lane streets with curbs and gutters. Most commercial routes and arterials have three lanes.

Regional Traffic Model

The development of mathematical models capable of simulating existing traffic patterns and projecting future travel demand is one of the most important phases of the transportation planning process. When transportation planning was in its infancy, simple trend analyses were performed to forecast traffic demands. However, such methods were based on the existing relationships between land uses and intensities of land uses. If land development patterns changed over time (and most do), forecasts were seldom reliable. Historical trend analyses also fail to account for the construction of new transportation facilities, or even the improvement of existing facilities.

As a result, a series of computerized subroutines described as a “model” was developed to perform traffic forecasting under dynamic conditions. Separate modules determine: 1) the number of trips generated by land uses in each small area (or traffic zones); 2) what other zones are part of the trip interchange; and 3) how each trip moves along the transportation network between zones. The flow diagram for this process has been graphically illustrated in **Exhibit 2-2**.

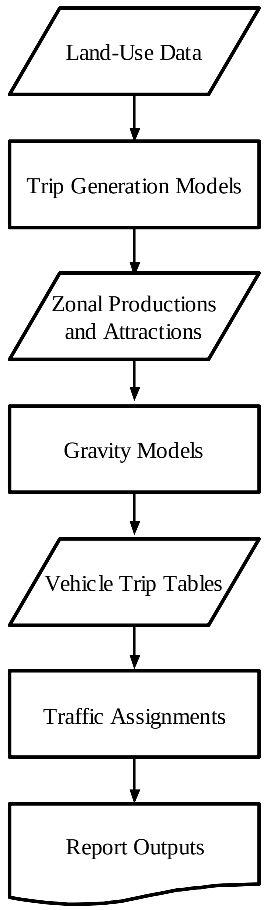
The development of mathematical models capable of simulating existing traffic patterns and projecting future travel demand is one of the most important phases of the transportation planning process. Failure to develop an accurate forecast often leads to misallocation of resources.

Types of Models

Transportation models can be derived either from extensive travel surveys (including household, workplace, and roadside surveys) or from synthetic models. In the past, extensive surveys have been found to be both time consuming and costly. On the other hand, satisfactory results have been obtained by utilizing synthetic models—that is, the utilization of modal results from comparable studies. There is currently a wealth of information available on travel demand, taken from a broad range of geographical, social, and economic conditions. These previous model results can be taken from other areas with characteristics similar to those in the area being studied.

For this study, a combination of both models was utilized to develop the travel demand models. Roadside surveys were conducted, as part of the Ozark Mountain High Road study, at various locations in the rural areas to determine longer-distance travel, and synthetic models were developed to simulate travel for those trips that did not pass through survey locations.

Exhibit 2–2
Model Flow Matrix



Roadside Travel Surveys – To provide insights into traffic demand in the study area, an origin and destination survey was conducted throughout the corridor for the Ozark Mountain High Road study. Separate trip matrices were developed for auto and truck traffic from the roadside survey's origin and destination data. Initial traffic assignments of the trip tables were made on the existing network, and the following checks were made to validate the survey trip table assignment:

- Origin and destination paths (long distance and short distance) were traced to verify the speeds and distances coded in the network and to check for reasonableness.
- Volumes crossing the survey station links were compared to auto and truck ground counts taken at those locations.

These initial assignments did not completely replicate all existing traffic movements because the survey data did not include trips that do not pass through survey locations. Much of this traffic is of a short distance nature.

Synthetic Gravity Model – Once the survey trip tables were assigned and calibrated, a gravity model (one for autos and one for trucks) was used to synthesize the trips that did not pass through one or more of the survey locations. Trip generation models were used to estimate the number of trips that begin or end in a traffic analysis zone (productions and attractions) without identifying where the other ends of these trips are located.

Model Input

Typical travel demand models have two primary data elements that are used as input: demographic information and transportation infrastructure. The demographic information used in the model included existing and forecasted land uses, historic traffic volumes on existing roadways, and employment information. All of the demographic information used in the development of the Branson Transportation Model was originally developed in the early 1990's as part of the Ozark Mountain High Road study. The socioeconomic and land use data collected at that time was updated, refined and used to recalibrate the model.

The transportation infrastructure input uses the existing roadway network as its foundation. The roadway network in transportation modeling is used for the determination of total zone-to-zone travel times for the trip distribution model and the assignment of traffic to the principle highway system. The computerized roadway network developed for this study included all federal and state highways along with a number of local roads within Branson. The regional network covered Taney County and a small portion of eastern Stone County and allowed for all highway corridors to be effectively studied. The roadway network used for this study is illustrated in **Exhibit 2-3**.

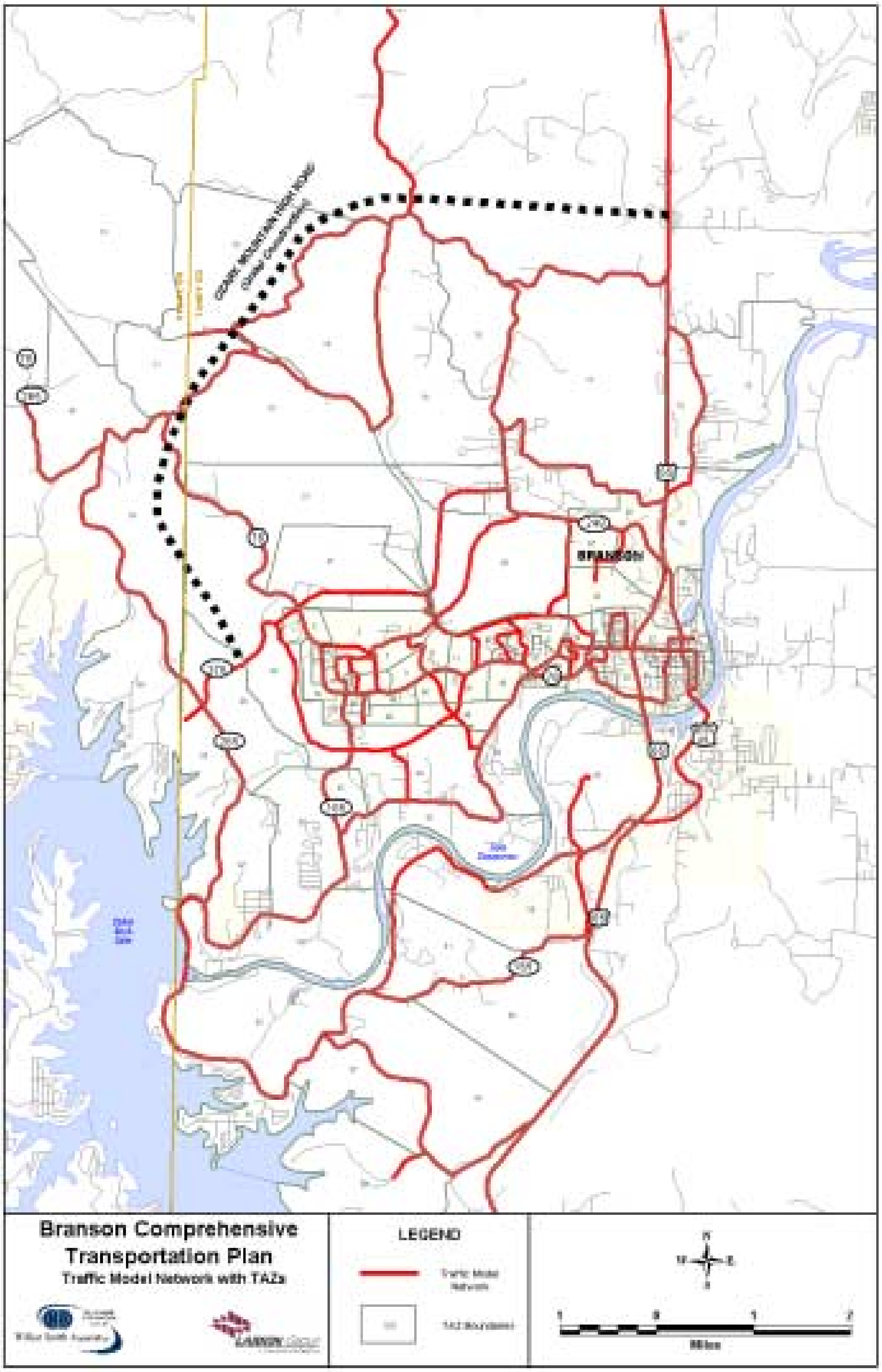
In order to relate travel demand to population and employment characteristics, and to develop travel movements between regions of the study area, Branson's existing roadway network was divided into traffic analysis zones (TAZs). Overall, the model utilizes a total of 101 internal traffic zones. In addition to the 101 internal zones, there are 5 external zones that were defined to represent trips that pass through the study area or have one trip end outside the study area. Each zone represents designated places within the study area and associated population/employment data is derived from the countywide socioeconomic estimates developed for this study as well as the number of theater seats, hotel rooms and retail space. **Exhibit 2-3** also identifies the traffic analysis zone structure used for the Branson study.

Methodology

The development of most travel demand models can be divided into three basic steps—trip generation, trip distribution, and traffic assignment.

The first step, trip generation, involves estimating the number of trip ends generated in (productions) and attracted to (attractions) each traffic analysis zone. Each trip on the regional highway system has both an origin (production) and a destination (attraction). In this fashion, two trip ends define each trip—one being a production and one being an attraction.

Exhibit 2–3
Branson Area Traffic Network



The second step, trip distribution, involves the distribution of the trip ends between all possible zones, which is accomplished by a mathematical trip distribution (gravity) model. The gravity model is so named because its basic form follows the mathematical formula Isaac Newton developed to approximate the pull of gravity. In general terms, this model suggests that the frequency of trip interchange between zone pairs is directly related to the number of productions and attractions in each zone, and inversely related to the travel time between them.

The third step, traffic assignment, is the assignment of vehicle trips to the roadway network, which is accomplished by selecting the route with the lowest travel time. As more and more vehicles use this route, the travel time will decrease until another route has the lowest travel time and vehicles will be assigned that route. The traffic model runs numerous iterations until all trips are completed with the lowest travel time.

Model Validation

The Branson regional traffic model utilized origin and destination information and existing traffic counts in formulating its traffic assignment. A trip table was developed based on this data. An initial traffic assignment of the trip table was made on the existing network, and the following checks were made to validate the trip table assignment:

- Origin and destination paths (long-distance and short-distance) were traced to verify the speeds and distances coded in the network and to check for reasonableness; and
- Volumes were compared to ground counts throughout the model.

To facilitate the comparison of model results with existing traffic volumes, various links in the network were compared to actual ground counts. The base year 1999 auto and truck matrices were assigned to the base year highway network. A total of 21 calibration points were compared with observed traffic counts at these locations. The percent deviation that is considered acceptable (falls below the curve) varies as a function of total volume. The percent deviation curve is an industry standard established by the National Cooperative Highway Research Program (NCHRP) and is defined in NCHRP Report #255. All 21 calibration points fell below the established curve and were deemed acceptable.

The comparison of estimated trips with observed traffic counts confirmed that the traffic model was in close agreement with 1999 conditions, and attested to the ability of the travel demand model to replicate 1997 travel patterns. Upon review of these results, it was concluded that the Branson traffic model could be used to reliably forecast future travel patterns.

Traffic Projections

In order to assess how each alternative or group of alternatives would affect future traffic patterns, the study team first had to establish a base case for future volumes. In this instance, traffic volumes were projected from 1999 out to the year 2020. This first involved establishing a base year from which to forecast into the future. The model then was calibrated to ensure that it accurately represented current conditions and past conditions.

The study team used 1999 as a base year for representing current traffic conditions. In 1999, the total number of trips measured within the study area was calibrated at 187,000. These trips were then distributed through the model of the region's transportation system that calculated the total average daily traffic assigned to each roadway segment.

Once the base year was established, the study team prepared a forecast for 2020 traffic conditions. The study team again had to establish a base case or "No Build Alternative". The No Build Alternative assumed that only improvements already identified and approved would be built. None of the alternatives identified through this process were included. The existing and 2020 no build traffic volumes are displayed in **Exhibit 2-4**. This provided the study team with a means for evaluating how each alternative would affect the travel patterns established for the no build condition. Given the growth trends of the area and knowing the types of development planned for the future, the No Build Alternative established that in 2020, there would be approximately 314,970 trips per day within the Branson area.

No Build Analysis

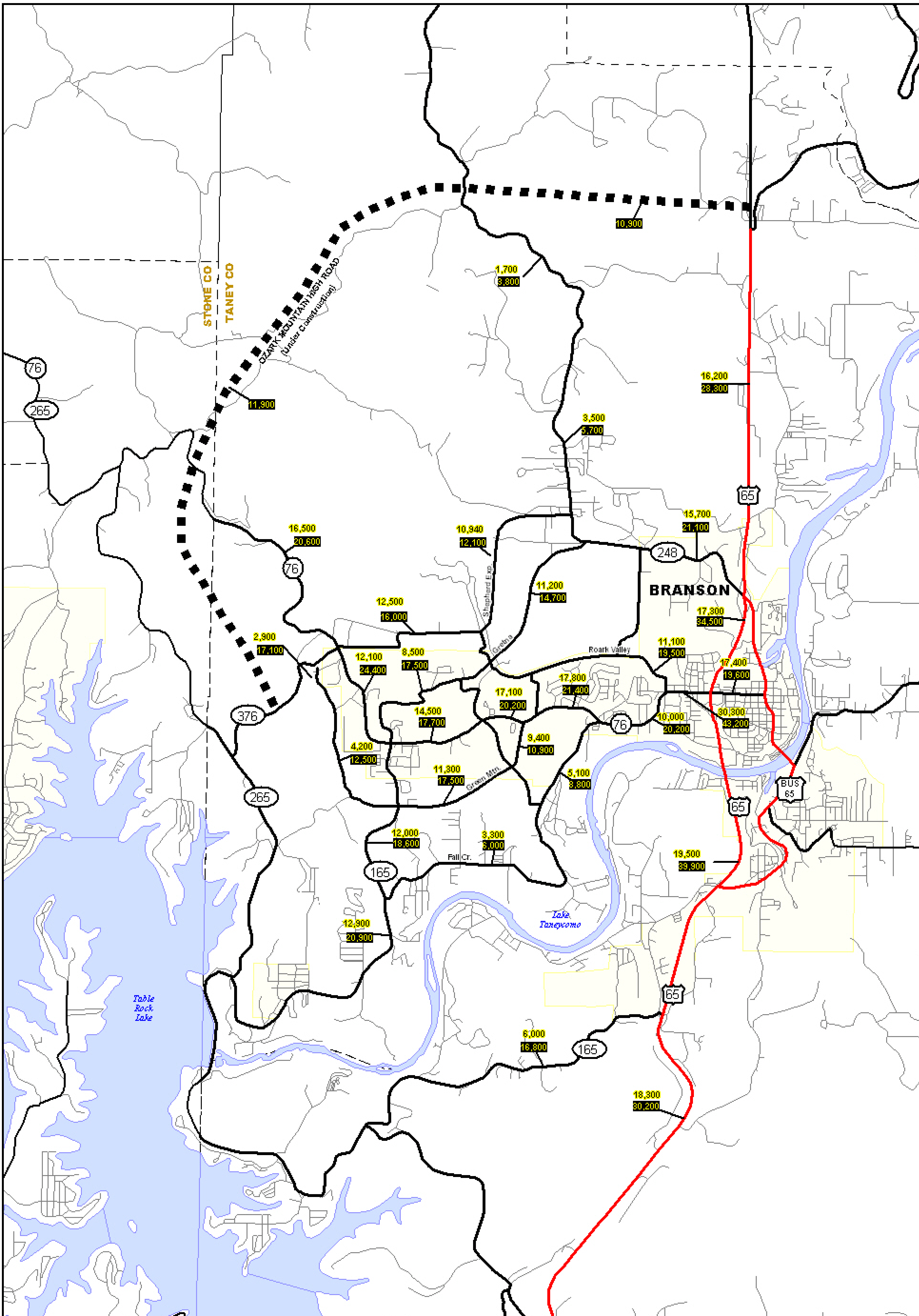
The "no build case" is the base case model that included the existing transportation system model plus all current commitments to the transportation system as calibrated and validated. It analyzed the transportation system assuming that only current commitments would be met and that no other improvements would be recommended and implemented as a result of this study. A more apt description of the transportation system under the "no build case" is to refer to it as the *existing plus committed transportation network*. The existing plus committed transportation network assumed the following commitments to development and to the transportation network would be built:

Known and Committed Projects and Developments

- Ozark Mountain Highroad (U.S. 65 to Route 376)
- Vista Plaza 40,000 square foot retail on Route 76 east of Forsyth
- Retail development (450 acres) on Green Mountain west of Route 165
- Strip mall near the intersection of Route 376 and Route 76

Between Route 248 and U.S. 67

- New high school
- Golf course and single family houses (1,300 acres)
- Commercial development (250 acres)



Existing & Projected Traffic Volumes

Branson Comprehensive Transportation Plan

VOLUMES

1999

2020

Sources: 1999 MoDOT count files / 2020 model volumes

N W E S

0.5 0 0.5 1 1.5

Miles

Along Gretna Road and vicinity

- Convention center (100,000 s.f.)
- Hotel (100 Rooms)
- Nursing home

All of the improvement options identified as roadway alternatives in **Chapter 3** are modified versions of this base case and existing plus committed network. To calculate the potential benefit and implications of each improvement alternative, the “improved case” (new roadway) was compared with the “no build case”. The benefits for each new roadway option were estimated by comparing each “improved case” with the regional “no build case”. In this manner, the net benefits were determined for each option and, implicitly, the improvement options could be compared. This analysis is discussed in detail in later chapters of this report.

Chapter 3 Roadway Alternatives

Discussion of Strategy and Area Constraints

The study team developed two types of roadway improvement alternatives for consideration in this study—roadway improvements located in the undeveloped portions of the study area and roadway improvements in developed areas. Each roadway alternative was then tested to assess its ability to meet the goals and objectives that it was developed to address.

Roadway alternatives in the developed areas were either independently created, or were modifications of alternatives developed in previous studies. Newly created alternatives were based on results from the study team's existing and no-build analysis. Other improvement alternatives originated from previous studies or were recommended by others for inclusion in the evaluation. The primary goal for these improvements was to address already existing problems that were anticipated to worsen over time. These alternatives were tested individually to evaluate each one's effect on existing travel patterns.

Improvement alternatives located in undeveloped areas were designed to address future problems in the transportation system. A proactive approach was established to provide areas targeted for future development with necessary access. The alternatives, which were primarily arterial roads, were not designed to serve as primary local access points. Rather, a set of local roads would be built off these arterials to serve local access, thus allowing the arterial roads to serve through travel. Also, due to the uncertainty of the type, location, and patterns of future development, the study team assessed how the entire group of alternatives would affect the transportation system.

Each alternative faced the constraint of severe terrain impacting roadway construction. This adds to the cost and restricts potential development for the same reason. Other constraints such as quarries, schools, cemeteries, creeks, transmission lines and churches were also considered in the location of the alternative routes.

Preliminary Alternatives

As noted, the study team drew on several sources when establishing the list of preliminary alternatives. Several alternatives had been identified and evaluated in previous studies and were incorporated into this process. There were also alternatives that had been planned for by local developers.

Some of these previously studied or planned alternatives were modified based on suggested changes from the city staff. Finally, the study team added alternatives based on the analysis of existing and future conditions. Each of the preliminary alternatives fit within one of the following categories:

A. Connections in developed areas—designed to provide relief for overburdened existing routes.

B. Widening of existing routes—designed to provide more capacity on high volume roads.

C. Connections in undeveloped areas—designed to provide future connections and to encourage development along those routes.

D. Bridge crossing—designed to provide more capacity across Lake Taneycomo. These included several logical connections between existing roadways, relief routes for overly congested corridors, and widening of already existing roadways.

The locations of these preliminary alternatives are displayed in **Exhibit 3-1.** **Table 3-1** includes both the location and a description of the types of improvements considered for each alternative.

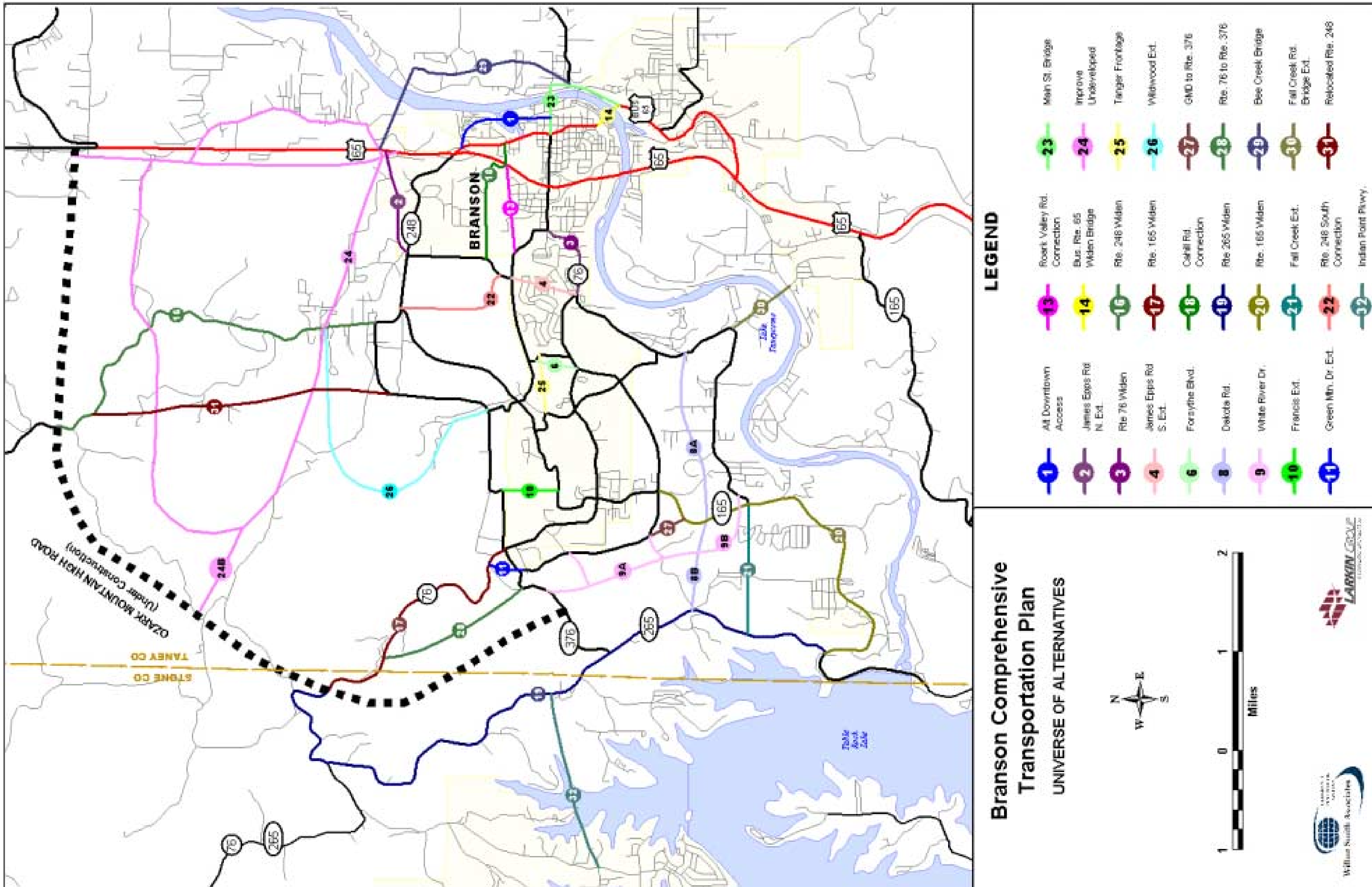


Exhibit 3-1
Universe of Alternatives

Table 3-1
Preliminary Roadway Alternatives

Alternative	Location	Category	Improvement Type
1	Alternate downtown access	A	New Road – 3 Lane
2	James Epps Road	C	New Road – 3 Lane
3	Route 76	B	Widening (5 lane)
4	James Epps Road	A	New Road – 3 Lane
5	Roark Valley Road	A	Realign Road - Phase I
6	Forsythe Boulevard	A	Realign Road - (3 Lane)
7	Frank Rae Boulevard	A	New Intersection (2 Lane)
8	Mutton Hollow / Dakota Road	C	New Road (3 Lane)
9	White River Drive	C	New Road (3 Lane)
10	Francis	A	New Road (3 Lane)
11	Green Mountain Dr.	A	New Road (2 Lane)
12	Fall Creek Rd.	C	New Intersection (2 Lane)
13	Roark Valley Rd.	A	New Road connect to Rt. 65 (2 Lane) One-way
14	Business Rt. 65	D	Intersection and Bridge (4 Lane)
15	Fall Creek Rd.	A	New Intersection (3 Lane)
16	Rt. 248	B	5 lanes widened
17	Rt. 76	B	4 lanes widened
18	Cahill Rd.	A	New Road (2 Lane)
19	Rt. 265	B	Widen to 3 lanes
20	Rt. 165	B	Widen to 3 lanes
21	Fall Creek Extension	C	New Road (3 Lane)
22	Route 248	A	New Road (3 Lane)
23	Main Street Bridge	D	New road / bridge across Lake Taneycomo (4 Lanes)
24	Undeveloped area road network	C	3 lane road(s)
24b	Undeveloped area road network	C	3 lane road(s)
25	Tanger frontage	A	New Road (2 Lane)
26	Wildwood	C	New extension 2 lane road
27	Green Mtn. Drive to Route 376	A	New 2 lane road
28	Route 76 to Route 376	C	New 3 lane road
29	Bee Creek Bridge	D	New 4 lane bridge
30	Fall Creek Rd. (Bridge)	D	New 4 lane bridge
31	Route 248 Relocation	C	New 3 lane road
32	Indian Point Parkway	A	New 2 lane bridge and roadway
33	Combination 8a and 9a	C	New Road (3 Lane)

Preliminary Estimates of Probable Costs

Preliminary cost estimates for each alternative were developed. Three primary sources were drawn upon to develop these estimates, including:

- Total costs from recent construction projects in the city.
- Cost estimates prepared for previously studied alternatives.
- Costs based on MoDOT preliminary construction unit cost methods.

