Greater Minneapolis External Origin-Destination Survey

2010 Travel Behavior Inventory

prepared for
Metropolitan Council

prepared by
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date
April 30, 2014
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1.0 Background

The 2010 Travel Behavior Inventory project is aimed at capturing travel behavior and travel patterns in the 19-county Metropolitan Council area. As part of this study, an origin-destination survey was conducted to capture the automobile-based travel patterns of non-residents that travel into, out of, or through the Metropolitan Council area.

This survey was conducted in a two-phase approach. First, license plates were captured at several key perimeter roadway locations. These license plates were matched to vehicle owner addresses by Minnesota and Wisconsin DOT staff analysis. These surveys were administered to those drivers whose addresses were outside the Metropolitan Council area.

Key steps in the survey process include:

- Coordination with Minnesota and Wisconsin State Departments of Transportation (MnDOT and WisDOT) to match license-plate information with driver address databases;
- Development of a simple survey questionnaire that focuses on only the most relevant travel behavior questions; and
- Development of customized location-specific questionnaires to serve as a prompted recall instrument for drivers.

Cambridge Systematics developed the survey questionnaire and assisted the Metropolitan Council in identifying the 14 locations for the license plate capture. The license plate capture was conducted by the Minnesota Traffic Observatory (MTO) at the University of Minnesota with support from Robert Gollnik, an independent contractor.

The report is structured as follows. Section 2 presents an outline of roadways included in the data collection and outlines the license plate capture data collection process. Section 3 describes how these license plates were used to support the prompted recall survey process. Also included in this section is an outline of the survey expansion process. Section 4 summarizes some of the key findings.
2.0 License Plate Capture Study


This section of the report outlines the site selection procedures, data collection plan, and results from the count analyses conducted using the license plate capture data.

2.1 Site Selection

Prior to gathering data on each roadway, it was necessary to inspect the area in person in order to determine the best locations to set up the video equipment. The criteria for selecting a site included the following:

- The safety of the data collection crew was critical - only those sites that ensured safety for the crews were considered further.
- The only other selection criterion was to identify locations that were best suited for the mounting of the video cameras to maximize the clarity of the recorded license plates.


Site inspections focused on locating either a safe overpass location from which to observe the desired freeway, or a generally straight segment with as low a speed limit as possible. Overpasses were preferred as they allowed the camera equipment to be placed on a lower-volume roadway, usually protected by curbs or concrete barriers for pedestrians.

In cases where there were no nearby overpasses, low-speed zones within towns offered a good second option. Lower speeds allowed cameras more time to capture license plates clearly and reduced the safety concerns for the crew. If no low-speed zones were available, straight segments of rural highway were acceptable locations.

Figure 2.1 below shows the locations of each of the 14 sites identified for data collection. Low speed sites are marked with small blue pins and the Interstate locations are marked with larger red pins.
• High Speed Locations:
  - I-35 north at Rush City
  - I-35 south at Medford
  - I-94 east at Wisconsin-128
  - I-94 west at Opportunity Drive

• Low Speed
  - MN-7 at Hutchinson
  - MN-55 at Annandale
  - MN-65 at Andree
  - US-8 at Turtle Lake (Wisconsin)
  - US-10 at Clear Lake
  - US-12 at Cokato
  - US-52 at Pine Island
  - US-61 at Lake City
  - US-169 north at Zimmerman
  - US-169 south at Le Sueur
2.2 **CAMERA EQUIPMENT**

The four Interstate locations controlled purchasing decisions as they represented the highest speed locations and required the most cameras. The study design required that all four sites were surveyed simultaneously to capture through movements. These sites also included the greatest number of lanes. As a result, 16 sets of camera equipment were required to successfully complete the capturing of license plates using one set for each lane across all the Interstate locations.

- The Samsung SMX-F50 camcorder was selected based on its resolution, optical zoom, manual shutter control, ease of use, and cost.
  - Each camera came with a standard battery pack, cables, and software. In addition to the standard battery pack, 3 extended-life battery packs were purchased for each camera.
- In order to charge the batteries, rapid battery chargers were purchased. Each charger included an adapter to plug into a vehicle, allowing on site charging during data collection.

- Power splitters were also purchased for each team (set of four cameras) in order to charge multiple batteries simultaneously on site.

- Fourteen Voyager tripods were purchased to mount and secure the cameras on site. A total of 22 (one per camera and six backup) 32-GB flash cards were purchased to store the data on each video camera. **Table 2.1** describes the costs associated with the equipment purchase.

### Table 2.1 Equipment Cost

<table>
<thead>
<tr>
<th>Item</th>
<th>Number</th>
<th>Price/Unit</th>
<th>Total Cost</th>
</tr>
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<tbody>
<tr>
<td>Samsung SMX-F50 Digital Camcorder</td>
<td>16</td>
<td>$139.00</td>
<td>$2224.00</td>
</tr>
<tr>
<td>BP210E Battery Pack</td>
<td>4</td>
<td>$19.95</td>
<td>$79.80</td>
</tr>
<tr>
<td>BP210E Battery Pack</td>
<td>44</td>
<td>$26.26</td>
<td>$1155.44</td>
</tr>
<tr>
<td>Rapid Battery Charger</td>
<td>16</td>
<td>$9.99</td>
<td>$159.84</td>
</tr>
<tr>
<td>Voyager Lite Tripod</td>
<td>14</td>
<td>$47.88</td>
<td>$670.32</td>
</tr>
<tr>
<td>Transcend 32 GB SD Memory</td>
<td>6</td>
<td>$42.80</td>
<td>$256.80</td>
</tr>
<tr>
<td>Transcend 32 GB SD Memory</td>
<td>16</td>
<td>$43.79</td>
<td>$700.64</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$5,246.84</strong></td>
</tr>
</tbody>
</table>

Source: So
2.3 **DATA COLLECTION – LICENSE PLATE CAPTURE**

Between October 25th and November 10th, 2011, each site was visited once to collect data. The ten non-interstate sites were visited by a team of two staff at a time, except for US-10 which required two teams simultaneously. The Interstate sites were surveyed simultaneously on November 9th, 2011 to capture the through movements more accurately. Sites were only visited during mid-week days (Tuesday, Wednesday, or Thursday) in order to avoid capturing irregular travel patterns.

Each crew was equipped with one set of equipment per lane, rope, bungee cords, weights, and safety cones, barrels, and vests. Crews arrived on site between 6:00 and 6:30 am for setup. Cameras began recording as soon as possible between 6:30 and 7:00 am depending on natural light conditions. Crews monitored equipment every 15-20 minutes throughout the day to ensure that the cameras were set correctly and were able to capture license plates as clearly as possible. Batteries were switched out as necessary and charged as quickly as possible.

Recording at each site continued throughout the day until dark. When light became insufficient to capture license plates, equipment was packed up and returned to the MTO for processing. For non-Interstate sites, only two to four cameras were required per site so each ‘team’ of four cameras would have at least one day of “down time” for uploading and recharging before going out on the field again.

In order to ensure the safety of the crews on site, traffic cones and barrels were deployed slightly upstream of the cameras and near the crew’s parked vehicle as necessary. Crew members wore reflective vests whenever outside the vehicle. Figure 2.2 below shows an example of cones protecting a camera at a roadside location.

![Figure 2.2 Safety Procedures Employed During License Plate Capture](image)

*Source: Safety Procedures Undertaken by the MTO.*
As teams completed the data collection at each site, the equipment sets were returned to the MTO. The data from each camera were given a quick examination to make sure they were useable before being uploaded to the MTO file server and duplicated onto an offline hard disk. Once the files were confirmed on both the server and hard disk, the originals on the flash drives were erased in preparation for reuse in the field.

