



MITIGATION MEASURES

Table 1
Mitigation Measures by Project Type

Project	Impact	Mitigation
General plan updates, large Specific plans, new towns	Regional ozone impact, PM-10 impact, CO hot spots, toxic air emissions, odors	<ul style="list-style-type: none">• Adopt air quality element/general plan air quality policies/specific plan policies• Adopt Air Quality Mitigation Fee Program• Fund TCM71 program: transit, bicycle, pedestrian, traffic flow improvements, transportation system management, rideshare, telecommuting, video-conferencing, etc.• Adopt air quality enhancing design guidelines/standards• Designate pedestrian/transit oriented development areas• on general plan/specific plan/ planned development land use maps• Adopt ordinance limiting woodburning appliances/fireplace installations• Fugitive dust regulation enforcement coordinated with SJVAPCD• Energy efficiency incentive programs• Local alternative fuels programs• Coordinate location of land uses to separate odor generators and sensitive receptors

Table 1
Mitigation Measures by Project Type (cont.)

Project	Impact	Mitigation
General plan amendments, small specific plans, and some zone changes	Potential regional Ozone impact, Cumulative impacts, CO hot spots, toxic air emissions, odors	<ul style="list-style-type: none"> • Apply general plan policies, local ordinances, and programs from above to the project site or adopt similar site specific programs • Restrict residential traditional wood fireplaces, install natural gas fireplaces or inserts • Provide pedestrian/transit oriented project design • Contribute to Air Quality Mitigation Fee Fund • Contribute towards TCM implementation programs • Commit to on-site improvements; bikeways, transit infrastructure, pedestrian enhancements • Provide traffic flow improvements for areas impacted by the project
Tentative maps, site plans, conditional use permits	Cumulative ozone impacts, CO, toxic air emissions, odors	<ul style="list-style-type: none"> • Apply general plan policies and local ordinances and programs from above to the project site • Pedestrian/Transit oriented site design • Provide on-site improvement: bikeways, transit infrastructure, pedestrian enhancements • Contribute to Air Quality Mitigation Fee Fund • Contribute to TCM implementation • Energy conservation measures above and beyond requirements • Require residences to install natural gas fireplaces or inserts in lieu of traditional openhearth wood fireplaces • Pay for fleet vehicle conversions to alternative fuels

Table 2
Regulation VIII Control Measures for Construction Emissions of PM-10

Regulation VIII Control Measures. - The following controls are required to be implemented at all construction sites. (Includes changes effective May 15, 2002)
<ul style="list-style-type: none">• All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.• All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.• All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.• With the demolition of buildings up to six stories in height, all exterior surfaces of the building shall be wetted during demolition.• When materials are transported off-site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.• All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. <i>(The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions.) (Use of blower devices is expressly forbidden.)</i>• Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.• Within urban areas, trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday.• An owner/operator of any site with 150 or more vehicle trips per day, or 20 or more vehicle trips per day by vehicles with three or more axles shall implement measures to prevent carryout and trackout.

Table 3
Enhanced Additional Control Measures for Construction Emissions of PM-10

<p>Enhanced Control Measures. - The following measures should be implemented at construction sites when required to mitigate significant PM-10 impacts (note, these measures are to be implemented in addition to Regulation VIII requirements):</p>
<ul style="list-style-type: none"> • Limit traffic speeds on unpaved roads to 15 mph; and • Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.
<p>Additional Control Measures. - The following control measures are strongly encouraged at construction sites that are large in area, located near sensitive receptors, or which for any other reason warrant additional emissions reductions:</p>
<ul style="list-style-type: none"> • Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site; • Install wind breaks at windward side(s) of construction areas; • Suspend excavation and grading activity when winds exceed 20 mph; and* • Limit area subject to excavation, grading, and other construction activity at any one time. <p>* Regardless of windspeed, an owner/operator must comply with Regulation VIII's 20 percent opacity limitation.</p>