A review of the recent projects constructed in the area included those projects displayed in **Table 3-2**. These recently constructed projects included widening of existing facilities and several construction projects along new alignment. These project costs included utility relocations and right-of-way purchase costs. The study team also drew on previous cost estimates developed by Bucher,Willis & Ratliff (BWR) as part of a MoDOT sponsored study. The BWR cost estimates were based on 1995 dollars. **Tables 3-3** and **3-4** depict the costs associated with previously studied alternatives and MoDOT established cost factors, respectively. It should be noted that MoDOT's cost assumptions were modified and combined to determine a unit cost for construction for various types of roadway improvement and would also account for the study area's terrain.

The study team reviewed each cost estimate for reasonableness and then updated each one to reflect current year value. All previous cost estimates and actual construction costs were updated to present day dollar values so that all alternatives could be accurately compared. In doing so the study team found that the costs associated with roadway widening projects were higher than any other method researched. The higher cost estimates were primarily associated with the severe terrain conditions in and around Branson.

Table 3-2
Recent City Roadway Construction Projects

Road	Construction Year	Improvement Type	Improvement Cost ($M/mile)
Roark Valley Road	1991	New 3 lane	1.39
Fall Creek Road	1993	Widen 2->3	1.88
Rosalee Street	1994	New 3 lane	1.77
Epps Road	1994	New 3/5 lane	3.84
Gretna Road (1)	1993	Widen 2->3	1.79
Gretna Road (2)	1995	Widen 2->3	2.91
White River Drive (1)	1993	New 3 lane	2.10
White River Drive (2)	1996	New 3 lane	2.99
Shep-X (1)	1996	Widen 2->5	4.51
Shep-X (2)	1997	Widen 2->5	2.28
Shep-X (3)	1997	New 5 lane	3.40
Shep-X (4)	1998	New 5 lane	3.91

Table 3-3
Previously Studied Alternatives

Alternative	Roadway	Length (Feet)	1995 cost ($ Millions)
1	Alternate downtown access	4,800	6.500
3	Route 76	5,700	9.114
4	James Epps Road	2,900	2.450
5	Roark Valley Road	2,000	0.225
6	Forsythe Boulevard	2,000	1.140
7	Frank Rae Boulevard	1,000	0.100
8B	Dakota Road	6,500	5.550
9	White River Drive	15,900	8.811
10	Francis	3,500	2.400
13	Roark Valley Rd.	3,900	5.000
14	Business Rt. 65	1,000	3.457
16	Rt. 248	35,500	7.125
17	Rt. 76	13,000	13.000
18	Cahill Rd.	6,600	2.200
19	Rt. 265	17,000	10.100
20	Rt. 165	20,500	3.592

MoDOT has unit costs for preliminary alternatives

Table 3-4
MoDOT Cost Factors

Grading and drainage
Base and surface
Interchange diamond
Interchange cloverleaf
Terrain factor
Utility relocations
Bridge structure
Major bridge structure
Approach structures
Bridge removal

Once unit cost estimates were established, the estimated costs for right-of-way (ROW) were then added for each alternative. This provided the study team with a total cost for each alternative. The two key factors that affect the overall cost associated with each alternative are ROW costs and terrain constraints. The costs we developed are consistently higher than the city costs. In an effort to provide a worst case scenario, these costs will be used for the new roadway construction costs.

It is important to note that these costs are only preliminary estimates designed to screen and assess each alternative's ability to improve traffic conditions. **Table 3-5** shows the preliminary estimate of probable cost for all of the roadway improvement alternatives. The study team's next step was to establish how each alternative would affect future traffic and in turn identify any potential benefits associated with the improvements.

Table 3-5
Preliminary Estimates of Probable Costs

No.	Roadway	2000 costs ($ Millions)	Type of Improvement
1	Alternate downtown access	8.296	New Road - 2 Lane
2	James Epps Road	4.412	New Road - 3 Lane
3	Route 76	11.632	Widening (5 lane)
4	James Epps Road	3.127	New Road - 3 Lane
5	Roark Valley Road	0.287	Realign Road - Phase I
6	Forsythe Boulevard	2.502	Realign Road - (3 Lane)
7	Frank Rae Boulevard	0.128	New Intersection (2 Lane)
8A.	Dakota Road	7.280	New Road (3 Lane)
8B.	Dakota Road	7.079	New Road (3 Lane)
9A.	White River Drive	7.785	New Road (3 Lane)
9B.	White River Drive	6.973	New Road (3 Lane)
10	Francis	3.063	New Road (3 Lane)
11	Green Mountain Dr.	0.486	New Road (2 Lane)
12	Fall Creek Road	1.488	New Intersection (2 Lane)
13	Roark Valley Road	6.381	New Road connect to Rt. 65 (2 Lane) One-way
14	Business Rt. 65	4.412	Intersection and Bridge (4 Lane)
15	Fall Creek Road	0.846	New Intersection (3 Lane)
16	Rt. 248	9.094	5 lanes widened
17	Rt. 76	16.592	4 lanes widened
18	Cahill Road	2.808	New Road (2 Lane)
19	Rt. 265	12.890	Widen to 3 lanes
20	Rt. 165	4.584	Widen to 3 lanes
21	Fall Creek Extension	6.185	New Road (3 Lane)
22	Route 248	5.800	New Road (3 Lane)
23	Main Street Bridge	8.000	New road/bridge across Lake Taneycomo (4 Lanes)
24A.	Undeveloped area road (north)	88.086	3 lane road(s)
24B.	Undeveloped area road (north)	120.595	3 lane road(s) and Interchange
25	Tanger frontage	2.088	New Road (2 Lane)
26	Wildwood	18.695	2 lane road
27	Green Mtn. Drive to Route 376	4.037	3 lane road
28	Route 76 to Route 376	4.952	3 lane road
29	Bee Creek Bridge	14.093	4 lane road
30	Fall Creek Road (Bridge)	10.672	4 lane road
31	Rte 248 Relocation	13.374	3 lane road
32	Indian Point Parkway	21.352	2 lane road
33	Combination 8a and 9a	15.061	New Road (3 Lane)

Traffic Projections

The study team modeled each of the alternatives separately and compared the results of each alternative against the 2020 no-build results to identify the vehicle mile traveled and vehicle hours traveled of each alternative. The projected year 2020 traffic volumes for each location are displayed in **Exhibit 3-2** and **Table 3-6**. As indicated in the exhibit, the overwhelming majority of these locations would experience increases in traffic related to the construction of any improvement in the area. Generally, these small improvement options are each likely to draw traffic away from an adjacent roadway but due to travel efficiency benefits, are likely to increase traffic volumes throughout the area.

Benefit/Cost Analysis

Identification of Benefits

With the establishment of future traffic volumes experienced under each alternative, the study team derived the potential benefits associated with each alternative. The potential benefits were calculated using Measures of Effectiveness (MOEs) identified for each alternative based on forecasted traffic conditions. The three primary MOEs used to identify benefits were:

- Reduced travel distance measured by Vehicle Miles Traveled (VMT) savings.
- Reduced travel time as measured by Vehicle Hours Traveled (VHT) savings.
- Cost savings from accident reductions.

Each MOE and the resulting benefit /cost analysis is discussed in more detail below. The total number of trips changed only slightly (plus or minus five percent) depending on the alternative improvement option. This means that each alternative improvement will not likely generate new traffic but will instead draw existing traffic onto the improved alignment effectively changing the route choice of certain drivers.

Travel Time Savings

A principal objective of a roadway improvement is to reduce the time required to travel between two points in the system. Following the adage that time is money, travel time savings utilize dollar values and VHT calculations to determine the amount of time and in turn the dollar value savings a roadway improvement can benefit travelers. An important consideration in determining the value of time saved is the trip purpose. For business trips, the value of time saved approximates hourly earnings, including fringe benefits. If time savings can be counted on, as may be the case when significant improvement is made to the roadway, a firm may be able to reschedule its traveling employees. Tying the value of travel time savings to hourly earnings requires special economic consideration of non-business trips. Generally speaking, travelers on non-business trips value their time significantly less.

Exhibit 3-2
Year 2020 Traffic Volumes

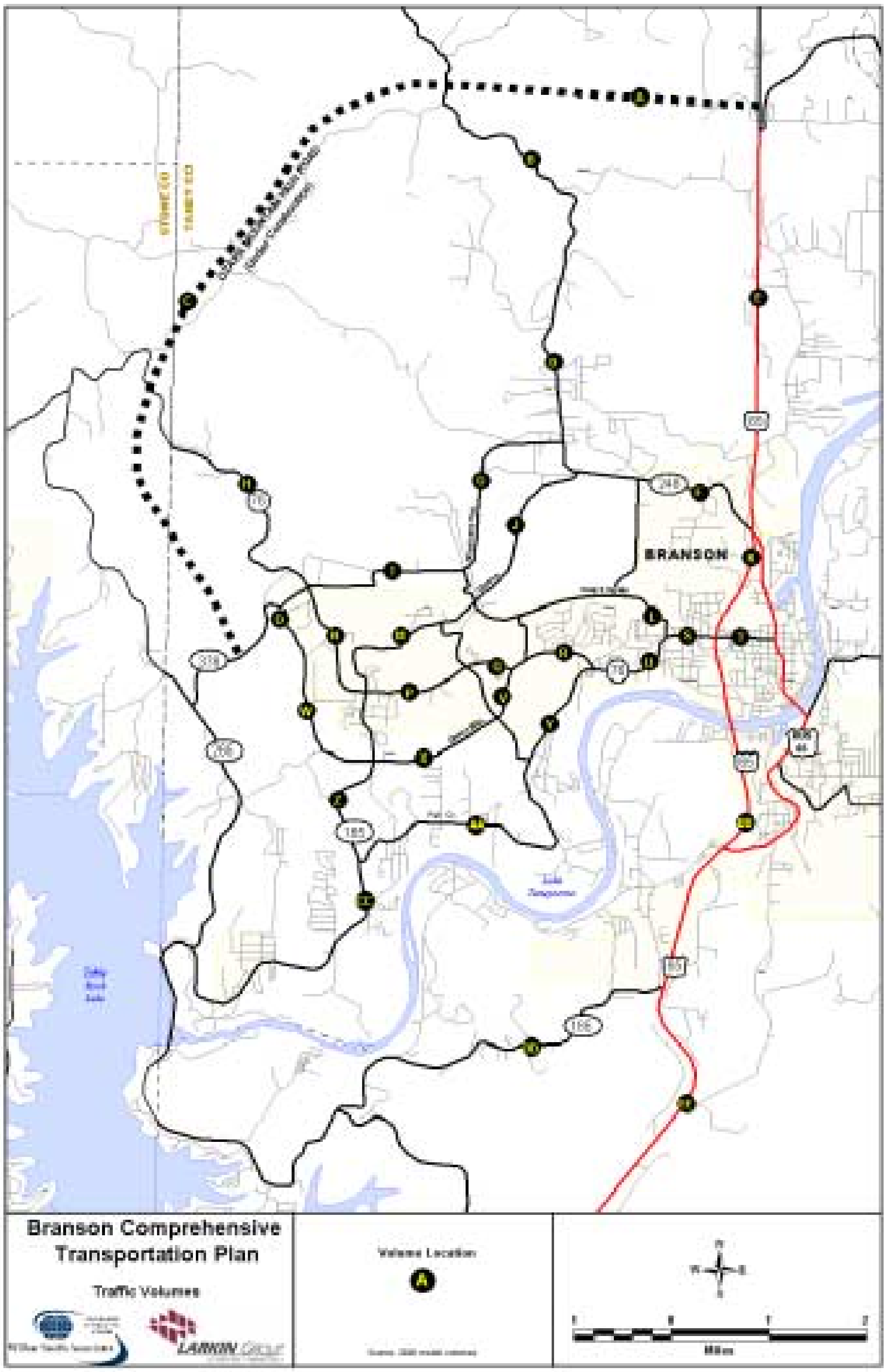


Table 3-6

Traffic Volumes for Each Alternative

Count Location	E+C	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 6	Alternative 8	Alternative 9	Alternative 9 a	Alternative 9 b	Alternative 10	Alternative 11	Alternative 13	Alternative 14	Alternative 16	Alternative 17	Alternative 18	Alternative 19
A	10900	14,100	13,900	13,800	13,700	13,600	9,700	13,900	14,200	14,000	14,000	13,700	13,700	13,800	13,800	10,500	13,600	13,000
B	1700	2,400	2,300	2,500	2,500	2,500	1,100	2,000	2,400	2,700	2,800	2,400	2,500	2,500	2,600	900	2,500	2,500
C	11900	15,900	15,600	15,800	15,700	15,600	11,100	15,300	15,900	16,100	16,300	15,600	15,600	15,800	15,900	11,700	15,600	15,800
D	5700	6,700	6,600	6,800	6,900	6,800	9,400	6,300	6,700	7,000	7,200	6,700	6,800	6,800	6,900	5,300	6,800	6,800
E	28300	33,400	33,100	33,000	33,000	32,800	28,700	32,900	33,200	32,900	32,900	32,900	32,900	33,100	33,100	29,000	32,900	33,100
F	21100	21,600	16,600	21,800	23,200	22,000	21,900	21,300	21,800	21,600	22,300	21,700	21,200	21,700	21,700	21,300	19,700	21,700
G	12100	12,900	12,300	13,200	11,700	13,400	13,900	13,100	13,100	13,300	13,300	13,200	13,300	13,200	13,200	13,500	12,500	13,200
H	20600	22,200	22,100	22,200	21,400	22,300	20,400	22,100	22,000	22,100	22,200	22,200	22,100	22,200	22,100	25,400	22,100	22,100
I	16000	18,200	17,800	18,400	16,400	19,000	19,300	18,000	18,400	18,700	18,700	18,600	18,400	18,300	18,300	19,100	18,000	18,300
J	14700	16,000	17,000	16,500	14,000	16,000	15,000	15,800	16,300	16,500	16,400	16,300	13,700	16,400	16,500	15,300	16,200	15,400
K	34500	35,500	37,800	38,500	35,900	38,300	34,600	31,800	38,800	38,200	37,900	38,400	41,400	38,500	38,500	35,000	35,800	38,500
L	19500	21,900	21,800	22,400	21,800	23,500	21,400	22,300	22,000	22,400	22,300	22,400	22,000	22,400	22,500	22,400	21,500	22,400
M	17500	19,700	19,800	19,700	19,600	18,600	19,400	19,400	19,300	19,700	20,600	19,700	19,700	19,600	19,700	19,700	19,900	19,700
N	24300	25,000	25,500	25,500	24,100	28,300	21,800	20,100	25,000	25,600	14,800	25,100	25,700	25,400	25,400	26,900	25,600	25,400
O	17100	19,200	19,100	19,400	19,600	19,700	15,600	13,100	12,600	19,800	19,800	19,700	19,300	19,400	19,400	16,700	19,100	19,400
P	17700	18,900	18,608	18,900	18,700	20,500	19,400	19,100	19,100	21,100	20,200	18,700	18,700	18,900	18,800	18,500	18,700	22,000
Q	20200	22,800	20,900	21,200	21,300	24,100	20,800	21,500	21,700	23,900	20,800	22,500	20,900	21,200	22,700	20,100	21,100	21,200
R	21400	24,700	22,700	24,000	21,300	23,500	21,800	23,700	24,400	42,400	23,500	24,100	23,700	24,100	24,100	22,400	23,500	24,100
S	43200	46,800	45,500	46,600	44,600	46,500	43,800	46,200	43,300	25,300	46,600	46,700	44,900	46,700	46,700	43,500	44,600	46,700
T	19600	19,900	25,700	25,400	25,300	25,400	24,400	25,300	24,300	23,800	24,500	25,300	23,200	25,400	25,400	25,500	19,100	25,400
U	20200	24,400	21,600	20,400	22,600	21,600	22,900	23,500	24,700	11,200	23,400	23,900	22,300	23,900	23,900	20,900	21,700	23,900
V	10900	11,200	11,400	11,300	11,300	12,600	12,700	10,500	11,400	14,900	11,100	11,100	11,300	11,300	11,300	10,900	11,300	11,300
W	12500	13,400	13,500	13,500	13,200	10,200	11,800	9,400	7,500	18,700	11,500	14,000	13,500	22,000	13,500	14,800	13,700	13,500
X	17500	18,500	18,700	18,500	18,300	16,400	19,500	18,200	18,800	10,100	16,700	18,600	18,400	18,500	18,500	17,800	18,900	18,500
Y	8800	10,100	10,400	10,100	10,300	9,800	12,100	10,000	10,500	13,900	10,100	10,200	9,800	10,100	10,100	9,100	10,100	10,100
Z	18600	18,900	19,100	18,900	18,900	19,300	23,200	14,700	18,800	6,200	19,100	19,100	19,100	13,500	18,900	19,600	19,100	18,900
AA	6000	7,200	7,200	7,200	7,300	6,700	2,600	5,400	7,300	41,700	7,100	7,100	6,900	7,200	7,200	6,800	7,100	7,200
BB	39900	41,700	41,600	42,000	42,100	41,400	41,200	41,700	42,000	21,800	41,700	42,000	41,700	42,000	42,000	42,100	41,500	42,000
CC	20900	21,600	22,000	21,600	21,500	21,800	19,900	21,900	21,400	17,400	21,400	21,700	21,900	21,600	21,700	21,700	22,000	21,600
DD	16800	17,700	17,600	17,700	17,800	17,700	18,100	17,400	17,400	33,300	17,700	17,700	17,600	17,700	17,700	17,800	17,100	17,700
EE	30200	33,300	33,300	33,300	33,300	33,100	34,000	33,300	33,500	9,300	33,300	33,300	33,300	33,300	33,300	33,300	33,300	33,300

Count Location	E+C	Alternative 20	Alternative 21	Alternative 22	Alternative 23	Alternative 24A	Alternative 24B	Alternative 25	Alternative 26	Alternative 27	Alternative 28	Alternative 29	Alternative 30	Alternative 31	Alternative 32a	Alternative 32b	Alternative 33	
A	10900	12,700	12,300	14,600	13,700	11,800	8,400	13,300	11,900	13,700	12,200	13,800	15,800	11,700	14,200	13,600	13,900	
B	1700	23,400	1,800	2,700	2,400	100	300	3,000	700	2,500	1,600	2,400	2,400	700	2,500	2,300	2,800	
C	11900	14,600	13,600	16,700	15,600	15,100	18,700	15,700	15,000	15,600	13,200	15,600	17,500	15,800	15,100	15,400	16,100	
D	5700	6,700	6,100	70,100	6,700	6,300	5,800	7,300	5,200	6,800	5,900	6,700	6,700	5,000	6,600	6,700	7,100	
E	28300	31,800	31,500	33,500	32,900	29,800	26,400	32,600	29,400	32,900	31,400	33,100	31,000	29,300	33,300	32,700	32,400	
F	21100	21,700	21,700	22,000	22,400	20,100	20,800	21,600	21,100	21,600	21,500	21,800	20,500	21,000	21,500	21,700	21,700	
G	12100	13,300	13,300	13,100	13,100	18,300	17,900	13,300	7,700	13,300	13,400	13,100	12,900	18,200	12,900	13,300	13,300	
H	20600	21,300	20,800	22,000	22,100	21,500	19,000	24,600	21,300	22,100	22,400	22,200	21,800	21,000	22,100	22,000	21,700	
I	16000	18,600	18,300	18,900	18,600	19,300	17,800	18,600	19,600	18,800	17,900	18,400	17,300	19,600	18,200	18,400	19,000	
J	14700	16,200	15,700	16,600	16,400	14,300	14,100	17,200	14,600	16,300	15,500	16,400	15,600	14,900	16,300	16,400	15,000	
K	34500	37,300	37,100	35,200	38,400	36,600	34,800	37,300	36,200	38,200	36,900	34,600	34,800	36,000	38,500	38,200	38,800	
L	19500	22,400	22,300	24,100	22,400	22,400	22,200	22,500	22,400	22,400	22,400	22,400	15,400	21,800	22,400	22,600	20,100	
M	17500	19,700	19,700	19,200	19,700	20,000	20,000	20,000	19,900	19,700	19,700	19,700	16,600	19,200	19,700	20,000	17,100	
N	24300	24,400	24,000	25,500	25,200	26,000	26,000	24,600	28,000	25,400	25,700	25,300	23,500	26,100	25,200	25,100	23,600	
O	17100	17,400	17,400	19,400	19,500	19,200	18,400	19,600	19,400	19,600	18,900	19,400	17,600	18,600	18,900	19,800	12,400	
P	17700	19,800	20,100	18,700	18,700	22,200	18,100	18,600	17,900	18,400	18,100	18,800	27,400	18,500	16,600	18,600	17,000	
Q	20200	20,900	21,100	21,300	22,500	20,500	21,700	18,100	20,300	20,900	20,300	21,100	24,500	20,800	21,000	20,900	20,800	
R	21400	23,300	23,400	23,700	24,100	22,400	22,400	23,800	22,300	23,900	23,400	23,900	27,500	22,900	24,100	9,400	25,300	
S	43200	41,500	45,800	48,500	46,700	45,000	43,400	46,200	44,700	46,600	45,300	42,400	42,700	39,900	42,100	42,200	43,400	
T	19600	24,500	24,300	22,300	25,300	25,400	24,800	25,200	25,400	25,300	25,300	21,500	23,200	25,400	25,500	25,400	24,200	
U	20200	22,400	22,800	23,600	23,900	21,900	21,100	23,600	21,800	23,900	22,600	23,700	24,800	22,000	23,600	23,800	24,700	
V	10900	11,500	11,800	11,900	11,300	11,500	11,600	11,000	11,700	11,200	11,100	11,300	13,500	11,600	11,100	11,300	12,900	
W	12500	12,000	10,400	13,600	13,600	13,700	14,500	13,500	13,900	14,700	14,500	13,600	12,000	14,200	13,400	13,600	7,600	
X	17500	19,500	20,000	18,400	18,700	18,600	18,200	18,600	18,600	18,800	18,100	18,700	19,500	18,400	18,200	18,700	17,200	
Y	8800	9,900	9,900	10,000	10,200	9,700	9,300	10,200	9,800	10,100	9,500	10,200	9,100	9,400	9,700	10,100	12,900	
Z	18600	20,000	19,400	19,000	18,900	19,000	19,400	18,900	19,000	12,700	19,600	18,900	20,700	19,600	18,900	18,700	18,800	
AA	6000	7,100	7,100	7,600	7,200	7,100	6,900	7,200	7,100	6,200	7,000	7,200	10,900	6,800	7,000	7,100	2,500	
BB	39900	41,200	42,000	42,100	42,000	42,100	42,300	42,000	42,100	41,700	42,200	41,900	32,000	42,400	42,000	41,900	41,400	
CC	20900	25,100	19,300	21,500	21,600	21,500	21,300	21,600	21,500	22,000	21,700	21,700	20,000	21,900	21,400	21,200	21,500	
DD	16800	16,900	18,600	17,500	17,600	17,700	17,800	17,700	17,700	17,400	17,800	17,600	11,900	17,900	17,700	17,700	17,300	
EE	30200	33,300	33,300	33,500	33,500	33,300	33,300	33,300	33,300	33,300	33,300	33,300	34,400	32,900	32,900	33,200	33,300	

than those on business trips. Because the value of time varies by purpose of trip and traveler, different dollar values were assigned to business and personal trips. Likewise, different dollar values were assigned business trips made by trucks and those made by cars.

