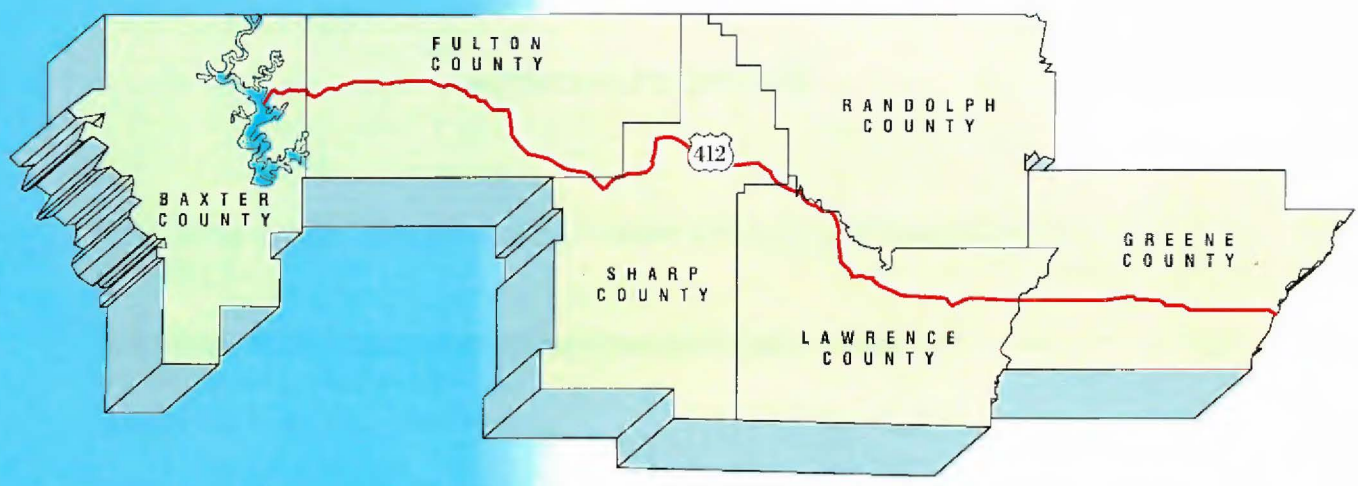
US 412
Corridor Planning Study

412

Executive Summary
December 1997



Lockwood, Andrews & Newnam, Inc.
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In collaboration with:
AMI Engineering, Inc.
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ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

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Arkansas State Highway and Transportation Department
Planning & Research Division
Statewide Planning Section

The study team also wishes to acknowledge the assistance of:
Mr. Steve Teague, Assistant Chief Engineer, Planning;
Mr. Bob Walters, Assistant Chief Engineer, Design;
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Mr. Joe Nelson, Project Manager, Statewide Planning Section.
Ms. Virginia Porta, Transportation Planning Engineer, Statewide Planning Section

US 412 CORRIDOR PLANNING STUDY
EXECUTIVE SUMMARY

1. INTRODUCTION

Highway US 412 is the main east-west corridor in northern Arkansas. It was designated as a "High Priority Corridor" by the U S Congress through the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), which provided funds to conduct feasibility studies.

In order to accomplish the intent of the legislation, the Arkansas State Highway and Transportation Department (AHTD) engaged the engineering firm of Lockwood, Andrews & Newnam, Inc. (LAN) to perform a corridor planning study on the eastern portion of US 412 within the state of Arkansas. This report presents a summary of the work and conclusions of this study.

2. EXISTING CONDITIONS

US 412 exists primarily as a two-lane rural highway across northern Arkansas. Regionally, it connects Tulsa, Oklahoma and Nashville, Tennessee. However, existing terrain and highway deficiencies preclude its use as a major east-west traffic carrier.

It functions primarily to handle local trips for work and recreation, as well as providing a connecting link between major north-south crossing highways. Recent sustained economic growth in the region particularly in the tourism, agriculture and manufacturing sectors, accents the need for the improvement of this roadway.