Table 4
Construction Equipment Mitigation Measures

Emissions Source	Mitigation Measure
Heavy duty equipment (scrapers, graders, trenchers, earth movers, etc.)	<ul style="list-style-type: none"> • Use of alternative fueled or catalyst equipped diesel construction equipment • Minimize idling time (e.g., 5 minute maximum) • Limit the hours of operation of heavy duty equipment and/or the amount of equipment in use • Replace fossil-fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set) • Curtail construction during periods of high ambient pollutant concentrations; this may include ceasing of construction activity during the peak-hour of vehicular traffic on adjacent roadways • Implement activity management (e.g. rescheduling activities to reduce short-term impacts)

Table 5 (a)
Transit Infrastructure-Based Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Provide transit enhancing infrastructure that includes: transit shelters, benches, etc.; street lighting; route signs and displays; and/or bus turnouts/bulbs	<ul style="list-style-type: none"> • Type of transit service (heavy rail, light rail, bus) – rail attracts more riders • Distance from home to transit station and transit station to work - ridership 2-4 times higher within ½ mile • Density of land use - higher densities provide greater ridership • Mix of uses at either end of transit trip - mixed use increases transit use • Pedestrian accessibility to transit system
Provide a Bus Rapid Transit (BRT) System	<ul style="list-style-type: none"> • Design features for high quality and cost effective transit service

Table 5 (b)
VMT Infrastructure-Based Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Provide park and ride lots and/or satellite telecommuting centers	<ul style="list-style-type: none"> • Distance to employment centers - long commute attracts park and ride users and telecommuters • Degree of congestion on routes to employment centers • Availability of high occupant vehicle (HOV) lanes, express transit, rail, rideshare incentives • Type of employers - information based jobs have higher telecommuting potential
Market Commute Trip Reduction Options	<ul style="list-style-type: none"> • Market strategies to reduce commute trips (e.g. new employee orientation of trip reduction and alternative mode options, event promotions, and publications)

Table 5 (c)
Pedestrian Infrastructure-Based Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Provide pedestrian enhancing infrastructure that includes: sidewalks and pedestrian paths; direct pedestrian connections; street trees to shade sidewalks; pedestrian safety designs/infrastructure; street furniture and artwork; street lighting; and/or pedestrian signalization and signage	<ul style="list-style-type: none"> • Degree of sidewalk/path coverage within walking distance • Mixture of uses to attract pedestrians within walking distance • Pedestrian circulation provides direct access (streets interconnected/pedestrian shortcuts) • Degree of street tree coverage along most used routes • Street system designed to enhance pedestrian safety (traffic calming, signalization, separation from traffic, limited curb cuts, etc.) • Pedestrian routes provide safety from crime (eyes on the street, high activity levels, lack of gangs) • Walking routes to important destinations provide visual interest for pedestrians

Table 5 (d)
Bicycle Infrastructure-Based Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Provide bicycle enhancing infrastructure that includes: bikeways/ paths connecting to a bikeway system; secure bicycle parking; and/or employee lockers and showers	<ul style="list-style-type: none"> • Degree area within bicycling distance (5 miles max.) is served by interconnected bikeways • Degree area within bicycling distance has wide paved shoulders and limited curb cuts • Speed limits on routes to frequent destinations - low speed limits enhance cycling • Presence of college or university within cycling distance • Mixture of uses that attract bicyclists within cycling distance • Availability of bicycle parking within cycling distance - communities with bike parking ordinance tend to have high availability

Table 6 (a)
Rideshare Operational Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Implement carpool/vanpool program e.g., carpool ridematching for employees, assistance with vanpool formation, provision of vanpool vehicles, etc.	<ul style="list-style-type: none"> • Employer provides support measures such as carpool/vanpool subsidies, preferential parking, guaranteed ride home program, etc. • Coordinate with regional ridesharing organizations, e.g., Commute Connection, Central Valley Ridesharing, Kern Rideshare • Multiple smaller worksites coordinate programs • Limited parking supply and/or implementation of parking fees or parking cash-out

Table 6 (b)
Services Operational Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Provide on-site shops and services for employees, such as cafeteria, bank/ATM, dry cleaners, convenience market, etc.	<ul style="list-style-type: none"> • Sufficient number of employees at worksite, or cooperation among multiple worksites • Safe, direct pedestrian access between employment and retail areas • Jurisdiction provides density bonuses, other incentives to encourage mixed land uses
Provide on-site child care, or contribute to offsite child care within walking distance	<ul style="list-style-type: none"> • Sufficient number of employees at worksite, or cooperation among multiple worksites

