AIR QUALITY ANALYSIS

SAN JOSE CITY COLLEGE FACILITIES MASTER PLAN UPDATE 2021

CITY OF SAN JOSE, CALIFORNIA

Prepared for:

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METEOROLOGICAL SETTING

The project site is located in the Santa Clara Valley, which lies within the San Francisco Bay Area Air Basin (SFBAAB), bounded by the San Francisco Bay to the north and mountains to the south, west and east. Temperatures are warm on summer days and cool on summer nights and the winter temperatures are relatively mild. Temperatures at nearby San Jose Airport average 61^0F annually, ranging from the low-40s on winter mornings to around 84^0F on summer afternoons.

Daily and seasonal fluctuations in temperature are relatively minor because of the moderating effects of the nearby ocean. In contrast to the steady temperature regime, rainfall is highly variable and confined almost exclusively to the "rainy" period from early November to mid-April. San Jose averages 15 inches of precipitation annually, but because much of the area's rainfall is derived from the fringes of mid-latitude storms, a shift in the annual storm track of a few hundred miles can mean the difference between a very wet year and near-drought conditions. Santa Clara County is shielded from strong daytime sea breezes by the intervening hills to the west. Daytime airflow across the project site is mainly air that has moved southward from San Mateo County along the western shores of San Francisco Bay. Winds in the project area are typically out of the northwest, north-northwest, and north (about 40% of the time). All other wind directions occur no more than 10% of the time. Decreasing wind speeds and the origin of the incoming air over populated areas creates elevated air pollution levels in Santa Clara County. Annual average wind speeds are approximately seven miles per hour (CARB 1984). However, light daytime winds, especially until mid-afternoon, and near-calm nocturnal conditions limit the dispersion potential of the local atmosphere. Santa Clara County typically experiences higher air pollution levels than do better-ventilated portions of the BAAB.

AMBIENT AIR QUALITY

The Bay Area Air Quality Management District (BAAQMD) operates a regional monitoring network which measures the ambient concentrations of six criteria air pollutants: ozone (O_3), carbon monoxide (CO), inhalable particulate matter (PM_{10}), lead (Pb), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). Existing and probable future levels of air quality in the project area can be generally inferred from ambient air quality measurements conducted by the BAAQMD at its Santa Clara County air monitoring stations. Table 1 is a five-year summary of monitoring data (2003-2007) from the BAAQMD's central San Jose monitoring station. Table 1 compares measured pollutant concentrations with state and national ambient air quality standards. These data indicate that the South Bay continues to experience air pollution problems with both atmospheric pollution potential and emissions continuing to be high in this area. Monitored values for ozone, PM_{10} and $PM_{2.5}$ have exceeded air quality standards during the last five years of published data. Since 1999, all other pollutants have remained within allowable levels.

Ozone (O_3). O_3 is not emitted directly into the atmosphere but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving hydrocarbons (HC) and nitrogen oxides (NO_X). O_3 is a regional pollutant because its precursors are transported and diffused by wind concurrently with O_3 production by the photochemical reaction process. O_3 causes eye and respiratory irritation, reduces resistance to lung infection, and

Table 1

Project Area Ambient Air Quality Monitoring Summary, 2003 – 2007

Pollutant	2003	2004	2005	2006	2007
Ozone					
1-hour > 0.09 ppm*	12	0	1	5	0
8-hour>0.07 ppm*	-	-	1	5	0
1-hour > 0.12 ppm**	0	0	NA	NA	NA
8-hour > 0.08 ppm**	0	0	0	1	0
Max. 1-hour Conc. (ppm)	0.12	0.09	0.113	0.118	0.083
Carbon Monoxide					
1-hour > 20 ppm*, > 35 ppm**	0	0	0	0	0
8-hour > 9 ppm*,**	0	0	0	0	0
Max 1-hour conc. (ppm)	5.5	4.4	4.3	4.1	3.5
Max. 8-hour Conc. (ppm)	4.0	3.0	3.1	2.9	2.7
Nitrogen Dioxide					
1-hour > 0.18 ppm*	0	0	0	0	0
Max. 1-hour Conc. (ppm)	0.090	0.073	0.074	0.074	0.065
Particulate Matter (PM_{10})					
24-hour > 50 $\mu g/m^3$*	3	4	2	2	3
24-hour > 150 $\mu g/m^3$**	0	0	0	0	0
Max. 24-hourConc. ($\mu g/m^3$)	60	58	54	73	69
Fine Particulates ($PM_{2.5}$)					
24-hour > 65 $\mu g/m^3$**	0	0	0	6[a]	9
Max. 24-hour Conc. ($\mu g/m^3$)	56.1	51.5	54.6	64.4	57.5

Notes:
* Number of Days Above California Ambient Air Quality Standards
** Number of Days Above National Ambient Air Quality Standards
[a] National standard reduced to 35 $\mu g/m^3$
NA National standard revoked

Source: BAAQMD (2003-2007), San Jose Central Air Monitoring Station (http://www.arb.ca.gov/adam/welcome.html)

may aggravate pulmonary conditions in persons with lung disease. Table 1 shows that exceedance of the one-hour state standard occurred on 18 days in central San Jose between 2003 and 2007. The less stringent federal standard of 0.12 ppm for one hour was met until the standard was revoked in June, 2005. The federal 8-hour ozone standard has only been exceeded once in the last five years. The slightly more stringent state 8-hour standard for ozone was exceeded six times in the last three years.

Carbon Monoxide (CO). CO is an odorless, invisible gas usually formed as the result of incomplete combustion of organic substances. Approximately 80 percent of the CO emitted in the SFBAAB comes from on-road motor vehicles (CARB, 1999). High levels of CO can impair the transport of oxygen in the bloodstream and thereby aggravate cardiovascular disease and cause fatigue, headaches, and dizziness. Table 1 shows that no exceedances of state CO standards were recorded between 2003 and 2007. Measurements of carbon monoxide (CO) show that eight-hour CO levels are currently only 30 percent of the eight-hour state and federal standard.

