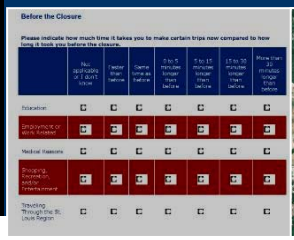
The New I-64 Economic and Regional Mobility Study

Annual Report 2008

Jan 2008- Dec 2008

Heartland Market Research

For Missouri Department of Transportation



Final Report

The New I-64 Economic and Regional Mobility Study
2008 Annual Report

Prepared for
Missouri Department of Transportation
Organizational Results

by

Dr. Lance Gentry, M.B.A. Ph.D.
Dr. Venkata Chilukuri, Ph. D.
Thomas Hiles, EI
Michael Trueblood, P.E., P.T.O.E.
Christopher Kinzel, P.E.
Robert Frazier, PE, AICP
Dr. Hojong Baik, Ph.D.
Daxiao Liu (Student)
Jonathan Lee
Daniel Hodge
Tom Ryan, P.E.

HDR Engineering, Inc.
Heartland Market Research, LLC
Missouri Science and Technology University

July 2009

The opinions, findings, and conclusions expressed in this publication are those of the principal investigators. They are not necessarily those of the Missouri Department of Transportation, the U.S. Department of Transportation or the Federal Highway Administration. This report does not constitute a standard or regulation.

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle: **The New I-64 Economic and Regional Mobility Study - 2008 Annual Report**		5. Report Date: **July, 2009** 6. Performing Organization Code
7. Author(s) **Gentry, Chilukuri, Hiles, Kinzel, Frazier, Trueblood, Baik, Liu, Lee, Hodge and Ryan**		8. Performing Organization Report No.
9. Performing Organization Name and Address Missouri Department of Transportation Research, Development and Technology P. O. Box 270-Jefferson City, MO 65102		10. Work Unit No. 11. Contract or Grant No.
12. Sponsoring Agency Name and Address Missouri Department of Transportation Research, Development and Technology P. O. Box 270-Jefferson City, MO 65102		13. Type of Report and Period Covered Final Report 14. Sponsoring Agency Code
15. Supplementary Notes The investigation was conducted in cooperation with the U. S. Department of Transportation, Federal Highway Administration.		
16. Abstract**: The 2008 Annual Report summarizes all study's activities conducted during the West End I-64 Full-closure construction project in the St. Louis, Missouri region. These activities included project communications, public opinions, regional mobility, roadway safety, and regional economics. The main evaluation question answered was "what impacts did the full-closure construction project have on the St. Louis region".**		
17. Key Words: **Communication, Public Opinions, Regional Mobility, Safety, Regional Economics, and Full-closure Construction**	18. Distribution Statement No restrictions. This document is available to the public through National Technical Information Center, Springfield, Virginia 22161	

19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. No. of Pages	22. Price

Form DOT F 1700.7 (06/98)

Executive Summary

The research team has found the following results on the four key study areas:

Communications

The Western closure in 2008 had a noticeable impact on respondent behavior and travel habits.

- Sizeable minority reported changes in their shopping and driving habits
- Many respondents reported slightly longer daily commutes compared to pre-construction period
- Majority of respondents are satisfied with how they are able to get around St. Louis
- Overwhelming majority of respondents are satisfied with MoDOT's decision to close parts of I-64 for two years instead of taking 6-8 years with lane closures (76.5% in the lowest measurement, 93.8% in the highest)
- Overall, the respondents have high level of satisfaction with how the I-64 closure has been handled (77% to 88%)
- Very satisfied/satisfied is the overwhelming majority responses received when asked about the delivery of accurate and understandable project information (89% to 95%)

Considering the reported changes in respondents' behavior, these are extremely high levels of satisfaction and reflect the public consensus that this project was well planned and is being well managed.

Mobility

Approximately 140,000 to 150,000 vehicles daily used the segment of I-64 between Ballas Road and I-170 before its January 2, 2008, closure. Assessments on how these daily trips were served or reduced in 2008 are listed in the bullets below:

- Traveled along the adjacent roadway network
- Switched to Metrobus and/or MetroLink
- Took advantage of RideShare and/or carpooling opportunities
- Reduced vehicle trips and/or combined several trips into a single trip
- Major companies allowed working from branch or satellite offices not impacted
- A small percentage even moved and/or switched jobs

Based on the traffic information collected, there were increases along I-270, I-44, I-170, I-70 with I-270 and I-44 experiencing the greatest increases (24,000 to 40,000 vehicles or 17 to 21% increase). Parallel arterial routes also experienced significant increases in traffic volume as well as travel time.

East-west arterial corridors, such as Clayton Road and Ladue Road, realized increases of between 10,000 and 20,000 vehicles per day. North-south arterial corridors such as Hanley Road and Lindbergh Boulevard experienced a slight increase in traffic volumes and travel times.

Travel speeds have dropped slightly in conjunction with increases in traffic volumes mentioned above on alternate routes. This has lead to increased travel times along some of the region's freeway network. It should be noted that the increase was not as high as some would have expected due to some of the pre-closure capacity improvements. The range of increase travel

times on some segments of alternate designated routes (like I-44, I-70 and I-270) were between 1 to 8 percent. When compared with increase traffic volumes ranging from 4 to 21%, travel times were slightly better than what would be expected.

Transit usage varied significantly from 2007 to 2008 on a month-by-month basis. MetroBus ridership varied from an 8.33% month drop when comparing March 2007 to March 2008 to a 13.1% increase when comparing February 2007 to February 2008. MetroLink ridership varied from a 4.45% drop when comparing August 2007to August 2008 to a 31.9% increase when comparing July 2007 to July 2008. Overall, MetroBus ridership experienced an increase of 5.52%, while MetroLink ridership experienced a 5.23% increase between 2007 and 2008.

The RideFinders Rideshare program experienced a significant increase through 2008 as it approached the 10,000 membership plateau in November. Carpool and vanpool programs had membership increases near 40 percent and 10 percent respectively over the previous year. Gas prices, regional and national economic impacts, and regional construction activities appear to be the strongest reasons for these increases.

Usage of commuter park-and-ride facilities in Missouri was up 22% in August 2008 to 1913 parking spots used. It was noticed that park-and-ride facilities served by transit were better utilized, showing that the intermodal connection had some impact on how people traveled.

Crash Analysis

The study team evaluated 5-year (2004-2008) of crashes data that occurred on 16 different roadways in the vicinity of the I-64 closure. Using the data set, 1-year (i.e., 2008) post-closure crashes are compared to 4-year (2004-2007) pre-closure crashes in various ways. The major findings from the crash analysis are as follow:

- Comparing year 2007 to year 2008, crash rates on most routes either decrease or remain about same except for six routes that increase slightly as follows: I-70(4%), I-55 (6%), MO 366 (4%), MO100 (8%), MO115 (6%) and MO Route D (3%). However, only I-70's 2008 crash rate was noticeably higher (15%) than the base year 2004 with the remaining five routes having 2008 crash rates that were the same or below the base year 2004 crash rate.
- We have tentatively concluded that the crash increase on I-70 in 2008 was partly due to the record breaking heavy rain in 2008. An increasing trend of the out-of-control crashes was noticed and the study team will be further analyzing it as we review 2009 crash data.
- In cases of MO100 or I-70, the increasing trend started before the I-64 closure (i.e., before 2008). So, it is hard to infer whether the I-64 closure caused the crashes to increase, and we will monitor them as we review 2009 and 2010.
- Although each route shows its own trend, the overall crashes on all three types of highways (i.e., interstate, MO, and US highways) have decreased in 2008.
- The observational inspections conducted in this study leads us to a tentative conclusion that there is no strong evidence proving that I-64 closure contributed to the crash increase on the highways that are potentially influenced by the closure. Continuation of this crash

analysis through 2009 and 2010 will provide additional information that will either confirm the tentative conclusion or provide information that changes this initial conclusion.

Economics

Since the housing and credit crisis emerged, national economic conditions have been in decline as economic activity has been weakening across most industry sectors and metropolitan regions in the US. Gross Domestic Product (GDP) fell 6.3 percent for the fourth quarter 2008 with exports, housing, and business investment continuing to decline. The residential and commercial real estate markets are deteriorating in conjunction with the construction industry. In addition, lending activity has declined. The weakening conditions have impacted the labor market as unemployment levels rose throughout 2008.

The St. Louis area is following the similar national trend and the challenge in this study is the separation of the impacts: national/regional recession and the I-64 construction project. The evaluation of some indicators (like employment and sales) showed that the economy measurements along the I-64 corridor are fairing better than the non-corridor economy measurements.

Information gathered through two business surveys and continuing dialogue with key business areas along the I-64 corridor confirmed that the national/region recession impacts had a significantly greater impact on the region's overall economy. A very high percentage of very satisfied/satisfied response was received from the business community surveyed when asked on how the project is being delivered and managed.

TABLE OF CONTENTS

List of Figures viii
List of Tables viii
Introduction 1
Objectives 1
Present Conditions 1
Results and Discussion (Evaluation) 2
Conclusions 57
Principal Investigator and Project Members 59
Bibliography 59
Appendix A- 1 Final Mail-out Survey Results……...A-1
Appendix B-1 Complete Crash Analysis…….....B-1
Appendix C-1 2009 Quarterly Reports..…….....C-1

List of Figures

Figure I-1 – Closure Site Map ……Page 1
Figure C-1 – Personal Impact Staification…..…….Page 4
Figure C-2 – Personal Impact Travel Impacts.……Page 5
Figure C-3 – Information Sources……..……..Page 6
Figure C-4 – Web Site Usage……..…..……Page 7
Figure C-5 – Alternate Routes…… ……...Page 7
Figure C-6 – Travel Time Differences Web…….Page 7
Figure C-7 – Travel Time Differences Mailed…….Page 8
Figure C-8 – Mode of Travel……Page 8
Figure M1 – Summary of Traffic Flow – East-West Routes...……Page 15
Figure M2 – Summary of Traffic Flow - North-South Routes……Page 16
Figure M3 – Summary of Hourly Traffic Flow……Page 17
Figure M4 – Summary of Hourly Traffic Flow……Page 18
Figure M5 – Summary of Arterial Traffic Flow…...……Page 19
Figure M6 – Summary of Arterial Traffic Flow……...Page 20
Figure M7 – Summary of Hourly Travel Speeds…….Page 22
Figure M8 – Summary of Travel Speeds……..Page 23
Figure M9 – Travel Time along Selected Major Arterial Roadways...……Page 26
Figure M10 – Summary of Arterial Travel Times……Page 28
Figure M11 – Summary of Arterial Travel Times……Page 29
Figure M12 – Park-and-Ride Summary……Page 30
Figure M Transit – Increase in Transit Ridership.....……Page 30
Figure M13- Quaterly Transit Ridership……..Page 31
Figure M14 – Monthly Transit Ridership…….Page 31
Figure M15 – Transit Ridership Near I-64……...Page 32
Figure M16 - Carpool Summary…...……Page 32
Figure M17 – Vanpool Summary....…….Page 33
Figure S-1 – All Crashes for Interstate Roadways……..…….Page 35
Figure S-2 – All Crashes for Major Arterials Roadways…….Page 36
Figure S-3 - All Crashes for Expressway Roadways.…….…….Page 37
Figure S-4 - All Crash Rates for Interstate Roadways…….Page 39
Figure S-5 – All Crash Rates for Major Arterials Roadways……...Page 40
Figure S-6 – All Crash Rates for Expressway Roadways……Page 41
Figure E-0 - Zip Code Definitions for Study Regions…..……Page 43
Figure E-1 – Un-employment Shares for St. Louis City and County..…….Page 46
Figure E-2 - Employment Growth Index by Region…….Page 47
Figure E-3 - Employment by Industry…….Page 47
Figure E-4 – Population Growth for St. Louis City and County……..Page 48
Figure E-5 - Total Quarterly Wages by Region……Page 48
Figure E-6 - Share of Wages by Industry…….Page 49
Figure E-7 - Taxable Sales by Region……..Page 50
Figure E-8 - Taxable Sales Index by Region……Page 51

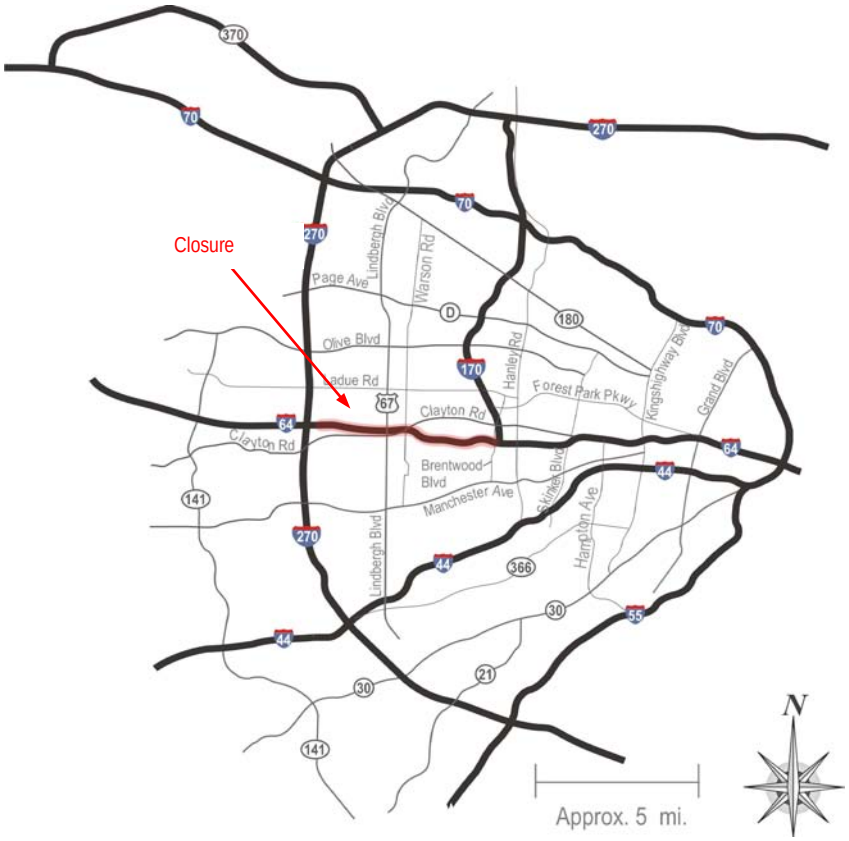
List of Tables

Table C-1 – Usage of I-64……...Page 4
Table C-2 – Knowledge of Closure……..Page 4
Table C-3 – Commuters' Impact…….....Page 5
Table C-4 – Demographics……Page 9
Table M1 – Summary of Freeway Travel Time…..……...Page 24
Table S-1 – Total Crashes…….Page 34
Table S-2 - Total Crash Rates……...Page 38
Table E-1 – Major Economic Concepts 2008…..……..Page 45
Table E-2 – Major Economic Concepts 2007……...Page 45
Table E-3 – Industries Interviewed……..Page 52
Table E-Results – Business Survey – Selected Results……Page 54
Table E-4 - Change in Weekly Sales and Customers……Page 56

Introduction

On January 2, 2008, the section of I-64 from Ballas Road to I-170 (map shows general closure area) was completely closed for construction. The closure lasted through the end of 2008, at which time a section to the east was closed for construction for the bulk of 2009.

This annual report for 2008 assesses the first twelve months that closely corresponds to the time period of the western closure. This report evaluates the four key areas of **Communications** (MoDOT's provision of information to the public, and the public's response to the project), **Mobility** (the effects of the closure/project on travel behavior, choices, and flow), **Economics** (the effects of the closure/project on businesses within the corridor as well as the economic health of the region) and a **Traffic Crash Analysis** (the effects of the closure/project on the region's transportation safety). This report is the culmination of monthly and quarterly reports produced in 2008. This 2008 report and a similar 2009 annual report along with the one-year post-construction assessment report will be included in the final report in mid-year 2011.



Objectives

Assess potential impacts in the following areas to provide information on how the I-64 full closure construction influenced regional activities:

- Communications
- Regional Mobility
- Roadway Safety
- Regional Economics

Present Conditions

Full-closure is a roadway construction strategy that has been considered when regional conditions exist where alternative roadways are available. This strategy permits construction to be accelerated and normally at a reduce construction cost. The major concern in implementing this strategy is the public concerns on impacts to region mobility, economics and safety.

Results and Discussion (Evaluation)

Major Goals – Communication Assessment

Develop and implement survey instruments

Determine effectiveness of pre-closure notification

Measure participant satisfaction for key issues

Estimate changes in behavior

Hear everyone's voice (obtain generalized sample)

Communications Discussion

Survey Methods and Characteristics

Over 5,000 people were surveyed in 2008 to measure their opinions about the Western closure and how it may have changed their behavior. Three survey methodologies were utilized in this study. Detailed survey instruments were designed specifically for this project (two online surveys, a mailed survey and in-person interviews). Two key questions were also added to the motorist assist and I-64 Traffic Response surveys distributed by MoDOT operators after providing traffic assistance to motorists in need.

On-Line Survey

Below are some statistics regarding the on-line survey on MoDOT's the New I-64 website:

- 1,362 responses were generated during the Western closure (1,040 responses on the first survey and 322 responses to revised second survey after June 1, 2008).
- 1,257 of these responses (92%) were by first-time visitors to the survey.
- On-line respondents tended to be Caucasian and affluent.

Mailed Survey

Ten thousand St. Louis residents were randomly selected and mailed surveys in January 2009. Since the list of 10,000 residents was randomly selected from multiple St. Louis area zip codes, this method provided the most representative sample of the area. The intent to increase minority participation to ensure a diverse study was accomplished with this mailed survey instrument.

- 776 responses were received
- Response rate was 7.76%
- African American participation was 16.3%

Motorist Assist Surveys

Motorist Assist respondents tended to be less affluent than most respondents. People in this income bracket are less likely to respond to mail surveys and online surveys, so two key questions were added to the standard surveys already distributed by motorist assist operators to ensure that the most important questions were asked of the lower income segment.

- 3,472 responses were received
- 2,764 through MoDOT's Motorist Assist program (freeways)
- 708 through the I-64 Traffic Response program (arterials)

Interviews

Three separate in-person interviews were conducted during 2008 to confirm consistency in respond between other survey instruments and to help measure impacts to the community. The first public interview was conducted at major shopping center and major supermarket located adjacent to the western closure. The second in-person interview was conducted with local, state and federal officials. The third in-person interview was conducted at the St. Louis Zoo in Forest Park. The following provides a summary of those interviewed:

- First survey - 100 participants at the Galleria Mall and Schnucks Supermarket
- Second survey – pubic officials from 3 cities, county and US Representative office
- Third survey – 80 participants at the Zoo (Forest Park) – 56 local citizens and 24 visitors

Survey Evaluation Methodology
The following seven (7) evaluation areas were developed to categorize the survey information gained and received from the various survey methods described above. The following defines the intent of the categorized evaluation area and the general overall results discovered:

"Awareness" defines how informed transportation users are with regard to the closure and other project construction activities that impact their normal travel patterns and region's economy. From the responses, it appears that MoDOT effectively communicated the closure to the affected population in 2007; pre-closure awareness was reported as very high. These responses have also reported that scheduled construction activities that impact travel have been effectively communicated.

"Satisfaction" defines how satisfied transportation users are with regard to the management of the construction project and travel in and around the St. Louis region. Respondents are largely satisfied with their ability to travel around the region. They also largely satisfied with project management that includes areas like the full closure approach, the level of information shared on project activities, and the project communication shared through various outlets.

"Information Sources" defines the various outlet sources that project information is shared and what are the most effective sources to get information to the transportation user. TV News appears to be the best way to reach the majority of the respondents, with radio news, road signs and newspaper also being effective methods. For those who use the internet, online information sources are almost as effective as TV news. However, a large portion of the general population does not obtain their information via the internet and these other methods should continue to be used to reach them.

"Alternative Routes" defines the designated and other alternate routes used by the transportation user to travel around the construction project. I-44 was the most recommended alternative route. Two nearby parallel arterials, Ladue Road and Clayton Road, received more negative responses when survey respondents were asked to make recommendations on preferred alternative routes.

"Travel Time" defines respondents' perception on how their travel times were impacted by the construction project. The majority of respondents are indicating that that their travel time for basic trips have increased; although many have indicated no change or even a few reported an improvement in travel times.

"Travel Mode" defines changes in transportation modes like use of transit or non-motorized transport (bike or walking) to accommodate their trips (commute, event/entertainment, shopping, etc.). Initial responses on how the closure has changed people's mode of travel are somewhat inconclusive. It is clear that the dominant mode of travel by the respondents has been and continues to be by the automobile.

"Personal Impact" defines how the construction project has impacted their trips in the region. The closure is affecting people's trip choices. Survey respondents are indicating changes in basic trip destinations such as shopping and eating out. Overall, almost three quarters of respondents are indicating that their frequency of travel to certain areas has been affected by the closure. Most commuters have reported not shifting their normal commute time.

To date, the responses have been fairly consistent over the various survey methods. This general agreement across surveys is important because it appears to demonstrate that one can generalize from the surveys to the general population. Other than issues related to access to the online survey that is not available to all transportation users for various reasons, the web-based survey instrument may present skewed information. The selection of a target area with the mailed survey to help ensure greater diverse survey participation and to counter potential web-based survey impacts was utilized.

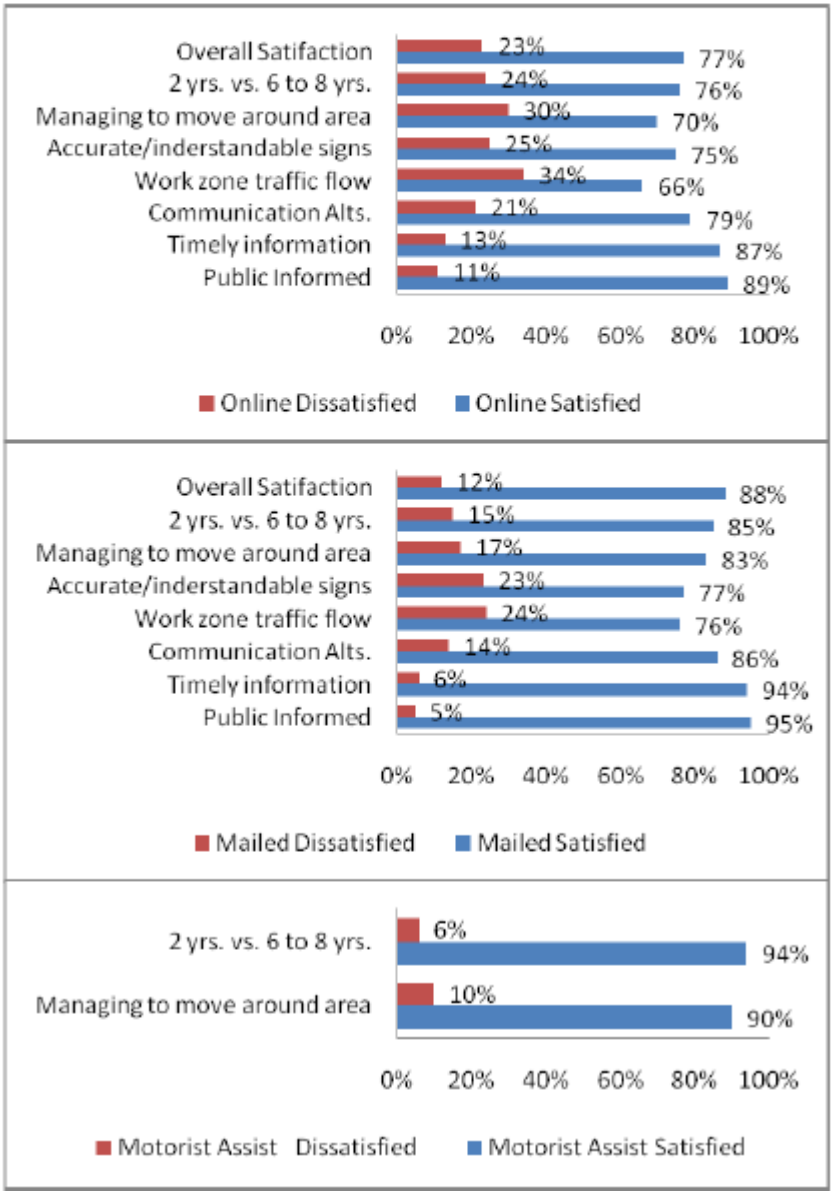
Usage of I-64 before Closure
(Web and Mailed)

Response	Online	Mailed
Never	2.8%	9.4%
Rarely	34.9%	33.6%
Most days	62.3%	57.1%

Knowledge of Closure
(Web Only)

Aware of closure before survey:	98 %
Learned about closure:	
Before Dec '07	94 %
Dec '07	4 %
Jan '08	2 %

In order to facilitate better comparisons of changes across survey types and from time to time, the statistics used in the project assessment usually do not include the "not sure" or "no opinion" percentages. This eliminates a major source of random variability and allows a more accurate observation of change over time. In addition, this methodology is consistent with how MoDOT calculates similar Tracker measures.



