

# **ATTACHMENT C**

## **Ridge Road: Moon Lake Road/Starkey Road to US 41 Extension**

### **Daily Travel Assessment**

**Prepared for:**

Pasco County, Florida

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Daily Travel Assessment**

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## **Part 1: Introduction and Methodology**

# Ridge Road: Moon Lake Road/Starkey Road to US 41 Extension

## Daily Travel Assessment

### 1.0 Introduction

Pasco County proposes to extend Ridge Road from Moon Lake Road to US 41 in central Pasco County as a four-lane roadway. Figure C-1 illustrates the extension concept. As a part of the assessment of impacts and benefits of this extension, the U.S. Army Corps of Engineers (USACE – which has regulatory authority over filled wetlands in the road corridor) has requested consideration of the effects of the proposed extension and its alternatives on routine daily travel demands and patterns relative to the project’s stated overall project purpose, to wit:

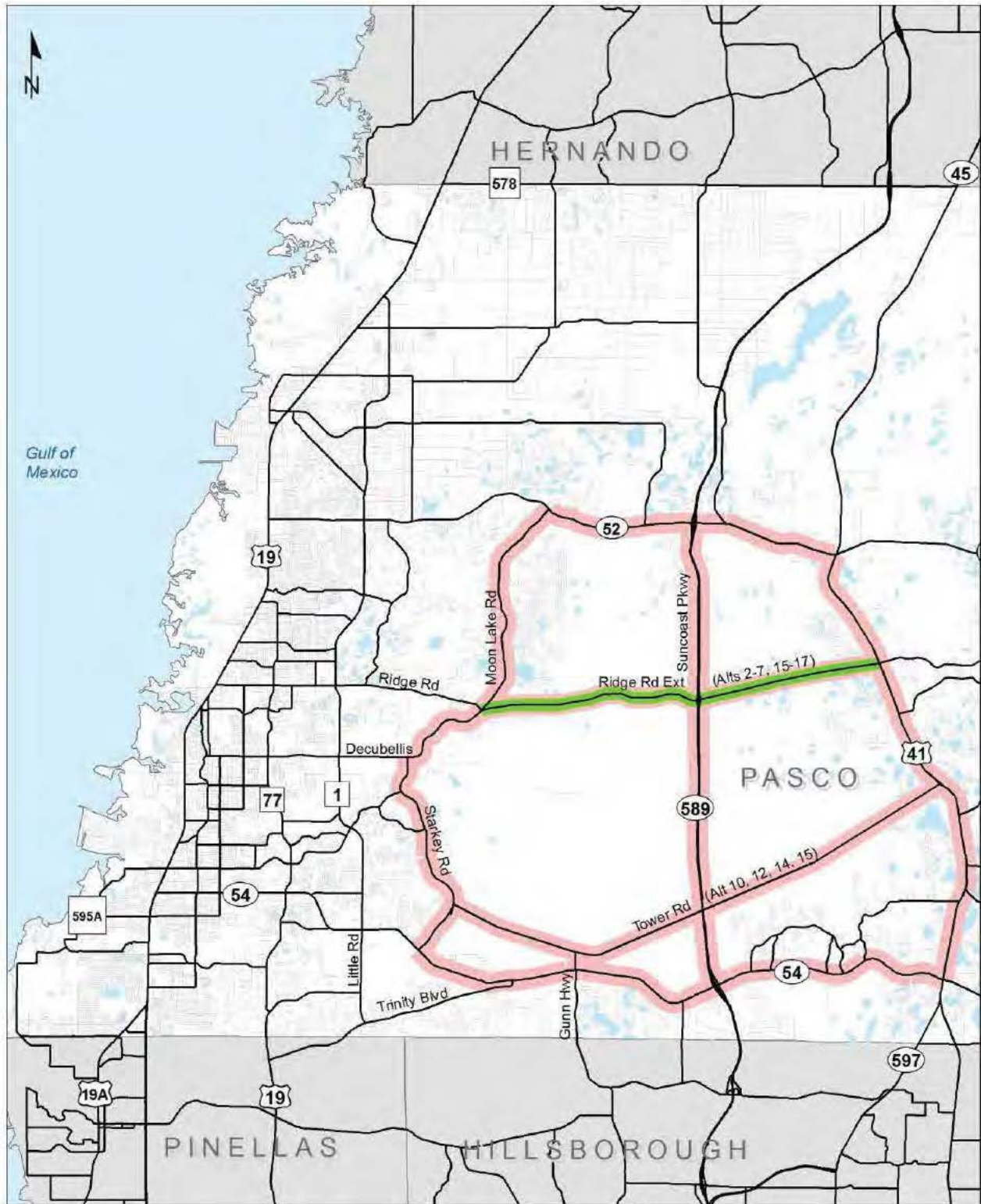
*To improve east-west roadway capacity and enhance overall mobility within the area bounded by SR-52 to the north, SR-54 to the south, US-41 to the east, and Moon Lake Road/DeCubellis Road/Starkey Boulevard to the west in accordance with the County's current Comprehensive Plan and the Metropolitan Planning Organization's Long Range Transportation Plan. The project will also provide additional roadway capacity and improved routing away from coastal hazard areas and improve hurricane evacuation clearance times in the event of a hurricane or other major weather-related occurrence in accordance with State of Florida requirements and the County's current Comprehensive Plan.*