Cameras, tripods, batteries, and chargers were all checked after the completion of data collection at each site to ensure that the equipment was functioning properly.

2.4 DATA PROCESSING

A specialized video processing program was used for data processing. The software allowed the video to proceed at a faster-than-real-time speed until a vehicle appeared in frame. All vehicles were categorized into one of three categories:

- Standard passenger vehicles with plates that were visible were counted and their license plates were recorded (plate and state);
- Standard passenger vehicles with plates that were not visible were counted; and
- Semi tractor-trailers, construction equipment, and other large commercial vehicles which would not lead to an individual driver-owner were noted.

Each vehicle was then classified and recorded using a shared spreadsheet system. Any irregularities such as nearly readable plates, unknown states, etc. that were found by the students were noted and checked by S. Zitzow.

Figure 2.3 shows the video processing software. Due to the way the cameras stored video data, a filter had to be used to remove image blurring.

Figure 2.3 Screenshot of Video Analysis Software with Filter Applied

Source: Video Filter Procedures Employed by MTO.
Figure 2.4 shows a portion of a spreadsheet where the data were recorded. Each location was recorded on a separate spreadsheet with tabs for directions and, if necessary, lane or am/pm. Each camera recorded video in a series of files with varying lengths from a few seconds up to slightly over an hour. Each video file was listed separately on the appropriate spreadsheet and tab.

**Figure 2.4  Screenshot of a Spreadsheet for License Plate Recording**

<table>
<thead>
<tr>
<th>Folder</th>
<th>File</th>
<th>Plate</th>
<th>State</th>
<th>Comments</th>
<th>Irrelevant</th>
<th>Not Visible/Unreadable/Missing</th>
</tr>
</thead>
<tbody>
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<td>104</td>
<td>V7G-779</td>
<td>MN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>2FDJMT</td>
<td>W</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>106</td>
<td>4962LX</td>
<td>W</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>107</td>
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<td></td>
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<tr>
<td>108</td>
<td>7499OM</td>
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<td></td>
<td></td>
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<tr>
<td>109</td>
<td>5799PH</td>
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<td>103BVS</td>
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<td></td>
</tr>
</tbody>
</table>

Source: Data Processing and Reporting Spreadsheets Developed by MTO.

After the data retrieval for each location was completed, the relevant spreadsheet was reviewed by supervisors and a backup duplicate was made. A special script written by the MTO was used to cross check the plates recorded for each video file against every other video file to ensure that no mistaken duplications had been made.

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1 It is important to note that the MN-55 data was processed first and, initially, commercial vehicles were not counted. Partway into the processing for MN-55, commercial vehicle counts were kept. As a result, the commercial/other vehicle counts for MN-55 are significantly lower than reality. Since the count of commercial vehicles is secondary to the project, the videos were not revisited.
2.5 Results

Table 2.2 details the final results of data processing. 138,217 vehicle events and nearly 100,000 unique plates were collected from the 436 hours of video recording. Over 26,000 commercial vehicles and nearly 13,000 unreadable plates were also noted. These values corresponded to 19 percent and 9.4 percent of the total highway volume, respectively.

Table 2.2  License Plate Counts by Location and Direction

<table>
<thead>
<tr>
<th>Location</th>
<th>Direction</th>
<th>Lanes</th>
<th>Time</th>
<th>Plates</th>
<th>Plates/Hr/Ln</th>
<th>Commercial</th>
<th>Unreadable</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-35</td>
<td>NB</td>
<td>2</td>
<td>18:47:39</td>
<td>6175</td>
<td>328.7</td>
<td>815</td>
<td>721</td>
<td>7711</td>
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<tr>
<td></td>
<td>SB</td>
<td>2</td>
<td>18:53:16</td>
<td>5011</td>
<td>265.1</td>
<td>709</td>
<td>613</td>
<td>6333</td>
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<tr>
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<td>NB</td>
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<td>19:45:48</td>
<td>4924</td>
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<td>2010</td>
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<td>7621</td>
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<td>742</td>
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<td>847</td>
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<table>
<thead>
<tr>
<th>Location</th>
<th>Direction</th>
<th>Lanes</th>
<th>Time</th>
<th>Plates</th>
<th>Plates/Hr/Ln</th>
<th>Commercial</th>
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<th>Volume</th>
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<td>475</td>
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<td>2977</td>
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<td>8:58:43</td>
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<td>155</td>
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<td>1219</td>
<td>126.3</td>
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<td>174</td>
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<td>978</td>
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<td>1093</td>
<td>391</td>
<td>5901</td>
</tr>
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<td>15:31:25</td>
<td>3478</td>
<td>236.3</td>
<td>618</td>
<td>351</td>
<td>4447</td>
</tr>
<tr>
<td>US-61</td>
<td>EB</td>
<td>1</td>
<td>10:10:53</td>
<td>1564</td>
<td>153.6</td>
<td>354</td>
<td>222</td>
<td>2140</td>
</tr>
<tr>
<td></td>
<td>WB</td>
<td>1</td>
<td>10:48:22</td>
<td>1758</td>
<td>162.7</td>
<td>315</td>
<td>174</td>
<td>2247</td>
</tr>
<tr>
<td>US-169</td>
<td>NB</td>
<td>2</td>
<td>20:19:16</td>
<td>4508</td>
<td>220.8</td>
<td>561</td>
<td>746</td>
<td>5815</td>
</tr>
<tr>
<td></td>
<td>SB</td>
<td>2</td>
<td>20:39:09</td>
<td>3749</td>
<td>181.5</td>
<td>578</td>
<td>751</td>
<td>5078</td>
</tr>
<tr>
<td>US-169</td>
<td>NB</td>
<td>2</td>
<td>20:04:47</td>
<td>2993</td>
<td>151.2</td>
<td>659</td>
<td>212</td>
<td>3864</td>
</tr>
<tr>
<td></td>
<td>SB</td>
<td>2</td>
<td>20:04:56</td>
<td>2961</td>
<td>147.2</td>
<td>769</td>
<td>248</td>
<td>3978</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td>28</td>
<td>282:32:46</td>
<td>54946</td>
<td>194.7</td>
<td>10250</td>
<td>6464</td>
<td>71660</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Direction</th>
<th>Lanes</th>
<th>Time</th>
<th>Plates</th>
<th>Plates/Hr/Ln</th>
<th>Commercial</th>
<th>Unreadable</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJECT TOTALS</td>
<td></td>
<td>44</td>
<td>436:39:34</td>
<td>98993</td>
<td>228.2</td>
<td>26300</td>
<td>12924</td>
<td>138217</td>
</tr>
</tbody>
</table>

Source: Data Processing Results Prepared by MTO.
A trip is defined as a ‘through’ trip when a vehicle enters the Metropolitan Council area by Interstate, travels through the freeway network using different paths, and emerges at a different Interstate location. In order to locate such trips, the plates entering at each Interstate site were compared to the plates exiting at every other Interstate site. Any plates appearing in both lists were considered ‘through’ trips. The condensed results are presented in Table 2.3.