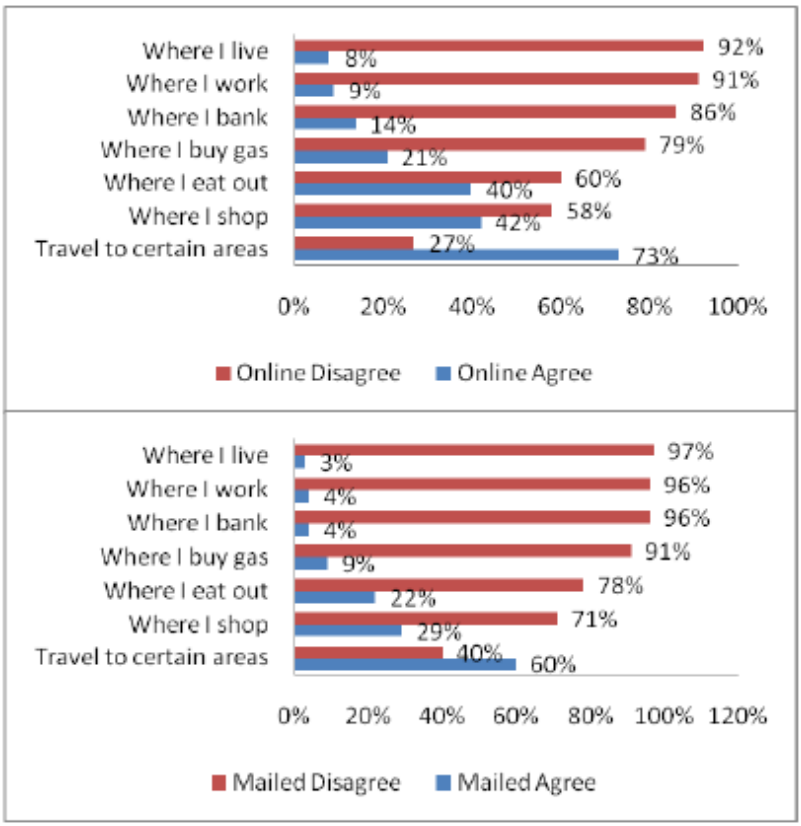
Awareness
The survey results indicate that the public was very aware of the closure well before it occurred. 98.1 percent of the on-line respondents were aware of the upcoming closure in 2007, and since 97.2 percent of the online respondents traveled on the affected section of I-64 at least once per week before the closure, it appears that the target population received the needed advance information.

Satisfaction
The charts at right summarize survey respondents' opinions in the area of satisfaction. As the graphs indicate, 66 percent or more of the respondents

expressed satisfaction in response to each question in each forum, and responses were fairly consistent across the different survey types.

Satisfaction was highest with “how well the public has been kept informed” (89 to 95 percent) and “the timeliness of information” (87 to 94 percent). The least amount of satisfaction was expressed for “how traffic is flowing in work zones” (66 to 76 percent) and “accuracy and understandability of construction zone signs” (75 to 77 percent).

The two survey questions for the motorist assist and I-64 traffic response programs showed a slightly higher satisfaction. This may indicate that those receiving service patrol assistance responded in a more positive manner of appreciation. This indication is another acknowledgement that these programs are well appreciated by transportation users.



Based on in-person interview surveys that were recently conducted at two shopping locations near the closed section of I-64 and the Zoo in Forest Park, it appears they are generally in agreement with the above results. For most measures, over 80 percent of the interview respondents were either satisfied or very satisfied. This included opinions regarding both the decision to close I-64 and overall satisfaction with how the I-64 closure has been handled.

Note that written responses to the surveys are still being processed, but one notable item is that respondents have expressed satisfaction regarding the regional collaboration on signal timing that has facilitated arterial flow during construction; the public has also expressed a desire to see these timing improvements continued after the project is complete.

Personal Impact of the Closure

The questions on how the I-64 construction and the full closure impacted regional travel will help in measuring and confirming potential travel and economic impacts. As the graphs at right indicate, respondents much more often modified their frequency of travel to certain areas than

Spatial/Temporal Effect on Job

	Mail	Web
Same hours, same location	73 %	65 %
Shifted hours	8 %	22 %
Shift location more often	3 %	6 %
Quit job	1 %	3 %

Typical Period of Commute (or Other Travel) Web only

	before	after
before 7 am	20 %	27 %
7 - 9 am	41 %	39 %
9 am - 3 pm	10 %	15 %
3 - 6 pm	37 %	43 %
after 6 pm	12 %	17 %

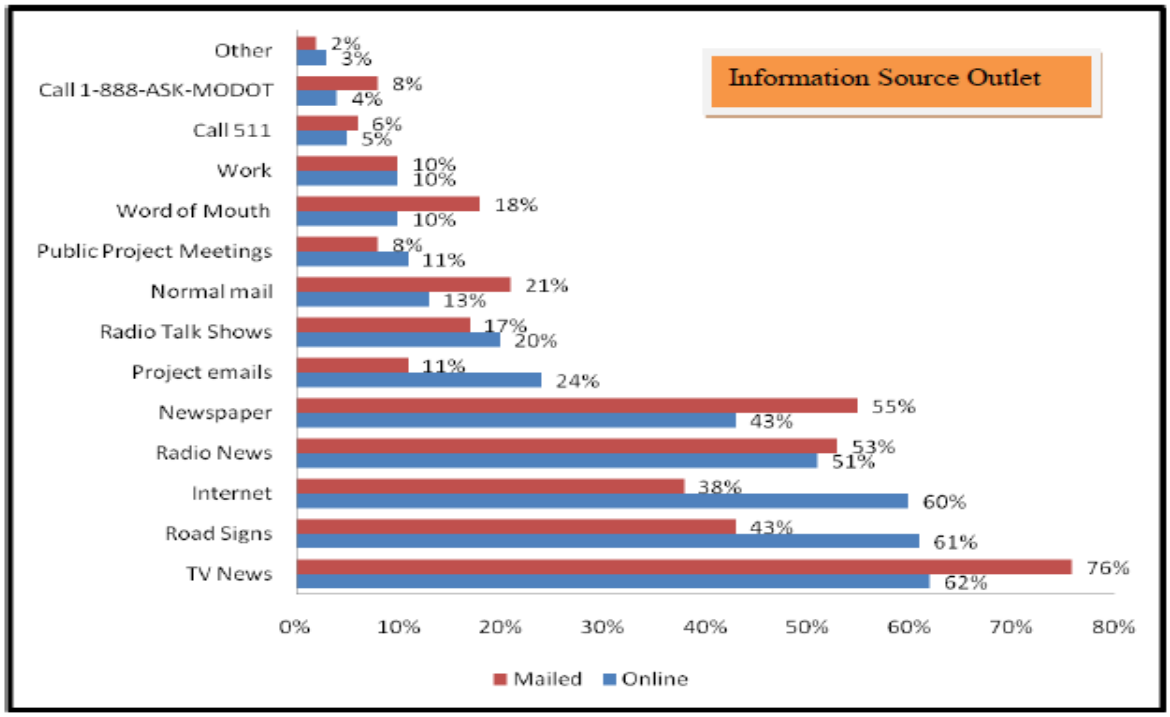
the location of their basic trip destinations. The most affected destinations were shopping (29 to 42 percent) and eating out (22 to 40 percent). While personal impacts to where someone lives, works or banks, were reported in surveys showing lesser impacts.

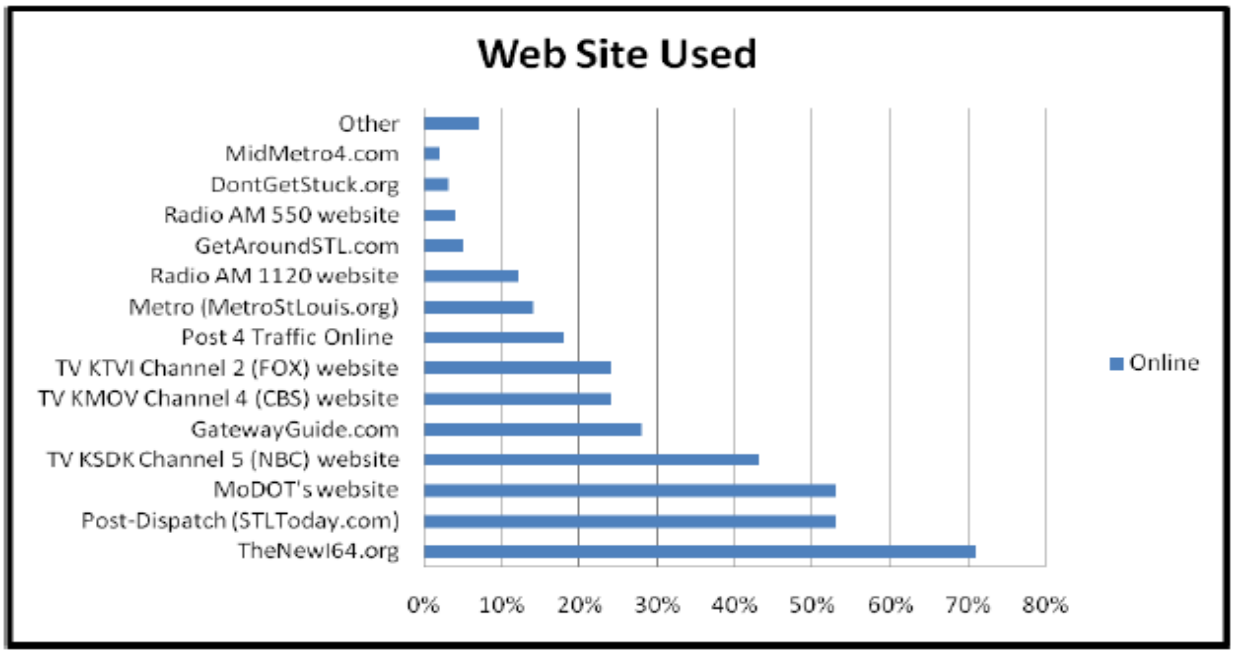
Most respondents indicated that they have continued to work the same hours in the same location since the closure. The online respondents, including residents more distant from the closure than the mailed survey, were much more likely to have shifted hours in response to the closure compared to those who completed the mailed survey.

The web survey revealed a stated shift to earlier morning commute/travel hours, but no significant shift in the evening hours. It should be noted that anecdotal information, and other observations, indicate that this shift was high initially, but has lessened over time as conditions begin to stabilize. The high number of web survey responses in the early weeks of the closure may therefore skew this data; future reports will further examine time trends to explore this effect.

Information Sources and Communication Methods

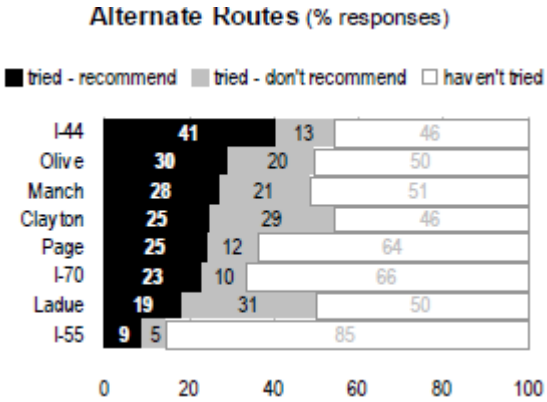
TV News was considered to be the best method for MoDOT to distribute information to the public by the respondents of both the online and mailed surveys. As expected, there was much variance in the perceived effectiveness of internet communications between the two survey types. Online respondents with access to the internet thought the internet was the second best way for MoDOT to provide information to them. However, those who returned the mailed surveys were not as likely to use the internet to obtain their information (only 38 percent of these respondents thought the internet was a good way for MoDOT to provide them with information). Road signs, radio news and newspapers were also considered very good methods of communication.





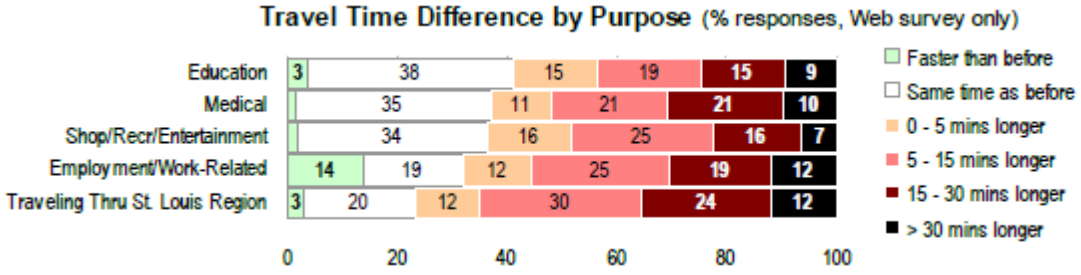
Alternative Routes

Respondents were also asked to provide input about eight alternative routes. This question has asked in the first online survey that was conducted through June 1, 2008. I-44 was the most recommended route, with 41 percent of the respondents recommending it. Clayton Road and Ladue Road were the least recommended routes, in the sense that more respondents recommended against their usage than for them.

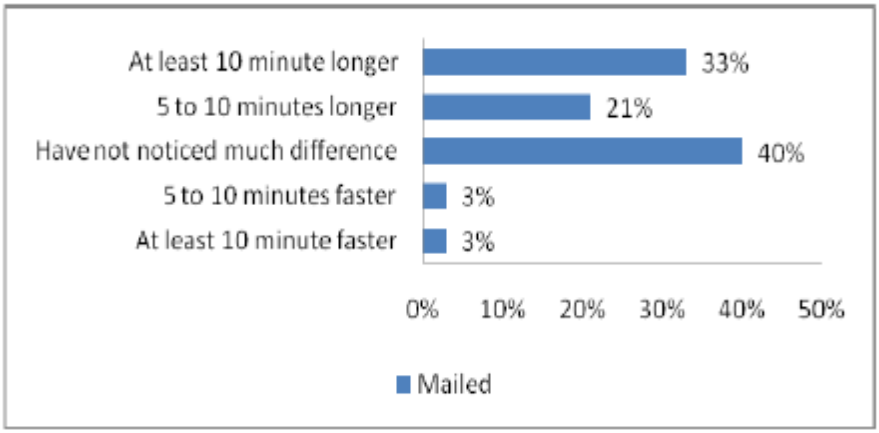


Travel Time

As indicated by the graph below, the majority of Web survey respondents (58 to 78 percent) indicated that various trips had gotten longer since the closure, with a total of 9 to 12 percent responding that their trips had increased by 30 minutes or more. Notably, when asked specifically about work trips, 14 percent of respondents indicated that their work trips were actually faster than before.

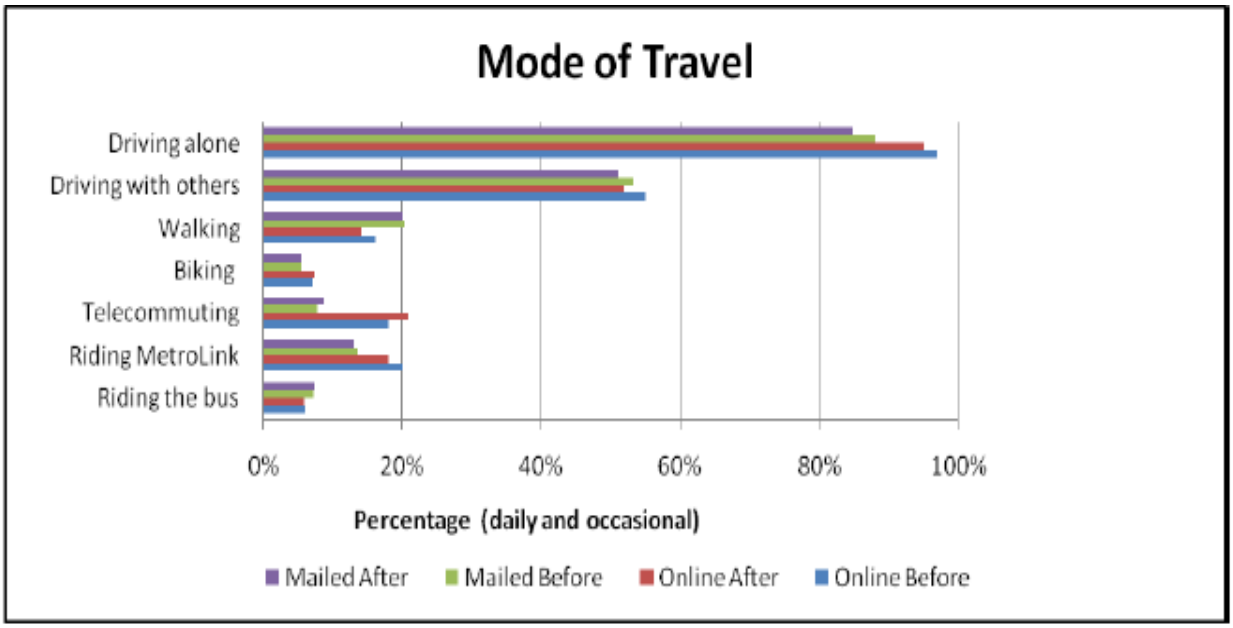


In the mailed survey, the question regarding the time difference between pre-closure trips and after closure trips was asked. Fifty-four (54) percent responding reported taking longer to complete their trip, while 40% did notice much difference in their trip times. The graph to the right indicates the results of the mailed survey.



Travel Modes

To date, the surveys have revealed only slight changes in reported travel mode since the closure, as illustrated below. Single-occupant driving has apparently slightly decreased by 2 to 3 percent, and carpooling also appears to have decreased. For other modes, the fluctuations are not stark, but there appears to have been some increase in each. The study team will continue monitor these indicates in 2009 to see if there is any difference between the west and east closure. With the east closure occurring near Forest Park, there maybe a shift based on the park serving as recreational and entertainment locations.



Demographics

The table at right summarizes the responses to demographic questions from the respective surveys. One of the purposes of supplementing the Web survey with a mail survey was to reach populations without internet access, in order to ensure the research considered the input of as many groups as possible – a representative sample. By targeting the mail survey at many of the zip codes near the closure, the research team succeeded in its objective of reaching a more diverse population, especially in reaching more minorities and more females.

Demographics of Survey Respondents

Age	Mail	Web
under 25	4 %	11 %
26 to 40	21 %	38 %
41 to 65	56 %	49 %
Over 65	19 %	2 %

Race	Mail	Web
American Indian	2 %	1 %
Asian	1 %	3 %
Black/African-American	16 %	2 %
Hispanic/Latino	1 %	1 %
White/Caucasian	78 %	91 %
Other	2 %	2 %

Gender	Mail	Web
Male	42 %	54 %
Female	58 %	46 %

Income	Mail	Web
Less than $20,000	-	2 %
$20,000 to $40,000	-	12 %
$40,001 to $60,000	-	17 %
$60,001 to $90,000	-	21 %
$90,001 to $120,000	-	22 %
$120,001 to $150,000	-	10 %
$150,001 to $200,000	-	9 %
More than $200,000	-	7 %

<u>Mobility Discussion</u>

The focus of this annual report is to highlight some of the key findings and trends during the 2008 closure and construction of the western section of I-64, from Ballas Road to I-170. An extensive amount of data was collected by a variety of agencies regarding the region's transportation network. Information about the region's roadways, mainly consisting of traffic volume and travel time data, was extensive. This annual report is intended to provide a brief overview of the changes along the region's roadway network during the western closure. Discussions related to changes to transit ridership, RideFinders, commuter parking lot usage, crash information and other significant data related to the region's mobility have also been included in this report. From a process standpoint, the study team collected available mobility data and, when possible, developed automated methods to assist in the collection, processing, and display of the enormous stream of mobility-related data. Key initial findings are listed below:

- Approximately 140,000 to 150,000 vehicles daily used the segment of I-64 between Ballas Road and I-170 before its January 2, 2008, closure. Volumes on I-64 west of I-270 decreased by approximately 10,000 to 15,000 vehicles per day during the closure. An assessment of where those vehicles have gone includes a wide array of explanations, as noted in the bulleted list below. It should be noted that a similar assessments will be completed during the eastern I-64 and further discussed in the Final Project Report (anticipated to be completed one year after the eastern closure has been opened).
    - Traveled along the adjacent roadway network
    - Switched to Metrobus and/or MetroLink
    - Took advantage of RideShare and/or carpooling opportunities
    - Reduced vehicle trips and/or combining several trips into a single trip
    - Major companies allowed working from branch or satellite offices not impacted
    - A small percentage even moved and/or switched jobs

- Based on the Traffic.com data, it appears that volumes along I-70 decreased west of I-170, while increasing east of I-170. Traffic volumes along I-270 south of I-64 increased by 30,000 to 40,000 vehicles per day. I-44 also experienced an increase in traffic volumes, ranging from 24,000 vehicles per day east of I-270 at Lindbergh Boulevard and as high as 7,000 vehicles per day near Jefferson Avenue.
- Travel speeds have dropped slightly in conjunction with increases in traffic volumes mentioned above on alternate routes. This has lead to increased travel times along some of the region's freeway network. It should be noted that the increase was not as high as some would have expected due to some of the pre-closure capacity improvements. The range of increase travel times on some segments of alternate designated routes (like I-44, I-70 and I-270) were between 1 to 8 percent.
- Parallel arterial routes also experienced significant increases in traffic volume as well as travel time. East-west arterial corridors, such as Clayton Road and Ladue Road, realized increases of between 10,000 and 20,000 vehicles per day. North-south arterial corridors such as Hanley Road and Lindbergh Boulevard experienced a slight increase in traffic volumes and travel times.
- Transit usage varied significantly from '07 to '08 on a month-by-month basis. MetroBus ridership varied from an 8.33% drop from March '08-'07 to a 13.1% increase from February '07-'08. MetroLink ridership varied from a 4.45% drop from August '08-'07 to a 31.9% increase from July '07-'08. Overall, MetroBus ridership experienced an increase of 5.52%, while MetroLink ridership experienced a 5.23% increase between 2007 and 2008.
- The RideFinders Rideshare program experienced a significant increase through 2008 as it approached the 10,000 membership plateau in November. Carpool and vanpool programs had membership increases near 40 percent and 10 percent respectively over the previous year. Gas prices, regional and national economic impacts, and regional construction activities appear to be the strongest reasons for these increases. Gas prices started to decline in the latter part of 2008 and the early part 2009. The research team may be able to determine the impact caused by higher gas prices in 2008, if the 2009 gas prices remain stable. This insight could provide a better understanding of potential impacts caused by the I-64 construction project to the Rideshare program.
- Usage of commuter park-and-ride facilities in Missouri was up 22% in August 2008 to 1,913 parking spots used. It was noticed that park-and-ride facilities served by transit were better utilized, showing that the intermodal connection had some impact on how people traveled.

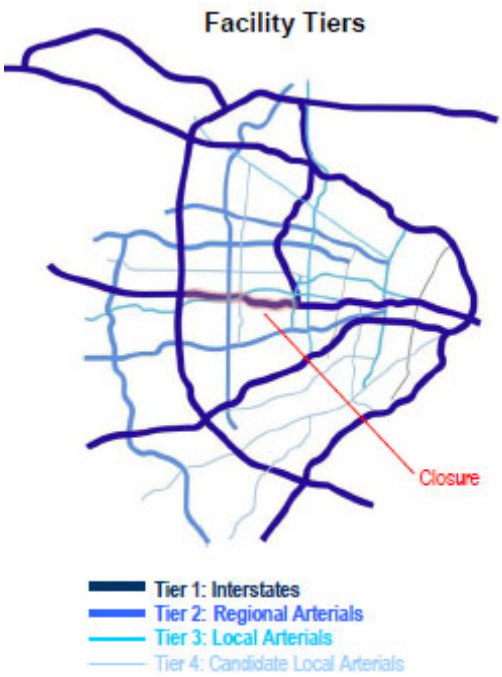
(Left Blank)

Major Goals – Mobility Assessment

Assess the shifts (temporal, spatial, and modal) in travel demand throughout the region

Assess congestion effects of the closure

Assess closure effects on transit, ride-sharing, and park-and-ride demand.