This assessment was undertaken to address the “improve east-west roadway capacity and enhance overall mobility” elements of the overall project purpose.

Fifteen alternatives to the Proposed Project, plus the “No Action” alternative were developed for consideration and comparison to the Proposed Project to evaluate its relative efficacy. These alternatives, more completely described in Attachment A, mostly involved improvements to parallel corridors (SR 54 and SR 52), but some involved developing a new corridor, the Tower Road corridor, consideration of a two-lane version of the Proposed Project in combination with parallel improvements, and changes to the alignment or bridging of the Proposed Project. This analysis examines these alternatives to determine whether they meet the Overall Project Purpose.

### 2.0 Analysis Procedure

Pasco County plans for routine daily travel demands using the Tampa Bay Regional (Transportation) Planning Model (TBRPM), version 7.2. This model was developed and is maintained by the Florida DOT and used by the Metropolitan Planning Organizations (MPOs) of Pasco, Pinellas, Hillsborough, and Hernando counties. It is the MPO-sanctioned technical support tool for undertaking the local, Federally-mandated “3-C” transportation planning



**Legend**

- TBRPM Model Roadway Network
- Ridge Rd Extension
- Study Area Roads

0 1 2 4 Miles

**Figure 1**  
**Ridge Road Extension Analysis**  
**Ridge Road Extension Location**  
**and Study Area Roads**

process (“MPO Planning Process”), current at the time this analysis was undertaken. Thus, it is the appropriate technical analysis tool to use to assess the effects of the proposed Ridge Road Extension on daily traffic circulation.

### Methodology Agreements

Prior to undertaking this analysis, a methodology statement proposing analysis assumptions and procedures was prepared and reviewed by the USACE. An updated methodology statement, revised to reflect discussions at a November 15, 2012 meeting with USACE staff to discuss the methodology is provided in Appendix C-1.

The procedures summarized in the original methodology statement (e.g. the one submitted to the USACE *prior* to the November 15, 2012 meeting) guided this assessment, with the exceptions summarized below resulting from the November 15 discussions:

- The methodology proposed evaluation of the 2035 Cost-Affordable Plan roadway network that surrounds and includes the proposed Ridge Road Extension. However, USACE requested that the analysis be based on a shorter-term (five-year) planning horizon and to recognize only “existing roads plus USACE-permitted roadway improvements” in the roadway network. These roads are illustrated in Figure C-1, and are referred to as the “Study Network.” Information reported subsequently in this report addresses those roads.
- The analysis documented herein addresses the “No-Action” alternative, the “Proposed Project” alternative, and the other potential alternatives defined by the USACE.

Several measures indicating the quality of transportation service provided in the Study Network by the alternative transportation networks were agreed upon to be reported, to wit:

- Weighted average volume:capacity (v:c) ratio
- Vehicle-hours of travel
- Average travel speed
- Crash rates
- Traffic volumes, road segment capacities, and v:c ratios for individual road segments.

