

**MINNESOTA
URBAN PARTNERSHIP AGREEMENT**

**NATIONAL EVALUATION:
EXOGENOUS FACTORS TEST PLAN**



**U.S. Department of Transportation
Research and Innovative Technology Administration
Federal Highway Administration
Federal Transit Administration**

**FINAL
November 17, 2009
Publication No. FHWA-JPO-10-007**

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NATIONAL EVALUATION: EXOGENOUS FACTORS TEST PLAN

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Prepared for

United States Department of Transportation
Federal Highway Administration (FHWA)
Office of Operations
1200 New Jersey Avenue, S.E.
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Contract No. DTFH61-06-D-00007/ORDER 07-T-08002/WO BA07-041

FINAL

November 17, 2009

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Technical Report Documentation Page

1. Report No. FHWA-JPO-10-007		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Minnesota Urban Partnership Agreement: Exogenous Factors Test Plan				5. Report Date November 17, 2009	
				6. Performing Organization Code	
7. Author(s) Katie Turnbull, Texas Transportation Institute				8. Performing Organization Report No.	
9. Performing Organization Name and Address Battelle 505 King Avenue Columbus, OH 43201				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No. DTFH61-06-D-00007/ORDER 07-T-08002/WO BA07-041	
12. Sponsoring Agency Name and Address U.S. Department of Transportation Research and Innovative Technology Administration Federal Highway Administration Federal Transit Administration 1200 New Jersey Avenue, S.E. Washington, DC 20590				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract This report presents the exogenous factors test plan for the national evaluation of the Minnesota Urban Partnership Agreement (UPA) under the United States Department of Transportation (U.S. DOT) UPA Program. The Minnesota UPA projects focus on reducing congestion by employing strategies consisting of combinations of tolling, transit, telecommuting/TDM, and technology, also known as the 4 Ts. As outlined in the Minnesota UPA National Evaluation Plan, the exogenous factors test plan will be used to monitor elements unrelated to the Minnesota UPA projects that may influence travel in the I-35W corridor, use of the UPA projects, changes in travel modes, and use of telecommuting and alternative work arrangements. These factors include unemployment rates, gasoline prices, parking rates in downtown Minneapolis, parking rates at the University of Minnesota, roadway construction, non-typical weather conditions, major traffic incidents, and major special events. The use of control corridors is also discussed. This report presents the data sources for obtaining information on these elements, the availability of the data, and potential risks associated with data collection activities. The data analysis techniques and the schedule and responsibilities are also described.					
17. Key Word Urban Partnership Agreement, Congestion Reduction Demonstration, congestion pricing, tolling, HOT, congestion reduction, transit, bus rapid transit, telecommuting, evaluation			18. Distribution Statement		
19. Security Classif. (of this report)		20. Security Classif. (of this page)		21. No. of Pages 36	22. Price

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ACKNOWLEDGEMENTS

A number of representatives from the Minnesota partnership agencies provided information critical to the development of the Minnesota UPA test plans. The assistance of Brian Kary, Minnesota Department of Transportation, with the roadway construction information contained in the Exogenous Factors Test Plan is both recognized and appreciated.

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LIST OF ABBREVIATIONS

4Ts	Tolling, Transit, Telecommuting, and Technology
APC	Automatic passenger counter
ATM	Active traffic management
AVL	Automatic vehicle location
BRT	Bus rapid transit
CBD	Central Business District
CBA	Cost and benefit analysis
CRD	Congestion Reduction Demonstration
CVO	Commercial vehicle operator
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HC	Hydrocarbon(s)
HOT	High-occupancy tolling
HOV	High-occupancy vehicle
ITS	Intelligent transportation systems
ITS-OTMC	Intelligent Transportation Systems-Operational Testing to Mitigate Congestion
MARQ2	Marquette and Second Avenue (downtown Minneapolis)
Mn/DOT	Minnesota Department of Transportation
MOE	Measure of effectiveness
MVTA	Minnesota Valley Transit Authority
NEF	National Evaluation Framework
NEP	National Evaluation Plan
NEPA	National Environmental Policy Act
NTOC	National Transportation Operations Coalition
O&M	Operation and maintenance
OTMC	Operational Testing to Mitigate Congestion
PDSL	Priced dynamic shoulder lane
RITA	Research and Innovative Technology Administration
ROG	Reactive organic gas(es)
ROWE	Results Only Work Environment
SOV	Single-occupant vehicle
TDM	Travel demand management
TMO	Traffic management operations
UPA	Urban Partnership Agreement
U.S. DOT	U.S. Department of Transportation
VII	Vehicle Infrastructure Integration
VMT	Vehicle miles traveled
VOC	Vehicle operating cost or Volatile organic compound
VT	Vehicle trips

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1.0 INTRODUCTION

This report presents the test plan for collecting and analyzing information on exogenous factors for the National Evaluation of the Minnesota Urban Partnership Agreement (UPA) under the United States Department of Transportation (U.S. DOT) UPA program. This information will be used to monitor elements unrelated to the Minnesota UPA projects that may influence travel in the I-35W corridor, use of the UPA projects, changes in travel mode, and use of telecommuting and alternative work arrangements. These factors include unemployment rates, gasoline prices, downtown Minneapolis parking rates, parking spaces and rates at the University of Minnesota, roadway construction, non-typical weather conditions, major traffic incidents, and significant special events. The use of control corridors is also presented. This test plan is one of 11 test plans identified in the Minnesota UPA National Evaluation Plan.

The test plan begins with a brief overview of the Minnesota UPA projects and the relationship between the analysis areas and the test plans outlined in the Minnesota UPA National Evaluation Plan. The test plan presents the sources for collecting information on the exogenous factors and the availability of needed data. Potential risks associated with the data and data collection activities are discussed. The data analysis techniques are described. The schedule and responsibilities for collecting, analyzing, and reporting on the exogenous factors analysis is also presented.

