APPENDIX I

Air Quality Analyses

Hercules ITC Summary Emissions

Ferry Emissions

	Pollutants (lbs/day)				
	POC	**NOx**	**CO**	**SOx**	**PM10**
Proposed Ferry Emissions	11.72	46.85	26.48	0.47	1.32

Motor Vehicle Emissions Associated with Ferry Trips

	Pollutants (lbs/day)				
	POC	**NOx**	**CO**	**SOx**	**PM10**
Proposed Emissions	0.69	1.29	13.42	0.01	0.05
Current Emissions	2.88	4.96	50.81	0.04	0.12
Net Change in Emissions	-2.19	-3.67	-37.39	-0.02	-0.07

Motor Vehicle Emissions Associated with Rail Trips

	Pollutants (lbs/day)				
	POC	**NOx**	**CO**	**SOx**	**PM10**
Proposed Emissions	0.60	1.11	11.58	0.01	0.04
Current Emissions	4.70	8.08	82.79	0.06	0.20
Net Change in Emissions	-4.10	-6.97	-71.20	-0.05	-0.16

Net Total Emission Associated with Hercules ITC

	Pollutants (lbs/day)				
	POC	**NOx**	**CO**	**SOx**	**PM10**
Net Ferry Emissions	11.72	46.85	26.48	0.47	1.32
Net MV (Ferry)	-2.19	-3.67	-37.39	-0.02	-0.07
Net MV (Rail)	-4.10	-6.97	-71.20	-0.05	-0.16
Total Net Change	5.42	36.21	-82.11	0.39	1.09
proposed	13.01	49.25	51.48	0.49	1.41
current	7.58	13.04	133.60	0.10	0.33
	5.42	36.21	-82.11	0.39	1.09

Motor Vehicle Gallons of Fuel Used

	2006	9812.7						
		VMT (1000 miles)	**Gallons Gasoline (1000 gallons)**	**Gallons Diesel (1000 gallons)**	**Gasoline (gallons)**	**Diesel (gallons)**	**Total Btu**	**PMT**
LDA		85,018	3,946	11.78	277.70	0.83	32,043,358.69	
LDT1		20,917	1,152	26.79	81.09	1.89	9,571,938.94	
LDT2		33,499	1,882	3.61	132.42	0.25	15,261,632.83	
Total		139,434	6,980	42.18	491.21	2.97	**56,876,930.46**	
Btu/PMT							5,796.34	9812.566
	2010	2653.3						
		VMT (1000 miles)	**Gallons Gasoline (1000 gallons)**	**Gallons Diesel (1000 gallons)**				
LDA		90,457	4,134	7.4	74.81	0.13	8,620,656.89	
LDT1		21,896	1,213	21.62	21.95	0.39	2,575,440.58	
LDT2		34,254	1,935	2.48	35.03	0.04	4,033,915.47	
Total		146,607	7,282	31.5	131.79	0.57	**15,230,012.94**	24650.01
Ferry							253,964,249.26	
Btu/PMT							10,920.66	

Conversion

	Gallon	Btu
Gasoline	1	115000
Diesel	1	130500

Note:
http://bioenergy.ornl.gov/papers/misc/energy_conv.html

From EMFAC2007

Hercules ITC
2025 Mode of Access

	Destination Mode	
Origin Mode	Ferry	Rail
Rail	0%	0%
Fery	0%	0%
Bus	15%	2%
Park and Ride	48%	59%
Kiss and Ride	5%	7%
Bike or Walk	32%	32%
	100%	100%