Table 6 (c)
Shuttle Operational Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Establish mid-day shuttle service from worksite to food service establishments/ commercial areas	<ul style="list-style-type: none"> • Sufficient number of employees at worksite, or cooperation among multiple worksites • Commercial area located within 3 miles • Frequent, scheduled service during lunch hours • Coordination among multiple employers, e.g., at business parks • Provide commute shuttle to transit station, use same vehicle for mid-day shuttle
Provide shuttle service to transit stations/multimodal centers	<ul style="list-style-type: none"> • Major transit facility/multimodal center located within 3 miles of project • Transit use incentives for employees, e.g., on-site distribution of passes, subsidized transit passes, etc. • Frequent, scheduled service during peak commute periods • Coordination among multiple employers, e.g., at business parks • Free or subsidized service • Provide mid-day shuttle to commercial areas, use same vehicle for commute shuttle

Table 6 (d)
Parking Operational Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Provide preferential parking (e.g., near building entrance, sheltered area, etc.) for carpool and vanpool vehicles	<ul style="list-style-type: none"> • Most effective if parking supply is limited and/or located far from building entrance
Implement parking fees for single occupancy vehicle commuters	<ul style="list-style-type: none"> • Reduced or waived fees for carpools and vanpools • Complemented by transit, ridesharing programs, other commute alternatives • Revenues used to support commute alternatives • Provisions in place to avoid off-site parking spillover
Implement parking cash-out program for employees (i.e., nondriving employees receive transportation allowance equivalent to value of subsidized parking)	<ul style="list-style-type: none"> • Complemented by transit, ridesharing programs, other commute alternatives • Implement at worksites not subject to state parking cash-out requirements • Tax benefits if travel allowance offered as transit / ridesharing subsidy • Provisions in place to avoid off-site parking spillover

Table 6 (e)
Transit Operational Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Provide transit incentives	<ul style="list-style-type: none"> • Transit use incentives for employees, e.g., on-site distribution of passes, subsidized transit passes, etc. • Transit route maps and schedules posted at worksite • Design and locate buildings to facilitate transit access, e.g., locate building entrances near transit stops, eliminate building setbacks, etc.

Table 6 (f)
Other Operational Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Implement compressed work week schedule (e.g., 4/40, 9/80)	<ul style="list-style-type: none"> • Consult with employees prior to program implementation
Implement home-based telecommuting program	<ul style="list-style-type: none"> • Participation increased if employer provides/assists with provision of equipment (modem, computer, etc.) • Especially effective if employee commute trips are long
Implement School Bus Program	<ul style="list-style-type: none"> • Restore or expand school bus service in project area and local community by working with school districts
Unbundle Parking Costs from Property Costs	<ul style="list-style-type: none"> • Separate parking from property costs requiring those who wish to purchase parking spaces to do so at an additional cost from the property cost. • This removes the burden from those who do not wish to utilize a parking space.
Implement Market Price Public Parking (On Street)	<ul style="list-style-type: none"> • Implement pricing strategy for parking by pricing all central business district/employment center/retail center on street parking • It will be priced to encourage 'park once' behavior • The benefit of this measure above that of paid parking at the project only is that it deters parking spillover from project-supplied parking to other public parking nearby, which undermine the vehicle miles traveled benefits of project pricing
Integrate Affordable and Below Market Rate Housing	<ul style="list-style-type: none"> • Strategy encourages building a greater percentage of smaller units that allow a greater number of families to be accommodated on infill and transit-oriented development sites within a given footprint and height limit. • Lower income families tend to have a lower level of auto ownership, allowing buildings to be designed with less parking.

Table 6 (f)
Other Operational Mitigation Measures (cont.)