**Table 2.3 Through Trips by Direction with State-by-State Volumes**

<table>
<thead>
<tr>
<th>From To</th>
<th>Total</th>
<th>State</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-35 South</td>
<td>58</td>
<td>CO</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IA</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MN</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MO</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NE</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WI</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WY</td>
<td>1</td>
</tr>
<tr>
<td>I-35 North</td>
<td>16</td>
<td>IL</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MN</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NY</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WI</td>
<td>2</td>
</tr>
<tr>
<td>I-94 East</td>
<td>4</td>
<td>MN</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WI</td>
<td>1</td>
</tr>
<tr>
<td>I-94 West</td>
<td>51</td>
<td>IA</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IL</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MN</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NE</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WI</td>
<td>2</td>
</tr>
<tr>
<td>I-94 West</td>
<td>16</td>
<td>CO</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IA</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MI</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MN</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NE</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WI</td>
<td>9</td>
</tr>
<tr>
<td>I-94 West</td>
<td>62</td>
<td>CO</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IA</td>
<td>17</td>
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<td></td>
<td></td>
<td>MN</td>
<td>30</td>
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<td></td>
<td></td>
<td>MT</td>
<td>1</td>
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<tr>
<td></td>
<td></td>
<td>ND</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WI</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Data Processing Results Prepared by MTO.

The license plates recorded were rechecked by Cambridge Systematics and shared (by location) with Minnesota DOT and Wisconsin DOT to generate user addresses for the prompted recall survey portion of the study. This process is discussed in greater detail in Section 3.
3.0 Prompted Recall Origin-Destination Survey

The next stage in the external origin-destination survey was to conduct a prompted recall survey to non-resident drivers whose vehicles were identified in the license plate capture portion of the study. This section outlines the development and implementation of the prompted recall survey.

3.1 Home Address Information

The license plate database provided by MTO was parsed into three separate databases – Minnesota license plates, Wisconsin license plates, and license plates from other states. The Minnesota and Wisconsin license plates were considered for further analysis:

- Of the 98,993 license plates that were recorded by MTO, 91,971 license plates were unique and belonged to either Minnesota or Wisconsin residents. Very few license plates were found to be from states other than Minnesota and Wisconsin.
- Among these, nearly 90 percent (83,373) of license plates belonged to Minnesota residents.
- There were only two locations, I-94 East and US-8, where more Wisconsin license plates were recorded than Minnesota license plates.
- The 91,971 license plates were shared with Minnesota and Wisconsin Departments of Transportation for address matching.

3.2 Identifying Drivers from External Regions

Once the home addresses were obtained, Cambridge Systematics’ staff assigned the home locations to a mapping system to identify drivers with home addresses outside the Metropolitan Council’s region.

- Of the 83,373 Minnesota licenses that were shared with Minnesota DOT, address matches were found for 78,744 license plates, a matching rate of over 94 percent.
- The matching of Wisconsin license plates was lower with 6,003 addresses matched among the 8,598 available license plates, a rate of 70 percent.
- Of the 84,747 license plates with an address match, only 24,725 addresses were found to be outside the study area. This is about 30 percent of all Wisconsin and Minnesota matched license plates.
• These 24,725 addresses serve as the sampling frame for the prompted recall origin-destination survey.

3.3 QUESTIONNAIRE DESIGN

It was always expected that a considerable amount of time would elapse from the time the license plate had been captured to the time the survey would be conducted. As a result, it was planned that the survey would be limited to a few key questions that provide information about travel purpose, time-of-day of travel, trip ends and frequency of trip making.

Further, it was also determined that customized questionnaires would be developed for each of the 14 locations. The surveys included a map of the interchange of interest (where the counts had been captured) to allow the respondent to provide information about a geographically accurate trip.

Figure 3.1 shows the customized questionnaire for the I-94 corridor.

Appendix B provides a list of all the survey questionnaires customized by location.

Figure 3.1  I-94 Origin-Destination Survey Questionnaire

Source: Survey Questionnaire Developed for the Origin-Destination Study by Cambridge Systematics.
3.4 **SURVEY IMPLEMENTATION**

A mail-in/mail-out survey option was selected for survey administration. Special care was taken to ensure that respondents were provided with a questionnaire that was consistent with the location where their license plate was captured.

- A local Minneapolis printing firm was hired to print and mail-out the surveys. The surveys had a pre-paid mailback postage stamp attached to them and respondents could simply fill out the survey and mail it back.
- In total, over 5,300 surveys were retrieved during the implementation phase reflecting a very good response rate of over 21 percent.
- One out of every three surveys had incomplete information, especially related to trip location information. These surveys were discarded from the final database which had a total of 3,377 surveys.
- **Table 3.1** showcases the distribution of the final survey database and compares it with other totals, such as total license plates captured, and the number of external addresses.

<table>
<thead>
<tr>
<th>Roadway</th>
<th>MN/WI Total License Plates</th>
<th>MN/WI External-to-Region Addresses</th>
<th>Usable Survey Records</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MN</td>
<td>WI</td>
<td>MN</td>
</tr>
<tr>
<td>I-35 N</td>
<td>10,123</td>
<td>709</td>
<td>1,495</td>
</tr>
<tr>
<td>I-35 S</td>
<td>7,993</td>
<td>258</td>
<td>2,404</td>
</tr>
<tr>
<td>I-94 E</td>
<td>3,308</td>
<td>4,604</td>
<td>254</td>
</tr>
<tr>
<td>I-94 W</td>
<td>12,936</td>
<td>316</td>
<td>3,543</td>
</tr>
<tr>
<td>MN-7</td>
<td>4,235</td>
<td>40</td>
<td>448</td>
</tr>
<tr>
<td>MN-55</td>
<td>5,347</td>
<td>14</td>
<td>934</td>
</tr>
<tr>
<td>MN-65</td>
<td>2,623</td>
<td>14</td>
<td>1,302</td>
</tr>
<tr>
<td>US-8</td>
<td>639</td>
<td>1,853</td>
<td>55</td>
</tr>
<tr>
<td>US-10</td>
<td>8,135</td>
<td>66</td>
<td>2,118</td>
</tr>
<tr>
<td>US-12</td>
<td>4,340</td>
<td>41</td>
<td>934</td>
</tr>
<tr>
<td>US-52</td>
<td>7,238</td>
<td>298</td>
<td>2,228</td>
</tr>
<tr>
<td>US-61</td>
<td>2,885</td>
<td>286</td>
<td>1,075</td>
</tr>
<tr>
<td>US-169 N</td>
<td>8,033</td>
<td>32</td>
<td>2,909</td>
</tr>
<tr>
<td>US-169 S</td>
<td>5,538</td>
<td>67</td>
<td>1,233</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>83,373</td>
<td>8,598</td>
<td>20,932</td>
</tr>
</tbody>
</table>

*Cambridge Systematics, Inc.*
3.5 **Survey Expansion**

Based on the available data, a simple two-step expansion procedure was developed and implemented:

- **Step 1.** The completed surveys from each location were expanded to the total number of “external addresses” for that location.

- **Step 2.** Given that different survey locations were surveyed for varying durations of time, a second expansion factor was used to properly compare the relative number of movements at each location.

- Table 3.2 identifies the expansion factors by survey location.