Suspended and Inhalable Particulate Matter (PM_{10} and $PM_{2.5}$). Particulate matter is a class of air pollutants that consists of solid and liquid airborne particles in an extremely small size range. Particulate matter is measured in two size ranges: PM_{10} for particles less than 10 microns in diameter and $PM_{2.5}$, for even smaller particles which are less than 2.5 microns in diameter. Motor vehicles generate about half of Bay Area particulates, through tailpipe emissions as well as brake pad and tire wear. Wood burning in fireplaces and stoves, industrial facilities, and ground-disturbing activities such as construction are other sources of fine particulates. Fine particulates are small enough to be inhaled into the deepest parts of the human lung ($PM_{2.5}$) can cause adverse health effects. Among the criteria pollutants that the BAAQMD regulates, particulates appear to represent the most serious overall health hazard. Studies have shown that elevated particulate levels contribute to the death of approximately 200 to 500 people per year in the Bay area. High levels of particulates have also been known to exacerbate chronic respiratory ailments, such as bronchitis and asthma, and have been associated with increased emergency room visits and hospital admissions (BAAQMD, 1996).

Diesel exhaust is a growing concern in the Bay Area and throughout California. The California Air Resources Board (CARB) identified diesel engine particulate matter as a toxic air contaminant. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Many of these toxic compounds adhere to the particles, and because diesel particles are very small, they penetrate deeply into the lungs. Diesel particulate matter (DPM) has been identified as a human carcinogen. Mobile sources such as trucks, buses, and automobiles are some of the primary sources of diesel emissions. Studies show that diesel particulate matter concentrations are much higher near heavily traveled highways and intersections. District analysis shows that the cancer risk from exposure to diesel exhaust is much higher than the risk associated with any other toxic air pollutant routinely measured in the region (BAAQMD, 1999).

Table 1 shows that exceedances of the state PM_{10} standard occur relatively infrequently in San Jose. State PM_{10} standards were exceeded on an average of 3 measurement days per year in the

last five years (PM_{10} is not monitored everyday). Federal PM_{10} standards have never been exceeded at the San Jose monitoring station.

In 1997, the U. S. Environmental Protection Agency adopted a new standard for $PM_{2.5}$, which represents the fine fraction of particulate matter; this standard was subject to legal challenge but was upheld by the U.S. Supreme Court in February 2001. California has adopted an annual state standard for $PM_{2.5}$ that is more stringent than the federal standard. The new state standard is an annual average standard of 12 $\mu g/m^3$, not to be exceeded. This standard went into effect in July 2003. $PM_{2.5}$ data collected at the San Jose station indicate that $PM_{2.5}$ concentrations have not exceeded the federal $PM_{2.5}$ standard until the standard was revised sharply downward in 2006.

Other Criteria Air Pollutants. The standards for NO_2, SO_2, and lead are being met in the Bay Area, and the latest pollutant trends information suggests that these standards will not be exceeded in the foreseeable future (ABAG and BAAQMD 1994).

Toxic Air Contaminants. Toxic air contaminants (TACs) are air pollutants that may lead to serious illness or increased mortality, even when present in relatively low concentrations. Potential human health effects of TACs include birth defects, neurological damage, cancer, and death. There are hundreds of different types of TACs with varying degrees of toxicity. Individual TACs vary greatly in the health risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another.

TACs do not have ambient air quality standards, but are regulated by the BAAQMD using a risk-based approach. This approach uses a health risk assessment to determine what sources and pollutants to control as well as the degree of control. A health risk assessment is an analysis where human health exposure to toxic substances is estimated, and considered together with information regarding the toxic potency of the substances, to provide quantitative estimates of health risks.

In addition to criteria pollutants, both the BAAQMD and the California Air Resources Board (CARB) operate TAC monitoring networks in the San Francisco Bay Area. These stations measure 10 to 15 TACs, depending on the specific station. The TACs selected for monitoring are those that have traditionally been found in the highest concentrations in ambient air, and therefore tend to produce the most significant risk. The BAAQMD operates two ambient TAC monitoring stations in San Jose. Using data from these two monitoring stations as well as data from the Fremont and San Francisco stations, it is estimated that estimated average lifetime cancer risk in the Bay Area was 143 in one million in 2003 for all Bay Area TACs (BAAQMD, 2007). Since this estimate is based, in part, on data from the San Jose stations, this cancer risk would be indicative of the current risks in the project area. These levels can be compared to the much higher background cancer incidence rate in the United States from all causes, which is 42%, or 420,000 in one million (National Cancer Institute, 2005).[1]

[1]It is generally believed that a large portion of the total background cancer risk in the United States comes from smoking and other personal habits, genetic susceptibilities, diet, natural radiation including radon, and other lifestyle factors.

CONFORMANCE WITH AIR QUALITY REGULATIONS

Ambient Air Quality Standards

The federal Clean Air Act Amendments of 1970 established national ambient air quality standards, and individual states retained the option to adopt more stringent standards and to include other pollution sources. California had already established its own air quality standards when federal standards were established, and because of the unique meteorological problems in the state, there is considerable diversity between state (SAAQS) and federal or national (NAAQS) standards currently in effect in California, as shown in Table 2.

The ambient air quality standards are intended to protect the public health and welfare, and they incorporate an adequate margin of safety. They are designed to protect those segments of the public most susceptible to respiratory distress, known as sensitive receptors, including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

Federal Standards

The 1977 Clean Air Act required that regional planning and air pollution control agencies prepare a regional Air Quality Plan to outline the measures by which both stationary and mobile sources of pollutants can be controlled in order to achieve all standards within the deadlines specified in the Clean Air Act. For the Bay Area air basin, the Association of Bay Area Governments (ABAG), the Metropolitan Transportation Commission (MTC), and the BAAQMD jointly prepared a *Bay Area Air Quality Plan* in 1982 which predicted attainment of all Federal Clean Air standards within the air basin by 1987. This forecast was somewhat optimistic in that attainment of federal Clean Air standards did not occur throughout the entire air basin until 1991. The plan, which is referred to as the State Implementation Plan (SIP), must contain control strategies that demonstrate attainment with national ambient air quality standards by deadlines established in the federal CAA.