This assessment uses a variety of tools to measure the region's mobility before, during, and after the construction and closure period. The assessment examines traveler shifts and their effects, using a multitude of data sources of varying resolution. The complexity and sheer size of the data set requires examinations at several levels to gain the most relevant information.

The initial analysis of the region's roadways and highways is focused on facilities in four Tiers, as illustrated at right. Based on initial monthly and quarterly reports and traffic field monitoring, it was determined that limited mobility impacts were experienced along Tier 4 facilities. Tier 1, 2 and 3 facilities within the area described as Interstate 70 on the north; Interstate 44 on the south; and Route 141 on the west appeared be impacted from mobility standpoint. For each of these facilities, relevant mobility data (traffic volumes, travel times, incidents) was gathered based on availability information.

Mobility data was obtained through numerous sources:

- MoDOT provided historical traffic counts through its annual traffic count program, as well as archived traffic data from the Gateway Guide system. In addition, MoDOT forces have conducted travel-time runs on key segments of Tier 2/3/4 facilities multiple times. These field assessment runs were conducted daily during the early days of the closure to enhance and adjust the regional traffic plan to accommodate mobility shifts and reduce mobility impacts. These runs were reduced after the first 4 to 6 weeks to periodic runs to ensure optimum traffic conditions were maintained. MoDOT also maintains statistics for its park-and-ride facilities across the state, and provided quarterly count data for its facilities in the region. Finally, MoDOT has produced a series of e-mail updates (initially daily, now weekly) that provide area residents (and the study team) with important mobility information that describes changes in construction activities, peak hour traffic conditions, etc.

- Traffic.com is a commercial Web site that provides, for highways in metropolitan areas across the U.S., real-time traffic congestion, travel-time, and incident data. These data are based primarily on sensors placed throughout the area. Traffic.com archives traffic volume, travel speed, and incident data – in 1-minute intervals – and has agreed to share this information with the research team based on their original data-sharing agreement

with MoDOT. The research team has developed customized software routines to collect and process significant amounts of data for use in this report. This source of data has been valuable in this study.

- St. Louis County has conducted and provided traffic counts and travel-time studies on regional arterials periodically since the closure.
- Metro collects ridership information on MetroLink, MetroBus, Call-A-Ride, and special services, and has provided statistics. We will continue to work with the transit provider to gain as much insight as we can on the impact made by the transit in reducing construction related congestion.
- RideFinders, sponsored by Madison County Transit, is the St. Louis regional rideshare program. Rideshare data has been provided on a monthly basis.
- The research team has supplemented data collection where necessary, including travel-time runs, traffic counts, and field observations.

Pre-closure Capacity Improvements

It is important to note that regional mobility began to be affected by the new I-64 project even before the closure. Perhaps most notably, several highway/roadway capacity improvements were implemented by MoDOT and St. Louis County on parallel and complementary facilities, as listed at right.

Key Improvements to Regional Highways/Roadways

I-70 Restripe from I-170 to I-270 (add lane in each direction)

I-44 Restripe from I-270 to I-55/I-70 (add lane in each direction)

I-270 Restripe from I-64 to Olive (add lane in each direction)

I-270/I-64 Restripe interchange ramps to improve traffic flow (Revised during 2008)

I-270/I-44 Restripe interchange ramps to improve traffic flow

Clayton Road Restripe from Mason Road to Lindbergh Blvd; upgrade various traffic signals; new traffic signals at Topping Road and Bopp Road

Ladue Road Upgrade various traffic signals; various new left/right-turn lanes; new traffic signals at Graeser Road/VVarson Road

Improved Signal Timing along Page Avenue, Olive Boulevard, Manchester Road, Lindbergh Boulevard, Clayton Road, Brentwood Boulevard, Hanley Road, Big Bend Boulevard, Kingshighway Boulevard, Grand Boulevard, and Forest Park Parkway

In addition to capacity improvements, temporary access management measures were also taken to increase traffic flow at or near key signalized intersections. Cross access (including left turns to and from key arterials) was prohibited to improve traffic flow, especially during the peak hours. Dynamic message boards were also used to inform drivers to utilize through traffic lanes in cases where the through lanes would merge downstream of an intersection.

Crash reconstruction sites were located and marked along interstate facilities to assist in traffic incident management activities. These sites provided a safe location for police to work non-injury crashes while maintaining freeway traffic-handling capacities.

In addition, Metro improved its transit system capacity in anticipation of the closure by increasing service frequency and adding new routes. Special funds were provided through the construction projects to allow Metro to conduct a regional marketing effort to encourage a shift towards transit as a transportation option.

Traffic Volumes

A key task included as part of this research project was the development of a series of systems to automate the collection, processing, and display of the enormous stream of available data. The graphics included in this section of the report were created using these systems. The research team developed a Macro using an Excel spreadsheet, and later using an SQL database application, to search the Traffic.Com and Gateway Guide traffic databases for specific traffic-related data for each highway segment of interest.

Prior to the closure, in baseline 2006, I-64 carried approximately 170,000 vehicles per day (vpd) on a typical weekday – this is Annual Average Daily Traffic, or AADT (excluding "outlier" days). In January-February of 2007, one year before the closure, this section of I-64 carried approximately 143,000 vpd on a typical weekday. This initial shift was potentially or partially caused by the anticipation of the construction along I-64 and travelers finding an early alternate route. One hundred (100) percent of this traffic was necessarily displaced (temporally and/or spatially) as a result of the closure.

One primary question of interest is, "where did all the traffic go?" Several sources have been used to determine the most appropriate answer to this question - including before/after volumes (from MoDOT, Traffic.com, and St. Louis County), responses to the various public surveys developed, and selected aggregated data reported by MoDOT in its frequent e-mail briefings. The project team summarized and analyzed roadway data based on the previously described "Tiered" facility approach. The following discussion highlights the trends in traffic volume, travel speeds, and travel time observed during the western closure.

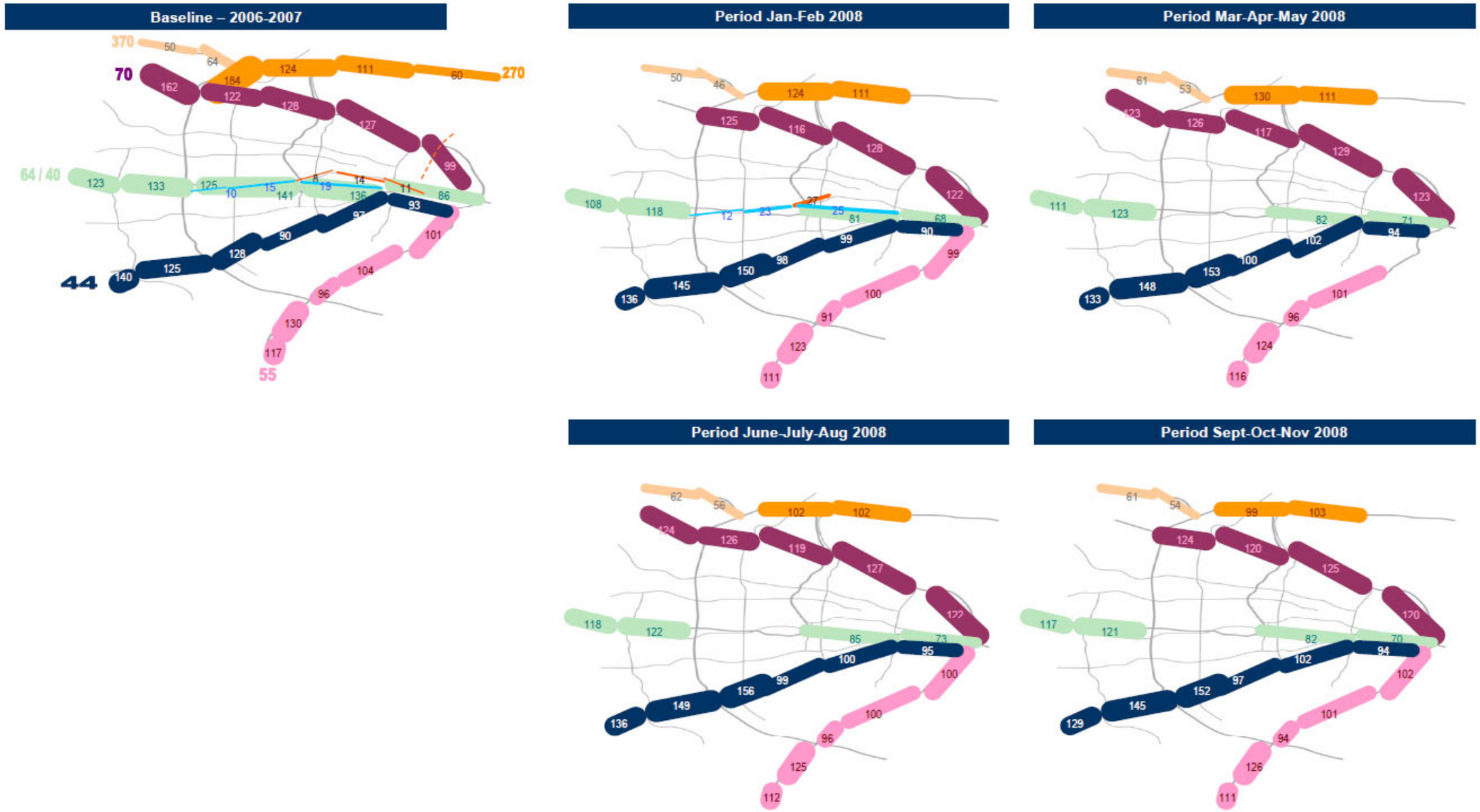
The graphs on the following pages (Figures M1 through M6) include a detailed summary of several freeway and arterial roadways. It is important to note that this summary is based on average traffic conditions for Tuesdays, Wednesdays and Thursdays excluding every holiday, weekend and "outlier" weekday (Mondays and Fridays) from the available data sets.

Based on these graphs, the following preliminary conclusions can be gleaned:

- Volumes along I-64 west of I-270 decreased by approximately 10,000 to 15,000 vehicles per day. East of I-170, traffic volumes decreased by over 50,000 vehicles. As I-64 traverses through downtown St. Louis, decreases of 10,000 to 15,000 vehicles per day were observed.
- Based on the Traffic.com data, it appears that volumes along I-70 have slightly decreased west of I-170, while slightly increasing east of Kingshighway Boulevard.
- Traffic volumes along I-270 south of I-64 have increased by 30,000 to 40,000 vehicles per day. This trend continued through the entire timeframe of the closure.
- I-44 became a key alternative east-west route with increases in traffic volumes ranging from 24,000 vehicles per day east of I-270 at Lindbergh Blvd and as high as 7,000 vehicles per day near Jefferson Ave**.**
- I-170 became a key route that connected several of the arterial roadways throughout the region. South of Page Avenue, volume increases of 20,000 to 30,000 vehicles per day were observed. Just north of I-64, volume increases of around 8,000 vpd were observed.

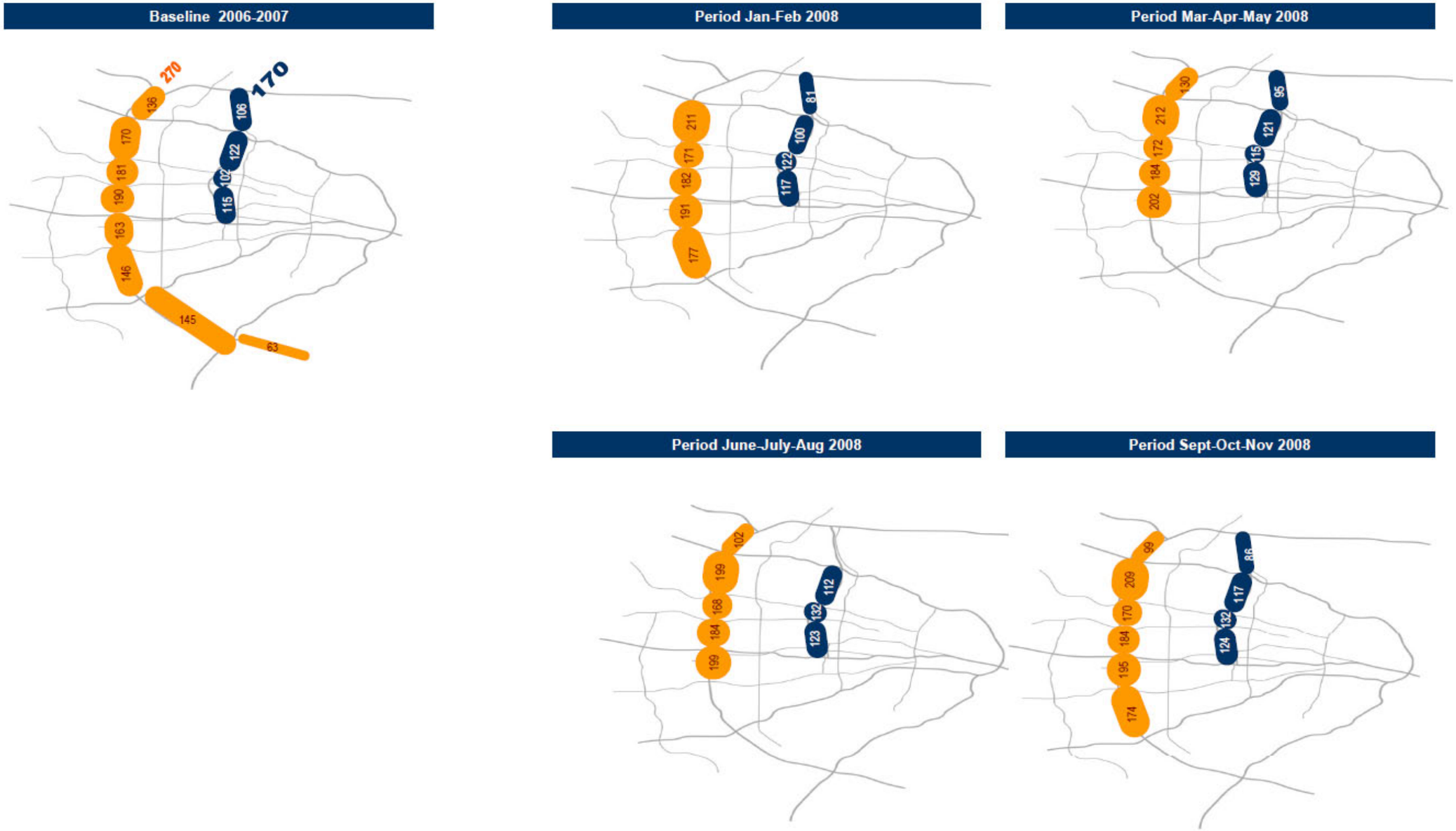
- Travel speeds dropped slightly and travel times increased (on major designated alternate routes 2 to 8%) slightly along the region's freeway network in conjunction with slight increases in traffic volumes.
- Parallel arterial routes also experienced significant increases in traffic volume and travel time. East-west arterial corridors closely located along the I-64 corridor like Clayton Road and Ladue Road, realized increases of between 10,000 and 20,000 vehicles per day.
- Forest Park Parkway experienced an increase of approximately 8,000 vehicles per day. The increase during the first few months of the eastern closure appears to be considerably higher.

(Left Blank)



Source Traffic.Com

The New I-64 Economic and Regional Mobility Study
Annual Report – 2008
Figure M1 – Summary of Traffic Flow – East/West Routes

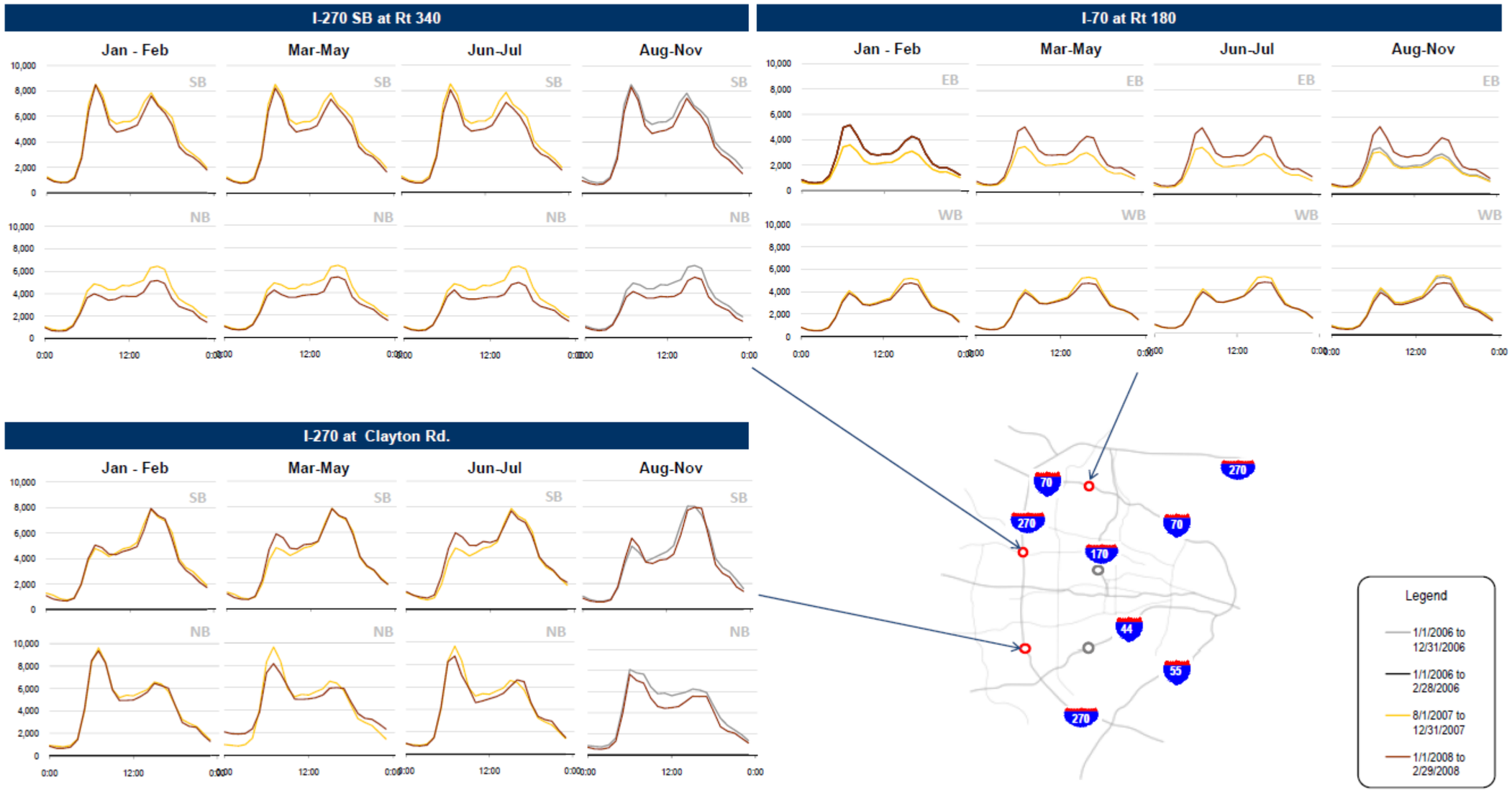


Source Traffic.Com

The New I-64 Economic and Regional Mobility Study
Annual Report – 2008
Figure M2 – Summary of Traffic Flow – North/South Routes

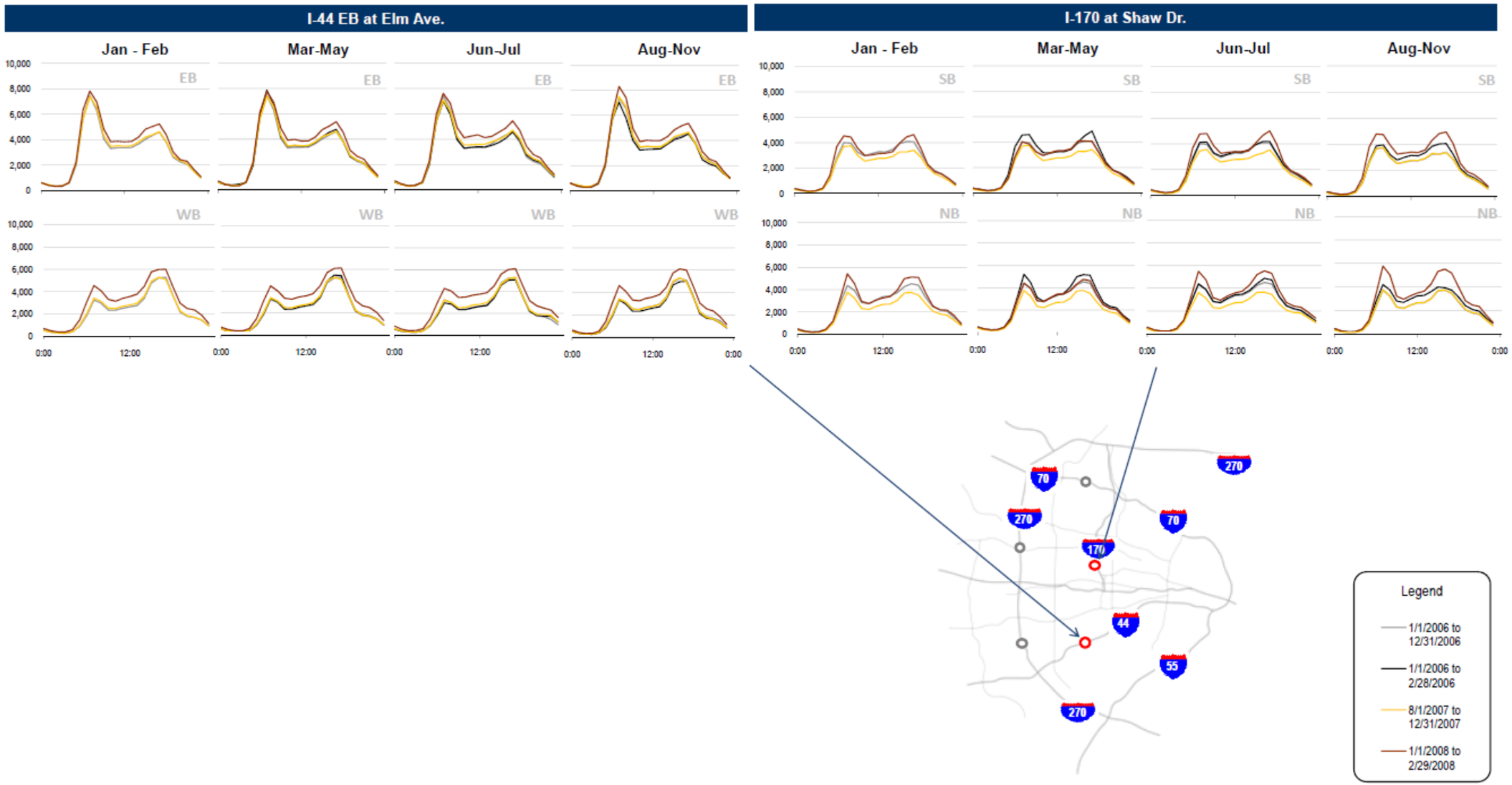
Source Traffic.Com

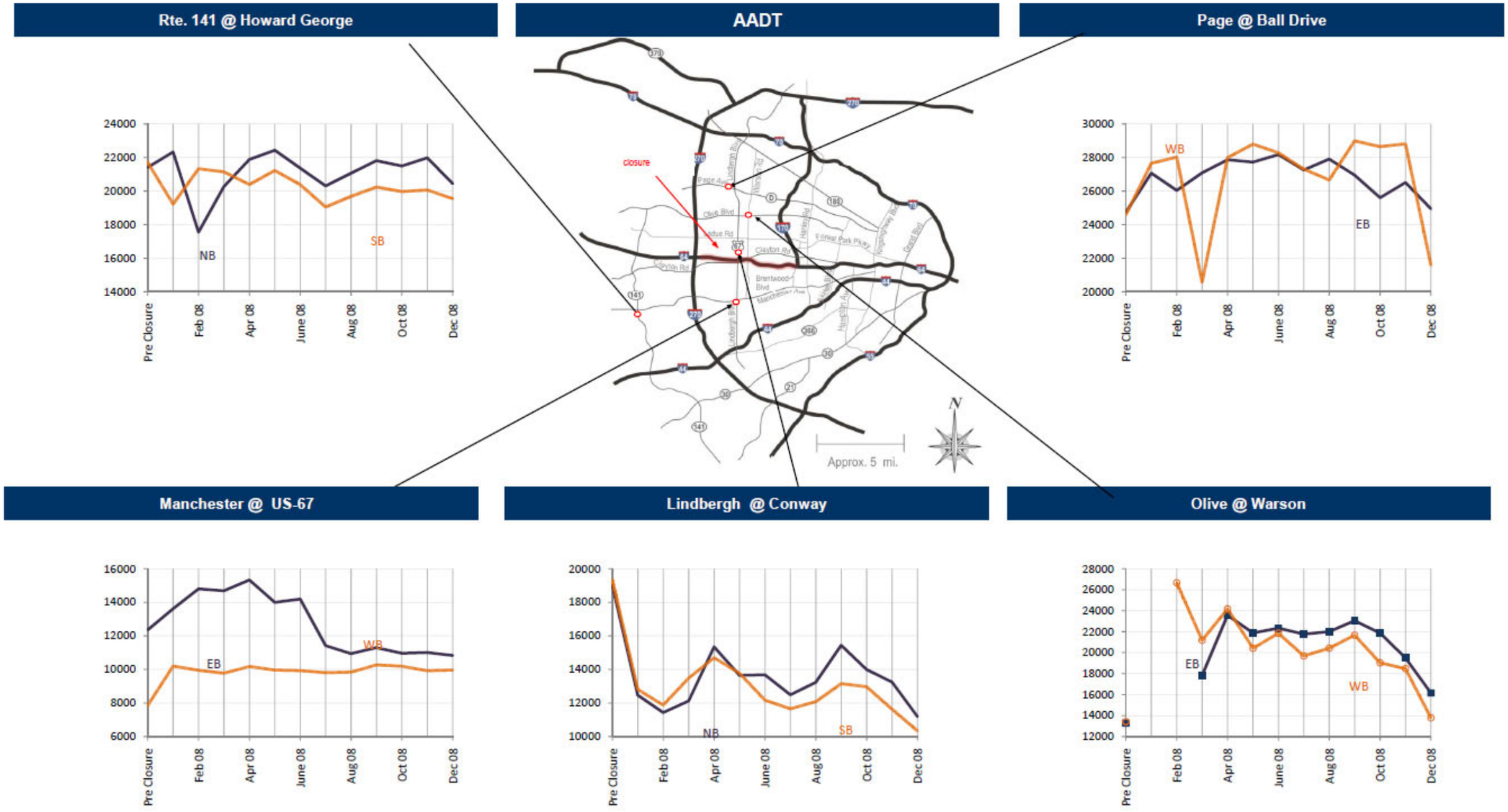
Figure M3 – Summary of Hourly Traffic Flow