3. PUBLIC INVOLVEMENT

A pre-emptive and proactive public involvement process was developed to educate, inform and update the public on activities associated with the study. The consultant team worked closely with AHTD to outline a successful public involvement plan and schedule. The plan developed included the following tasks:

- Develop a comprehensive mailing list of project contacts
- Construct meeting notices and press releases
- Develop a public meeting format
- Establish project handout materials
- Conduct two open houses
- Implement public opinion surveys
- Provide media relations

Three press releases were developed for this project. The first release was a general announcement of the purpose and methodology of the project. The second press release was an announcement of the open house public meetings. The final press release contained a summary of the project's conclusions and recommendations.

From the public involvement program it was determined that the local population was supportive of the improvements to the overall route. The main concerns expressed by the public were related to local safety and bypass issues.

4. PROPOSED ALTERNATIVES

Five Proposed Alternatives were developed and analyzed in detail to serve the corridor. These include:

Base Case - This alternative is essentially the existing conditions plus committed improvements. An ongoing maintenance program is assumed, and no capacity improvements are included. The base case is the alternative against which the other alternatives were compared.

Improved Two-Lane Rural Arterial - Consists of localized improvements to the existing roadway.

Multilane Undivided Rural Highway - Proposes to widen the existing roadway to a four-lane undivided section with unlimited access.

Four-Lane Divided Rural Highway - This alternative proposes to convert the existing two-lane/two-way roadway to a one-way roadway and build a parallel two-lane/one-way road. This proposed roadway would have unlimited access.

Four-Lane Freeway - Proposes to build a controlled access, grade separated freeway to Interstate Standards.

5. TRAVEL DEMAND

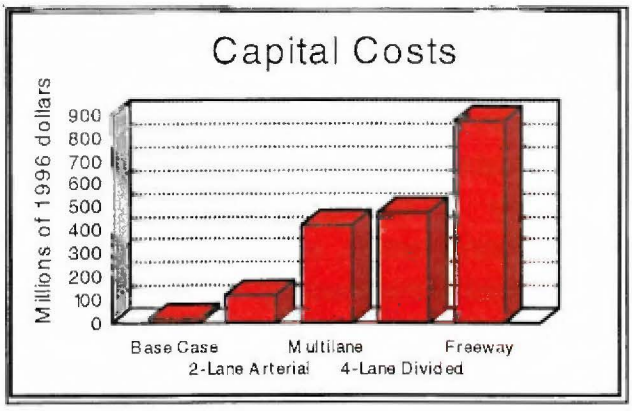
Urban congestion is often experienced in the corridor's small cities at or near major intersections with crossing highways. Heavy truck volumes are a consideration in some of these major crossing corridors, and in the mountainous areas where the terrain influences traveler delays. Travel demand forecasting included the following elements:

- Review of available traffic volume data.
- Development of future volume projections using historical traffic growth rates.
- Analysis and forecast of travel demands for the Proposed Alternatives for design year 2017.

For the purpose of project analysis, the corridor was divided into ten segments. The projected year 2017 Level Of Service (LOS) for the base case is illustrated in Exhibit 1.

6. COST

Detailed cost estimates were developed based on AHTD's weighted average unit prices, Right-Of-Way (ROW) and environmental field surveys, and statewide annual average maintenance costs. All cost estimates were done in constant 1996 dollars. These cost estimates provide the basis for comparison between the Proposed Alternatives and their feasibility evaluation. Capital Costs included construction, ROW and environmental mitigation.



7. PROJECT GOALS

Four project goals were established to evaluate the Proposed Alternatives, these are:

Improve Mobility - Improve person throughput capacity, reduce travel time, reduce accident rates, improve access, and facilitate through trips (minimum peak hour LOS: C).

Project Constructability - The Proposed Alternatives should be feasible from a construction perspective.

Environment Preservation - Preserve and enhance the existing environment and minimize possible environmental impacts.

Economic Development - Promote economic development in the communities served and be feasible from a public investment standpoint.