For purposes of analysis, the study team assumed that for business related trips the hourly value of time per commercial truck equaled $19.20 and the value of time per automobile equaled $10.20. Non-business automobile trips were valued at $5.10 per automobile. It should be noted that most drivers do not perceive a noticeable difference when savings are between one to five minutes as much as they might notice savings of twenty or more minutes. However, for this analysis no distinction was made based on these attitudes and it was assumed that a driver would benefit equally from each minute saved even if they do not perceive any accumulated savings.

When assessing VHT savings, the study team evaluated both the amount of savings found across the entire transportation network as well as the savings for travelers on Route 76. The vehicle hours of travel (VHT) savings attributable to each improvement option with the monetary value of those savings projected for 2020 is displayed in **Table 3-7.** As displayed in the table, Alternative 8b, a new three-lane road built off Dakota Road, was estimated to have the greatest time savings on Route 76—with savings of over 1,000 VHT per day. Alternative 30, a four-lane bridge over Bee Creek, is likely to provide the greatest overall travel time savings—over 23,000 hours of travel a day. On Route 76 however, this alternative would only likely save 260 hours of travel each day. Alternative 10, a new three-lane road built off Francis, was estimated to save over 930 hours of time on Route 76. However, Alternative 10 would likely only save 880 hours when the entire study area was taken into account, meaning that although the alternative would greatly improve travel on Route 76, these improvements would come at the expense of the transportation system as a whole.

Several of the alternatives were predicted to lead to increases in travel time that would be indicative of poor travel efficiency. Alternative 3, which would widen Route 76 to five lanes, and Alternative 18, a two-lane road located off Cahill, would likely increase travel times on Route 76 and in the study area as a whole. Alternative 6, Alternative 9a, and Alternative 22, would produce time savings for the study area as a whole, but would cause increases on Route 76. The reverse was found for Alternative 11 and Alternative 13 where savings would take place on Route 76 but not for the study area as a whole. The VHT savings for each alternative are displayed in **Exhibit 3-3,** ranking from the alternative with the greatest savings (Alternative 30) to the alternative that would add the greatest amount of travel time to the system (Alternative 13).

Exhibit 3-3
Vehicle Hours Saved By Alternative

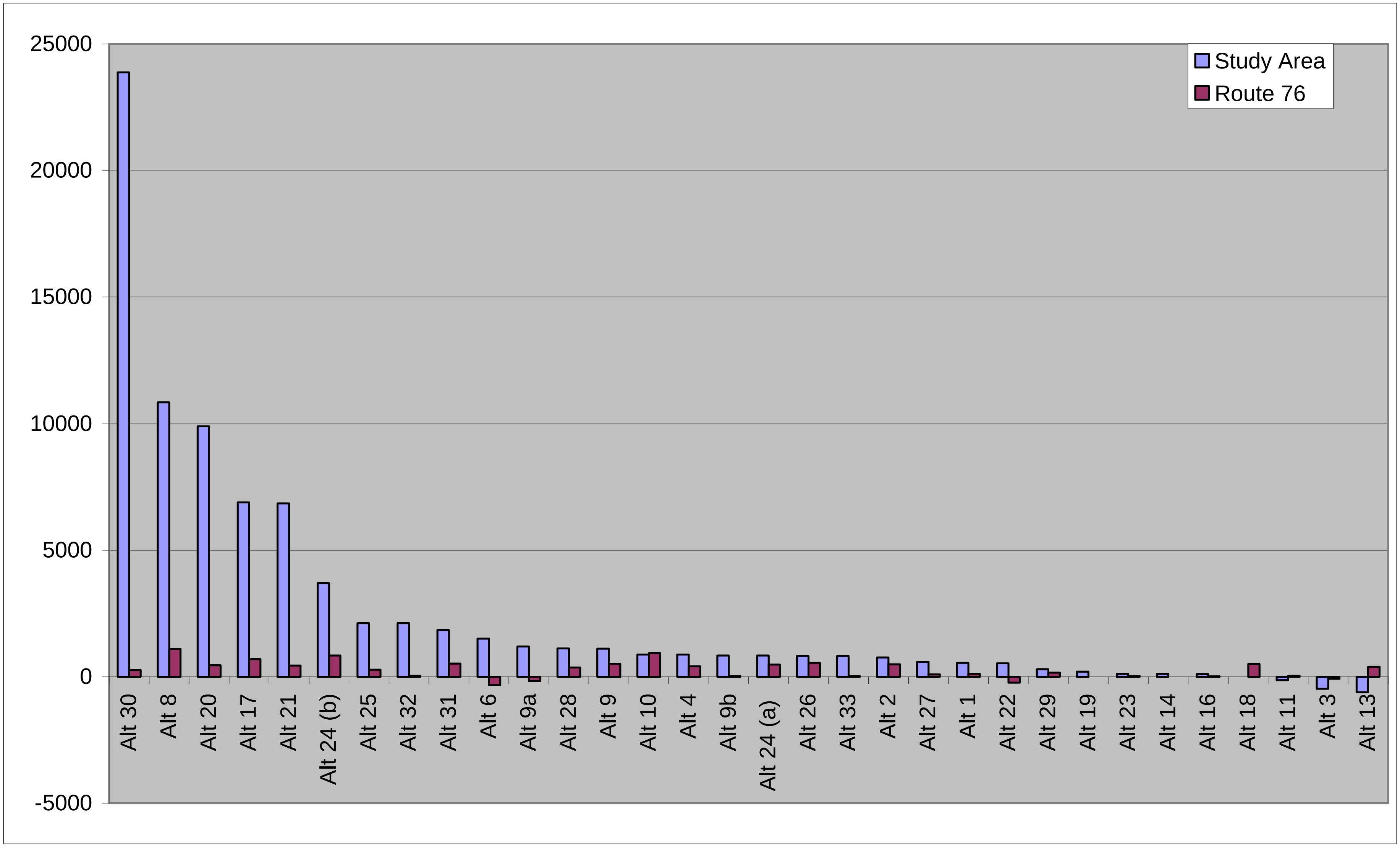


Table 3-7
Vehicle Hour Travel Savings

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 6	Alternative 8
Hours/Day	548	764	(470)	877	1,502	10,844
On Route 76	110	486	-74	413	-334	1,103
Total Value for 2020*	$1,245,705	$1,815,518	($1,116,876)	$2,084,044	$3,569,251	$25,768,950

	Alternative 9	Alternative 9a	Alternative 9b	Alternative 10	Alternative 11	Alternative 13
Hours/Day	1,106	1,198	834	881	(134)	(607)
On Route 76	514	-170	25	934	39	396
Total Value for 2020*	$2,628,224	$2,846,846	$1,981,861	$2,093,549	($318,429)	($1,442,434)

	Alternative 14	Alternative 16	Alternative 17	Alternative 18	Alternative 19	Alternative 20
Hours/Day	114	100	6,886	(4)	203	9,903
On Route 76	0	14	693	499	0	456
Total Value for 2020*	$270,902	$237,633	$16,363,426	($9,505)	$482,395	$23,532,821

	Alternative 21	Alternative 22	Alternative 23	Alternative 24a	Alternative 24b	Alternative 25
Hours/Day	6,850	528	119	834	3,702	2,110
On Route 76	443	-238	32	478	834	279
Total Value for 2020*	$16,277,878	$1,254,704	$282,784	$1,981,861	$8,797,183	$5,014,062

	Alternative 26	Alternative 27	Alternative 28	Alternative 29	Alternative 30	Alternative 31
Hours/Day	821	583	1,114	294	23,884	1,837
On Route 76	552	92	369	165	256	520
Total Value for 2020*	$1,950,969	$1,385,402	$2,647,234	$698,642	$56,756,325	$4,365,323

	Alternative 32	Alternative 33
Hours/Day	2,110	821
On Route 76	36	25
Total Value for 2020*	$5,014,062	$1,950,969

* in 2000 dollars

Vehicle Operating Cost Savings

While the costs of constructing and maintaining highways are significant, the costs of operating motor vehicles on those facilities are even more significant. Vehicle operating costs are comprised of a number of components, some of which are use-related and others that are time-related (e.g., insurance and license fees). Use-related costs, such as engine oil, gasoline, maintenance, and tires are most directly affected by improving highways. For each cost component, different levels of impacts result when highway attributes are changed. These attributes include distance, grades, horizontal curves, roadway surface, running speeds, and speed change cycles. Comparisons between current conditions and those that would result if any of the alternatives where adopted constitute the basis for estimating vehicle operating cost savings.

Automobile and commercial truck operating cost savings estimates were made following guidelines established by the Federal Highway Administration's Technical Report: *Vehicle Operating Costs, Fuel Consumption and Pavement Type and Conditions*. The analysis used consumers' surplus techniques, so the cost savings accurately depict savings not only to common traffic (traffic on the route both before and after the highway improvements) but also diverted traffic (traffic diverted from other regional highways) and even induced traffic. The vehicle operating cost changes reflect differences in vehicle miles of travel, travel speed changes, and other changes that influence vehicle operations. The cost savings were developed to accurately depict savings not only to traffic on the new alternative, but savings to motorists on all roadways.

As was done with vehicle hours traveled, VMT savings and total vehicle operational cost savings (VOC savings) were calculated for year 2020 for the entire network as well as for Route 76. The total VMT and VOC savings are displayed in **Table 3-8**. As with travel time savings, the majority of improvement alternatives would create savings in miles traveled for both the study area as well as for Route 76. The predicted VMT savings for each alternative in the year 2020 are illustrated in **Exhibit 3-4**. Alternative 10, a new three-lane road built off Francis, had the largest contrast between savings within the entire study area versus savings on Route 76. Alternative 10 would provide the greatest VOC savings on Route 76, but at the expense of the entire study area.

Exhibit 3-4
Vehicle Mile Travel Savings

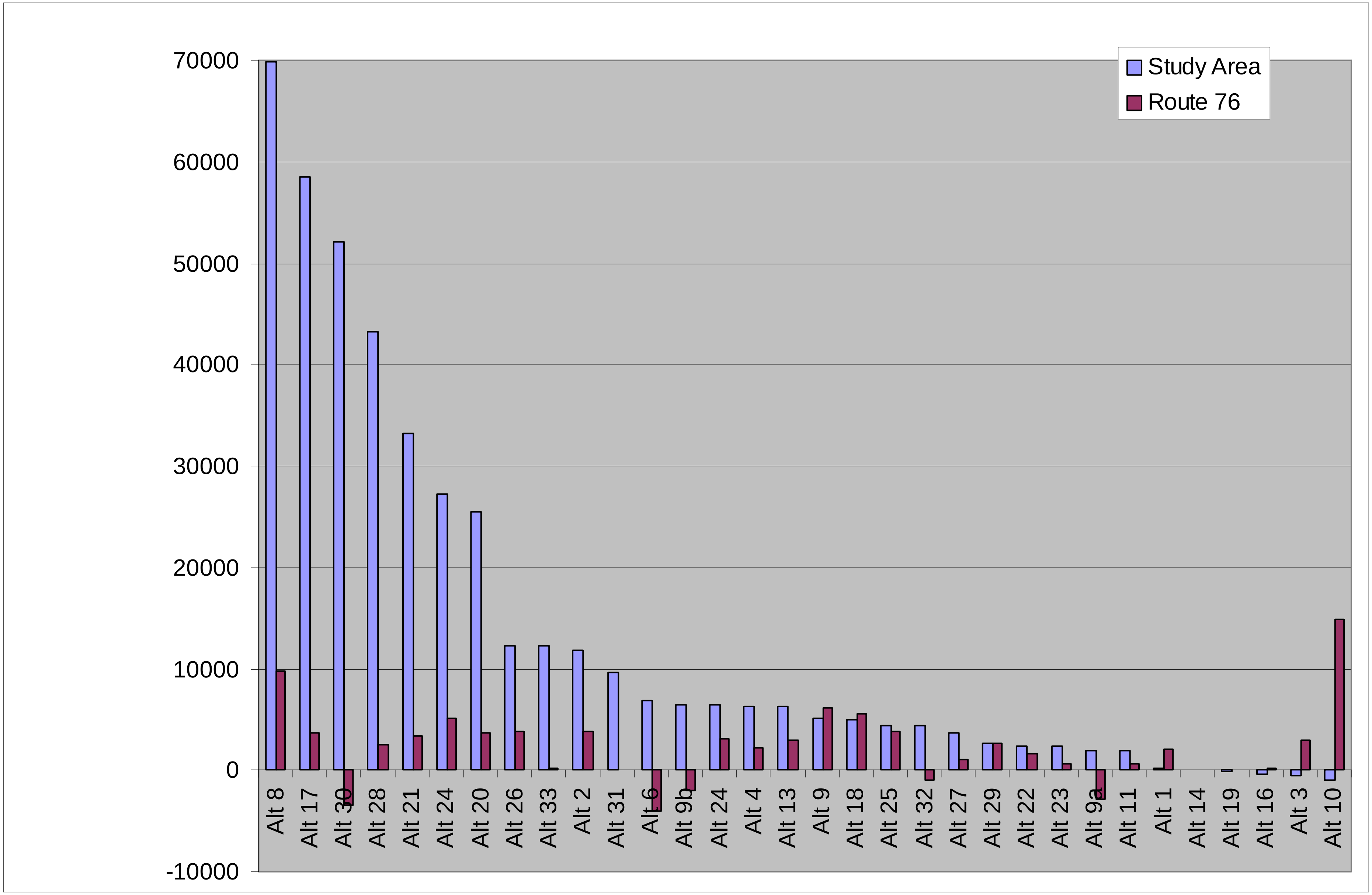


Table 3-8
Vehicle Operating Cost Savings

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 6	Alternative 8
VMT Savings (Miles/Day)	110	11,836	(591)	6,261	6,821	69,822
On Route 76	2,110	3,834	2,947	2,216	(4,005)	9,785
Total Value for 2020*	$9,463	$1,018,257	($50,844)	$538,637	$530,050	$5,425,763

	Alternative 9	Alternative 9a	Alternative 9b	Alternative 10	Alternative 11	Alternative 13
VMT Savings (Miles/Day)	5,193	1,938	6,484	(1,045)	1,861	6,224
On Route 76	6,079	(2,833)	(1,956)	14,839	668	2,894
Total Value for 2020*	$403,540	$166,727	$557,822	($81,205)	$144,616	$483,658

	Alternative 14	Alternative 16	Alternative 17	Alternative 18	Alternative 19	Alternative 20
VMT Savings (Miles/Day)	No Change	(465)	58,526	4,979	(118)	25,451
On Route 76	No Change	161	3,677	5,606	6	3,709
Total Value for 2020*	No Change	($36,134)	$4,547,968	$386,911	($9,170)	$1,977,759

	Alternative 21	Alternative 22	Alternative 23	Alternative 24 a	Alternative 24 b	Alternative 25
VMT Savings (Miles/Day)	33,272	2,398	2,372	6,484	27,262	4,458
On Route 76	3,430	1,690	613	3,157	5,090	3,839
Total Value for 2020*	$2,585,517	$186,345	$184,325	$503,862	$2,118,489	$346,424

	Alternative 26	Alternative 27	Alternative 28	Alternative 29	Alternative 30	Alternative 31
VMT Savings (Miles/Day)	12,207	3,611	43,274	2,602	52,060	9,692
On Route 76	3,774	1,002	2,514	2,672	(3,429)	48
Total Value for 2020*	$948,588	$280,605	$3,362,758	$202,198	$4,045,505	$753,151

	Alternative 32	Alternative 33
VMT Savings (Miles/Day)	4,458	12,207
On Route 76	(1,023)	189
Total Value for 2020*	$346,424	$948,588

* in 2000 dollars

Accident Cost Savings

Generally, an improved roadway results in a reduction of accidents. In some instances, the savings achieved through accident reductions are sufficient that they may alone justify construction to improve safety conditions. For this study, the study team used state accident histories as a basis for accident calculations. Accident rates were established for three accident types (fatal, injury, property damage only), with appropriate monetary values established based on information provided by the Branson Police Department. Accident rates per 1 million vehicle miles traveled were established by highway type based on accident histories provided by the state. **Table 3-9** shows the established accident rates by highway type, **Table 3-10** shows the accident rate provided by the Branson Police Department; and **Table 3-11** shows the monetary values assigned to each type of accident.

Table 3-9
Assumed Accident Rates by Highway Type

Highway Type	Accident Rate
2 Lane	185.74
3 Lane	239.64
4 Lane	95.76
5 Lane	408.45

Source: 1998 MoDOT Transportation Mgmt., Systems Statewide Accident Database

Table 3-10
City of Branson Accident History

Accident History	Accidents	Injury	Property Damage Only	Fatality
1996	1015	194	819	2
1997	1015	188	826	1
1998	1086	193	892	1
1999	1274	214	1059	1
Average	1097.5	197.25	899	1.25
Percentage of Accidents		81.91%	17.97%	0.11%

Source: City of Branson Police Department

Table 3-11
Accident Cost Assumptions

Property Damage Only	$3,220.00
Injury	$44,100.00
Fatality	$3,390,000.00
Fatality And Injury Together	$65,170.00

For this analysis, the study team developed another cost assumption for a combined value for fatalities and injury accidents. Creating a combined category was necessary because a reliable crash reduction factor suitable for application to fatal crashes was difficult to develop due to the infrequency of fatal crashes in Branson.

The total value of accident savings by type of accident from the year 2000 to 2020 that were summed and discounted is displayed in **Table 3-12**. Savings were calculated using vehicle miles traveled and the assumed accident rates, as well as by the number of vehicle miles traveled on each highway type. The discounted accident savings illustrated in **Exhibit 3-5** shows that roughly half of the alternative improvement options would have positive impacts, and half would have negative impacts.

Alternative 30 would result in the greatest amount of accident savings for the study area. On the other hand, Alternative 17 would have the worst impacts on traffic safety within the study area. Alternatives 9a and 9b, a new three-lane road off White River Drive on different alignments, would not likely have positive influences on traffic safety in the study area. However, when components of these two alternatives were combined to form Alternative 9, positive impacts on safety were identified.

Table 3-12
Discounted Accident Savings (2000$)

Alternate 1	Alternate 2	Alternate 3	Alternate 4	Alternate 6	Alternate 8
$33,867.24	$9,054.18	$16,372.46	$20,157.35	$1,227.13	$64,643.70
Alternate 9	Alternate 9a	Alternate 9b	Alternate 10	Alternate 11	Alternate 13
$8,088.70	($1,581.11)	($1,033.77)	($20,000.05)	$187.24	$14,223.64
Alternate 14	Alternate 16	Alternate 17	Alternate 18	Alternate 19	Alternate 20
$0	($61,508.64)	($210,000.31)	($5,533.74)	($813.86)	($14,337.02)
Alternate 21	Alternate 22	Alternate 23	Alternate 24 a	Alternate 24 b	Alternate 25
$36,572.02	$9,040.18	$1,569.83	($17,077.61)	($8,037.05)	($757.71)
Alternate 26	Alternate 27	Alternate 28	Alternate 29	Alternate 30	Alternate 31
($7,031.32)	($1,901.22)	$46,332.21	$8,499.60	$111,699.49	($26,188.37)
Alternate 32	Alternate 33				
($134.69)	$781.88				

Benefit/Cost Discussion

To assist in the determination of whether or not a particular investment should be made in the Branson area, various alternative improvement options were subjected to a series of benefit/cost assessments. A benefit/cost evaluation was used to evaluate these various assessments collectively. The evaluation was based on measures of effectiveness (vehicle mile savings, vehicle hour savings, accident reductions) and preliminary costs discounted to take into account the time value of money. **Table 3-13** displays the maintenance costs that were used to develop the cost of each improvement.

Table 3-13
Maintenance Assumptions

4 lane freeway = 17,500/mile (1999$) Missouri	$17,500.00
3 lanes=13,125/mile	$13,125.00
2 lanes =8,750/mile (1999$) Missouri	$8,750.00
1 lanes=4,375/mile	$4,375.00

To calculate the economic feasibility in travel efficiency terms, all costs and benefits were determined for the years 2001 through 2020. These values were then discounted back to 1999 dollars using a discount rate of 7 percent. The benefits were then compared with the roadway construction costs using conventional feasibility indicators.

Travel efficiency is the conventional and traditional method of defining whether or not a highway improvement is economically feasible. According to this test, a highway improvement needs to be quite successful in reducing per vehicle operating costs, travel time, and accident risk. It also needs to have sufficient traffic volumes on the roadway to attain the necessary level of user economic benefits.

The travel efficiency feasibility indicators are summarized in **Table 3-14**. The following rules are appropriate when interpreting this table. A feasible project is one that has:

- A positive Net Present Value (NPV).
- An Internal Rate of Return (IRR) equal to or exceeding the discount rate (7%).
- A discounted Benefit/Cost (B/C) ratio of 1.0 or higher.

The feasibility of a project increases as the value of the NPV, IRR, and B/C ratio increases.

The B/C information displayed in **Table 3-14** is sorted in descending order with Alternative 30, with a ratio of 25.71, listed first. In all, 19 alternatives had a B/C ratio of 1.0 or higher.