Rail Terminal Trip Distribution

Existing

Geographical Demand Zone	Relative Size	Total PR	Total KR	Peak PR	Peak KR	Richmond/ San Jose Rail Station to Peak PR	Distance miles	Richmond/ San Jose Rail Station to Peak KR	Distance miles	Martinez Sacramento Rail Station to Peak PR	Distance miles	Martinez Sacramento Rail Station to Peak KR	Distance miles
West Rodeo	5	20	2	20	2	4	9.8	0	9.8	16	12.6	2	12.6
East Rodeo	5	20	2	20	2	4	9.8	0	9.8	16	12.4	2	12.4
Waterfront Hercules	5	20	2	20	2	4	9.6	0	9.6	16	12.3	2	12.3
West Hercules	1	4	0	4	0	1	8.6	0	8.6	3	12.5	0	12.5
East Hercules	8	32	4	32	4	6	10.1	1	10.1	25	11.5	3	11.5
West Pinole	2	8	1	8	1	2	6.9	0	6.9	6	13.2	1	13.2
Central Pinole	2	8	1	8	1	2	6.5	0	6.5	6	14.2	1	14.2
Pinole Valley	2	8	1	8	1	2	7.3	0	7.3	6	12.7	1	12.7
S. Central Pinole	2	8	1	8	1	2	6.0	0	6.0	6	13.5	1	13.5
East Pinole	4	16	2	16	2	3	8.5	0	8.5	13	14.2	1	14.2
	36	143	16	143	16	29	9.0	3	9.0	114	12.6	13	12.6

Proposed

Geographical Demand Zone	Relative Size	Total PR	ITC Distance Miles	Total KR	ITC Distance Miles	Peak PR	ITC Distance Miles	Peak KR	ITC Distance Miles
West Rodeo	5	20	2.6	2	2.6	20	2.6	2	2.6
East Rodeo	5	20	2.7	2	2.7	20	2.7	2	2.7
Waterfront Hercules	5	20	1.2	2	1.2	20	1.2	2	1.2
West Hercules	1	4	1.9	0	1.9	4	1.9	0	1.9
East Hercules	8	32	2.5	4	2.5	32	2.5	4	2.5
West Pinole	2	8	2.1	1	2.1	8	2.1	1	2.1
Central Pinole	2	8	2.1	1	2.1	8	2.1	1	2.1
Pinole Valley	2	8	1.9	1	1.9	8	1.9	1	1.9
S. Central Pinole	2	8	2.4	1	2.4	8	2.4	1	2.4
East Pinole	4	16	3.8	2	3.8	16	3.8	2	3.8
	36	143	2.4	16	2.4	143	2.4	16	2.4

Ferry Terminal Trip Distribution

Existing

Geographical Demand Zone	Relative Size	Total PR	Total KR	Peak PR	Peak KR	SF to Peak PR	SF Distance miles	BART to Peak PR	BART Distance miles	SF to Peak KR	SF Distance miles	BART to Peak KR	BART Distance miles	HTC to Peak PR	HTC Distance miles	HTC to Peak KR	HTC Distance miles
West Rodeo	5	37	4	18	2	3	25.5	3	9.8	0	25.5	0	9.8	13	1.6	2	1.6
East Rodeo	5	37	4	18	2	3	25.4	3	9.8	0	25.4	0	9.8	13	1.8	2	1.8
Waterfront Hercules	5	37	4	18	2	3	25.0	3	9.6	0	25.0	0	9.6	13	1.2	2	1.2
West Hercules	1	7	1	4	0	1	24.2	1	8.6	0	24.2	0	8.6	3	1.4	0	1.4
East Hercules	8	59	7	30	3	4	25.7	4	10.1	0	25.7	0	10.1	21	1.5	2	1.5
West Pinole	2	15	2	7	1	1	22.5	1	6.9	0	22.5	0	6.9	5	2.0	1	2.0
Central Pinole	2	15	2	7	1	1	22.1	1	6.5	0	22.1	0	6.5	5	2.0	1	2.0
Pinole Valley	2	15	2	7	1	1	23.0	1	7.3	0	23.0	0	7.3	5	1.6	1	1.6
S. Central Pinole	2	15	2	7	1	1	22.9	1	6.0	0	22.9	0	6.0	5	2.3	1	2.3
East Pinole	4	30	3	15	2	2	24.2	2	8.5	0	24.2	0	8.5	10	3.7	1	3.7
	36	266	30	133	15	20	24.6	20	9.0	2	24.6	2	9.0	93	1.9	11	1.9

