Fehr & Peers

Enhancing Project-Level ABM Application by asking the right questions

Adrita Islam | September 2025

momo2025 BY ZEPHYR

Questions

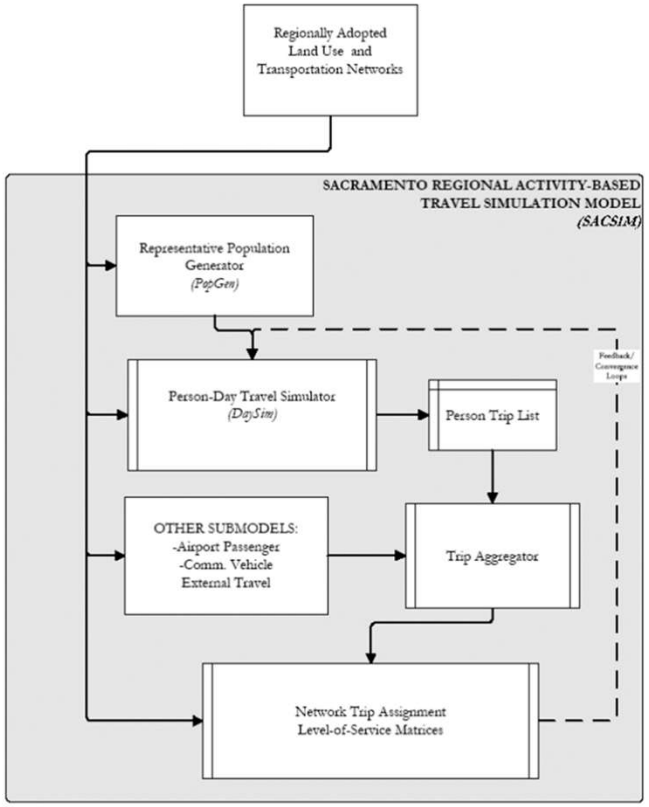
01 Is this the right tool for your project?

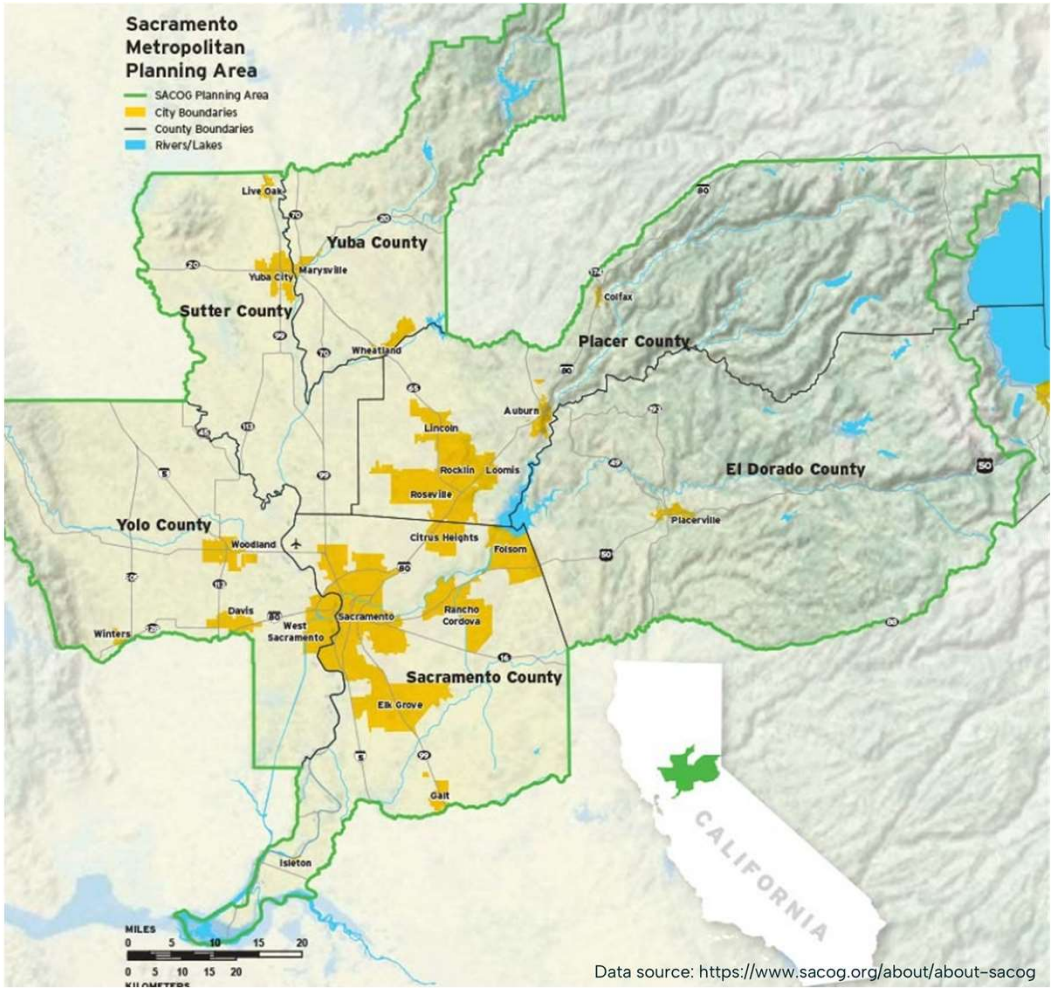
02 What to consider when scoping your analysis?