Exhibit 3-5
Discounted Accident Savings

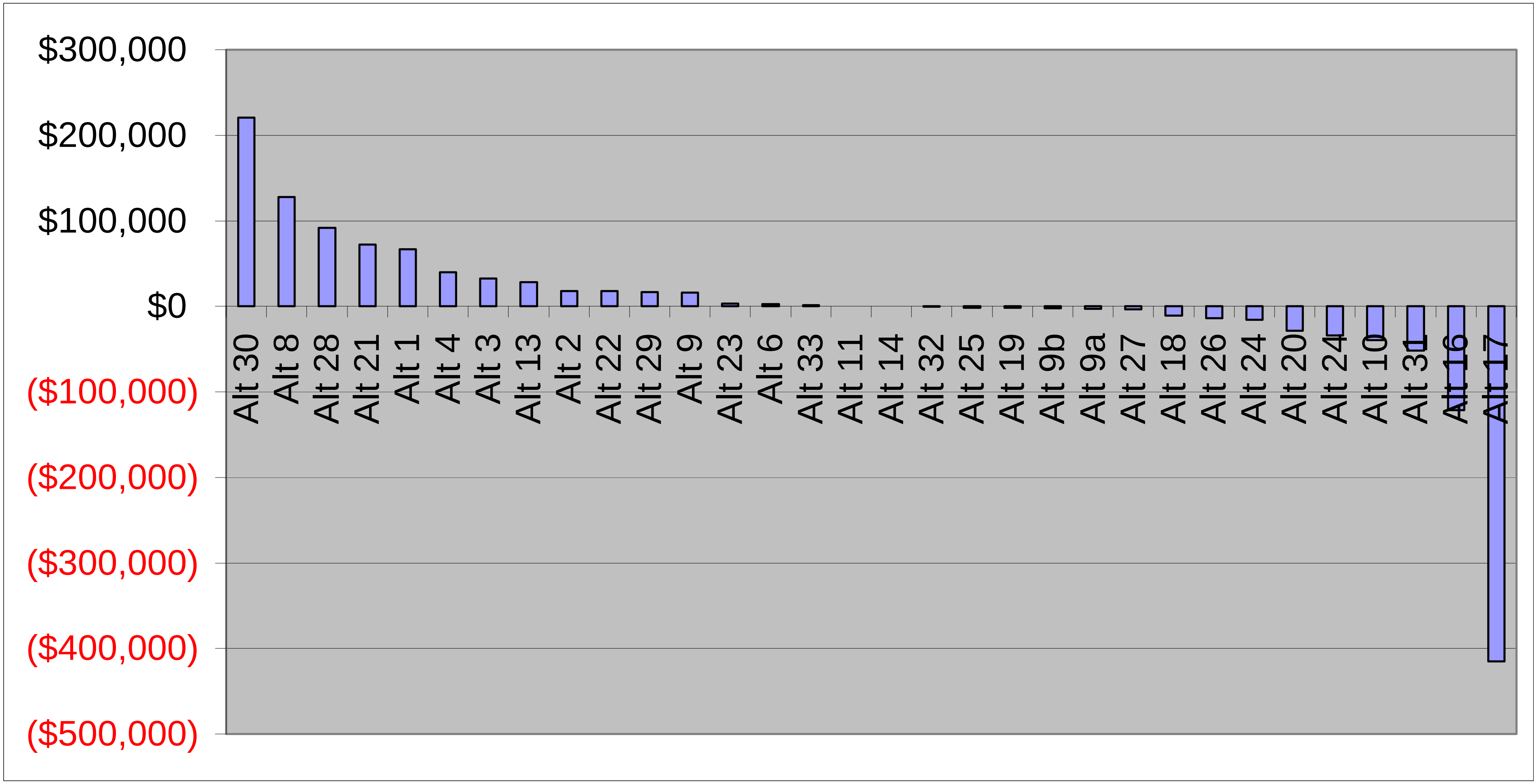


Table 3-14
Benefit/Cost Summary

Alternative	Estimated Cost (million)	VMT Savings Network	VMT Savings Route 76	VHT Savings Network	VHT Savings Route 76	ADT on Alternative	B/C Ratio
Alternative 30	10.672	52,060	(3,429)	23,884	256	24,400	25.71
Alternative 20	4.584	25,451	3,709	9,903	456	25,100	23.02
Alternative 21	6.185	33,272	3,430	6,850	443	4,100	14.39
Alternative 25	2.088	4,458	3,839	2,110	279	9,100	11.83
Alternative 8	7.083	69,822	9,785	10,844	1,103	15,900	9.21
Alternative 28	4.952	43,274	2,514	1,114	369	6,100	7.46
Alternative 6	2.500	6,821	(4,005)	1,502	(334)	18,600	7.37
Alternative 17	16.592	58,526	3,677	6,886	693	35,800	6.1
Alternative 4	3.127	6,261	2,216	877	413	9,300	3.88
Alternative 2	4.412	11,836	3,834	764	486	16,600	3.35
Alternative 10	3.063	(1,045)	14,839	881	934	16,200	2.43
Alternative 27	4.037	3,611	1,002	583	92	9,900	1.99
Alternative 9b	6.973	(6,591)	(1,956)	834	25	9,252	1.36
Alternative 9	11.245	5,193	6,079	1,106	514	13,200	1.18
Alternative 32	21.352	6,657	(1,023)	2,110	36	12,803	1.13
Alternative 22	5.800	2,398	1,690	528	(238)	3,500	1.1
Alternative 33	14.868	5,099	189	821	25	19,193	1.06
Alternative 18	2.808	4,979	5,606	(4)	499	6,500	1.05
Alternative 9a	7.785	1,938	(2,833)	1,198	(170)	7,432	0.87
Alternative 1	8.296	110	2,110	548	110	6,200	0.63
Alternative 23	8.000	2,372	613	119	32	4,900	0.51
Alternative 24B	115.000*	27,262	5,090	3,702	834	5,500	0.44
Alternative 29	14.093	2,602	2,672	294	165	4,900	0.37
Alternative 14	4.412	0	0	114	0	12,900	0.24
Alternative 19	12.890	(118)	6	203	0	24,500	0.14
Alternative 24A	95.080	6,484	3,157	834	478	2,000	0.12
Alternative 26	18.695	12,207	3,774	821	552	6,200	0.07
Alternative 31	13.374	9,692	48	1,837	520	8,925	0.07
Alternative 16	9.094	(465)	161	100	14	6,900	0.06
Alternative 11	0.486	1,861	668	(134)	39	4,700	-0.22
Alternative 13	6.381	6,224	2,894	(607)	396	6,600	-0.29
Alternative 3	11.632	(591)	2,947	(470)	(74)	20,400	-0.41

The basic rule regarding benefit/cost ratios like these is that projects with a ratio of 1.0 or higher are considered feasible from an engineering perspective. Therefore, alternatives 30 through 18 in **Table 3-14** are all considered good projects to further pursue. Conversely, alternatives 9a through 3 are considered not feasible from an engineering perspective and would have to be justified for other reasons such as roadway continuity or community development.

Chapter 4

Management Alternatives

Route 465 Signage Plan Review

The information in this report is a review of the signing plan for the I-465 Ozark Mountain Highroad (OMH). Signing information on several approaches throughout the area was collected as a part of the Branson Comprehensive Transportation Plan, offering a unique perspective on the impact of the Highroad and its signage plan. The impact of area signage on future developments, future traffic projections and travel patterns in the area has been taken into consideration.

Impact of Current Signage Plan for SB Route 65

The approach signing on SB Route 65 heading into the area from Springfield, Missouri is potentially confusing for the new visitor to the area. According to the *Manual of Uniform Traffic Control Devices* (MUTCD), the role of highway signing is to provide directional information to the driver unfamiliar to the area (MUTCD, Section 2F-2).

The exit sign for the Highroad implies that in order to get to Branson attractions you must exit then, when many attractions still lie ahead along Route 65. An overhead sign directing motorists to downtown Branson or East Branson attractions is not warranted according to MUTCD and MoDOT guidelines for highway signage at this location. Overhead signs are typically only used to assist in confusing situations like left-turn exits or multilane exits. These are called pull through signs. A few suggestions to help the driver are included in the following sections.

Potential Improvements to Current Plan

In rural communities served by several exits, MUTCD (Section 2E-36) recommends the use of a sign that states “Branson Area Next 4 Exits,” prior to the first exit to the area. This would be helpful prior to the OMH exit; informing the motorist that there are several Branson exits. The signing plan included a sign that listed the next several exits as a group with distances to each (MUTCD, Section 2E-34). This sign is helpful in guiding those unfamiliar to the area and informing them of exits that are still ahead. A modification to this sign would include a title to the list of exits reading “Branson Area Exits.” This would help to emphasize that these exits are also considered the Branson Area. This concept is also recommended in the MUTCD, Section 2E-35.

Another suggestion would be to name all four Branson exits in the list. Route 76 is a primary destination and could serve to direct the driver who can’t remember the exit he needs but does know Route 76. This list of approaching exits should be continued south of the Highroad as well to assist the tourist traveler to find his destination. While the MUTCD suggests that only three exits be listed in a group, we feel that listing all four would be helpful to the visiting driver

Signage for Exits at Route 248

The Route 248 exit from the Highroad presents another problem. We have been analyzing the area growth projections for the land south of the Highroad along Route 248 as a part of the long-range portion of the study. Not signing Route 248 for Branson may inhibit development along Route 248. Currently the Branson city limit is several miles from the Highroad, but growth to the north could be encouraged once the Highroad opens.

The MUTCD provides several examples for signing an exit at a diamond interchange. The direction sign at the ramp terminal is almost always consistent with the city designations on the exit signs. The purpose of the direction sign is to provide information of the location of the business section of town, which in the case of Branson is several miles away, but along Route 248. Perhaps a designation like "North Branson Attractions" similar to the direction to "West Branson Attractions" currently used could be used on the Highroad exit signs.

Route 248 is a viable option to get to Shepherd of the Hills Expressway. There is currently one major theater and a few other attractions along Route 248. It seems appropriate to sign for these locations. People will still use Route 465 and Route 65 as the primary access routes into the Branson area, but proper signage could aid growth in the northern part of the city.

Other Issues

The phrase "West Branson Attractions" is very similar to "Branson West" a nearby-incorporated city, and might serve to confuse a number of visiting drivers. An alternative naming system would be helpful.

Downtown Branson should be signed as a special destination. MUTCD allows for signing of recreational or cultural interest areas. This sign would be close to the Route 76 exit. This would not impact the traffic at the OMH but it might help to reinforce the concept of different areas within Branson.

The need is to create a system of signage that will assist new drivers to the area to reach their intended destinations. Any trips that are intended to reach downtown or eastern Branson attractions but get redirected to the west along the Highroad would be forced to take a much longer path and through potentially more congestion. Some modifications are necessary to the current signing plan for the OMH.

Access Management Recommendations

The following is a summary of the MoDOT Access Management Standards and Guidelines, which was approved early this year. MoDOT has encouraged consultants and local communities to follow these guidelines and use their plan as a model for local control of access management. This section is a review of MoDOT's plan and details the specific features that best apply to the Branson area.

Purpose

Access management involves the thoughtful planning and design of points of access to the public roadway system, for example, interchanges, intersections between public roads, median breaks, and private driveways. Sound access management can have a profound impact on highway safety and the ability of roadways to successfully carry traffic. Failure to properly manage access can result in safety problems as well as lead to diminution of the public's investment in the roadway system.

Standards have been developed to establish uniformity in the design and provision of access to facilities operated by the city of Branson and MoDOT. The standards apply to a variety of situations, including long-range planning, new project planning and design, right-of-way acquisition, redesign of existing highway corridors, and driveway permitting. Uniform standards are intended to improve the safety, effectiveness, and efficiency traffic moving on and off public roadway facilities.

Background

The goals established for the access management standards include the following:

- Improve roadway safety
- Improve traffic operations
- Protect the taxpayer's large investment in roadways
- Create better conditions for non-automobile modes

Development of a roadway classification system is the first step in defining the contingent access management standards. The roadway classification identifies the present and future functional role of a particular section of roadway and provides the basis for the access management standards that will be incorporated.

Standards are then developed for the intersections, driveways, and other pertinent areas related to these classifications of roadway. Standards for intersections include spacing for public road intersections and spacing of traffic signals. Driveway standards include the following:

- Driveway spacing and density
- Corner clearance and clearance of functional areas of public road intersections
- Sight-distance minimums
- Driveway geometric design
- Angle of intersection and approach radii
- Driveway width, throat length, and grade
- Standards for surfacing and curbs

Other related issues to which standards apply are: median openings, guidelines for the use of two-way left-turn lanes (TWLTL), "three-lane roadways", raised medians, warrants for auxiliary turn lanes, frontage and backage roads, recommended practices for local land-use planning agencies, and consideration of non-automobile modes in managing access.

New Projects versus Retrofit Projects

All of the standards contained in this section shall apply to new highway construction projects. Where access is being managed on an existing roadway (a "retrofit project"), the city will strive to incorporate the standards contained in this section and will always incorporate the sight distance standard at a minimum. However, it may not be possible to incorporate and attain all of the access management standards in retrofit projects due to economic, physical, and other constraints.

Roadway Classification System for Access Management

Roadways, by their nature, serve a dual purpose–providing a means of transport between one place and another, and providing access to adjacent property. Sometimes these dual purposes come into conflict. Access management is intended to emphasize roadways' role of serving through traffic. The property access role of roadways becomes secondary (or even eliminated altogether) when access is strictly managed.

MoDOT has classified roadways into 10 categories. The categories include freeway, major arterial, minor arterial, collector and local access road classifications for both rural and urban conditions. In the Branson area, while mostly considered rural, the urban classification will apply due to the high number of developments along the area roadways. None of the existing roadways in the Branson area meet the qualifications of a major arterial.

Branson has a freeway facility (Route 65) running north/south through the city, and a partial bypass route (Route 465, the Ozark Mountain Highroad) soon to be completed. These roadways will serve to facilitate the longer distance trips and have fully controlled access through the Branson area. The minor arterials primarily serve through trips while allowing for some direct access. Shepherd of the Hills Expressway and Route 248 should exhibit these qualities. Due to the intense development along Route 76, the city has attempted to provide alternate routes to support the large number of visitors to the region. These support facilities' primary goal is to connect points of interest and deliver drivers to those locations. For the most part these support facilities have been classified as collectors, which also serve for local access. The new facilities recommended in later sections of this report are also included in this classification exhibit.

General guidelines for the Branson Area

Table 4-1 provides a list of several key guidelines for these facilities that fall most directly under the city's control. The freeway facilities are under direct control of MoDOT. The local access roads are designed to provide the most direct access to local development. While rules of common sense apply to these facilities to consolidate and design access points only as necessary. The guidelines in the table are based on general speed for the region. Definitions of these criteria and descriptions of their use are in the MoDOT guidelines. These guidelines are to be used as helpful goals to reference as development continues to occur throughout the region.

Table 4-1
General Guidelines

Category	Guideline	Collector	Minor Arterial
Spacing			
	Spacing between driveways and at grade intersections	660	1,320'
	Spacing between traffic signals	1,320	2,640'
	Driveway spacing	220'	330'
Driveway			
	Corner to corner clearance	220'	330'
	Right-in Right-out corner clearance	110'	165'
	Angle for a two-way driveway – desired (min)	90° (70°)	90° (70°)
	Angle for a one-way driveway – desired (min)	60°	60°
	Turning Radius – desired (min)	25' (10')	25' (10')
	Throat length – min (desired)	20' (60')	20' (60')
	Grade change desired (max)	5% (6%)	5% (6%)
	Width for a two-way driveway - min (max)	28' (42')	42' (54')
	Width for a one-way driveway - min (max)	20' (30')	20' (30')

Source: MoDOT access management classification system and standards.

The spacing of intersections, traffic signals and driveways is designed to preserve the traffic flow and avoid conflicts between decision points. The recommended values for various spacings for the roadway classifications in the Branson area is shown in **Table 4-1**.

Roadway elements such as dedicated turn lanes or raised medians are based mostly on three factors: speed of the roadway; volume of the left-turning traffic; and the directional volume of the through traffic. Raised medians should be used only on minor arterials or higher classification and when the ADT exceeds 28,000 VPD.A traffic study should be considered when a right-turn lane is to be evaluated. Generally, a right-turn lane is warranted when all of the following are true:

- Speed is 35 mph or greater
- Traffic exceeds 10,000 VPD
- Turning traffic exceeds the following in the peak hour:
    - 30 on a two-lane road with speeds over 45
    - 40 on a four-lane road with speeds over 45
    - 80 on a two-lane road with speeds under 45
    - 110 on a four-lane road with speeds under 45

In addition a right-turn lane should be strongly considered under the following conditions:

- Poor internal site design leads to backups on the mainline
- Peak hour traffic is greater than 10 percent
- Mainline speed is greater than 55 mph
- Right-turn traffic includes a large number of trailers or other large vehicles
- The intersection is at a skew
- High accident location

Table 4-2 shows the limits for warranting a left-turn lane. If the left-turn lane volume and directional volume both exceed the values in the table, a turn lane is warranted.

Table 4-2
Warrants for Left-Turn Lane

Left-Turn Volume	Directional Volume (35 mph)	Directional Volume (45 mph)
10	400	350
20	300	225
30	225	150
40	175	100
50	150	100
60	100	100

The length of the turn lanes is based on approach speed and is listed in **Table 4-3** for both left- and right-turn lanes.

Table 4-3
Length of Turn Lanes

Speed (MPH)	Right-Turn Lane	Left-Turn Lane
50	310	350
45	250	290
40	210	250
35	170	210

Chapter 5

Recommendations and Implementation

Description of Recommended Improvements

Based on the fact that there are so many visitor and subsequent trips generated in the area, several of the proposed projects result in a good benefit/cost ratio. Generally speaking any project with a B/C ratio greater than 1 should be constructed because the benefits outweigh the costs. Due to the uncertain nature of surrounding development and the number of projects that met these criteria, a minimum B/C ratio was set at 2.0 for a project to be recommended. This accounts for any overestimation of growth in the region and any underestimation of costs based on unforeseen issues.

Utilizing the benefit/cost (B/C) analysis described in this report, each alternative was modeled for potential effectiveness. Projects that benefit the community while at the same time giving the maximum cost efficiency to the city tend to have a higher B/C ratio. While the B/C table is an excellent tool used to evaluate the roadway improvements, other considerations must also be taken into account.

First, the timing of the projects must be considered. Some projects may serve to improve traffic conditions right now, while other projects may be exclusively designed to serve future development, which is subject to change and difficult to predict.

Second, some of the alternatives also serve the same basic travel demands. In other words, two alternatives may help relieve the same segment of the network. Only one of these two alternatives may need to be built. Not only will the B/C ratio be lower when the projects are combined, but it could result in an unfeasible project. Twelve projects met all of these criteria and were recommended for construction.

Projects in the undeveloped areas for the most part did not rank very highly in terms of B/C ratio. This is mostly due to the relatively low traffic volumes projected for these areas in comparison to the rest of the studied alternatives. These projects will depend highly on the development in the area and will not serve to accommodate any existing traffic needs, so they were not included in the recommendations. In time, when developments expand through the region, it will be possible to better predict the needs in these areas.

Four different bridge alternative projects were evaluated and Alternative 30 came out far ahead of the others in terms of projected volume and network efficiency. The study area for this project stopped at Lake Taneycomo. Inventory was not collected south of the lake. While further study would need to be done to fully evaluate a new bridge crossing location, from a traffic point of view, Alternative 30 holds the most promise and should be considered a front-running location. There will be environmental issues outside the scope of this study that need to be evaluated. The B/C ratio for this project was so high that even if additional improvements or higher costs are required it will still be the most feasible location.

Alternative 8 and Alternative 21 both provide a key connection between Route 265 and Route 165 south of Route 76. Alternative 21 has a better B/C ratio but is more dependent on future development. Alternative 8 also provides a second key connection between Fall Creek Road and Route 165 and has a much higher volume of traffic on it. This recommends Alternative 8, and shows Alternative 21 to be a duplication and unnecessary. In the event that the Highroad continues south of Route 376, Alternative 21 will incur a significantly higher cost for crossing it, estimated at as much as two million dollars.

Alternative 17 is recommended because of the anticipated coordination with the expected increase in volumes from the eminent opening of the Ozark Mountain Highroad. Alternative 28 could serve as a reliever route for Route 76. This is viewed as only a temporary measure. The main route into Branson from the west will remain Route 76. The development along Alternative 28 will be difficult to control. The cost of Alternative 28 is much lower but it does not serve the entire distance to the Highroad.

Alternative 27 is below the threshold for projects recommended. However, if the improvements along Alternative 20 are more costly than expected due to any unforeseen ROW or relocation costs, Alternative 27 could serve to relieve Route 165. This problem is not anticipated, and is therefore excluded from the recommendations in favor of widening Route 165 in Alternative 20.

Table 5-1 shows a summary of the recommended projects listed in order by alternative number. The recommended alternatives are also shown in **Exhibit 5-1**. As discussed in **Chapter 3**, each of the alternatives fit into one of the following categories:

- Connections in developed areas
- Widening of existing routes
- Connections in undeveloped areas
- Bridge crossings

Exhibit 5-1 Recommended Alternatives

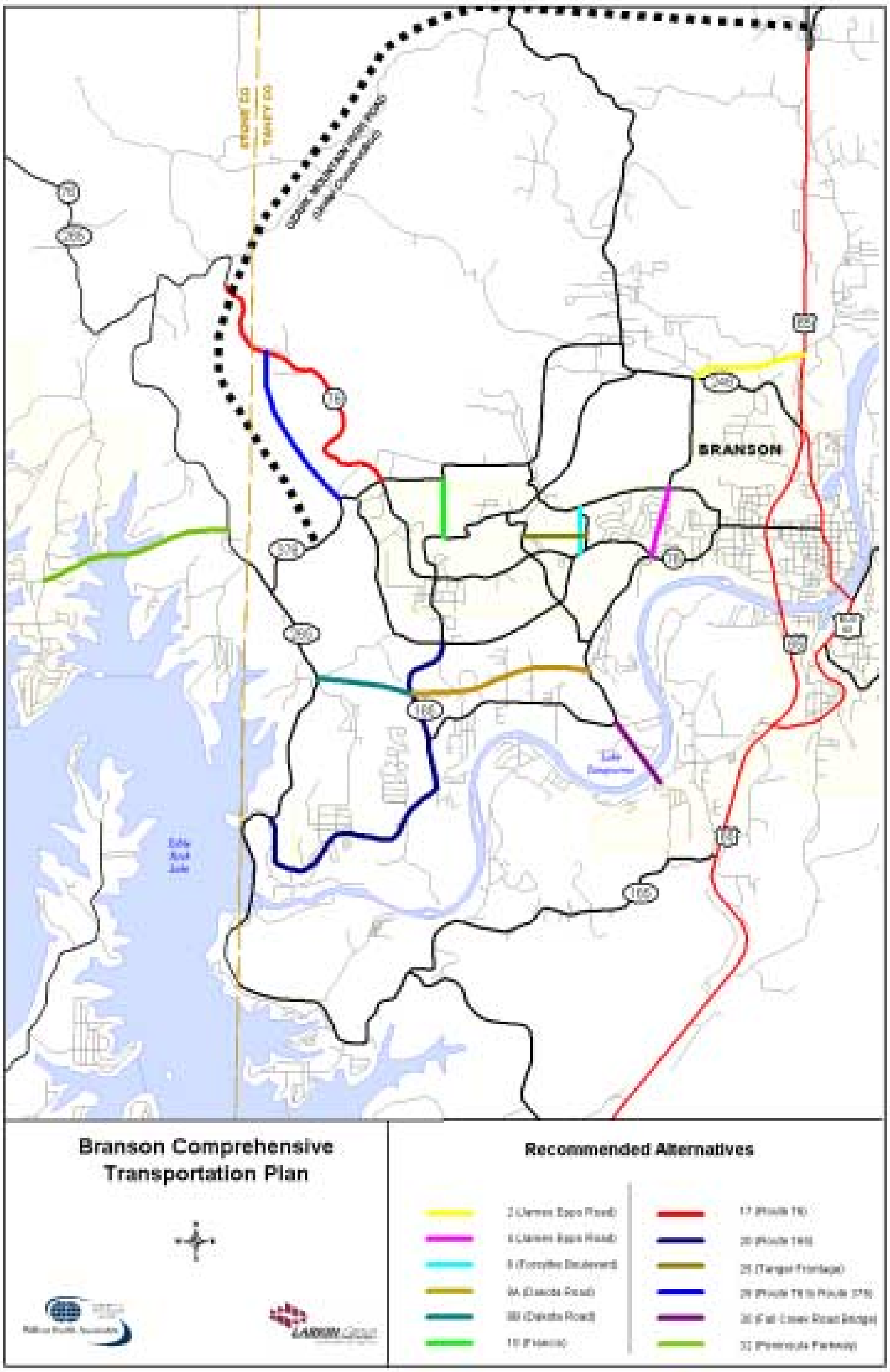


Table 5-1
Recommended Projects

Alternative	Route	Cost ($M)	Improvement	B/C
2	James Epps Road	4.41	New Road (3-Lane)	**3**
4	James Epps Road	3.13	New Road (3-Lane)	**4**
6	Forsythe Boulevard	1.46	Realign Road (3-Lane)	**13**
8A	Dakota Road	7.36	New Road (3-Lane)	**9**
8B	Dakota Road	7.08	New Road (3-Lane)	
10	Francis	3.06	New Road (3-Lane)	**2**
17	Rt. 76	16.59	4 Lanes Widened	**6**
20	Rt. 165	4.58	Widen to 3 lanes	**23**
25	Tanger Frontage	2.09	New Road (2-Lane)	**12**
28	Rte 76 to Rte 376	4.95	3-Lane Road	**7**
30	Fall Creek Road (Bridge)	10.67	4-Lane Road	**26**
32	Peninsula Parkway	21.35	New Road (2-Lane)	**15**

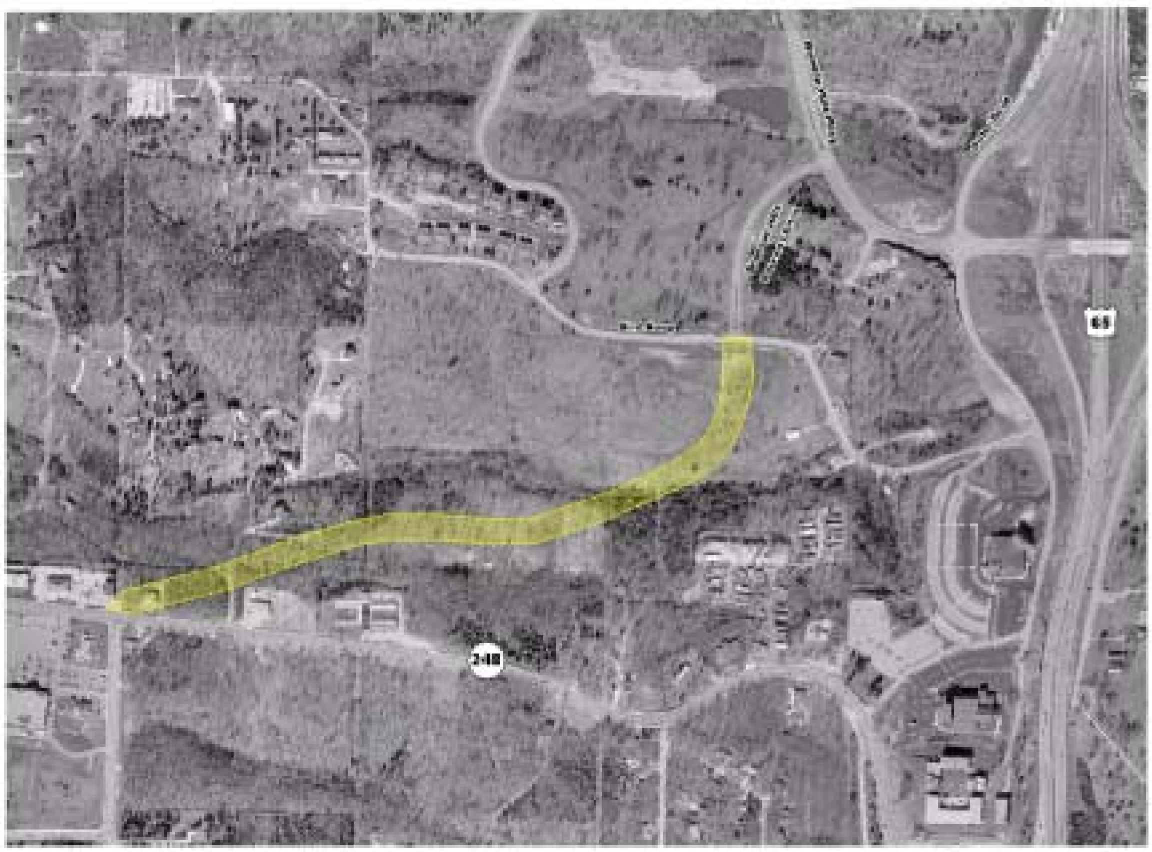
Connections in developed areas—There is a group of recommended alternatives that would serve to provide connection in the currently developed areas so that people can make a more direct trip to a desired destination rather than driving on Route 76. These projects include Alternatives 2, 4, 6, 10, and 25. Also included in this group is the Indian Point connection Alternative 32. Additional study will be needed to include impacts and needs farther west, but it is a project that will greatly benefit the interaction between Branson and points west.