8. ENVIRONMENTAL OVERVIEW

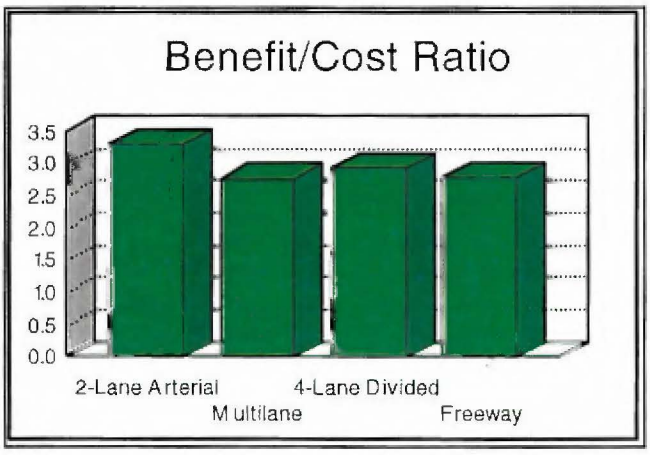
An environmental overview of the study area was performed describing the existing environmental conditions and the impact of the Proposed Alternatives on it. These impacts provided a basis for comparison between the Proposed Alternatives and for their feasibility evaluation.

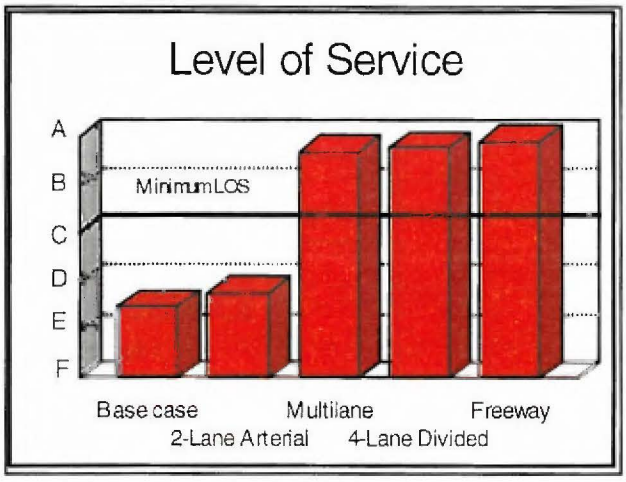
9. ECONOMIC JUSTIFICATION STUDIES

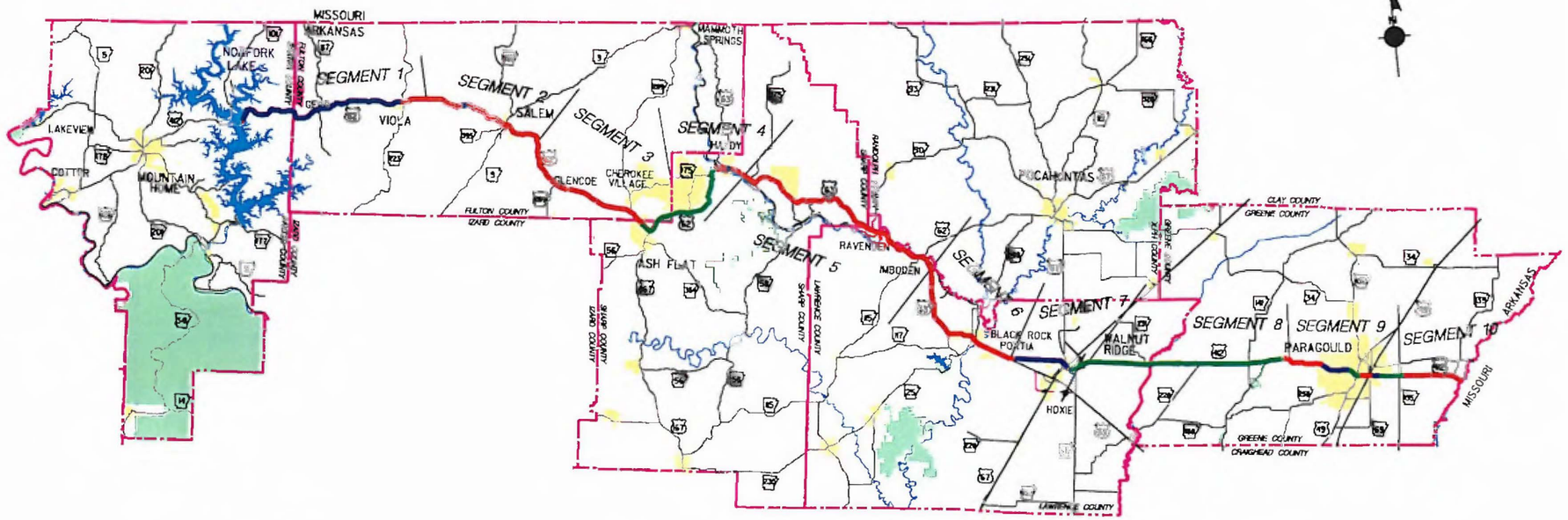
The Proposed Alternatives were evaluated in terms of economic development impacts and economic feasibility. These impacts provided a basis for comparison between the Proposed Alternatives.

