

Highway Economic Analysis Tool

Developing a GIS-Based Transportation Economic Analysis Tool Box

presented to

2004 GIS-T Symposium

presented by

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Transportation leadership you can trust.

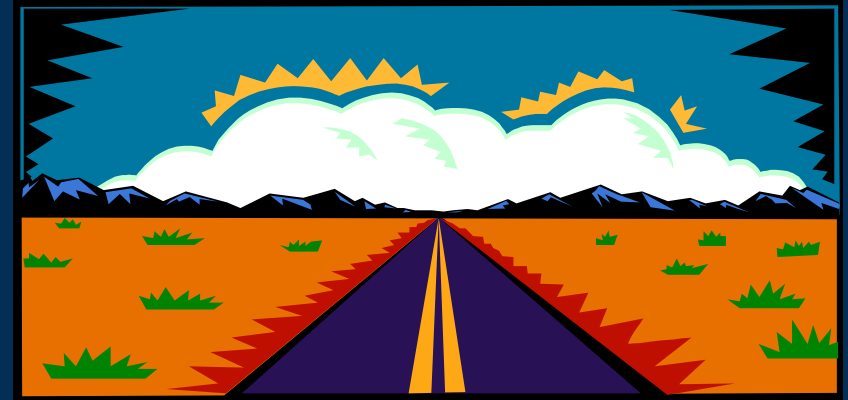
Montana Highway Economic Analysis Tool (HEAT)

Definition of the Project

- **Analyze, model, and implement economic impacts of Highway investment scenarios**
- **Used GIS throughout**
 - **Process data**
 - **Explain concepts**
 - **Present results**
 - **Implement tools**
- **Cambridge Systematics and Montana Highway Department of Transportation (MDT)**

Montana Highway Economic Analysis Tool (HEAT) Topics

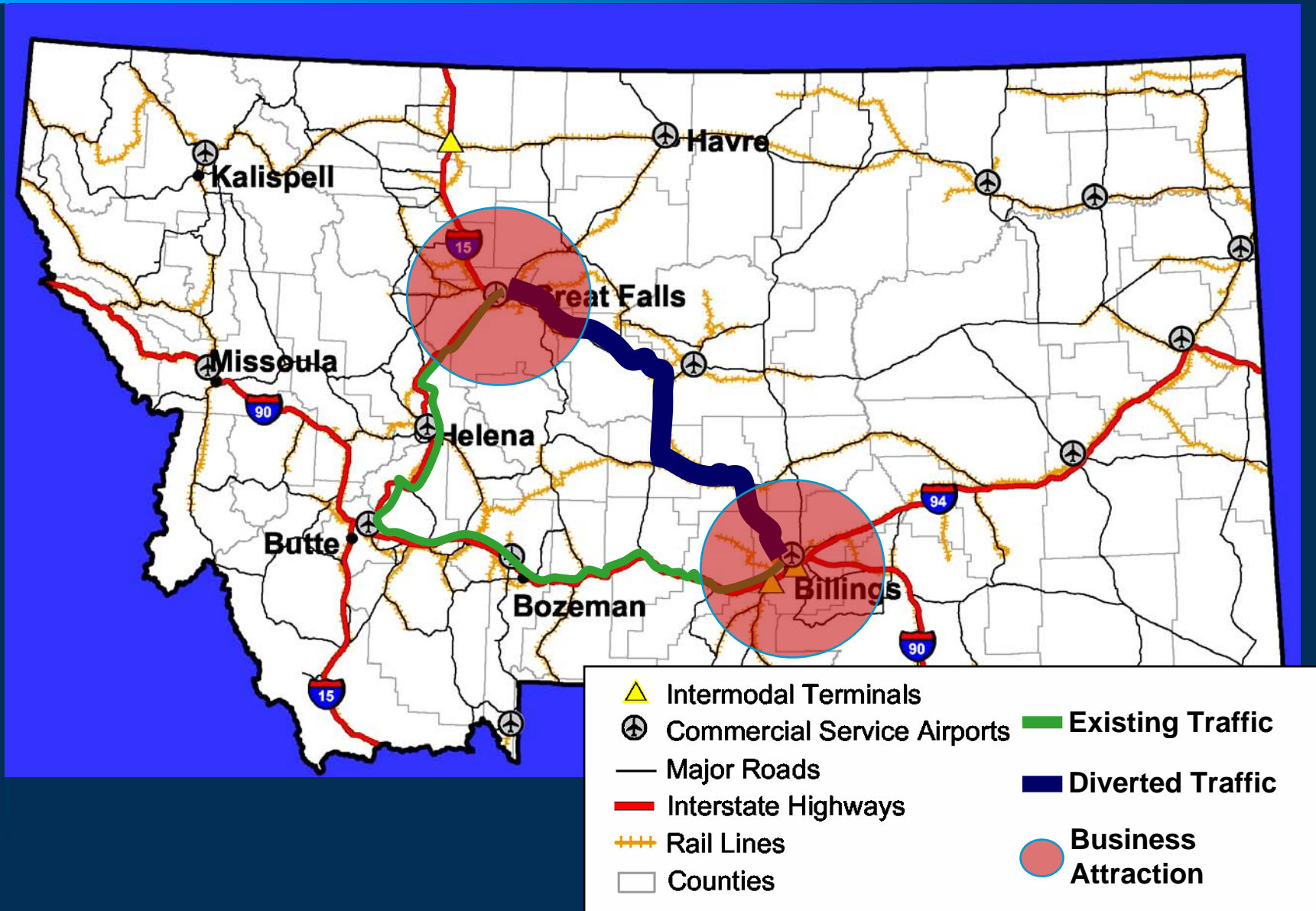
- Project background
- Project objectives
- Why GIS?
- HEAT model components
- HEAT demo
- Questions