03 Do Model Settings Matter?

04 How to get the right VMT?

SACSIM



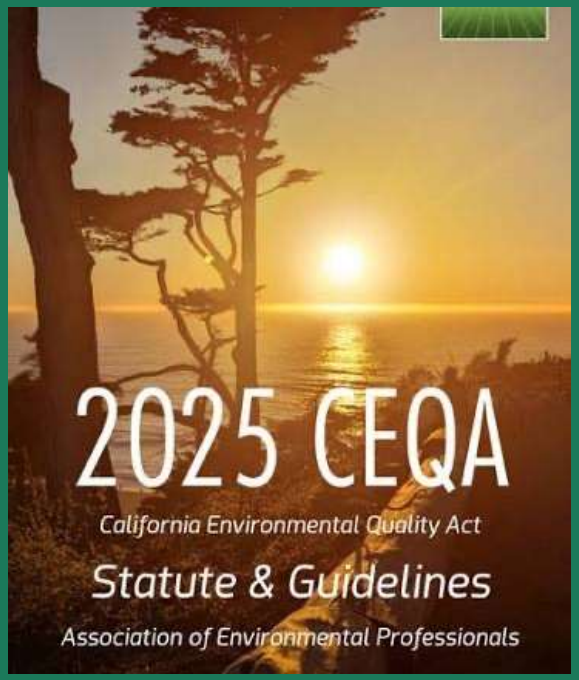


Data source: https://www.sacog.org/about/about-sacog

Is this the right tool for your project?

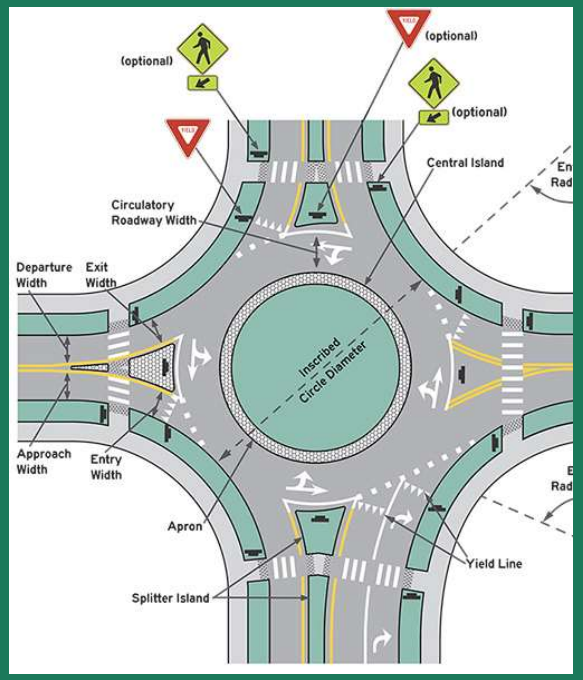
What is the purpose of this project?

