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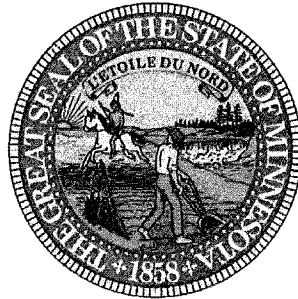
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New Emergency Operations Center Traffic Study

February 2011

Prepared for:



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COMMUNICATIONS SECTION
DEPT OF PUBLIC SAFETY
STATE OF MINNESOTA

Prepared By

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Executive Summary

The 2010 Laws of Minnesota, Chapter 189 states that bond proceeds for the predesign and design for the State Emergency Operations Center to be located in Arden Hills not be released until such time as the Commissioner of Administration reports to the Chairs and ranking minority members of the House and Senate Public Safety, Finance, Capital Investment, and Ways and Means committees "how the Arden Hills site will be adequately accessible in the event of a disaster that adversely affects major transportation corridors."

The State of Minnesota's Department of Public Safety, Division of Homeland Security and Emergency Management (HSEM) has asked Jacobs to perform an emergency operations traffic study to evaluate accessibility issues for its new Emergency Operations Center (E.O.C.), proposed to be located at the Arden Hills Army Training Site (AHATS). AHATS is a military training area under the control of The Minnesota National Guard. AHATS is located in the northeast quadrant of the I-35W and US 10 / Minnesota County Road 96 interchange, about 12 miles from the downtown St. Paul area. Arterials and freeways serving AHATS include I-35W, I-694, US 10 and major arterials in and around Arden Hills, MN. Three scenarios have been analyzed for the year 2015 as described below.

1. Base Case Scenario: Assumes the existing and proposed network and traffic volumes in the 2015 timeframe
2. Network Emergency: Assumes an event causing the closure of key segments of I-35W and I-694
3. Monticello Evacuation: Assumes the evacuation of the town of Monticello

Jacobs worked with the Metropolitan Council (Met. Council) to estimate Year 2015 traffic projections for all three scenarios.

The Network Emergency Scenario assumed that segments of two major freeways (I-35W and I-694) serving AHATS and the region were rendered unusable. Jacobs requested that the Met. Council provide travel demand model runs for the Year 2015 for this scenario.

For the Monticello Evacuation scenario, "panicked evacuation" trips from the Monticello area were manually added to freeway segments in the vicinity of AHATS. For this study, it was assumed that the trips from the Monticello area would use major routes to the Minneapolis-St. Paul area and to others areas around Monticello.

Jacobs then compared each of the alternate runs (Network Emergency and Monticello Evacuation) to the Base Scenario to determine where the roadway network could expect a significant increase in congestion levels. Volume to capacity ratios (V/C) were used in this analysis. V/C is the ratio of the projected demand to the capacity of each roadway segment and is commonly used as a measure of the sufficiency of the roadway segment to handle the projected traffic.

When both I-35W and I-694 are rendered unusable to traffic, the adversely affected roadways are generally between I-35W and I-35E for north-south movements and generally between US 10 and US 36 for east-west movements. Under the Network Emergency Scenario, emergency responders (i.e. State Agency Coordinators and Public Information Officers) who need to travel from the Capitol complex or downtown St. Paul to the E.O.C. should avoid using these affected roadways and use other roads for alternate access to

AHATS. The assumption that both routes are unusable is clearly an extreme scenario. With only one route interrupted, it would be easier to find alternative routes than if both occurred simultaneously. Alternatively, using other available travel modes for critical state agency responders (e.g. helicopter) could be used to avoid any roadway congestion.

Under the Monticello Evacuation Scenario, incident management personnel bound for the E.O.C. from the Capitol complex or the downtown St. Paul area should be able to use all major corridor routes (i.e., I-35W, I-35E, I-694 and US 10), because they would be traveling in the opposing direction from traffic leaving the Monticello area.

Because the proposed site for the E.O.C. will be the daily office space for HSEM staff who manage emergency operations and the E.O.C., staff will not have to travel if roads become unusable. Scheduling the E.O.C. will also be used as a means to avoid peak times during emergency operations. As reported in the 2008 comparison of the current E.O.C. facility to the proposed facility at AHATS, the average increase in travel distance for emergency responders is less than 4 miles.

Background

The 2010 Laws of Minnesota, Chapter 189 states that bond proceeds for the predesign and design for the State Emergency Operations Center to be located in Arden Hills not be released until such time as the Commissioner of Administration reports to the Chairs and ranking minority members of the House and Senate Public Safety, Finance, Capital Investment, and Ways and Means committees "how the Arden Hills site will be adequately accessible in the event of a disaster that adversely affects major transportation corridors."

The State of Minnesota's Department of Public Safety, Division of Homeland Security and Emergency Management (HSEM) has asked Jacobs to perform an emergency operations traffic study to evaluate accessibility issues for its new Emergency Operations Center (E.O.C), proposed to be located at the Arden Hills Army Training Site (AHATS). AHATS is a military training area under the control of The Minnesota National Guard. AHATS is located in the northeast quadrant of the I-35W and US10 / Minnesota County Road 96 interchange, about 12 miles from the downtown St. Paul area. Arterials and freeways serving AHATS include I-35W, I-694, US 10 and major arterials in and around Arden Hills, MN. **Figure 1** shows the study area.