1.1 The Minnesota UPA

Minnesota was selected by the U.S. DOT as an Urban Partner to implement projects aimed at reducing congestion based on four complementary strategies known as the 4Ts: Tolling, Transit, Telecommuting/Travel Demand Management (TDM), and Technology. Under contract to the U.S. DOT, a national evaluation team led by Battelle is assessing the impacts of the projects in a comprehensive and systematic manner in Minnesota and other sites. The national evaluation will generate information and produce technology transfer materials to support deployment of the strategies in other metropolitan areas. The national evaluation will also generate findings for use in future federal policy and program development related to mobility, congestion, and facility pricing.

The Minnesota UPA partners include the Minnesota Department of Transportation (Mn/DOT), the Twin Cities Metropolitan Council, Metro Transit, the City of Minneapolis, Minnesota Valley Transit Authority (MVTA), and Anoka, Dakota, Ramsey, and Hennepin counties. The Center for Transportation Studies and the Hubert H. Humphrey Institute of Public Affairs at the University of Minnesota are also partners in the UPA.

The Minnesota projects are focused on reducing traffic congestion in the I-35W corridor and in downtown Minneapolis. ITS technologies underlie many of the Minnesota UPA projects, including those focused on tolling, real-time traffic and transit information, transit signal priority, and guidance technologies for shoulder-running buses. Figure 1-1 highlights the general location of the various Minnesota UPA projects, which are described below.