CEQA Analysis

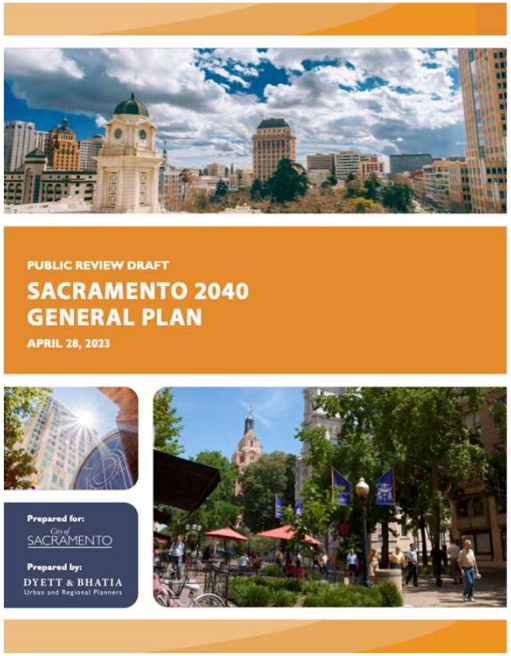


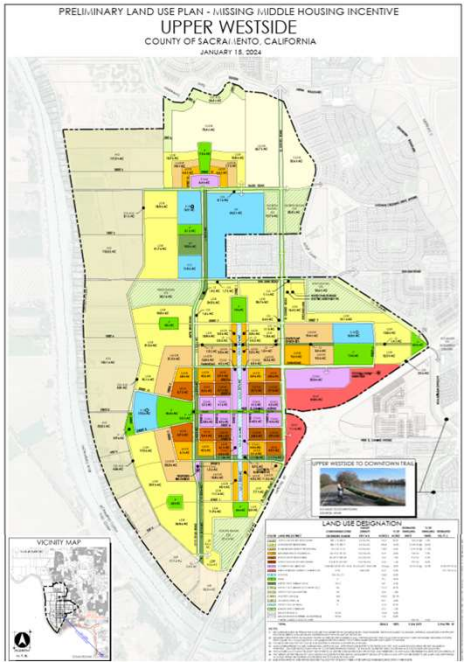
High-Level Planning

Design Projects

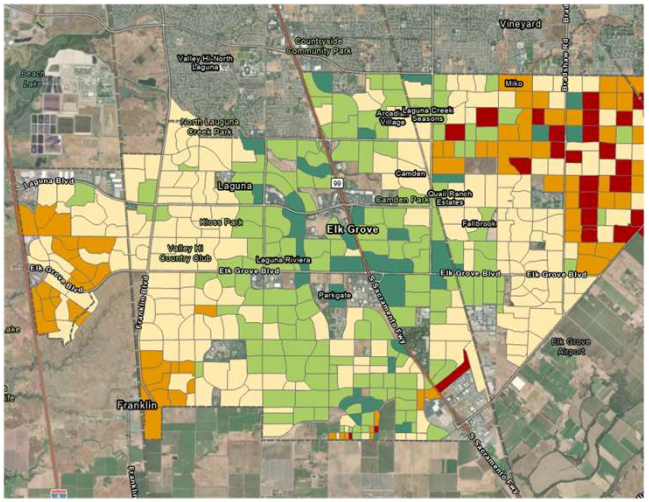