**Table 3.2 Survey Expansion Factor**

<table>
<thead>
<tr>
<th>Survey Location</th>
<th>Completion Rate Factor</th>
<th>Duration Normalization Factor</th>
<th>Joint Expansion Factor</th>
<th>Expanded Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-35 N</td>
<td>5.99</td>
<td>1.21</td>
<td>7.28</td>
<td>2,321</td>
</tr>
<tr>
<td>I-35 S</td>
<td>7.64</td>
<td>1.16</td>
<td>8.88</td>
<td>2,912</td>
</tr>
<tr>
<td>I-94 E</td>
<td>7.90</td>
<td>1.16</td>
<td>9.13</td>
<td>2,885</td>
</tr>
<tr>
<td>I-94 W</td>
<td>8.02</td>
<td>1.22</td>
<td>9.77</td>
<td>4,486</td>
</tr>
<tr>
<td>MN-55</td>
<td>7.11</td>
<td>1.04</td>
<td>7.41</td>
<td>978</td>
</tr>
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<td>MN-65</td>
<td>6.33</td>
<td>1.20</td>
<td>7.59</td>
<td>1,571</td>
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<tr>
<td>MN-7</td>
<td>9.63</td>
<td>1.05</td>
<td>10.12</td>
<td>486</td>
</tr>
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<td>US-10</td>
<td>9.20</td>
<td>1.12</td>
<td>10.30</td>
<td>2,400</td>
</tr>
<tr>
<td>US-12</td>
<td>7.44</td>
<td>1.00</td>
<td>7.44</td>
<td>945</td>
</tr>
<tr>
<td>US-169 N</td>
<td>7.45</td>
<td>1.12</td>
<td>8.32</td>
<td>3,262</td>
</tr>
<tr>
<td>US-169 S</td>
<td>6.38</td>
<td>1.14</td>
<td>7.27</td>
<td>1,439</td>
</tr>
<tr>
<td>US-52</td>
<td>6.76</td>
<td>1.31</td>
<td>8.88</td>
<td>3,117</td>
</tr>
<tr>
<td>US-61</td>
<td>5.87</td>
<td>1.09</td>
<td>6.40</td>
<td>1,306</td>
</tr>
<tr>
<td>US-8</td>
<td>7.34</td>
<td>1.19</td>
<td>8.77</td>
<td>693</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td>28,800</td>
</tr>
</tbody>
</table>
4.0 Analysis

This section highlights some of the key findings from the External O-D prompted recall survey data. The analysis focused on the three most relevant variables – travel purpose, time-of-day of travel and roadway traveled.

4.1 Origins and Destinations by Roadway

As outlined in Table 3.2, the three major roadways comprising of I-35, I-94 and US-169 account for nearly 60 percent of all external trips. Figures C.1 through C.11 in Appendix C showcase the distribution of trip origins by major roadway type. Similarly, Figures D.1 through D.11 in Appendix D showcase the distribution of trip destinations by major roadway type.

4.2 Travel Purpose

Travel purpose was segmented into four categories – work, shopping, university and “other” summarized in Figure 4.1.

- Work-related travel varies from a low of 23 percent on MN-7 to a high of 47 percent on MN-55.
- US-169, US-12, US-10 and US-61 also have a high share of work-related travel that is over 35 percent.
- The share of work-related travel on the two interstates is almost identical at 30 percent each.
- Shopping-related travel has a share of about 40 percent on all major roadways, except MN-55 (29 percent) and US-12 (34 percent).
- University-related travel has relatively modest shares of 1-2 percent on all roadways except I-94 which has a relatively higher share of about 4 percent.

4.3 Time-of-Day of Travel

Since this is a prompted recall survey, respondents could choose multiple times during which they made the trip. If respondents reported making the trip during the peak period, the data was assigned a “peak travel” label. If respondents reported making trips during off-peak hours only, then the trip was assigned an “off peak travel” label (Figure 4.2).

The share of off peak travel remains in the 18 – 20 percent range across all major roadways except US-52 where it is 24 percent, MN-55 where it is 12 percent, and US-8 where it is 14 percent of total trips.
Figure 4.1  Share of Travel Purpose by Roadway

Figure 4.2  Peak vs. Off Peak Travel by Roadway
The final dataset from the external O-D survey is included in this report as an attachment in Excel format. The documentation of the survey variables is included in Appendix E which provides a dictionary of all variables.
A. Site Locations

The specific license plate capture locations for each of the data collection sites are shown in Figure A.1 through Figure A.14.

At each location, an aerial image of the surrounding area is shown. The midpoint of the red band highlights the approximate location of the video camera that was used to capture the license plates of passing vehicles.

Figure A.1  I-35 North at Crossing of County Road 3 near Rush City, MN

Source: Aerial Imagery Map Developed by MTO.
Figure A.2  I-35 South at Central Avenue W in Medford, MN

Source: Aerial Imagery Map Developed by MTO.

Figure A.3  I-94 East at Crossing of Wisconsin 128 near Hersey, WI

Source: Aerial Imagery Map Developed by MTO.
Figure A.4  I-94 West at Opportunity Drive (County Highway 75)  
West of Clearwater, MN

Source: Aerial Imagery Map Developed by MTO.

Figure A.5  MN-7 at Hutchinson, MN East City Limit

Source: Aerial Imagery Map Developed by MTO.
Figure A.6  MN-55 at Cherry Avenue N in Annandale, MN

Source: Aerial Imagery Map Developed by MTO.

Figure A.7  MN-65 West of County Road 7 near Andree, MN

Source: Aerial Imagery Map Developed by MTO.
Figure A.8  US-8 West of US-63 at Turtle Lake, WI

Source: Aerial Imagery Map Developed by MTO.

Figure A.9  US-10 East of 75th Avenue SE in Clear Lake, MN

Source: Aerial Imagery Map Developed by MTO.
Figure A.10  US-12 West of Broadway Avenue N in Cokato, MN

Source: Aerial Imagery Map Developed by MTO.

Figure A.11  US-52 at County Highway 62 in Pine Island, MN

Source: Aerial Imagery Map Developed by MTO.
Figure A.12 US-61 at East Side of Frontenac, MN

Source: Aerial Imagery Map Developed by MTO.

Figure A.13 US-169 North at County Road 9 North of Zimmerman, MN

Source: Aerial Imagery Map Developed by MTO.
Figure A.14  US-169 South at County Highway 8 near Le Sueur, MN

Source: Aerial Imagery Map Developed by MTO.
B. Survey Instruments Customized for Each Intercept Location

Figure B.1 O-D Survey for MN 7 Highway

Travel Behavior Inventory Origin-Destination Survey

The Minnesota and Wisconsin Departments of Transportation are surveying drivers in several counties surrounding the Twin Cities metro area. The purpose of this survey is to better understand the needs of the transportation system users to prepare for future demand in McLeod and Carver Counties and the greater region.

Your household has been selected to participate in a brief survey as a potential user of MN State Highway 7. Please take a few minutes to answer the following questions.

Thank you for your time.

If you have any questions, please contact:
Jim Henricksen, Minnesota Department of Transportation
Tel. 651-234-7782 or jimi.henricksen@state.mn.us

Please think about the last time you used Minnesota State Highway 7 crossing the McLeod/Carver County line.

Did you start your trip on MN State Highway 7 at home?
a. Yes  b. No

If not, where did you start your trip on MN State Highway 7?
Nearest cross streets: ______________ at ______________
City or Place name: ______________

What was the destination of your trip?
Nearest cross streets: ______________ at ______________
City or Place name: ______________

What day of the week did you make your trip on MN State Highway 7?
a. Monday  b. Tuesday  c. Wednesday  d. Thursday  e. Friday

When did you make this trip on MN State Highway 7?
a. Before 4 AM  e. 12 Noon – 3 PM
b. 4 AM – 6 AM  f. 3 PM – 6 PM
c. 6 AM – 9 AM  g. 6 PM – 9 PM
d. 9 AM – 12 Noon  h. 9 PM – 12 Midnight

What was the primary purpose of your trip?
a. Commute to work or work-related  b. Shopping or leisure
c. School or University  d. Other ______________

Did you make this trip alone?
a. Yes  b. No

If no, how many passengers were traveling with you? ______________

Did you make a return trip on MN State Highway 7 on the same day?
a. Yes  b. No

When did you make your return trip on MN State Highway 7?
a. Before 4 AM  e. 12 Noon – 3 PM
b. 4 AM – 6 AM  f. 3 PM – 6 PM
c. 6 AM – 9 AM  g. 6 PM – 9 PM
d. 9 AM – 12 Noon  h. 9 PM – 12 Midnight
Figure B.2  O-D Survey for US 61 Highway

Travel Behavior Inventory Origin-Destination Survey

The Minnesota and Wisconsin Departments of Transportation are surveying drivers in several counties surrounding the Twin Cities metro area. The purpose of this survey is to better understand the needs of the transportation system users to prepare for future demand in Wabasha and Goodhue Counties and the greater region.