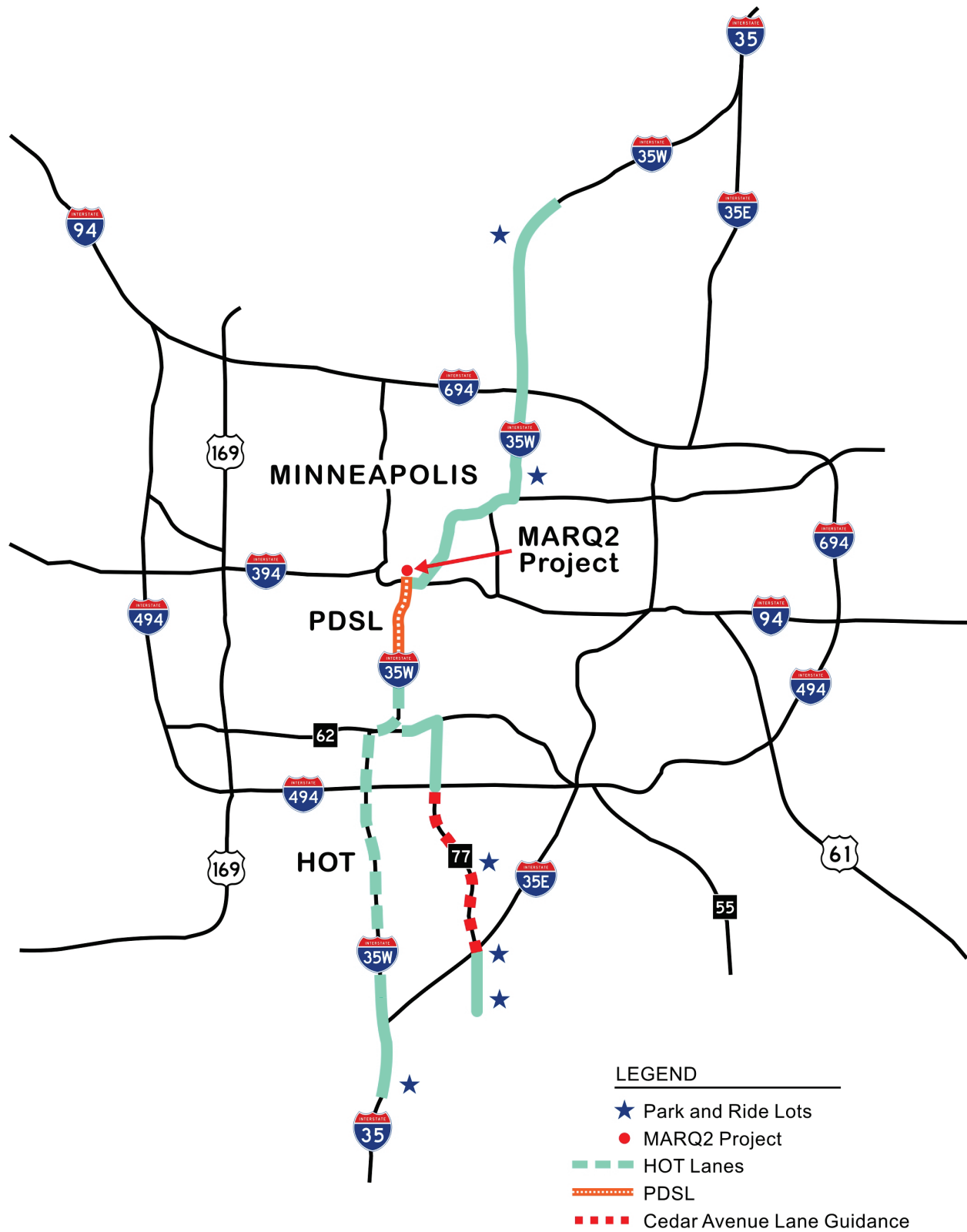


Figure 1-1. General Location of Minnesota UPA Projects

- **High Occupancy Toll (HOT) Lanes.** The HOT lanes on I-35W represent a major component of the Minnesota UPA. This element includes expanding the existing HOV lanes to HOT lanes and constructing new HOT lanes. The HOT lanes will be dynamically priced. The existing HOV lanes on I-35W from Burnsville Parkway to I-494 will be expanded into dynamically priced HOT lanes. A new dynamically priced HOT lane will be added on I-35W from I-494 to 46th Street as part of the reconstruction of the Crosstown Commons Section.
- **Priced Dynamic Shoulder Lane (PDSL).** The second tolling element of the Minnesota UPA is the implementation of a PDSL on I-35W in the northbound direction from 46nd Street to downtown Minneapolis. The PDSL incorporates active lane management techniques and technologies, including speed harmonization.
- **Auxiliary Lanes.** An auxiliary lane and collector ramp is being constructed on I-35W in the northbound direction from 90th Street and I-494. An auxiliary lane is being constructed on I-35W in the southbound direction from 106th Street to Highway 13.
- **Park-and-Ride Facilities.** A total of six new or expanded park-and-ride facilities will be constructed as part of the Minnesota UPA. Two of the park-and-ride facilities are on I-35W north of downtown Minneapolis, one is on I-35W south of downtown Minneapolis, and three are on Cedar Avenue. The following describes the general facility locations and the anticipated number of parking spaces. A new 500-space parking ramp will be constructed adjacent to the existing 1,000-space parking lot at 95th Ave along I-35W North in Blaine. A new 460-space parking ramp will be constructed along I-35W North in Roseville. A new 750-space parking ramp will be constructed along I-35W south in Lakeville. A new 120-space parking lot with an enclosed passenger waiting facility will be constructed along Cedar Ave at Highway 13 in Eagan. A new 200-space parking lot will be constructed along Cedar Avenue at 180th Street in Lakeville. A new 500-space parking ramp, a 250-space surface lot, and a side platform station will be constructed along Cedar Ave at 155th Street in Apple Valley.
- **New Buses.** A total of 27 new buses will be purchased as part of the Minnesota UPA. These vehicles include a mix of standard, hybrid, and coach buses. The buses will be used to operate new and expanded express bus service.
- **Downtown Minneapolis Dual Bus Lanes on Marquette and 2nd Avenues.** Double contraflow bus lanes are being constructed on Marquette and 2nd Avenues in downtown Minneapolis. Called the MARQ2 project, the lanes replace existing single contraflow lanes on each avenue. The project also includes construction of wider sidewalks, and improved lighting, landscaping, and passenger waiting areas.
- **Transit Advantage Bus Bypass Lane.** A “Transit Advantage” bus bypass lane/ramp has been constructed to facilitate the movement of northbound buses at the Highway 77/Highway 62 intersection. A new bus-only left-turn lane has been constructed and new traffic signals have been installed to allow buses to make a left turn from Highway 77 to Highway 62.
- **Cedar Avenue Lane Guidance System.** A lane guidance system for shoulder-running buses will be developed, implemented, and operated on Cedar Avenue. The system

includes lateral guidance assistance, collision avoidance, and AVL technology. Lane assistance feedback will be provided to the bus operator through a “heads up” windshield display, a vibrating seat, and an active steering wheel.

- **Real-Time Transit Information and Real-Time Traffic and Transit Information.** Real-time transit information, including next bus arrival information, will be provided along the MARQ2 lanes in downtown Minneapolis and park-and-ride facilities. Dynamic message signs along I-35W will display real-time traffic and transit travel times to downtown Minneapolis.
- **Transit Signal Priority.** Transit signal priority will be implemented along a contiguous stretch of Central Avenue north of downtown Minneapolis, and at selected locations around two park-and-ride facilities.
- **Telecommuting.** The telecommuting element of the Minnesota UPA focuses on increasing the use of Results Only Work Environment (ROWE), telecommuting, and flexible work arrangements throughout the region, including increasing the number of teleworkers and/or workers on flexible schedules in the I-35W corridor by 500 individuals. ROWE provides employees flexibility in the work location and hours by focusing on performance and results rather than presence at the office during standard work hours. ROWE is used extensively at Best Buy Corporation, headquartered in Minnesota. The UPA telecommuting component seeks to increase its use by other businesses in the region. The telecommuting element is funded entirely with state funds.

The Transit Advantage project became operational in December 2008. The majority of projects will be in operation by December 2009. The I-35W HOT lanes in the Crosstown Commons Section, the Cedar Avenue Lane Guidance System, and the Cedar Avenue Transit Station are scheduled for completion by October 2010.

1.2 Minnesota UPA National Evaluation Plan and Exogenous Factors

The Minnesota UPA National Evaluation Plan focuses on the 12 analysis areas outlined in the NEF¹ and 11 test plans. Table 1-1 presents the relationships among the analysis areas and the test plans. The exogenous factors test plan provides data that may support all of the analysis areas, and hypotheses from all analysis areas are listed in Appendix A. There are no specific measures of effectiveness associated with the exogenous factors, but the information gathered in the test plan may be of benefit in completing the other analyses and examining factors that may influence use of the Minnesota UPA projects.

The remainder of this report is divided into three sections. Chapter 2.0 presents the data sources and data availability for monitoring the exogenous factors, along with the potential risks associated with the data and data collection activities. Chapter 3.0 describes the data analysis techniques that will be used to assess the potential impact of the exogenous factors. Chapter 4.0 presents the data collection schedule and responsibilities for monitoring and assessing the exogenous factors.