Proposed

Geographical Demand Zone	Relative Size	Total PR	ITC Distance miles	Total KR	ITC Distance miles	Peak PR	ITC Distance miles	Peak KR	ITC Distance miles
West Rodeo	5	37	2.6	4	2.6	18	2.6	2	2.6
East Rodeo	5	37	2.7	4	2.7	18	2.7	2	2.7
Waterfront Hercules	5	37	1.2	4	1.2	18	1.2	2	1.2
West Hercules	1	7	1.9	1	1.9	4	1.9	0	1.9
East Hercules	8	59	2.5	7	2.5	30	2.5	3	2.5
West Pinole	2	15	2.1	2	2.1	7	2.1	1	2.1
Central Pinole	2	15	2.1	2	2.1	7	2.1	1	2.1
Pinole Valley	2	15	1.9	2	1.9	7	1.9	1	1.9
S. Central Pinole	2	15	2.4	2	2.4	7	2.4	1	2.4
East Pinole	4	30	3.8	3	3.8	15	3.8	2	3.8
	36	266	2.4	30	2.4	133	2.4	15	2.4

Current Trips

			POC	NOx	CO	SOx	PM10
Emission Factor		g/mi	0.351	0.603	6.176	0.005	0.015
	New Destination	VMT/day					
Hercules to SF	Ferry	2,168.5	1.68	2.88	29.52	0.02	0.07
Hercules to HTC	Ferry	774.2	0.60	1.03	10.54	0.01	0.03
Hercules to BART	Ferry	789.1	0.61	1.05	10.74	0.01	0.03
Hercules to Martinez/Sacramento	Rail	5,158.7	3.99	6.85	70.23	0.05	0.17
Hercules to Richmond/San Jose	Rail	922.2	0.71	1.23	12.55	0.01	0.03
Total		9,812.6	7.58	13.04	133.60	0.10	0.33

2006 EMFAC2007 Results
San Francisco Bay Area Air Basin Simple Average

Reactive Organic Compounds

		Light-Duty Autos	Light Duty Trucks 1	Light-Duty Trucks 2	Light-Duty Trucks	Light-Duty Autos and Trucks
VMT	1000 mi/day	85018	20917	33498	54415	139433
ROC	tons/day	32.410	11.042	10.432	21.474	53.884
	g/mi	0.35	0.48	0.28	0.36	0.35

Oxides of Nitrogen

		Light-Duty Autos	Light Duty Trucks 1	Light-Duty Trucks 2	Light-Duty Trucks	Light-Duty Autos and Trucks
VMT	1000 mi/day	85018	20917	33498	54415	139433
NOx	tons/day	46.971	18.639	27.005	45.644	92.615
	g/mi	0.50	0.81	0.73	0.76	0.60

Carbon Monoxide

		Light-Duty Autos	Light Duty Trucks 1	Light-Duty Trucks 2	Light-Duty Trucks	Light-Duty Autos and Trucks
VMT	1000 mi/day	85018	20917	33498	54415	139433
CO	tons/day	536.792	206.498	205.880	412.378	949.170
	g/mi	5.73	8.96	5.58	6.88	6.18

Sulfur Dioxide

		Light-Duty Autos	Light Duty Trucks 1	Light-Duty Trucks 2	Light-Duty Trucks	Light-Duty Autos and Trucks
VMT	1000 mi/day	85018	20917	33498	54415	139433
SOx	tons/day	0.382	0.135	0.18	0.315	0.697
	g/mi	0.00	0.01	0.00	0.01	0.005

Particultate Matter

		Light-Duty Autos	Light Duty Trucks 1	Light-Duty Trucks 2	Light-Duty Trucks	Light-Duty Autos and Trucks
VMT	1000 mi/day	85018	20917	33498	54415	139433
PM10	tons/day	1.129	0.377	0.829	1.206	2.335
	g/mi	0.012	0.02	0.02	0.02	0.02