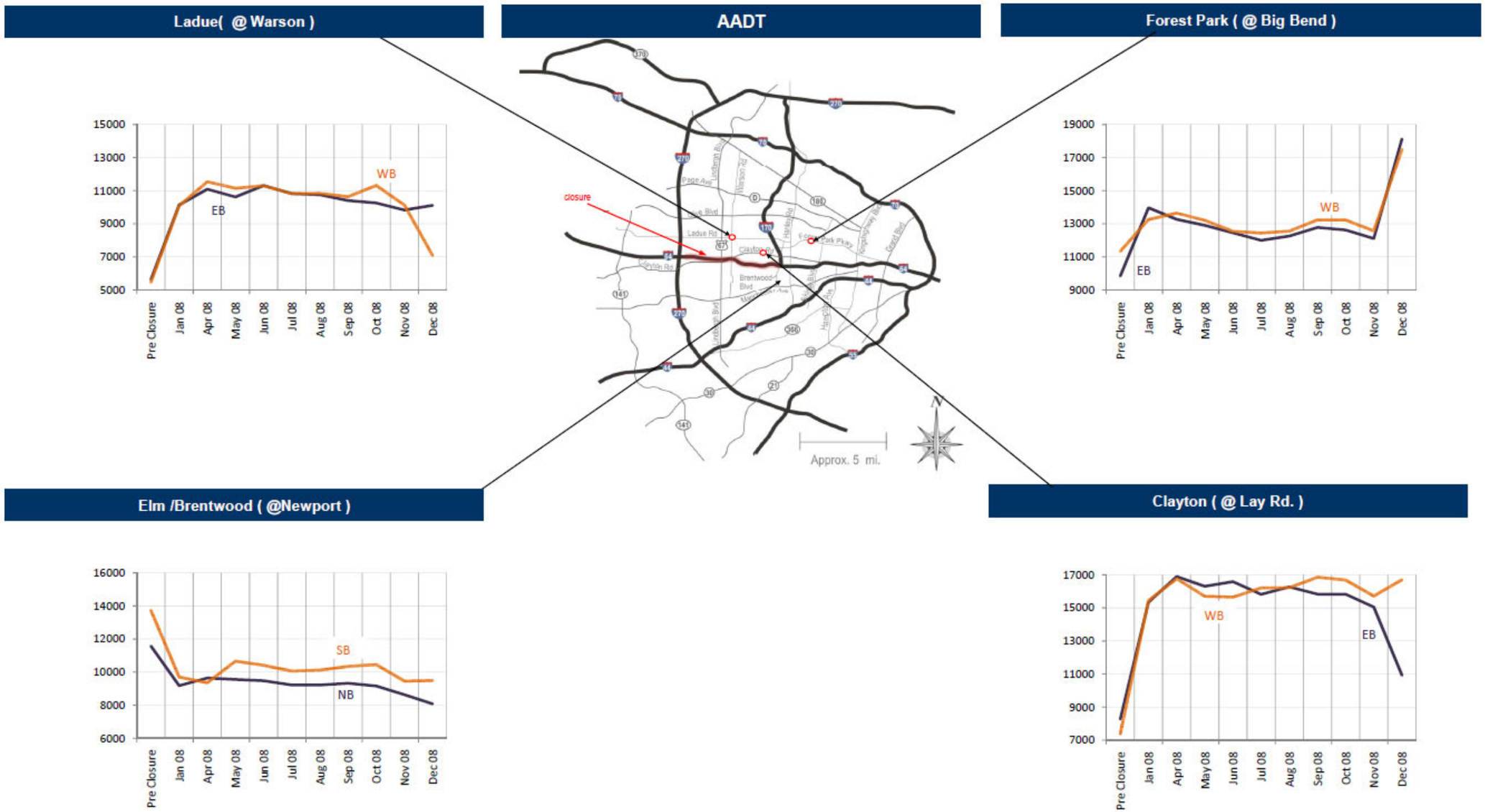
Source Traffic.Com

Figure M4 – Summary of Hourly Traffic Flow





The New I-64 Economic and Regional Mobility Study
Annual Report – 2008
Figure M5 – Summary of Arterial Average Daily Traffic Data



The New I-64 Economic and Regional Mobility Study
Annual Report – 2008
Figure M6 – Summary of Arterial Average Daily Traffic Data

Average Speeds

Average speeds were obtained from freeway detection sites (source Traffic.com) based on a one-minute resolution level. Average speed is an indication of how well traffic is flowing and can be an indicator of traffic congestion or an incident/event occurrence. For purposes of this study, average speed is also used in the determination of travel time along the freeway network. Generally, travel time performance measurement is better understood by the general public, since it is how most travelers or commuters measure their trips.

Travel speed was measured using an average daily profile. Speed at low traffic volumes will be closer to the free-flow speed or speed limit of the highway segment (an upper horizontal straight line is the typical free flow speed). Profiles dipping below this line show traffic slowing due to traffic volume increases or incidents. Figures M7 and M8 on the following pages include a detailed summary of five spot locations along I-270, I-70, I-44 and I-170. It is important to note that this summary is based on average traffic conditions for Tuesdays, Wednesdays and Thursdays excluding every holiday, weekend and "outlier" weekday (Mondays and Fridays) from the available data sets. It should also be noted that baseline 2006 data was not available along all roadways. Based on these graphs, the following preliminary conclusions can be gleaned:

- In general, drivers traveling during the peaks hours experienced a decrease in travel speed.
- Travel speeds along I-270 at Clayton Road actually increased from 2007 to 2008. The increase could be attributed to the additional striped lanes and reduced merging traffic from I-64.
- Drivers along WB I-44 experienced a decrease in travel speeds of between 10 and 13 mph. This is most likely related to traffic exiting I-44 destined to I-270 NB or SB.
- Travel speeds along I-70 generally increased, except during the first and third quarters of 2008, where slight decreases were observed.

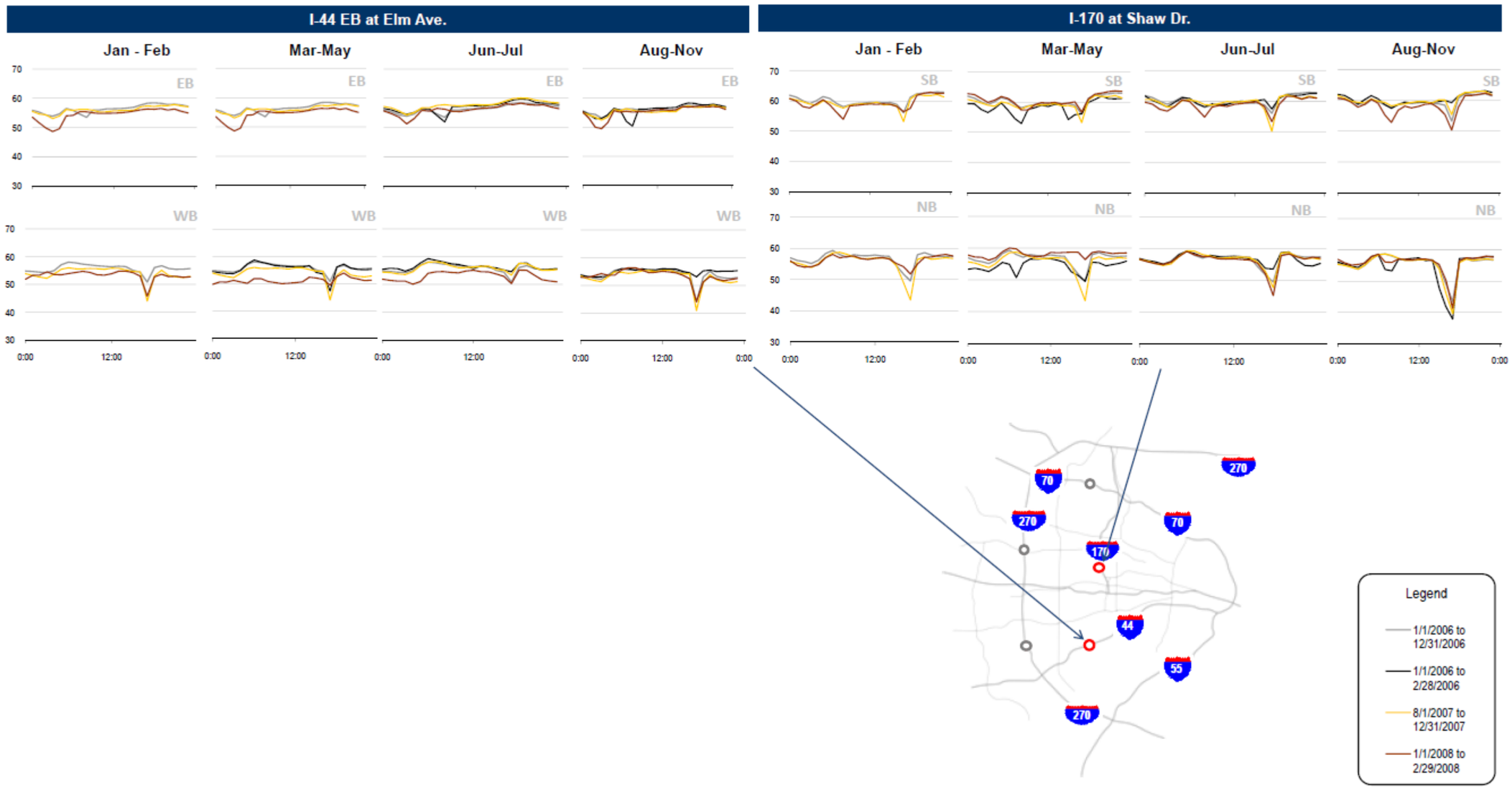
(Left Blank)

Source Traffic.Com

Figure M7 – Summary of Hourly Travel Speeds

Source Traffic.Com

Figure M8 – Summary of Hourly Travel Speeds



Travel Times

Travel times along the freeway network or Tier 1 arterials were calculated using the average travel speeds that were obtained from Traffic.com. Travel time statistics, as mentioned above, is a more understandable performance measurement, since most travelers or commuters measure their trips based on the time it takes to get from one location to the next. Travel times are measured from a known point to another known point (e.g., I-270 from I-64 to I-44 was 5 minutes during the morning peak period). Comparison of pre-construction (known as baseline), construction and post-construction periods will provide a better insight into impacts related to traveling during construction, as well as the future value gained from the constructed improvements. Table M1 depicts a summary of twelve (12) freeway segments within the potential impacted I-64 project region. The pink shaded ratios indicate an increase in travel time, while the green shaded ratios indicate a decrease in travel time compared to the based year.

AM Peak Period		Travel Time (min)					Travel Time Index			
Road Segment	Distance (mi)	8/1/2007 12/31/2007	1/1/2008 2/29/2008	3/1/2008 5/31/2008	6/1/2008 8/31/2008	9/1/2008 11/30/2008	1/1/2008 2/29/2008	3/1/2008 5/31/2008	6/1/2008 8/31/2008	9/1/2008 11/30/2008
I-70 EB from I-270 (Exit 232) to I-170 (Exit 238)	5.8	5.6	5.4	5.7	5.7	5.6	0.972	1.023	1.025	1.003
I-70 WB from I-270 (Exit 232) to I-170 (Exit 238)	6.1	6.0	5.9	5.8	5.6	5.7	0.982	0.958	0.930	0.941
I-170 NB from I-70 to I-64/US 40 (Exit 0)	7.6	8.0	7.2	7.6	7.0	7.1	0.909	0.959	0.877	0.894
I-170 SB from I-70 to I-64/US 40 (Exit 0)	7.7	8.7	7.6	8.4	8.0	9.1	0.872	0.965	0.915	1.038
I-270 NB from I-70 (Exit 20) to I-64 (Exit 12)	7.7	7.8	8.0	7.8	7.7	7.7	1.034	1.003	0.997	0.993
I-270 SB from I-70 (Exit 20) to I-64 (Exit 12)	7.6	9.3	9.2	8.8	7.9	8.6	0.996	0.944	0.853	0.923
I-270 NB from I-64 (Exit 12) to I-44 (Exit 5)	6.5	7.0	6.3	7.6	7.6	7.3	0.902	1.082	1.085	1.040
I-270 SB from I-64 (Exit 12) to I-44 (Exit 5)	6.6	7.0	10.6	6.7	6.2	6.3	1.530	0.966	0.892	0.907
I-44 EB from I-270 to Kingshighway (Exit 287)	10.5	11.5	10.9	11.2	10.8	10.9	0.949	0.979	0.939	0.952
I-44 WB from I-270 to Kingshighway (Exit 287)	10.5	11.1	12.0	12.0	11.3	11.2	1.080	1.076	1.014	1.007
I-64 EB from Rte 141 (Exit 22) to I-270 (Exit 25)	3.3	3.9	3.5	3.6	3.6	3.7	0.910	0.945	0.925	0.967
I-64 WB from Rte 141 (Exit 22) to I-270 (Exit 25)	3.3	3.0	2.9	2.9	2.9	2.9	0.950	0.963	0.962	0.962

Note: Due to bad data on I-170 in late 2007, traffic data from the same period in 2006 was used for the baseline and travel time index

PM Peak Period		Travel Time (min)					Travel Time Index			
Road Segment	Distance (mi)	8/1/2007 12/31/2007	1/1/2008 2/29/2008	3/1/2008 5/31/2008	6/1/2008 8/31/2008	9/1/2008 11/30/2008	1/1/2008 2/29/2008	3/1/2008 5/31/2008	6/1/2008 8/31/2008	9/1/2008 11/30/2008
I-70 EB from I-270 (Exit 232) to I-170 (Exit 238)	5.8	5.6	5.4	5.6	5.8	5.5	0.956	0.985	1.019	0.968
I-70 WB from I-270 (Exit 232) to I-170 (Exit 238)	6.1	6.3	5.9	5.8	5.7	5.7	0.940	0.927	0.901	0.901
I-170 NB from I-70 to I-64/US 40 (Exit 0)	7.6	8.3	7.2	7.8	7.1	7.2	0.868	0.932	0.850	0.866
I-170 SB from I-70 to I-64/US 40 (Exit 0)	7.7	7.8	7.6	7.8	7.3	7.7	0.974	0.994	0.933	0.985
I-270 NB from I-70 (Exit 20) to I-64 (Exit 12)	7.7	9.2	8.0	8.1	8.0	8.3	0.873	0.876	0.872	0.907
I-270 SB from I-70 (Exit 20) to I-64 (Exit 12)	7.6	9.8	9.2	8.9	7.8	8.8	0.947	0.916	0.800	0.903
I-270 NB from I-64 (Exit 12) to I-44 (Exit 5)	6.5	7.3	6.3	6.8	6.6	6.7	0.867	0.937	0.904	0.926
I-270 SB from I-64 (Exit 12) to I-44 (Exit 5)	6.6	12.7	10.6	10.6	9.6	9.8	0.840	0.838	0.757	0.774
I-44 EB from I-270 to Kingshighway (Exit 287)	10.5	11.5	10.9	10.8	10.5	10.7	0.949	0.940	0.917	0.930
I-44 WB from I-270 to Kingshighway (Exit 287)	10.5	12.0	12.0	11.9	11.6	12.2	0.999	0.990	0.967	1.015
I-64 EB from Rte 141 (Exit 22) to I-270 (Exit 25)	3.3	3.7	3.5	3.5	3.5	3.5	0.946	0.953	0.946	0.943
I-64 WB from Rte 141 (Exit 22) to I-270 (Exit 25)	3.3	3.7	2.9	2.9	3.0	3.0	0.788	0.790	0.806	0.807

Note: Due to bad data on I-170 in late 2007, traffic data from the same period in 2006 was used for the baseline and travel time index

Traffic.com provides a map display of traffic conditions for including information such as congestion levels, speed and travel time for any specific segment. Additionally, drivers could sign up to receive email alerts of traffic conditions for specific roadway segments at predetermined time periods. For example, “Eastbound Page between I-270 and I-170 at 7:00 AM” could designate your commute to work.

Travel time for key Tier 1 arterials were also collected and summarized. Four segments within close proximity to the closure were chosen for studying the travel-time impacts of the I-64 western closure. Email alert travel time data was collected at specific times during both the AM (7:00 or 7:30) and PM (5:00) periods. A total of 16 alerts (beginning in July 2008) were collected during a typical weekday. From travel times conducted by both agency staff and the research team before the closure, baseline travel times were developed for comparison. The segments are as follows;

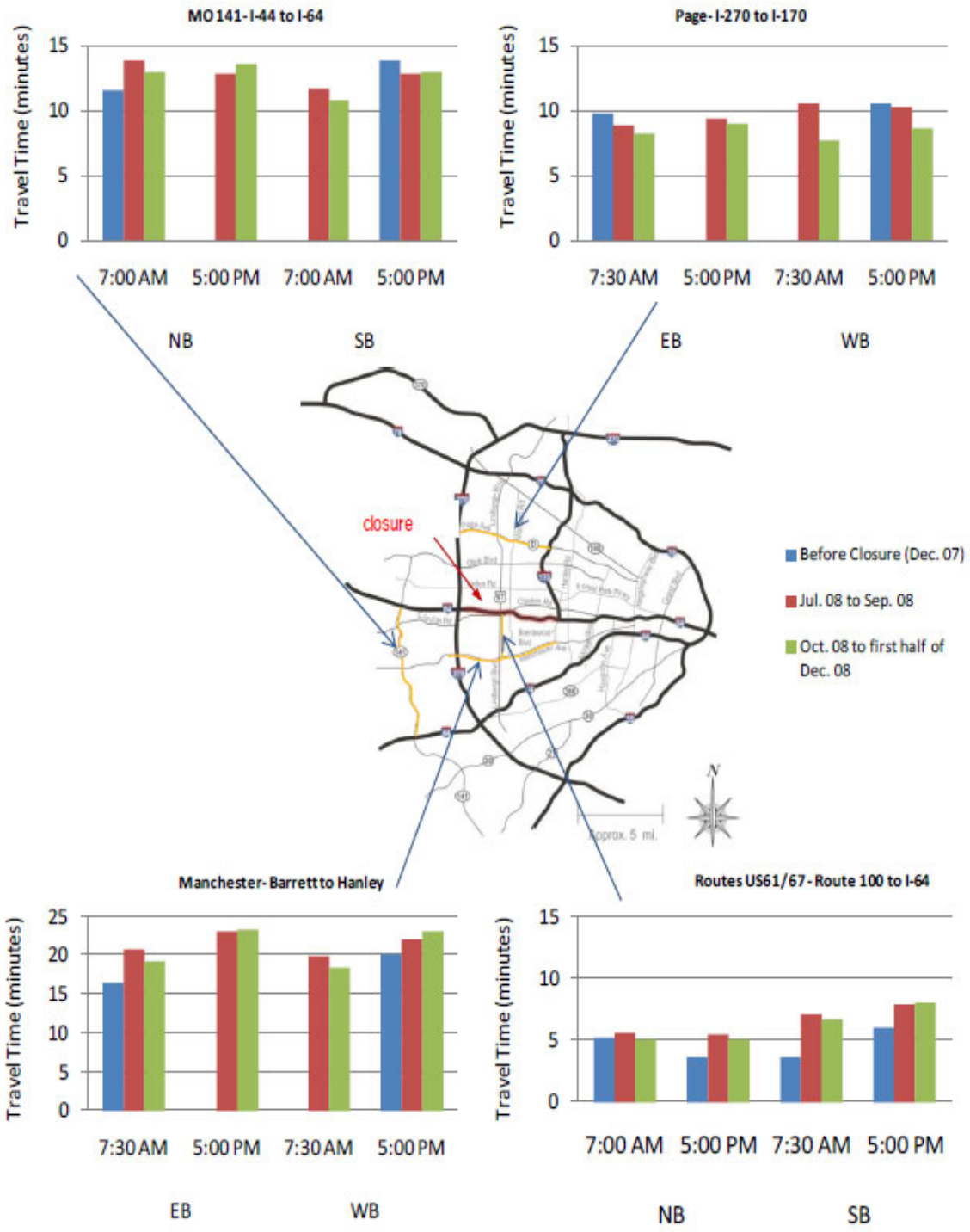
- Lindbergh Boulevard: Between Route 100 and US 40/I- 64 (2.45 miles)
- MO 141: Between US 40/I-64 and I-44 (7.5 miles)
- Page Avenue: Between I-270 and I-170 (5.5 miles)
- Manchester Road: Between Barrett Station Road and Hanley Road (7.95 miles)

To ensure the data being collected through the Traffic.com website was accurate, the team monitored Traffic.com data while project team members conducted actual travel time runs along the selected roadway segments. The observed differences were around 1 minute between the Traffic.com data sets and the observed field results that confirmed the traffic information source general reliability was acceptable.

Figure M9 depicts the average travel times for the third and fourth quarters of 2008 for the selected arterials. Since the data from Traffic.com was only available from July 2008 forward, the pre-closure data was taken from actual travel time runs obtained in December 2007. In general, travel times increased, but not significantly. Travel times along Page Avenue actually dropped. This was most likely due to the additional through lane that was added prior to the closure and the improvement signal timing implemented.

(Left Blank)

Figure M9 – Travel Time Along Selected Tier 1 Arterial Roadways



Summarizing travel time data along the remaining arterial roadway network was much more data intensive and required more manual handling than the more automated freeway network. Electronic email alerts and/or data streams from Traffic.com were not available. Project team members and several agency staff members conducted actual travel time runs along each of the primary corridors selected for analysis. Travel time data for over 25 arterial roadways was collected at various times throughout the western closure of I-64. From this data, the project team selected 10 roadways and conducted a detailed analysis of the travel time data.