Widening of existing routes—Alternatives 17 and 20 are widening projects of Route 165 and 76 through the developed Branson area. Alternative 20 has a very high B/C ratio, and while Alternative 17 has a high B/C ratio, it is not as high as some other projects. Alternative 17 was selected in this group for a couple of reasons. The traffic model does not predict the level of attraction that Route 76 has in this region. Once the Highroad is opened it will be even more critical that the segment between it and Branson be adequate for the anticipated traffic from the west. Timing of this improvement will be critical. If the Highroad brings traffic around the city only to drop them off in a highly congested area it will be perceived as a wasted effort.

Connections in undeveloped areas—The third group includes Alternative 8A, Alternative 8B, and Alternative 28 that are the most dependent on future development as well as the bridge project (Alternative 30) that will require the most additional study and environmental coordination.

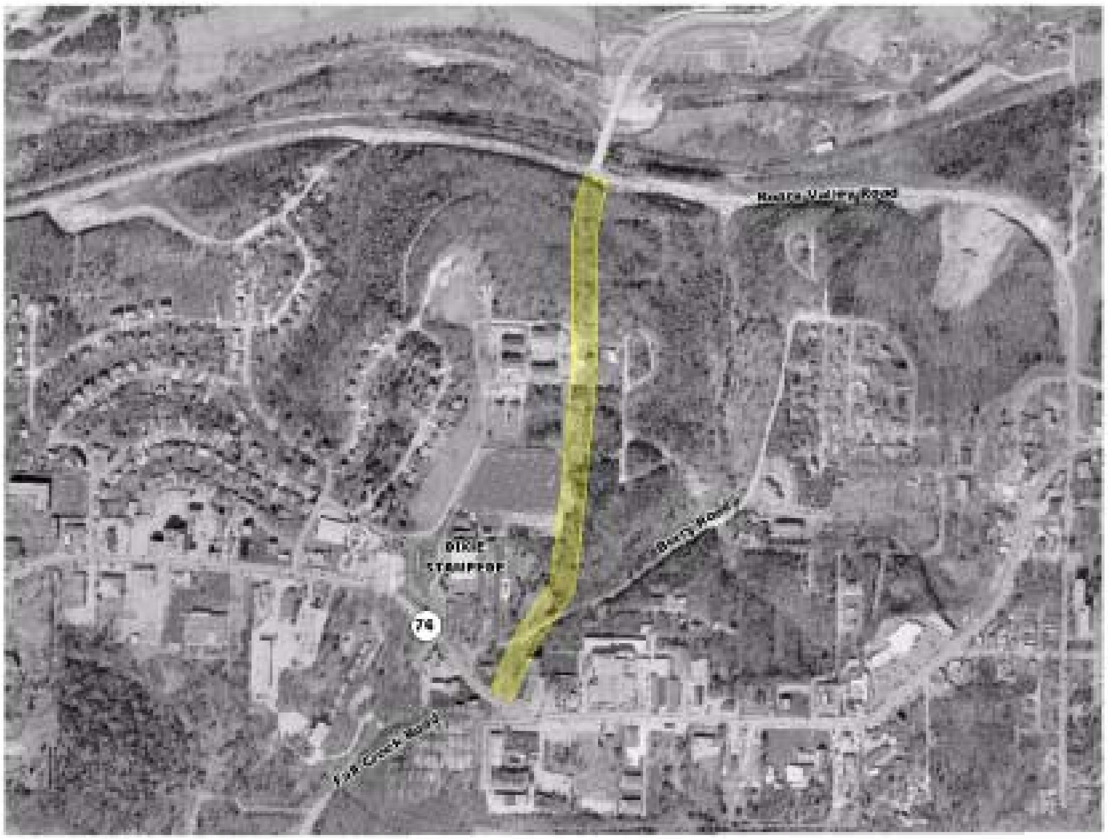
Alternative 2 (James Epps Road North)

This alternative will provide the north leg to the current James Epps Road and Route 248 intersection and travel generally east northeast. The new three-lane road will tie into Branson Hills/Gateway Drive. This will provide an alternate access/congestion relief to the Route 76 and Route 65 interchange, which is one of the most congested areas in Branson.



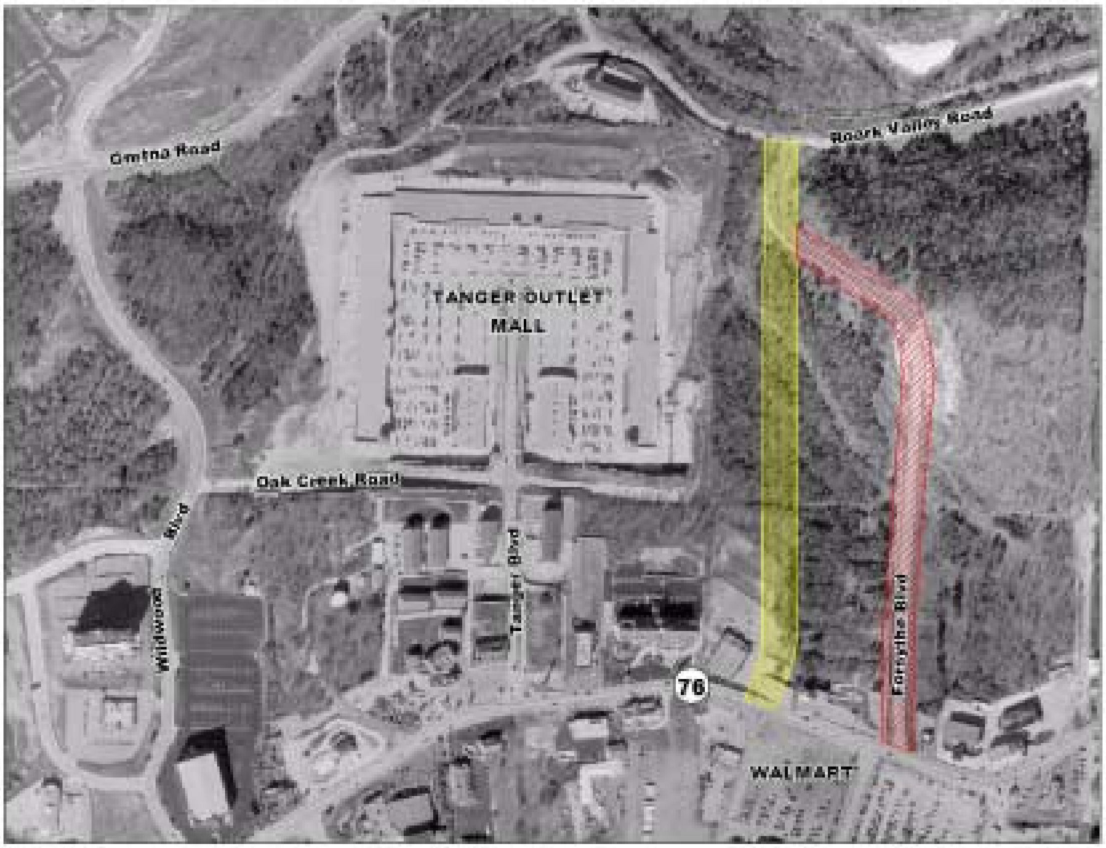
Alternative 4 (James Epps Road South)

This alternative will provide the south leg at the current James Epps Road and Roark Valley Road and travel south. The three-lane road will utilize a small piece of Berry Road as it crosses before providing the north leg of the Route 76 and Fall Creek intersection.



Alternative 6 (Forsythe Boulevard)

Alternative 6 will realign the existing Forsythe Boulevard to flow due south and provide the north leg of the Route 76 and Green Mountain Road intersection. The existing Forsythe Boulevard would be closed to eliminate the current offset intersection situation with the entrance to Wal-Mart.

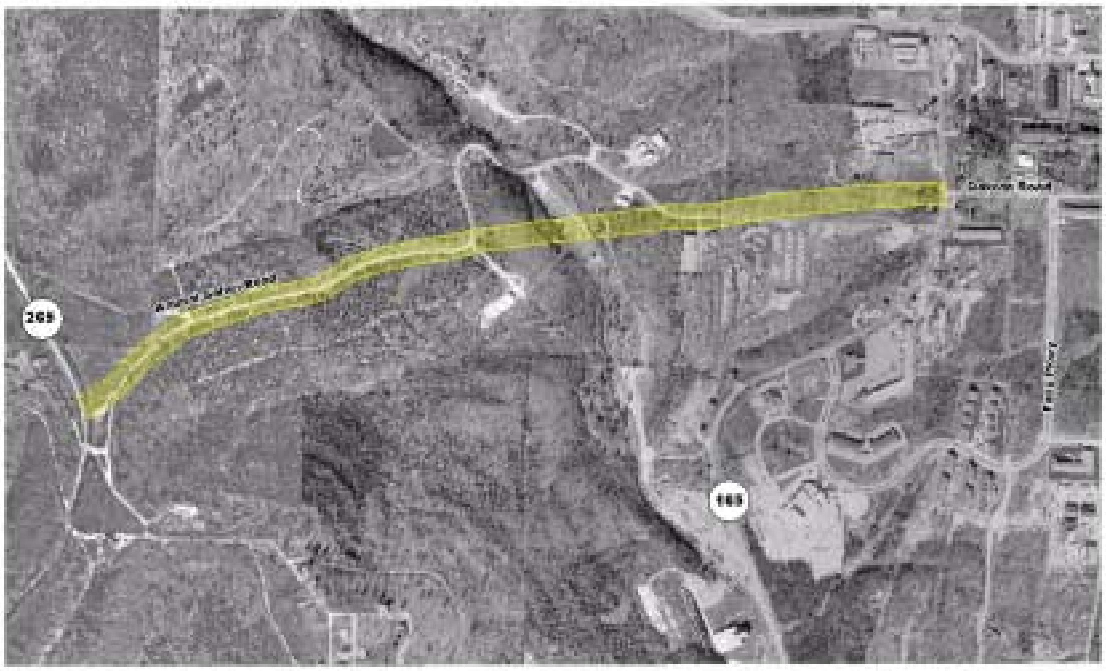


Alternative 8A (Dakota Road)

This alternative will provide a connection between Fall Creek Road and Route 165. This alternative will be a new three-lane road other than using the existing road through the Thousand Hills Golf course.

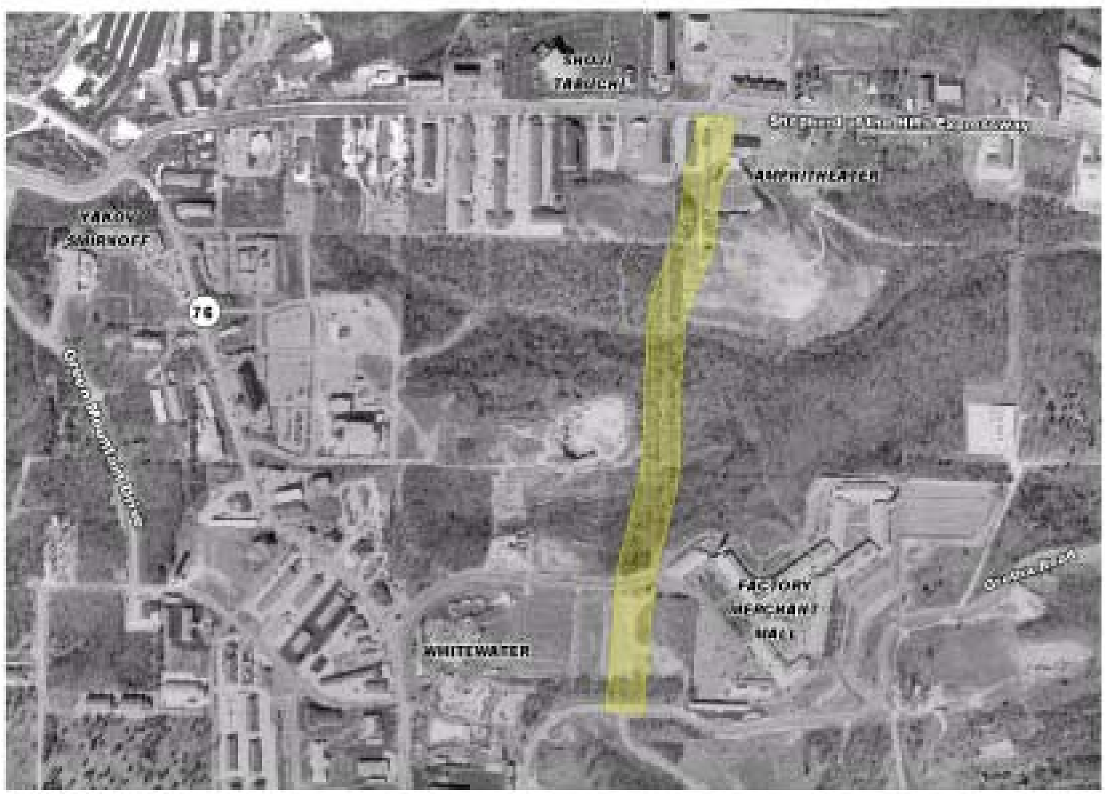
Alternative 8B (Dakota Road)

This alternative is a continuation of Alternative 8A. This alternative will provide a new three-lane connection between Route 165 and Route 265. There are parts of Safari Road that may be used as part of this alternative.



Alternative 10 (Francis Road)

This alternative will provide a new three-lane connection between Gretna Road and Shepherd of the Hills Expressway. Francis Road will extend north from the existing Francis Road and Gretna Road intersection.

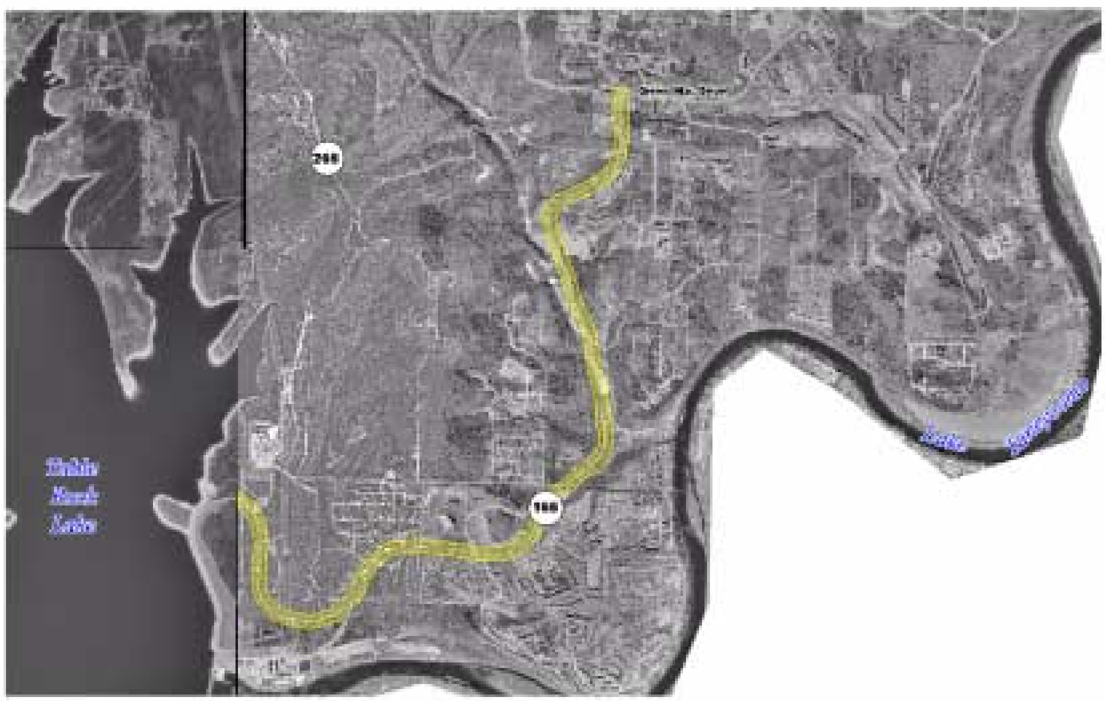


Alternative 17 (Route 76)

This alternative will widen the existing Route 76 from Route 376/Shepherd of the Hills Expressway to the new Ozark Mountain High Road. The widening of Route 76 to five-lanes will occur along the same general alignment as to existing road.

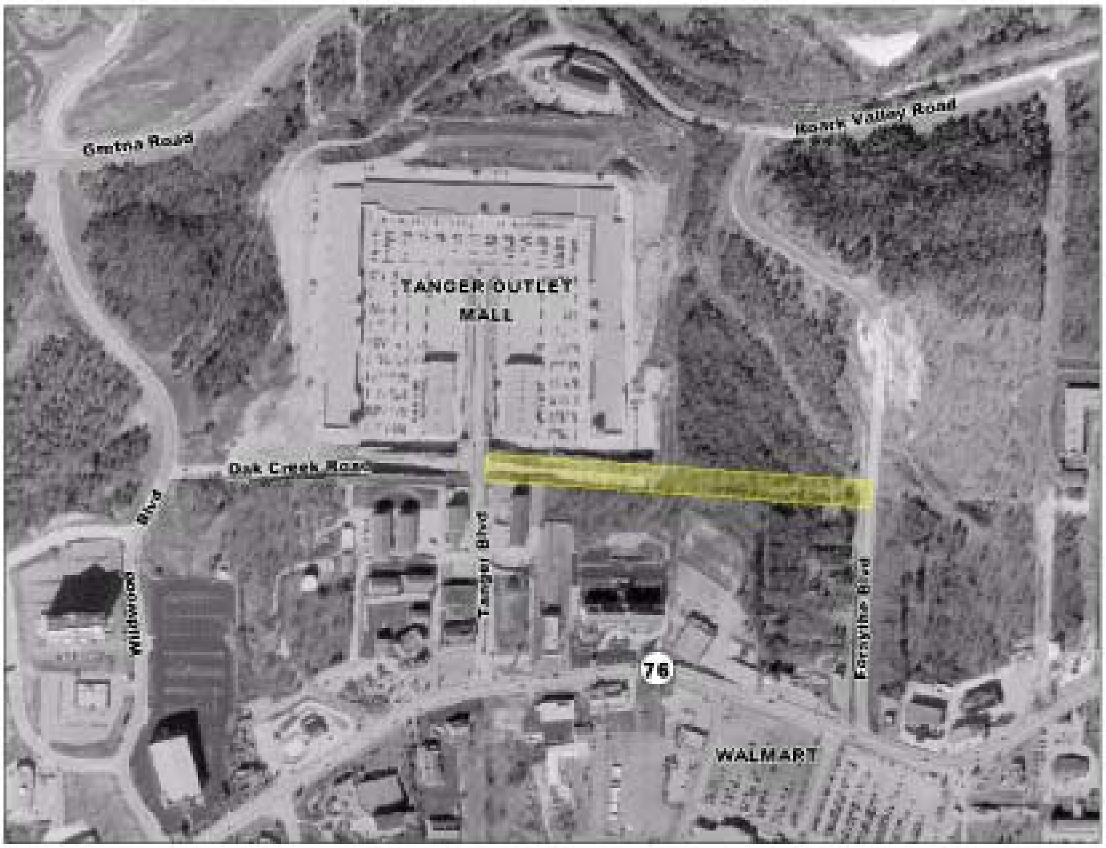
<u>Alternative 20 (Route 165)</u>

This alternative will widen the existing Route 165 from Route 265 to Green Mountain Road. The widening of Route 165 to five-lanes will occur along the same general alignment as to existing road. As Branson continues to grow in the south, this alternative will become increasing important.



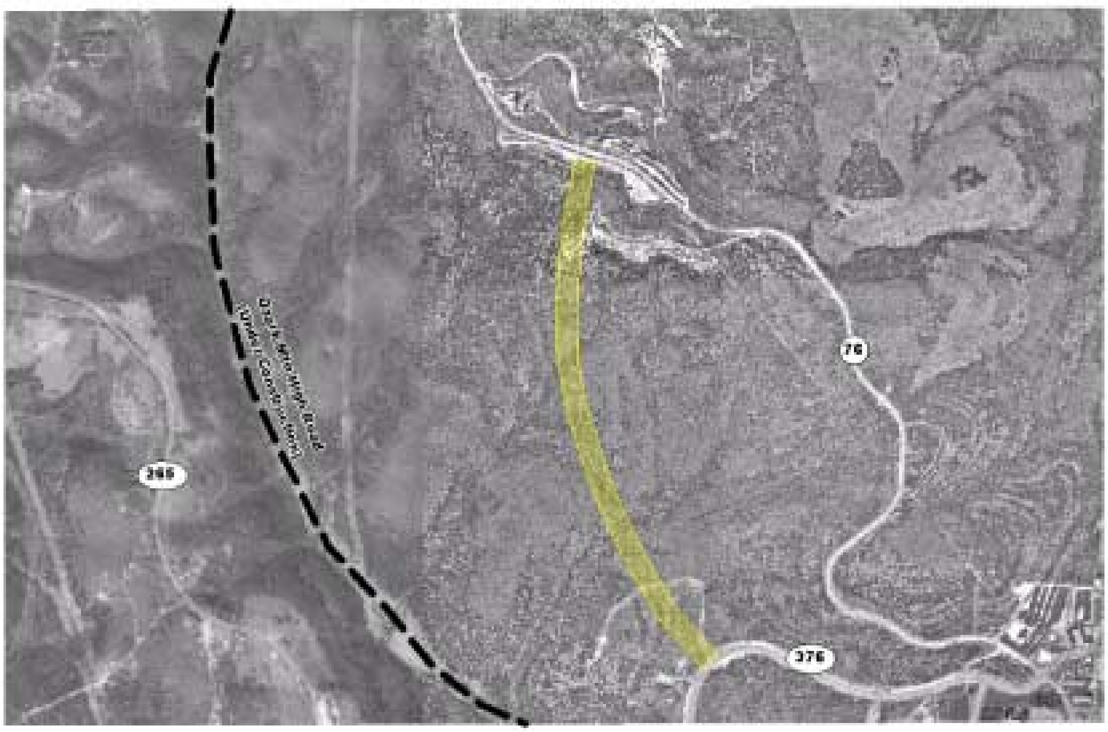
Alternative 25 (Tanger Frontage)

This alternative will provide a new two-lane road from Wildwood Drive to Forsythe Boulevard and run along the south side of the Tanger Outlet Mall. The Tanger Frontage Road construction should be coordinated with the Forsythe Boulevard realignment (Alternative 6).