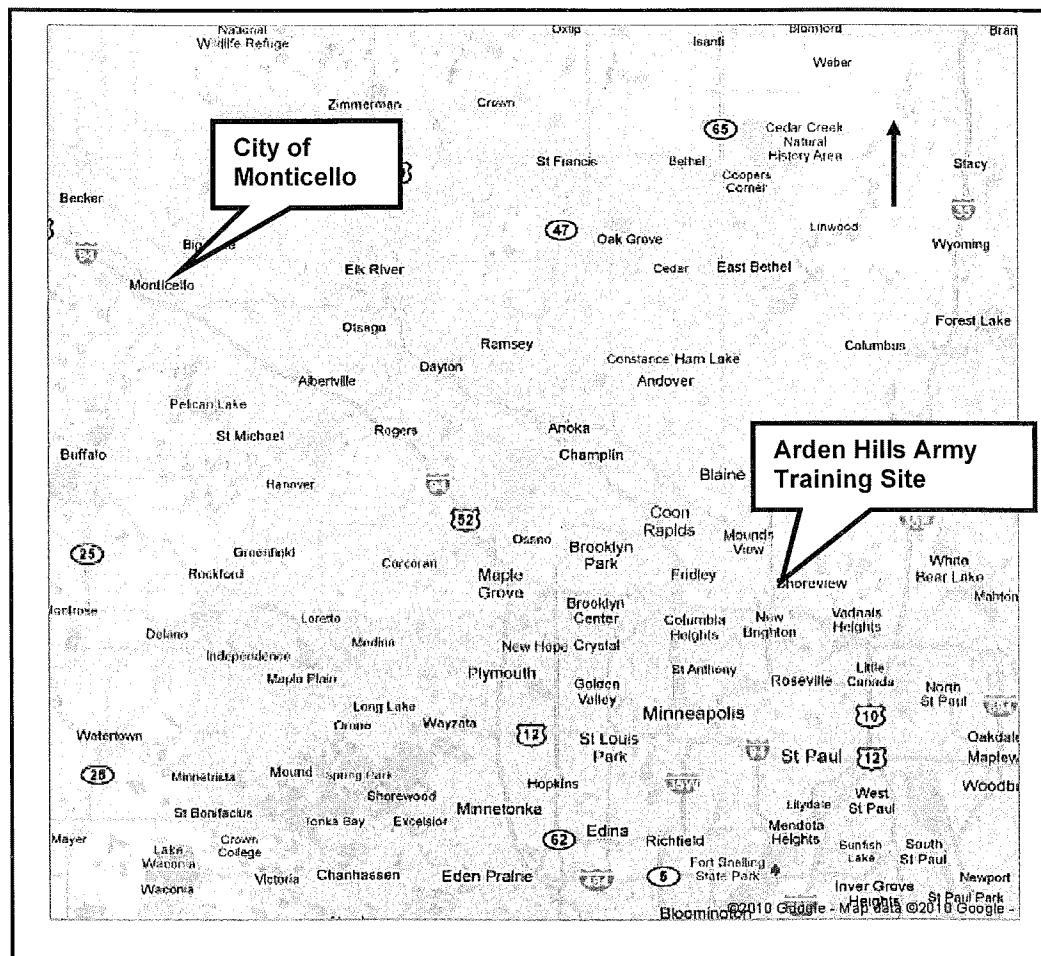


Figure 1 Study Area

Personnel needing to report to the E.O.C. include State Agency Coordinators and Public Information Officers. According to the 2008 comparative study of the existing E.O.C. location and the proposed location at AHATS, employees of the following agencies would potentially need to report to the E.O.C.:

- National Guard
- Department of Health
- Agriculture
- DNR
- PCA
- State Patrol
- Prairie Island Nuclear Power Plant
- Monticello Nuclear Power Plant
- Goodhue County
- Wright County
- Dakota County
- Sherburne County
- Federal responders

If an emergency occurs during normal working hours, HSEM personnel would already be on site, and the majority of the other emergency responders would travel from the Capitol complex or downtown St. Paul. If an emergency occurs during non-work hours, emergency personnel would report from all parts of the Minneapolis / St. Paul area. However, during these times, peak hour traffic flows would not be a factor.

Three transportation accessibility scenarios have been analyzed for the year 2015 as described below.

1. Base Case Scenario: Assumes the existing and proposed network and the traffic volumes in the 2015 timeframe
2. Network Emergency: Assumes an event causing the closure of key segments of I-35W and I-694
3. Monticello Evacuation: Assumes the evacuation of the town of Monticello

Methodology and Data Collection

Jacobs has reviewed and reconciled existing and projected (Year 2015) traffic data provided by the Minnesota Department of Transportation (MNDOT) and Metropolitan Council (Met. Council). The Met. Council is the regional planning agency serving the Twin Cities seven-county metropolitan area and providing essential services to the region. Jacobs obtained travel demand model runs from the Met. Council for existing (2009) conditions and the 2015 Base Case Scenario.

The Network Emergency Scenario assumed that segments of two major freeways (I-35W and I-694) serving AHATS and the region were rendered unusable. Jacobs requested that the Met. Council provide travel demand model runs for the Year 2015 for this scenario. **Figure 2** shows the segments along I-35W and I-694 which were eliminated for the purpose of the analysis of this scenario.