¹The document is available online at following website:
http://www.itsdocs.fhwa.dot.gov//JPODOCS/REPTS_TE//14446

Table 1-1. Relationship Among Test Plans and Evaluation Analysis

Evaluation Analysis												
Minnesota UPA Test Plans	Congestion Analysis	Tolling Analysis	Transit Analysis	Telecommuting/ TDM Analysis	Technology Analysis	Safety Analysis	Environmental Analysis	Equity Analysis	Goods Movement Analysis	Business Impact Analysis	Non-Technical Success Factors Analysis	Cost Benefit Analysis
Traffic System Data Test Plan	●	○	○	○	●	○	○	○	●	○		●
Tolling Test Plan		●					○	○	○			●
Transit System Data Test Plan	○	○	●	○	●	○	○	○				●
Telecommuting Data Test Plan				●								
Safety Test Plan						●						●
Surveys Test Plan	●	●	●	●	●	●	●	●	●	●	●	
Transportation Modeling Test Plan												●
Environmental Data Test Plan							●	○				●
Content Analysis Test Plan											●	
Cost Benefit Analysis Test Plan												●
Exogenous Factors Test Plan	○	○	○	○	○	○	○	○	○	○	○	○

● — Major Input ○ — Supporting Input

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2.0 DATA SOURCES, AVAILABILITY, AND RISKS

2.1 Data Sources

As outlined in this section, elements included in the exogenous factors test plan are unemployment rates, gasoline prices, downtown Minneapolis parking rates, parking spaces and rates at the University of Minnesota, roadway construction, and non-typical weather conditions, traffic incidents, and special events. In addition, control corridors and regional data will be used to provide a comparison to changes in traffic, transit, and safety conditions in the I-35W corridor. The data for the control corridors and region-wide levels will be collected in the appropriate test plans.

Minnesota Department of Employment and Economic Development (DEED)

Unemployment Rates. The Minnesota DEED tracks unemployment rates at the state level and at the county level. The information is posted on the DEED website. For the purpose of the Minnesota UPA National Evaluation analysis, the seasonally adjusted state unemployment rate and the not-seasonally-adjusted unemployment rates for the Minneapolis-St. Paul-Bloomington Metropolitan Statistical Area (MSA) will be monitored. The not-seasonally-adjusted unemployment rates will be used for the MSA, as that is the only available data from the DEED. Data will be examined from 2000 to the conclusion of the UPA evaluation.

Table 2-1 presents the annual average state seasonally adjusted unemployment rates for 2000 through 2008 from the DEED. Table 2-2 contains the monthly state seasonally adjusted unemployment rate for January 2008 through May 2009. Table 2-3 presents the not-seasonally-adjusted annual average unemployment rate for the Minneapolis-St. Paul-Bloomington MSA. Table 2-4 highlights the monthly not-seasonally-adjusted unemployment rate for the Minneapolis-St. Paul-Bloomington MSA for January 2008 through May 2009.

Table 2-1. Minnesota Annual Average Unemployment Rate, Seasonally Adjusted

Year	Minnesota
2008 Annual Avg.	5.4
2007 Annual Avg.	4.6
2006 Annual Avg.	4.1
2005 Annual Avg.	4.2
2004 Annual Avg.	4.6
2003 Annual Avg.	4.9
2002 Annual Avg.	4.5
2001 Annual Avg.	3.8
2000 Annual Avg.	3.1

Source: Minnesota Department of Employment and Economic Development

Table 2-2. Minnesota Monthly Unemployment Rate, Seasonally Adjusted

Month/Year	Minnesota
May 2009	8.2
April 2009	8.0
March 2009	8.2
February 2009	8.0
January 2009	7.5
December 2008	6.6
November 2008	6.1
October 2008	5.6
September 2008	5.4
August 2008	5.4
July 2008	5.4
June 2008	5.3
May 2008	5.3
April 2008	5.4
March 2008	5.1
February 2008	5.0
January 2008	4.8

Source: Minnesota Department of Employment and Economic Development

Table 2-3. Minneapolis-St. Paul-Bloomington MSA Annual Average Unemployment Rate, Not-Seasonally-Adjusted

Year	Minnesota
2008 Annual Avg.	5.2
2007 Annual Avg.	4.3
2006 Annual Avg.	3.8
2005 Annual Avg.	3.8
2004 Annual Avg.	4.3
2003 Annual Avg.	4.6
2002 Annual Avg.	4.4
2001 Annual Avg.	3.5
2000 Annual Avg.	2.7

Source: Minnesota Department of Employment and Economic Development

**Table 2-4. Minneapolis-St. Paul-Bloomington MSA
Monthly Unemployment Rate, Not-Seasonally-Adjusted**

Month/Year	Minnesota
May 2009	7.8
April 2009	7.8
March 2009	8.4
February 2009	8.2
January 2009	7.7
December 2008	6.4
November 2008	5.6
October 2008	5.1
September 2008	5.4
August 2008	5.3
July 2008	5.2
June 2008	5.1
May 2008	4.7
April 2008	4.5
March 2008	4.9
February 2008	4.6
January 2008	4.9