The Bay Area Air Basin attainment status with respect to federal standards is summarized in Table 2. In general, the Bay Area experiences low concentrations of most pollutants when compared to federal standards, except for O_3, for which the standard is exceeded periodically. In 1995, after several years of minimal violations of the Federal one-hour ozone standard, the EPA revised the designation of the Bay Area air basin from "non-attainment" to "attainment" for this standard. However, with less favorable meteorology in subsequent years, violations of the federal one-hour ozone standard were again observed in the basin. Effective August 1998, the EPA downgraded the Bay Area's classification for this standard from a "maintenance" area to an "unclassified non-attainment" area. In 1998, after many years without violations of any carbon monoxide (CO) standards, the attainment status for CO was upgraded to "attainment."

Table 2

State and Federal Ambient Air Quality Standards and Attainment Status

Pollutant	Averaging Time	(State) SAAQS[a] Standard	(State) SAAQS[a] Attainment Status	(Federal) NAAQS[b] Standard	(Federal) NAAQS[b] Attainment Status
Ozone	1-hour	0.09 ppm	**N**	NA	NA
	8-hour	0.07 ppm	**N**	0.075 ppm	**N**
Carbon Monoxide	1 hour	20 ppm	A	35 ppm	A
	8 hour	9 ppm	A	9 ppm	A
Nitrogen Dioxide	1 hour	0.18 ppm	A	NA	NA
	Annual	0.030 ppm	NA	0.053 ppm	A
Sulfur Dioxide	1 hour	0.25 ppm	A	NA	NA
	24 hour	0.04 ppm	A	0.14 ppm	A
	Annual	NA	A	0.03 ppm	A
Particulate Matter (PM_{10})	24 hour	50 $\mu g/m^3$	**N**	150 $\mu g/m^3$	U
	Annual	20 $\mu g/m^3$	**N**	NA	NA
Fine Particulate Matter ($PM_{2.5}$)	24 hour	NA	NA	35 $\mu g/m^3$	**N**
	Annual	12 $\mu g/m^3$ [(c)]	**N**	15 $\mu g/m^3$	A
Sulfates	24 hour	25 $\mu g/m^3$	A	NA	NA
Lead	30 day	1.5 $\mu g/m^3$	A	NA	NA
	Cal. Quarter	NA	NA	1.5 $\mu g/m^3$	A
Hydrogen Sulfide	1 hour	0.03 ppm	U	NA	NA
Visibility Reducing Particles	8 hour	see Note d	A	NA	NA

Notes: A = Attainment; **N** = Non-Attainment; U = Unclassified; NA = Not Applicable; ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

a SAAQS = State Ambient Air Quality Standards (California). SAAQS for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, particulate matter, and visibility reducing particles are values that are not to be exceeded. All other state standards shown are values not to be equaled or exceeded.

b NAAQS = National Ambient Air Quality Standards. NAAQS, other than ozone and particulates, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4^{th} highest daily concentration is 0.08 ppm or less. The 24-hour PM10 standard is attained when the 3-year average of the 99^{th} percentile of monitored concentrations is less than the standard. The 24-hour PM2.5 standard is attained when the 3-year average of 98^{th} percentiles is less than the standard.

c This State 8-hour ozone standard was approved in April 2005 and became effective in May 2006.

d Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70%. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

Source: Bay Area Air Quality Management District (updated 12/30/2008)

In response to the EPA's redesignation of the basin for the one-hour federal ozone standard, the BAAQMD, ABAG, and MTC were required to develop an ozone attainment plan to meet this standard. The *1999 Ozone Attainment Plan (OAP)* was prepared and adopted by these agencies in June 1999. However, in March 2001, the EPA proposed and took final action to approve portions of the 1999 OAP and disapprove other portions, while also making the finding that the Bay Area had not attained the national one-hour ozone standard. As a result, a revised OAP was prepared and adopted in October 2001. The 2001 OAP amends and supplements the 1999 OAP. The 2001 OAP contains control strategies for stationary and mobile sources. The adopted mobile-source control program was estimated to significantly reduce volatile organic compound and NO_X emissions between 2000 and 2006, reducing emissions from on- and off-road diesel engines (including construction equipment). In addition to emission reduction requirements for engines and fuels, the OAP identified 28 transportation control measures to reduce automobile emissions, including improved transit service and transit coordination, new carpool lanes, signal timing, freeway incident management, and increased state gas tax and bridge tolls.

With the revocation of the federal one-hour ozone standard, the only federal standard that was exceeded in the air basin was a marginal exceedance of the 8-hour ozone standard of 0.08 ppm. No federal standards attainment plan (SIP) was necessary for a marginal exceedance. In 2008, EPA lowered the 8-hour standard to 0.075 ppm. With this new standard, the basin is more solidly in non-attainment status. EPA will issue final designations by March, 2010. Preparation of a SIP may become necessary after the EPA action.

EPA also lowered the 24-hour $PM_{2.5}$ standard in 2006 from 65 µg/m3 to 35 µg/m3. The SFBAAB was designated as non-attainment for this revised standard. That designation becomes final in April, 2009. Preparation of a SIP for $PM_{2.5}$ may also become necessary in the next few years.

State Standards

The CARB is the state agency responsible for regulating air quality. The CARB's responsibilities include establishing state ambient air quality standards, emissions standards, and regulations for mobile emissions sources (e.g., autos, trucks, etc.), as well as overseeing the efforts of countywide and multi-county air pollution control districts, which have primary responsibility over stationary sources. The emission standards most relevant to the proposed Master Plan are those related to automobiles and on- and off-road heavy-duty diesel engines. The CARB also regulates vehicle fuels with the intent to reduce emissions; it has set emission reduction performance requirements for gasoline (California reformulated gasoline) and limited the sulfur and aromatic content of diesel fuel to make it burn cleaner. The CARB also sets the standards used to pass or fail vehicles in smog check and heavy-duty truck inspection programs.