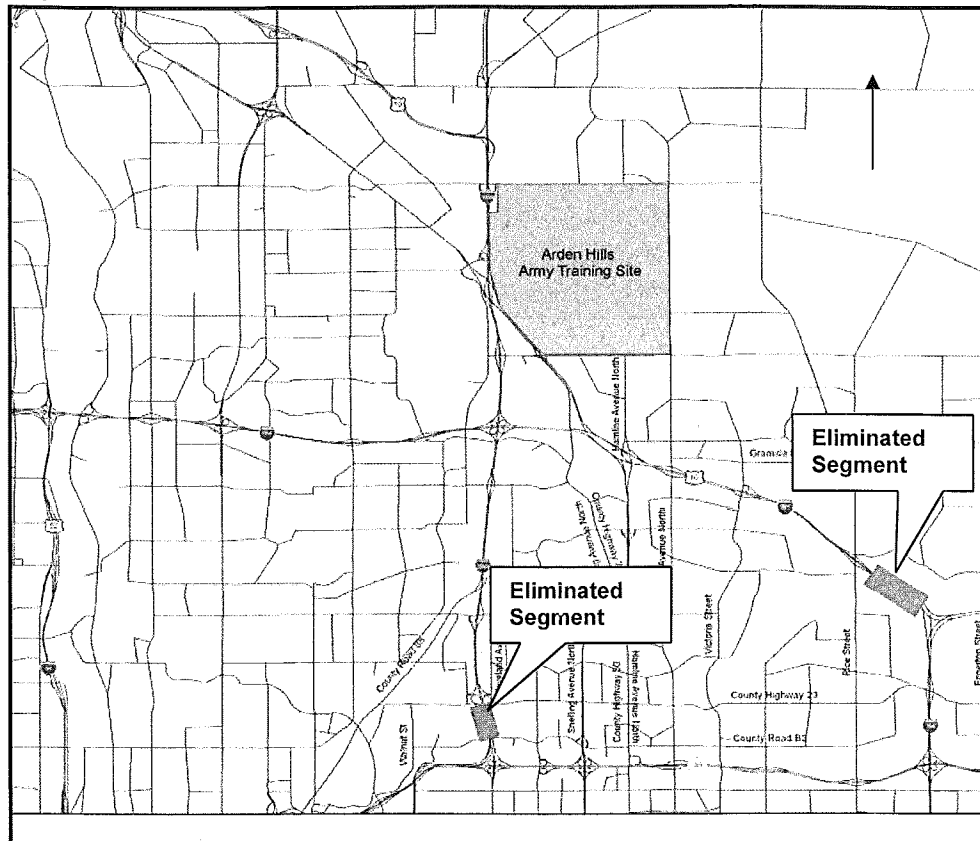


Figure 2 Eliminated Segments

The Monticello Evacuation scenario assumes an event at the nuclear generating plant northwest of the city of Monticello, which is located on the Mississippi River at the northern edge of Wright County. This scenario assumed that panicked residents evacuated to many different destinations. The assumed trip distribution of the evacuation has been reviewed and approved by the State (for the purposes of this study only) and is shown in **Figure 3**. To determine the total trips resulting from the evacuation of Monticello, the city's demographic profile based on State of Minnesota (Department of Administration) website and 2000 Census has been used. **Table 1** shows the Monticello Demographic Profile.

Table 1
Monticello Demographics

Year	Population	Households
2000*	7,868	2,944 (2.67 persons per household)
2009 estimate**	11,501	4,307
2015 (Projected at 5% growth rate)	14,951	5,600

* 2000 Census SF1 Profile

** Minnesota State Demographic Center, Metropolitan Council

It was assumed under a Monticello Evacuation Scenario that 50% of any one household would use 2 cars and another 50% would use 1 car. Therefore, the total vehicle trips generated under a Monticello Evacuation Scenario would be 8,400. These assumptions have been reviewed and approved by the State for the purposes of this study.

Based on the trip distribution, 10% of the evacuating traffic will travel north from Monticello to Clearwater and Clear Lake, 10% will travel west to the City of Buffalo, 15% will travel east to the City of Elk River, and 20% and 45% will use US 10 and I-94, respectively, to reach the Minneapolis-St. Paul area.

The US 10 and I-94 "panicked evacuation" trips from the Monticello area have been manually added to the base scenario conditions in the vicinity of the Arden Hills Army Training Site to complete the Monticello Evacuation Scenario analysis. For this study, it was assumed that the trips from the Monticello Evacuation would use major routes to the Minneapolis-St. Paul area.

Jacobs then compared each of the alternate runs (Network Emergency and Monticello Evacuation) to the Base Scenario to determine where the roadway network could expect a significant increase in congestion levels. Volume to capacity ratios (V/C) were used in this analysis. V/C is the ratio of the projected demand to the capacity of each roadway segment and is commonly used as a measure of the sufficiency of the roadway segment to handle the projected traffic in each scenario. A V/C ratio more than 1 implies that the estimated capacity is not sufficient to handle the forecasted traffic demand.

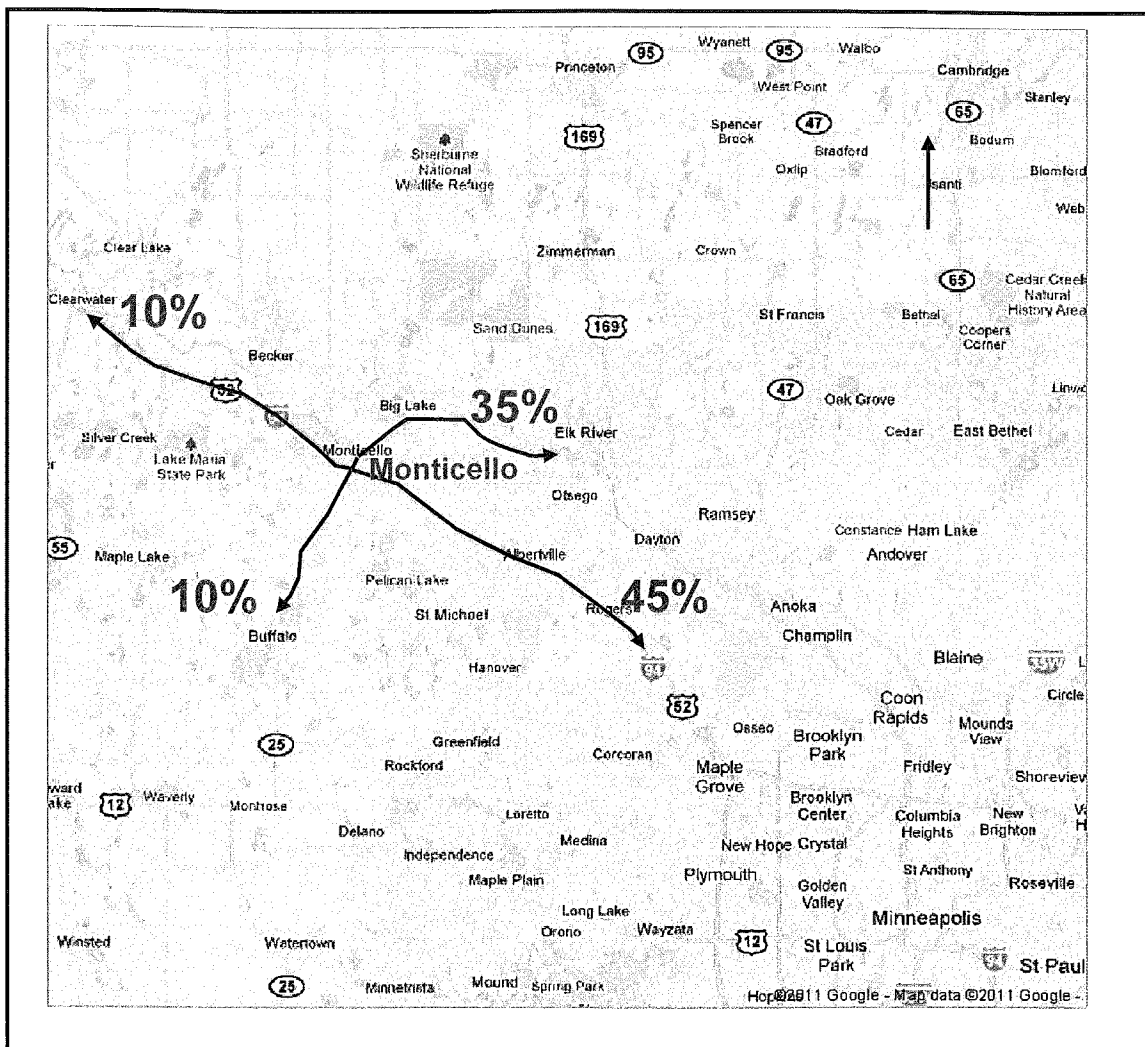


Figure 3 Monticello Evacuation Trip Distribution

Traffic Analysis

Figure 4 and Figure 5 show the V/C ratio for the AM and PM peak hours, respectively, for the Base Scenario (Scenario 1). The V/C ratios are organized into three levels. The first level (V/C between 0 and 0.65) is shown as green to indicate adequate capacity and good traffic flows. The second level (V/C between 0.66 and 1) is shown as yellow to indicate roadways segments approaching (but not yet exceeding) capacity, and thus strained traffic flows. The third level (V/C greater than 1) is shown as red to indicate volumes exceeding capacity and "break down" conditions.