10. FEASIBILITY

All the Proposed Alternatives were found feasible from a perspective of benefit/cost ratio. Therefore, they are a good investment of public funds. While the highest benefit/cost ratio possible is sought, a minimum acceptable LOS must be obtained to make the project feasible. The improved two lane rural arterial alternative fails to meet the minimum LOS criteria.







LEGEND

- LEVEL OF SERVICE A–C
- LEVEL OF SERVICE D
- LEVEL OF SERVICE E–F

NOTE: Segment 9 not included in this Study.

MILES
2 0 2 4 6 8
2 1 0 2 4 6 8 10
KILOMETERS

BASE MAP PROVIDED BY THE MAPPING SECTION,
PLANNING AND RESEARCH DIVISION,
ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT,
IN COOPERATION WITH THE U.S. DEPARTMENT OF TRANSPORTATION

U.S. 412 PLANNING STUDY
NORFORK LAKE TO THE MISSOURI STATE LINE

BASE CASE YEAR 2017 LEVEL OF SERVICE

Exhibit 1

Lockwood, Andrews & Newnam, Inc.
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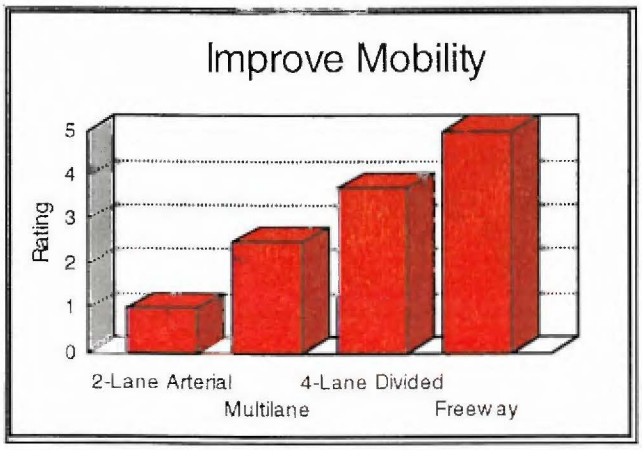
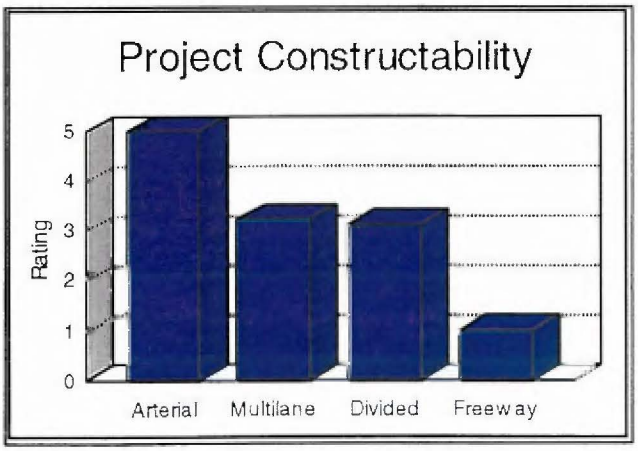
11. EVALUATION

A series of Measures Of Effectiveness (MOE's) was developed to evaluate each project goal. A comprehensive procedure was established to assess the Proposed Alternatives. The objective of the evaluation process was to choose a balanced solution that would attain all the specified project goals. The most desirable option was sought from a combination of the project goals.