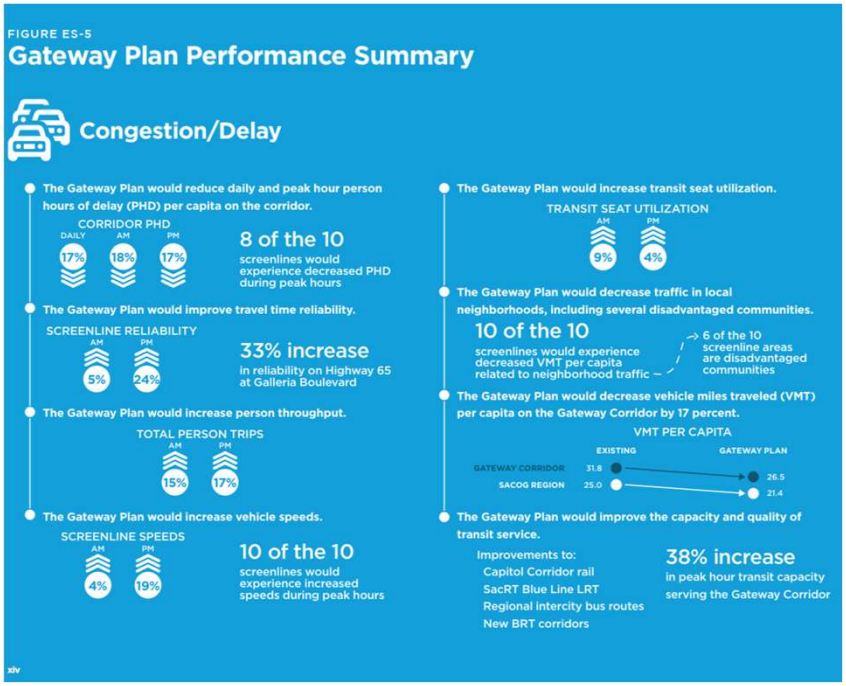
What is the type and size of the Project?

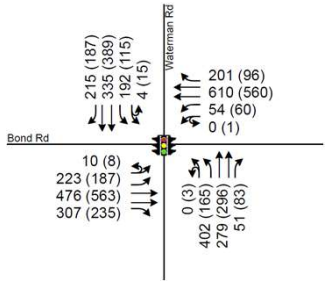


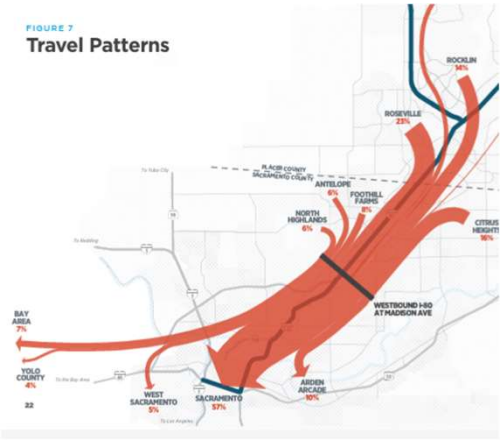


What forecasts are needed?