The alternatives are listed and briefly described below, and more extensive descriptions are provided in Attachment A. The alternative numbering scheme in this report corresponds to the numbering scheme used in other elements of this permit application.

1. “No-Action” alternative, which considered existing roads plus road improvements that were permitted by the USACE.
- 2-7. “Build” alternative, the Proposed Project, which includes the proposed Ridge Road Extension as a four-lane, controlled access parkway eastward from Moon Lake Road to US 41, with an interchange at the existing Suncoast Parkway. Alternatives two through seven differ in the extent to which the proposed Ridge Road Extension is carried on

bridge structures to avoid wetland impacts or involve shifts in roadway alignment, which have no effect of substance on the traffic circulation assessment.

8. Add four lanes to SR 52
9. Add four lanes to SR 54
10. Build Tower Road from Starkey Rd to US 41 as a four-lane road
11. Add four elevated, toll lanes to SR 54
12. Add two lanes to SR 54 and build Tower Road as a two-lane road
13. Add two lanes to SR 52 and SR 54
14. Add two lanes to SR 52 and build Tower Road as a two-lane road
15. Build Ridge Road as a two-lane road and Tower Road as a two-lane road
16. Build Ridge Road as a two-lane road and add two-lanes to SR 52
17. Build Ridge Road as a two-lane road and add two-lanes to SR 54

Other than the road network changes noted above, all other model inputs were held constant for these applications so that the effects of the various alternatives on daily traffic circulation could be estimated and compared.

#### Adjustments to “Out-of-the-Box” Model

“Out-of-the-Box” model refers to the version of the TBRPM made available from the model’s host website at <http://www.tbrta.com>. The 2014 existing plus committed (“E+C”) model road and transit networks were used as the basis for the analysis, and adjusted to reflect the existing roads plus permitted improvements, as noted above.

The proposed Ridge Road Extension was coded into the “Out-of-the-Box” 2014 E+C model, as an uninterrupted flow urban arterial road west of the Suncoast Parkway -- which was the design intent for the roadway when the plan was developed. However, in the intervening years, the improvement concept has been adjusted to reflect a limited access type of facility, as described in section 2, above. As a result, the facility type 22 coding west of the Suncoast Parkway (reflecting an unsignalized facility with adjacent land access) and the facility type 23 coding east of the Suncoast Parkway (from the 2035 Plan network – reflecting a signal-controlled urban arterial) were changed to facility type 17 for the “controlled access” portions of the road. Facility type 17 reflects a facility with few driveway connections or traffic signals. Maps illustrating the edits to the model network and roadway facility type are provided in Appendix C-2.

In addition, the 2014 E+C model network for Pasco County, north Hillsborough County, and south Hernando County was reviewed to identify if the network changes that were expected when the 2014 E+C network was created (in 2009) had indeed been implemented, and to reflect the roads considered “permitted” by the ACOE. The changes made are also illustrated in Appendix C-2, and include such items as:

- reflecting the six-laning of SR 54 from the Suncoast Parkway to US 41,
- six-laning of I-75 throughout Pasco County, and
- widening the existing two-lane Ridge Road from Little Road to Moon Lake Road to four lanes.

The above adjustments to the 2014 E+C model were applied to create Alternative 1, the “No-Action” model alternative. Then, the other alternatives were created from the No-Action network by adding the proposed Ridge Road Extension, Tower Road, elevated lanes on SR 54, or editing the number of lanes on other existing roads in the road network file, as appropriate. Maps of the model networks for each alternative are provided in Appendix C-2.

The land use and growth forecasts (“socio-economic data”) of the standard model horizon years of 2007 and 2035 were interpolated to create a set of year 2019 growth estimates. The 2019 socio-economic data was held constant across all alternative tests so that the effects of the road network changes could be isolated.

Peak season daily traffic volumes are analyzed because that is the standard approach of the TBRPM version 7.2.



## Part 2: Findings

### 3.0 Findings

A series of measures is produced by the TBRPM for each alternative, and these measures are summarized for all alternatives in Table C-1, below. Each of the measures is discussed in the following paragraphs, and each discussion is accompanied by a graph and table sorted in increasing or decreasing order so that the advantages and disadvantages of alternatives can be more easily visually assessed. The measures are reported for the roadway network specified in the transportation methodology statement and illustrated in Figure C-1. These measures included the Ridge Road Extension, Tower Road, and the elevated lanes over SR 54 (when applicable), as illustrated in Figure C-1 as “Study Network.”