Your household has been selected to participate in a brief survey as a potential user of US Highway 61. Please take a few minutes to answer the following questions.

Thank you for your time.

If you have any questions, please contact:

Jim Henricksen, Minnesota Department of Transportation
Tel. 651-294-7782 or jim.henricksen@state.mn.us

Please think about the last time you used US Highway 61 crossing the Wabasha/Goodhue County line.

Did you start your trip on US Highway 61 at home?  
- Yes  - No

If not, where did you start your trip on US Highway 61?  
Nearest cross streets: _______ at _______
City or Place name: __________________________

What was the destination of your trip?  
Nearest cross streets: _______ at _______
City or Place name: __________________________

What day of the week did you make your trip on US Highway 61?  
a. Monday  b. Tuesday  c. Wednesday  d. Thursday  e. Friday

When did you make this trip on US Highway 61?  
a. Before 4 AM  e. 12 Noon – 3 PM
b. 4 AM – 6 AM  f. 3 PM – 6 PM
b. 4 AM – 6 AM  f. 3 PM – 6 PM
c. 6 AM – 9 AM  g. 6 PM – 9 PM
d. 9 AM – 12 Noon  h. 9 PM – 12 Midnight

What was the primary purpose of your trip?  
a. Commute to work or work-related  
b. Shopping or leisure  
c. School or University  
d. Other _______

Did you make this trip alone?  
- Yes  - No

If no, how many passengers were traveling with you? _______

Did you make a return trip on US Highway 61 on the same day?  
- Yes  - No

When did you make your return trip on US Highway 61?  
a. Before 4 AM  e. 12 Noon – 3 PM
b. 4 AM – 6 AM  f. 3 PM – 6 PM
b. 4 AM – 6 AM  f. 3 PM – 6 PM
c. 6 AM – 9 AM  g. 6 PM – 9 PM
d. 9 AM – 12 Noon  h. 9 PM – 12 Midnight
Figure B.3  O-D Survey for US 8 Highway

Travel Behavior Inventory Origin-Destination Survey

The Minnesota and Wisconsin Departments of Transportation are surveying drivers in several counties surrounding the Twin Cities metro area. The purpose of this survey is to better understand the needs of the transportation system users to prepare for future demand in Barron and Polk Counties and the greater region.

Your household has been selected to participate in a brief survey as a potential user of US Highway 8. Please take a few minutes to answer the following questions.

Thank you for your time.

Please think about the last time you used US Highway 8 crossing the Barron/Polk County line.

Did you start your trip on US Highway 8 at home?
- a. Yes
- b. No

If not, where did you start your trip on US Highway 8?
- Nearest cross streets: ___________ at ___________
- City or Place name: ___________

What was the destination of your trip?
- Nearest cross streets: ___________ at ___________
- City or Place name: ___________

What day of the week did you make your trip on US Highway 8?
- a. Monday
- b. Tuesday
- c. Wednesday
- d. Thursday
- e. Friday
- f. Other

When did you make this trip on US Highway 8?
- a. Before 4 AM
- b. 4 AM – 6 AM
- c. 6 AM – 9 AM
- d. 9 AM – 12 Noon
- e. 12 Noon – 3 PM
- f. 3 PM – 6 PM
- g. 6 PM – 9 PM
- h. 9 PM – 12 Midnight

What was the primary purpose of your trip?
- a. Commute to work or work-related
- b. Shopping or leisure
- c. School or University
- d. Other ___________

Did you make this trip alone?
- a. Yes
- b. No

If no, how many passengers were traveling with you? ___________

Did you make a return trip on US Highway 8 on the same day?
- a. Yes
- b. No

When did you make your return trip on US Highway 8?
- a. Before 4 AM
- b. 4 AM – 6 AM
- c. 6 AM – 9 AM
- d. 9 AM – 12 Noon
- e. 12 Noon – 3 PM
- f. 3 PM – 6 PM
- g. 6 PM – 9 PM
- h. 9 PM – 12 Midnight

If you have any questions, please contact:

Jim Henrickson, Minnesota Department of Transportation
Tel. 651-294-7782 or jim.henrickson@state.mn.us
Figure B.4  O-D Survey for MN 65 Highway

Travel Behavior Inventory Origin-Destination Survey

The Minnesota and Wisconsin Departments of Transportation are surveying drivers in several counties surrounding the Twin Cities metro area. The purpose of this survey is to better understand the needs of the transportation system users to prepare for future demand in Kanabec and Isanti Counties and the greater region.

Your household has been selected to participate in a brief survey as a potential user of MN State Highway 65. Please take a few minutes to answer the following questions.

Thank you for your time.

Please think about the last time you used MN State Highway 65 crossing the Kanabec/Isanti County line.

Did you start your trip on MN State Highway 65 at home?
- a. Yes
- b. No

If not, where did you start your trip on MN State Highway 65?
Nearest cross streets: __________ at __________
City or Place name: __________

What was the destination of your trip?
Nearest cross streets: __________ at __________
City or Place name: __________

What day of the week did you make your trip on MN State Highway 65?
- a. Monday
- b. Tuesday
- c. Wednesday
- d. Thursday
- e. Friday

When did you make this trip on MN State Highway 65?
- a. Before 4 AM
- b. 4 AM – 6 AM
- c. 6 AM – 9 AM
- d. 9 AM – 12 Noon
- e. 12 Noon – 3 PM
- f. 3 PM – 6 PM
- g. 6 PM – 9 PM
- h. 9 PM – 12 Midnight

What was the primary purpose of your trip?
- a. Commute to work or work-related
- b. Shopping or leisure
- c. School or University
- d. Other: __________

Did you make this trip alone?
- a. Yes
- b. No

If no, how many passengers were traveling with you? __________

Did you make a return trip on MN State Highway 65 on the same day?
- a. Yes
- b. No

When did you make your return trip on MN State Highway 65?
- a. Before 4 AM
- b. 4 AM – 6 AM
- c. 6 AM – 9 AM
- d. 9 AM – 12 Noon
- e. 12 Noon – 3 PM
- f. 3 PM – 6 PM
- g. 6 PM – 9 PM
- h. 9 PM – 12 Midnight

If you have any questions, please contact:
Jim Henrickson, Minnesota Department of Transportation
Tel 651-234-7782 or jim.henrickson@state.mn.us
Figure B.5   O-D Survey for I-35 N

Travel Behavior Inventory Origin-Destination Survey

The Minnesota and Wisconsin Departments of Transportation are surveying drivers in several counties surrounding the Twin Cities metro area. The purpose of this survey is to better understand the needs of the transportation system users to prepare for future demand in Pine and Chisago Counties and the greater region.

Your household has been selected to participate in a brief survey as a potential user of Interstate 35. Please take a few minutes to answer the following questions.

Thank you for your time.

If you have any questions, please contact:

Jim Henrickson, Minnesota Department of Transportation
Tel. 651-234-7782 or jim.henrickson@state.mn.us

Please think about the last time you used Interstate 35 crossing the Pine/Chisago County line.