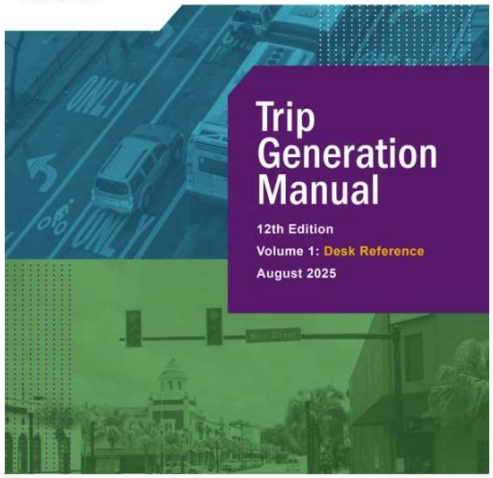


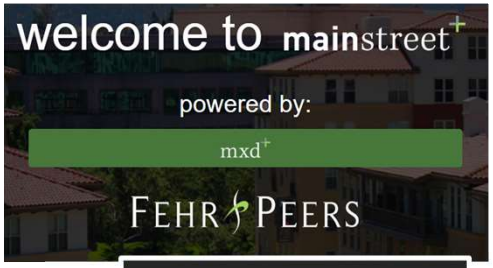


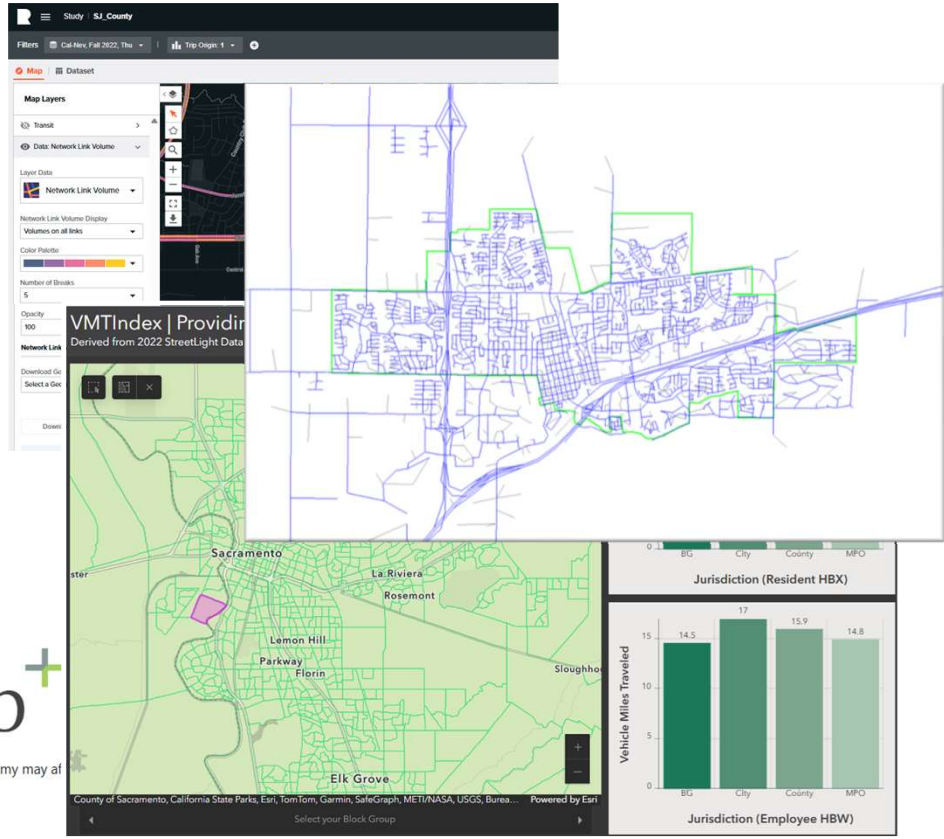




What tools are available?







National Center for Sustainable Transportation
A USDOT University Transportation Center

What to consider when scoping your analysis?