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Implement NEV Network	<ul style="list-style-type: none"> • Create local ‘light’ vehicle network such as NEV networks • NEV are classified as ‘low speed vehicles’ and are electric powered and must conform to applicable federal automobile safety standards • NEV offer an alternative to traditional vehicle trips and can legally be used on roadways with speed limits of 35 mph or less, ideal for short trips up to 30 miles in length • Project will implement necessary infrastructure, including NEV parking, charging facilities, striping, and educational tools • NEV routers will be implemented throughout the project and will double as bicycle routes

Table 7
Area Source Mitigation Measures

Mitigation Measures	Supporting Factors to Enhance Effectiveness
Residential Water Heaters	<ul style="list-style-type: none"> • Use solar or low-emission water heaters (beyond Rule 4902) • Use central water heaters
Residential Energy Efficiency	<ul style="list-style-type: none"> • Orient buildings to take advantage of solar heating and natural cooling and use passive solar designs • Increase wall and attic insulation beyond Title 24 requirements
Commercial Water Heaters	<ul style="list-style-type: none"> • Use solar or low-emission water heaters • Use central water heating systems
Commercial Energy Efficiency	<ul style="list-style-type: none"> • Orient buildings to take advantage of solar heating and natural cooling and use passive solar designs • Increase wall and attic insulation beyond Title 24 requirements
Industrial Heating	<ul style="list-style-type: none"> • Orient buildings to take advantage of solar heating and natural cooling and use passive solar designs
Landscape Maintenance	<ul style="list-style-type: none"> • Provide electric maintenance equipment
Residential Heating	<ul style="list-style-type: none"> • Eliminate or limit the amount of traditional fireplaces installed (i.e. natural gas fireplaces/inserts or at least EPA certified wood stoves or inserts instead of open hearth fireplaces)

On-site Emission Reduction Mitigation Measures

The San Joaquin Valley Air Pollution Control District (District) has prepared the following list of on-site mitigation measures to help developers identify ways to reduce air impacts associated with development projects occurring within the San Joaquin Valley Air Basin. Please note that this is not an exhaustive list, and developers are encouraged to suggest new mitigation measures for addition to the list.

All Mitigation Measures

1. Project is located within 1/2 mile of existing or planned Class I or II bike lanes on arterial/collector streets, or where a suitable parallel route exists.
2. Project is located within 1/4-1/2 mile of a transit stop.
3. Project is located within one mile of a park and ride lot operated by a transportation agency.
4. Other trip reduction services on site or within 1/4 mile of site.
5. Projects that minimize the need for trips that are located near residential, mixed, or retail/commercial use areas that are located within a 1/4 mile.
6. Increase residential density. Density is measured in terms of dwelling units or jobs per acre.
7. Designate a portion of residential units as deed-restricted below-market-rate (BMR) housing; Affordable Housing.
8. Provide Class I and Class II bicycle parking/storage facilities on-site. Bicycle parking facilities should be near destination points and easy to find. At least one bicycle parking space for every 20 vehicle parking spaces.
9. Provide shower and locker facilities to encourage employees to bike and/or walk to work, typically one shower and three lockers for every 25 employees.
10. Provide Class I bicycle parking at apartment complexes or condos without garages.
11. Install Class I or II bike lanes on arterial/collector streets, or where a suitable route exists.
12. Provide building access and paths which are physically separated from street parking lot traffic and that eliminate physical barriers such as walls, berms, landscaping and slopes that impede the use of pedestrians, bicycle facilities, or public transportation vehicles.

All Mitigation Measures Cont.

13. Provide continuous sidewalks separated from the roadway by landscaping and on-street parking.
14. Provide on and off-site pedestrian facility improvements such as trails linking them to designated pedestrian commuting routes and/or on-site overpasses and wider sidewalks.
15. Link cul-de-sacs and dead-end streets to encourage pedestrian and bicycle travel.
16. Improve walkability design and provide traffic reduction modifications to project roads, such as: narrower streets, speed platforms, bulb-outs and intersection modifications designed to reduce vehicle speeds and to encourage pedestrian and bicycle travel.
17. Provide a parking lot design that includes clearly marked and shaded pedestrian pathways between transit facilities and building entrances.
18. Provide pedestrian access between bus service and major transportation points and to destination points within the project.
19. Provide a display case or kiosk displaying transportation information in a prominent area accessible to employees, residents, or visitors.
20. Display Bike Route Maps, Bus Schedules, and any other transportation information such as carpooling, car sharing.
21. Project design uses models by the Local Government Commission (LGC) in the "Smart Growth Guidebook," such as: street block patterns that form an interconnected grid, short block faces, numerous alleys and narrow streets.
22. Develop and implement parking pricing strategies, such as charging parking lot fees to low occupancy (single occupant vehicles) vehicles, implement workplace parking at its employee centers, or increase the on-street public parking.
23. Provide preferential parking spaces near the entrance of buildings for those who carpool/vanpool/rideshare and provide signage.
24. Install efficient heating and other appliances, such as water heaters, cooking equipment, refrigerators, furnaces and boiler units beyond Title 24 requirements (see Title 24, Part 6, Energy Efficiency Standards for Residential and Nonresidential Buildings: <http://www.energy.ca.gov/title24/>)
25. Improve the thermal integrity/efficiency of buildings, and reduce the thermal load with automated and timed temperature controls or occupant sensors.
26. Solar Design such as installing solar panels.