Project Background

- **Montana Legislature mandated inclusion and consideration of economic development issues in**
 - **Transportation planning**
 - **Transportation funding**
- **MDT has**
 - **Existing suite of planning tools to do capital investment planning**
 - **Gaps in existing tools**
 - **No statewide travel demand forecasting model**
 - **No way of analyzing freight flows**
 - **No way of analyzing economic impacts**

How Roadway Improvements Impact the Economy



Project Objectives

- **Develop a non traditional way of comparing and analyzing the relative benefits of a highway investment scenarios**
- **Evaluate role of transportation investment**
 - **Assess Existing Industries**
 - **Identify New & Emerging Industries**
 - **Analyze freight and auto flow and demand**
- **Produce quantitative meaningful comparable results**
- **Give MDT the capability to analyze scenarios in house**

HEAT Usage

- **HEAT will be integrated into Montana's existing capital planning process**
- **Statewide or regional analysis**
- **Corridor planning**
- **Analysis of alternatives as part of project-level environmental processes**

Why GIS?

- **Increasingly accessible software platform**
- **Data integration**
- **Ability to manage the model components and allow user flexible access to related supporting information.**
 - **Mapping capability**
 - **Library tool**
 - **Documentation and User Guide**
- **Visual Basic customization**
- **Ability to easily interface with other software**

HEAT Model Components

- **User exploration tools**
 - [Map data](#)
 - [Desire lines \(trip making patterns\)](#)
 - **Document library**
- **Scenario designation tools**
 - **Establish a highway scenario**
 - **Code project(s) and attributes of projects**

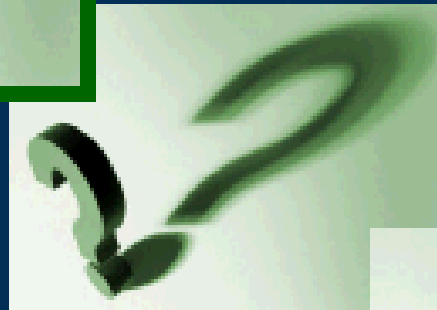
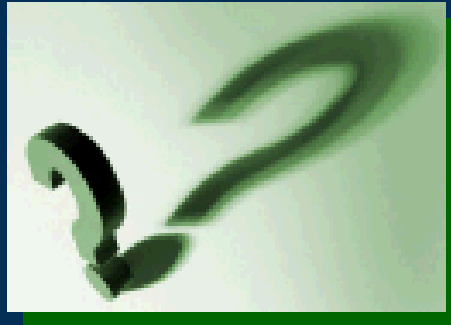
HEAT Model Components Continued

- **Network analysis tools (Comparing highway investment scenarios)**
 - Assignment routine
 - Accessibility analysis
 - User Benefits analysis
- **Economic analysis**
 - Tourist dollars
 - Business attraction (jobs)
 - Scenario costs
 - Economic growth by industry sector
 - Interface to REMI model
 - Scenario benefit / cost ratio