**Table C-1: Summary of Study Network Performance**

**TBRPM Results:**

Alternative:	1	2-7	8	9	10	11	12	13	14	15	16	17
Description:	"No Action"	RRE-4	SR 52-4	SR 54-4	Tower-4	SR 54-4E	Tower-2/ SR 54-2	SR 54-2/ SR 52-2	Tower-2/ SR 52-2	RRE-2/ Tower-2	RRE-2/ SR 52-2	RRE-2/ SR 54-2
Vehicle-Miles of Travel*:	2,154,568	2,332,751	2,228,427	2,300,884	2,184,719	2,327,651	2,238,978	2,268,936	2,214,973	2,299,884	2,308,477	2,354,580
Vehicle-Hours of Travel*:	113,974	112,189	112,115	105,478	111,308	105,249	108,584	109,088	111,003	111,247	111,917	108,589
Speed (mph)*:	18.90	20.79	19.88	21.81	19.63	22.12	20.62	20.80	19.95	20.67	20.63	21.68
Wtd V:C*:	1.11	1.032	1.072	1.005	1.059	0.924	1.033	1.048	1.060	1.042	1.052	1.025
Crashes/Year:	3,617	3,555	3,756	3,989	3,697	3,457	3,843	3,884	3,749	3,635	3,606	3,730
Crashes/MVMT:	4.60	4.18	4.62	4.75	4.64	4.07	4.70	4.69	4.64	4.33	4.28	4.34

**Differences from No-Action Alternative**

Vehicle-Miles of Travel*:		178,183	73,859	146,316	30,151	173,083	84,410	114,368	60,405	145,316	153,909	200,012
Vehicle-Hours of Travel*:		-1,785	-1,859	-8,496	-2,666	-8,725	-5,390	-4,886	-2,971	-2,727	-2,057	-5,385
Speed (mph)*:		1.89	0.97	2.91	0.72	3.21	1.72	1.90	1.05	1.77	1.72	2.78
Wtd V:C*:		-0.078	-0.038	-0.105	-0.051	-0.186	-0.077	-0.062	-0.050	-0.068	-0.058	-0.085
Crashes/Year:		-62	139	372	80	-161	226	266	131	18	-11	113
Crashes/MVMT:		-0.424	0.018	0.151	0.037	-0.531	0.104	0.090	0.037	-0.269	-0.320	-0.259

**Percent Difference from No-Action Alternative:**

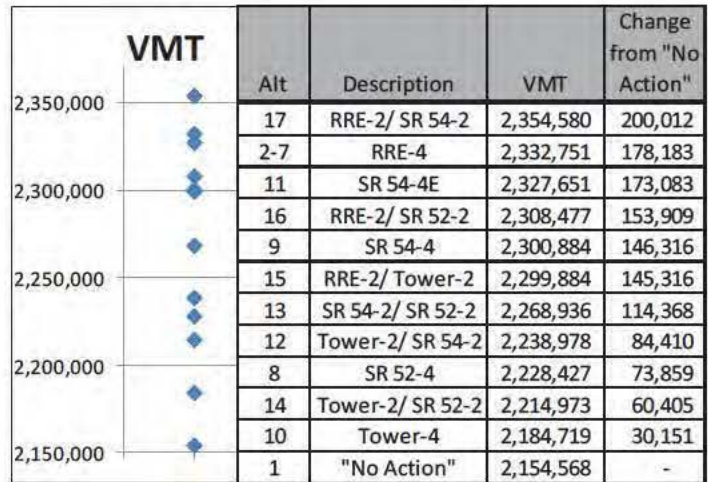
Vehicle-Miles of Travel*:		8.3%	3.4%	6.8%	1.4%	8.0%	3.9%	5.3%	2.8%	6.7%	7.1%	9.3%
Vehicle-Hours of Travel*:		-1.6%	-1.6%	-7.5%	-2.3%	-7.7%	-4.7%	-4.3%	-2.6%	-2.4%	-1.8%	-4.7%
Speed (mph)*:		10.0%	5.1%	15.4%	3.8%	17.0%	9.1%	10.0%	5.6%	9.4%	9.1%	14.7%
Wtd V:C*:		-7.1%	-3.4%	-9.5%	-4.6%	-16.8%	-6.9%	-5.6%	-4.5%	-6.1%	-5.2%	-7.7%
Crashes/Year:		-1.7%	3.8%	10.3%	2.2%	-4.4%	6.3%	7.4%	3.6%	0.5%	-0.3%	3.1%
Crashes/MVMT:		-9.2%	0.4%	3.3%	0.8%	-11.5%	2.3%	2.0%	0.8%	-5.8%	-6.9%	-5.6%