Figure 6 and Figure 7 show the V/C ratio for the AM and PM peak hours, respectively, for the Network Emergency Scenario (Scenario 2). This scenario assumes that key links on both I-35W and I-694 have been rendered unusable through a catastrophic event such as a bridge collapse or a major accident. The V/C ratios are organized into three levels as in Scenario 1.

Figure 8 and **Figure 9** show the AM and PM peak hour segments, respectively, that are most affected by the Network Emergency Scenario, i.e., where the change in V/C between Scenario 1 and Scenario 2 is more than 20% in the AM and PM peak hours. As with the previous figures, these most affected links are also organized into the three levels of V/C ratios, further identifying where the increase in traffic causes adverse conditions.

Based on the analysis, the segments that are most affected by the elimination of the key links on I-35W are:

- CR 88;
- Snelling Avenue N;
- Lexington Avenue N;
- Victoria Street; and
- Rice Street.

The segments that are most affected by the elimination of the key links on I-694 are:

- Vadnais Boulevard;
- County Road B2;
- County Road F; and
- County Highway 23.

When both I-35W and I-694 are rendered unusable to traffic, the affected roadways are between I-35W and I-35E for north-south movements and between US 10 and US 36 for east-west movements.

Figure 10 and **Figure 11** show the V/C ratios for the AM and PM peak hours, respectively, for the Monticello Evacuation (Scenario 3). This scenario includes the additional trips associated with an evacuation. These trips have been manually routed to different destinations in the vicinity of the study site. The V/C ratios are organized into three levels as done in Scenario 1.

Figure 12 and **Figure 13** show the segments that are most affected by the Monticello Evacuation Scenario, i.e., where the change in V/C between Scenario 1 and Scenario 3 is more than 20% in the AM and PM peak hours. Based on the analysis, the segments that are most affected by an evacuation of Monticello are:

- I-694 (eastbound);
- I-94 (eastbound);
- I-35W (southbound);
- US 10 (southbound);
- County Road 10 (southbound); and
- I-35E (southbound)

Conclusions

Under the Network Emergency Scenario, people who need to travel from the Capitol Complex or the downtown St. Paul area to the E.O.C. should avoid using these affected roadways and use other roads for alternate access to AHATS. Based on the projected traffic volumes from the travel demand model, possible alternate routes that are further from the affected routes are as follows.

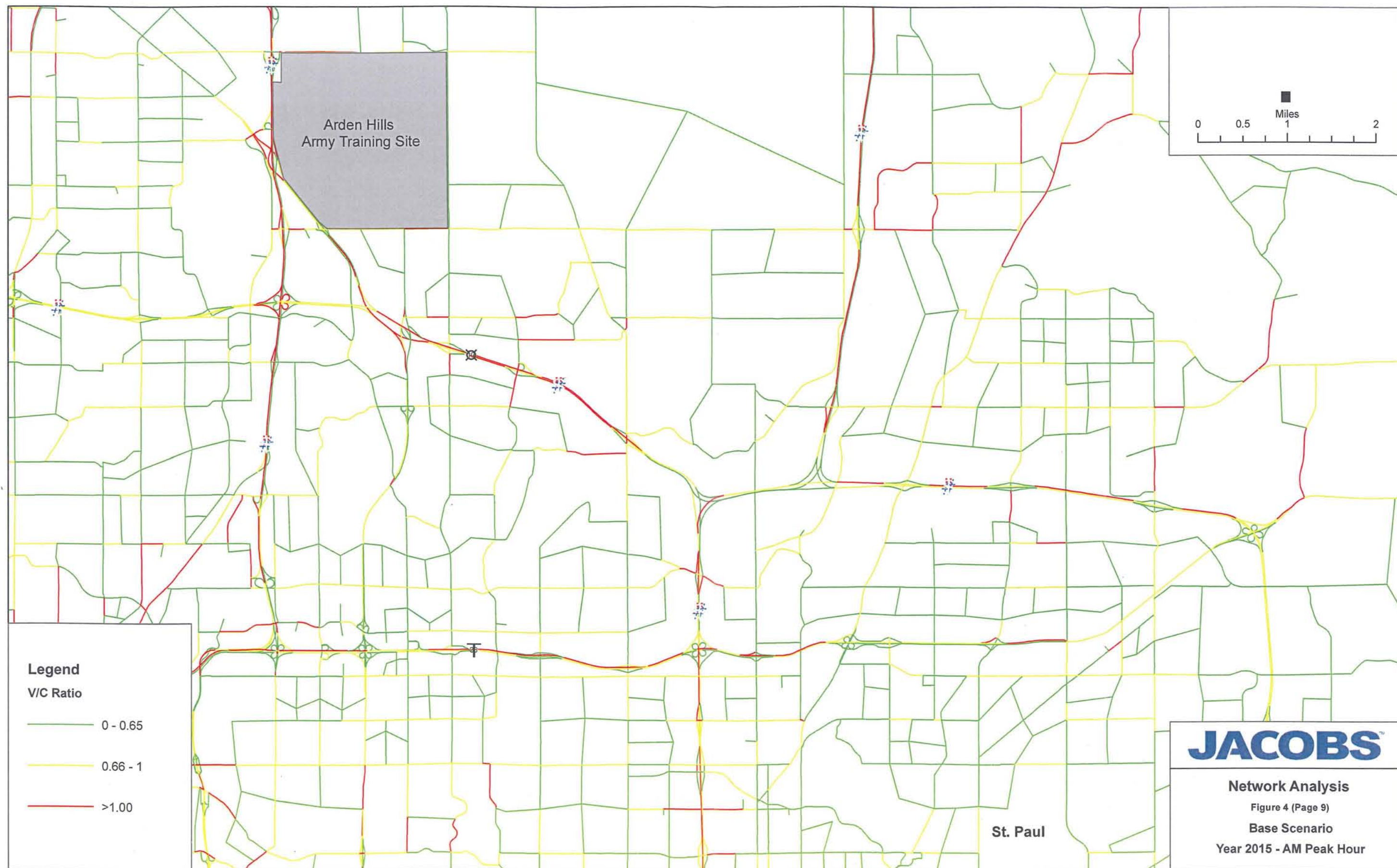
Alternates to I-35W: Edgerton Street
 US 61
 White Bear Ave. N