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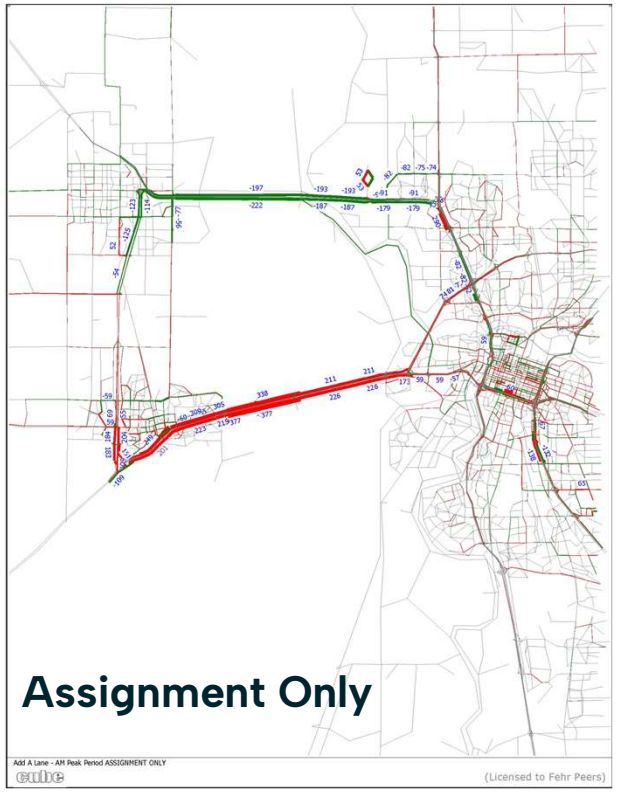
Do we need subarea validation?

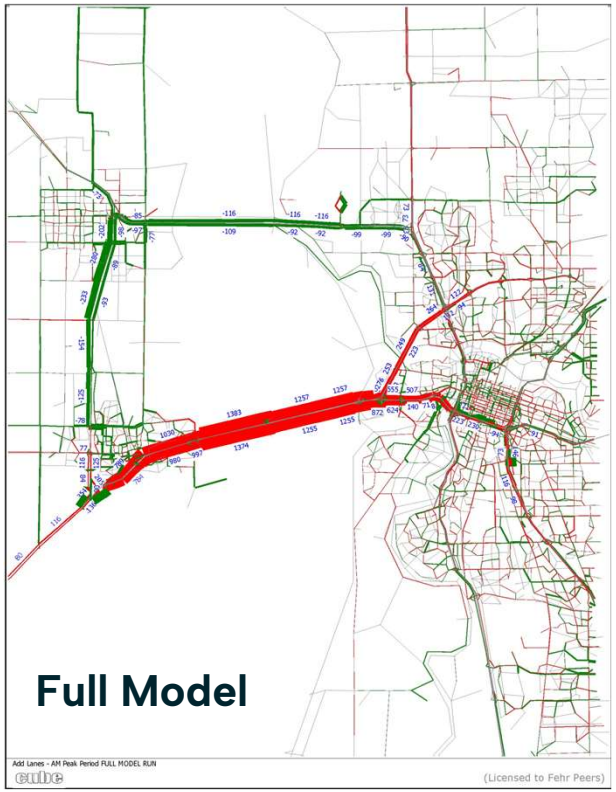
Parameters	Off-the-shelf Model			Calibrated EGSIM model		
	Daily	AM	PM	Daily	AM	PM
Model/Count Ratio	0.92	0.86	0.89	0.99	1.01	0.94
Percent Within Caltrans Maximum Deviation (>75%)	71%	66%	70%	86%	86%	89%
Percent Root Mean Square Error (<40%)	32%	47%	41%	22%	26%	22%
Correlation Coefficient (>0.88)	0.92	0.85	0.87	0.96	0.94	0.95

2024 Regional Transportation Plan Guidelines for Metropolitan Planning Organizations, California Transportation Commission, January 2024

Do we need full model runs or assignment only runs?

Model Run Type Comparison





Should the output be focused on the full model area or within specific boundary?

Model-wide vs Study Area: Project's impact comparison

Scenario		Study Area			Model-wide		
		VMT	VHT	VHD	VMT	VHT	VHD
Base	**Daily Total**	602,202	19,561	1,752	62,101,320	1,827,611	221,091
Base Plus Project	**Daily Total**	604,732	19,658	1,762	62,088,238	1,826,606	220,509
	% change	0.42%	0.50%	0.58%	-0.02%	-0.06%	-0.26%

Do Model Settings Matter?

Should convergence parameters be updated?

