FEHR PEERS

Draft Memorandum

Date: March 30, 2021

To: Michael Lloyd, P.E., City of Moreno Valley

From: Jason D. Pack, P.E.
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Subject: Moreno Valley General Plan Circulation Element Vehicle Miles Traveled (VMT) Impact Assessment

OC19-0685

Fehr & Peers has completed a Transportation Impact Assessment that analyzes Vehicle Miles Traveled in support of the Moreno Valley General Plan. The assessment below is consistent with Senate Bill 743 (SB 743) and the *City of Moreno Valley Transportation Impact Analysis Preparation Guide for Vehicle Miles Traveled and Level of Service Assessment* (June 2020).

Approach & Traffic Modeling Methodology

The Riverside County Transportation Analysis Model (RIVTAM) was utilized to estimate VMT for the analysis scenarios. RIVTAM[1] was originally developed to be consistent with the 2012 Southern California Association of Governments (SCAG) Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) and was updated to be consistent with the 2016 SCAG RTP/SCS for this effort[2]. This version of RIVTAM uses a 2012 base year and 2040 future year.

[1] The Riverside County Model (RIVCOM) is currently under development and will be consistent with the 2020 SCAG RTP/SCS. RIVCOM is anticipated to be completed in Summer 2021 and was not ready for use in this assessment.

[2] Although, the 2020 SCAG RTP/SCS was nearing adoption, land use assumptions were not available when we started this assessment.

To estimate the Existing Baseline (2018) condition for the transportation impact assessment, Fehr & Peers interpolated between the base year (2012) and future year (2040)[3] to the appropriate Baseline condition. Please note that the base year (2012) land use and roadway network were not modified.

For the General Plan scenario modeling, Fehr & Peers worked with Dyett & Bhatia to develop buildout land use assumptions for the Existing General Plan and Proposed General Plan. These land use scenarios are summarized in **Table 1**. As shown in **Table 1**, the overall anticipated growth in the number of households and total number of jobs in the City is not projected to change under the proposed General Plan. However, the General Plan does anticipate a shift to more multi-family households (resulting in a lower population estimate) and a shift in the employment makeup in the City from retail/commercial to office employment.

Table 1: RIVTAM Model Inputs for General Plan Scenarios

Land Use	2012 Base Year	2018 Baseline	2040 Existing GP	2018-2040 EXGP Delta	2040 Proposed GP	2018-2040 PGP Delta
Population	194,669	195,177	256,600	61,423	252,179	57,002
Household[1]	51,038	52,008	72,737	20,729	72,737	20,729
Commercial/Retail Employment	21,781	25,007	35,985	10,978	32,209	7,202
Office Employment	4,084	6,090	9,543	3,453	13,625	7,535
Industrial Employment	4,968	13,326	37,708	24,382	37,503	24,177
Total Employment	30,993	44,659	83,573	38,914	83,573	38,914

Notes:
1. Households reflect a 94% occupancy rate of available housing units.
2. GP = General Plan, EXGP = Existing General Plan, PGP = Proposed General Plan

Fehr & Peers also modified the future year (2040) roadway networks to reflect buildout of the transportation network for the existing General Plan and for the Proposed General Plan as part of the forecasting assessment.

VMT Impact Criteria

The *City of Moreno Valley Traffic Impact Preparation Guide* (June 2020) outlines methodology for VMT assessment for land use projects and defines adopted thresholds of significance for impact assessment and are defined below. This transportation impact assessment compares VMT generated by the Proposed

[3] The 2040 condition of RIVTAM represents the SCAG land use forecast for growth from buildout of the current Moreno Valley General Plan in year 2040.

General Plan (2040) to VMT generated by the Existing Baseline (2018) and to VMT generated by the Existing General Plan Buildout (2040) at a total and per capita level to provide a comprehensive assessment.