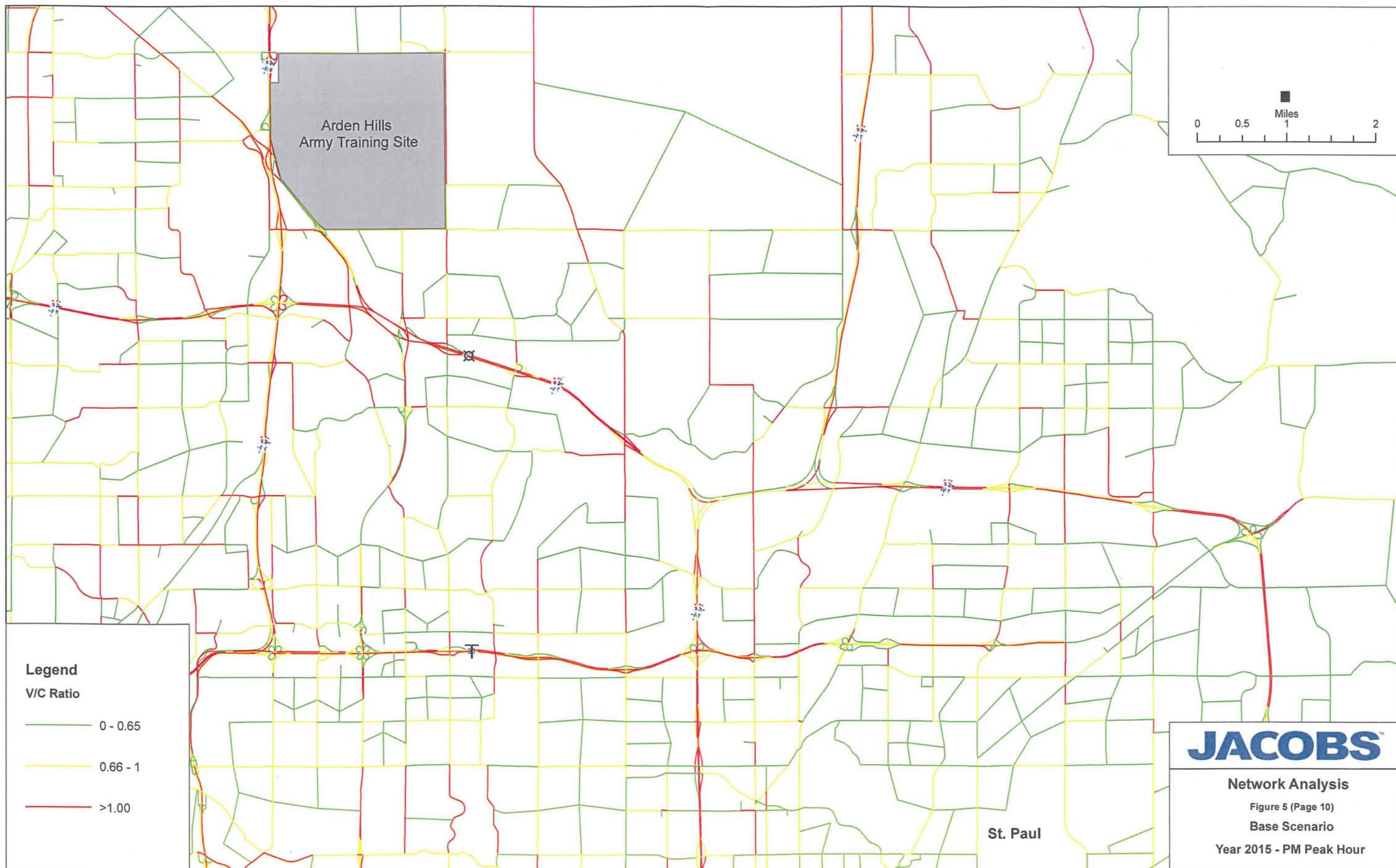
Alternates to I-694: County Road 96
 State Highway 36
 Larpenteur Ave. W