One of the key considerations that must be accounted for is having a clear understanding of when the actual travel time runs were conducted. Simply stating, "during the am peak hour", does not distinguish the timeframe for an apples to apples comparison. Comparing a 6:30 am travel time run to an 8:00 am travel time run would not provide a fair assessment between a before and after comparison. Since travel times can vary by time-of-day, multiple travel-time runs were taken during each peak period. In general, three to five "before" runs were conducted in December 2007. Figures M10 and M11 depict a series of graphs highlighting the selected roadway segments. A more detailed set of graphs are also included in the appendix. Based on the travel time data, the following preliminary conclusions can be gleaned:

- Average travel times along northbound Route 141 increased slightly. The maximum travel times, however, were significantly higher than the pre-closure travel times.
- Average travel times along westbound Route 100 (Manchester) at the beginning of the PM peak hour increased rather significantly, but generally decreased during the five to six o'clock timeframe.
- Page Avenue experienced higher average travel times during the AM peak hour and similar travel times during the PM peak hour.
- Ladue Road and Clayton Road experienced higher average travel times when compared to the pre-closure. Since traffic on these **r**oadways increased significantly, this was not a surprise to the project team.
- Average travel times along the remaining corridors were generally within acceptable limits when compared to pre-closure travel times.

In general, increases in post-closure travel time runs were observed along several of the corridor. This, most likely, could be due to significant increase in traffic volumes using these facilities. These conditions could have been significantly worse if not for the planned and implemented improvements in the region's signal timing and coordination efforts to address anticipated increases in traffic volumes. It should be noted that collaboration between local and state agencies was a critical factor in maintaining acceptable traffic flow. The public appeared to notice these improvements, based on survey responses received.

The New I-64 Economic and Regional Mobility Study: Annual Report – 2008

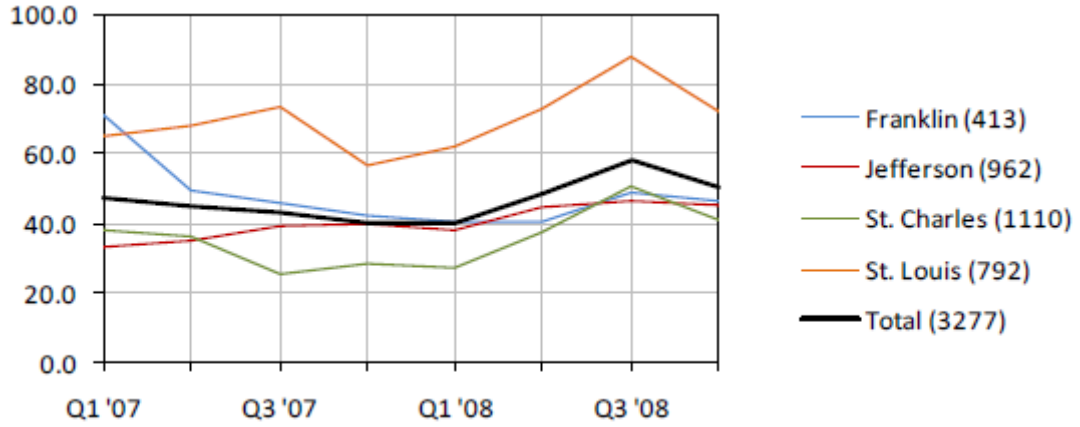
Figure M10 – Summary of Arterial Travel Time Data

The New I-64 Economic and Regional Mobility Study
Annual Report – 2008
Figure M11 – Summary of Arterial Travel Time Data

Park-and-Ride

Figure M12 below summarizes both baseline year (2007) and construction year one (2008) quarterly percentage of parking spaces used at MoDOT's Park-and-Ride lots in St. Louis County and neighboring counties. As the graph indicates (numbers in parenthesis indicate total number of available spaces), the 2nd, 3rd and 4th quarters indicated an increase in usage. This increase could be somewhat related to gas prices and/or the economic downturn in 2008. The construction and closure along I-64 may have had a limited impact on park-and-ride usage, since the 1st quarter actually showed a decrease when concerns of the closure's impact were at their peak. The research team will continue to monitor these trends to see if we can gain better insights into whether or not construction caused a shift to either more carpooling or transit services that stop at these park-and-ride facilities.

Figure M12 – Park-and-Ride Summary



Transit

The figure to the right depicts the overall change in total transit ridership since 2004. In general, transit ridership has increased over the past several years. In terms of the potential changes in transit ridership during the I-64 closure, monthly transit ridership varied significantly between 2007 and 2008. Several factors could have contributed to this increase, such as an increase in gas prices and a general downturn in the economy. Figures M13 and M14 depict quarterly and monthly percentage changes in ridership totals for both MetroBus and MetroLink. In general, MetroBus ridership increased during all four quarters, while MetroLink ridership increased during the first three quarters. Figure M15 depicts a summary of MetroBus ridership along four routes located within close proximity to I-64. In general, significant increases were observed along three of the four routes.

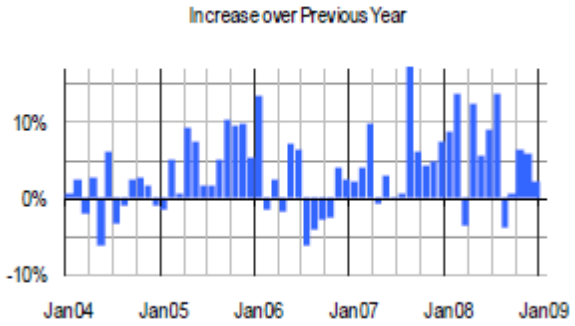


Figure M13 – Quarterly Percentage Change in Metro's Ridership 2007 vs. 2008

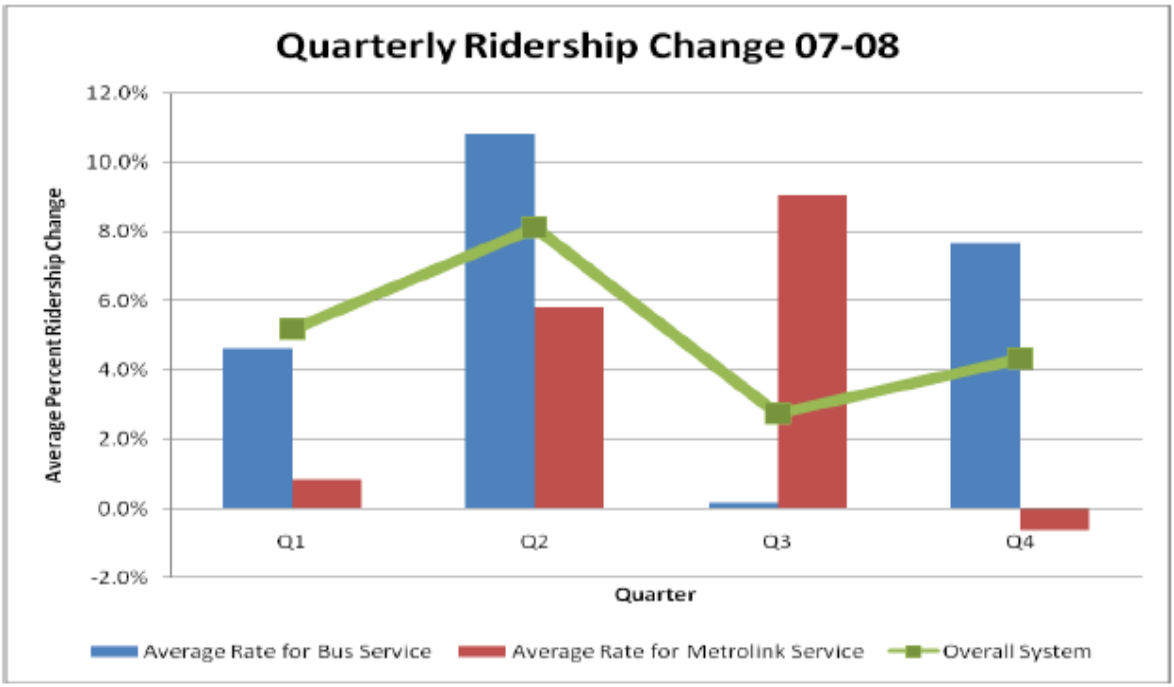


Figure M14 – Monthly Percentage Change (Year 2007 vs. 2008) Selected Metro's Routes

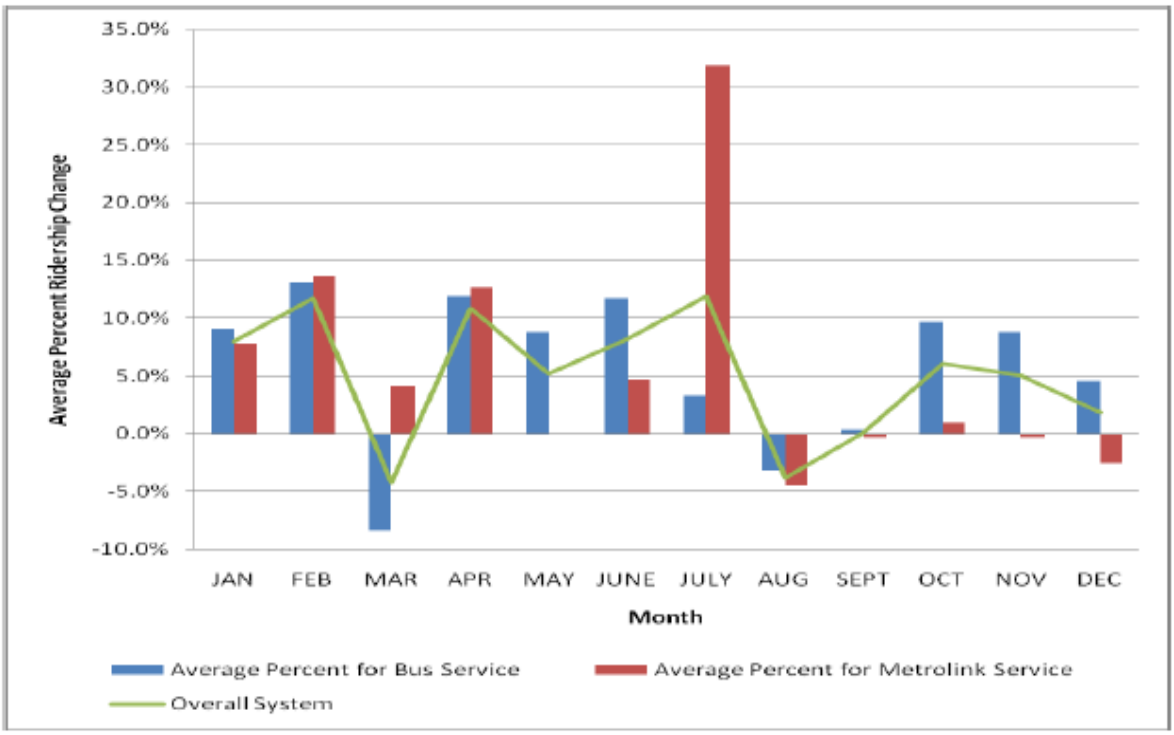
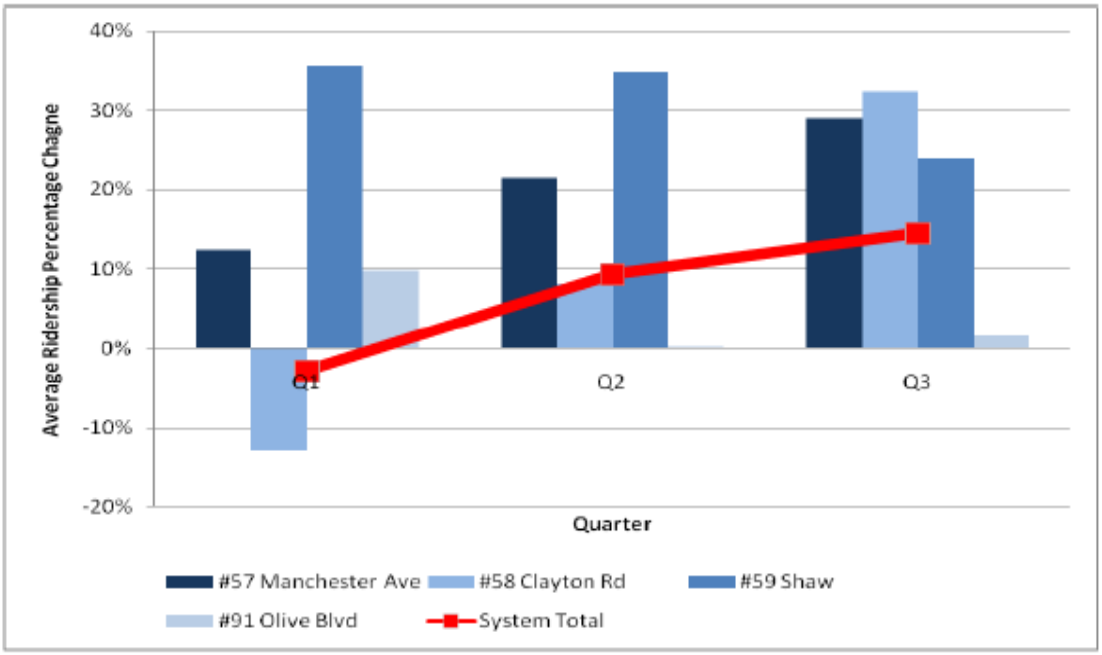


Figure M15 – Selected MetroBus Routes near I-64 Percentage Change (Year 2007 vs. 2008)



Rideshare

RideFinders, sponsored by Madison County Transit, is the St. Louis regional rideshare program. The M16 and M17 figures shown below were developed from historical ridership information from RideFinders. In general, these graphs indicate a general upward trend since the second half of 2007. This trend continued throughout most of 2008 with the highest comparative increase occurring in November 2008 (vs. 2007) with 2,587 more carpoolers (+41%) and 111 more vanpoolers (+13%). As previously mentioned, these increases could be due in part to gas prices and the economic down-turn in addition to the New I-64 construction project. The research team will continue monitor this monthly information.

Figure M16 Carpool Summary

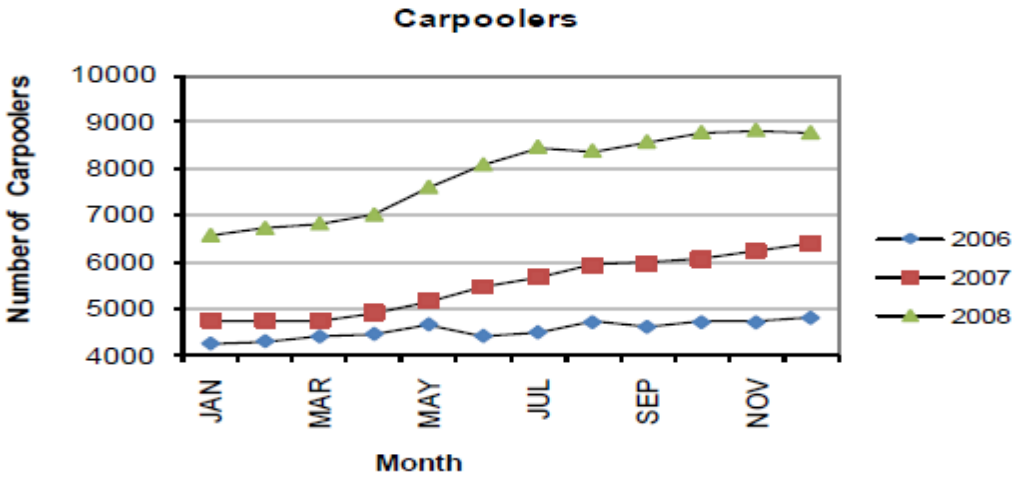
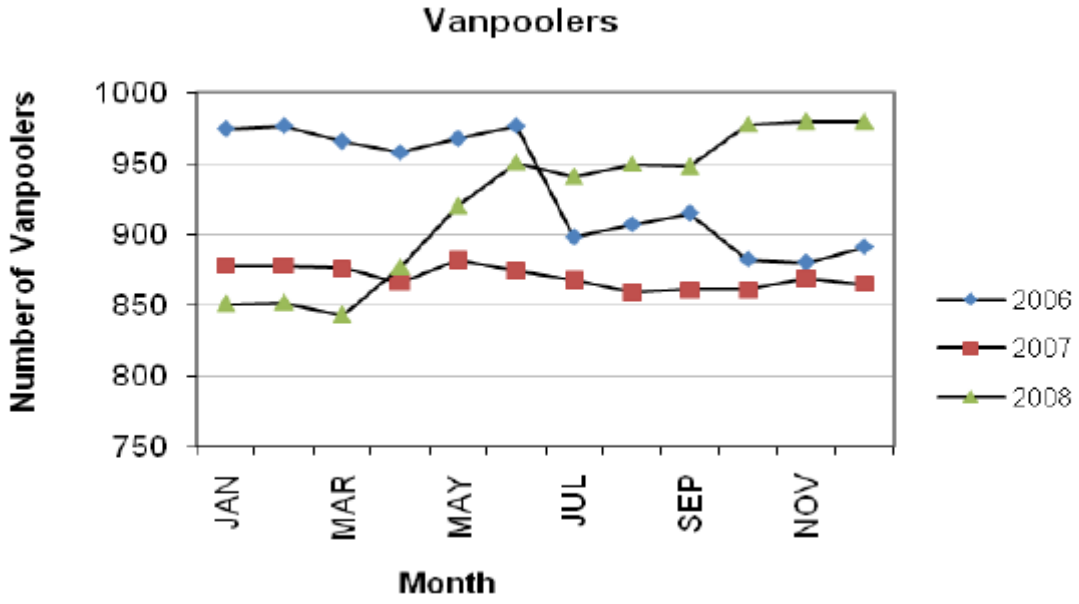


Figure M17 – Vanpooler Summary



Mobility – Crash Analysis

On January 2, 2008, the Missouri Department of Transportation (MoDOT) closed I-64 for reconstruction purposes. During the planning stages of this reconstruction project, the plan to close all lanes of roadways was met with concern from many aspects, inciting questions from traffic safety engineers and even the general public alike*: Could closing the roadway possibly contribute to more (or less) crashes than before? And, if noticeable changes existed in the number and types of crashes, are the changes due to closing the roadway or other influencing factors?*

This study aims to answer these questions by examining crash data before and after the closure, and by providing objective explanations to the changes if any. To achieve this goal, this study conducts two analyses (i.e., Crash Analysis and Crash Rate analysis). In this report, we describe basic methods applied to the analyses, the data sets acquired for the analyses, and resulting conclusions. This study is an on-going research project, and thus will be continued to extend the analyses with more crash data whenever it is available. The main findings from two analyses are summarized as follow:

Crash Analysis**:**

The research team was provided 5-year (2004-2008) crashes data that includes all accidents occurred on 16 roadways in the vicinity of the I-64 closure site. Using the data set, 1-year (i.e., 2008) post-closure crashes are compared to 4-year (2004-2007) pre-closure crashes in various ways. Table 1 and Figures 1-3 show the total number of crashes on each routes investigated. The major findings from the crash analysis are as follow:

- Compared to year 2007, the number of crashes in 2008 slightly increased in the routes such as I-70 (4%), I-44 (4%) , I-55 (5%) and MO 100 (6%) whereas the number

decreased in the routes such as I-270, I-170, MO 340, US40/I-64 and MO141. Other routes almost stayed at the level same.

- It is found that the crash increase on I-70 in 2008 was partly due to the record breaking heavy rain in 2008. This finding is confirmed by figure S-37 (Appendix page 57) showing the increasing trend of the out-of-control crashes on the same highway in 2008.
- In cases of MO100 or I-70, the increasing trend started before the I-64 closure (i.e., before 2008). So, it is hard to imply whether the I-64 closure causes the crash to increase.
- Although each route shows its own trend, the overall crashes on all three types of highways (i.e., interstate, MO, and US highways) have decreased in 2008.
- The observational inspections conducted in this study leads us to a tentative conclusion that there is no strong evidence proving that I-64 closure contributed to the crash increase on the highways that are potentially influenced by the closure. Continuation of this crash analysis through 2009 and 2010 will provide additional information that will either confirmed the tentative conclusion or provide information that changes this initial conclusion.

Table S-1 shows the trend in total crashes for the various highways identified as highways that could be potentially impacted by the I-64 construction project.

Table 1: Total Crashes by year (2004 - 2008)

	Route	2004	2005	2006	2007	2008
Interstate Highway	I-44	1,100	1,061	1,037	1,086	1,126
	I-270	2,103	2,201	2,302	2,287	2,083
	I-64	1,624	1,610	1,494	1,205	717
	I-70	1,907	1,998	2,004	2,072	2,161
	I-170	906	827	904	873	815
	I-55	964	948	963	948	994
	All IS	8,604	8,645	8,704	8,471	7,896
MO Highway	MO366	655	645	652	519	526
	MO30	1,298	1,297	1,049	1,048	941
	MO100	1,179	1,085	1,019	1,086	1,146
	MO115	455	432	382	370	385
	MO180	879	822	721	689	675
	MO340	1,068	935	1,059	1,053	998
	All MO	5,534	5,216	4,882	4,765	4,671
US highway and ExpressWay	MO141	503	566	504	589	503
	RtD	728	682	636	690	699
	US61	853	828	819	791	761
	US67	484	386	396	358	345
	US40	489	536	553	529	344
	All US	3,057	2,998	2,908	2,957	2,652
Overall		17,195	16,859	16,494	16,193	15,219

Index value provides an easy way to display and show trends or changes. An established base year can be used to compare against other years to show increases or decreases from the base year. Example – 100 crashes occurred in the base year and 90 crashes occurred in the next year – the index value would be 0.9 (90 divided by 100) or a 10 percent reduction. Year 2004 is the based year and Figure S-1 through S-3 shows the resulting index values each highway type group.