CEQA VMT Impact Thresholds

The following are the Moreno Valley thresholds of significance for use as part of the environmental review process under CEQA:

1. A project would have a significant VMT impact if, in the Existing Plus Project scenario[4], its net VMT per capita (for residential projects) or per employee (for office and industrial projects) exceeds the per capita VMT for Moreno Valley. For all other uses, a net increase in VMT would be considered a significant impact.
2. If a project is consistent with the regional RTP/SCS, then the cumulative impacts shall be considered less than significant subject to consideration of other substantial evidence. If it is not consistent with the RTP/SCS, then it would have a significant VMT impact if:
    a. For residential projects its net VMT per capita exceeds the average VMT per capita for Moreno Valley in the RTP/SCS horizon-year.
    b. For office and industrial projects its net VMT per employee exceeds the average VMT per employee for Moreno Valley in the RTP/SCS horizon year
    c. For all other land development project types, a net increase in VMT in the RTP/SCS horizon-year would be considered a significant impact.

Note that the Cumulative No Project scenario shall reflect the adopted RTP/SCS; as such, if a project is consistent with the regional RTP/SCS, then the cumulative impacts shall be considered less than significant subject to consideration of other substantial evidence.

As these thresholds were not intended to specifically address the appropriate methodology and metric for a general plan, the following thresholds of significance are proposed to evaluate the Proposed General Plan:

1. Any increase in the VMT per Service Population/Resident/Employee calculated using the Boundary Method, Production/Attraction Method, or Origin/Destination method compared to the Existing Baseline would be considered a significant impact.

[4] It is not a reasonable assessment to add General Plan buildout onto the existing scenario as the General Plan is anticipated to take decades to develop. As such, as part of General Plan assessment, a more appropriate approach is to focus the project-generated VMT assessment on the 2040 horizon, consistent with a horizon that would be more appropriate with the absorption of the General Plan.

2. Any increase in the total VMT or VMT per Service Population/Resident/Employee calculated using the Boundary Method, Production/Attraction Method, or Origin/Destination method compared to the Existing General Plan would be considered a significant impact.

These methodologies and metrics are detailed below.

VMT Analysis Methodology

For all methodologies outlined, VMT can be presented as total VMT or as VMT per Service Population, Resident, or Employee. Total VMT represents all VMT generated in the City on a typical day. VMT per Service Population, Resident, or Employee is an efficiency metric which represents VMT generated on a typical day per person who lives and/or works in the City. VMT per person can be measured as VMT per Resident for residential only projects, VMT per Employee for employment only projects, and VMT per Service Population for projects and land use plans which include both residential and employment uses. Total VMT gives an estimate of the total travel, while VMT per person measures the efficiency of travel.

Total VMT and per person estimates were calculated using the three methodologies outlined below. Please note that there are multiple methods to estimate VMT, and there are limitations in the available VMT assessment tool, RIVTAM, which is a typical four-step travel demand forecasting model. The model steps, which convert person trips to vehicle trips, limit the ability to separate trips by trip purpose while also accounting for all modal trips, as noted further below.

Production/Attraction VMT

The Production/Attraction (PA) method for calculating VMT sums all weekday VMT generated by trips with at least one trip end in the study area and while trips are still tracked by trip purpose. The PA method tracks trips with at least one trip end to/from their ultimate destination unless that destination is outside of the model boundary area (e.g. outside of the SCAG region). Productions are land use types that generate trips (residences) and attractions are land use types that attract trips (employment). Productions and attractions are converted from person trips to vehicle trips for the purposes of calculating VMT.

The PA method allows project VMT to be evaluated based on trip purpose which is consistent with OPR recommendations in the Technical Advisory and the City's guidelines. For example, a single-use project such as an office building could be analyzed based only on the commute VMT, or home-based-work (HBW) attraction VMT per employee; and a residential project could be analyzed based on the home-based (HB) production VMT per resident.

PA matrices do not include external trips that have one trip end outside of the model boundary (IX-XI trips) or truck trips, and therefore do not include those trips in the VMT estimates. This is not consistent with the OPR recommendations that suggest full accounting of VMT should be completed.

