TDM Strategies and Effectiveness Calculations

If a Project is found to have a significant transportation VMT impact, the impact must be mitigated by reducing the project's Resident VMT/capita or Employee VMT/employee. Typically, VMT is reduced by implementing strategies that achieve one of the following:

- Reducing the number of automobile trips generated by the project or by the residents or employees of the project.
- Reducing the distance that people drive.

Strategies that reduce single occupant automobile trips or reduce travel distances are called Transportation Demand Management (TDM) strategies.

The City of San Diego requires TDM, transportation amenities, and VMT reduction amenities for certain project types pursuant to the San Diego Municipal Code Section 142.0528 (Parking Standards Transit Priority Area Regulations), San Diego Municipal Code Sections 143.1101, 143.1102 and 142.1103 (Complete Communities: Mobility Choices), and the Climate Action Plan Consistency Checklist. Applicants should refer to the San Diego Municipal Code and the Climate Action Plan Consistency Checklist to determine if the project must comply with either policy.

There are several resources for estimating the reduction in VMT due to TDM measures such as the California Air Pollution Control Officers Association (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures* (2010) (Quantification Report) and the SANDAG Mobility Management Guidebook/VMT Reduction Calculator Tool (see Mitigation Section below). The applicant should coordinate with the Development Services Department's Transportation Development Section staff to determine the appropriate method for calculating TDM measure effectiveness. The methods described below are based on the CAPCOA Quantification Report.

Possible TDM measures that can be considered by the applicant to mitigate significant CEQA VMT transportation impacts are listed and organized by land use type. Additionally, measures that overlap with the VMT reduction amenities in the San Diego Municipal Code and the TDM in the Climate Action Plan Consistency Checklist are identified. A mitigation measure can be used to satisfy the San Diego Municipal Code and the Climate Action Plan Consistency Checklist if it is an overlapping measure.

Strategies are categorized as primary or supportive. A primary strategy has a VMT reduction effectiveness that can be directly calculated using the CAPCOA Quantification Report. Typically, the effectiveness calculation requires assumptions regarding participation or eligibility rates. While VMT reductions should not be applied for supportive strategies, they boost participation or eligibility rates and make the primary strategy more effective.

All assumptions regarding participation, eligibility, and other variables should be clearly documented for each applied TDM strategy. Also, as described in the CAPCOA Quantification Report, strategies are not directly additive, and when determining the overall VMT reduction, the VMT reduction

separately calculated for each of the individual strategies (within their overall TDM strategy category) should be dampened, or diminished, according to a multiplicative formula to account for the fact that some of the strategies may be redundant or applicable to the same populations. The multiplicative equation to accomplish this adjustment is as follows:

Overall % VMT Reduction = 1-(1-A)*(1-B)*(1-C)*(1-D)*…

Where A, B, C, D … = individual mitigation strategy reduction percentages

For example, if two strategies were proposed with corresponding VMT reductions of 20% and 10%, the equation would be [1-(1-20%)*(1-10%)] or [1-(80%*90%)], which equates to a 28% reduction rather than the 30% reduction that would otherwise be seen with a direct sum.

The following steps should be followed to calculate TDM program effectiveness:

Step 1: Calculate individual measures effectiveness.

Step 2: Use the multiplicative equation for each TDM Category (represented by different colors in the table below): Neighborhood/Site Enhancement, Parking Policy/Pricing, Transit System Improvements, and Commute Trip Reduction Programs. Check the Category Max Reduction and choose the smaller value of the two.

Step 3: Use the multiplicative equation to determine the combined effectiveness of the Neighborhood/Site Enhancement, Parking Policy/Pricing, and Transit System Improvements categories. Check the Cross-Category Max Reduction and choose the smaller value of the two.

Step 4: Use the multiplicative equation to determine the combined effectiveness of the Neighborhood/Site Enhancement, Parking Policy/Pricing, Transit System Improvements, and Commute Trip Reduction Programs. Check the Global Max Reduction and choose the smaller value of the two.