Did you start your trip on Interstate 35 at home?
- a. Yes
- b. No

If not, where did you start your trip on Interstate 35?
- Nearest cross streets: _______ at _______
- City or Place name: __________________________

What was the destination of your trip?
- Nearest cross streets: _______ at _______
- City or Place name: __________________________

What day of the week did you make your trip on Interstate 35?
- a. Monday
- b. Tuesday
- c. Wednesday
- d. Thursday
- e. Friday

When did you make this trip on Interstate 35?
- a. Before 4 AM
- b. 4 AM – 6 AM
- c. 6 AM – 9 AM
- d. 9 AM – 12 Noon
- e. 12 Noon – 3 PM
- f. 3 PM – 6 PM
- g. 6 PM – 9 PM
- h. 9 PM – 12 Midnight

What was the primary purpose of your trip?
- a. Commute to work or work-related
- b. Shopping or leisure
- c. School or University
- d. Other ________

Did you make this trip alone?
- a. Yes
- b. No

If no, how many passengers were traveling with you? ________

Did you make a return trip on Interstate 35 on the same day?
- a. Yes
- b. No

When did you make your return trip on Interstate 35?
- a. Before 4 AM
- b. 4 AM – 6 AM
- c. 6 AM – 9 AM
- d. 9 AM – 12 Noon
- e. 12 Noon – 3 PM
- f. 3 PM – 6 PM
- g. 6 PM – 9 PM
- h. 9 PM – 12 Midnight
Figure B.6  O-D Survey for I-35 S

Please think about the last time you used Interstate 35 crossing the Steele/Rice County line.

Did you start your trip on Interstate 35 at home?
  a. Yes  b. No

If not, where did you start your trip on Interstate 35?
Nearest cross streets: __________________________ at __________________________
City or Place name: __________________________

What was the destination of your trip?
Nearest cross streets: __________________________ at __________________________
City or Place name: __________________________

What day of the week did you make your trip on Interstate 35?
  a. Monday  b. Tuesday  c. Wednesday  d. Thursday  e. Friday

When did you make this trip on Interstate 35?
  a. Before 4 AM  e. 12 Noon – 3 PM
  b. 4 AM – 6 AM  f. 3 PM – 6 PM
  c. 6 AM – 9 AM  g. 6 PM – 9 PM
  d. 9 AM – 12 Noon  h. 9 PM – 12 Midnight

What was the primary purpose of your trip?
  a. Commute to work or work-related
  b. Shopping or leisure
  c. School or University
  d. Other __________________________

Did you make this trip alone?
  a. Yes  b. No

If no, how many passengers were traveling with you? __________

Did you make a return trip on Interstate 35 on the same day?
  a. Yes  b. No

When did you make your return trip on Interstate 35?
  a. Before 4 AM  e. 12 Noon – 3 PM
  b. 4 AM – 6 AM  f. 3 PM – 6 PM
  c. 6 AM – 9 AM  g. 6 PM – 9 PM
  d. 9 AM – 12 Noon  h. 9 PM – 12 Midnight

If you have any questions, please contact:

Jim Henricksen, Minnesota Department of Transportation
Tel: 651-234-7782 or jim.henricksen@state.mn.us
Figure B.7  O-D Survey for MN 55 Highway

Please think about the last time you used MN State Highway 55 crossing the Stearns/Wright County line.

Did you start your trip on MN State Highway 55 at home?
  a. Yes  b. No

If not, where did you start your trip on MN State Highway 55?
Nearest cross streets: _________ at __________
City or Place name: ____________________________

What was the destination of your trip?
Nearest cross streets: _________ at __________
City or Place name: ____________________________

What day of the week did you make your trip on MN State Highway 55?
  a. Monday  b. Tuesday  c. Wednesday  d. Thursday  e. Friday

When did you make this trip on MN State Highway 55?
  a. Before 4 AM
  b. 4 AM – 6 AM
  c. 6 AM – 9 AM
  d. 9 AM – 12 Noon
  e. 12 Noon – 3 PM
  f. 3 PM – 6 PM
  g. 6 PM – 9 PM
  h. 9 PM – 12 Midnight

What was the primary purpose of your trip?
  a. Commute to work or work-related
  b. Shopping or leisure
  c. School or University
  d. Other

Did you make this trip alone?
  a. Yes  b. No

If no, how many passengers were traveling with you? _________

Did you make a return trip on MN State Highway 55 on the same day?
  a. Yes  b. No

When did you make your return trip on MN State Highway 55?
  a. Before 4 AM
  b. 4 AM – 6 AM
  c. 6 AM – 9 AM
  d. 9 AM – 12 Noon
  e. 12 Noon – 3 PM
  f. 3 PM – 6 PM
  g. 6 PM – 9 PM
  h. 9 PM – 12 Midnight

If you have any questions, please contact:
Jim Hendricksen, Minnesota Department of Transportation
Tel. 651-294-7782 or jim.hendricksen@state.mn.us
Figure B.8 O-D Survey for I-US 169 N Highway

Travel Behavior Inventory Origin-Destination Survey

The Minnesota and Wisconsin Departments of Transportation are surveying drivers in several counties surrounding the Twin Cities metro area. The purpose of this survey is to better understand the needs of the transportation system users to prepare for future demand in Mille Lacs and Sherburne Counties and the greater region.

Your household has been selected to participate in a brief survey as a potential user of US Highway 169. Please take a few minutes to answer the following questions.

Thank you for your time.

Did you start your trip on US Highway 169 at home?
- Yes
- No

If not, where did you start your trip on US Highway 169?
- Nearest cross streets: __________________ at __________________
- City or Place name: __________________

What was the destination of your trip?
- Nearest cross streets: __________________ at __________________
- City or Place name: __________________

What day of the week did you make your trip on US Highway 169?
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday

When did you make this trip on US Highway 169?
- Before 4 AM
- 4 AM – 6 AM
- 6 AM – 9 AM
- 9 AM – 12 Noon
- 12 Noon – 3 PM
- 3 PM – 6 PM
- 6 PM – 9 PM
- 9 PM – 12 Midnight

What was the primary purpose of your trip?
- Commute to work or work-related
- Shopping or leisure
- School or University
- Other: __________

Did you make this trip alone?
- Yes
- No

If no, how many passengers were traveling with you? __________

Did you make a return trip on US Highway 169 on the same day?
- Yes
- No

When did you make your return trip on US Highway 169?
- Before 4 AM
- 4 AM – 6 AM
- 6 AM – 9 AM
- 9 AM – 12 Noon
- 12 Noon – 3 PM
- 3 PM – 6 PM
- 6 PM – 9 PM
- 9 PM – 12 Midnight

If you have any questions, please contact:
Jim Hendricksen, Minnesota Department of Transportation
Tel: 651-234-7782 or jim.hendricksen@state.mn.us
Figure B.9  O-D Survey for I-94 W

Travel Behavior Inventory Origin-Destination Survey

The Minnesota and Wisconsin Departments of Transportation are surveying drivers in several counties surrounding the Twin Cities metro area. The purpose of this survey is to better understand the needs of the transportation system users to prepare for future demand in Stearns and Wright Counties and the greater region.

Your household has been selected to participate in a brief survey as a potential user of Interstate 94. Please take a few minutes to answer the following questions.

Thank you for your time.

If you have any questions, please contact:
Jim Hendrickson, Minnesota Department of Transportation
Tel. 651-234-7762 or jim.hendrickson@state.mn.us

Please think about the last time you used Interstate 94 crossing the Stearns/Wright County line.