Origin/Destination VMT

The Origin/Destination (OD) method for calculating VMT sums all weekday VMT generated by trips with at least one trip end in the study area and tracks those trips to their estimated origins/destinations. The OD method is completed after the final loops of assignment in the travel demand model after person trips are converted to total vehicle trips. Origins are all vehicle trips that start in a specific traffic analysis zone, and destinations are all vehicle trips that end in a specific traffic analysis zone.

The OD method accounts for external and truck trips and therefore provides a more complete estimate of all VMT within the study area. This methodology also estimates VMT consistent with VMT estimates in Air Quality, Noise, and Energy sections of an EIR.

Unfortunately, OD trip matrices do not separate trips by trip purpose, and therefore VMT cannot be calculated by home-based-work (HBW) attraction VMT per employee or home-based (HB) production VMT per resident, but only by total VMT. It should also be noted that, although VMT includes trips to/from the City that originate or are destined to locations outside of the model area, those trip lengths are artificially truncated at the model boundary.

Boundary Method VMT

The boundary method is the sum of all weekday VMT on a roadway network within a designated boundary.[5] Boundary method VMT estimates VMT by multiplying the number of trips on each roadway segment by the length of that segment. This approach includes all trips, including those trips that do not begin or end in the designated boundary and is another way to summarize VMT. This is the only VMT method that captures the effect of cut-through and/or displaced traffic. The boundaries utilized in the assessment below is the Moreno Valley City Boundary and Western Riverside Council of Governments Boundary. The two boundaries provide a focused assessment specific to Moreno Valley while also reviewing the effect of uses in at the

[5] OPR recommends against using "arbitrary" boundaries such as City or County lines, however the model-wide results would include all six counties in the model. The addition of a single project in such a large area would be negligible. The only way to distinguish between no project and plus project results to determine the effect on VMT is to set a boundary at a scale where the effect on VMT from an individual project can be measured. Therefore, Fehr & Peers recommends the City or sub-regional level boundary would be an appropriate scale for this methodology.

edge of the City that may be truncated by the City Boundary. Land use assumptions for WRCOG are provided as **Attachment B**.

VMT Estimates

The VMT estimates performed for each scenario are presented in **Table 2**. As noted previously, the RIVTAM base year model is year 2012 and the baseline 2018 scenario was estimated by interpolating between the 2012 base year model and the 2040 Exiting General Plan Model. Notable takeaways from the VMT estimates include:

- The Total VMT, Home-Based Production (HBP) VMT, and Home-Based-Work Attraction (HBWA) VMT generated by the City are lower in the Proposed General Plan than the Existing General Plan in year 2040.
- HBP VMT/Resident and HBWA VMT/Employee are lower in the Proposed General Plan than the Existing General Plan which indicates a more efficient mix of jobs and households in the Proposed Plan as residents and employees have shorter commutes on average.
- HBP VMT/Resident is forecast to improve with both plans compared to Existing Baseline (2018), though the Proposed General Plan reduction is twice as large as the Existing General Plan.
- Boundary VMT is higher under the Proposed General Plan than the Existing General Plan within the Moreno Valley City boundary and lower within the WRCOG boundary. Under both boundaries the Boundary VMT/SP is higher under the Proposed General Plan.
- Many factors contribute to changes in Boundary VMT including the amount of cut through traffic that bypasses the City. It should be noted that the 2040 Boundary VMT estimates are within 0.09-0.66% of each other which is within the default 1% convergence criteria programmed in the traffic model runs; this implies that the differences in the estimates could be attributed to "model noise", or inherent randomness between model runs.