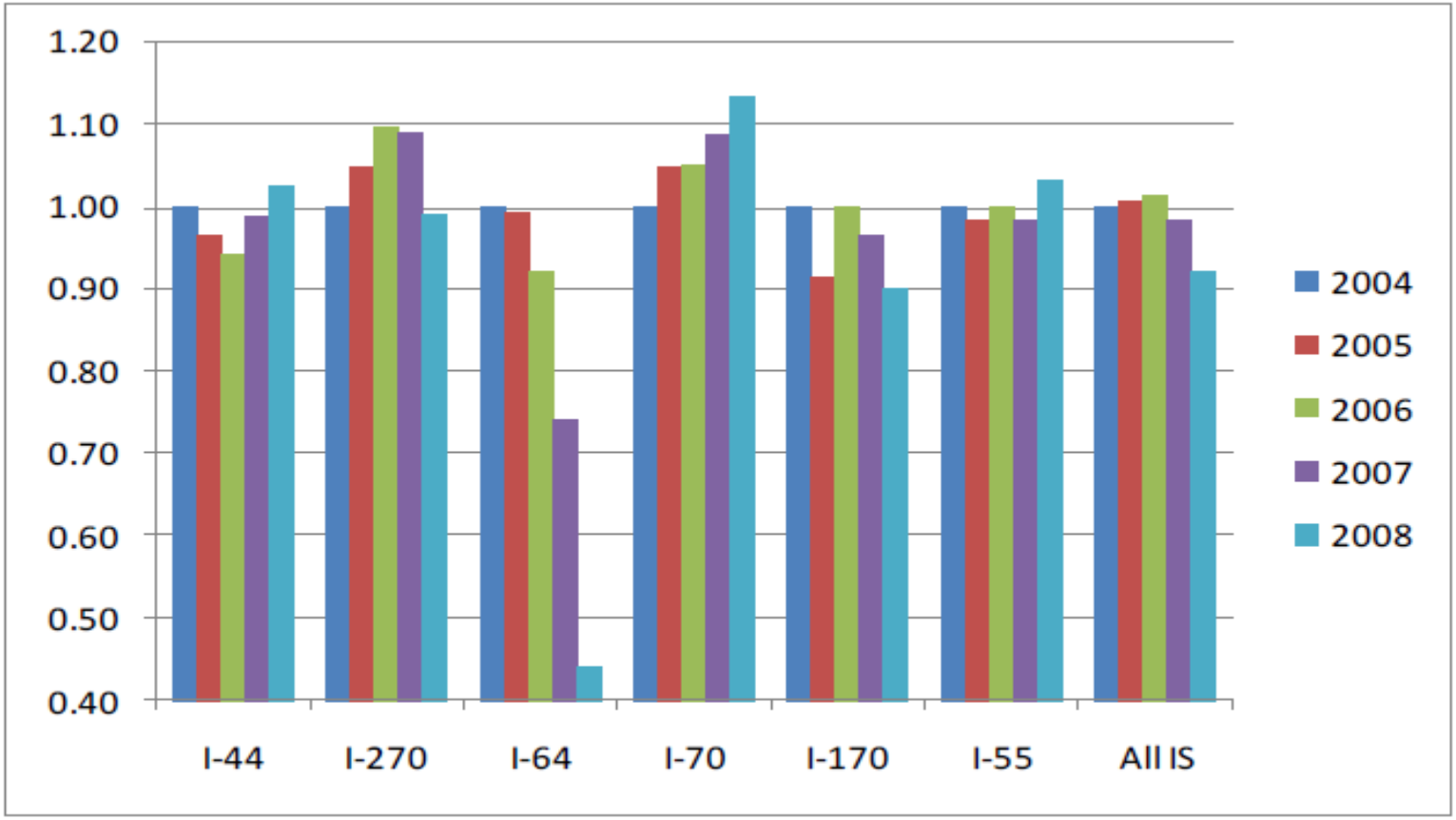


Figure 1: 5-year Crashes, Interstate Highway (2004 through 2008)

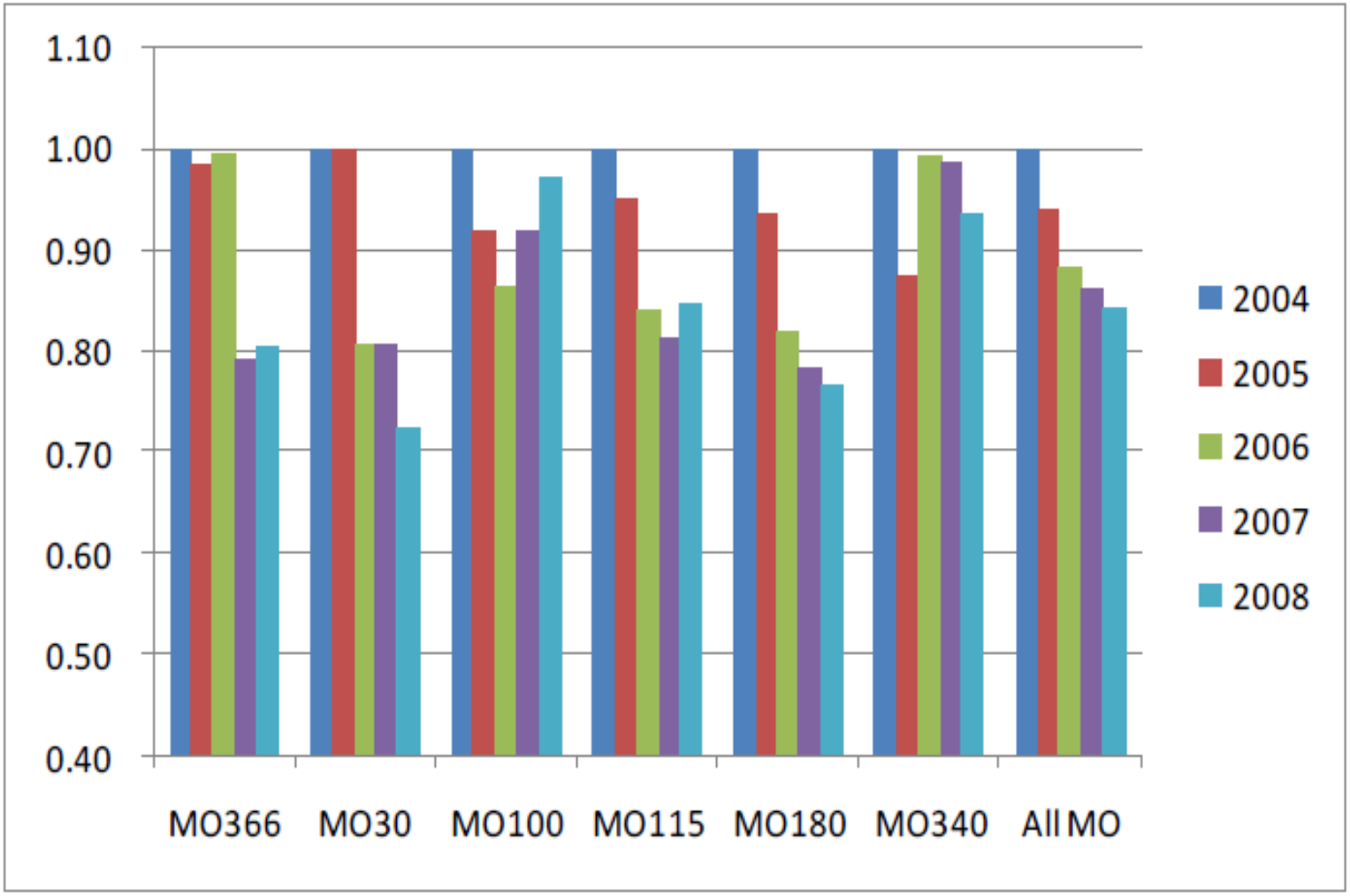


Figure 2: 5-year Crashes, MO Highway (2004 through 2008)

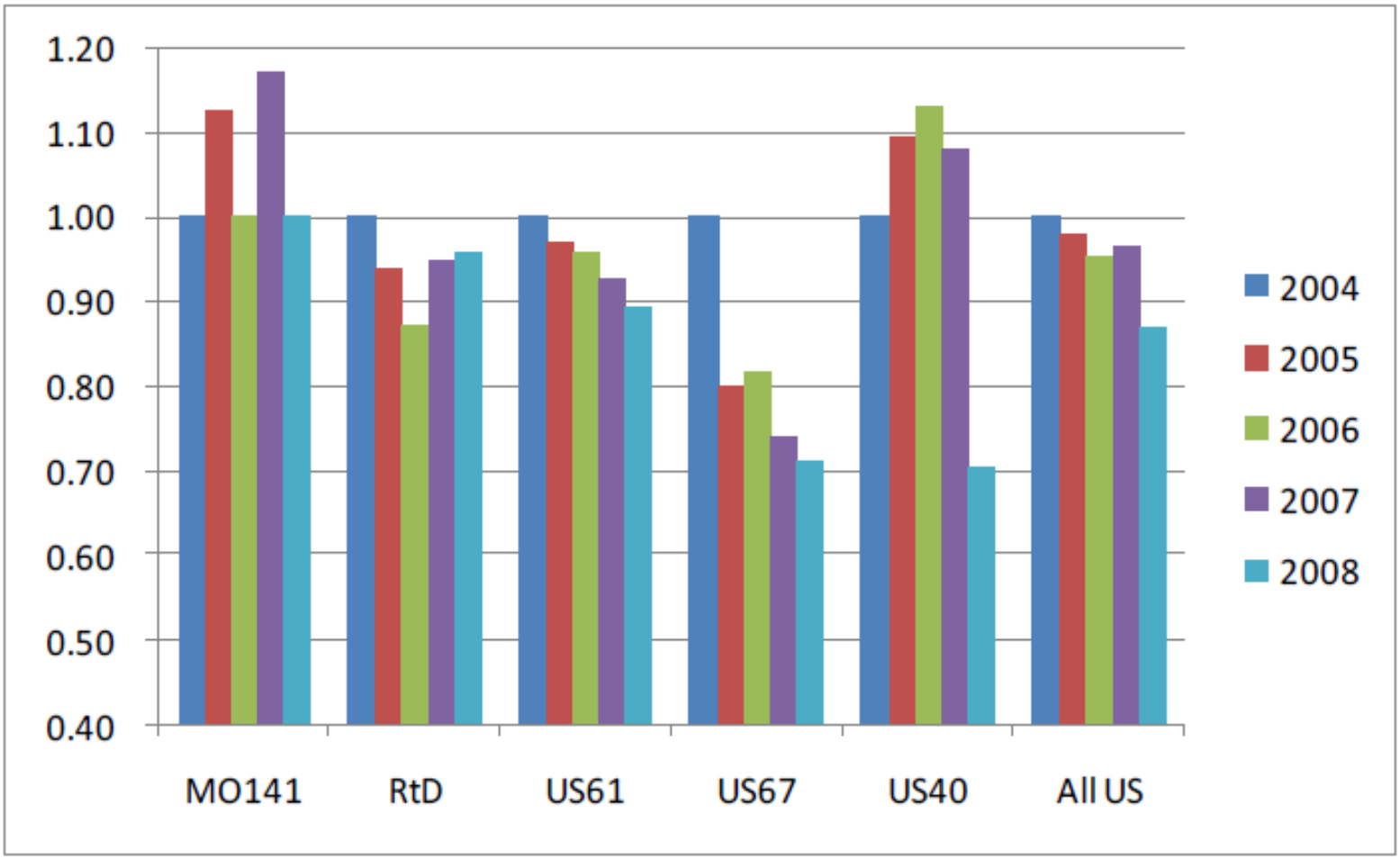


Figure 3: **5-year Crashes, US Routes and Expressways** (2004 through 2008)

Crash Rates Analysis:
The crash rate represents the intensity of crashes relative to total vehicle miles traveled. For example, if roadway A shows a higher crash rate than roadway B, it indicates that roadway A is more vulnerable to crashes than roadway B in case the traffic volume and the roadway lengths of both roadways are same (i.e., under the same condition.) Table S-2 and Figures S-4, S-5 and S-6 present the crash rates on the roadway investigated, and the major findings from the crash analysis are as follow:

- Compared to year 2007, crash rates on most routes either decrease or remain about same in 2008 except for six routes including I-70 (4%), I-55 (6%), MO 366 (4%), MO100 (8%), MO115 (6%) and MO Route D (3%).
- However, it is hard to conclude that I-64 closure caused the crash rate to increase in year 2008 since either this increasing trend started before the I-64 closure or the crash rates were less than highest crash rate over the four baseline years (2004 through 2007).
- The I-55 Southbound section showed an increase in 2008, further investigation is recommended when more crash data are available.
- US-61 shows the highest crash rates over the evaluated years, but the crash rate decreased in 2008 as compared to 2007. Since US-61 is routed over both US-40 and US-67 in the study area, some recent indications have risen that crashes might be logged to the wrong route causing a higher rate for US-61 and lesser for US-40 and US-67.

Table 2: All Crash Rate (Both Directions)

		2004	2005	2006	2007	2008
Interstate Highway	I-44	162	157	150	156	157
	I-270	154	161	165	162	155
	I-64	226	226	207	169	119
	I-70	196	205	215	218	226
	I-170	217	199	215	206	193
	I-55	153	151	143	139	147
MO Highway	MO366	392	396	406	321	335
	MO30	568	579	465	466	427
	MO100	553	521	498	530	572
	MO115	645	611	647	633	673
	MO180	461	441	444	424	425
	MO340	516	471	465	462	433
US highway and ExpressWay	MO141	350	404	353	412	359
	RtD	407	388	364	396	409
	US40	100	110	120	116	77
	US67	346	290	325	294	268
	US61	900	894	800	833	818

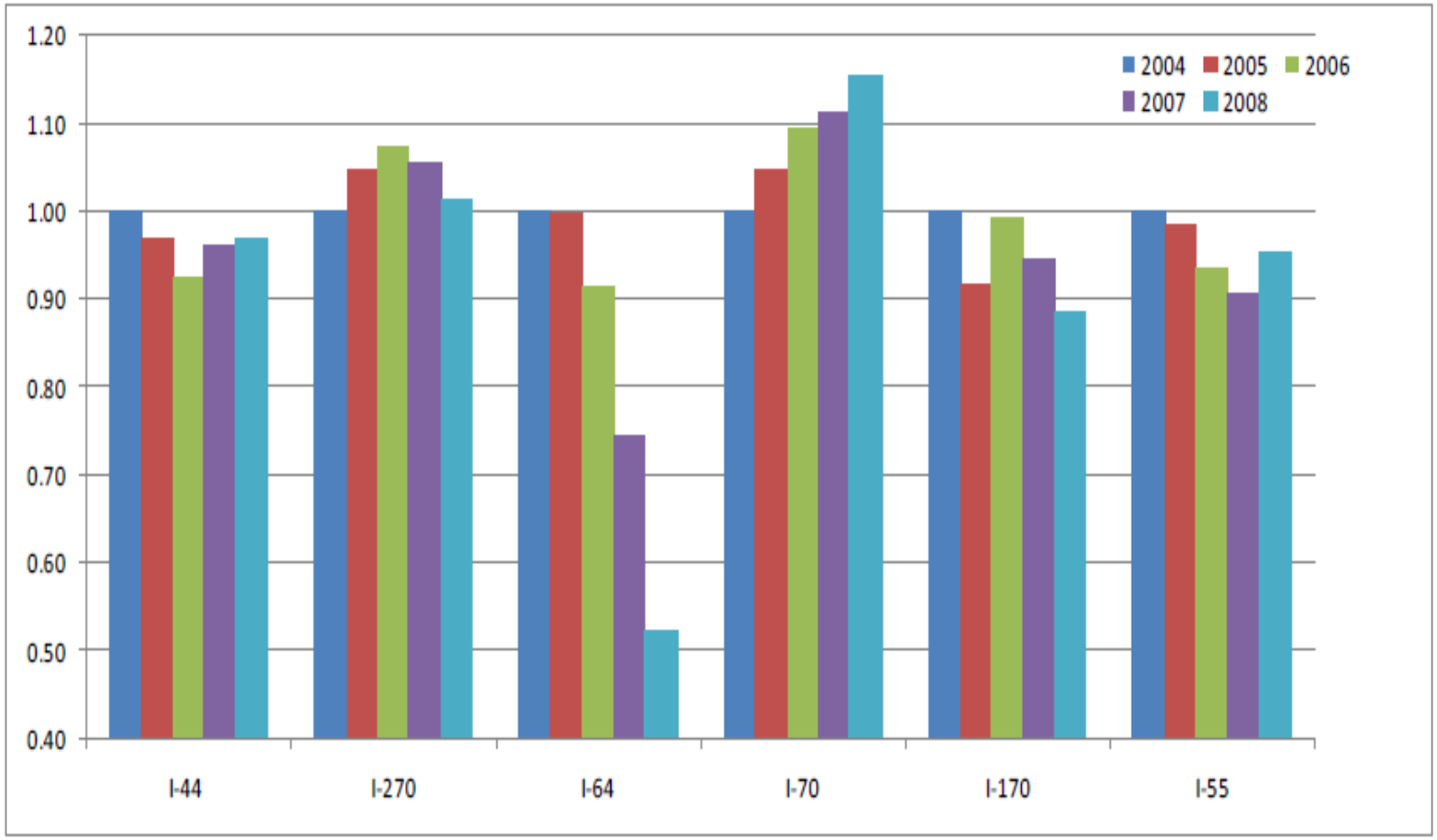


Figure 4: 5-year Relative Crash Rate, Interstate Highway (Both Directions, Base year: 2004)

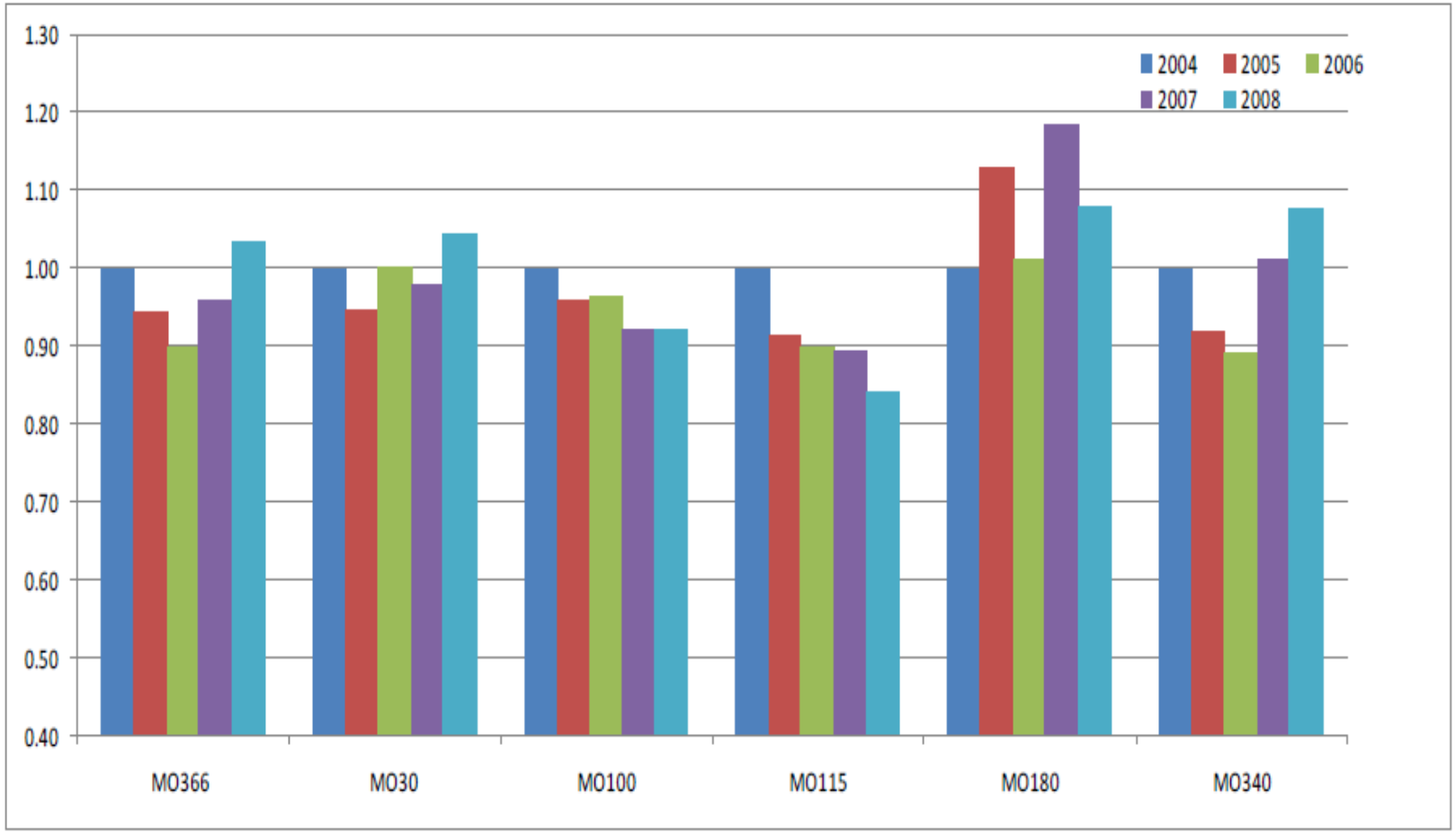


Figure 5: 5-year Relative Crash Rate, MO Highway (Both Directions, Base year: 2004)

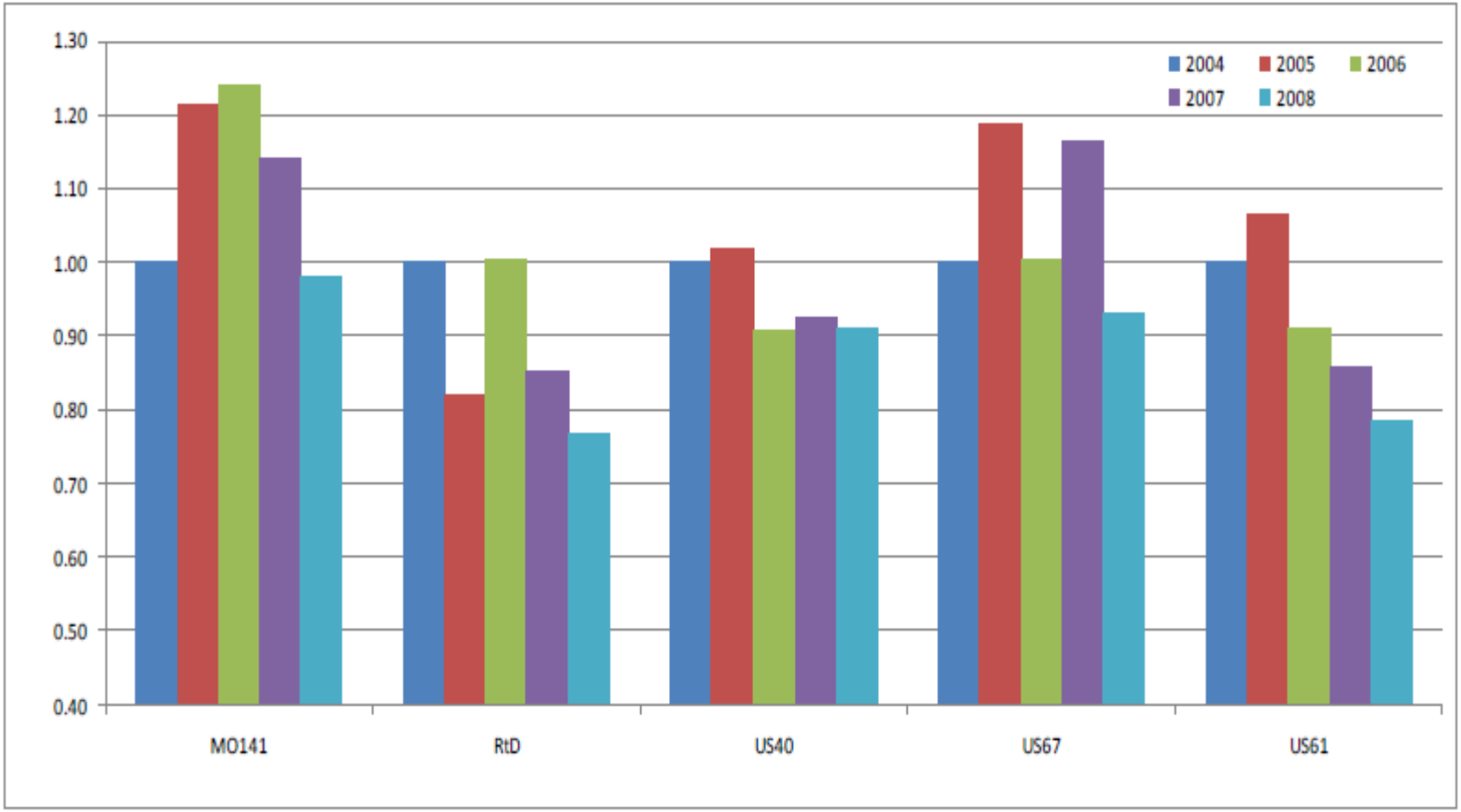


Figure 6: 5-year Relative Crash Rate, US Highway and Expressway (Both Directions, Base year: 2004)

Economics Discussion

The economic analysis of the New I-64 project evaluates and measures the impacts on the economy and regional mobility of the full closure deployment to improve the New I-64 corridor. This analysis tracks and focuses on the impacts before, during, and after the systematic closures of I-64 to determine how the closures impact the local economy, businesses, and traffic patterns. The overall objective of this analysis is to determine if the closures are disrupting local businesses due to increased congestion and possible barriers to access labor, customers, or shipments. Various methods are used to quantify and determine the magnitude of local and regional impacts.

Thus far data has been collected for the period prior to the initial construction through to the re-opening of the Western closure. This analysis assesses the economic impacts to local businesses, the real estate market, commuters, and revenues due to the closure. Beyond published data, two surveys were developed and released to local businesses periodically to track the effects of I-64's closure on (1) commuting impacts, (2) transportation costs, and (3) sales, visitation, and economic activity.

Overview of Methodology

Published Economic Data

The purpose of the published data collection is to track economic indicators over the course of the I-64 reconstruction project and establish an economic baseline of current conditions in a manner consistent with the previous MERIC Pre-Construction Analysis1. The starting point for data collection was to review the data sources from the 2006 Pre-Construction analysis, and catalogue other Federal, State, County, City, and private-sector data resources. The core economic and demographic concepts selected are: employment, labor force, population, commercial and retail real estate trends, taxable sales, and other related metrics. The main selection criteria for each data series was the frequency of publication, time lag, availability, and level of detail. The industrial and geographic detail were considered crucial as businesses will respond differently to changes in the road network based on their proximity to I-64 and the industry reliance on transportation. To gauge the impacts from I-64 reconstruction, comparisons focused on: a) time series trends (before, during, after); b) sub-county economic trends; and c) metropolitan area and U.S.-level macroeconomic conditions.