Source: Minnesota Department of Employment and Economic Development

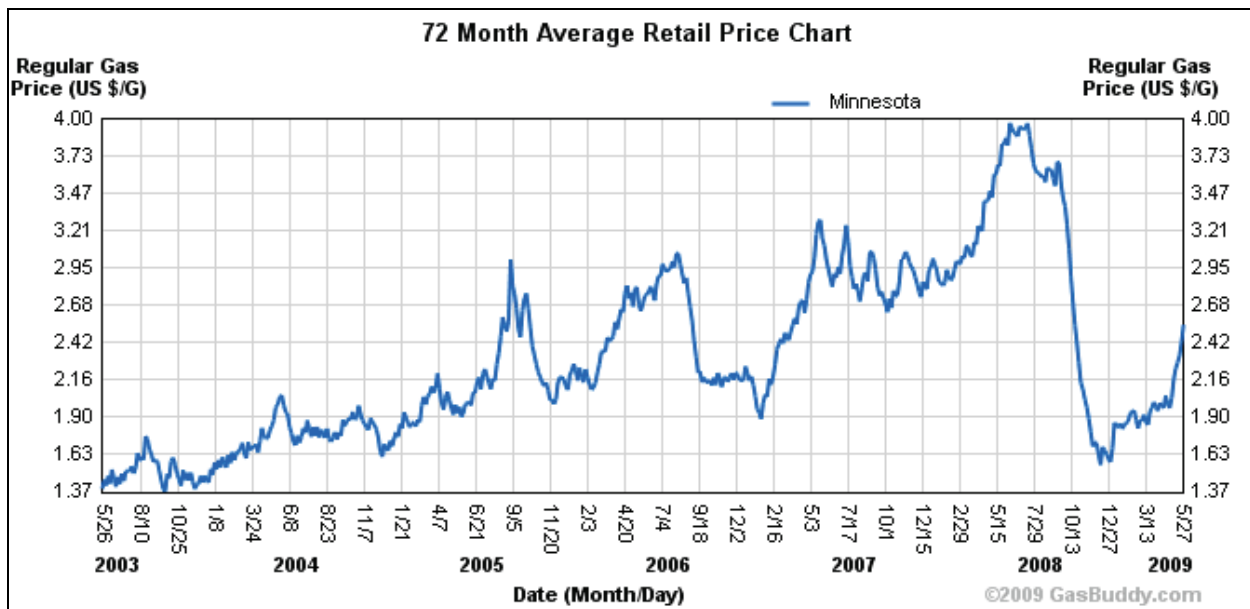
U.S. Department of Energy (DOE) and MinnesotaGasPrices.com Gasoline Prices. The U.S. DOE monitors gasoline prices by selected states, including Minnesota. Data on the weekly price of retail gasoline prices for various grades since 2000 are available on-line at the DOE website. Table 2-5 presents the regular conventional retail gasoline price per gallon for Minnesota from the first week in June 2000 to the first week in June 2008. Figure 2-1 presents the monthly average from the commercial Internet site – MinnesotaGasPrices.com. Data from both sources will be monitored over the course of the Minnesota UPA evaluation.

City of Minneapolis Downtown Parking Rates. The availability of parking spaces for commuters and the cost of parking influence mode choice. Current City of Minneapolis parking policies limit the availability of commuter parking in the downtown area to encourage use of transit and ridesharing. Discounted parking rates are also used to encourage carpooling in some corridors, including the I-394 and the I-94 corridors. Information on the City of Minneapolis Municipal Parking system is available on the City’s internet site. Available information includes the location of downtown parking ramps and parking rates at these facilities.

Table 2-5. Minnesota Weekly Regular Conventional Retail Gasoline Prices

Date	Price Per Gallon
June 5, 2000	\$1.58
June 4, 2001	\$1.77
June 3, 2002	\$1.35
June 2, 2003	\$1.43
June 7, 2004	\$1.92
June 6, 2005	\$2.01
June 5, 2006	\$2.81
June 4, 2007	\$3.07
June 2, 2008	\$3.85
June 1, 2009	\$2.28

Source: U.S. Department of Energy



*Chart found at http://www.minnesotagasprices.com/Retail_Price_Chart.aspx

Figure 2-1. Minnesota Historical Gas Price Chart – 2003 to 2009

The Minneapolis Municipal Parking system includes 17 parking ramps and seven surface lots in the downtown area. Figure 2-2 illustrates the location of the parking ramps. Table 2-6 presents the current parking rates for the municipal ramps. The costs of the first hour, daily, monthly, reserved, monthly carpool, and special events are shown. This information will be monitored throughout the course of the UPA evaluation.