Table 2: VMT Summary

Land Use	2012 Base Year	2018 Baseline Interpolation	2040 Existing GP	2040 Proposed GP
Population	194,669	195,177	256,600	252,179
Employment	30,993	44,659	83,573	83,573
Service Population	225,662	239,836	340,173	335,752
Total OD VMT	5,514,827	5,985,420	9,132,168	9,048,076
OD VMT/SP[3]	24.44	24.96	26.86	**26.96**
HBP VMT[1]	2,472,986	2,467,621	3,187,219	3,046,905
HBP VMT/Resident	12.70	12.64	12.42	12.08
HBWA VMT[2]	340,886	524,833	1,211,220	1,201,670
HBWA VMT/Employee	11.00	11.75	14.51	**14.40**
City Boundary VMT[4]	1,686,559	1,844,892	2,888,203	**2,907,283**
City Boundary VMT/SP	7.47	7.69	8.49	**8.66**
WRCOG Boundary VMT	37,762,840	43,066,465	64,353,390	64,296,920
WRCOG Boundary VMT/SP[6]	16.73	17.15	18.71	**18.72**

Notes:

1. HBP VMT = Home-based production VMT; VMT generated by trips originating or ending at homes in Moreno Valley.
2. HBWA = Home-based-work attraction VMT; VMT generated by trips originating or ending at employment centers in Moreno Valley.
3. SP = Service Population; the sum of population and employment.
4. The boundary method VMT estimated for Existing General Plan and Proposed General Plan are within 1%, which could be a function of model noise related to the default convergence criteria (0.01) in RIVTAM.
5. Items identified in **bold** are higher than either 2018 Baseline or 2040 Existing General Plan.
6. Land use assumptions for WRCOG are provided as Attachment B.

VMT Impact Assessment

Based on the VMT metrics presented in **Table 2**, the Proposed General Plan would result in a net increase in VMT per Resident, Employee or Service Population; or an overall net increase in VMT in the RTP/SCS horizon-year and are considered significant impacts:

- OD VMT/SP is higher in the Proposed General Plan than the Existing General Plan in year 2040
- OD VMT/SP increases from Existing Baseline (2018) to Proposed General Plan (2040)
- HBWA VMT/Emp increases from Existing Baseline (2018) to Proposed General Plan (2040)
- Boundary VMT and Boundary VMT/SP are higher in the Proposed General Plan than the Existing General Plan

Goals, policies and actions from the Moreno Valley General Plan Circulation Element that are anticipated to reduce VMT are provided as **Attachment A**. However, it is not anticipated that VMT reductions associated with TDM measures would be large enough to guarantee that significant impacts could be fully mitigated.

Therefore, the Proposed General Plan is anticipated to result in a **significant and unavoidable transportation impact related to VMT**.