Hercules Intermodal Transit Center
Existing Trips Diverted to Ferries

Peak Hour

% Hercules Transit Center	Hercules Transit Center Trips	% Hercules to San Franscisco	Hercules to San Franscisco Trips	% Richmond and El Cerrito del Norte BART	Richmond and El Cerrito del Norte BART Trips	Total Trips
70%	197	15%	42	15%	42	281

Daily

% Hercules Transit Center	Hercules Transit Center Trips	% Hercules to San Franscisco	Hercules to San Franscisco Trips	% Richmond and El Cerrito del Norte BART	Richmond and El Cerrito del Norte BART Trips	Total Trips
70%	786	15%	169	15%	169	1124

Hercules Intermodal Transit Center
Existing Trips Diverted to Rail

Peak Hour

% Martinez Rail Station	Martinez Rail Station Trips	% Richmond Rail Station	Richmond Rail Station Trips	Total Trips
80%	193	20%	48	241

Daily

% Hercules Transit Center	Hercules Transit Center Trips	% Richmond Rail Station	Richmond Rail Station Trips	Total Trips
80%	619	20%	155	774

Proposed Trips

			POC	NOx	CO	SOx	PM10
Emission Factor		g/mi	0.220	0.410	4.274	0.004	0.016
	Destination	VMT/day					
Hercules to ITC	Ferry	1,424.1	0.69	1.29	13.42	0.01	0.05
Hercules to ITC	Rail	1,229.2	0.60	1.11	11.58	0.01	0.04
Total		2,653.3	1.29	2.40	25.00	0.02	0.10

2010 EMFAC2007 Results
San Francisco Bay Area Air Basin Simple Average

Reactive Organic Compounds

		Light-Duty Autos	Light Duty Trucks 1	Light-Duty Trucks 2	Light-Duty Trucks	Light-Duty Autos and Trucks
VMT	1000 mi/day	90457	21896	34254	56150	146607
ROC	tons/day	20.184	7.663	7.675	15.338	35.522
	g/mi	0.20	0.32	0.20	0.25	0.22

Oxides of Nitrogen

		Light-Duty Autos	Light Duty Trucks 1	Light-Duty Trucks 2	Light-Duty Trucks	Light-Duty Autos and Trucks
VMT	1000 mi/day	90457	21896	34254	56150	146607
NOx	tons/day	31.853	13.833	20.496	34.329	66.182
	g/mi	0.32	0.57	0.54	0.55	0.41

Carbon Monoxide

		Light-Duty Autos	Light Duty Trucks 1	Light-Duty Trucks 2	Light-Duty Trucks	Light-Duty Autos and Trucks
VMT	1000 mi/day	90457	21896	34254	56150	146607
CO	tons/day	371.150	155.034	164.579	319.613	690.763
	g/mi	3.72	6.42	4.36	5.16	4.27

Sulfur Dioxide

		Light-Duty Autos	Light Duty Trucks 1	Light-Duty Trucks 2	Light-Duty Trucks	Light-Duty Autos and Trucks
VMT	1000 mi/day	90457	21896	34254	56150	146607
SOx	tons/day	0.388	0.116	0.181	0.297	0.685
	g/mi	0.00	0.00	0.00	0.00	0.004

Particultate Matter

		Light-Duty Autos	Light Duty Trucks 1	Light-Duty Trucks 2	Light-Duty Trucks	Light-Duty Autos and Trucks
VMT	1000 mi/day	90457	21896	34254	56150	146607
PM10	tons/day	1.225	0.409	1.020	1.429	2.654
	g/mi	0.012	0.02	0.03	0.02	0.02