Today, virtually all of California is classified as "nonattainment" for the State PM_{10} Standard. In 2003 the California Legislature enacted Senate Bill 656 (SB 656) to reduce public exposure to PM_{10} and $PM_{2.5}$. In response to SB 656, CARB compiled a list of existing PM rules, regulations, and programs existing in California as of January 1, 2004 and also approved various regulatory measures to reduce emissions from new, modified, and existing stationary, area, and mobile sources.

The California Clean Air Act (CAAA) requires that progress be demonstrated towards attainment of state standards by the earliest practicable date. The CCAA requires periodic reporting on progress and updating of control strategies. The preparation of such a plan is generally accomplished though the unified efforts of the local air district (BAAQMD), the metropolitan planning organization (ABAG), the regional transportation planning agency (MTC), and other regional partners such as BCDC.

San Francisco Bay Area Air Basin

The Bay Area Air Quality Management District (BAAQMD) is the regional agency responsible for air quality regulation within the SFBAAB. The BAAQMD regulates air quality through its planning and review activities. The BAAQMD has permit authority over most types of stationary emission sources and can require stationary sources to obtain permits, and can impose emission limits, set fuel or material specifications, or establish operational limits to reduce air emissions. The BAAQMD regulates new or expanding stationary sources of toxic air contaminants.

In September 2005, the BAAQMD, in cooperation with the MTC and ABAG, prepared the draft *Bay Area 2005 Ozone Strategy*. The Ozone Strategy is a roadmap showing how the San Francisco Bay Area will achieve compliance with the state 1-hour ozone standard as expeditiously as practicable, and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. The control strategy includes stationary-source control measures to be implemented through BAAQMD regulations; mobile-source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with the MTC, local

governments, transit agencies, and others. The BAAQMD is currently in the process of preparing the *2009 Bay Area Clean Air Plan,* an update of the 2005 Ozone Strategy. The new plan will:

- Update the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement "all feasible measures" to reduce ozone
- Consider the impacts of ozone control measures on PM_{10} and $PM_{2.5}$, TACs, and GHGs in a single, integrated plan
- Review progress in improving air quality in recent years
- Establish emission control measures to be adopted or implemented in the 2009-2012 timeframe

In response to SB 636, the BAAQMD completed the *Particulate Matter Implementation Schedule* in November 2005. This schedule evaluates applicability of the 103 PM control measures on ARB's list and discusses how applicable measures are implemented by the District. The BAAQMD implements a number of regulations and programs to reduce PM emissions, such as controlling dust from earthmoving and construction/demolition operations, limiting emissions from various combustion sources such as cement kilns and furnaces, and reducing PM from composting and chipping activities. In addition to limiting stationary sources, the BAAQMD implements a variety mobile source incentive programs to encourage fleet operators and the public to purchase low-emission vehicles, re-power old polluting heavy duty diesel engines, and install after market emissions control devices to reduce particulates and NO_X emissions.

AIR QUALITY IMPACT

Significance Criteria

Based upon the criteria presented in Appendix G of the *CEQA Guidelines*, a project would have a significant effect on the environment if it would:

- conflict with or obstruct implementation of the applicable air quality plan
- violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)
- expose sensitive receptors to substantial pollutant concentrations
- create objectionable odors affecting a substantial number of people

For construction-related impacts, BAAQMD recommends that significance should be based on a consideration of the control measures to be implemented (BAAQMD, 1999). If appropriate mitigation measures are implemented to control PM_{10} emissions, the impact would be less than significant.

For operational impacts, the BAAQMD provides the guidelines to determine whether total emissions from project operations could exceed one of the following thresholds of significance:

- 80 pounds of NO_x, ROG, and PM_{10} per day
- 550 pounds of CO per day (a trigger level for which a "hot spot" analysis should be performed)

Projects approaching or exceeding these guidelines should undergo a more detailed analysis. The BAAQMD generally does not recommend a detailed air quality analysis for projects generating less than 2,000 vehicle trips per day, unless warranted by the specific nature of the project or project setting.

CONSTRUCTION ACTIVITY IMPACTS

Impact 1: Construction and demolition activities associated with Master Plan implementation would generate short-term emissions of criteria pollutants, including suspended and inhalable particulate matter and equipment exhaust emissions. (Temporarily Significant)

The project site is currently developed with college facilities. The San Jose City College Facilities Master Plan Update involves the reorganization of campus facilities and the reconfiguration of campus access and circulation. All facilities will be developed within the existing campus boundaries. Several buildings will be remodeled, while others will be demolished. The campus currently contains 423,400 square feet of assignable space. The

Master Plan Update proposes new construction of 93,000 square feet of classroom/office/administration space, but the demolition of over 159,000 square feet by 2021, an anticipated growth of 2,000 students can be accommodated in 66,000 square feet less of assignable space than in 2008. In addition a new parking garage may be constructed in the future when enrollment increases sufficiently.

Phase I of the campus development has already been completed consistent with implementation of the 2000 Master Plan (Prior Plan). There are two phases of future development planned. Phase II project components which have not been completed include the Performing Arts Building, the Physical Education Complex and the Vocational-Technology Center. The relocated Baseball Field and associated facilities has been provided with bleachers, speakers and dugouts. The remainder of this phase of development is scheduled for completion by 2013.

Phase III components consist of possible construction of the second Parking Garage and a light tower. Funding for Phase III has not been secured and it is currently unknown when Phase III will be completed. However it is anticipated that the projects will be completed prior to 2021.