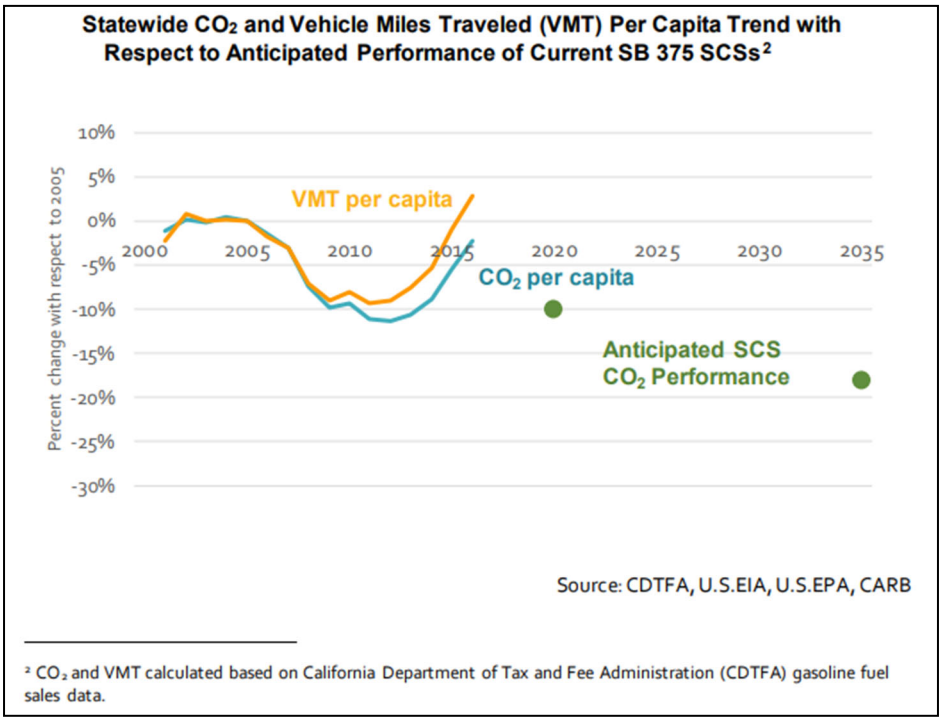
Other Impact Analysis Evidence

When making a final VMT impact determination, other available evidence related to VMT trends should be considered. This study identified the following two relevant studies.

- *2018 Progress Report, California's Sustainable Communities and Climate Protection Act*, California Air Resources Board, November 2018 (referred to as the Progress Report in the remainder of this document).
- *California Air Resources Board Improved Program Measurement Would Help California Work More Strategically to Meet Its Climate Change Goals*, Auditor of the State of California, February 2021 (referred to as the Audit Report in the remainder of this document).

The Progress Report measures the effect of Senate Bill 375 (SB 375) revealing that VMT and Greenhouse Gas (GHG) per capita increased in California between 2010 and 2016 and are trending upward, as shown in **Figure 1**.

Figure 1: VMT/Capita Trends



The Audit Report is a more recent assessment of California Air Resources Board's (ARB's) GHG reduction programs, which also found that VMT and its associated GHG emissions were trending upward through 2018. Per the audit, the state is not on track to achieve 2030 GHG reduction goals, and emissions from transportation have not been declining.

The evidence from these two reports does not refute the project's VMT impact finding but does suggest greater action on the part of the state may be needed to achieve the state's GHG reduction goals. The project contributes to the basic objectives of SB 743 for local agencies such as adding development in a land use efficient area where the short-trip lengths to destinations allows for more multi-modal choices and low VMT generation. The monitoring of state performance indicates that the state may need to take further action to discourage vehicle travel (i.e., increasing the cost of driving) while reducing the barriers or constraints that prevent more efficient use of vehicles and greater use of transit, walking, and bicycling. If these types of actions are taken, residents and employees in Moreno Valley would have multiple travel options to further reduce their vehicle use because of the proximity to existing destinations.

Analysis Limitations

This analysis was performed in March 2021 during the COVID-19 pandemic. The COVID-19 response has dramatically changed human activities and associated travel patterns. Performing more activities from home was already a trend due to the internet, but COVID-19 accelerated transitions to working and shopping from home. In addition, other disruptive trends related to demographic changes, new travel choices such as Uber and Lyft, and the potential for autonomous vehicle (AV) travel make predicting future travel demand and outcomes less certain. Given these limitations of modeling and forecasting, the general consistency of the project with the broader SB 743 objectives and the legislative intent of CEQA noted below may warrant greater emphasis in the VMT impact assessment.

> Public Resources Code 21001. ADDITIONAL LEGISLATIVE INTENT
>
> *The Legislature further finds and declares that it is the policy of the state to:*
>
> *(d) Ensure that the long-term protection of the environment, consistent with the provision of a decent home and suitable living environment for every Californian, shall be the guiding criterion in public decisions.*

VMT Estimates for Greenhouse Gas Assessment

VMT estimates were performed for the project using the Recommendations of the Regional Targets Advisory Committee (RTAC) methodology to utilize in the Greenhouse Gas Assessment. The estimates were performed using the Origin-Destination approach. The RTAC Methodology specifies to apply 100% of internal to internal trips (ii trips) and 50% of internal to external or external to internal trips (ix & xi trips). These estimates for each scenario and by vehicle type (passenger car, light truck, medium truck and heavy truck) are provided as **Attachment C.** Please note that these estimates differ from **Table 2** as those estimates applied 100% of ix & xi trips, consistent with transportation impact analysis.