Did you start your trip on Interstate 94 at home?
a. Yes  b. No

If not, where did you start your trip on Interstate 94?
Nearest cross streets: ________ at ________
City or Place name: ________

What was the destination of your trip?
Nearest cross streets: ________ at ________
City or Place name: ________

What day of the week did you make your trip on Interstate 94?
 a. Monday  b. Tuesday  c. Wednesday  d. Thursday  e. Friday

When did you make this trip on Interstate 94?
 a. Before 4 AM  e. 12 Noon – 3 PM
 b. 4 AM – 6 AM  f. 3 PM – 6 PM
 c. 6 AM – 9 AM  g. 6 PM – 9 PM
 d. 9 AM – 12 Noon  h. 9 PM – 12 Midnight

What was the primary purpose of your trip?
 a. Commute to work or work-related
 b. Shopping or leisure
 c. School or University
 d. Other ________

Did you make this trip alone?
 a. Yes  b. No

If no, how many passengers were traveling with you? ________

Did you make a return trip on Interstate 94 on the same day?
 a. Yes  b. No

When did you make your return trip on Interstate 94?
 a. Before 4 AM  e. 12 Noon – 3 PM
 b. 4 AM – 6 AM  f. 3 PM – 6 PM
 c. 6 AM – 9 AM  g. 6 PM – 9 PM
 d. 9 AM – 12 Noon  h. 9 PM – 12 Midnight
Greater Minneapolis External Origin-Destination Survey
Appendix

Figure B.10  O-D Survey for I-94 E

Travel Behavior Inventory Origin-Destination Survey

The Minnesota and Wisconsin Departments of Transportation are surveying drivers in several counties surrounding the Twin Cities metro area. The purpose of this survey is to better understand the needs of the transportation system users to prepare for future demand in St. Croix and Dunn Counties and the greater region.

Your household has been selected to participate in a brief survey as a potential user of Interstate 94. Please take a few minutes to answer the following questions.

Thank you for your time.

If you have any questions, please contact:
Jim Henrickson, Minnesota Department of Transportation
Tel: 651-294-7782 or jim.henrickson@state.mn.us

Please think about the last time you used Interstate 94 crossing the St. Croix/Dunn County line.

Did you start your trip on Interstate 94 at home?
   a. Yes   b. No

If not, where did you start your trip on Interstate 94?
Nearest cross streets: ________ at ________
City or Place name: ________ at ________

What was the destination of your trip?
Nearest cross streets: ________ at ________
City or Place name: ________ at ________

What day of the week did you make your trip on Interstate 94?
   a. Monday   b. Tuesday   c. Wednesday  d. Thursday  e. Friday

When did you make this trip on Interstate 94?
   a. Before 4 AM  e. 12 Noon – 3 PM
   b. 4 AM – 6 AM  f. 3 PM – 6 PM
   c. 6 AM – 9 AM  g. 6 PM – 9 PM
   d. 9 AM – 12 Noon h. 9 PM – 12 Midnight

What was the primary purpose of your trip?
   a. Commute to work or work-related
   b. Shopping or leisure
   c. School or University
   d. Other ________

Did you make this trip alone?
   a. Yes   b. No

If no, how many passengers were traveling with you? ________

Did you make a return trip on Interstate 94 on the same day?
   a. Yes   b. No

When did you make your return trip on Interstate 94?
   a. Before 4 AM  e. 12 Noon – 3 PM
   b. 4 AM – 6 AM  f. 3 PM – 6 PM
   c. 6 AM – 9 AM  g. 6 PM – 9 PM
   d. 9 AM – 12 Noon h. 9 PM – 12 Midnight
Figure B.11 O-D Survey for US 12 Highway

Travel Behavior Inventory Origin-Destination Survey
The Minnesota and Wisconsin Departments of Transportation are surveying drivers in several counties surrounding the Twin Cities metro area. The purpose of this survey is to better understand the needs of the transportation system users to prepare for future demand in Meeker and Wright Counties and the greater region.

Your household has been selected to participate in a brief survey as a potential user of US Highway 12. Please take a few minutes to answer the following questions.

Thank you for your time.

Please think about the last time you used US Highway 12 crossing the Meeker/Wright County line.

Did you start your trip on US Highway 12 at home?
  a. Yes  b. No

If not, where did you start your trip on US Highway 12?
Nearest cross streets: _________ at _________
City or Place name: _________

What was the destination of your trip?
Nearest cross streets: _________ at _________
City or Place name: _________

What day of the week did you make your trip on US Highway 12?
  a. Monday  b. Tuesday  c. Wednesday  d. Thursday  e. Friday

When did you make this trip on US Highway 12?
  a. Before 4 AM  e. 12 Noon – 3 PM
  b. 4 AM – 6 AM  f. 3 PM – 6 PM
  c. 6 AM – 9 AM  g. 6 PM – 9 PM
  d. 9 AM – 12 Noon  h. 9 PM – 12 Midnight

What was the primary purpose of your trip?
  a. Commute to work or work-related
  b. Shopping or leisure
  c. School or University
  d. Other _________

Did you make this trip alone?
  a. Yes  b. No

If no, how many passengers were traveling with you? _________

Did you make a return trip on US Highway 12 on the same day?
  a. Yes  b. No

When did you make your return trip on US Highway 12?
  a. Before 4 AM  e. 12 Noon – 3 PM
  b. 4 AM – 6 AM  f. 3 PM – 6 PM
  c. 6 AM – 9 AM  g. 6 PM – 9 PM
  d. 9 AM – 12 Noon  h. 9 PM – 12 Midnight

If you have any questions, please contact:
Jim Herricksen, Minnesota Department of Transportation
Tel. 651-294-7782 or jim.herricksen@state.mn.us

If you have any questions, please contact:
Jim Herricksen, Minnesota Department of Transportation
Tel. 651-294-7782 or jim.herricksen@state.mn.us
Figure B.12 O-D Survey for US 10 Highway

Travel Behavior Inventory Origin-Destination Survey

The Minnesota and Wisconsin Departments of Transportation are surveying drivers in several counties surrounding the Twin Cities metro area. The purpose of this survey is to better understand the needs of the transportation system users to prepare for future demand in Benton and Sherburne Counties and the greater region.

Your household has been selected to participate in a brief survey as a potential user of US Highway 10. Please take a few minutes to answer the following questions.

Thank you for your time.

If you have any questions, please contact:

Jim Hendrickson, Minnesota Department of Transportation
Tel 651-234-7782 or jim.hendrickson@state.mn.us

Please think about the last time you used US Highway 10 crossing the Benton/Sherburne County line.

Did you start your trip on US Highway 10 at home?
  a. Yes    b. No

If not, where did you start your trip US Highway 10?
Nearest cross streets: __________ at __________
City or Place name: __________

What was the destination of your trip?
Nearest cross streets: __________ at __________
City or Place name: __________

What day of the week did you make your trip on US Highway 10?
  a. Monday   b. Tuesday   c. Wednesday   d. Thursday   e. Friday

When did you make this trip on US Highway 10?
  a. Before 4 AM   e. 12 Noon – 3 PM
  b. 4 AM – 6 AM   f. 3 PM – 6 PM
  c. 6 AM – 9 AM   g. 6 PM – 9 PM
  d. 9 AM – 12 Noon  h. 9 PM – 12 Midnight

What was the primary purpose of your trip?
  a. Commute to work or work-related
  b. Shopping or leisure
  c. School or University
  d. Other __________

Did you make this trip alone?
  a. Yes    b. No

If no, how many passengers were traveling with you? __________

Did you make a return trip on US Highway 10 on the same day?
  a. Yes    b. No

When did you make your return trip on US Highway 10?
  a. Before 4 AM   e. 12 Noon – 3 PM
  b. 4 AM – 6 AM   f. 3 PM – 6 PM
  c. 6 AM – 9 AM   g. 6 PM – 9 PM
  d. 9 AM – 12 Noon  h. 9 PM – 12 Midnight
Figure B.13 O-D Survey for US 52 Highway

Travel Behavior Inventory Origin-Destination Survey

The Minnesota and Wisconsin Departments of Transportation are surveying drivers in several counties surrounding the Twin Cities metro area. The purpose of this survey is to better understand the needs of the transportation system users to prepare for future demand in Olmsted and Goodhue counties and the greater region.