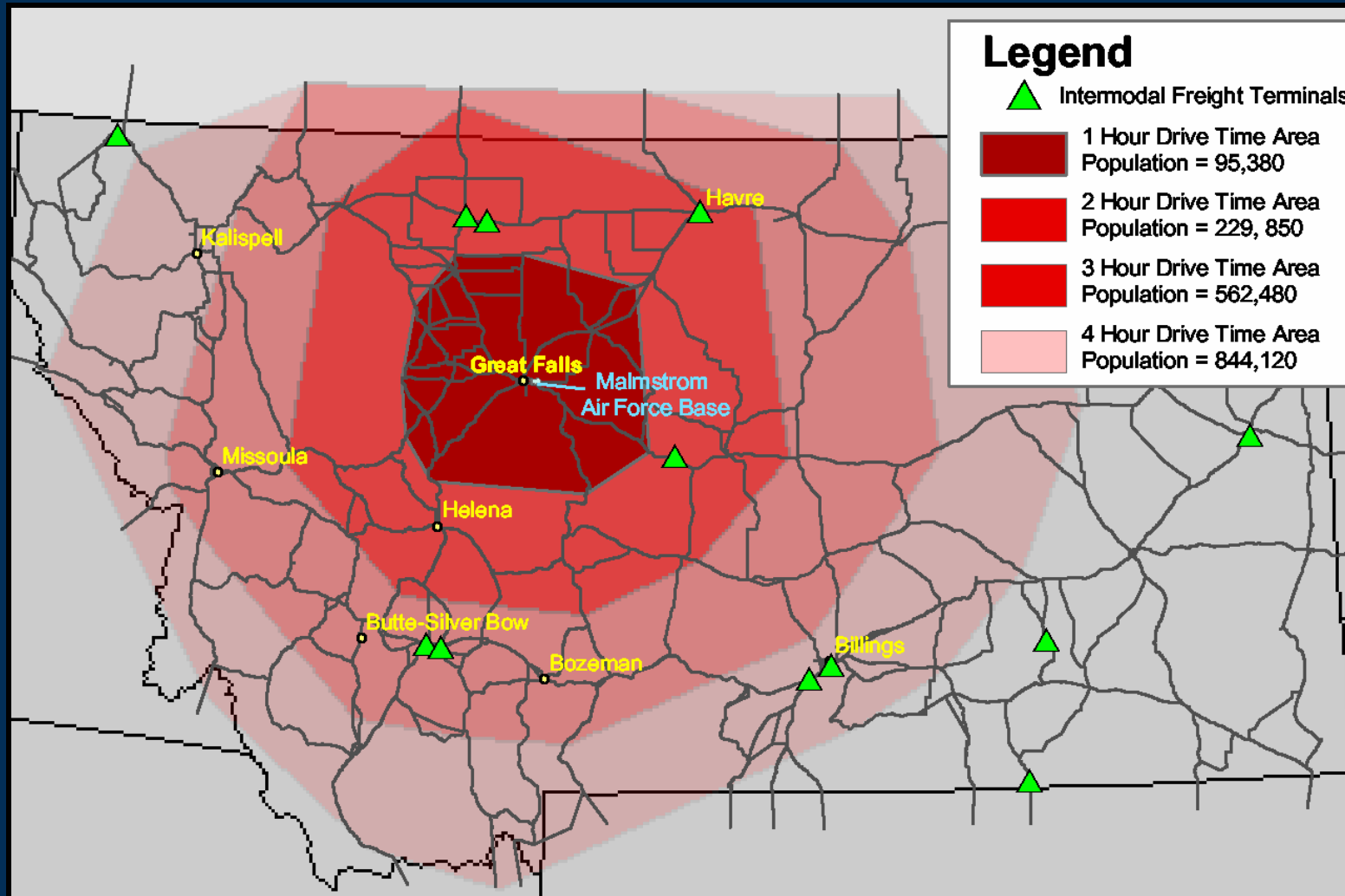
HEAT Demonstration

- [Demo 1 User Exploration Tools](#)
- [Demo 2 Scenario Designation Tools](#)
- [Demo 3 Network Analysis Tools](#)