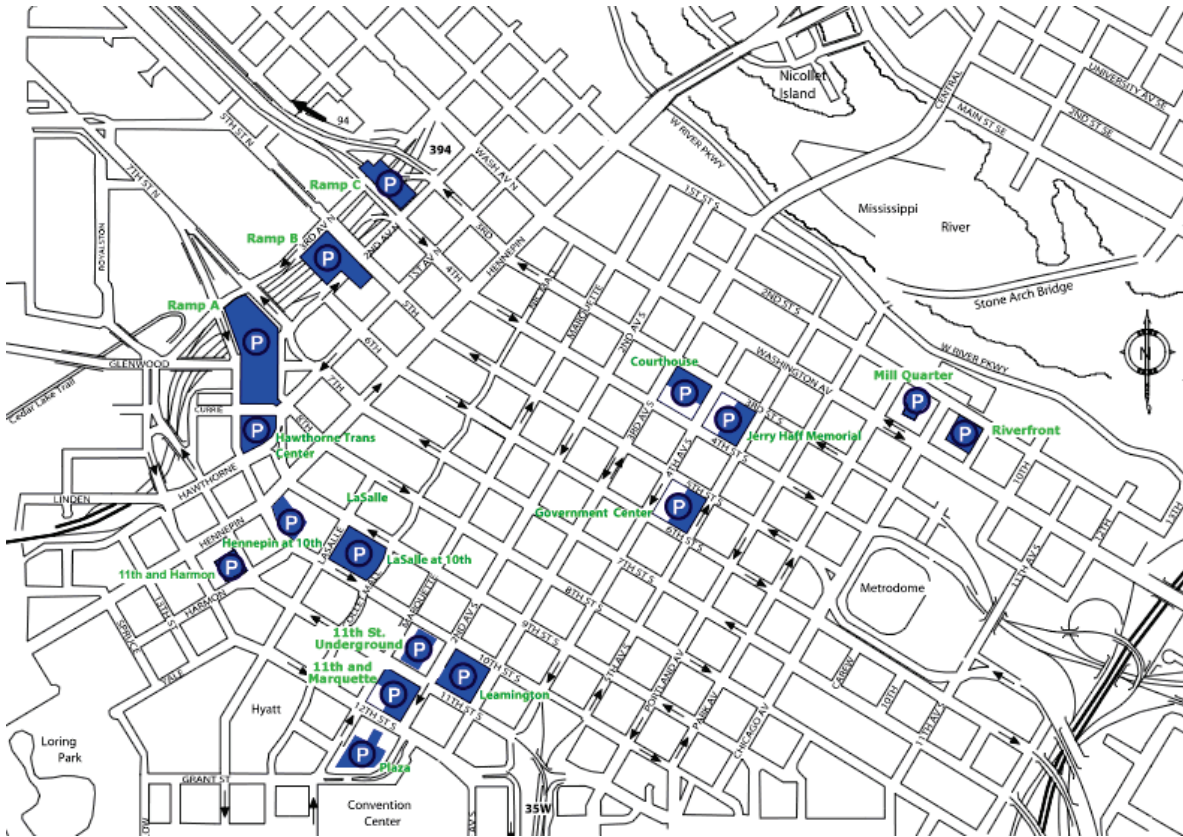


Figure 2-2. Location of Downtown Minneapolis Parking Ramps

Source: City of Minneapolis

Table 2-6. Parking Rates in Downtown Minneapolis

Parking Ramp	1 st Hour	Daily/Hours	Monthly	Monthly Reserved	Monthly Carpool	Events
11th & Harmon	\$2.50	\$8.00/4-12 Hours	\$171.50	\$210.00	N/A	N/A
11 th & Marquette	\$3.00	\$9.00/2½-12 Hours	\$142.50	\$204.00	N/A	\$9.00
A Ramp	\$2.00	\$9.00/4-12 Hours	\$135.00	N/A	\$20.00*	\$7.00-\$9.00
B Ramp	\$2.00	\$9.00/4-12 Hours	\$130.00	N/A	\$20.00*	\$7.00-\$9.00
C Ramp	\$2.25	\$7.00/4-12 Hours	\$117.50	N/A	\$20.00*	\$7.00-\$9.00
Courthouse	\$2.50	\$12.00/4-12 Hours	\$205.00	N/A	N/A	\$5.00-\$11.00
Government Center	\$3.00	\$10.50/3-12 Hours	\$159.50	\$204.00	N/A	\$5.00-\$15.00
Hawthorne Transportation Center	\$2.75	\$8.00/4-12 Hours	\$130.00	N/A	N/A	\$7.00-\$8.00
Hennepin at 10 th	\$2.75	\$10.50/5½-12 Hours	\$197.00	N/A	N/A	\$7.00
Hilton Hotel	\$3.00	\$12.00/5-24 Hours	\$165.00	\$220.00	N/A	\$9.00
Jerry Haaf Memorial	\$3.00	\$9.00/2½-12 Hours	\$149.50	\$205.00	N/A	\$5.00-\$15.00
LaSalle at 10 th	\$4.00	\$15.00/6½-12 Hours	\$268.00	N/A	N/A	N/A
Leamington	\$3.00	\$9.00/2½-12 Hours	\$155.00	\$210.00	N/A	\$9.00
Mill Quarter Municipal Parking Ramp	\$2.00	\$5.00/2-12 Hours	\$77.00	N/A	N/A	\$5.00-\$20.00
North Terminal	N/A	\$7.50	N/A	N/A	N/A	\$5.00
Plaza	\$3.00	\$9.00/3-12 Hours	\$180.00	\$220.00	N/A	\$8.00-\$10.00
Riverfront Municipal Parking Ramp	\$2.00	\$6.00/2-12 Hours	\$72.00	\$144.00	N/A	\$6.00-\$20.00
Vineland Place	\$2.00	\$4.00/1-12 Hours	\$65.00	N/A	N/A	\$7.00

*Carpools traveling eastbound on I-94 or I-394 are eligible for the \$20.00 carpool contract rate. The monthly parking rate for carpools traveling from outside of the I-94 or I-394 travelsheds is \$99.00.

Source: City of Minneapolis

University of Minnesota Parking Spaces and Rates. Some of the existing and the new bus routes in the I-35W corridor provide service to the University of Minnesota. The number of parking spaces available at the university and parking rates may influence the use of these bus routes. Information on parking spaces and rates is available from the University of Minnesota Parking and Transportation Services. Parking facilities at the University include those oriented toward faculty and staff, on-campus student housing, commuting students, and the public.

Information available from the University Parking and Transportation Services includes the facility name, the type of parking available (public or contract), the rate, and the number of spaces. Members of the Battelle team have obtained this information for the East Bank Campus, the West Bank Campus, and the St. Paul Campus. There are 192 separate parking facilities (some have only one or a few spaces), accounting for a total of 19,426 parking spaces at the university. While the Battelle team will continue to obtain information on all these facilities, those oriented toward commuting students are of primary interest. Table 2-7 highlights examples of the parking facilities on the East Bank Campus oriented toward commuting students.

Table 2-7. Examples of University of Minnesota East Bank Campus Parking Facilities

Facility Type	Type	Rate per Month	Capacity
East River Road Garage – Commuter	Contract	\$127.25	75
Fourth Street Ramp – Commuter	Contract	\$127.25	75
Gold Lot	Public	\$3.75 per day	261
Maroon Lot	Public	\$3.75 per day	479
Minnesota Lot – Commuter	Contract	\$65.50	201
C58 – Commuter	Contract	\$65.50	50
Gopher Lot – C77	Contract	\$65.50	103
Lot 33	Public	\$3.75 per day	237
Lot 37	Public	\$3.75 per day	690

Source: University of Minnesota Parking and Transportation Services

Roadway Construction. Roadway construction is occurring associated with the Minnesota UPA projects and with other projects in the area. Information on major roadway construction projects will be obtained from Mn/DOT RTMC, the City of Minneapolis, and other communities in the I-35W corridor. This information will be examined along with the traffic and transit data obtained in other test plans to identify road construction that may influence travel patterns, bus routes, and other factors. This information will be monitored over the course of the evaluation.