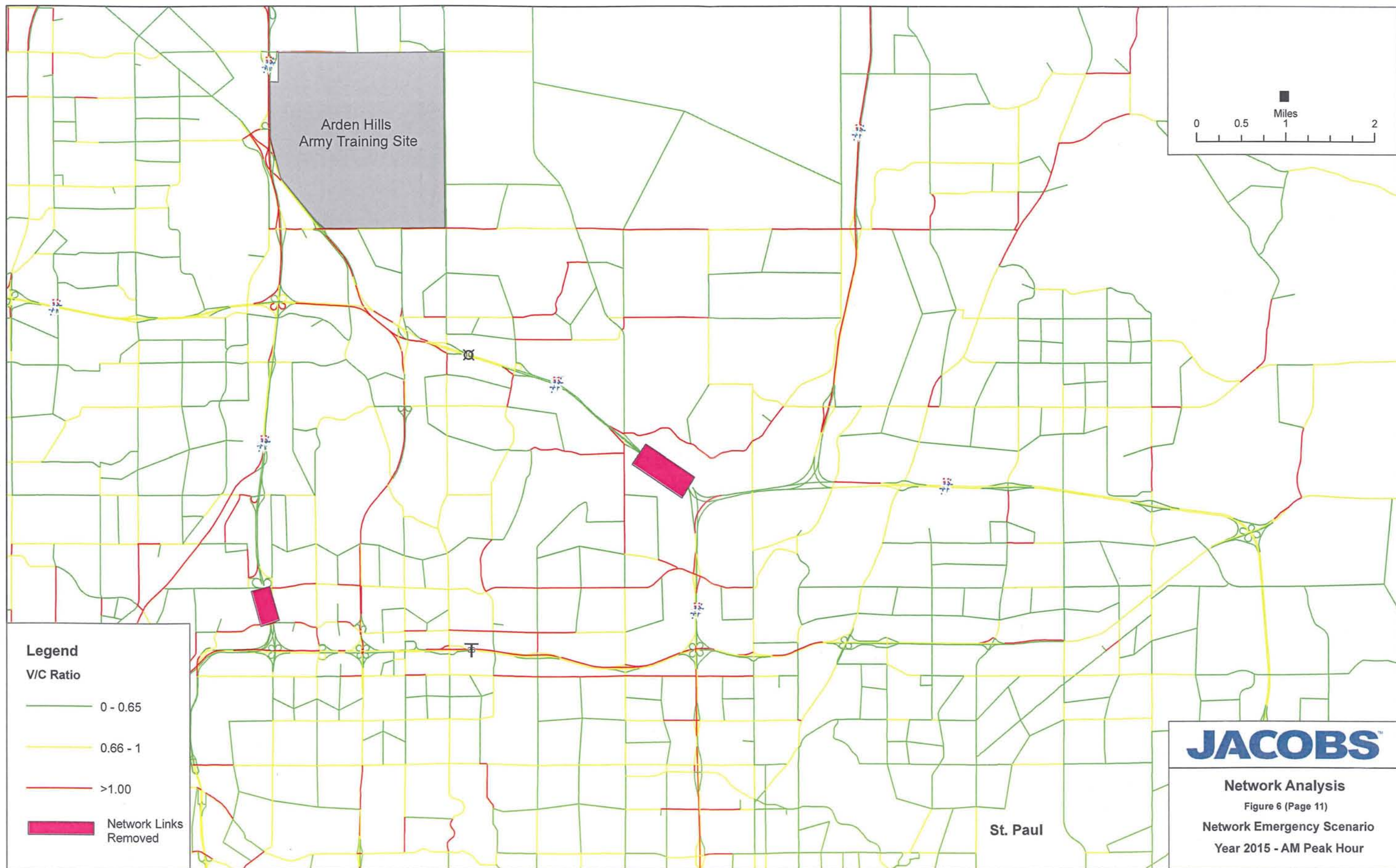
The assumption that both routes are unusable is clearly an extreme scenario. With only one route interrupted, it would be easier to find alternative routes than if both occurred simultaneously.

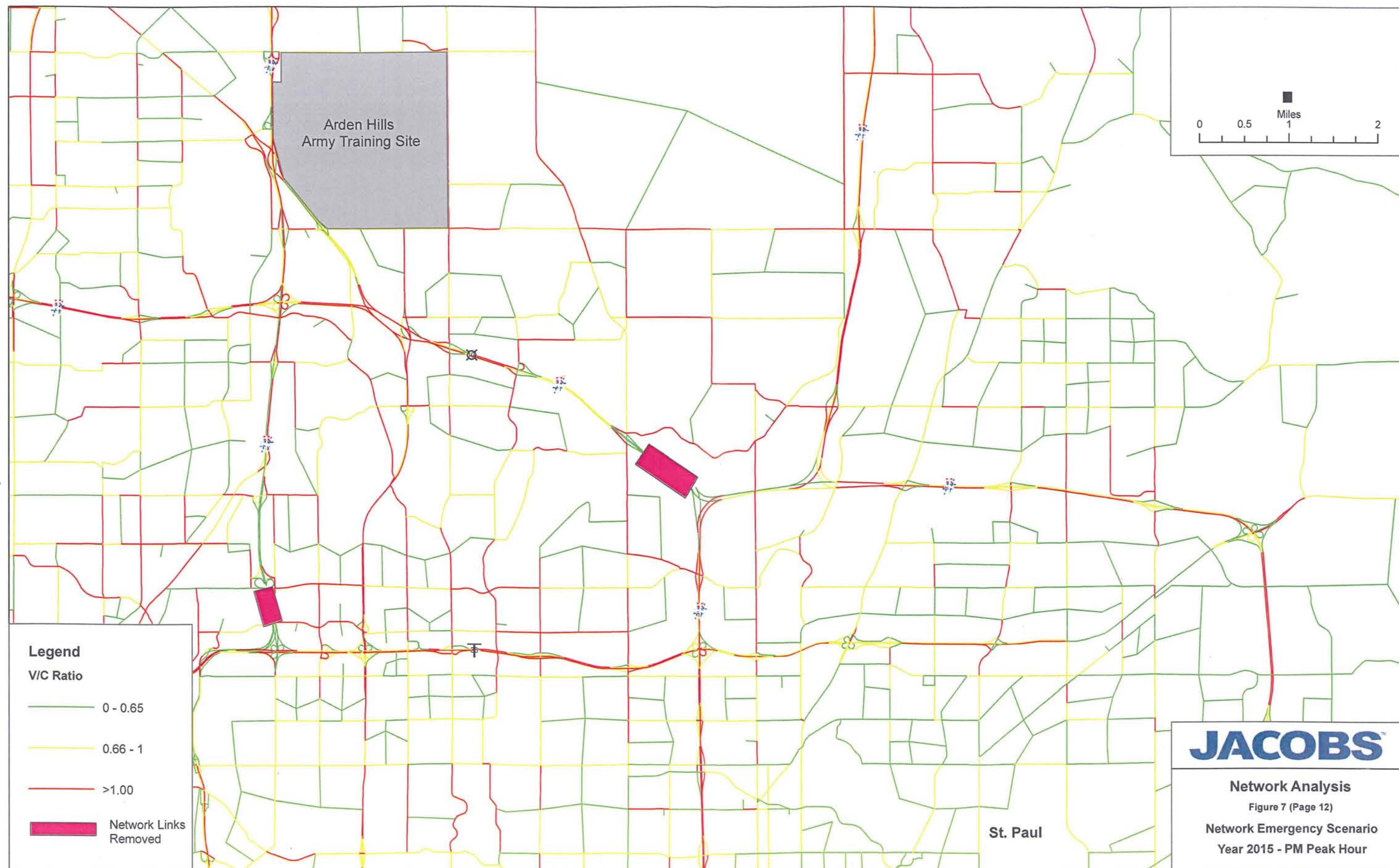
Under the Monticello Evacuation Scenario, incident management personnel bound for the E.O.C. from the St. Paul area should be able to use all major corridor routes (e.g., I-35W, I-35E, I-694 and US 10), because they would be traveling in the opposing direction from traffic leaving the Monticello area.