Construction activity dust emissions would be related to the size of the disturbance area. The extent of surface disturbance at any given time during the next 13 years (until 2021) would depend on the timing of planned projects. The potential for surface disturbance would be greatest when demolition of infrastructure and new building construction occurs simultaneously. Building expansions would also result in some surface disturbance, while interior remodeling and maintenance projects would have the lowest potential for surface disturbance.

The total gross square footage of new buildings for Phases II and III is estimated to be 130,000. The total square footage of demolished building is estimated to be 235,425. Since precise phasing information is not known with certainty, a worst case construction scenario was selected for analysis for construction emissions. It should be noted that the BAAQMD considers construction part of already anticipated growth and as such analysis is not strictly necessary, but is included as part of this study for informational purposes.

To evaluate dust and construction emissions, worst case project construction emissions were examined. Any other years would then result in smaller areas of surface disturbance. As a worst case, in year 2009 it is assumed that 50,000 square feet of building space are to be demolished and in year 2010 25,000 square feet of new construction would occur.

The Air Resource Board URBEMIS2007 computer model was used to calculate construction activity emissions. For the worst case assumptions, in year 2010, the model predicts that there will be 1.2 acres of total disturbance acreage of which 0.3 acres could be under simultaneous heavy construction at some point during this construction phase. Combining this construction disturbance area with a dust generation factor of 51 pounds per day per acre (BAAQMD 1999) would result in daily PM_{10} (inhalable particulates) generation rate of 15 pounds per day without any dust control measures. However, emissions with use of basic control measures (BCMs) for PM_{10} can reduce emission levels to around ten (10) pounds per acre per day. RACM's for PM_{10} emissions include the application of typical dust control measures such as watering unpaved areas and street cleaning at points of site access. With the use of enhanced control measures (ECMs) the California Air Resources Board URBEMIS2007 computer model predicts that emissions can be reduced to 1-2 pounds per acre per day.

When compared to the BAAQMD significance threshold for PM_{10} of 80 pounds per day, project-related construction would be regionally less than significant without dust control measures. However, given the variable number of different demolition, remodeling, renovation, and construction projects that could occur in any given year as well as the Bay Area's current non-attainment status for PM_{10}, Master Plan-related emissions are considered to be *temporarily significant,* and implementation of dust control measures will be required to reduce potential Plan-related construction emissions to a less-than-significant level.

Exhaust emissions will result from on and off-site heavy equipment. The types and numbers of equipment will vary among contractors such that such emissions cannot be quantified with certainty. Initial grading will gradually shift toward building construction, etc. The URBEMIS2007 computer model was used to calculate emissions from the following prototype construction equipment fleet:

Worst Case Construction Scenario

Demolition	1 Concrete Saw
	1 Rubber Tired Dozer
	1Tractor/Loader/Backhoe
Grading	1 Grader
	1 Rubber Tired Dozer
	1 Water Truck
	1 Tractor/Loader/Backhoe
Construction	1 Crane
	2 Forklifts
	1 Tractor/Loader/Backhoe

Calculated construction activity emissions are summarized by phase as follows:

Construction Activity Emissions (pounds/day)

Activity	**ROG**	**NOx**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Demolition (late 2009)							
No Mitigation	1.4	10.4	6.7	0.0	2.9	1.1	1,084.0
With Mitigation	1.4	9.2	6.7	0.0	2.3	0.6	1,084.0
Grading, Construction and Coating (2010)							
No Mitigation	4.8	25.1	13.6	0.0	4.2	1.8	2,349.2
With Mitigation	4.8	25.1	13.6	0.0	4.2	1.8	2,349.2
BAAQMD Threshold	80	80	550	-	80	-	-

NOTES: ROG: Reactive Organic Gases NOx: Nitrogen Oxides CO: Carbon Monoxide
PM_{10}: Inhalable Particulates $PM_{2.5}$: Fine Inhalable Particulates SO_2: Sulfur Dioxide
CO_2-Carbon Dioxide

Source: URBEMIS2007 Model, Output in Appendix

The BAAQMD's *CEQA Guidelines* (1999) acknowledges that construction activity emissions vary markedly from project to project, from day to day, and from one contractor to another. Rather than focus on a quantification of project-related emissions, the BAAQMD has developed a menu of mitigation options to control construction activity dust emissions. The BAAQMD (1999) considers implementation of all applicable dust control measures (which vary according to project magnitude) as reducing Plan-related particulate (PM_{10}) emissions to less-than-significant levels. These measures are grouped into three categories as follows:

- "Basic Control Measures" apply to all construction sites.
- "Enhanced Control Measures" apply to sites greater than four acres or to those projects where sensitive receptors are in close proximity such as homes close to the campus.
- "Optional Control Measures" apply to larger sites near sensitive receptors.

Based on the average size of surface disturbance during any given year, implementation of the Basic and Enhanced Control Measures listed below would maintain the Plan's construction-related impacts at a less-than-significant level. Due to the proximity of existing residential uses to the west, some optional control measures are also recommended to maintain impacts at a less-than-significant level when construction occurs in the southern and western parts of the campus.

Construction equipment emits ozone precursors and carbon monoxide during combustion of diesel fuel. The BAAQMD's determination, however, is that these emissions have been included in the emissions inventory, which was the basis for the '97 CAP and subsequent air quality plans. Since the BAAQMD does not consider construction-related exhaust emissions to be "new" emissions, they would not impede attainment or maintenance of ozone or CO standards in the air basin (BAAQMD 1999). Therefore, impacts associated with increased criteria pollutants are considered *less than significant*. However, since diesel emissions have been identified by the CARB as a toxic air contaminant (TAC) and outdoor sports facilities are located in proximity to some construction sites, efforts should be made to reduce construction-related diesel emissions to the extent feasible, particularly since these emissions would occur over the next 16 years.

