

# SCOPE OF WORK

<b>SUBMITTED TO:</b>	Santosh Bhattarai	via Email
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<b>CLIENT:</b>	Fresno Council of Governments	
<b>DATE SUBMITTED:</b>	August 24, 2023	
<b>RSG PROJECT #:</b>	_____	<b>TASK ORDER #:</b> _____
<b>CLIENT PROJECT #:</b>	_____	<b>VERSION #:</b> _____ 1
<b>PROJECT TITLE:</b>	Enhancements to Fresno ABM for Managed Lane and Truck Scenarios and On-Call Support	

This document describes RSG approach, budget, and schedule to enhance the Fresno Activity-Based (AB) model to prepare it for evaluating scenarios related to managed lanes and truck specific restrictions and scope of services for on-call support.

## 1.1 ENHANCEMENTS APPROACH

### TASK 1: Managed Lane

“Managed lanes” is a demand management strategy that regulates demand and utilizes available and unused capacity to make the most effective and efficient use of a freeway facility. FHWA defines managed lanes as highway facilities or a set of lanes where operational strategies are proactively implemented and managed in response to changing conditions<sup>1</sup>. Examples include high occupancy vehicle (HOV) lanes, value priced lanes, high occupancy toll (HOT) lanes, or exclusive/special use lanes.

As part of this task, RSG will update the AB model to add sensitivity to managed lanes strategies (e.g., HOV, HOT). The update will include the following:

- **Network.** FresnoCOG, with support from RSG, will update the highway network to add new attributes identifying the managed lane type. RSG will update the network processing procedure to recognize the new attributes and retain them in the output planning network to be used in supply models.
- **Network Skimming.** Presently, network skims are generated for three auto modes (sov, hov2, and hov3). RSG will update the skimming procedures to generate auto skims by three value-of-time bins. To provide functionality of

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<sup>1</sup> [https://ops.fhwa.dot.gov/publications/managelanes\\_primer/](https://ops.fhwa.dot.gov/publications/managelanes_primer/)

dynamic pricing by time period, RSG will update the skimming procedures to generate skims by 4 time periods (am, mid-day, pm, and evening) instead of 2 time periods (peak and off-peak) currently skimmed in the model.

- **DaySim.** RSG will update the DaySim configuration to use new VOT skims and 4 time periods. RSG will make these updates in the DaySim roster file that specifies impedances for DaySim. RSG will also update the value of time parameters in accordance with recent toll studies.
- **Network Assignment.** RSG will update assignment procedures to consider managed lane specific attributes during highway assignment. Note that assignment classes already include VOT specific auto classes, so no updates are required there.
- **Reporting.** RSG will update post-processing procedures to generate reports/summaries, as desired, specific to managed lane scenarios. RSG will also update existing reports as needed to match the updated setup.
- **Testing.** RSG will test the above-described changes using a test scenario and debug/update the model to ensure reasonable results.
- **Documentation.** RSG will document the changes under this task in the model update report and on the GitHub wiki.

## **TASK 2: Truck Restrictions**

RSG will update the AB model to add capability to test scenarios where certain streets are restricted to only trucks or to only non-truck modes. The update will include the following:

- **Network.** FresnoCOG, with support from RSG, will update the highway network to add new attributes to specify truck restrictions on links. RSG will update the network processing procedure to recognize the new attributes and retain them in the output planning network.
- **Network Skimming.** Presently, network skims are generated for three auto modes (sov, hov2, and hov3) with no skims for trucks. RSG will update the skimming procedures to generate truck skims by considering truck restriction attributes in the network.
- **DaySim.** No changes are required.
- **Network Assignment.** RSG will update assignment procedures to consider truck restriction specific attributes during assignment.
- **Reporting.** RSG will update post-processing procedures to generate reports/summaries, as desired, specific to truck restrictions scenarios.



- **Testing.** RSG will test the above-described changes using a test scenario and debug/update the model to ensure reasonable results.
- **Documentation.** RSG will document the changes under this task in the model update report and on the GitHub wiki.

## 1.2 BUDGET

Table 1 provides breakdown of the RSG cost to perform the two enhancements described above. The total cost is **\$41,590**.

**TABLE 1: BUDGET**

Task Task Description		RSG				Total Hours	Total Cost
		Nagendra Dhakar (Project Manager)	Mark Bradley (Technical Advisor)	Hannah Carson (Analyst)			
		Hourly Rate					
		\$ 189.86	\$ 368.84	\$ 155.69			
<b>1</b>	<b>Managed Lane</b>	<b>28</b>	<b>4</b>	<b>136</b>	<b>168</b>	<b>\$ 27,965</b>	
	Network	2	0	4	6	\$ 1,002	
	Network skimming	10	0	40	50	\$ 8,126	
	DaySim	4	2	12	18	\$ 3,365	
	Assignment	2	0	12	14	\$ 2,248	
	Reporting	2	0	16	18	\$ 2,871	
	Testing	4	2	40	46	\$ 7,725	
	Documentation	4	0	12	16	\$ 2,628	
<b>2</b>	<b>Truck Restrictions</b>	<b>16</b>	<b>0</b>	<b>68</b>	<b>84</b>	<b>\$ 13,625</b>	
	Network	2	0	4	6	\$ 1,002	
	Network skimming	4	0	16	20	\$ 3,250	
	DaySim	0	0	0	0	\$ -	
	Assignment	2	0	8	10	\$ 1,625	
	Reporting	2	0	8	10	\$ 1,625	
	Testing	4	0	24	28	\$ 4,496	
	Documentation	2	0	8	10	\$ 1,625	
<b>TOTAL</b>		<b>44</b>	<b>4</b>	<b>204</b>	<b>252</b>	<b>\$ 41,590</b>	

## 1.3 ENHANCEMENTS SCHEDULE

The enhancements will require **2 months** to complete.

## 1.4 ON-CALL MODELING SUPPORT

RSG will assist Fresno COG staff with any technical issues related to the Fresno ABM. The tasks include but are not limited to: model refinement and integration, troubleshooting modeling problems, review of assumptions, creating scripting files, and providing training on significant aspects of the model.

### **TASK 1: Task 1- SB 743 VMT Methodology Update**

Aid in developing and updating the SB 743 VMT methodology including updates to model reporting or post-processing.

### **TASK 2: Task 2 – Model Refinements and Improvements**

Assist as needed to improve the model setup for organization, efficiency, or any other emerging issues.

### **TASK 3: Task 3 – Trouble shooting modeling problems**

Trouble-shoot major and minor problems related to the model or model related data.

### **TASK 4: Task 4 – Update and maintain the ABM software**

RSG will ensure the current published version of DaySim continues to run to completion with FresnoCOG DaySim inputs and produces reasonable outputs. RSG shall provide FresnoCOG with any updates or upgrades to DaySim or to documentation.

### **TASK 5: Task 5 – Provide training for COG staff**

Provide training for COG staff as needed.

### **TASK 6: Task 6 – Provide support for RTP/SCS 2026 modeling**

Support RTP/SCS by assisting in the review of scenario inputs, model settings, and model outputs.

**TABLE 2: BILLING RATES<sup>2</sup>**

NAME	CLASSIFICATION	HOURLY RATE
Mark Bradley	Advisor	\$407.63
Joel Freedman	Advisor	\$375.02
Nagendra Dhakar	Project Manager	\$209.83
Hannah Carson	Analyst	\$172.08

<sup>2</sup> Table 1 rates are 2022 rates while Table 2 rates are 2023 updated rates.