The location of roadway projects that may influence travel patterns in the historical, pre-deployment, and post-deployment periods are highlighted below:

- I-35W/Highway 62 Crosstown construction (including HOT lane) – July 2007 to Fall 2010.
- Highway 100 from Highway 7 to Minnetonka Boulevard, addition of third lane – June 2006 to October 2006.
- Highway 77, pavement preservation – single lane from May 2007 to June 2007
- I-35W Bridge collapse and replacement – major rerouting of traffic from August 2007 to September 2008.
- Second and Marquette in downtown Minneapolis – construction of dual bus lanes from 2008 to December 2009.

Non-Typical Weather Conditions, Traffic Incidents, and Special Events. Information from the Mn/DOT RTMC will be used to identify major weather conditions, traffic incidents, and special events that may influence normal travel patterns, bus routes, and other factors. Examples of these types of occurrences include major snowstorms, events such as the Republican National Convention held in St. Paul in 2008, and other similar major events. Information available from the RTMC will be monitored over the course of the evaluation.

Control Corridors. Two control corridors will be used to compare changes in the travel patterns in the I-35W corridor. The two control corridors are I-394, from I-494 to downtown Minneapolis, and I-94N to I-694. Both corridors will be used to monitor traffic, transit, crash, and incident data. In addition, the MnPASS HOT lanes on I-394 will be used as a control for the MnPASS HOT lanes and the PDSL on I-35W. In addition, region-wide data on transit ridership, park-and-ride lot use, traffic, and crashes will be monitored. These data will be collected and analyzed in the Traffic System Data Test Plan, the Transit System Data Test Plan, the Tolling Data Test Plan, and the Safety Data Test Plan.

2.2 Data Availability

As Table 2-8 highlights, pre-deployment, and post-deployment data is available for unemployment rates and gasoline prices. Historical and pre-deployment data on the other exogenous factors are limited, but post-deployment data will be available on all of the elements in the test plan.

Table 2-8. Available Pre- and Post-Deployment Exogenous Factors Data

Data Sources	Historical Data	Pre-Deployment Data	Post-Deployment Data
DEED Unemployment Rates	✓	✓	✓
USDOE and MinnesotaGasPrices.com Gasoline Prices	✓	✓	✓
City of Minneapolis Downtown Minneapolis Parking Rates	Not Needed	✓	✓
University of Minnesota Parking Spaces and Rates	Not Needed	✓	✓
Mn/DOT RTMC Roadway Construction	Not Needed	Some	✓
Mn/DOT RTMC Major Weather Conditions, Traffic Incidents, and Special Events	Not Needed	Some	✓
Control Corridors and Region-Wide Traffic, Transit, and Crash Data from Other Test Plans	Some	Some	✓

2.3 Potential Risks

There do not appear to be any significant risks associated with obtaining the information from the sources outlined previously. A potential risk is the reliance on the availability of updated data on the DEED, US DOE, MinnesotaGasPrice.com, and City of Minneapolis websites, as well as the ability to obtain updated information from the University of Minnesota and the Mn/DOT RTMC. All of these sources appear to provide regular data updates, however. Thus, no special efforts to address the low risk are recommended.

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3.0 DATA ANALYSIS

The information obtained in this test plan will be used as comparison checks in all of the analysis areas. The information on the exogenous factors will assist in identifying elements that may influence and explain changes in travel patterns, traffic conditions, mode changes, and use of telecommuting and alternative work arrangements in the I-35W corridor. Examples of the types of questions which may be examined are highlighted below.

- Were there significant changes in unemployment rates and how might these changes have influenced use of the Minnesota UPA projects?
- Were there significant changes in gasoline prices and how might these changes have influenced use of the Minnesota UPA projects?
- Were there significant changes in parking rates in downtown Minneapolis or the University of Minnesota and how might these changes have influenced use of the Minnesota UPA projects?
- Were there any major roadway construction, weather, incidents, or special events and how might these changes have influenced use of the Minnesota UPA projects?

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4.0 DATA COLLECTION SCHEDULE AND RESPONSIBILITY

Members of the Battelle team have already initiated data collection activities related to this test plan. As presented in Section 2.1, historical and pre-deployment data has been obtained on unemployment rates and gasoline prices. Pre-deployment information on parking rates in downtown Minneapolis municipal ramps, at the University of Minnesota, and major roadway construction projects has also been obtained. Members of the Battelle team will continue to monitor the on-line resources and obtain information from agencies over the course of the pre- and post-deployment periods.

The responsibilities for this test plan include:

- Battelle team members will monitor the on-line sources and update the tables on unemployment rates, gasoline prices, and downtown Minneapolis municipal parking ramp rates on a quarterly basis;
- Battelle team members will obtain information from the University of Minnesota Parking and Transportation Services before the start of the fall semesters and will monitor on-line information;
- Mn/DOT will provide information on major roadway construction projects, weather, incidents, and special events from the Mn/DOT RTMC to the Battelle team on a quarterly basis; and
- Battelle team members will analyze the data and incorporate the results into the appropriate analysis areas.

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APPENDIX A – COMPILATION OF HYPOTHESIS/QUESTIONS FROM THE MINNESOTA UPA NATIONAL EVALUATION PLAN