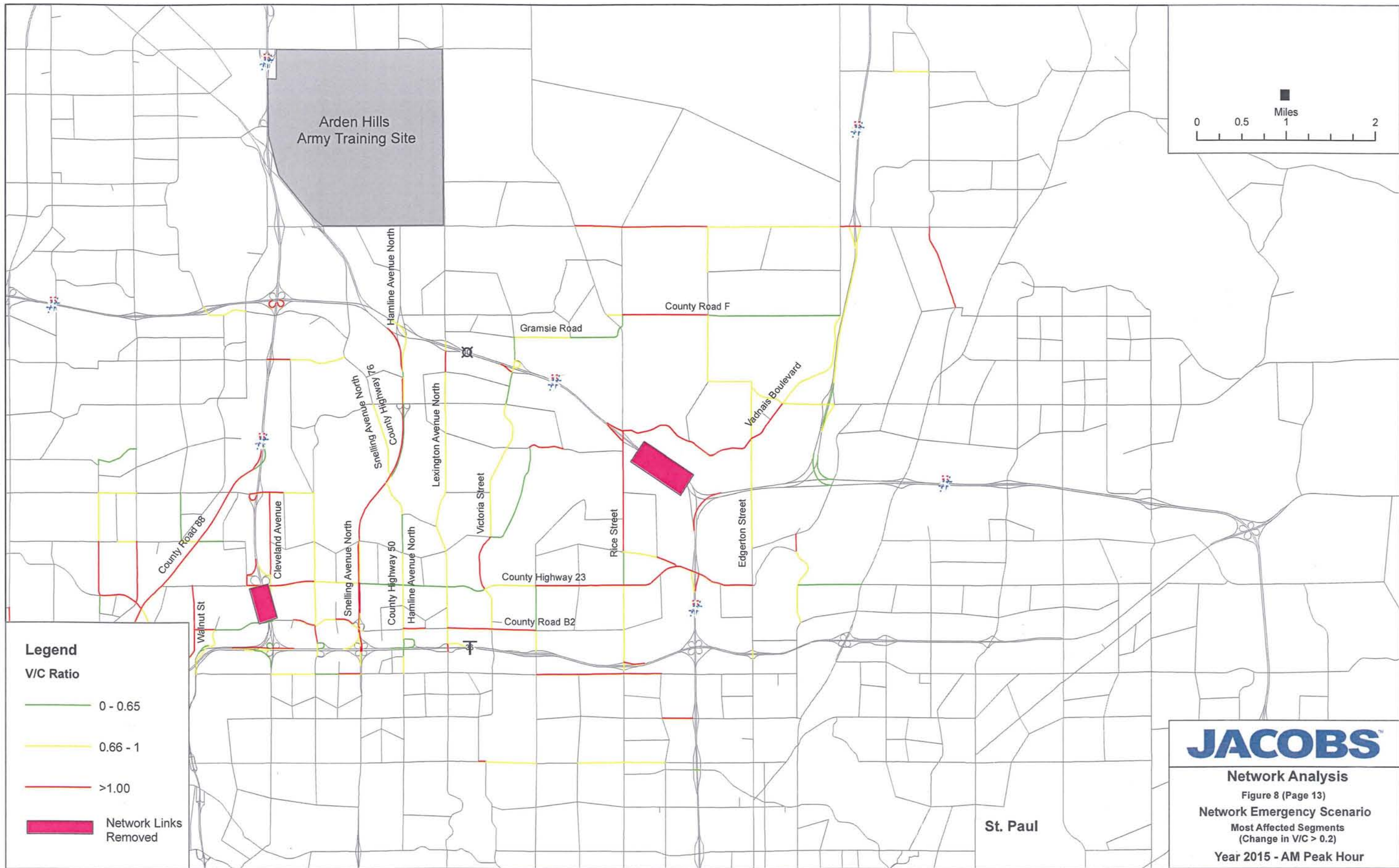
Because the proposed site for the E.O.C. will be the daily office space for HSEM staff who manage emergency operations and the E.O.C., staff will not have to travel if roads become unusable. Scheduling the E.O.C. will also be used as a means to avoid peak times during emergency operations. Alternatives exist to get off-site emergency personnel (State Agency Coordinators and Public Information Officers) to the E.O.C. in a reasonable timeframe. If the emergency occurs during non-work hours, responders will be traveling to the E.O.C. from various locations around the Minneapolis / St. Paul area, but would be less likely to experience peak traffic flows. Finally, using other available travel modes for critical state agency responders (i.e., emergency vehicles or helicopter) could be used to avoid any roadway congestion.