TABLE APPENDIX D-1

TDM STRATEGIES AND APPROXIMATE EFFECTIVENESS

TDM STRATEGY	PRIMARY (P) OR SUPPORTIVE (S)	APPLICABLE LAND USES: RESIDENTIAL (RES) EMPLOYMENT (EMP), RETAIL (RET)	CAP CONSISTENCY CHECKLIST	TRANSPORTATION AMENITY	VMT REDUCTION AMENITY	VMT REDUCTION RANGE
Global Max Reduction For (Four Categories) Neighborhood/Site Enhancement, Parking Policy/Pricing, Transit System Improvements, and Commute Trip Reduction Programs: Urban: 60% Compact Infill: 30% Suburban Center: 15% Suburban: 10%						
Cross-Category Max Reduction For (Three Categories) Neighborhood/Site Enhancement, Parking Policy/Pricing, and Transit System Improvements: Urban: 45% Compact Infill: 20% Suburban Center/Suburban: 10%						
Neighborhood/Site Enhancement: **Category Max Reduction – Without NEV: 5% With NEV: 15%**						
Bicycle TDM						
Bicycle Infrastructure Improvements: Add additional bicycle facilities (Class I, II, or IV) or upgrade existing facilities to Class I, II, or IV.	**P**	RES, EMP, RET			X	0.6%-2.5%
Bike Share/Micromobility Fleet: A bike share/micromobility fleet provides shared bicycles and can help eliminate trips made by car during the day.	**P**	RES, EMP	X	X	X	0.2%-0.5%
Bicycle Riders Guide: A guide with bicycle routes, lanes, and paths to the site and bicycle parking facilities on the site make it easier for people to bike and walk to work. Development of individualized bicycle plans.	S	RES, EMP, RET				NA

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Electric Bicycle/Micromobility Charging Station: Charging stations for electric bicycles/micromobility located throughout the project which can be used for longer trips than standard bicycles.	S	RES, EMP, RET		X	X	NA
Subsidized Bicycle Expenses: Provide monthly subsidy to bicyclists to encourage use.	S	RES, EMP	X			NA
Bicycle Parking: Provide dedicated secure parking (enclosed lockers or bicycle cages) and bicycle racks.	S	RES, EMP, RET	X		X	NA
Bicycle Supportive Programs: Participation and promotion of bicycle programs encourage employees/residents to bike and may include participation in Bike-to-Work Day, creating biking groups, developing a bicycle buddies program, gamifying bicycling (i.e. prizes/incentives for number of days biked).	S	RES, EMP				NA
DIY Bicycle Repair Stands: Do-it-yourself bicycle repair stands offer an air pump and basic tools for bicycle maintenance and repair. Typically, they have Phillip's/flat-head screwdrivers, combination wrenches, and Allen wrenches.	S	RES, EMP, RET		X	X	NA
On-Site Showers and Lockers: Shower and changing rooms help promote bicycling (and walking).	S	RES, EMP	X		X	NA
Pedestrian/Walking TDM						
Pedestrian Network Improvements: Designing a site for pedestrian connectivity with attractive and safe connections between buildings and to the surrounding streets can encourage people to walk more.	**P**	RES, EMP, RET			X	0-2%

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Walking Supportive Programs: Walking programs encourage employees/residents to walk and may include mapping walking routes, creating walking groups or buddies, providing incentives, gamifying walking (i.e. prizes/incentives for number of days walked).	S	RES, EMP				NA
Subsidized Walking Expenses: Provide monthly subsidy to pedestrians to encourage use.	S	RES, EMP				NA
Other						
Traffic Calming: Implement traffic calming features on-site and on nearby roadways to reduce vehicle speeds and provide an enhanced environment for biking and walking.	**P**	RES, EMP			X	0.25-1%
Neighborhood Electric Vehicle Dedicated Network: Create a path/roadway system that accommodates NEVs and limits conflicts with standard automobiles. Can be used to estimate effectiveness of a network dedicated for an electric powered micromobility fleet, provided that a separate roadway network is available to the micromobility bikes/scooters.	**P**	RES, EMP				0.5-12.7%
Car Share: SEE COMMUTE TRIP REDUCTION PROGRAMS.	**P**	RES, EMP	X	X	X	0.4-0.7%
Passenger Loading Zones: Provide a dedicated passenger loading zone space convenient to main entries to encourage use of carpools, vanpools, and transportation network companies (TNCs) such as Uber and Lyft.	S	RES, EMP, RET			X	NA

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Mobility Hub: Build a multi-modal transportation hub that includes access to transit, car share, bike/scooter share, on-site shuttle, package delivery facility, and other features to facilitate modal transfer and reduce vehicle trips.	S	RES, EMP, RET				NA