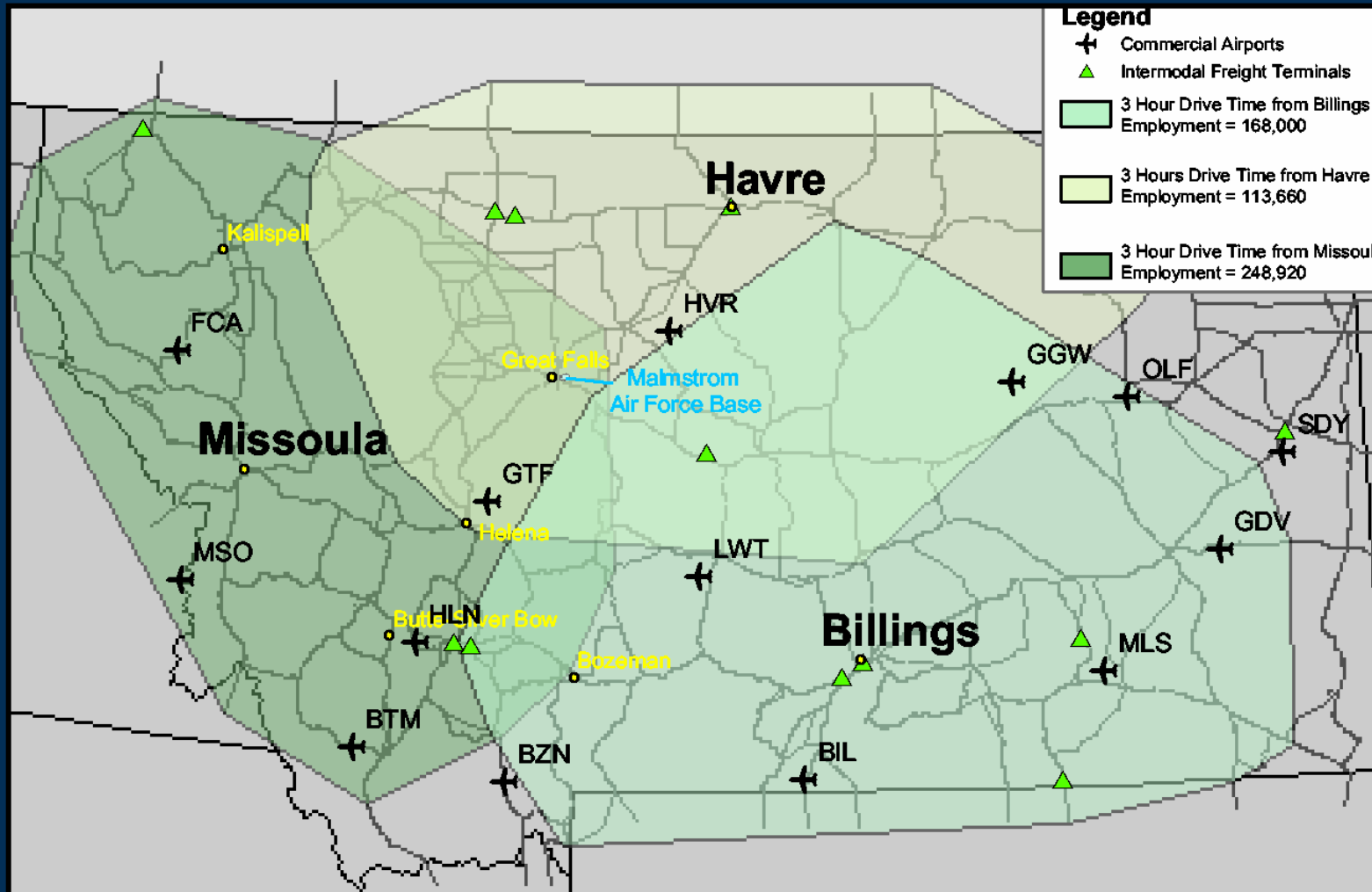
Questions?



Accessibility from Great Falls Drive Times



Accessibility for Missoula, Billings and Havre Three Hour Drive Time



Cost Estimation Tool

3) Other features (check box only if applies):

- a. Mountainous region

4) Enter project information:

	<u>Quantity</u>	<u>Units</u>
a. Length of roadway	10	KM
b. Number of passing lanes	1	each
c. Number of turn lanes		each
d. Number of signalized intersections		each
e. Number of interchanges		each
f. Number of interchange removals		each
g. Number of new overpasses		each
h. Number of overpass removals		each
i. Kilometers of railroad relocation		KM