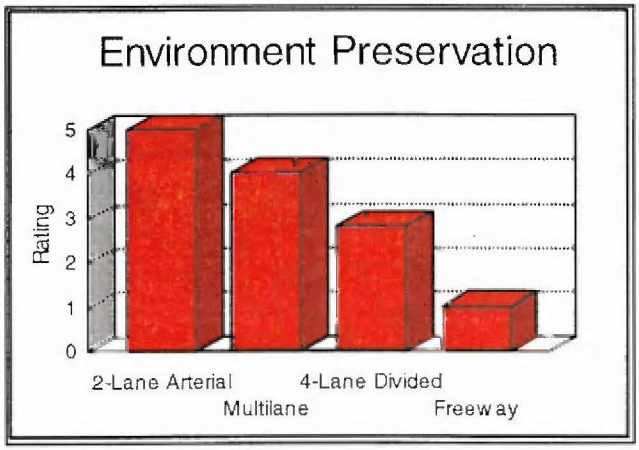
Improve Mobility - The freeway alternative provides the highest level of mobility. As mentioned previously, the improved two-lane rural arterial proposed alternative fails to meet the minimum LOS criteria (LOS C).



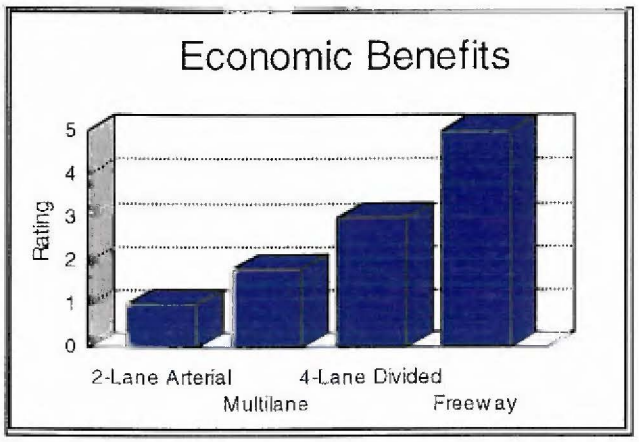
Project Constructability - The improved two lane rural arterial is the most desirable alternative, and the freeway the least desirable. No significant difference was found between the multilane rural highway and the four-lane divided rural highway.



Environment Preservation - The environmental impacts are directly related to the amount of new ROW required. In addition, the latent demand attracted by the improved design speeds affects the corridor with greater noise and emissions.

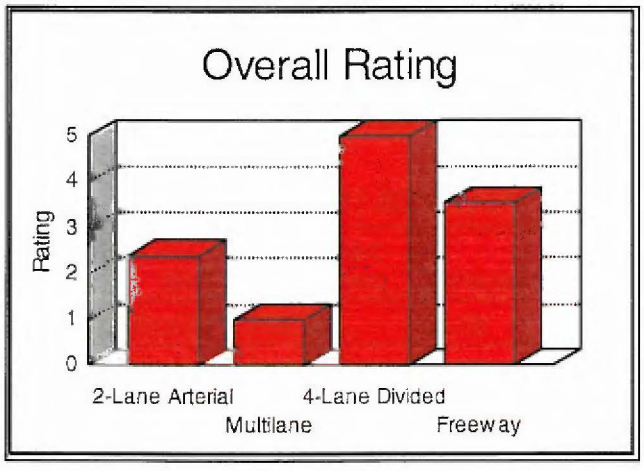


Economic Benefits - A large portion of the local economy is tourism based. This segment could be substantially benefited from the implementation of the proposed improvements to US 412. The economic benefits are expenditure driven; therefore, higher cost alternatives yield higher returns.