Alternative 28 (Route 76 to Route 376)

This alternative will provide a new three-lane road from Route 376 midway between The Ozark Mountain High Road and Route 76 to Route 76 east of the Taney/Stone County line. Alternative 28 could serve as a reliever route for Route 76.

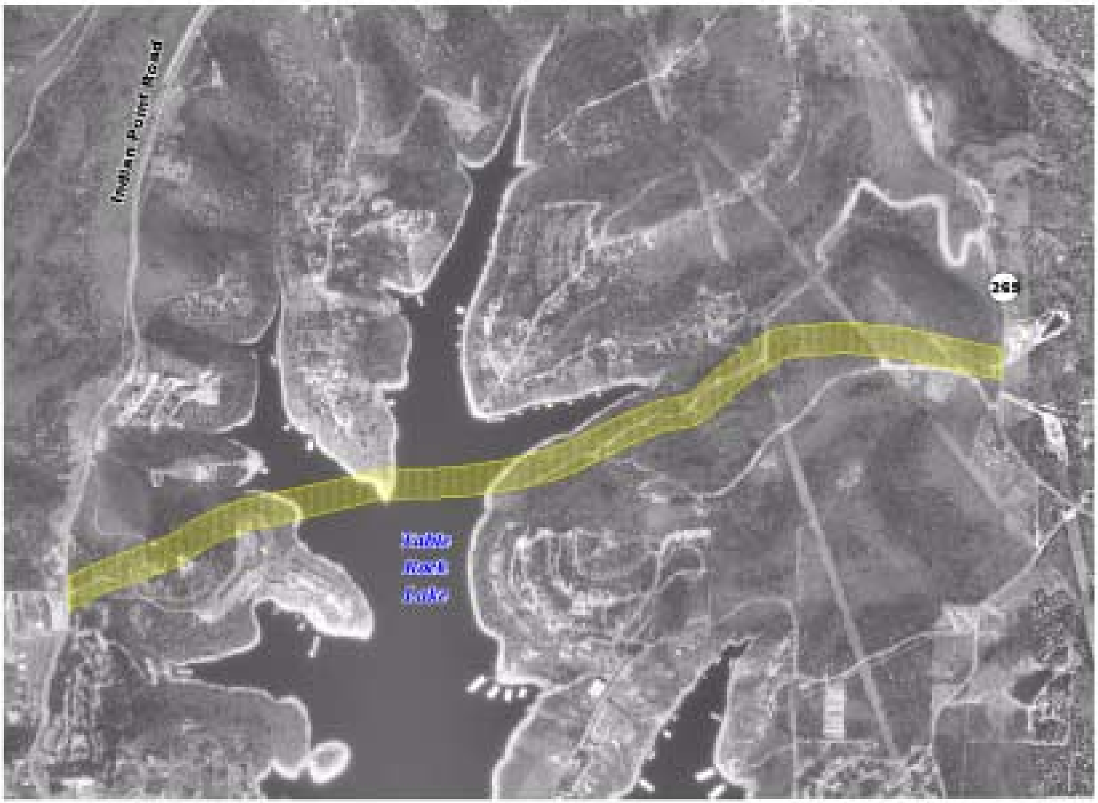


Alternative 30 (Fall Creek Bridge)

This alternative will provide a new four-lane road and bridge from the southeast point of Fall Creek Road to Route V south of the Lake Taneycomo/White River. As noted above, Alternative 30 is the most dependent on future development and includes the construction of a large bridge. Therefore, this project will require the most additional study and environmental coordination. In addition to the segment described, improvements may be needed to connect this alternative to U.S. 65 as an addition access to Branson.

Alternative 32 (Peninsula Parkway)

This alternative will provide a new two-lane road from Indian Point Road to Route 265. With only one way to/from Indian Point (via Route 76) and the heavily congestion already on Route 76, an additional option is needed. This alternative will allow Indian Point travelers to avoid the heavy traffic using Route 76 to/from Silver Dollar City and points west.



Combined Traffic Impacts and Analysis

Sometimes an alternative that performs well in the traffic model does not have the same benefits when combined with other alternatives. Therefore, the combined traffic impacts of the 12 recommended alternatives were evaluated using the same methods applied in **Chapter 3**.

In the traffic model, the 12 alternatives were combined for evaluation. Traffic volumes were only projected to 2020, meaning that the evaluation of each of these alternatives relied on traffic projections from 1999 to 2020. The evaluation did not take into account the life of each construction project past the year 2020, effectively assuming each is built in 2000 and will last until 2020.

Traffic Volumes

Traffic volumes from around the study area were studied to identify areas of potential congestion complications are shown in **Table 5-2**. The lettered locations on Table 5-2 are associated with Exhibit 3-2. Congestion was measured using a vehicle-to-capacity ratio (V/C). The average annual daily traffic volumes projected for the year 2020 were divided by the design capacity of the road associated with each particular count location. This ratio indicates how far traffic levels are above or below capacity. If a segment is well over capacity, congestion is likely, and if a segment is far under capacity, the road is underutilized.

Table 5-2
Combined Impacts on Congestion

	E+C	2020	2020 V/C
A	10,900	10,248	0.37
B	1,700	1,018	0.13
C	11,900	10,248	0.43
D	5,700	5,093	0.64
E	28,300	28,800	0.55
F	21,100	16,586	1.38
G	12,100	12,665	1.05
H	20,600	15,771	0.79
I	16,000	24,298	1.01
J	14,700	14,535	0.61
K	34,500	28,469	0.55
L	19,500	14,060	1.17
M	17,500	14,947	1.87
N	24,300	13,197	0.55
O	17,100	14,770	1.85
P	17,700	21,624	0.90
Q	20,200	18,198	0.76
R	21,400	20,490	0.85
S	43,200	31,820	1.33
T	19,600	23,293	0.97
U	20,200	13,976	0.58
V	10,900	13,116	1.09
W	12,500	17,719	0.97
X	17,500	11,599	1.48
Y	8,800	9,851	1.23
Z	18,600	18,435	2.30
AA	6,000	6,554	0.82
BB	39,900	31,763	0.51
CC	20,900	23,125	1.93
DD	16,800	12,875	1.61
EE	30,200	35,455	2.98

The highest V/C ratio (2.98) is at location "EE" on US 65 just south of Branson. This ratio suggests that traffic will be nearly three times greater than road capacity. Following the construction of the 11 alternatives, there are likely to be several locations with over-capacity levels of traffic.

Along Route 76, all locations are likely to be impacted positively by the construction of the alternatives except for at P and T. However, traffic volumes will not be reduced enough, and O and S are likely to be over-capacity.

Travel Efficiency

Traffic volumes and V/C ratios are good at evaluating likely conditions at specific points in the transportation network, but they do not allow us to understand the total benefits or costs to travelers throughout the network. In order to analyze the total traffic impacts, the collective effectiveness of the alternatives was calculated in terms of the following travel efficiency benefits:

- Value of travel time savings based on vehicle hour travel (VHT) savings.
- Vehicle operating cost savings based on vehicle mile travel (VMT) savings.
- Accident cost savings (ACC) based on accident reductions.

The measurement of these impacts assumes that the projects are built in the year 2000 (**Table 5-3**). By the time construction is completed, the traffic volumes are likely to be higher and distributed differently reducing the overall benefits of the alternatives.

Table 5-3
Measurements of Effectiveness for Year 2020

Estimated	VMT Savings		VHT Savings	
Cost (million)	Network	Route 76	Network	Route 76
85.620	172,016	38,378	76,770	3,666

The savings measured in terms of VMT and VHT translate into dollar savings for the traveler. By saving time, travelers save an amount of money roughly equal to what an hour is worth to them. It was assumed that the normal auto travelers save approximately $5 an hour, business travelers save approximately $10 an hour and truck drivers save a little over $19 an hour. By reducing the number of miles traveled, the vehicle operational costs (VOC) are reduced. By driving fewer miles, all vehicles require less gas, maintenance, etc. Furthermore, by driving fewer miles, the risk of having an auto crash is reduced, resulting in accident cost savings.

For the year 2020, assuming that all alternatives are built in 2000, travel time savings are likely to be worth around $180 million to the travelers in Branson (**Table 5-4**). VOC savings are also likely to be worth a substantial amount, over $15 million.

Table 5-4
Vehicle Time, Operational Cost, and Accident Cost Savings in 2020

Travel Time Savings	VOC Savings	ACC Savings
$182,431,046	$14,798,622	($2,755)

Note: Values are projected for the year 2020 in 2000 dollars

Regarding safety, conditions are likely to be the same as if none of the improvements were built. **Table 5-5** shows the accident rates per 1 million vehicle miles traveled, based on a statewide accident database created by the Missouri Department of Transportation. According to the traffic model, the construction of the alternatives will roughly triple the number of miles traveled on five-lane roadways. As seen in **Table 5-5**, five-lane roadways have the highest accident rate for types of road, and this is why the construction of these alternatives is likely to lead to a slight increase in the number of crashes.

Table 5-5
Accident Rates by Roadway Types

Assumed Accident Rates	
2-Lane	185.74
3-Lane	239.64
4-Lane	95.76
5-Lane	408.45

Source: 1998 MoDOT Transportation Mgmt., Systems Statewide Accident Database

Benefit/Cost Ratio

The incremental benefits accrued by travel time savings, vehicle operational cost savings, and accident savings were totaled, discounted and then divided by the initial capital cost for construction and additional yearly maintenance costs associated with these 11 combined alternatives. This created a ratio (B/C Ratio) that describes the likely return of benefits on each dollar invested. A ratio of 1.0 means that for every dollar spent on this option, a dollar in positive value is created.

The B/C ratio for the combined impacts of the alternatives calculated is 6.03. This means that from a strict engineering perspective, the combination of these alternatives results in six times the amount of benefits required to determine feasibility.

Detailed Plan, Profile and Opinion of Probable Costs

As a part of this study, the city will be provided with the detailed location of several projects. The widening of existing routes will be determined by ROW acquisition and property owner negotiation. The basic roadway alignment is already defined, so these projects have not been included in this analysis. The projects in the undeveloped areas that have been identified as needed in 2020 have not been included, due to the unexpected nature of the development that may drive the need for these roadways. Two alternatives have been identified as needing further study to fully evaluate their impacts to the region. The future bridge crossing (Alternative 30) will require an evaluation of the environmental impact to the project. This project is determined worthy of consideration based on impacts to traffic in the region, but a full evaluation of environmental issues is outside of the project scope and would require specialized expertise. The project at Indian Point (Alternative 32) has been recommended but lies outside of the available mapping area and will connect with a proposed roadway alignment much farther to the west.

The following is a list of the projects provided to the city with a preliminary plan and profile sheet that are in the Appendix.

- Alternative 2
- Alternative 4
- Alternative 6
- Alternative 10
- Alternative 25

Citywide Traffic Circulation Plan

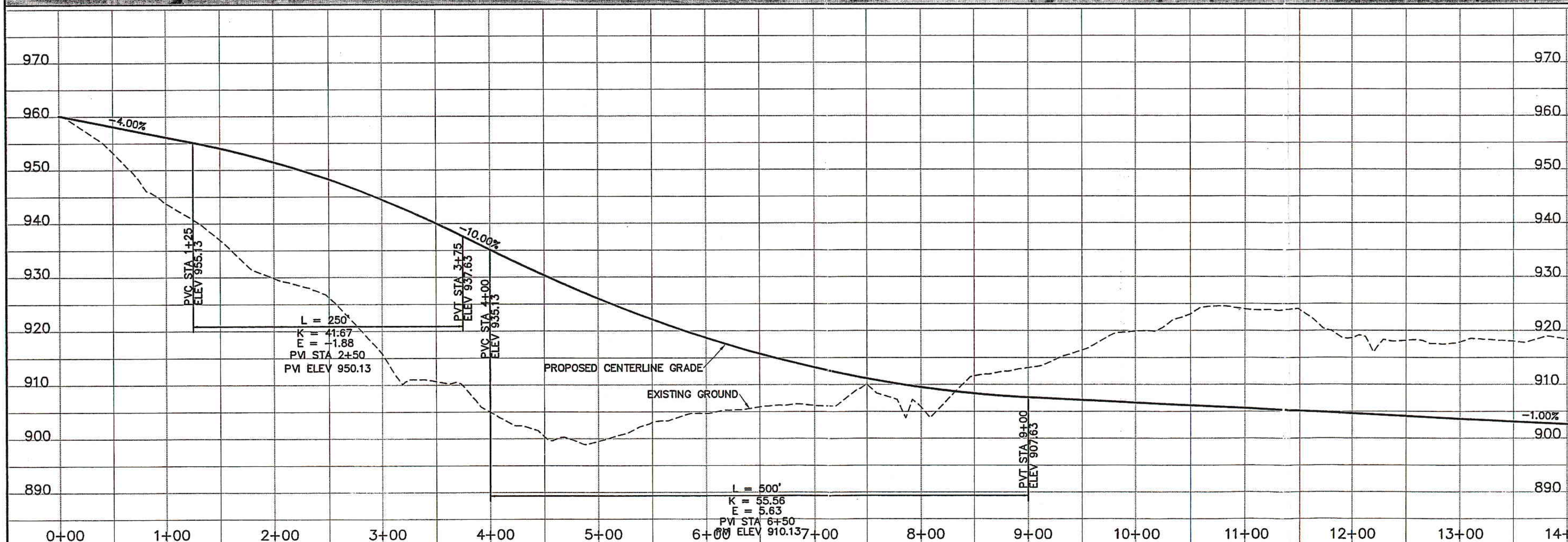
Traffic flow through the area will be improved through a combination of the roadway improvements recommended here and the roadway classification system and access management recommendations described in section 4.2.

By creating additional connections allowing shorter trips and multiple options combined with improvements recommended in Phase 1 of the study, the resulting network improves the overall travel time and miles from the current facilities.

Funding of Improvements

The study team has not prioritized the preferred alternatives because the timing for the alternatives is difficult to determine. The ability of the city to leverage federal and state funding for any improvement on a state maintained road could expedite some of the alternatives. Another key element is the ability to acquire the necessary right-of-way in a timely matter to construct the alternatives. In some cases, right-of-way acquisition is the timeliest part of some projects. The study team has agreed to leave the timing of the projects to the city.

APPENDIX
Preliminary Plan and Profile Sheets



Issued:	Notes:	Drawn:	Checked:	Approved:
		PSW	BLT	BLT

Filename: Alt2sht1
Job # KC99-0215
Drawer:

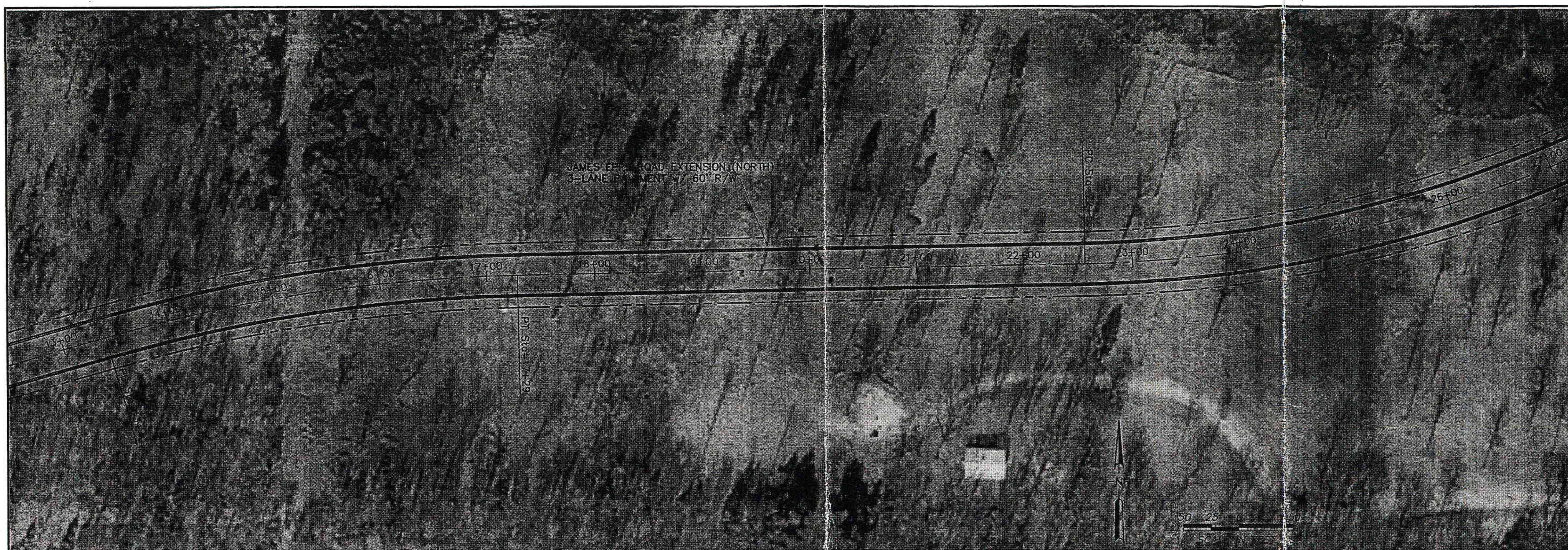
THE LARKIN GROUP INC

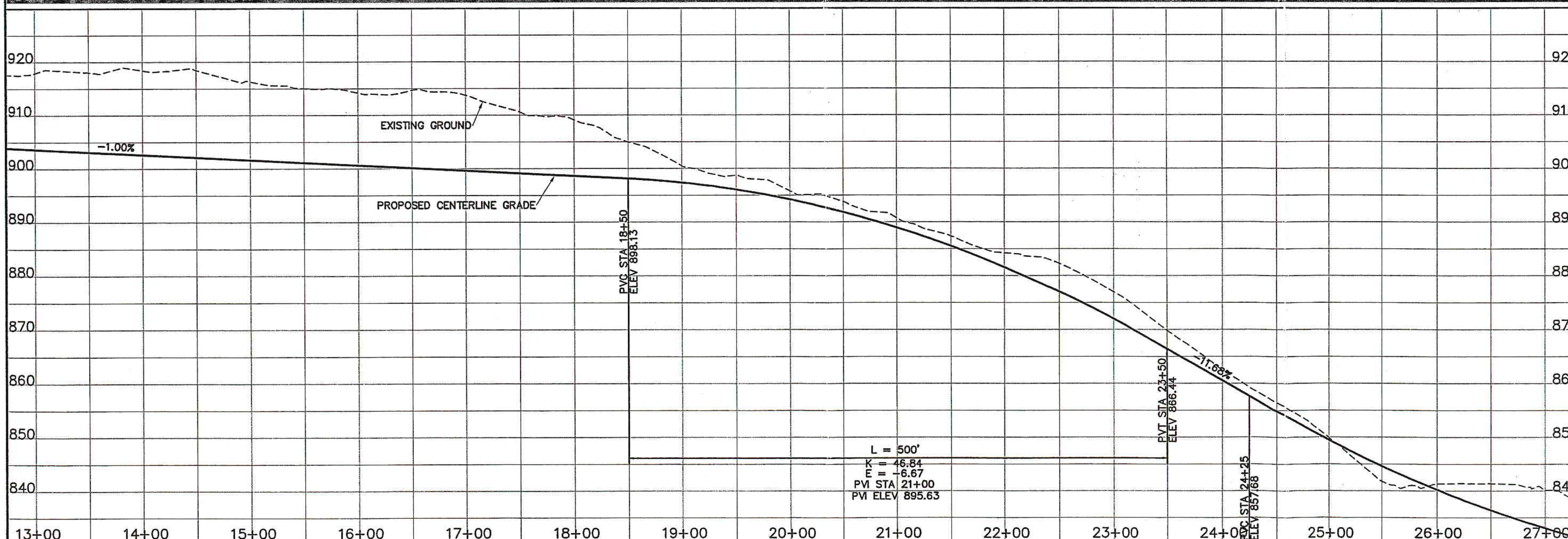
SPRINGFIELD OFFICE:
2139 East Primrose
Suite F
Springfield, MO 65804
Phone: 417-887-3999

Branson, Missouri
Comprehensive Transportation Plan
Preliminary Plan and Profile
Alternative 2 (James Epps Road North)

1 OF 3

1





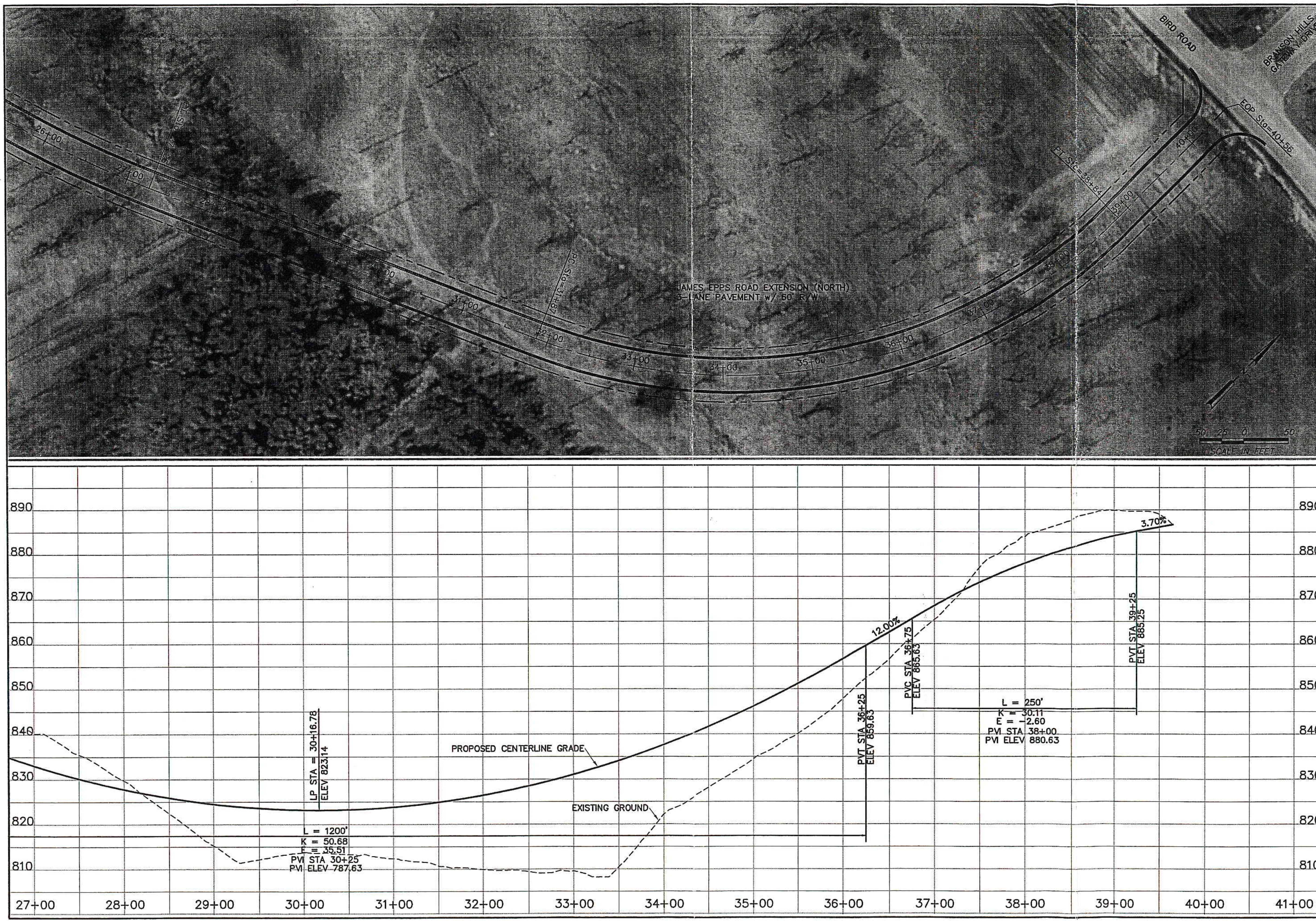
Issued: Notes: Drawn: PSW Checked: BLT Approved: BLT

Filename: Alt2sht2
Job # KC99-0215
Drawer:

THE LARKIN GROUP INC.