> **Mitigation Measure 1:** Construction activities must comply with the "Basic Control Measures" and "Enhanced Control Measures" and applicable "Optional Control Measures" for dust emissions and recommendations for exhaust emissions as outlined in the BAAQMD *CEQA Guidelines*. The appropriate level of mitigation shall be determined based on the total area of disturbance resulting from all planned projects occurring simultaneously. These requirements include:
>
> <u>Basic Dust Control Measures</u> *(apply to all construction sites)*
>
> a. Water all active construction areas at least twice daily.
> b. Cover all trucks hauling soil, sand, and other loose debris *or* require all trucks to maintain at least two feet of freeboard.
> c. Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
> d. Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites.
> e. Sweep streets daily (with water sweepers) if visible soil material is carried onto

adjacent public streets.

Enhanced Dust Control Measures *(apply to construction sites greater than four acres)*

f. Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
g. Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.).
h. Limit traffic speeds on unpaved roads to 15 mph.
i. Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
j. Replant vegetation in disturbed areas as quickly as possible.

Optional Dust Control Measure *(apply to construction sites that are large in area, located near sensitive receptors, or which for any other reason may warrant additional emissions reductions)*

k. Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.

Equipment Exhaust Control Measures *(apply to all construction projects to the extent feasible)*

l. Require 90-day low-NOx tune-ups for off-road equipment.
m. Limit allowable idling to 5 minutes for trucks and heavy equipment.
n. Utilize equipment whose engines are equipped with diesel oxidation catalysts if available.
o. Utilize diesel particulate filter on heavy equipment where feasible.

Impact Significance After Mitigation: Less than significant.

Construction Airborne Toxics

Demolition of older structures may involve the handling of asbestos-containing materials (ACMs). All structures to be demolished must be surveyed for the possible presence of ACMs. If ACMs are within the structure, they must be removed following the detailed procedures in BAAQMD Rule 11-2. Rule 11-2 specifies the protocols to safely remove ACMs without harm to the remediation workers or the public. Rule 11-2 also requires the presence of trained management personnel, accurate record keeping and handling/disposal of the waste. Compliance with Rule 11-2 will protect remediation workers and students and staff to a less-than-significant level of air toxics exposure to ACMs.

OPERATIONAL IMPACTS

Impact 2: Mobile emissions generated by Plan-related traffic and area source emissions generated by the Plan's additional building space would increase local and regional vehicular emissions. (Less than Significant)

Operational emissions for project-related traffic were calculated using a computerized procedure developed by the California Air Resources Board (CARB) for urban growth mobile source emissions. The URBEMIS2007 model was run using the trip generation factors specified by the project traffic consultant. The model was used to calculate area source emissions and the resulting vehicular operational emissions for project build-out year of 2021. At project completion, additional trip generation is estimated to be 2,781 daily trips with an associated 20,732 vehicle miles traveled (VMT). The results are shown in Table 3 below.

Table 3

Project Daily Regional Emissions (2020)

Project Buildout Year	ROG	NO_X	CO[1]	SO_X	PM10	CO_2
	Project-Related Mobile Source Emissions (Pounds per Day)					
2021	21.9	9.8	108.8	0.2	35.5	19,925.3
	Project-Related Area Source Emissions (Pounds per Day)					
	1.3	1.8	3.0	Negligible	Negligible	2,137.2
Total Emissions	23.3	11.6	111.8	0.2	35.5	22,062.5
BAAQMD Threshold	80	80	550	-	80	

NOTES:
ROG: Reactive Organic Gases NO_x: Nitrogen Oxides CO: Carbon Monoxide
PM10: Inhalable Particulates SOx: Sulfur Oxides gsf: gross square feet
[1] Requires a microscale impact analysis, if exceeded.

This table indicates that pollutant emissions associated with project-related traffic increases would not exceed BAAQMD thresholds of significance at campus build-out. The BAAQMD thresholds address the impacts of mobile source emissions on local and regional air quality. Therefore, the Master Plan's contribution to the total pollution burden in the region would have a *less-than-significant impact* on regional air quality. The Prior Plan had concluded that air quality operational impacts would be less-than-significant at campus build-out, but only with a very small margin of safety (within 0.015 percent of significance for ROG). The present analysis shows a very large margin of safety relative to the BAAQMD CEQA thresholds.

Additional floor space resulting from implementation of the Master Plan would cause an increase in non-vehicular emissions from a variety of miscellaneous sources (area sources). Emissions-generating activities could include increased use of electricity and natural gas (for space heating, hot water or cooking), evaporative cleaning products used in maintenance, or paints and solvents

used in periodic building maintenance. As shown in Table 3, addition of these area source emissions to the Plan's mobile source emissions burden for 2020 would not cause the BAAQMD CEQA significance thresholds to be exceeded. Therefore, the Master Plan's combined mobile and area source emissions would be *less than significant*.

The Prior Plan air quality impact analysis concluded that cumulative impacts would be significant because the master plan anticipated an increase of 5,000 full time equivalent students (FTE) by 2015. That increase was considered inconsistent with the San Jose General Plan EIR dated July, 1994. The current facilities master plan anticipates a 2,000 FTE increase not achieved until 2021. This increase is incorporated into *Envision San Jose 2040* currently under preparation. The facilities master plan is thus consistent with development plans incorporated into any future air quality attainment plans.

LOCAL MOBILE SOURCE EMISSIONS

In addition to the regional contribution to the total pollution burden, traffic generated by Plan implementation could result in localized "hot spots," or areas with high concentrations of carbon monoxide (CO) emissions around stagnation points such as major intersections and heavily traveled and congested roadways. Traffic associated with Plan implementation could add more cars as well as cause existing non-project traffic to travel at slower travel speeds, which could cause increased emissions and more localized hot spots.

A microscale air quality analysis of CO is warranted if daily Plan-related CO emissions exceed 550 pounds per day. Although plan-related emissions would not exceed this threshold, as shown in Table 4, a microscale screening analysis was completed for the proposed Plan. The results of the analysis are shown in Table 3. This table indicates that the Master Plan would result in a *less-than-significant impact* on all study intersections under existing and future conditions. The state one-hour CO standard (more stringent than the federal standard) is 20 ppm. Any change in CO of less than 1 ppm is considered a non- reportable change.