Business Surveys and Interviews

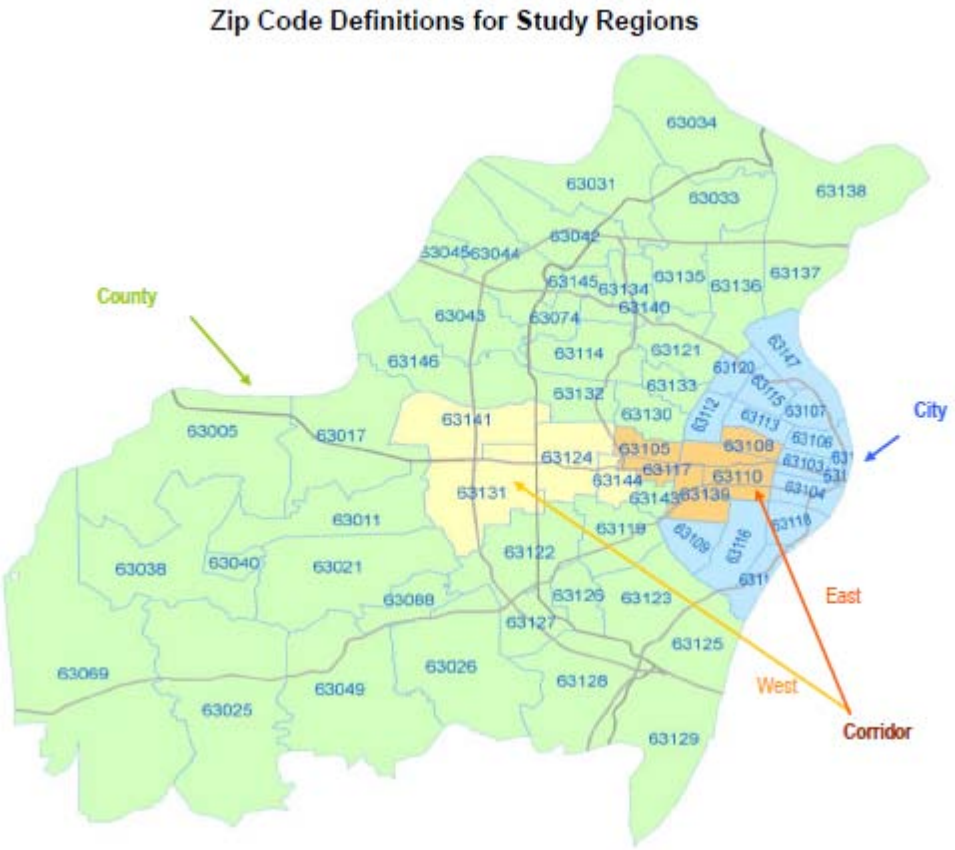
The business surveys were conducted to specifically target the business climate and economic conditions. The surveys were distributed, with the help of local business associations, to businesses within St. Louis City and County. The first survey's questions were directed at conditions just prior to the initial closure of the western portion of I-64, as well as the changes following the closure. The three main areas the survey focused on are related to: 1) Transportation Costs, 2) Sales and Visitation, and 3) Commuting Impacts. Certain questions also pertained to the level of satisfaction with alternative routes and MoDOT's delivery of the I-64 project. The second business survey was released shortly before the transition from the Western to Eastern closure. The second business survey's questions were similar to those of the first survey to track changes in business behavior, satisfaction, commuting, and overall costs.

[1] "Interstate 64 Business Climate Report Pre-Construction Analysis" April 2006

As a supplement to the business survey, HDR conducted follow-up, in-depth interviews with transportation-dependent businesses in and near the I-64 corridor. During the interview process 12 separate businesses from varying industries were interviewed via telephone to determine how: businesses prepared for the closure, commuters were impacted, transportation costs were affected, if new policies were implemented, and if outreach with employees, clients, and patients was successful. Different industry groups were targeted, to gauge how similar industries are being impacted, which are more susceptible, and the steps businesses are taking to cope with the closure.

Economic Data Indicators

The economic data collected and reported through this study was designed to be consistent with the "Interstate 64 Business Climate Report: Pre-Construction Analysis" (2006). Given the nature of the project and the required level of detail, the research team employed a "bottom up" analysis approach using detailed ZIP-code-level data for the I-64 corridor. The map below illustrates the ZIP code definitions for each region, including those composing the I-64 Corridor. The published economic data collected covers: jobs, wages, number of establishments, and taxable sales by industry type. Real estate, household, and other demographic information are being collected in addition to the industry based data to capture the total impacts to the region. Throughout this report, the terms "corridor" and "non-corridor" will be used to describe aggregations of the data. "Corridor" refers to the regions labeled "East" and "West" below, while "non-corridor" refers to the balance of the map below, labeled "County" and "City".



Data Concepts and Sources

Employment, Wages, and Establishment Statistics

The "Quarterly Census of Employment and Wages" (QCEW) dataset is compiled by MERIC covering employment, wages, and the number of establishments by industry. It is publicly available at the county level. Specific to this evaluation study and the need to track sub-county corridor-level conditions, the research team has reached an agreement with MERIC to create custom tabulations of the QCEW at the zip-code level for the two-digit NAICS industries. The standard QCEW has few data suppressions at both the City and County level. The most recent release for both St. Louis County and St. Louis City is the Fourth Quarter of 2008. Although the economic data is published on a quarterly basis, there is a lag of at least 3 months from collection and processing to its official release.

Unemployment Rate, Labor Force

MERIC's Local Area Unemployment Statistics (LAUS) covers labor force and subsequent unemployment rates for each county, city, and MSA within the state. These estimates are derived from historical data, the CES program, and the Unemployment Insurance System (UI). The data is reported monthly for all geographical areas (excluding ZIP code level) typically on a 3-month lag. The last reported month was March 2009. The LAUS dataset is preferred to National data sources, as MERIC reports this information directly to the Bureau of Labor Statistics (BLS) for their unemployment estimates.

Population

The population estimates program by the U.S. Census Bureau publishes demographic data for the nation, state, cities, and towns. Estimates for the total population are available for both the City and County up to 2008; these estimates were released in 2008. The reference date for all census estimates is always July 1st. Census population data and estimates are the most commonly cited and available demographic data for the US. With each new July 1st release, the Census Bureau revises previous historical estimates. The population data to date has been collected, and will be reported periodically.

Taxable Sales

Missouri Department of Revenue (MoDOR) reports Quarterly Taxable Sales by ZIP code (currently available up to and including the fourth quarter of 2008) which is used to track consumer/retail spending and overall economic activity at a detailed geographic level. The Taxable Sales by City dataset also separates taxable sales for each individual industry via the Standard Industrial Codes (SIC) at the two-digit level. Since 1997, most have adopted the North American Industrial Classification System (NAICS) classifications for reporting business related economic data, which presented a minor challenge as MoDOR's data is still tabulated using the older SIC classifications. Comparing the taxable sales data by ZIP code with the geographic detail allows an examination of the direct sales impacts on the I-64 Corridor.

Real Estate

The "I-64 Business Climate Report: Pre-Construction Analysis" used a custom tabulation provided by the Torto Wheaton Research Group (TWR). TWR data included annual estimates for industrial building gross rental asking price, availability, net absorption, and stock for St. Louis City, St. Louis County, and the I-64 Corridor. The TWR data is a fee-based service that HDR is currently acquiring. Alternative and supplemental data sources were sought out prior to

acquiring the TWR dataset. For commercial and office real estate data at the Metro level, the research team referenced quarterly reports from CB Richard Ellis. On the residential side, the National Association of Homebuilders (NAHB) reports the volume of building permits for single and multi-family units both at the region and nation.

Data Trends – Baseline and Current Conditions

The collection and synthesis of the published economic data was performed primarily to be consistent with the previous "Pre-Construction" report of the I-64 region. The economic concepts were collected and tracked since the "Pre-Construction" analysis through the Western closure to create a baseline of conditions before the closure throughout the project to completion. Since the data is available at the ZIP code geographic level, these results can be compared at the corridor level, like the business surveys. Table 1 shows the major economic concepts for 2008 and Table 1a shows the same indicators for 2007. In terms of employment, both the corridor and non-corridor regions saw a decline in jobs for the third quarter of 2008; however, this dip in employment is consistent with historical trends. The table also shows a decline in employment for the non-corridor region and a rise in taxable sales for each region. Looming large in any analysis of economic trends in 2008 is the economic slowdown as the nation officially began its current recession in December 2007, according to the National Bureau of Economic Research.

Table 1: Major Economic Data Concepts – 2008

	1st Quarter 2008		2nd Quarter 2008		3rd Quarter 2008		4th Quarter 2008	
	Corridor	Non-Corridor	Corridor	Non-Corridor	Corridor	Non-Corridor	Corridor	Non-Corridor
Jobs	200,772	616,400	201,577	631,271	200,533	627,295	202,055	619,160
Number of Establishments	9,232	31,155	9,197	31,131	9,178	31,256	9,185	31,134
Wages ($ Millions)	$ 2,705	$ 7,413	$ 2,555	$ 7,193	$ 2,453	$ 7,028	$ 2,727	$ 8,950
Total Taxable Sales ($ Millions)	$ 833	$ 3,977	$ 914	$ 4,226	$ 888	$ 4,096	$ 941	$ 4,152

Table 2a: Major Economic Data Concepts – 2007

	1st Quarter 2007		2nd Quarter 2007		3rd Quarter 2007		4th Quarter 2007	
	Corridor	Non-Corridor	Corridor	Non-Corridor	Corridor	Non-Corridor	Corridor	Non-Corridor
Jobs	197,088	622,930	201,778	636,941	201,242	628,136	205,271	632,136
Number of Establishments	9,465	31,362	9,482	31,426	9,405	31,445	9,333	31,318
Wages ($ Millions)	$ 2,521	$ 7,225	$ 2,385	$ 7,055	$ 2,471	$ 6,754	$ 2,785	$ 7,541
Total Taxable Sales ($ Millions	$ 891	$ 4,028	$ 950	$ 4,315	$ 928	$ 4,168	$ 1,016	$ 4,420

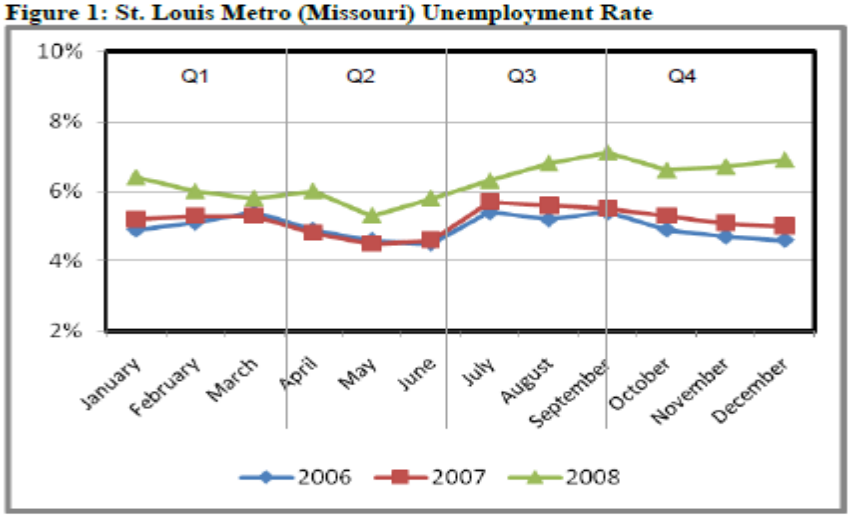
Sources: QCEW and MO Department of Revenue

Employment

As of fourth quarter 2008, the total employment for the study area was 821,215 of which 25 percent are concentrated in the corridor region. Traditionally, employment trends for the region show rise in employment in the second quarter, a small contraction in the 3rd quarter, and a rebound in the fourth quarter. Throughout 2008, employment levels followed the overall seasonal trends with the exception of the fourth quarter. Despite growth in employment in the corridor region, the losses in the non-corridor region resulted in a 0.8 percent decline in overall employment.

Figure E-1 shows the monthly unemployment trends for the St. Louis, MO metro for 2006 through 2008. The seasonal unemployment trends hold for each year; however, after June of 2007 the unemployment rates are greater compared to the previous year. This steady rise in unemployment has been consistent with national unemployment trends.

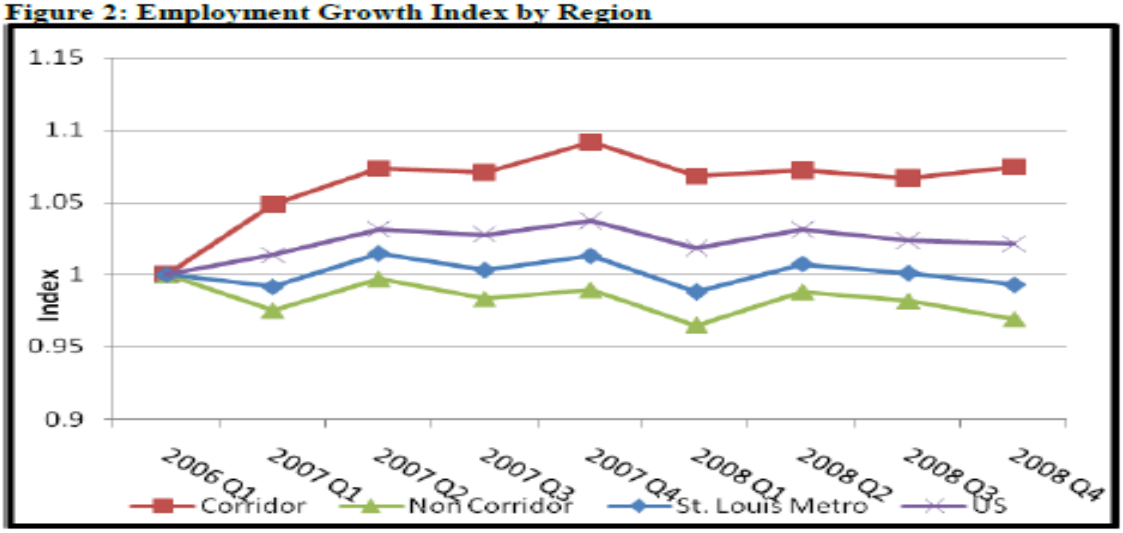
Figure 1: St. Louis Metro (Missouri) Unemployment Rate



Source: MERIC LAUS

The overall employment growth for the St. Louis region shows a similar trend to the unemployment rate, as seen in the employment growth index (Figure E-2). The growth index demonstrates the change in employment from the first quarter of 2006 that serves as the baseline indicator (greater than 1 shows increase and less than 1 show decrease). The graph depicts positive growth from first quarter of 2007 through the fourth quarter of 2007 for the corridor and non-corridor regions. Employment growth declined in the first quarter of 2008 for the corridor and growth for the non-corridor fell below 2006 levels. Although the corridor region maintains a steady positive growth, it is only 25% of the total employment for the region, and therefore the effects of the non-corridor's decline displace the marginal gains in the corridor region.

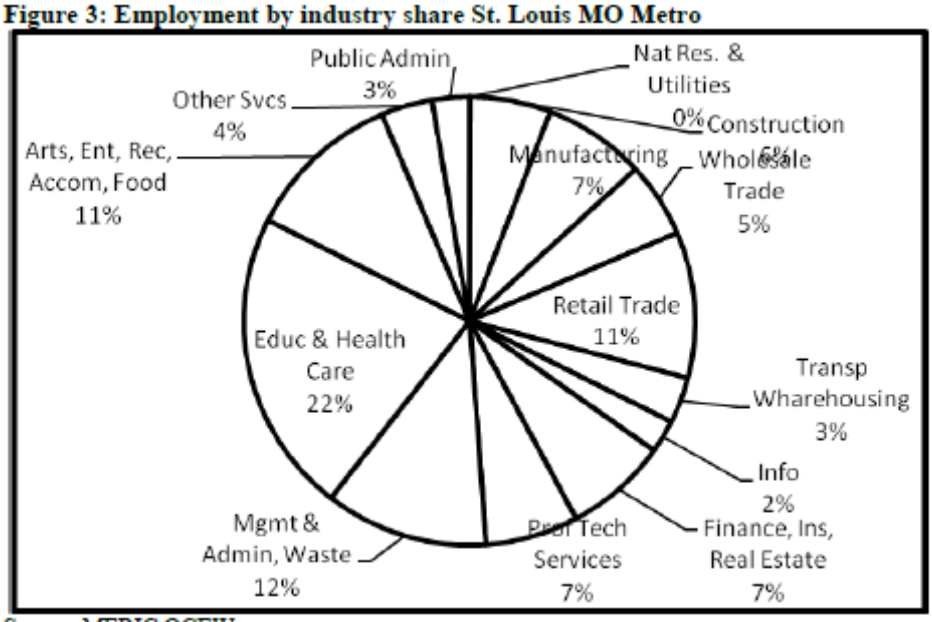
Figure 2: Employment Growth Index by Region



Source: MERIC QCEW

Figure E-3 shows the share of employment by industry for the entire region, where the majority of jobs are in education and health care; management and administration; arts, accommodation and recreation; and retail. The corridor region has a heavy concentration in business institutions (i.e. finance and real estate), which surprisingly showed very stable growth throughout 2007 until fourth quarter 2008, where finance and real estate employment declined by 2 percent. In addition, the high percentage of health care within the corridor is unique as its services are generally critical for residents and have limited or no substitutes. The high concentration of hospitals and health care establishments in the corridor, and the unique nature of the health care services contribute to maintaining positive employment growth in the corridor[2].

Figure 3: Employment by industry share St. Louis MO Metro



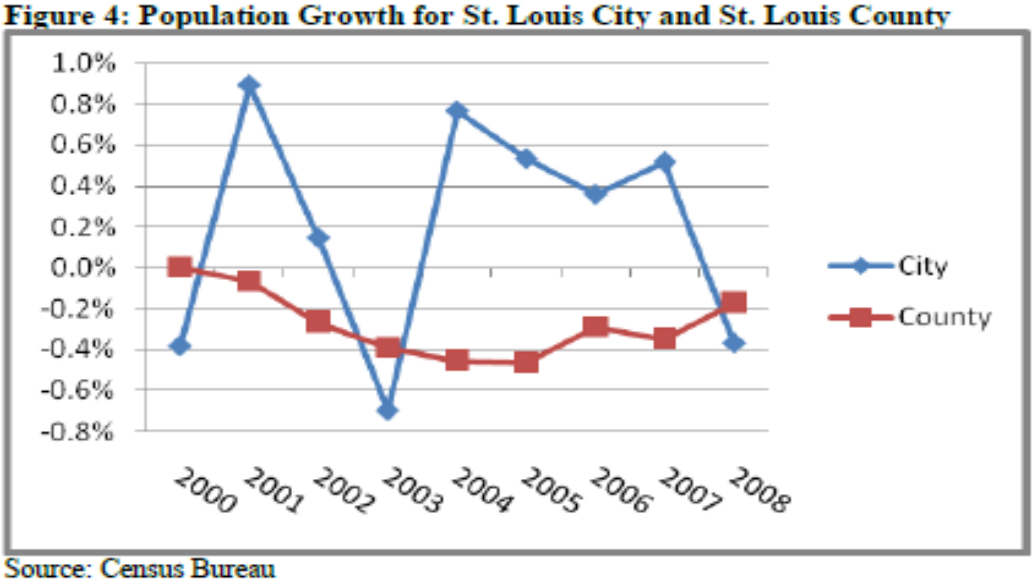
Source: MERIC QCEW

Population

St. Louis County's population in 2008 of 991,830 is more than double of St. Louis City's population of 354,360. Although the City and County are adjacent to each other, the population trends have been different. The City has demonstrated positive growth from 2004 through 2007, while the County has seen a steady decline in overall population from its peak in 2000, as seen Figure E-4. Although the County's population trend is demonstrating negative growth, the decline is less than one-half of a percent per year and has not shown any fluctuation since the start of the I-64 project. However, the City's growth rate shifted from positive to negative growth in 2008; this demographic response is likely related to economic conditions rather than the closure of I-64.

[2]Business Surveys and Interviews confirmed that hospital patients and activities were unaffected by I-64

Figure 4: Population Growth for St. Louis City and St. Louis County

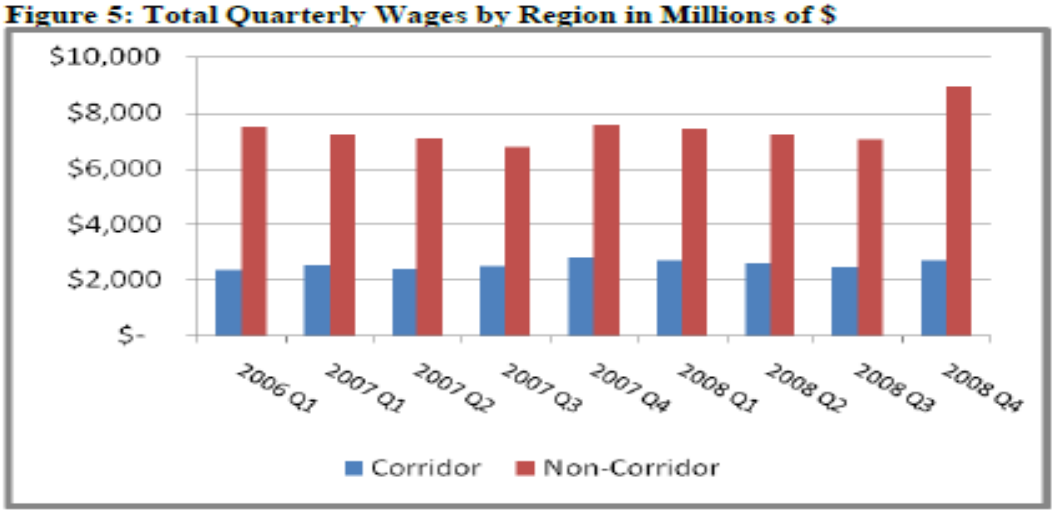


Source: Census Bureau

Wages

Similar to employment, the MERIC QCEW wage data is provided at the ZIP code and industry level. At the geographic level, the 9-ZIP-code corridor region generates upwards of 23% of the total wages of the entire region, totaling $2.7 billion in the fourth quarter of 2008. The much larger non-corridor region generated $8.9 billion in wages. Seasonal trends are evident in the wage data for the years 2007 and 2008, as the wages declined from the first quarter through the third quarter of the year and then recovered in the fourth quarter. National economic pressures, however, have placed more downward pressure on wages across both regions; however the data suggests there is an increase in fourth quarter 2008 wages. This substantial increase in fourth quarter 2008 wages is attributable to additional compensation (year-end bonuses, profit-sharing and firm buyout payments) that represents a unique one-time payment and account for the large wage variation from the previous quarter. Net of these additional compensation payments, the non-corridor would have still demonstrated positive growth from third quarter 2008, albeit at a much smaller rate.

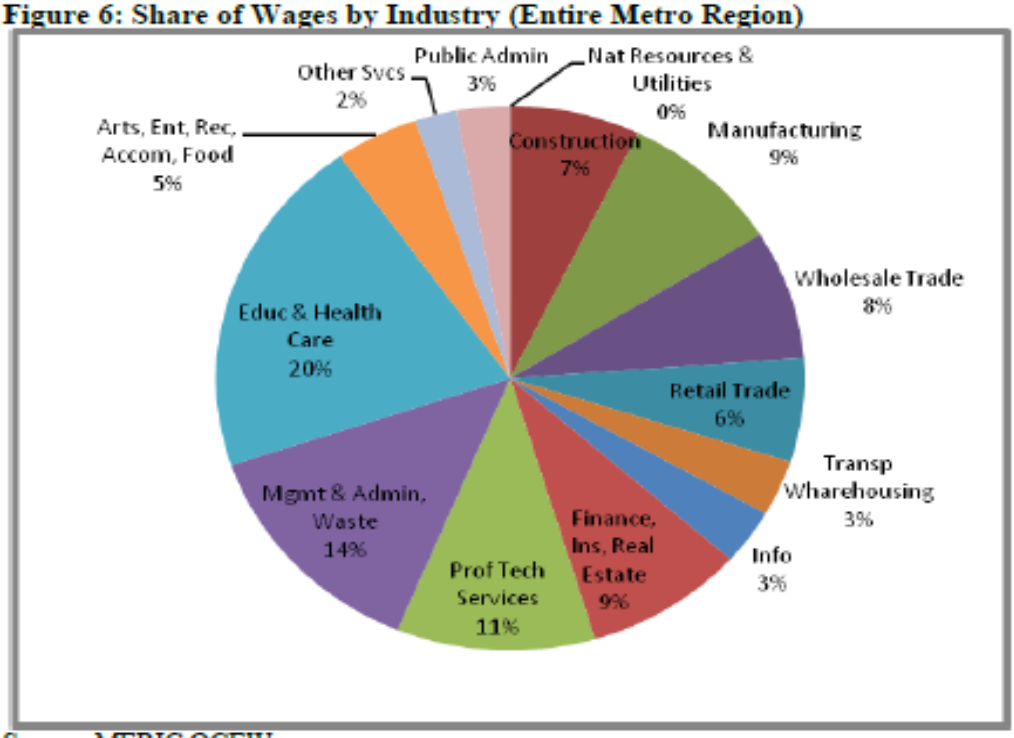
Figure 5: Total Quarterly Wages by Region in Millions of $



Source: MERIC QCEW

Service-based industries account for over half of the wages distributed. Health care and education are the largest contributors to wages in the region, providing over 20 percent, as shown in Figure E-6. Wholesale trade and retail trade contribute 14 percent of the total wages to the region, which is less than their share of the total employment, and implies that wholesale and retail trade pay lower wages per job on average. The same is true of the arts, recreation, entertainment, and food service industries, where the share of wages is 6 percentage points lower than the share of employment.