SPRINGFIELD OFFICE:
2139 East Primrose
Suite F
Springfield, MO 65804
Phone: 417-887-3999

Branson, Missouri
Comprehensive Transportation Plan
Preliminary Plan and Profile
Alternative 2 (James Epps Road North)



Issued: Notes: Drawn: PSW Checked: BLT Approved: BLT

Filename: Alt2pfn3
Job #KC99-0215
Drawer:
COPYRIGHT 2001

THE LARKIN GROUP INC.

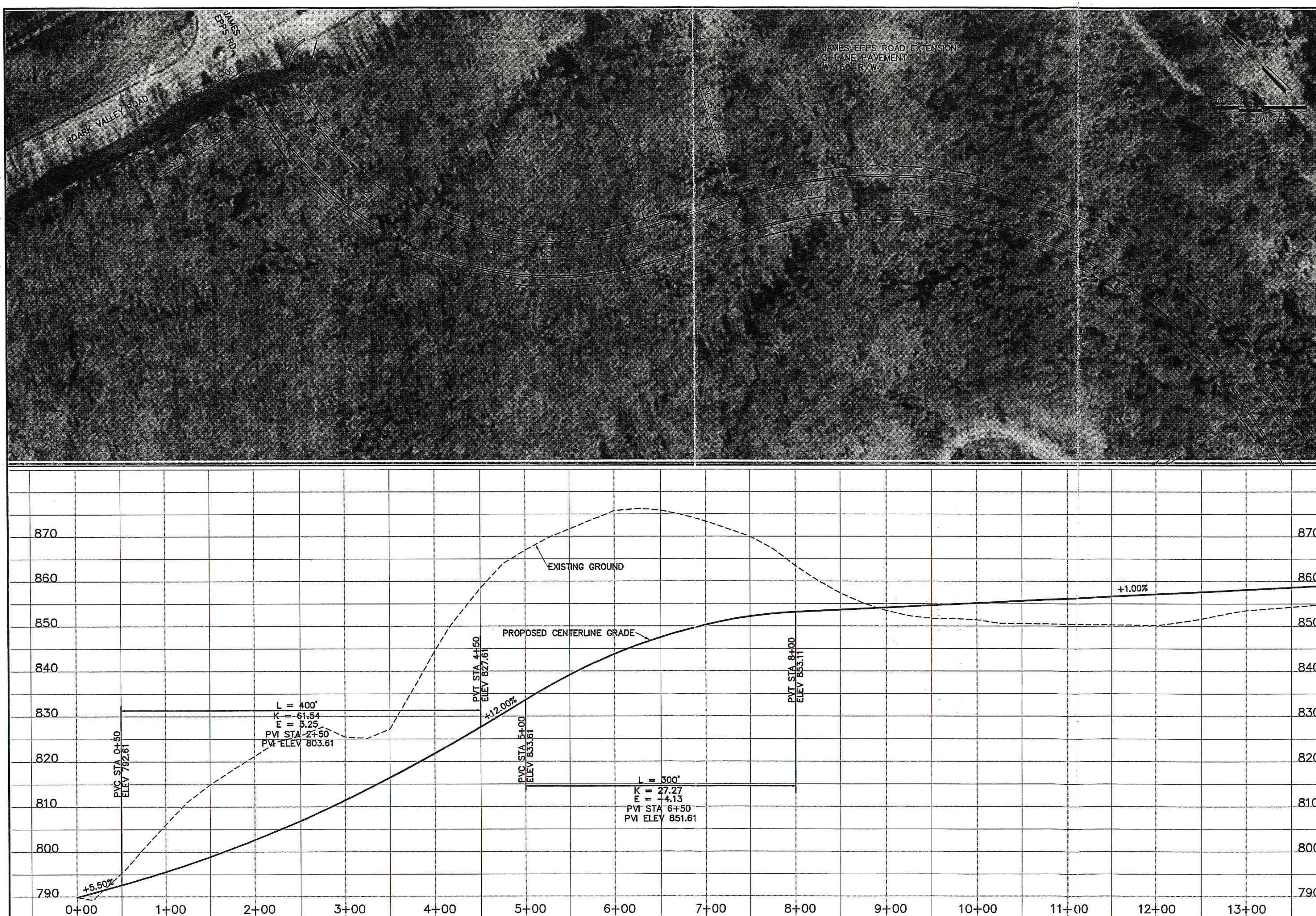
SPRINGFIELD OFFICE:
2139 East Primrose
Suite F
Springfield, MO 65804
Phone: 417-887-3999

Branson, Missouri

Comprehensive Transportation Plan
Preliminary Plan and Profile
Alternative 2 (James Epps Road North)

3 OF 3

3



Issued: Notes: Drawn: PSW Checked: BLT Approved: BLT

Filename: Alt4sht1
Job # KC99-0215
Drawn:
COPYRIGHT 2001

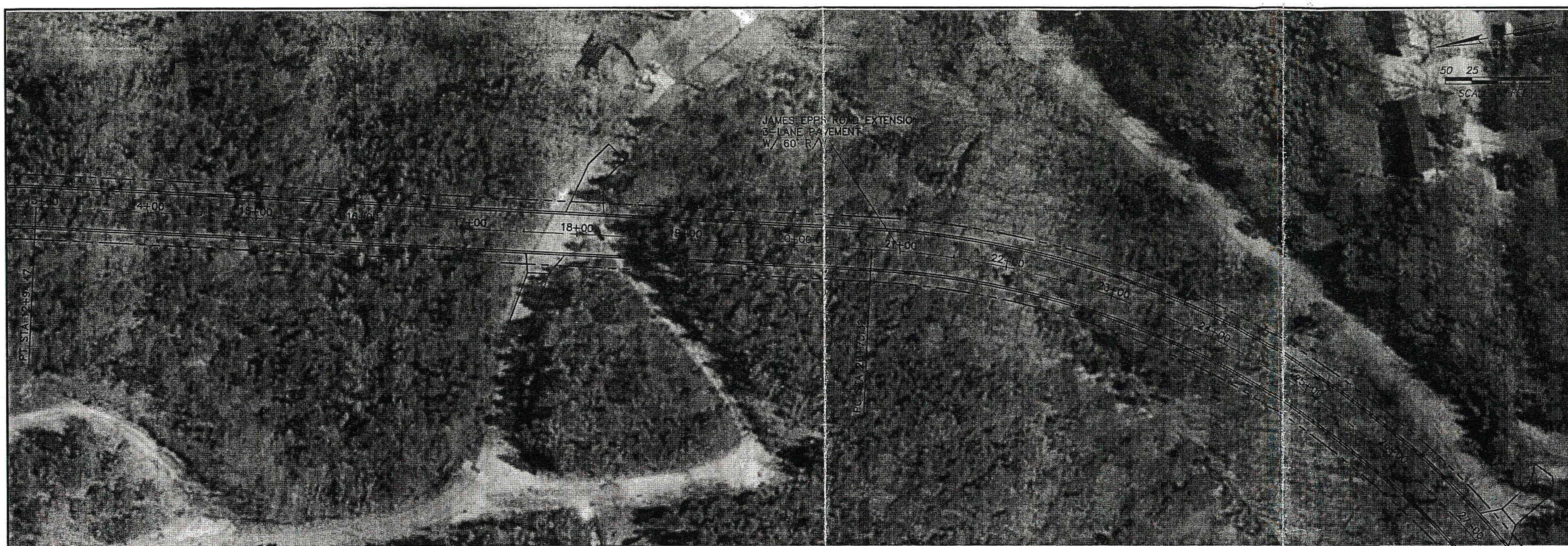
THE LARKIN GROUP INC.

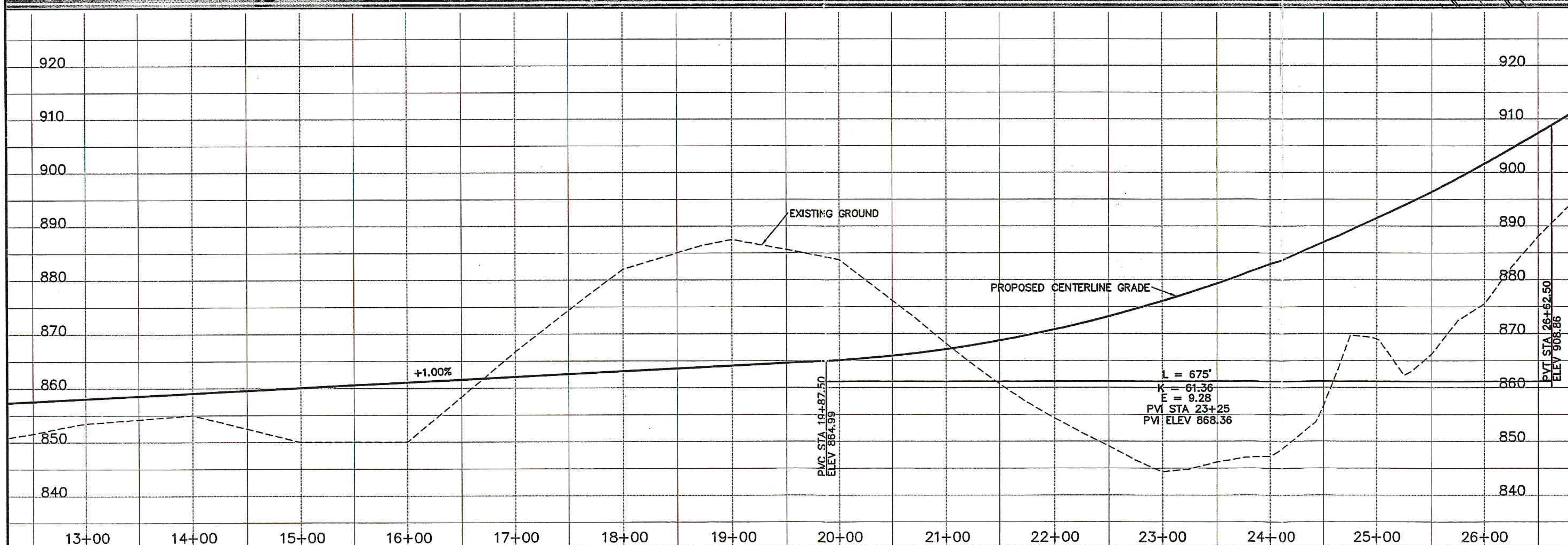
SPRINGFIELD OFFICE:
2139 East Primrose
Suite F
Springfield, MO 65804
Phone: 417-887-3999

Branson, Missouri
Comprehensive Transportation Plan
Preliminary Plan and Profile
Alternative 4 (James Epps Road South)

1 OF 4

1





Issued:	Notes:	Drawn:	Checked:	Approved:
		PSW	BLT	BLT

Filename: Alt4sht2
Job # KC99-0215
Drawer:
COPYRIGHT 2001

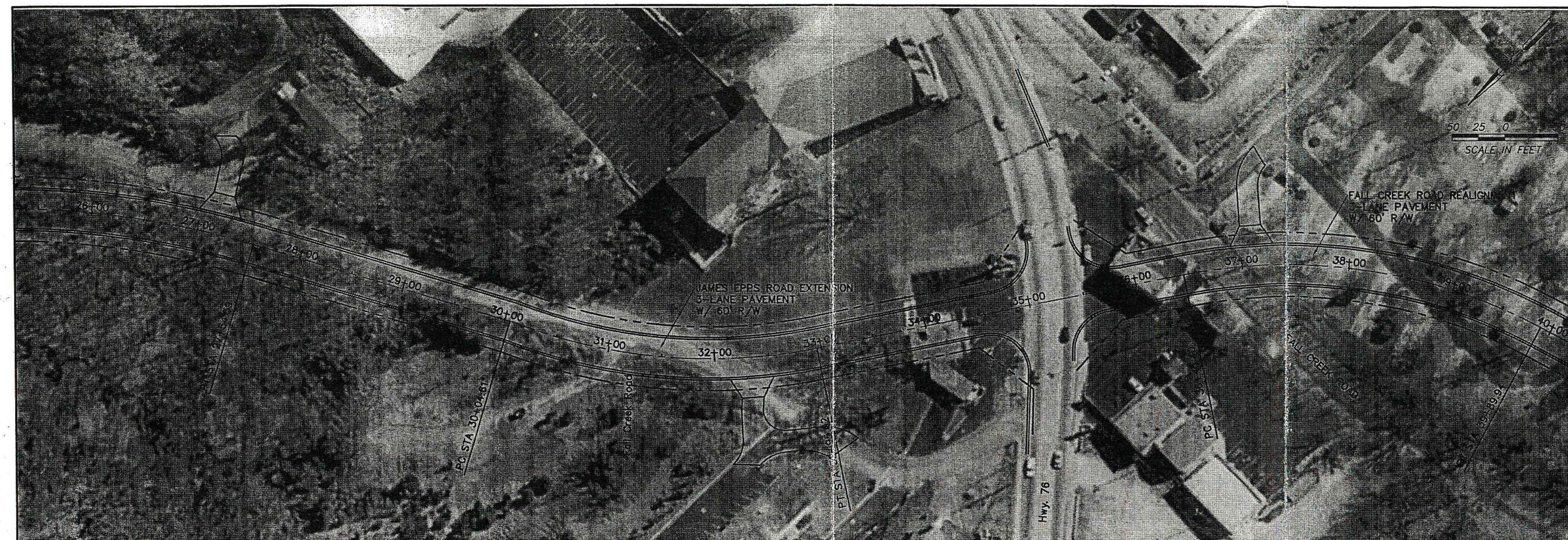
THE LARKIN GROUP INC.

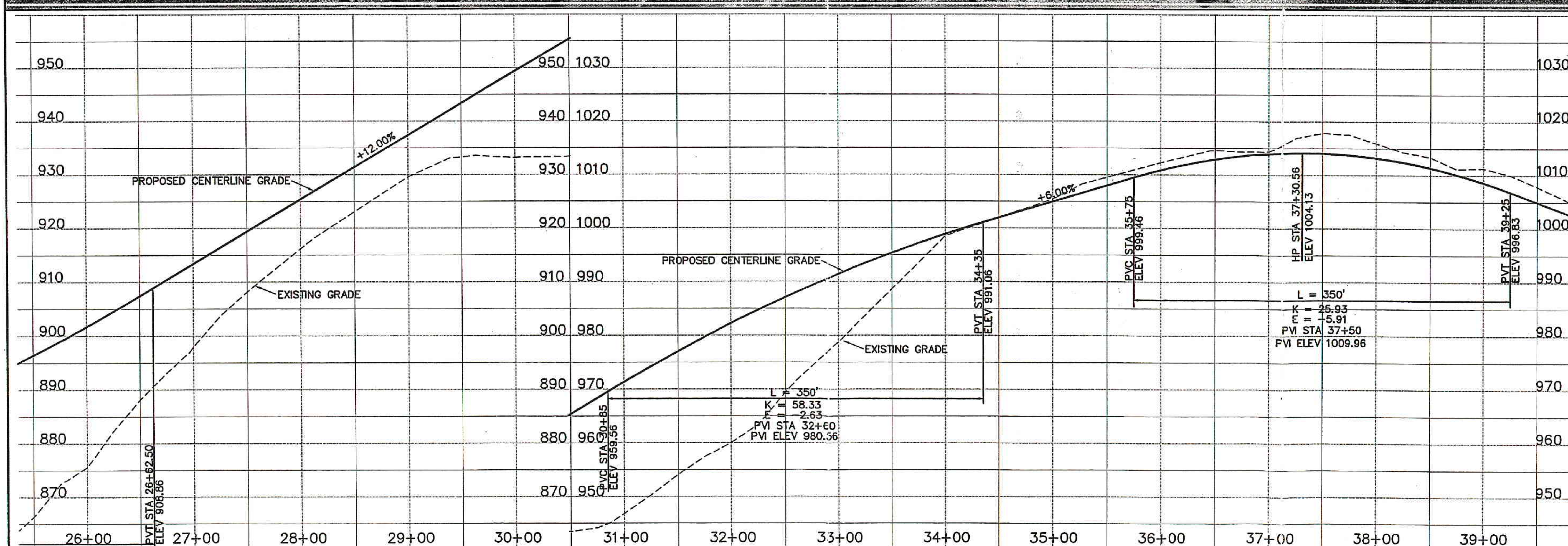
SPRINGFIELD OFFICE:
2139 East Primrose
Suite F
Springfield, MO 65804
Phone: 417-887-3999

Branson, Missouri
Comprehensive Transportation Plan
Preliminary Plan and Profile
Alternative 4 (James Epps Road South)

2 OF 4

2





Issued: | Notes: | Drawn: PSW | Checked: BLT | Approved: BLT

Filename: Alt4sh3
Job # KC99-0215

Drawer:

COPYRIGHT 2001

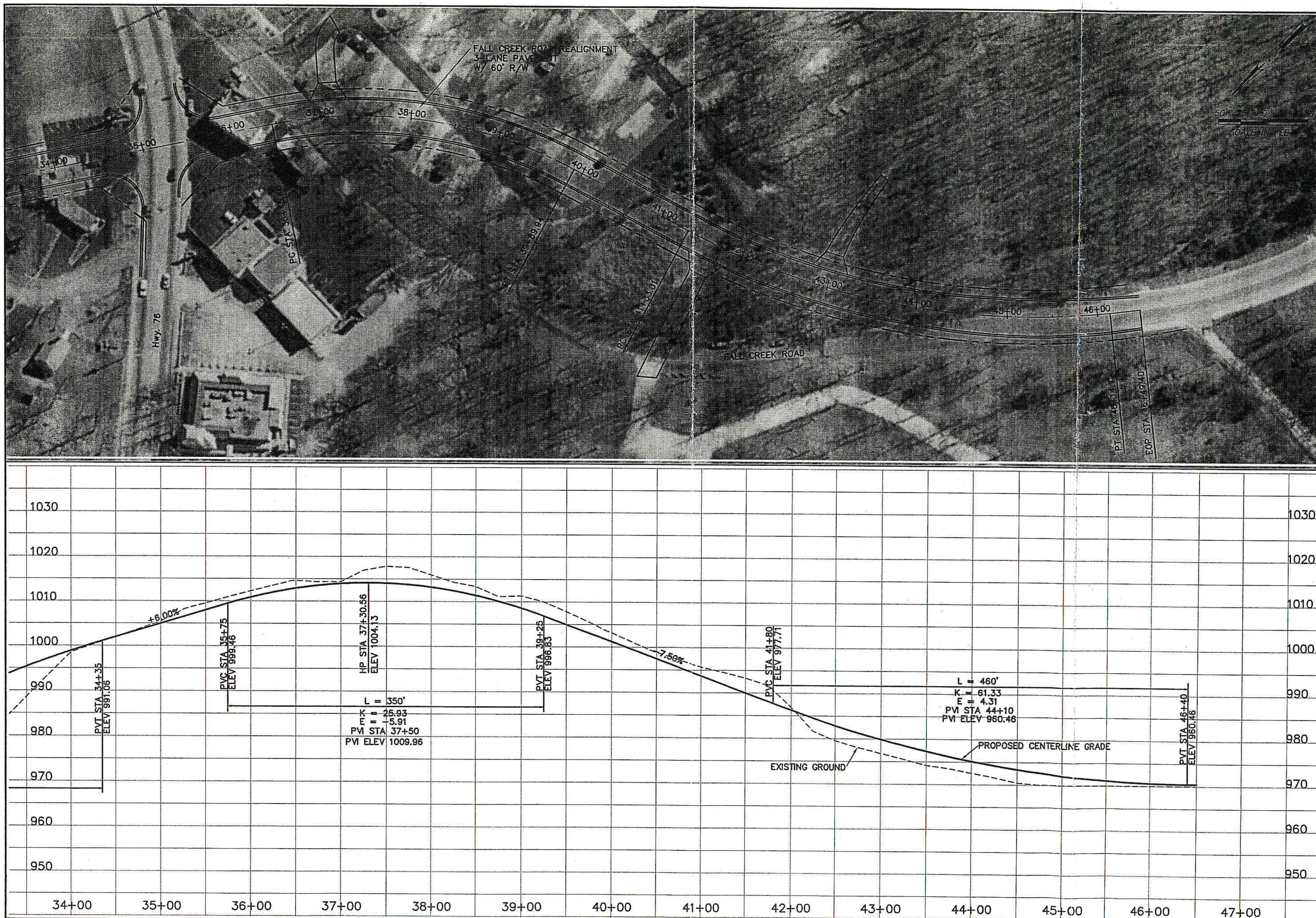
THE LARKIN GROUP INC.