Scenario	Add a Lane
Short Term Elasticity VMT Range	8,092 – 48,550

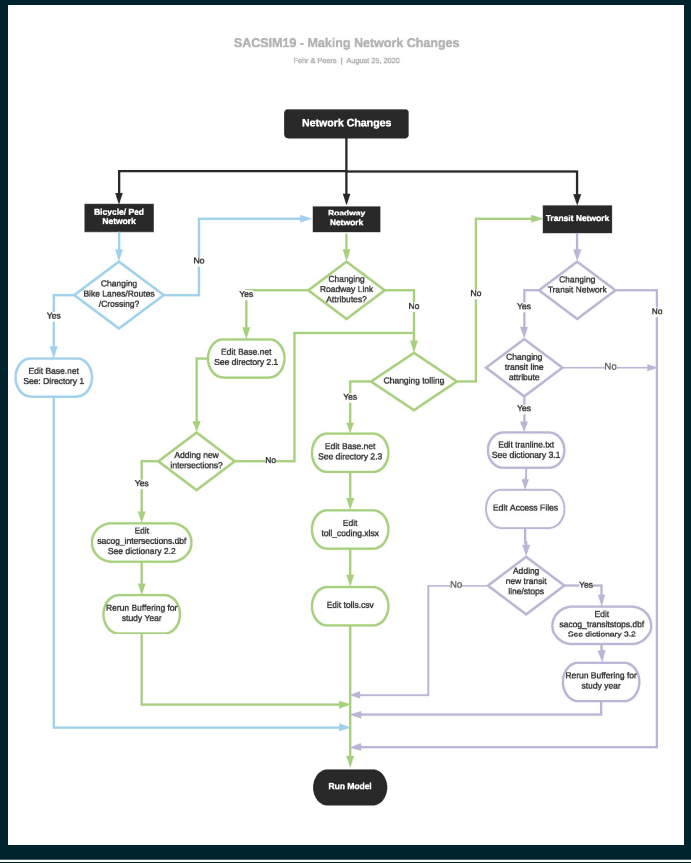
Run Type	Full Model	Assignment Only		Full Model	
Parameter	Original Settings	Original Settings	Revised Settings	Original Settings	Revised Settings
Relative Gap	0.0002	0.0002	**0.00001**	0.0002	**0.00001**
Maximum Iterations	300	300	**500**	300	**500**
Run Time	15:39:00	4:28:17	5:58:12	17:33:00	18:24:00
VMT	58,230,898	58,251,355	58,246,905	58,385,989	58,373,077
Model VMT Change	-	20,457	16,007	155,091	142,179

How many model runs are required? – Daily VMT comparison

	Citywide VMT			Study Area VMT		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Random Seed	1234	6421	7638	1234	6421	7638
Daily VMT	14,895,300	14,898,290	14,882,710	1,345,187	1,347,037	1,342,368
Change	-	0.02%	-0.08%	-	0.14%	-0.21%

What model inputs warrant attention?

How to appropriately account for project changes?