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Parking Policy/Pricing **Category Max Reduction: 20%**						
Limit Parking Supply: Provide less parking supply as compared to typical parking supply at similar nearby developments. Limiting supply encourages use of other modes by not offering an abundance of convenient parking. To be effective, on-street parking must be priced and/or managed (through parking meters, residential parking permit districts, etc.). Additionally, the analyst must consider if the reduction in parking supply will result in single occupant TNC (Uber and Lyft) use, which does not reduce VMT.	**P**	RES, EMP, RET			X	5-12.5%
Unbundled Parking: Parking spaces in residential buildings are not associated with a specific unit and are offered at an additional cost or rented separately on a monthly or annual basis. To be effective, on-street parking must be priced and/or managed (through residential parking permit districts, etc.).	**P**	RES	X			2.6-13%
Priced Public Parking: Charge (or increase price by more than 25%) for parking on all public streets adjacent to and nearby the project.	**P**	RES, EMP				2.8-5.5%
Parking Cash-Out Program: Employees or residents receive the cash equivalent of the cost of a parking space if they forgo parking. This provides a financial incentive for either not owning a car or using it for commuting purposes. To be effective, on-street parking must be priced and/or managed (through residential parking permit districts, etc.).	**P**	RES, EMP	X			0.6-7.7%

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Residential Area Parking Permit Program: Implement permit program for use of on-street parking. This supports the limit on-site parking supply and unbundled parking strategies by discouraging regular and long-term parking on City streets. Permit programs reduce parking spillover from developments that have reduced parking supply or unbundled parking.	S	RES				NA
Time Limited Street Parking: Time limiting on-street parking spaces reduces the potential for vehicles to be stored for extended periods of time, which reduces overall vehicle ownership and encourages use of other modes.	S	RES, EMP				NA
Real-Time Parking Information: Information provided via a mobile app or sign that provides information on number of spaces available and where available spaces are located.	S	RES, EMP, RET				NA
Transit System Improvements Category Max Reduction: 10%						
Transit Network Expansion: Expand transit network through coordination with SANDAG or by providing private transit/shuttle service that connects to available public transit.	**P**	RES, EMP, RET				0.1-8.2%
Increase Transit Service Frequency/Speed: Coordinate with SANDAG or implement supplemental shuttle service to increase transit service headways. Increase transit vehicle speed and reliability by providing transit related improvements such as transit service priority at traffic signals, dedicated bus lanes, etc.	**P**	RES, EMP				0.02-2.5%

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Transit Pass Subsidy: SEE COMMUTE TRIP REDUCTION PROGRAMS.	**P**	RES, EMP				0.3-20%
Enhance Transit Amenities: Coordinate with transit agencies to improve facilities at existing bus stops such as benches, shelters, lighting, bicycle parking, etc. in order to make transit a more attractive option.	S	RES, EMP, RET		X	X	NA
Transit Encouragement Programs: Transit programs encourage employees/residents to take transit may include transit route planning assistance/transit riders guide, free trial transit rides, transit field trips, creating transit groups or buddies, providing incentives, gamifying transit use (i.e. prizes/incentives for number of transit trips taken).	S	RES, EMP				NA
Transit App: Downloadable smart phone application providing schedule and stop information for private shuttles and public transit make transit use more convenient.	S	RES, EMP				NA
Onsite Transit Pass Outlet: Providing transit passes for sale onsite as a convenience to encourage use.	S	RES, EMP				NA
Commute Trip Reduction Programs **Category Max Reduction: 15% Overall VMT (25% Work VMT)**						
Voluntary Commute Trip Reduction Program. A voluntary, multi-strategy program for reducing commute trips. The program must include all	**Carpooling Program and Encouragement:** Establish a formal ride-sharing program that matches individuals and encourages carpooling.	**P**	RES, EMP	X			1-15% Commute VMT

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strategies listed to the right of this description. Any commute trip reduction strategy that is not listed can be added to the program (i.e. transit subsides), and its individual strategy effectiveness can be added using the dampening equation. The effectiveness is based on the combined individual strategies (with dampening) up to the max reduction listed below. **Max Reduction: 6.2% Commute VMT** (regardless of individual strategy effectiveness)	**Alternative Work Schedules:** Employees can set/modify their arrival/departure time to provide flexibility for carpooling (or use of other non-private auto modes). Alternative work schedules could be staggered starting times, flexible schedules, or compressed work weeks.	**P**	EMP	X			0.07-3.75% Commute VMT
	Vanpool Program: Vanpool programs help vanpools to form by matching drivers and passengers and by providing or subsidizing vans. This could be implemented through the SANDAG iCommute Program.	**P**	EMP	X			0.3-13.5% Commute VMT