Peak Hour

	Peak Hour Ridership	% Transit Access	Transit Trips	% Pedestrian or Bicycle Access	Pedestrian or Bicycle Trips	% Park and Ride Access	Park and Ride Trips	Park and Ride Vehicles	% Kiss and Ride Access	Kiss and Ride Trips	Total Trips
Ferry	281	15%	42	32%	90	48%	134	85	5%	15	281
Rail	241	2%	5	32%	77	59%	143	143	7%	16	241

Daily

	Peak Hour Ridership	% Transit Access	Transit Trips	% Pedestrian or Bicycle Access	Pedestrian or Bicycle Trips	% Park and Ride Access	Park and Ride Trips	Park and Ride Vehicles	% Kiss and Ride Access	Kiss and Ride Trips	Total Trips
Ferry	1124	15%	169	32%	360	48%	539	343	5%	57	1124
Rail	964	2%	19	32%	308	59%	569	569	7%	67	964

Hercules Intermodal Transit Project
Qualitative $PM_{2.5}$ Hot Spot Analysis Summary

INTRODUCTION

The U.S. Environmental Protection Agency commented on the Hercules ITC Draft EIR/Draft EIS that since the grace period from transportation conformity requirements for $PM_{2.5}$ nonattainment areas expired in December 14, 2010, which was prior to a Record of Decision on the project, the Hercules ITC project needs to take steps to determine project conformity with transportation plans and programs. These steps include clarifying whether the project is included in the region's conforming transportation plan and transportation improvement program, consulting with the Metropolitan Transportation Commission to determine whether the project is a 'project of air quality concern' and whether a $PM_{2.5}$ air quality hot spot analysis should be performed.

In late 2010, the EPA released final modeling guidance for performing quantitative PM2.5 and PM10 hot spot analyses at the project level for transportation projects, and established a two-year grace period for the implementation of the new guidelines. Quantitative hot-spot analyses will not be required for Transportation Conformity under 40 C.F.R. § 93.123(b)(4) until the end of the implementation grace period in December 2012. Per EPA comments and the final modeling guidance, a qualitative PM2.5 hot spot analysis (following the EPA's and the Federal Highway Administration's joint guidance) was conducted for the proposed project for inclusion in the Final EIR/EIS.

PARTICULATE MATTER

Background

Particulate matter refers to solid or liquid particles suspended in the air that may be composed of acids, organic chemicals, metals, or soil and dust particles. Particle sizes range from those large enough to be seen as smoke or haze to those that act as a gas and can only be seen through an electron microscope. Those particles with diameters less than 2.5 microns are denoted as $PM_{2.5}$, and sources include fuel combustion, power plants, and diesel vehicles. Those particles with diameters of less than 10 microns are denoted as PM_{10}, and sources include fuel combustion, fugitive dust from unstable or disturbed dirt surfaces, vehicle travel on unpaved roads, crushing and grinding operations, and open burning. The San Francisco Bay Area has been designated nonattainment for the $PM_{2.5}$ NAAQS, but is in attainment for the PM_{10} NAAQS.

The Hercules Intermodal Transit Center (Hercules ITC) project involves the development of a multimodal transit facility on the Hercules waterfront in Contra Costa County. The development would include bus and commuter train access, parking for transit passengers, and roadway/trail/sidewalk infrastructure necessary to support the multimodal facility. The project would improve access to public mass transit.

The Hercules ITC would be designed to facilitate alternative modes of transportation. It would be pedestrian and bicyclist-oriented, and would link together rail and bus service (WestCAT). The Hercules ITC would also be designed to facilitate a future ferry terminal to serve commuters

to and from downtown San Francisco. The Hercules ITC would include the construction of a station building, a platform, and a pedestrian bridge spanning over the Union Pacific Railroad (UPRR) right-of-way. Vehicular and pedestrian bridges at Transit Loop Drive, the extension of Bayfront Boulevard, and a new railroad bridge at the Refugio Creek terminus are planned. The project would include realignment of the UPRR tracks and an East Bay Regional Parks Trail (Bay Trail).