\* Study-area roadways only.

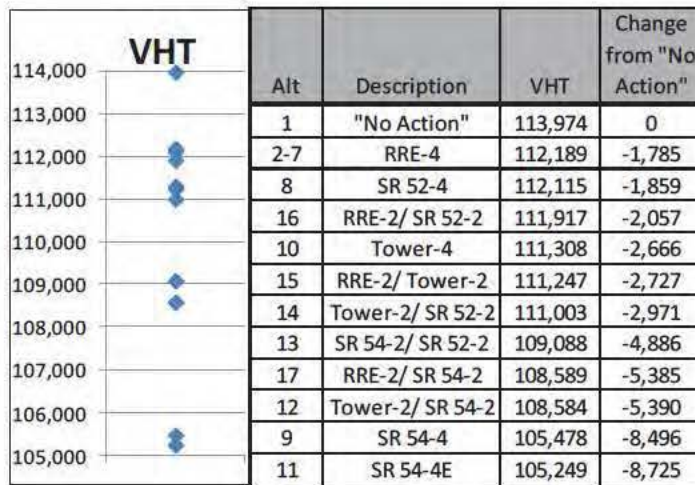
The Tampa Bay Regional Planning Model (TBRPM) is a Florida Standard Urban Transportation Model Structure (FSUTMS) daily travel demand model. Results provided are for one 24-hour period, unless otherwise described.

**Vehicle-Miles of Travel:** Vehicle-miles of travel (vmt) indicates the quantity of travel served by the study network, and addresses the project purpose of adding capacity to improve east-west mobility. Capacity is increased in every alternative, since four additional lanes are added to the east-west roadways in every alternative (except the “No-Action alternative”). Increased capacity can be addressed simply as a result of the defined alternative -- freeway lanes have more capacity than parkway lanes, and parkway lanes have more capacity than interrupted flow (signalized) arterial lanes. Thus, the alternative of adding elevated expressway lanes will add the most capacity, and alternatives adding interrupted flow arterial lanes will add the least. However, simply adding capacity *somewhere* in the network isn’t the most valuable end. Adding capacity *where it will be used* is the more relevant measure, and the attraction of vmt

into the network provides the better measure. The transportation system planning model will assign more traffic into a network when that network provides an advantageous travel route (based on travel time) compared to other routes. The alternatives served vmt ranging from 2.15 to 2.35 million, with the six alternatives involving Ridge Road improvements (2-7) ranking at the top by this measure. As would be expected, Alternative 1, the “No-Action” alternative served the lowest quantity of travel, since no east-west capacity is added.



**Vehicle-Hours of Travel:** Vehicle-hours of travel (vht) indicates how long it takes all vehicles to navigate the study network. Less time would indicate a better quality of service, provided the quantity of travel served (vmt) remains the same or increases – and all alternatives attracted more vmt into the study network. Thus, vht alone, without consideration of vmt, does not indicate the quality of service experienced by an individual driver. Average travel speed, discussed further below, provides the needed “interaction” between vmt and vht.