Evaluation Analysis	Hypothesis/Question Number	Hypothesis/Question
Congestion	MNCong-1	Deployment of the UPA improvements will reduce the travel time of users in the I-35W corridor.
	MNCong-2	Deployment of the UPA improvements will improve the reliability of user trips in the I-35W corridor.
	MNCong-3	Traffic congestion on I-35W will be reduced to the extent that travelers in the corridor will experience a noticeable improvement in travel time.
	MNCong-4	Deployment of the UPA projects will not cause an increase in the extent of traffic congestion on surrounding facilities adjacent to I-35W.
	MNCong-5	Deploying the UPA improvements will result in more vehicles and persons served in the I-35W corridor during peak periods.
	MNCong-6	A majority of survey respondents will indicate a noticeable reduction in travel times after the deployment of the UPA improvements.
	MNCong-7	A majority of survey respondents will indicate a noticeable improvement in trip-time reliability after the deployment of the UPA projects.
	MNCong-8	The majority of survey respondents will indicate a noticeable reduction in the duration of congestion after deployment of the UPA projects.
	MNCong-9	A majority of survey respondents will indicate a noticeable reduction in the extent of congestion after the deployment of the UPA projects.
Tolling	MNTolling-1	Vehicle access on the HOT lanes and PDSL on I-35W will be regulated to improve operation of I-35W
	MNTolling-2	Some general-purpose lane travelers will shift to the I-35W HOT lanes and PDSL, while HOV lane travelers will remain in the HOT lane
	MNTolling-3	HOV violations will be reduced
	MNTolling-4	After ramp-up, the HOT lanes and PDSL on I-35W maintains improved operations

Evaluation Analysis	Hypothesis/Question Number	Hypothesis/Question
Transit	MNTransit-1	The HOT lanes, PDSL, MARQ2 bus lanes, and Transit Advantage project, and shoulder running lane guidance system will increase bus travel speeds, reduce bus travel times, and improve bus trip-time reliability in the I-35W and Cedar Avenue corridors, and downtown Minneapolis
	MNTransit-2	The new park-and-ride lots and new and expanded transit services will result in ridership increases including a mode shift to transit.
	MNTransit-3	The mode shift to transit from the UPA transit strategies will reduce congestion on I-35W, downtown Minneapolis, and other roadways.
	MNTransit-4	What was the relative contribution of each of the Minnesota UPA transit strategies to mode shift to transit?
Telecommuting/ TDM	Tele/TDM-1	Use of telecommuting, ROWE, and other flexible work schedules removes trips and VMT from the I-35W corridor.
	Tele/TDM-2	Integration of telecommuting into the UPA project enhances congestion mitigation.
	Tele/TDM-3	What was the relative contribution of the telecommuting strategies to overall travel behavior changes, including secondary impacts of telecommuting
Technology	MNTech-1	Active traffic management strategies, including speed harmonization and DMS with transit and highway travel times, promoting better utilization and distribution of traffic to available capacity in the I-35W corridor.
	MNTech-2	Active traffic management strategies will reduce the number and duration of incidents that result in congestion in the I-35W corridor.
	MNTech-3	What was the relative contribution of each technology enhancement on congestion reduction in the I-35W corridors?
Safety	MNSafety-1	Active traffic management will reduce the number of primary and/or secondary crashes.
	MNSafety-2	The HOT lanes and the PDSL on I-35W South will not adversely affect highway safety.
	MNSafety-3	The MARQ2 dual bus lanes in Downtown Minneapolis will not adversely affect safety.
	MNSafety-4	The lane guidance system for shoulder running buses will not adversely affect safety.

Evaluation Analysis	Hypothesis/Question Number	Hypothesis/Question
Equity	MNEquity-1	What are the direct social effects (tolls paid, travel times, adaptation costs) for various transportation system user groups from the I-35W HOT lanes, PDSL, transit, and other UPA strategies?
	MNEquity-2	What is the spatial distribution of aggregate out-of-pocket and inconvenience costs, and travel-time and mobility benefits?
	MNEquity-3	Are there any differential impacts on certain socio-economic groups?
	MNEquity-4	How does reinvestment of revenues from the I-35W HOT lanes and PDSL impact various transportation system users?
Environmental	MNEnv-1	What are the impacts of the Minnesota UPA strategies on air quality?
	MNEnv-2	What are the impacts on perceptions of overall environmental quality?
	MNEnv-3	What are the impacts on energy consumption?
Goods Movement	MNGoods-1	CVOs will experience reduced travel time by using the HOV lanes and PDSL on I-35W if CVO use is permitted.
	MNGoods-2	CVOs will experience reduced travel time by the overall reduction in congestion on I-35W from the UPA projects.
	MNGoods-3	CVOs hauling or delivering goods will perceive net benefit of HOT and PDSL (e.g., benefits such as faster service and greater customer satisfaction outweigh higher operating costs due to tolls). The exception may be in downtown Minneapolis, where delivery and service vehicles will not be allowed to use the dual bus lanes during the peak hours.
Business	MNBusiness-1	What is the impact of the UPA strategies on employers? e.g., employee satisfaction with commute perceived productivity impacts employee retention/hiring impacts negative impacts (increased cost of doing business)
	MNBusiness-2	How are businesses that are particularly impacted by transportation costs affected (e.g., taxis, couriers, distributors, tradesmen)?

Evaluation Analysis	Hypothesis/Question Number	Hypothesis/Question
Non-Technical	MNNonTech-1	What role did factors related to “people” play in the success of the deployment? People (sponsors, champions, policy entrepreneurs, neutral conveners)
	MNNonTech-2	What role did factors related to “process” play in the success of the deployment? Process (forums including stakeholder outreach, meetings, alignment of policy ideas with favorable politics, and agreement on nature of the problem)
	MNNonTech-3	What role did factors related to “structures” play in the success of the deployment? Structures (networks, connections and partnerships, concentration of power and decision-making authority, conflict-management mechanisms, communications strategies, supportive rules and procedures)
	MNNonTech-4	What role did factors related to “media” play in the success of the deployment? Media (media coverage, public education)
	MNNonTech-5	What role did factors related to “competencies” play in the success of the deployment? Competencies (cutting across the preceding areas: persuasion, getting grants, doing research, technical/technological competencies; ability to be policy entrepreneurs; knowing how to use markets)
	MNNonTech-6	Does the public support the UPA/CRD strategies as effective and appropriate ways to reduce congestion?
Cost Benefit	MNCBA-1	What is the net benefit (benefits minus costs) of the UPA/CRD strategies?

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EDL # 14510