Statutory Requirements for PM2.5 Hot-spot Analyses

An air quality hot-spot analysis is an estimation of the likely future localized pollutant concentrations and a comparison of those concentrations to the relevant air quality standards. The focus is usually the immediate area around a proposed project, as opposed to the regional focus of an emissions inventory for an entire nonattainment area. Hot-spot analyses may be either quantitative, in which future concentrations are calculated for specific locations within the study area, or qualitative, in which the proposed project and study area are compared to similar existing facilities, existing monitoring data, and other readily available information.

In December 2010, EPA released final modeling guidance for performing quantitative $PM_{2.5}$ and PM_{10} hot-spot analyses at the project level for transportation projects (EPA 2010), and established a two-year grace period for the implementation of the new guidelines. Quantitative hot-spot analyses will not be required for Transportation Conformity under 40 C.F.R. § 93.123(b)(4) until the end of the implementation grace period in December 2012. During the grace period, transportation projects that are within nonattainment or maintenance areas for $PM_{2.5}$ and are not exempt require a qualitative analysis that must document that no new local $PM_{2.5}$ violations will be created and the severity or number of existing violations will not be increased as a result of the project.

In March 2006, EPA and FHWA issued a joint, updated guidance document on performing qualitative hot-spot analyses in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas (EPA and FHWA 2006). Those projects that are of "air quality concern," as defined by 40 C.F.R. § 93.123(b)(1), require a hot-spot analysis. The methodology may involve a comparison of the study area with an area possessing similar characteristics, a review of findings from air quality studies that may have been performed, or other qualitative approaches.

$PM_{2.5}$ Regional Conformity Determination

Section 176(c) of the CAA and the federal conformity rule require that transportation plans and programs conform to the intent of the State Implementation Plan for air quality through a regional emissions analysis in $PM_{2.5}$ nonattainment areas. For the San Francisco Bay Area, the relevant transportation plans and programs are the long-range regional transportation plan (RTP), called *Transportation 2035 Plan: Change in Motion*, adopted by the Metropolitan Transportation Commission (MTC) in April 2009, and the *2011 Transportation Improvement Program* (TIP), adopted by MTC in October 2010. MTC has determined that the *Transportation 2035 Plan* and the *2011 TIP* are consistent with and conform to the intent of the State Implementation Plan, as demonstrated in the *Transportation-Air Quality Conformity Analysis for the Transportation 2035 Plan and 2011 Transportation Improvement Program*, dated October 27, 2010.

The Hercules Intermodal Transit Center project was included in the regional emissions analysis, and there have been no significant changes in the project's design concept or scope as used in the conformity analysis. Therefore, the project comes from a conforming plan and program in accordance with 40 C.F.R. § 93.115.

$PM_{2.5}$ Hot-spot Analysis

As previously noted, EPA's latest guidance on $PM_{2.5}$ hot-spot analyses requires localized assessment for projects of air quality concern. The proposed project is of air quality concern primarily because it would be a new bus and rail terminal that would have a significant number of diesel vehicles congregating at a single location (40 C.F.R. 93.123(b)(1)(iii)); therefore, it requires a hot-spot analysis.

A comparison approach was used for this analysis, in which anticipated rail and bus traffic volumes at the new intermodal transit center were compared with those at a similar transit center near existing air quality monitoring sites. This approach essentially uses the similar site as a surrogate for comparison with the proposed project.

Ideally for the comparison approach, $PM_{2.5}$ air quality monitoring stations should be located close to transit stations to obtain representative pollutant levels that can be used as a surrogate for the proposed project site. However, the collocation of these facilities is rare in the real world. Therefore, it is usually necessary to identify several similar transit stations and all $PM_{2.5}$ air quality monitoring stations in the vicinity for the comparison analysis.

