

APPENDIX

Travel Demand Modeling Mapping for Free Bridge Congestion Relief Alternatives

At the first stakeholder meeting on November 18th 2013, MPO Program Manager, Sarah Rhodes, presented information on various project alternatives that had previously been considered, specifically in earlier studies, for easing congestion at Free Bridge. Included in this appendix is the comprehensive mapping analysis presented at the November meeting. The following section explains how to interpret the analysis:

To analyze the various project scenarios considered as part of the Free Bridge Congestion Relief Project, the MPO utilized its Regional Travel Demand Model. More information about this model and how it works can be found in the first portion of this document. The data analysis from this model was reinterpreted into map form for readability. Using maps as data templates allowed MPO staff to illustrate, from a variety of data perspectives, how each project would impact the overall transportation system and, subsequently, Free Bridge. Below is the list of project alternatives that were considered as part of this analysis. This list also includes information on the existing travel conditions at Free Bridge referred to as the “2010 base,” and the 2040 forecasted travel conditions for Free Bridge, also known as the “2040 existing and committed base.” All projects are considered for the year 2040 and can be compared back to the 2040 base in order to understand the project’s impact. Consider the 2040 base as the “no-build,” or “if we do nothing, this is what will happen,” scenario.

Base and project alternative list:

- 2010 Base (existing conditions of Free Bridge)
- 2040 Existing and Committed (E+C) Base (No-Build)
- 2040 South Pantops Drive Connector
- 2040 State Farm Boulevard Connector
- 2040 2-lane Eastern Connector
- 2040 4-lane Eastern Connector
- 2040 Limited Access on US 250
- 2040 US 29/US 250 and Interstate 64 Widening
- 2040 the South Pantops Drive Connector and the 2-lane Eastern Connector

As mentioned above, each project was illustrated using a variety of maps to aid in analysis. Each project alternative considered includes a series of maps that, when combined, provide a comprehensive analysis of the impacts each alternative will have if implemented. The 2010 base and the 2040 base also include a series of maps. The types of maps for each of the projects and the two bases are listed below.

The two base scenarios (2010 Base and 2040 Base) each contain three different maps:

1. Congestion;

2. Select Link Analysis; and
3. Percentage of Trips that are External (starting or ending in areas outside the MPO).

The remaining seven scenarios, which examine alternatives to using Free Bridge, each contain four different maps:

1. Change in Traffic Volume;
2. Congestion;
3. Select Link Analysis; and
4. Percentage of Trips that are External (starting or ending in areas outside the MPO).

Map Type 1: Change in Traffic Volume (Blue and Red Maps)

The change in traffic volume map compares the number of trips on the roads in the 2040 Base (no-build scenario) to the number of trips on the roads in each alternative. It illustrates how the traffic volume is expected to shift when the road network is altered. Red roads indicate areas where traffic volume **increases** by at least 1,000 daily trips. Blue roads indicate areas where the traffic volume **decreases** by at least 1,000 daily trips. Above the road is a label with two values:

The top value in italics identifies the number of daily trips with the changes to the network.

The bottom value identifies the number of trips in the 2040 E+C Base (without any changes).

The red and blue lines are drawn thicker as the change in volume increases. (These maps are not available for the 2010 base and 2040 base because they are a comparison to those bases).

Map Type 2: Congestion

Following the change in traffic volume maps is the congestion map. Congestion maps identify roads that are expected to experience either minor congestion or heavy congestion. Roads with minor congestion are shown with a thin red line. These roads will likely experience congestion during peak-hour travel but should not be congested during other times of the day. Heavily congested roads are shown with a thick maroon line. These roads will likely remain congested throughout the day.

Map Type 3: Select Link Analysis

Following the congestion map is the select link analysis map series, which identifies where people travel when they use a particular road. Essentially, the select link series shows the network distribution of all the trips that cross Free Bridge. These maps are useful in understanding if the trips on a road tend to be local or regional in nature. The heavy pink and purple lines identify large volumes of trips on the network that cross the selected link.



Figure A-1. Select Link Analysis Map

The select link analysis works as follows: for each scenario the Free Bridge analysis is presented first, followed by the select link analysis of the proposed connector road, and then by the select link analysis of both Free Bridge and the proposed connector road. The Free Bridge map shows the network trip distribution of trips crossing Free Bridge, in that specific project scenario. The project alternative map shows the network distribution of trips crossing the project alternative being considered. And the final map shows the network distribution for both Free Bridge and the project alternative. The select link analysis for both links shows the comprehensive network distribution that will occur due to the implementation of the project alternative.



Figure A-2. Percentage of External Trips Map

Map Type 4: Percentage of External Trips

Immediately following each of the select link analysis maps is a map showing the percentage of trips from the select link analysis maps that are external (i.e. travel to or from areas outside the MPO). Together, these maps indicate the trips on a link that both cross Free Bridge and are external (not local). Table A-1 draws information from the select link analysis data (Figure A-1) and from the Percentage of External Trips data (Figure A-2) to illustrate this point. This information shows how the external trips that cross Free Bridge disperse throughout the network. The red circles indicate the related data.

Table A-1. Select Link Analysis and Percentage of External Trips			
Location	Select Link Analysis Value	Percentage of Trips that are External	External Trips Crossing Free Bridge
US 250 from Stony Point Road/Route 20 to State Farm Boulevard	27,706	66.22%	18,347
US 250 from State Farm Boulevard to Peter Jefferson Parkway	25,293	72.40%	18,312
US 250 from Interstate 64 to Hunters Way	10,130	43.44%	4,400
Interstate 64	14,113	98.54%	13,907

This highly technical analysis is a key part of the modeling process that MPO staff developed to explore the previously studied options for Free Bridge Congestion Relief. If you have any questions please feel free to email MPO Program Manager, Sarah Rhodes, with your questions (srhodes@tjpd.org).