Attachment A - Moreno Valley Goals, Policies, and Actions related to VMT Reduction

C.2-1 Design, plan, maintain, and operate streets using complete streets principles for all types of transportation projects including design, planning, construction, maintenance, and operations of new and existing streets and facilities. Encourage street connectivity that aims to create a comprehensive, integrated, connected network for all modes.

C.2-2 Implement a layered network approach by prioritizing conflicting modes, such as trucks and bicyclists, on alternative parallel routes to provide safe facilities for each mode.

C.2-9 Require connectivity and accessibility to a mix of land uses that meets residents' daily needs within walking distance. Typically, this means creating walkable neighborhoods with block lengths between 330 feet and 660 feet in length, based on divisions of the square mile grid on which the city is laid out.

C.2-10 Ensure that complete streets applications integrate the neighborhood and community identity into the street design and retrofits. This can include special provisions for pedestrians and bicycles that complement the context of each community.

C.2-B Continue to implement the Bicycle Master Plan to provide low-stress bicycle network improvements citywide.

C.2-C Develop curb space management guidelines that incorporate best practices and strategies for deliveries and drop-offs in commercial and mixed-use areas.

C.2-F As new transportation technologies and mobility services, including connected and autonomous vehicles, electric vehicles, electric bicycles and scooters, and transportation network companies (e.g., Uber and Lyft) are used by the public, review and update City policies and plans to maximize the benefit to the public of such technologies and services without adversely affecting the City's transportation network. Updates to the City's policies and plans may cover topics such as electric vehicle charging stations, curb space management, changes in parking supply requirements, shared parking, electric scooter use policies, etc.

C.2-H Evaluate opportunities to implement roundabouts as traffic control as new development projects are proposed, considering safety, traffic calming, cost, maintenance and greenhouse gas reduction related to idling.

C.3-4 Require development projects to complete traffic impact studies that conduct vehicle miles traveled analysis and level of service assessment as appropriate per traffic impact study guidelines.

C.3-7 Support regional efforts in the development of a VMT mitigation impact fee program.

C.3-10 Employ parking management strategies, such as shared parking in mixed use areas, on-street residential parking, and spill-over parking to avoid construction of unnecessary parking.

C.4-1 Support the development of highspeed transit linkages or express routes connecting major destinations within the city and beyond, including the Metrolink Station, that would benefit the residents and employers in Moreno Valley.

C.4-3 Support the establishment of a Transit Center/Mobility Hub in the Downtown Center.

C.4-4 All new developments shall provide sidewalks in conformance with the City's streets cross-section standards, and applicable policies for designated urban and rural areas.

C.4-5 Recognize that high-speed streets, high-volume streets and truck routes can increase pedestrian and bicycle stress levels and decrease comfortability. Provide increased buffers and protected bicycle lanes in high-stress areas, where feasible. Provide landscaped buffers where feasible to separate pedestrian environments from the travel way adjacent to motor vehicles. Provide convenient and high-visibility crossings for pedestrians.

C.4-A Prepare and maintain a Pedestrian Access Plan supporting a safer and more convenient network of identified pedestrian routes with access to major employment centers, shopping districts, regional transit centers, schools, and residential neighborhoods; the plan should address safer routes to schools, safer routes for seniors, and increase accessibility for persons with disabilities.

C.4-B The City shall actively pursue funding for the infill of sidewalks in developed areas. The highest priority shall be to provide sidewalks on designated school routes.

C.4-C Continue on-going coordination with transit authorities toward the expansion of transit facilities into newly developed areas.

C.4-D Work with major employers, the hospital complexes, and Moreno Valley College to study alternatives to conventional bus systems, such as smaller shuttle buses (micro-transit), on-demand transit services, or transportation networking company services that connect neighborhood centers to local activity centers with greater cost efficiency.