As indicated in Table 4, the Plan's maximum one- and eight-hour CO contributions would be 0.6 ppm, which would be a less-than-significant change. Therefore, implementation of the proposed Master Plan would not have a significant effect on local air quality with respect to CO emissions.

In addition to an increase in the number of passenger vehicles, the number of buses and delivery trucks serving the campus could also increase, thereby increasing exhaust pollutant emissions. Increased student enrollments could increase demand for bus service and supply deliveries. Buses and delivery vehicles are typically diesel-fueled, and diesel particulate matter emissions are listed by the CARB as a TAC. However, increased demand for bus service would increase ridership and would not necessarily increase the number of buses operating. In addition, increasing numbers of parcel delivery trucks are using alternative fuels such as compressed natural gas, and newer diesel engines for trucks and buses are required to meet increasingly stringent emission levels by the CARB and the U.S. EPA. Therefore, diesel particulate emissions from these types of vehicles are expected to continue to decrease in the future as bus and truck fleets are updated.

Mitigation 3: None required.

Table 4

Localized Microscale Carbon Monoxide Emissions

Intersection	Project's Net Change in One-Hour CO Concentrations, in Parts Per Million (ppm)							
	Existing		Existing with Project		Cumulative		Cumulative – With Project	
	1-Hour	8-Hour	1-Hour	8-Hour	1-Hour	8-Hour	1-Hour	8-Hour
AM								
Bascom Ave/ San Carlos	4.2	3.4	4.2	3.4	4.3	3.5	4.3	3.5
Leigh Ave/ San Carlos	4.0	3.2	4	3.2	4.2	3.4	4.0	3.2
Leigh Ave/Scott	3.7	2.9	3.7	2.9	3.7	2.9	3.7	2.9
Bascom Ave/ Parkmoor	4.2	3.4	4.3	3.5	4.5	3.7	4.3	3.5
Leland Ave/ Parkmoor	3.9	3.1	3.9	3.1	4.0	3.2	4.0	3.2
Leigh Ave/ Parkmoor	4.0	3.2	4.0	3.2	4.1	3.3	4.1	3.3
Bascom Ave/ Moorpark	4.4	3.6	4.4	3.6	4.6	3.8	4.6	3.8
Leland Ave/ Moorpark	3.9	3.1	3.9	3.1	4.0	3.2	4.0	3.2
Leigh Ave/ Moorpark	4.0	3.2	4.0	3.2	4.0	3.2	4.0	3.2
Bascom Ave/ Renova	4.1	3.3	4.2	3.4	4.3	3.5	4.2	3.4
Bascom Ave/ Laswell	4.1	3.3	4.1	3.3	4.3	3.5	4.1	3.3
Bascom Ave/ Enborg	4.2	3.4	4.2	3.4	4.3	3.5	4.3	3.5
Sherman Oaks Dr/ Fruitdale	3.9	3.1	3.9	3.1	3.9	3.1	3.9	3.1
Leigh Ave/ Fruitdale	4.0	3.2	4.1	3.3	4.1	3.3	4.1	3.3
Southwest Exprsswy/ Fruitdale	4.3	3.5	4.2	3.4	4.4	3.6	4.4	3.6
PM								
Leigh Ave/ San Carlos	4.4	3.6	4.4	3.6	4.5	3.7	4.5	3.7
Leigh Ave/Scott	4.1	3.3	4.1	3.3	4.2	3.4	4.2	3.4
Bascom Ave/ Parkmoor	3.7	2.9	3.7	2.9	3.7	2.9	3.8	3.0
Leland Ave/ Parkmoor	4.3	3.5	4.3	3.5	4.4	3.6	4.5	3.7
Leigh Ave/ Parkmoor	3.9	3.1	3.9	3.1	3.9	3.1	3.9	3.1
Bascom Ave/ Moorpark	4.0	3.2	4.1	3.3	4.1	3.3	4.1	3.3
Leland Ave/ Moorpark	4.4	3.6	4.4	3.6	4.6	3.8	4.7	3.9
Leigh Ave/ Moorpark	4.2	3.4	4.2	3.4	4.3	3.5	4.4	3.6
Bascom Ave/ Renova	4.3	3.5	4.3	3.5	4.4	3.6	4.4	3.6
Bascom Ave/ Laswell	4.2	3.4	4.1	3.3	3.7	2.9	4.4	3.6
Bascom Ave/ Enborg	4.2	3.4	4.2	3.4	4.4	3.6	4.2	3.4
Sherman Oaks Dr/ Fruitdale	4.2	3.4	4.3	3.5	4.3	3.5	4.3	3.5
Leigh Ave/ Fruitdale	3.8	3.0	3.9	3.1	3.9	3.1	3.9	3.1
Southwest Exprsswy/ Fruitdale	4.0	3.2	4.0	3.2	4.1	3.3	4.1	3.3
Background Level (Included)	3.5	2.7	3.5	2.7	3.5	2.7	3.5	2.7
Clean Air Standard	20.0	9.0	20.0	9.0	20.0	9.0	20.0	9.0

GREENHOUSE GAS EMISSIONS

Impact 3: Plan-related activities will increase greenhouse gas emissions from transportation and other energy consumption sources.

"Greenhouse gases" (so called because of their role in trapping heat near the surface of the earth) emitted by human activity are implicated in global climate change, commonly referred to as "global warming." These greenhouse gases contribute to an increase in the temperature of the earth's atmosphere by transparency to short wavelength visible sunlight, but near opacity to outgoing terrestrial long wavelength heat radiation. The principal greenhouse gases (GHGs) are carbon dioxide, methane, nitrous oxide, ozone, and water vapor. Fossil fuel consumption in the transportation sector (on-road motor vehicles, off-highway mobile sources, and aircraft) is the single largest source of GHG emissions, accounting for approximately half of GHG emissions globally. Industrial and commercial sources are the second largest contributors of GHG emissions with about one-fourth of total emissions.