5) Enter typical section dimensions

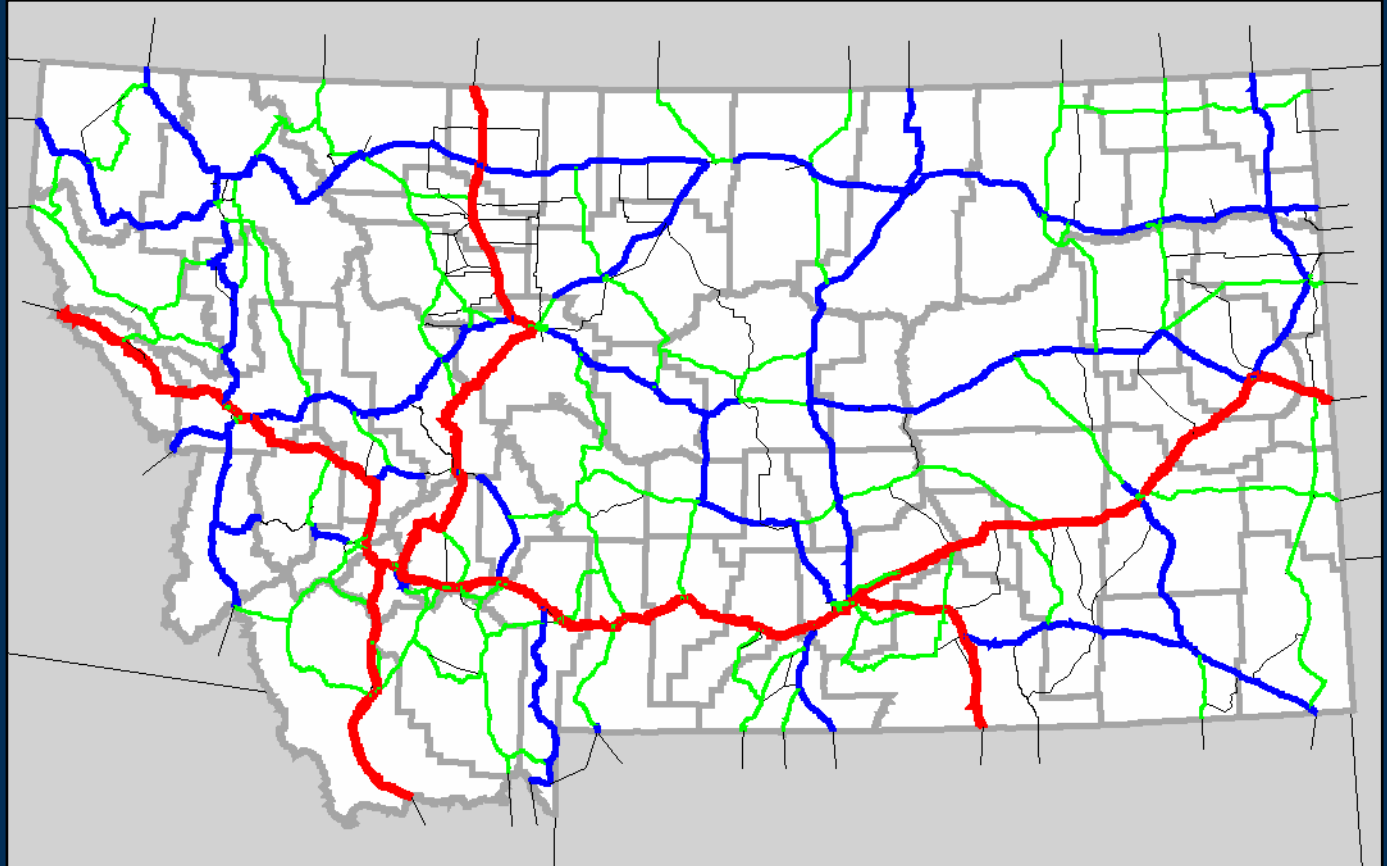
	<u>Quantity</u>	<u>Units</u>
a. Roadway surface width (see section 2e.)	12.8	M
b. Asphalt Concrete Thickness	90	mm
c. Crushed Top Thickness	50	mm
d. Granular Base Thickness	400	mm
e. Overlay width (see section 2d.)		M
f. Overlay Thickness (see section 2d.)		mm

Preliminary Estimated Cost

Construction Cost:	\$7,597,237
Construction Engineering:	\$759,724
Contingency:	\$759,724
Total:	\$9,116,684

Roadway Network and Map Layers

- International borders
- Interstates
- State highways
- Selected county roads
- Airports
- Intermodal yards
- Railroads
- Rail heads
- Grain Elevators



Top 10 Inter-county Flows for All Commodities Millions of Tons (2001)