SPRINGFIELD OFFICE:
2139 East Primrose
Suite F
Springfield, MO 65804
Phone: 417-887-3999

Branson, Missouri
Comprehensive Transportation Plan
Preliminary Plan and Profile
Alternative 4 (James Epps Road South)

3 OF 4

3



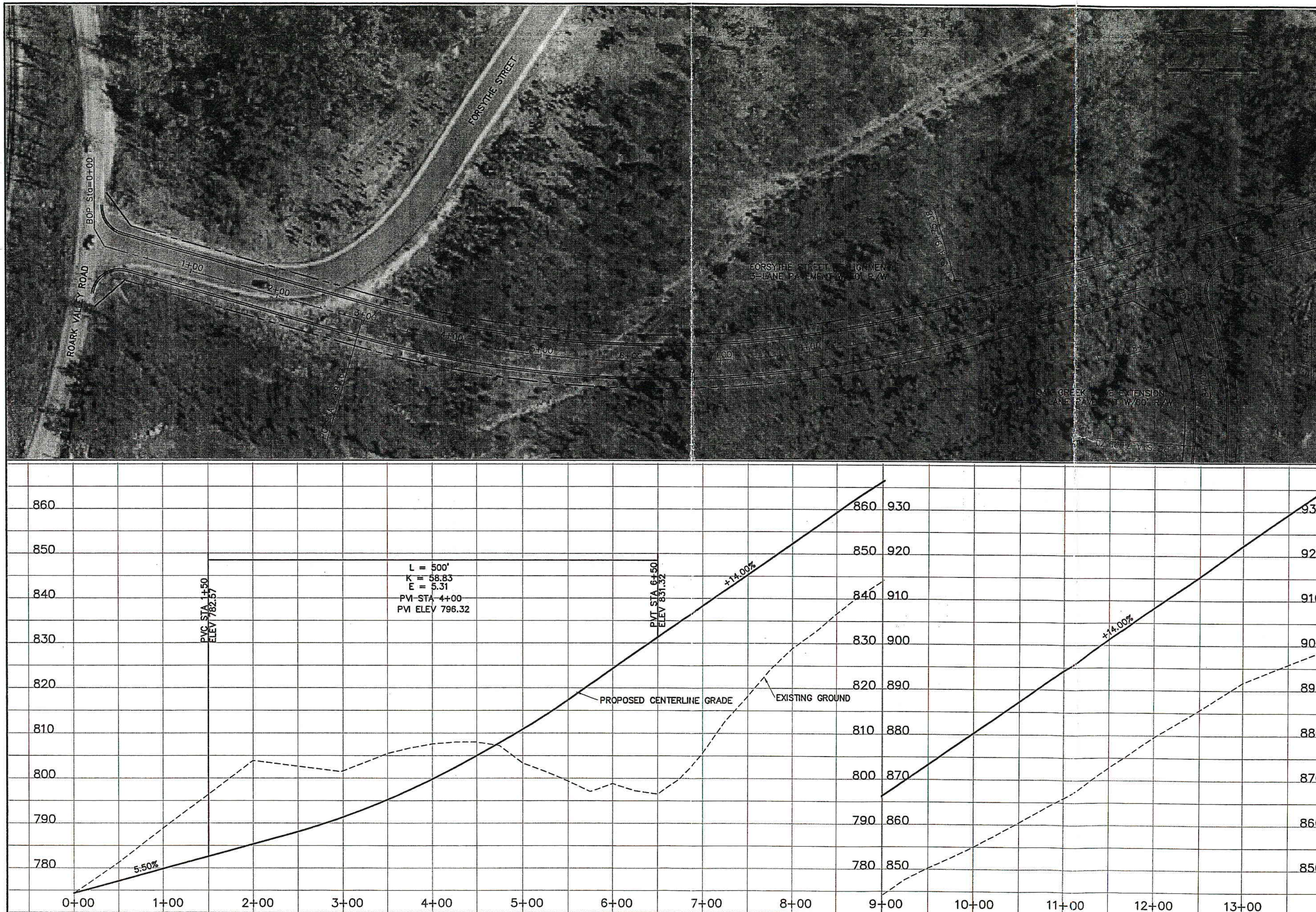
Issued:	Notes:	Drawn:	Checked:	Approved:
		PSW	BLT	BLT

Filename: Alt4sht3
Job # KC99-0215
Drawer:
COPYRIGHT 2001

THE LARKIN GROUP INC

SPRINGFIELD OFFICE:
2139 East Primrose
Suite F
Springfield, MO 65804
Phone: 417-887-3999

Branson, Missouri
Comprehensive Transportation Plan
Preliminary Plan and Profile
Alternative 4 (James Epps Road South)



Issued: Notes: Drawn: PSW Checked: BLT Approved: BLT

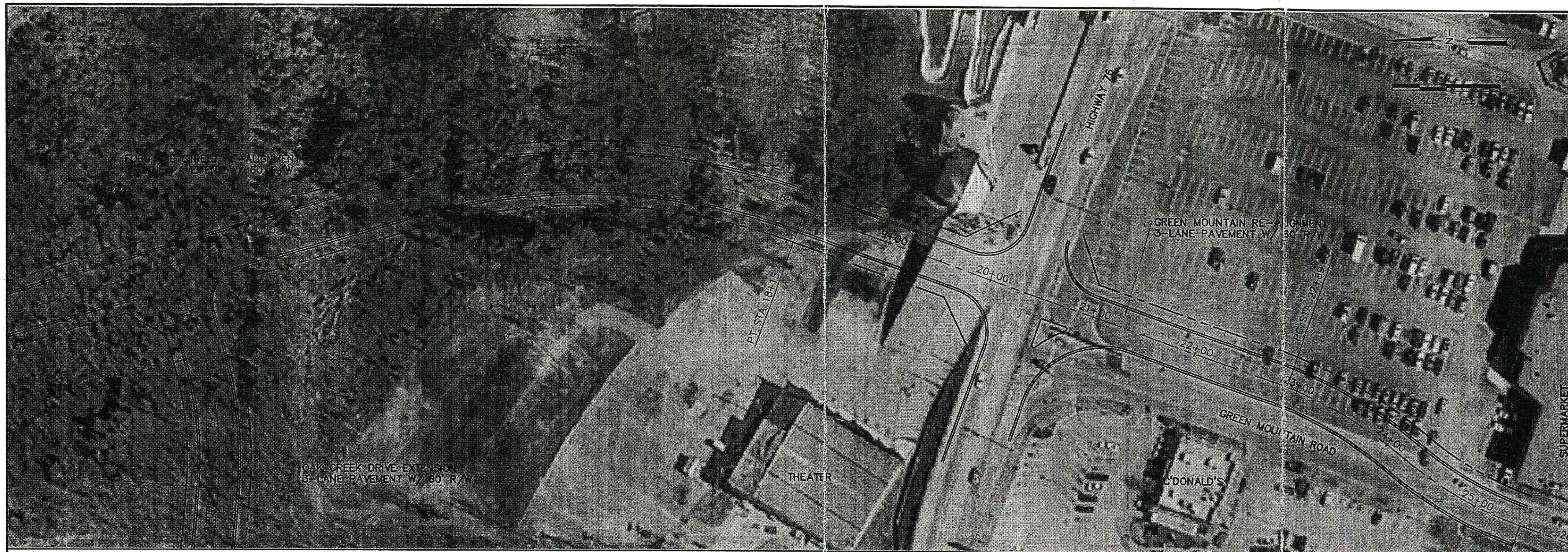
Filename: AltSht1
Job # KC99-0215

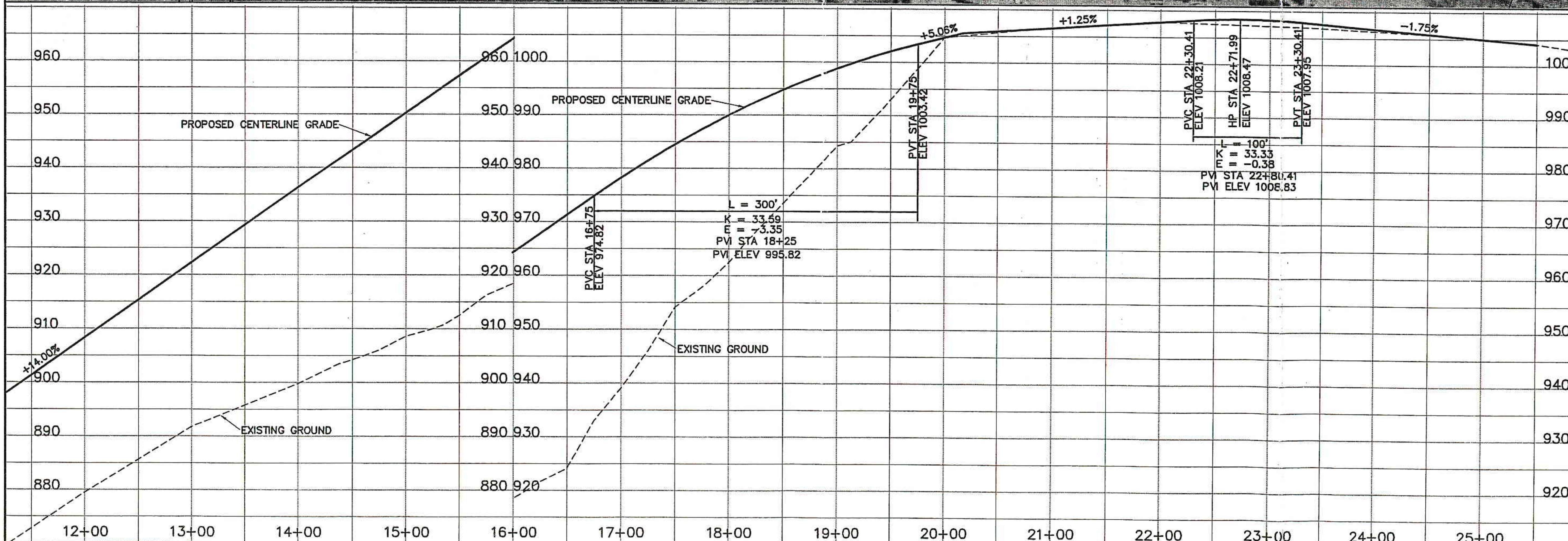
Drawer:

THE LARKIN GROUP INC.

SPRINGFIELD OFFICE:
2139 East Primrose
Suite F
Springfield, MO 65804
Phone: 417-887-3999

Branson, Missouri
Comprehensive Transportation Plan
Preliminary Plan and Profile
Alternative 6 (Forsythe St. Realignment)





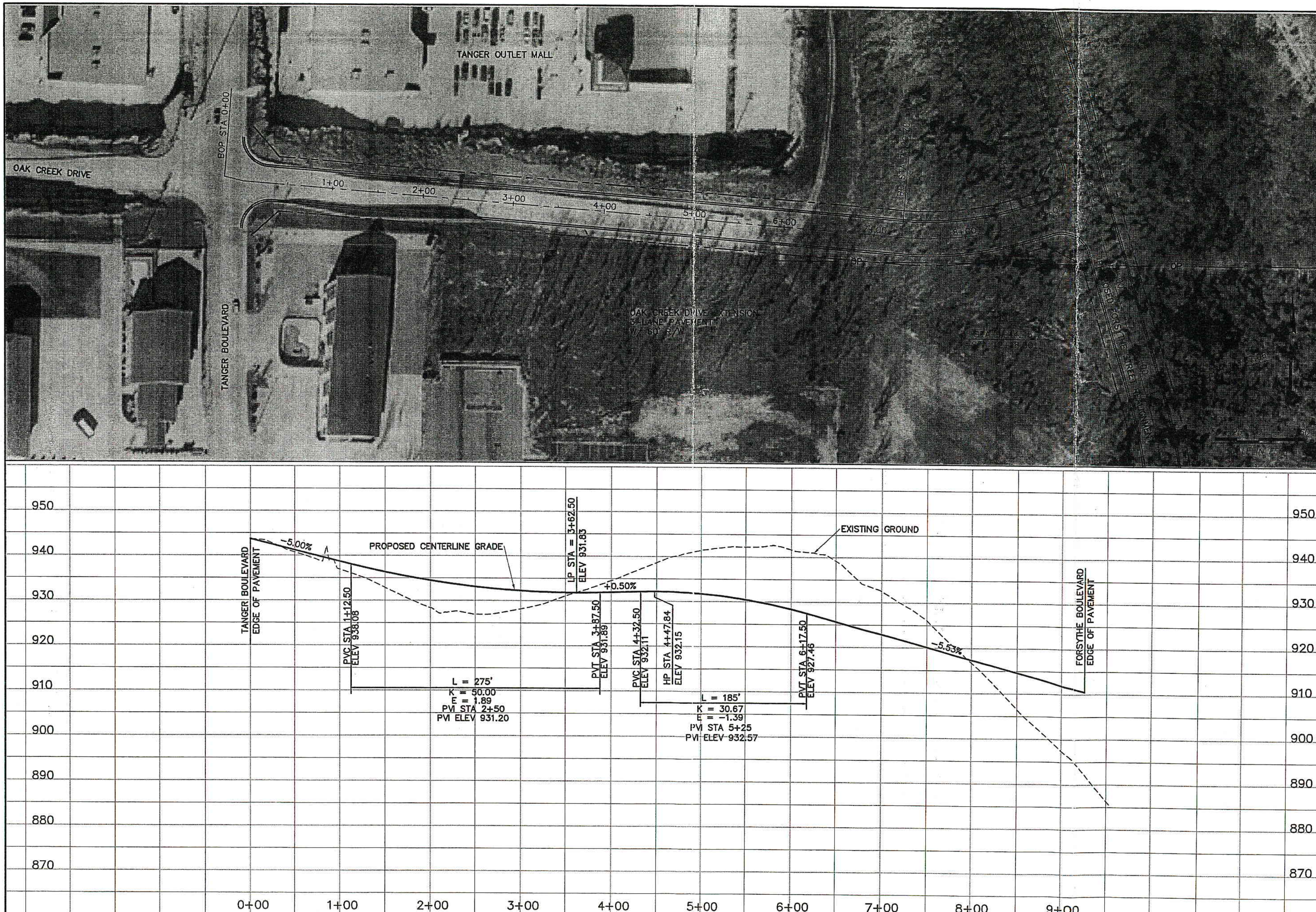
Issued: | Notes: | Drawn: PSW | Checked: BLT | Approved: BLT

Filename: Alt6sht2
Job # KC99-0215
Drawer:

THE LARKIN GROUP INC.

SPRINGFIELD OFFICE:
2139 East Primrose
Suite F
Springfield, MO 65804
Phone: 417-887-3999

Branson, Missouri
Comprehensive Transportation Plan
Preliminary Plan and Profile
Alternative 6 (Forsythe Boulevard)



Issued: | Notes: | Drawn: PSW | Checked: BLT | Approved: BLT

Filename: Alt25sh11
Job # KC99-0215
Drawer:
COPYRIGHT 2001

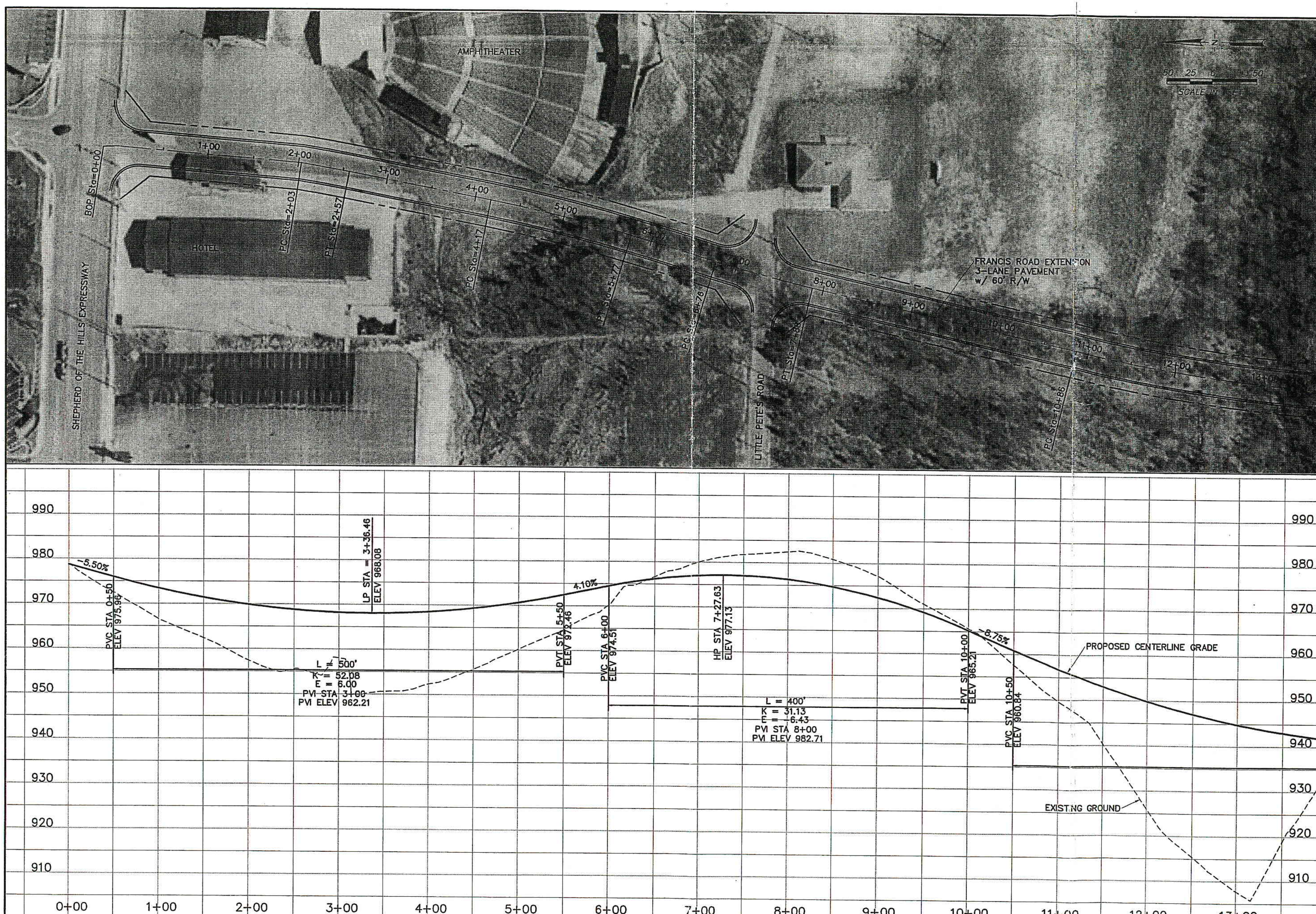
THE LARKIN GROUP INC.

SPRINGFIELD OFFICE:
2139 East Primrose
Suite F
Springfield, MO 65804
Phone: 417-887-3999

Branson, Missouri
Comprehensive Transportation Plan
Preliminary Plan and Profile
Alternative 25 (Oak Creek Drive Extension)

3 OF 3

3



Issued: Notes:

Drawn: PSW Checked: BLT Approved:

Filename: Alt10aht1
Job # KC99-0215
Drawer:
COPYRIGHT 2001

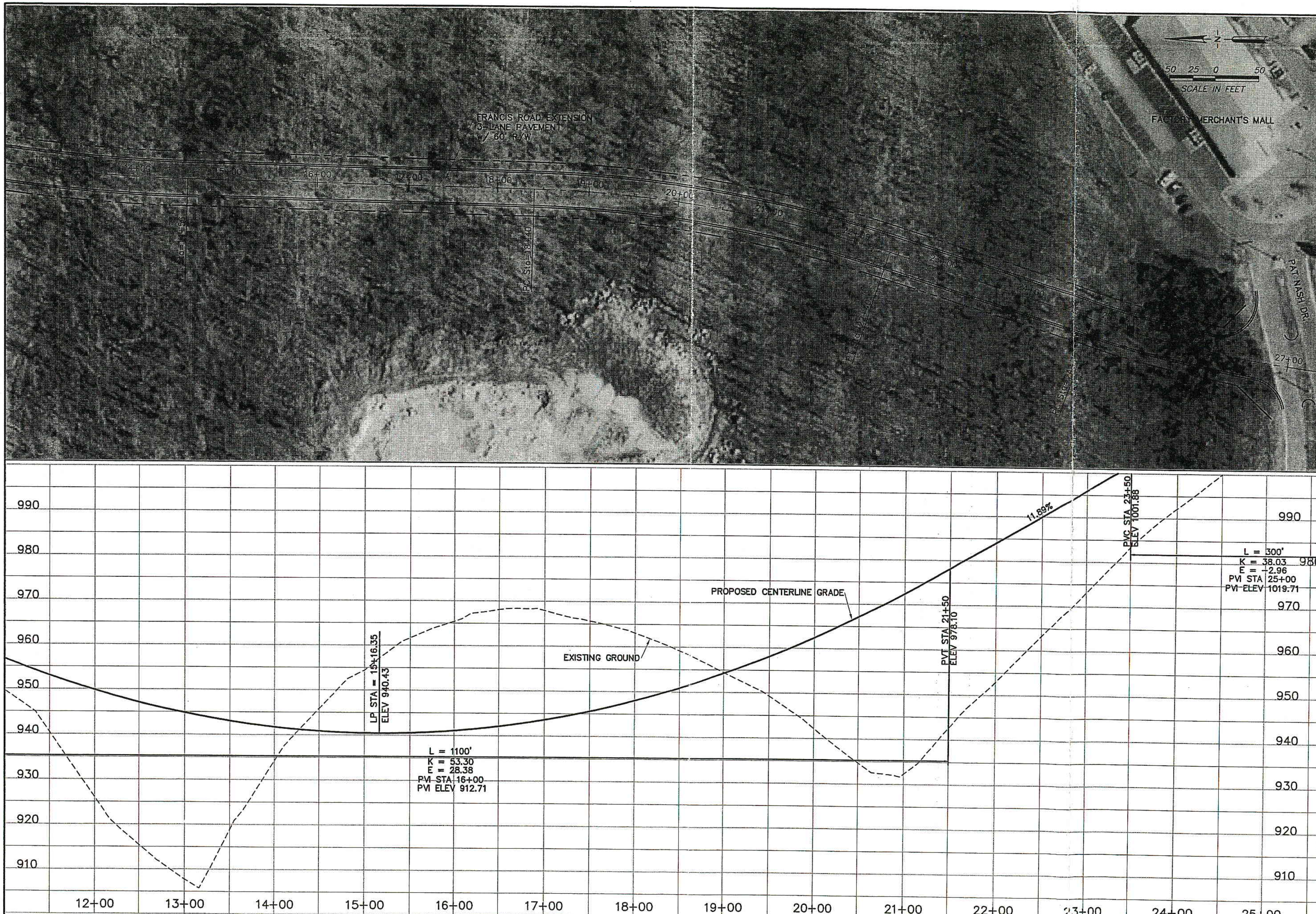
THE LARKIN GROUP INC.

SPRINGFIELD OFFICE:
2139 East Primrose
Suite F
Springfield, MO 65804
Phone: 417-887-3999

Branson, Missouri
Comprehensive Transportation Plan
Preliminary Plan and Profile
Alternative 10 (Francis Road)

1 OF 3

1



Issued: Notes: Drawn: PSW Checked: BLT Approved: BLT

Filename: Alt10alt2
Job # KC99-0215
Drawer:
COPYRIGHT 2001

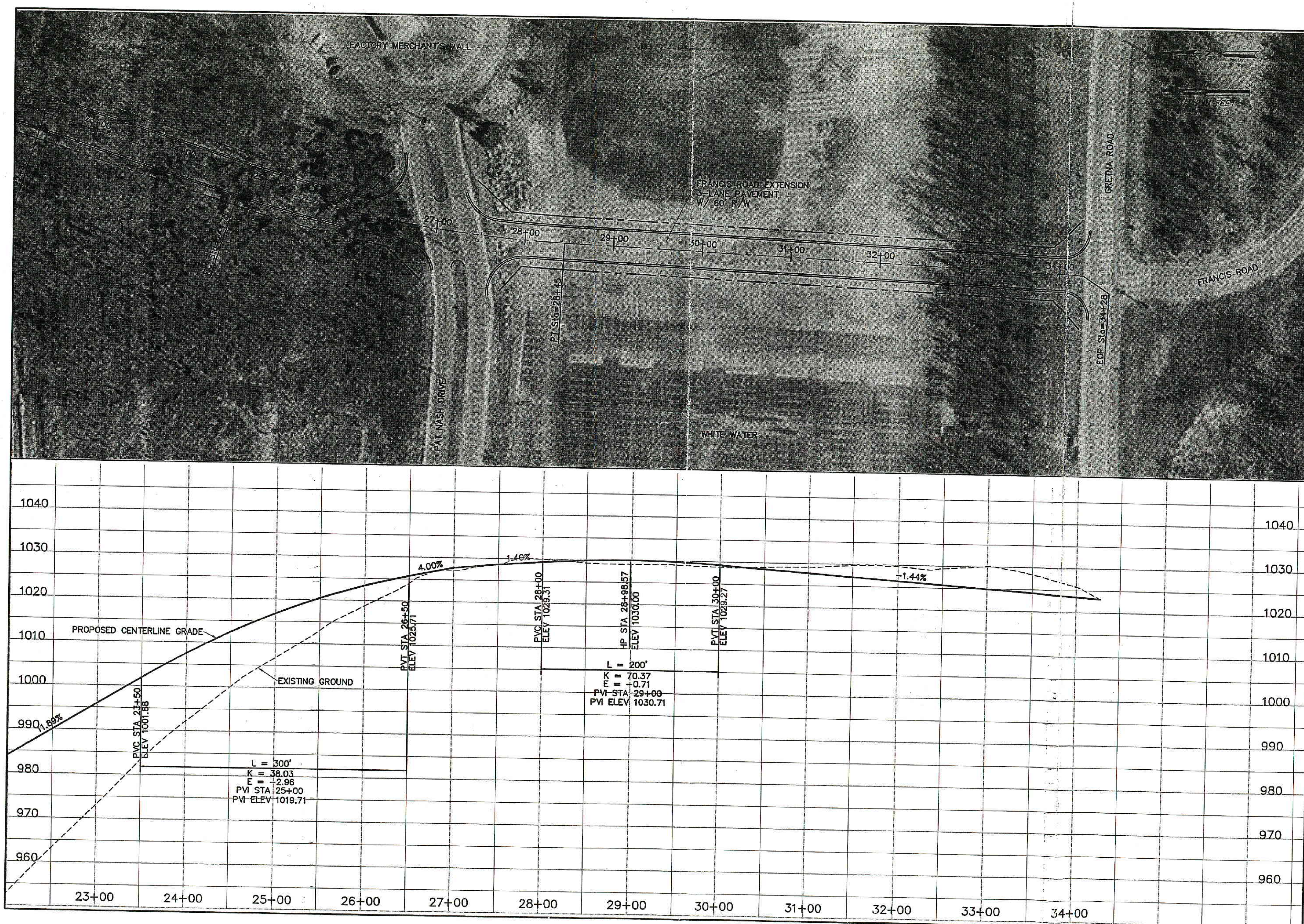
THE LARKIN GROUP INC

SPRINGFIELD OFFICE:
2139 East Primrose
Suite F
Springfield, MO 65804
Phone: 417-887-3999

Branson, Missouri
Comprehensive Transportation Plan
Preliminary Plan and Profile
Alternative 10 (Francis Road)

2 OF 3

2



Issued: | Notes: | Drawn: PSW | Checked: BLT | Approved: BLT

Filename: Alt10alt.3
Job # KC99-0215

Drawer:

THE LARKIN GROUP INC.

SPRINGFIELD OFFICE:
2139 East Primrose
Suite F
Springfield, MO 65804
Phone: 417-887-3999

Branson, Missouri
Comprehensive Transportation Plan
Preliminary Plan and Profile
Alternative 10 (Francis Road)

3 OF 3

3