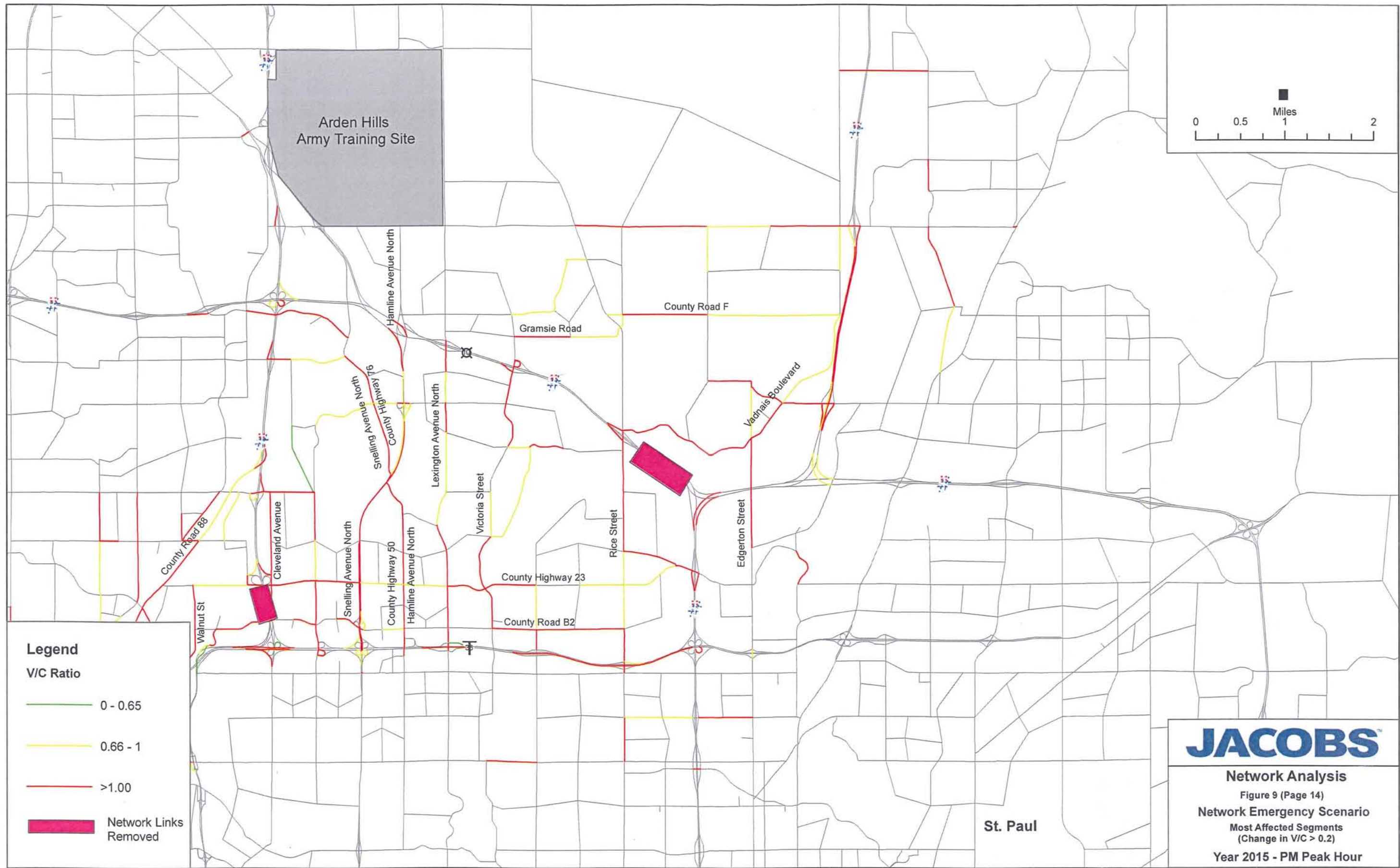












Legend

V/C Ratio

- 0 - 0.65
- 0.66 - 1
- >1.00

Network Links Removed

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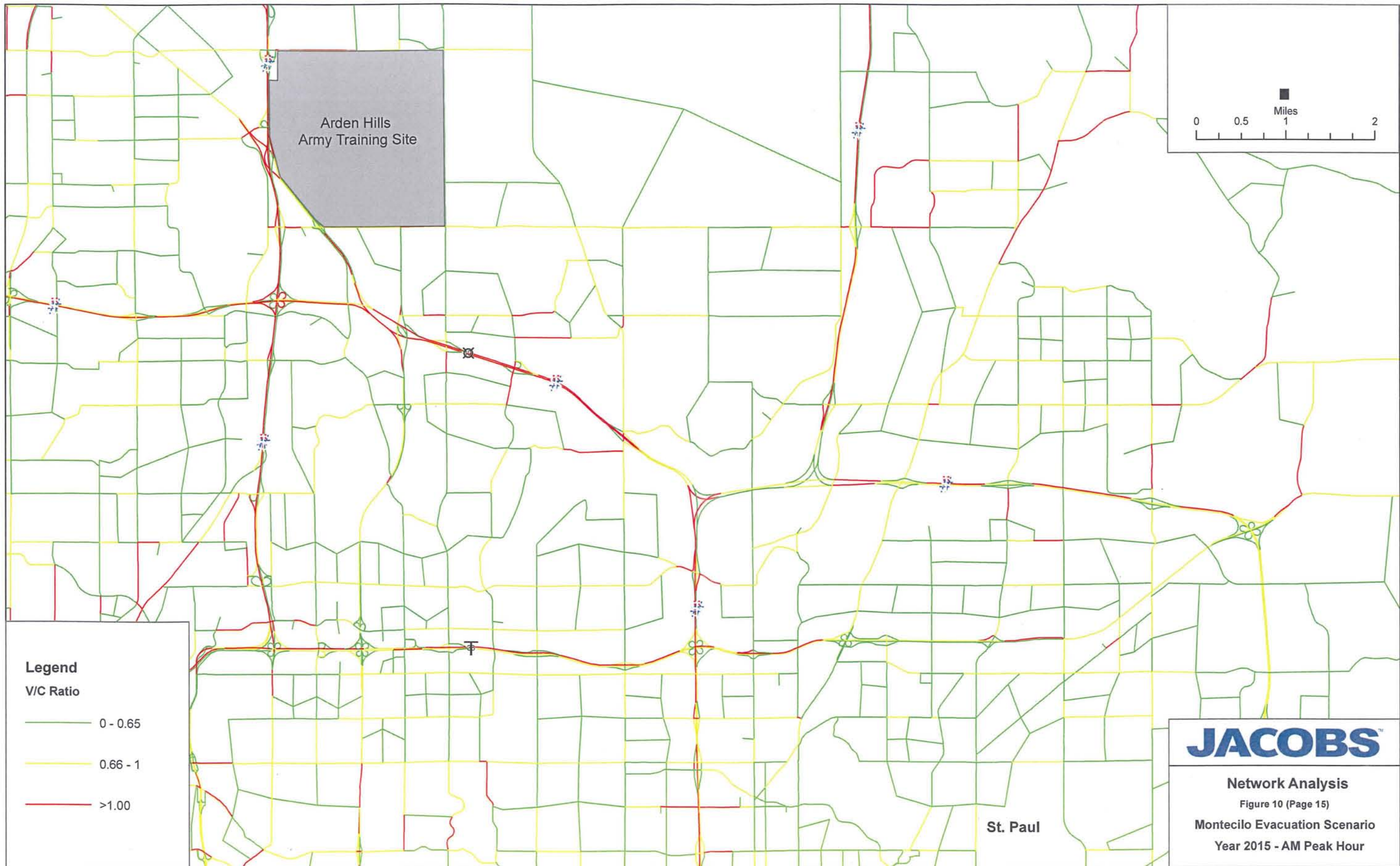
Network Analysis

Figure 9 (Page 14)

Network Emergency Scenario

Most Affected Segments
(Change in V/C > 0.2)

Year 2015 - PM Peak Hour



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Network Analysis
Figure 10 (Page 15)
Montecilo Evacuation Scenario
Year 2015 - AM Peak Hour