California has passed several bills and the Governor has signed at least three executive orders regarding greenhouse gases. GHG statues and executive orders (EO) include AB 32, SB 1368, EO S-03-05, EO S-20-06 and EO S-01-07. The Governor's Office of Planning and Research is in the process of developing CEQA significance thresholds for GHG emissions. Preliminary draft *CEQA Guideline* amendments for addressing GHGs within the CEQA process were released on January 8, 2009. If/when adopted, Appendix G of the *CEQA Guidelines* will require a good-faith effort to calculate GHG emissions in any CEQA document. It will also require a good faith effort to develop a threshold of significance for GHG emissions and evaluation of any available mitigation measures.

AB 32 is one of the most significant pieces of environmental legislation that California has adopted. Among other things, it is designed to maintain California's reputation as a "national and international leader on energy conservation and environmental stewardship." It will have wide-ranging effects on California businesses and lifestyles as well as far reaching effects on other states and countries. A unique aspect of AB 32, beyond its broad and wide-ranging mandatory provisions and dramatic GHG reductions are the short time frames within which it must be implemented. Major components of the AB 32 include:

- Require the monitoring and reporting of GHG emissions beginning with sources or categories of sources that contribute the most to statewide emissions.
- Requires immediate "early action" control programs on the most readily controlled GHG sources.
- Mandates that by 2020, California's GHG emissions be reduced to 1990 levels.
- Forces an overall reduction of GHG gases in California by 25-40%, from business as usual, over the next 13 years (by 2020).
- Must complement efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminants.

Statewide, the framework for developing the implementing regulations for AB 32 is under way. Additionally, through the California Climate Registry (CCAR), general and industry-specific protocols for assessing and reporting GHG emissions have been developed. GHG sources are categorized into direct sources (i.e. company owned) and indirect sources (i.e. not company owned). Direct sources include combustion emissions from on-and off-road mobile sources, and fugitive emissions. Indirect sources include off-site electricity generation and non-company owned mobile sources.

Implementation of the proposed Master Plan update would contribute to long-term increases in greenhouse gases (GHGs) as a result of traffic increases (mobile sources) and minor secondary fuel combustion emissions from space heating, etc. Development occurring as a result of the proposed project would also result in secondary operational increases in GHG emissions as a result of electricity generation to meet project-related increases in energy demand. Electricity generation in California is mainly from natural gas-fired power plants. However, since California imports about 20 to 25 percent of its total electricity (mainly from the northwestern and southwestern states), GHG emissions associated with electricity generation could also occur outside of California. Short-term GHG emissions will also derive from construction activities.

During project construction, the URBEMIS2007 computer model predicts that a peak activity day will generate the following CO_2 emissions:

Grading - 1,084 pounds/day

Construction - 2,349 pounds/day

For purposes of analysis, it was assumed that non-CO_2 GHG emissions are negligible, and that the total annual project construction GHG burden can be characterized by 80 peak grading days and 100 peak construction days. The estimated annual GHG impact is estimated as follows:

Grading = (1,084 lbs/day x 80 peak days/year) / 2,000 lbs/ ton = 43.4 tons/year

Construction = (2,349 lbs/day x 100 peak days/year)/2,000 lbs/ton = 117.5 tons/year

Combined Annual = 43.4 + 117.5 = 160.9 tons/year

In 2004, the statewide annual GHG inventory in CO_2-equivalent levels (including all non-CO_2 gases weighted by their thermal absorption potential) was 492,000,000 metric tons (541,000,000 short tons). The worst-case project construction impact of 160.9 tons/year represents approximately 0.00003 percent of the statewide burden.

New daily operational CO_2 emissions from project-related traffic and area source emissions are predicted to be 22,062 pounds. The average attendance was assumed to be 200 days per year. On an annual basis, this would translate into 1,550 tons per year. This worst-case estimate represents only 0.0004 percent of the most recent statewide inventory.

There are no adopted thresholds of GHG emissions significance. However, GHG emissions are implicated in the acceleration of global warming experienced in the last several decades. Climatic impacts are global in scale. Any project-specific contribution to the global issue is miniscule. In the absence of any definitive thresholds of significance, the GHG emphasis on a

project-specific level is to incorporate project design features that reduce energy consumption and reduce vehicular travel as much as is reasonably feasible.

It should be noted that the proposed Master Plan update incorporates more efficient use of space that includes enhanced energy conservation features. The update also anticipates an enrollment increase of 2,000 full-time equivalent students compared to the 5,000 student increase analyzed in the Prior Plan (2000). The smaller and more compact campus design is intrinsically consistent with GHG minimization objectives. Nevertheless, reasonably available mitigation measures must be adopted to reduce the cumulative impact to climate change associated with Master Plan update implementation.

Mitigation Measure 2: GHG reduction options on a project-level basis are similar to those measures designed to reduce criteria air pollutants (those with ambient air quality standards). Measures that reduce trip generation or trip lengths, measures that optimize the transportation efficiency of a region, and measures that promote energy conservation within a development will reduce GHG emissions. Additionally, carbon sequestering can be achieved through urban forestry measures.

Project-specific mitigation recommendations to reduce the global cumulative impact from project implementation include the following:

Land Use and Transportation

- Distribute information that will promote increased utilization of public transit
- Provide support for the existing rideshare program to encourage the use of alternatives to the single occupant vehicle (SOV) for campus access

Energy Conservation

- Construct the new classroom and office buildings to meet LEED (Leadership in Energy and Environmental Design) Silver Certification
- Maximize use of low pressure sodium and/or fluorescent lighting
- Require acquisition of new appliances and equipment to meet Energy Star certification

Urban Forestry

- Plant trees or vegetation to shade buildings and thus reduce heating/ cooling demand
- Select landscaping that is fast-growing while minimizing water demand to sequester carbon while reducing electrical loads associated with regional water transportation
- Participate in green waste collection and recycling programs for landscape maintenance

APPENDIX

URBEMIS2007 Computer Model Output