12. RECOMMENDED ALTERNATIVE

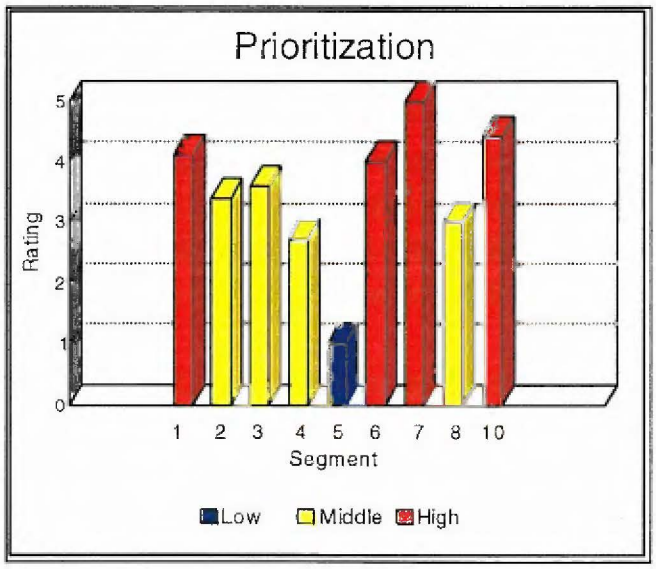
The four-lane divided rural highway yields the highest overall rating for all the MOE's, and is selected as the Recommended Alternative. It provides the best balance in terms of satisfying all the project goals. The estimated annualized benefits & costs are shown graphically on page 8.



13. PRIORITIZATION

A comparative analysis was performed on the study segments of the Recommended Alternative utilizing the same MOE's developed for the analysis of the proposed alternatives. Segment 7 improvements are limited to connections to the Walnut Ridge/Hoxie bypass. Segment 9 was not included in the Study. A prioritization rating was assigned to the segments as follows:

- High Priority: Segments 1, 6, 7 and 10.
- Medium Priority: Segments 2, 3, 4 and 8.
- Low Priority: Segment 5.



14. INTERIM IMPROVEMENTS

In recognition of the fact that funding may not be immediately available to implement the Recommended Alternative, a program of interim improvements was developed. These improvements primarily address safety issues and capacity improvements to the segments with the highest existing congestion in the

corridor. The proposed interim improvements are:

A) Widen to four lanes undivided from Black Rock to Hardy by connecting the existing truck climbing lanes.
B) Construct a four-lane divided partial access control bypass around Hardy.
C) Construct a four-lane divided partial access bypass around Black Rock-Portia or realign road and reconstruct approaches and reconstruct the "SH 25, Black River," and the "Black River Relief" bridges.
D) Widen to four lanes undivided section from west of Paragould to SH 168.
E) Construct a four-lane divided partial access control bypass around Imboden.
F) Construct a left turn bay and install a fully-actuated traffic light in Cherokee Village at the intersection of US 63 with SH 175 Spur.
G) Widen lanes and shoulders to 3.6 m (12') and 2.4 m (8') respectively, from Salem to Viola.
H) Rehabilitate the "Flat Board Road Slough" bridge, which is located near the Lawrence/Greene county line.
I) Install semi-actuated traffic lights at the following locations (subject to warrant studies):
   - In Hardy at the intersection of US 62 with US 63.
   - In Viola at the intersection of US 62 with SH 223.
   - In Imboden at the intersection of US 63 with US 62.
   - In Gepp, at the intersection of US 62 with SH 87.

     In Glencoe, at the intersection of US 62 with SH 289 southbound.
   - West of Ash Flat, at the intersection of US 62 with SH 289 northbound.
   - East of Hardy, at the intersection of US 63 with SH 175 northbound.
   - In Ravenden, at the intersection of US 63 with SH 90 northbound.

COST ESTIMATES FOR THE PROPOSED ALTERNATIVES (1996 millions)

	Construction	ROW	Mitigation	O&M (for one year)	Total
Base Case	$13.09	$0.00	$0.00	$0.34	$13.43
Improved Two-Lane Rural Arterial	$111.31	$7.25	$1.03	$0.34	$119.93
Multilane Undivided Rural Highway	$408.82	$9.12	$1.99	$0.56	$420.48
Four-Lane Divided Rural Highway	$459.29	$15.68	$2.28	$0.56	$477.81
Four-Lane Freeway	$850.30	$16.30	$8.13	$0.69	$875.42