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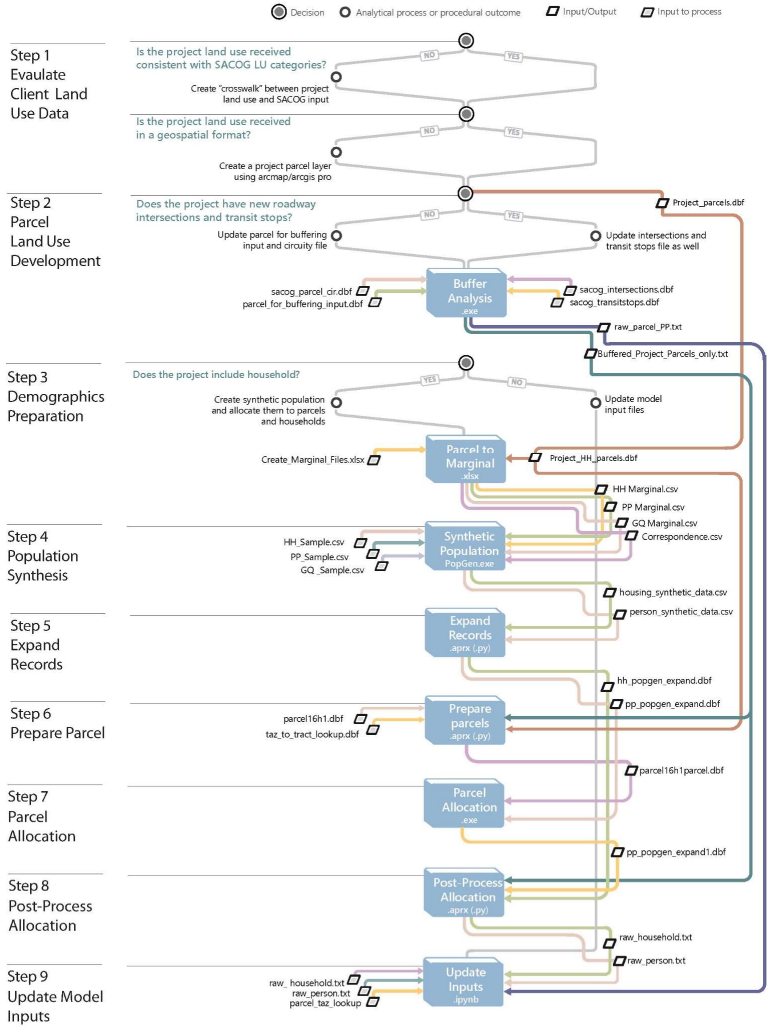
Applying Land Use Projects in SACSIM19



What about other inputs?

Gateway Weight Adjustment – Daily Volume Comparison

Major Gateways	PEMS/ Replica	Off-the-shelf Model	Updated SACSIM19 Model	Elk Grove Model
SR99N--Sutter/Butte CL	**17,300**	13,477	17,303	13,488
SR70N--Yuba/Butte CL	**13,900**	11,009	13,944	11,017
SR49NE--Placer/Nevada CL	**30,700**	23,592	30,687	23,592
I-80NE--E.of Yuba Gap	**28,700**	24,683	28,738	24,711
SR16+SR49E--Sacramento/Amador CL	**12,300**	9,413	18,373	9,430
SR99S--Sacramento/SJ CL	**73,100**	59,033	73,300	73,192
I-5 S--Sacramento/SJ CL	**55,700**	46,894	55,820	62,877
SR160S--S of SR12	**14,100**	12,769	14,158	12,779
I-80 W--W. of I-505	**176,000**	141,250	158,959	141,238

What about other inputs?

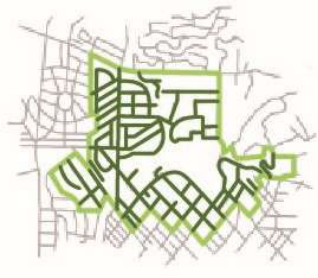
Gateway Trip Length Adjustment – VMT/Capita Comparison

	Without Adjustment	With Adjustment	Compare
SACOG	17.68	21.12	+19.5%
Sac County	15.99	18.51	+15.8%
Project	21.87	24.41	+11.6%

Adjustment based on Replica 2019 data for IX-XI trip length beyond SACOG boundary for each TAZ

How to get the right VMT?

VMT Lexicon



Total VMT

Total VMT generated by a project

Total VMT per service population

Residential VMT per resident

Home-Based VMT per resident

Total VMT per land use unit (e.g., KSF)

Total VMT per employee

Work Tour VMT per employee

Home-Based Work (HBW) VMT per employee

Ask the right questions to …

Understand model capabilities and limitations

Make necessary adjustments for project-level application

Use ABMs to gain valuable insights to support informed decision-making

Questions?

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