Your household has been selected to participate in a brief survey as a potential user of US Highway 52. Please take a few minutes to answer the following questions.

Thank you for your time.

If you have any questions, please contact:
Jim Hendrickson, Minnesota Department of Transportation
Tel. 651-296-7782 or jim.hendrickson@state.mn.us

Please think about the last time you used US Highway 52 crossing the Olmsted/Goodhue County line.

Did you start your trip on US Highway 52 at home?
- Yes
- No

If not, where did you start your trip on US Highway 52?
Nearest cross streets: ___________________ at ___________________
City or Place name: ___________________

What was the destination of your trip?
Nearest cross streets: ___________________ at ___________________
City or Place name: ___________________

What day of the week did you make your trip on US Highway 52?
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday

When did you make this trip on US Highway 52?
- Before 4 AM
- 4 AM – 6 AM
- 6 AM – 9 AM
- 9 AM – 12 Noon
- 12 Noon – 3 PM
- 3 PM – 6 PM
- 6 PM – 9 PM
- 9 PM – 12 Midnight

What was the primary purpose of your trip?
- Commute to work or work-related
- Shopping or leisure
- School or University
- Other: __________

Did you make this trip alone?
- Yes
- No

If no, how many passengers were traveling with you? __________

Did you make a return trip on US Highway 52 on the same day?
- Yes
- No

When did you make your return trip on US Highway 52?
- Before 4 AM
- 4 AM – 6 AM
- 6 AM – 9 AM
- 9 AM – 12 Noon
- 12 Noon – 3 PM
- 3 PM – 6 PM
- 6 PM – 9 PM
- 9 PM – 12 Midnight
Figure B.14  O-D Survey for US 169 S Highway

Travel Behavior Inventory Origin-Destination Survey

The Minnesota and Wisconsin Departments of Transportation are surveying drivers in several counties surrounding the Twin Cities metro area. The purpose of this survey is to better understand the needs of the transportation system users to prepare for future demand in Nicollet and Sibley Counties and the greater region.

Your household has been selected to participate in a brief survey as a potential user of US Highway 169. Please take a few minutes to answer the following questions.

Thank you for your time.

If you have any questions, please contact:
Jim Herricksen, Minnesota Department of Transportation
Tel. 651-234-7702 or jim.herricksen@state.mn.us

Please think about the last time you used US Highway 169 crossing the Nicollet/Sibley County line.

Did you start your trip on US Highway 169 at home?
- a. Yes
- b. No

If not, where did you start your trip on US Highway 169?
- Nearest cross streets: ____________ at ____________
- City or Place name: ____________

What was the destination of your trip?
- Nearest cross streets: ____________ at ____________
- City or Place name: ____________

What day of the week did you make your trip on US Highway 169?
- a. Monday
- b. Tuesday
- c. Wednesday
- d. Thursday
- e. Friday

When did you make this trip on US Highway 169?
- a. Before 4 AM
- b. 4 AM – 6 AM
- c. 6 AM – 9 AM
- d. 9 AM – 12 Noon
- e. 12 Noon – 3 PM
- f. 3 PM – 6 PM
- g. 6 PM – 9 PM
- h. 9 PM – 12 Midnight

What was the primary purpose of your trip?
- a. Commute to work or work-related
- b. Shopping or leisure
- c. School or University
- d. Other

Did you make this trip alone?
- a. Yes
- b. No

If no, how many passengers were traveling with you? ____________

Did you make a return trip on US Highway 169 on the same day?
- a. Yes
- b. No

When did you make your return trip on US Highway 169?
- a. Before 4 AM
- b. 4 AM – 6 AM
- c. 6 AM – 9 AM
- d. 9 AM – 12 Noon
- e. 12 Noon – 3 PM
- f. 3 PM – 6 PM
- g. 6 PM – 9 PM
- h. 9 PM – 12 Midnight
C. Origins of Trips that Are Intercepted at Each Location

Figure C.1 Origins of I-35 Drivers
Figure C.2  Origins of I-94 Drivers

Figure C.3  Origins of MN 7 Drivers
Figure C.4  Origins of MN 55 Drivers

Figure C.5  Origins of MN 65 Drivers
Figure C.6  Origins of US 8 Drivers

Origin Location - US 8

Figure C.7  Origins of US 10 Drivers

Origin Location - US 10
Figure C.8  Origins of US 12 Drivers

Figure C.9  Origins of US 52 Drivers
Figure C.10 Origins of US 61 Drivers

Figure C.11 Origins of US 169 Drivers
D. Destinations of Trips Intercepted at Each Location

Figure D.1 Destinations of I-35 Drivers
Figure D.2  Destinations of I-94 Drivers

Figure D.3  Destinations of MN 7 Drivers
Figure D.4  Destinations of MN 55 Drivers

Figure D.5  Destinations of MN 65 Drivers
Figure D.6  Destinations of US 8 Drivers

Figure D.7  Destinations of US 10 Drivers
**Figure D.8  Destinations of US 12 Drivers**

**Figure D.9  Destinations of US 52 Drivers**
Figure D.10 Destinations of US 61 Drivers

Figure D.11 Destinations of US 169 Drivers
## E. O-D Survey Dictionary

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<td>unique ID assigned in data entry software</td>
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<tr>
<td><strong>FlyerID</strong></td>
<td>unique ID assigned in printed survey</td>
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| **Major Roadway**                  | primary roadway used for trip | I 94  
|                                    |                                  | I 35  
|                                    |                                  | MN 65 |
|                                    |                                  | MN 55 |
|                                    |                                  | MN 7  
|                                    |                                  | US 8  
|                                    |                                  | US 10 |
|                                    |                                  | US 12 |
|                                    |                                  | US 52  
|                                    |                                  | US 61 |
|                                    |                                  | US 169 |
| **CountyLine**                     | county border crossed in trip | Barron/Polk  
|                                    |                                  | Benton/Sherburne |
|                                    |                                  | Kanabec/Isanti  
|                                    |                                  | McLeod/Carver |
|                                    |                                  | Meeker/Wright |  
|                                    |                                  | Mille Lacs/Sherburne |
|                                    |                                  | Nicollet/Sibley |
|                                    |                                  | Olmsted/Goodhue |
|                                    |                                  | Pine/Chisago  
|                                    |                                  | St.Croix/Dunn  
|                                    |                                  | Stearns/Wright |
|                                    |                                  | Steele/Rice  
<p>|                                    |                                  | Wabasha/Goodhue |
| <strong>OriginateHome</strong>                  | trip originated at driver's residence | Yes |
|                                    |                                  | No |
| <strong>OXSt1</strong>                          | origin intersection cross-street 1 | [various] |
| <strong>OXSt2</strong>                          | origin intersection cross-street 2 | [various] |
| <strong>OCity</strong>                          | origin city | [various] |</p>
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<td>Home Address</td>
<td>home address of respondent is reported</td>
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<td>weights</td>
<td>Weights have been prepared accordingly to make the sample representative of the traffic movement across the study area</td>
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