All Mitigation Measures Cont.

27. Install high efficiency Energy Star heating or ground source heat pump.
28. Install energy efficient interior lighting.
29. Install built-in energy efficient appliances.
30. Install electrical outlets on the exterior walls of both the front and back of residences or all commercial buildings to promote the use of electric landscape maintenance equipment.
31. Install electric vehicle recharging station with both conductive and inductive charging capabilities in residential garages / parking lots.
32. Install a gas outlet for use with outdoor cooking appliances, and in any proposed fireplaces, including outdoor recreational fireplaces or pits.
33. Install HEPA (High Efficiency Particle Arrestance) Filters.
34. Install "whole-house" or "fresh-air" ventilation system.
35. Reduce Wood Burning Fireplaces and/or Woodstoves above that required by District Rule 4901.
36. Provide guaranteed ride home.
37. Provide carpool support system.
38. Provide car-sharing services support system.
39. Employ or appoint an Employee Transportation Coordinator to work with the TMA and the District.
40. Implement a rideshare program.
41. Provide incentives to employees to carpool/vanpool, take public transportation, telecommute, walk, bike, etc.
42. Participate in an employee "flash-pass" program, which provides free travel on transit buses.
43. Provide transit pass subsidy (100%) and/or commute alternative allowance.
44. Provide an employer subsidized shuttle service to connect to existing transit sites.

All Mitigation Measures Cont.

45. Implement a lunchtime shuttle to reduce single occupant vehicle trips.
46. Provide electric shuttle or minibus service to transit stops.
47. Provide free transfers between all shuttles and transit.
48. Operation of a shuttle bus to shopping, health care, public services sites, etc. to reduce automobile use.
49. Implement alternative work schedules such as compressed workweek schedules where weekly work hours are compressed into fewer than five days. Examples of these options are: 9/80, 4/40, 3/36.
50. Project provides and/or requires use of electric maintenance equipment; including, but not limited to electric lawn mowers, electric leaf blowers, etc.
51. Prohibit gas powered landscape maintenance equipment within developments.
52. Replace diesel fleet with alternative fuel engine technology and infrastructure.
53. Retrofit existing equipment to reduce emissions using methods such as particulate filters, oxidation catalyts, or other approved technologies.
54. Adopt a Vehicle Idling Policy requiring all vehicles under company control to adhere to a 5 minute idling policy.
55. Add-on control devices, e.g., particulate traps, catalytic oxidizers on construction equipment.
56. Repower/Retrofit heavy-duty diesel fleet with cleaner diesel engine technology and/or diesel particulate filter after-treatment technology.
57. Replace auxiliary power units with cleaner engine technology, alternative fuels, or require electric connection while at loading dock.
58. Replace diesel fleet vehicles with cleaner fueled low emission vehicles (i.e. school buses, buses, on- and off- road heavy duty vehicles, lighter duty trucks and passenger vehicles).
59. Improve destination accessibility such as locating the project within 12 miles from downtown or a job center.
60. Use of a "Construction Clean Fleet that will reduce construction emissions by 20% for oxides of nitrogen (NOx) and 45% for particulate matter of 10 microns or less in size (PM10) from the statewide average as estimated by the Air Resource Board (ARB).

All Mitigation Measures Cont.

A Construction Clean Fleet for a project includes all the pieces of construction equipment that are greater than 50 horse power and generate emissions from the use of an internal combustion engines related to construction activity.