Vehicle-hours of travel in the study network ranged from 105,249 to 113,974, with Alternative 11, the elevated toll road over SR 54, providing the lowest travel times and alternative 1, the No-Action network, providing the greatest times. Since the toll road is coded with the greatest speeds, and the No-Action alternative has the fewest lanes, these results are reasonable. Alternatives involving the Ridge Road Extension fall in the “middle of the pack”, with alternatives involving the

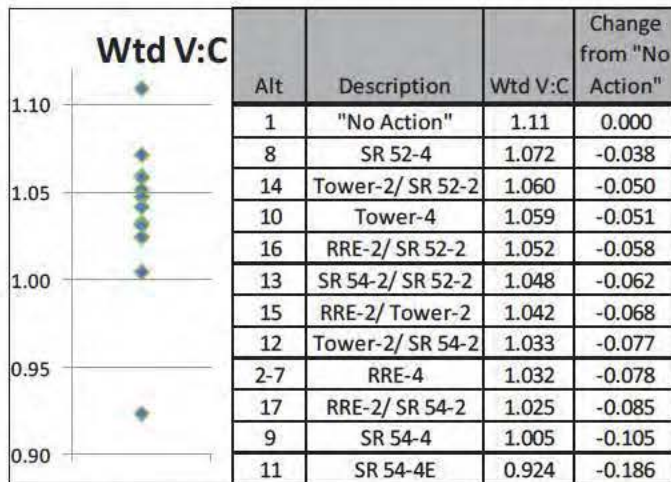
“southern corridor” (SR 54 and Tower Road) in the lower vht ranges. This may reflect the influence of current development patterns, as the southern corridor would serve existing traffic generators in northern Hillsborough and southern Pasco County; whereas the central corridor (Ridge Road Extension) alternatives would serve land uses developing in the central Pasco corridor.

**Network Average Speed:** Network average speed is computed as the vehicle-miles of travel divided by the vehicle-hours of travel (vehicle-miles divided by vehicle-hours = miles per hour) This measure gives an indication of the quality of service an individual vehicle passing through the study network would experience. The network average speeds divided into four “tiers” – with alternative 1, the No-Action alternative in the lowest tier all by itself, delivering the slowest speed.



The next tier of alternatives delivered speeds in the 19.5 to 20.0 mph range (involving improvements to Tower Road and SR 52). The upper tier of alternatives delivered speeds in the 20.6 to 21.0 mph range. Three of the four alternatives involving the Ridge Road corridor fell into this tier. The top tier of three alternatives delivered speeds averaging 21.7 to 22.1 mph, and included the elevated lanes alternative, adding four lanes to SR 54, and alternative 17, building the Ridge Road Extension as a two-lane road and adding two lanes to SR 54.

**Weighted Volume:Capacity Ratio:** The weighted volume:capacity (v:c) ratio gives an indication of the degree of roadway saturation experienced by the driving public. To compute these



values, individual road segment v:c ratios are multiplied by the vehicle-miles of travel on the segment, and the sum of these values is divided by the sum of the vehicle-miles of travel. Lower degrees of saturation indicate more travel on roads with less congestion. Values for the study network ranged from 1.11 for Alternative 1, the “No-Action” alternative, to 0.924 for Alternative 11, adding four elevated toll lanes over SR 54. Overall, this measure provided comparisons that were fairly consistent with the Network

Average Speed measure, with the three alternatives with the lowest weighted v:c ratios (the best performance) in the same order as the Network Average Speed. After the two alternatives with the lowest weighted v:c ratios, then six of the next eight better-performing alternatives involve building the Ridge Road Extension. Improvements involving Tower Road and SR 52 predominated the least-performing alternatives by this measure. The traffic volumes, capacities, and v:c ratios on which the Table C-1 values are based are provided in Appendix C-3.

Crashes/Day and Crash Rate:

Crashes forecasted by the model also indicate the number of daily crashes and the crash rates. The lower the crash rates, the safer the network for individual drivers. Crash rates ranged from 4.068 crashes per million vehicle-miles of travel (MVMT) to 4.75 crashes per MVMT, with the lower rates (safer alternatives) being those with limited



access facilities such as the four lane toll facility over SR 54 and the limited access facility proposed for the Ridge Road Extension. Alternatives involving these two facilities accounted for all of the five safest alternatives, with crash rates ranging from 4.07 to 4.34 crashes per MVMT. Crash rates for all of the remaining alternatives ranged from 4.60 to 4.75.

The number of crashes per year occurring in the study network increased in some cases over the No Action alternative because either more travel was attracted into the study network, or because more travel was served by the roadway with less safe operating characteristics.

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