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	Transportation Coordinator: A voluntary commute trip reduction program should have dedicated staff time to implement the program (at least part-time for a voluntary program). Transportation coordinators are responsible for developing, marketing, implementing, and evaluating TDM programs. Having dedicated personnel on staff helps to make the TDM program more robust, consistent and reliable.	S	RES, EMP				
	Preferential Carpool Parking: Designated parking spaces for carpools and vanpools near building entrances to encourage carpooling.	S	EMP	X		X	NA
	Bicycle End Trip Facilities: Provide on-site showers, lockers, and bicycle parking).	S	EMP	X		X	NA

TDM STRATEGY		PRIMARY (P) OR SUPPORTIVE (S)	APPLICABLE LAND USES: RESIDENTIAL (RES) EMPLOYMENT (EMP), RETAIL (RET)	CAP CONSISTENCY CHECKLIST	TRANSPORTATION AMENITY	VMT REDUCTION AMENITY	VMT REDUCTION RANGE
Mandatory Commute Trip Reduction Program (Ordinance): A mandatory, multi-strategy program for reducing commute trips. The program must include all strategies listed to the right of this description. The effectiveness is based on the combined individual strategies (with dampening) up to the max reduction listed below. **Max Reduction: 21.0% Commute VMT** (regardless of individual strategy effectiveness)	**Carpooling Program and Encouragement:** Establish a formal ride-sharing program that matches individuals and encourages carpooling.	**P**	RES, EMP	X			1-15% Commute VMT
	Transit Pass Subsidy: Provide subsidized transit passes through programs such as Commuter Check or by purchasing passes to provide a financial incentive for employees or tenants to use transit.	**P**	RES, EMP	X	X		0.3-20% Commute VMT
	Alternative Work Schedules: Employees can set/modify their arrival/departure time to provide flexibility for carpooling (or use of other non-private auto modes). Alternative work schedules could be staggered starting times, flexible schedules, or compressed work weeks.	**P**	EMP	X			0.07-3.75% Commute VMT

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	Vanpool Program: Vanpool programs help vanpools to form by matching drivers and passengers and by providing or subsidizing vans. This could be implemented through the SANDAG iCommute Program.	**P**	EMP	X			0.3-13.5% Commute VMT
	Commute Trip Reduction Marketing: The commute trip reduction program will be marketed through use of kiosks, flyers, posters, and emails. New employees/tenants are provided information on their travel options and program incentives.	**P**	RES, EMP	X	X	X	0.8-4.0% Commute VMT
	Car Share: Provide on-site car share (with dedicated car share parking spaces) to provide an option for use of a car to residents or employees that choose to not own a car.	**P**	RES, EMP	X	X	X	0.4-0.7% Commute VMT

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	Transportation Coordinator: A commute trip reduction program should have dedicated staff time to implement the program. Transportation coordinators are responsible for developing, marketing, implementing, and monitoring/ evaluating TDM programs.	S	RES, EMP				
	Preferential Carpool Parking: Designated parking spaces for carpools and vanpools near building entrances to encourage carpooling.	S	EMP	X		X	NA
	Bicycle End Trip Facilities: Provide on-site showers, lockers, and bicycle parking).	S	EMP	X		X	NA
Commute Trip Reduction Additional Strategies (that are not part of the voluntary or mandatory programs listed above).							
Transit Pass Subsidy: Provide subsidized transit passes through programs such as Commuter Check or by purchasing passes to provide a financial incentive for employees or tenants to use transit.		**P**	RES, EMP	X	X		0.3-20%
Price Workplace Parking: Price workplace parking to encourage use of alternate commute modes.		**P**	EMP	X			0.1-19.7% Commute VMT

TDM STRATEGY	PRIMARY (P) OR SUPPORTIVE (S)	APPLICABLE LAND USES: RESIDENTIAL (RES) EMPLOYMENT (EMP), RETAIL (RET)	CAP CONSISTENCY CHECKLIST	TRANSPORTATION AMENITY	VMT REDUCTION AMENITY	VMT REDUCTION RANGE
Telecommuting: Telecommuting allows employees to work from home and reduces trips made to the employer site.	**P**	EMP	X			0.2-5.5% Commute VMT
Commute Trip Reduction Marketing: The commute trip reduction program will be marketed through use of kiosks, flyers, posters, and emails. New employees/tenants are provided information on their travel options and program incentives.	**P**	RES, EMP	X	X	X	0.8-4.0% Commute VMT
Guaranteed Ride Home Program: Employees who use transit, carpools, or vanpools are guaranteed a ride home in case of emergency or if they need to work late which helps to reduce concerns about using alternative modes.	S	RES, EMP		X		
Last Mile Connections: Provide means for connecting the project to the closes transit stop (subsidized TNC rides, shuttle service, etc.).	S	RES, EMP				