Figure 6: Share of Wages by Industry (Entire Metro Region)



Source: MERIC QCEW

Taxable Sales

Taxable sales is a dynamic method of tracking economic performance, as taxable sales measure the amount of spending within the region with limited lag effects. These effects can be seen on the national scale as consumer spending has declined and savings has increased. The combined taxable sales for the City and County of St. Louis were $5.1 billion for the fourth quarter of 2008. When compared on a year-on-year basis, the third quarter 2008 taxable sales revenues dropped $350 million dollars from the fourth quarter of 2007. The graph below shows the total taxable sales for each quarter, from first quarter 2005 to fourth quarter 2008, in millions of dollars. As Figure E-7 indicates, the taxable sales for St. Louis County are roughly three and a half times larger than the taxable sales for St. Louis City.

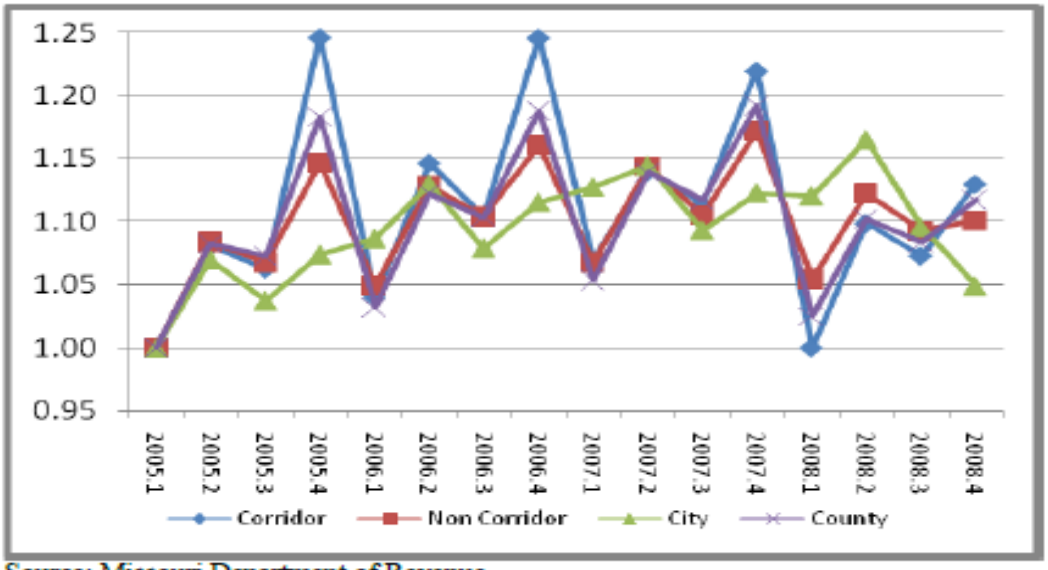
Figure 7: Taxable sales in Millions of Dollars by region

Source: Missouri Department of Revenue

The seasonal taxable sales patterns are best seen in the taxable sales growth index, Figure E-8. The index demonstrates quarterly taxable sales growth by each region in the study area. The index's baseline is the 1st Quarter of 2006 and is used to compare other Quarters in 2006, 2007 and 2008. A number greater than 1 means an increase taxable sales and a number less than 1 means a decrease taxable sales. Each year, sales follow a quarterly cycle where the lowest sales take place in the first quarter of the calendar year, the second and third quarter show some degree of recovery, and then the final quarter of the year has the largest sales, which are traditionally boosted by holiday spending. The overall growth for all regions followed a similar pattern, maintaining a consistent level of positive growth until 2007, where the fourth quarter 2007 growth fell short of the previous years, and was followed by a significant drop in taxable sales in first quarter 2008. The decline in sales for the corridor region was the most extreme and sales dropped back to 2005 levels, as seen in Figure 8. Although sales did recover over the course of 2008, they remained below 2006 levels; with the exception of St. Louis City for second quarter 2008.

(Left Blank)

Figure 8: Taxable Sales Index by Region



Source: Missouri Department of Revenue

Although overall sales declined in 2008, individual industries were impacted differently (see appendix). For example, the taxable sales for food stores remained steady from 2005 through 2007 for all regions, but in 2008 purchases at food and grocery stores grew significantly compared to restaurants, suggesting a shift in consumer spending. Real estate sales in St. Louis began contracting in 2006 for both the City and County, consistent with national real estate and housing trends. Since then, real estate sales in St. Louis City have remained at roughly half of the first quarter 2005, while St. Louis County has returned to positive growth in the second half of 2008.

In terms of overall spending, St. Louis City appears to be the most impacted, with the corridor region showing effects immediately after the western closure of I-64. Since then, the corridor region has exhibited signs of recovery in the second and fourth quarters of 2008, and it is unlikely that these trends are due to the closure of I-64, but rather overall economic trends that began in December of 2007.

Real Estate

The office vacancy rates in the St. Louis metropolitan area have increased since the second quarter of 2007 to 14.57% and average office lease rates have fallen to $18.39 per square foot from a high of $20 per square foot. St. Louis ranks 25th in terms of its office vacancy rate compared to the major metropolitan areas in the US[3], which is 10 percentage points greater than the national average. As for residential housing, the number of building permits for single-family housing in the St. Louis metro area has fallen, consistent with national trends[4], but to a lesser degree. As of April 2008, building permits for single and multifamily housing in the St. Louis Metro were down by 44%, two percentage-points less than the national average. The reduction in housing permits, decline in construction and real estate jobs at the end of 2008, and contraction of wages for these industries are all evidence that the fluctuations in the national housing market have impacted St. Louis.

[3] CB Richard Ellis

[4] National Association of Homebuilders

Business Survey and Interviews
Interviews
HDR has conducted in-depth follow-up interviews with transportation-dependent businesses in and near the I-64 corridor. Different industry groups were targeted, with significant help from the St. Louis Regional Chamber and Growth Association (RCGA), to provide a detailed and in-depth range of private sector businesses that are being impacted adversely by the I-64 closure, and the steps businesses are taking to cope with the closure. At least one representative from the following local businesses and organizations has been interviewed in Table E-2.

Table 3: Industries Interviewed

Industry	Transportation Needs[5]	Employees[6]	Locations
Utilities	On-site technicians	1,000+	Multiple
Network Hospital	Patient access	1,000+	Multiple
Distributors	Freight shipments	<1,000	Multiple
Parcel Shippers	Freight shipments	1,000+	Multiple
Rental Car Agency	Customer access	<1,000	Multiple
Catering	Delivery	<50	Multiple
Research laboratories	Commuter access	1,000+	Multiple
Convention Center	Visitor access	<1,000	Single
Museum	Visitor access	<1,000	Single
Accommodation	Visitor access	<100	Single

The interviews found businesses expected the worst prior to the closure, but the conditions for the first quarter were not nearly as bad as they anticipated. To cope, many of the businesses with a large commuting labor force offered flex-time hours or telecommuting options, encouraged carpooling or public transit, and, in some cases, public transit passes. Businesses reported that impacts to peak commute times were largely negligible. In terms of operations, businesses with delivery schedules had planned for additional travel time per delivery into the impacted areas, but found that the additional delivery time was unnecessary. Onsite service industries, such as utilities, track emergency response time statistics and these statistics showed emergency response times were not impacted by the western closure.

Lastly, those interviewed were asked if they were satisfied with MoDOT's delivery of the I-64 project and how it has impacted sales, visitation, and operations. The interviews found that many businesses were pleased with the delivery of the project and support activities including: MoDOT's outreach and planning, the timing of traffic signals to improve traffic flow, and the amount of information available to the public.

Presentation with Economic Leaders
On June 17, 2008, the results of the first business survey were presented to local economic development leaders in St. Louis. The comments from the economic development leaders were consistent with the conclusions of the published economic data. Economic development leaders were concerned with current national economic conditions that were becoming evident in St. Louis, which were expected to make it difficult to isolate the impacts of I-64. The major concerns included the decline in available credit for businesses, high fuel prices, fluctuations in the housing market, the exchange rate and exports, all of which are points for the economic decline. The meeting also provided some positive feedback, similar to the interviews.

[5] Please note commuter access was sited as a transportation need by all industries
[6] Employee ranges are for non-disclosure purposes

Business Surveys
The two business surveys were created to evaluate the impacts and conditions business were experiencing due to the western and eastern closure of I-64. The survey questions were specifically designed to track conditions over time and determine the variations between the two separate closures. The first business survey was released on February 18, 2008, shortly after the western portion of I-64 was closed, and the second business survey was released on November 5, 2008 just before the reopening of the western closure.

Response
As the survey was online and specifically targeted for businesses rather than the general public, arrangements were made with the following local organizations to facilitate as many responses as possible: St. Louis Regional Chamber and Growth Association (RCGA), Regional Business Council (RBC), Downtown St. Louis Partnership, Civic Progress, and the St. Louis County Economic Council (SLCEC). The combined distribution list included 6,000 contacts from 3,600 various businesses. The survey was advertised and distributed via e-mail and newsletters with reminder notices urging members to participate in the online business survey. It is important to note that the 6,000 represented the total number of individual contacts in the combined distribution list, and therefore included duplicate entries and multiple contacts from the same business.

The first business survey received 369 separate and complete responses, while the second business survey received 84 responses. Although this is less than 10% of the total distribution list, there were additional obstacles that inhibited participation and completion of this web-based survey including: e-mail address spelling precision, spam filters, and internet content blockers. Previous web-based surveys have reported failure rates for survey invitations reaching potential respondents as low as 1% to 5% in well-defined samples and as high as 7% to 17% in less-than-well-defined samples[7]. Therefore, the final number of people receiving the survey e-mail was likely less than 6,000. The response rate for the second survey was much smaller, and therefore makes some of the comparisons between surveys difficult at a more detailed level. The research team attributes this reduction in completed surveys to: a) business complacency and acceptance regarding I-64; and b) larger economic concerns regarding the recession.

Profile of Businesses Responding
On a percentage basis, the businesses responding were fairly uniform in terms of the industry type and the number of employees. The first business survey did have a greater response rate which could be attributed to the concern from businesses and residents prior to the western closure. The first survey had relatively high representation of corridor-based businesses which could be indicative of their close proximity and relationship with the closed sections of I-64, possibly prompting and motivating such businesses to complete a survey. Respondents were asked how close they were to the western closure in miles, and for each survey over 70 percent of the total businesses responding were within 10 miles of the Western Closure.

[7] Manfreda, Katja Lozar & Vehovar, Vasja "Survey Design Features Influencing Response Rates in Web Surveys" University of Ljubljana

Results

The table below summarizes some key statistics for each of the two surveys. As the table indicates, 86 percent of respondents were either satisfied or very satisfied at the time of the first survey, while 96 percent of those participating in the second survey were either satisfied or very satisfied with MoDOT's execution of the I-64 project.

Business Survey – Selected Results

	1st Survey	2nd Survey
Total Distributed	6,000+	6,000+
Total Responses	369	84
Respondent location *(based on zip code)*		
Immediate I-64 region	23%	40%
Satisfaction w/ MoDOT execution of project		
Very satisfied	46%	56%
Satisfied	40%	40%
No Opinion	10%	0%
Dissatisfied	3%	4%
Very dissatisfied	1%	0%

Summary of survey results from key areas

Commuting Impacts

- The majority (56 percent) of businesses are experiencing limited effects on employee commuting behavior due to the closure. The first survey found 41 percent of the respondents indicated noticeably earlier or noticeably later commute times, while at the end of the western closure (second survey) respondents reported a 32 percent earlier or later commute.
- Eighty-one (81) percent of businesses surveyed are implementing, or have implemented, new commuter benefit programs. The large number of businesses who have implemented new commuter benefit programs may be correlated to "self-selection" as the businesses who are the most actively engaged in this type of activity may also be the ones most likely to respond to a survey on I-64.
- The second survey found 14 percent (down from 27 percent) of respondents reported a significant increase in commute time or cost. The majority of businesses reported a minor increase in commute time or cost.

Transportation Costs

- Both surveys found almost half of the businesses (44 percent for the first survey, 46 percent for the second) near the reconstruction are experiencing an increase in transportation costs. Of those businesses experiencing an increase in transportation costs, 49 percent reported an increase in freight shipping costs. This is an increase of 4 percentage points from the first survey.
- Despite almost half of the businesses reporting an increase in transportation costs, 10 percent of respondents from the first survey and one respondent from the second survey claimed to participate in the MoDOT outreach grant program. See http://www.thenewi64.org/ for more information.

Sales, Visitation and Economic Activity

- The responses related to sales and visitation for both surveys found a decrease in sales and business activity. A greater number and percentage businesses outside of the corridor cited a lower volume in weekly sales.
- The first survey found 9 percent of all businesses cited a lower volume of weekly sales. This percentage jumped to 17 percent by the second survey.
- A slightly larger portion, 13 percent of all businesses, described a lower volume of weekly visitors or customers. Again the non-corridor respondents articulated a greater loss than the corridor businesses. The second survey found this percent jumped to 21 percent.

Post Closure Commute

Respondents were asked exactly how employee commute behavior has changed since January (Western section closed). Both surveys found corridor and non-corridor businesses were not experiencing major changes. The most frequently noted change was employees shifting their commute times to either earlier or later in the day. Coinciding with this trend, 36 percent of businesses offered flextime arrangements for employees with another 7 percent offering telecommuting options to mitigate the effects of I-64 reconstruction. A small portion of businesses, 10 percent (up from 8 percent) of respondents reported subsidizing employee's public transit expenses. The most dramatic shift from the first to the second survey was the decline in businesses offering telecommuting. This shift could be due to businesses overestimating the anticipated impacts before the closure and the perceived impacts after the closure being less disruptive.

Transportation Costs

Although the measurable commuter impacts to business respondents were relatively minor, respondents consistently noticed an increase in transportation costs. The first survey found a majority of respondents experienced a significant or minor increase in costs related to time travel and delay. Not surprisingly, respondents noted a rise in fuel costs, but this can be only indirectly related to I-64. While the rise in fuel costs per unit is apparent, the actual impacts related to I-64 are a result of longer distances traveled through detours around the closure or by an increase in stop-and-go traffic conditions. Reliability and travel delay are the major sources of the perceived transportation cost both exceeding the change in freight shipment costs. Corridor-based businesses reported changes consistent with businesses outside of the corridor, often to a lesser degree, especially in the case of freight costs. The industry mix is likely responsible for these differences.

Satisfaction

Following the closure, the level of satisfaction with the performance of I-64's closure and alternative routes were very high, especially when considering the number of businesses experiencing at least a minor rise in transportation costs. The response was almost identical across all regions as 86 percent or more felt that the alternative routes for the Western Closure provided reasonable access. The second business survey found that 96 percent those responding were either satisfied or very satisfied.

The results indicate that despite a rise in cost attributable to an increase in travel time, businesses are coping with the closure and are to a large extent satisfied with the project delivery and mitigation thus far. Although there have been proactive steps made by MoDOT and many of the local businesses, the sentiment still seems the same: travel delays and costs are higher but not enough (at this point) to warrant the implementation of drastic changes or cause major impacts. This conclusion is consistent with the small percentage of total businesses surveyed enrolled in MoDOT-sponsored outreach programs.

Sales and Visitors

The second survey found that over 80 percent of businesses reported the change in customers, visitors, and patients were either not relevant or not noticeable. However, 17 percent of responding businesses (down from 20 percent) did report a decline in visitor, patient, and customer volumes compared to previous seasons as seen in Table 4. Although the majority of businesses are still reporting no change in customers or sales, the level of awareness remains high, as the second survey discovered a larger percentage of businesses that are seeing a lower volume in sales and customers. See Table E-4 for a breakdown of changes in weekly sales and customers reported for each survey.

Table 4: Change in Weekly Sales & Customers

	First Survey		Second Survey	
	Sales	Customers	Sales	Customers
Lower Volume	9%	12%	17%	21%
Higher Volume	1%	1%	1%	1%
No Change	57%	60%	58%	54%
Not Relevant	33%	26%	24%	24%
Total	**100%**	**100%**	**100%**	**100%**

(Left Blank)

Conclusions

Communications

The Western closure had a noticeable impact on respondent behavior. A sizeable minority of respondents are reporting changes in their shopping and driving habits. Many respondents report their daily commute now takes longer than before the closure. However, despite these changes, the majority of respondents are satisfied with how they are able to get around St. Louis with the closure. Further, the overwhelming majority of respondents are satisfied with MoDOT's decision to close parts of I-64 for two years instead of taking 6-8 years with lane closures (76.5% in the lowest measurement, 93.8% in the highest). Overall, the respondents have high level of satisfaction with how the I-64 closure has been handled with results ranging from 76.7% to 87.8%. **Considering the reported changes in respondents' behavior, these are extremely high levels of satisfaction and reflect the public consensus that this project was well planned and is being well managed.**

The Appendix to this report contains complete survey information for the online, mailed and in-person surveys conducted in 2008 for reference

Mobility

Based on these results, the following preliminary mobility conclusions can be made:

- Volumes along I-64 west of I-270 decreased by approximately 10,000 to 15,000 vehicles per day. East of I-170, traffic volumes decreased by over 50,000 vehicles. As I-64 traverses through downtown St. Louis, decreases of 10,000 to 15,000 vehicles per day were observed.
- Based on the Traffic.com data, it appears that volumes along I-70 have slightly decreased west of I-170, while slightly increasing east of Kingshighway Boulevard.
- Traffic volumes along I-270 south of I-64 have increased by 30,000 to 40,000 vehicles per day. This trend continued through the entire timeframe of the closure.
- I-44 became a key alternative east-west route with increases in traffic volumes ranging from 24,000 vehicles per day east of I-270 at Lindbergh Blvd and as high as 7,000 vehicles per day near Jefferson Ave**.**
- I-170 became a key route that connected several of the arterial roadways throughout the region. South of Page Avenue, volume increases of 20,000 to 30,000 vehicles per day were observed. Just north of I-64, volume increases of around 8,000 vpd were observed.
- Travel speeds dropped slightly and travel times increased (on major designated alternate routes 2 to 8%) slightly along the region's freeway network in conjunction with slight increases in traffic volumes.
- Parallel arterial routes also experienced significant increases in traffic volume and travel time. East-west arterial corridors closely located along the I-64 corridor like Clayton Road and Ladue Road, realized increases of between 10,000 and 20,000 vehicles per day.
- Forest Park Parkway experienced an increase of approximately 8,000 vehicles per day. The increase during the first few months of the eastern closure appears to be considerably higher.

Based on these results, the following preliminary safety conclusions can be made:

- Compared to year 2007, the number of crashes in 2008 slightly increased in the routes such as I-70 (4%), I-44 (4%) , I-55 (5%) and MO 100 (6%) whereas the number decreased in the routes such as I-270, I-170, MO 340, US40/I-64 and MO141. Other routes almost stayed at the level same.
- It is found that the crash increase on I-70 in 2008 was partly due to the record breaking heavy rain in 2008. This finding is confirmed by figure S-37 (Appendix page 57) showing the increasing trend of the out-of-control crashes on the same highway in 2008.
- In cases of MO100 or I-70, the increasing trend started before the I-64 closure (i.e., before 2008). So, it is hard to imply whether the I-64 closure causes the crash to increase.
- Although each route shows its own trend, the overall crashes on all three types of highways (i.e., interstate, MO, and US highways) have decreased in 2008.
- The observational inspections conducted in this study leads us to a tentative conclusion that there is no strong evidence proving that I-64 closure contributed to the crash increase on the highways that are potentially influenced by the closure. Continuation of this crash analysis through 2009 and 2010 will provide additional information that will either confirmed the tentative conclusion or provide information that changes this initial conclusion.

Economics

National and Metro area economic conditions

Since the housing and credit crisis emerged, national economic conditions have been in decline as economic activity has been weakening across most industry sectors and metropolitan regions in the US. Gross Domestic Product (GDP) fell 6.3 percent for the fourth quarter 2008 with exports, housing, and business investment continuing to decline. The residential and commercial real estate markets are deteriorating in conjunction with the construction industry. In addition, lending activity has declined[8]. The weakening conditions have impacted the labor market as unemployment levels rose throughout 2008.

Consumer spending demonstrated shifts in most metro areas as discount stores showed greater performance, luxury item purchases declined, and vehicle sales dropped in most Federal Reserve Districts, including St. Louis. Non-residential investment declined 36.9 percent fourth quarter 2008, while residential investment fell over 20 percent for each of the last two quarters of 2008[9]. Although consumer spending has declined nationally for most of 2008, 2009 is showing the first signs of positive growth as consumer spending rose 1.5 percent[10]. Clearly these trends have spread to most metropolitan areas and therefore are applying pressure to industry and labor markets.

[8] "Current Economic Conditions" by Federal Reserve District
[9] Bureau of Economic Analysis, National Economic Accounts - May 2009
[10] Bureau of Economic Analysis, National Economic Accounts - May 2009

Looking ahead
The overall economic impacts measured in terms of jobs, sales and business perceptions thus far appear to be modest, with a few exceptions, and the overall level of business satisfaction with the I-64 reconstruction project is high thus far. Businesses surveyed are coping with higher transport costs mostly attributable to travel cost (i.e. increased gas prices, delays, etc.) and seem to be less concerned with the I-64 closure than with overall economic conditions.

Looking forward, another businesses survey will be conducted to determine if the initial reactions to the eastern closure are consistent over the long term, and how they compare to the western closure. The third business survey will likely be released in the fourth quarter of 2009. Data from Torto Wheaton Research (TWR) will be obtained to better understand the commercial real estate market. Lastly, the research team will quantify the changes to highway user costs that have resulted in changes in traffic, travel delay, and vehicle miles traveled (VMT).

Principal Investigator and Project Members
Dr. Lance Gentry, M.B.A. Ph.D., Lead Investigator, Project Communication and Public Opinion
Dr. Venkata Chilukuri, Ph. D., Regional Mobility – Arterial Assessment
Thomas Hiles, EI – Regional Mobility – Freeway Assessment
Michael Trueblood, P.E., P.T.O.E., Lead Investigator, Regional Mobility
Christopher Kinzel, P.E. Regional Mobility
Robert Frazier, P.E. AICP, Regional Mobility
Dr. Hojong Baik, Ph.D., Lead Investigator, Roadway Safety
Daxiao Liu (Student), Investigator, Roadway Safety
Jonathan Lee, Lead Investigator, Economics
Daniel Hodge, Investigator, Economics
Tom Ryan, P.E., Principal Investigator

Bibliography
1. Congressional Budget Office (CBO) **–** Budget and Economic Outlook Report **–** **http://www.cbo.gov/**
2. Missouri Economic Research and Information Center (MERIC) , "Interstate 64 Business Climate Report Pre-Construction Analysis" St. Louis, MO: MERIC, April 2006
3. MERIC, "Interstate 64 Business Climate Report Pre-Construction Analysis" St. Louis, MO: MERIC, April 2006
4. MERIC - Quarterly Census of Employment and Wages (QCEW) complied dataset
5. Business Survey and Interviews – "The New I-64 Economic and Regional Mobility Study" – 2008 and 2009
6. Red Capital Group – "Market Overview St. Louis, Missouri"
7. CB Richard Ellis – Custom Real Estate Database for Corridor and Non-corridor area
8. CB Richard Ellis – "completions" concluded conveyance of property sales
9. National Association of Homebuilders was the source for national trends
10. Manfreda, Katja Lozar & Vehovar, Vasja "Survey Design Features Influencing Response Rates in Web Surveys" University of Ljubljana – Validation of business survey response rate
11. Business Interviews – Commuter access was mentioned as a "Transportation Need" by all industries surveyed

12. Business Interviews – Employee ranges are for non-disclosure purposes
13. "Addendum to the 1997 Federal Highway Cost Allocation Study Final Report" Federal Highway Administration May 2000