C.4-E Pursue regional, state and federal grant opportunities to fund design and construction of the City bikeway system.

C.5-1 Work to reduce VMT through land use planning, enhanced transit access, localized attractions, and access to non-automotive modes.

C.5-2 Encourage public transportation that addresses the particular needs of transit-dependent individuals, including senior citizens, the disabled, and low -income residents.

C.5-3 Encourage bicycling as an alternative to single occupant vehicle travel for the purpose of reducing fuel consumption, traffic congestion, and air pollution.

C.5-4 Particularly in corridors and centers, work with transit service providers to provide first-rate amenities to support pedestrian, bicycle and transit usage, such as bus shelters and benches, bike racks on buses, high-visibility crossings, and modern bike storage.

C.5-5 Encourage local employers to implement TDM strategies, including shared ride programs, parking cash out, transit benefits, allowing telecommuting and alternative work schedules.C.5-A Maintain a list of recommended Transportation Demand Management (TDM) strategies for employers and new developments.

C.5-A Keep the City's traffic impact study guidelines current and revise the CEQA threshold of significance for VMT as appropriate.

C.5-B Maintain a list of recommended Transportation Demand Management (TDM) strategies for employers and new developments.

C.5-C Remain flexible in the pursuit and adoption of transportation funding mechanisms that fund innovative transportation solutions.

C.5-D Work with RTA and Metrolink to increase transit service frequency, speed, and reliability and increase ridership. Strengthen linkages and access to the Metrolink Station.

C.5-E Integrate transit access and information systems into employment centers, major destinations and new multi-family residential development.

C.5-F Develop a Park Once strategy to promote walkability in mixed use centers and corridors.

C.5-G Study the feasibility of implementing car-sharing program, working with established providers.

C.6-2 Support implementation of new technologies and best practices that make logistics operations cleaner, greener, and more efficient, including electric truck charging stations, autonomous vehicle sensors and communications.

AttachmentB – WRCOG Land Use Assumptions & VMT Estimates

Land Use	2012 Baseline	2018 Baseline	2040 Existing GP	2040 Proposed GP
Population	1,790,042	1,944,104	2,508,999	2,504,578
Employment	467,493	566,767	930,772	930,772
Service Population	2,257,535	2,510,871	3,439,771	3,435,350
WRCOG Boundary VMT	37,762,840	43,066,465	64,353,390	64,296,920
WRCOG VMT/SP	16.73	17.15	18.71	18.72
Notes:				
1. GP = General Plan, EXGP = Existing General Plan, PGP = Proposed General Plan, SP = Service Population				

Attachment C – Daily VMT by Vehicle Class (RTAC Methodology)

Year		Auto		Light-Heavy Trucks		Medium-Heavy Trucks		Heavy-Heavy Trucks		Total VMT		RTAC VMT
		i	x	i	x	i	x	i	x	i	x	100% ii +50% ix & xi
2012	i	409,031	2,230,854	3,353	17,379	892	23,518	380	56,369	413,656	2,328,121	2,757,414
	x	2,262,033	-	17,394	-	23,536	-	56,431	-	2,359,394	-	
2018	i	466,347	2,509,668	4,867	21,648	1,340	30,320	1,019	86,141	473,573	2,647,777	3,144,986
	x	2,557,012	-	21,652	-	30,316	-	86,068	-	2,695,048	-	
2040 Existing General Plan	i	676,507	3,531,984	10,416	37,302	2,983	55,262	3,363	195,302	693,269	3,819,850	4,566,084
	x	3,638,600	-	37,265	-	55,177	-	194,737	-	3,925,779	-	
2040 Proposed General Plan	i	680,988	3,505,546	10,294	37,269	2,747	53,130	3,211	190,010	697,240	3,785,955	4,524,038
	x	3,588,110	-	37,208	-	53,005	-	189,318	-	3,867,641	-	