For this analysis, nine stations along the Capitol Corridor line were included in the comparison, from the Suisun/Fairfield Station on the north to the Fremont/Centerville Station on the south. All nine stations have multiple transit bus connections and two have connections to the Bay Area Rapid Transit (BART) system. Eight ambient $PM_{2.5}$ air quality monitoring stations were also included, encompassing all $PM_{2.5}$ monitoring stations within a 50-mile radius of the proposed Hercules ITC.

The proposed Hercules ITC project is tentatively scheduled for construction in 2011. Anticipated rail and bus traffic volumes were obtained from the project description and the Traffic Impact Analysis prepared for the proposed project.

The qualitative analysis of the potential impacts associated with the proposed project began with a review the selected transit stations, including approximate size and configuration of the station, the number and frequency of bus connections, the presence of other rail transit connections (e.g., BART), and the proximity to other potential emission sources (e.g., industrial facilities, airports). For the purpose of this analysis, all bus traffic was assumed to consist of diesel-engine vehicles because specific data on engine types were not available. Reviewed parameters for the rail transit stations are summarized in Table 1.

The review of rail transit stations along the Capitol Corridor line in the region of the proposed Hercules Intermodal Transit Center revealed that the current design of the Hercules ITC is

similar in size and configuration to other regional transit stations. Further, the expected number and frequency of bus connections is similar to other nearby stations. Nearby transit stations most similar to the proposed Hercules ITC are the Martinez, Emeryville, and Oakland Jack London stations. Nearby transit stations that are more active, with more intensive uses, more nearby emissions sources, and connections to other major rail transit, are the Richmond and Oakland Coliseum stations. Nearby transit stations that are smaller, less intensive, or with less nearby major emission sources are the Suisun/Fairfield, Berkeley, Hayward, and Fremont/Centerville stations.

Table 1. Rail transit stations along Capitol Corridor

Station name	Bus connections		Other rail transit connections	Other emission sources nearby
	Number of routes	Typical frequency		
Suisun/Fairfield	3	15 min. to 1 hr.	None	Industrial sites – 1.5 mi.
Martinez	5	40 min. to 2 hrs.	None	Industrial sites – 0.25 mi. Major oil refinery – 0.75 mi. Shipping port – 1.0 mi.
Hercules (proposed)	6−8 (est.)	30 min. (est.)	None	Wastewater treatment plant – 0.75 mi. Oil refinery – 1.5 mi.
Richmond	8	15−30 min.	BART	Industrial sites – 1.0 mi. Large rail yard – 1.0 mi. Major oil refinery – 1.5 mi.
Berkeley	1	15−30 min.	None	No major sources within 1.5 mi.
Emeryville	8	15−30 min.	None	Major shipping port – 1.5 mi.
Oakland Jack London	8	15−30 min.	None	Oakland Inner Harbor – 0.25 mi. Major shipping port – 0.5 mi. Naval air station – 1.5 mi.
Oakland Coliseum	4	15−30 min.	BART	Industrial sites – 0.1 to 1.0 mi. Metal pipe foundry – 0.25 mi. Oakland Int. Airport – 1.5 mi.
Hayward	4	1 hr.	None	Industrial sites – 0.25 to 0.5 mi. Hayward Executive Airport – 1.0 mi.
Fremont/Centerville	4	30 min.	Altamont Commuter Express	No major sources within 1.5 mi.

The review then focused on the air quality monitoring stations in the area, including measured concentrations of $PM_{2.5}$; number of exceedances of the National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$; size of the surrounding community; proximity of the monitoring station to the nearest rail station, bus transit center, major roadway or highway, and other sources of fine particulate matter; and estimated traffic volumes on nearest major roadways or highways. Reviewed parameters for the $PM_{2.5}$ air quality monitoring stations are summarized in Table 2.

Table 2. $PM_{2.5}$ air quality monitoring stations in the Bay Area

Station name	Size of surrounding community[a]	2009 $PM_{2.5}$ monitoring results (in µg/m^3 [b])							ADT on nearest major roadway[j]	Other major $PM_{2.5}$ sources
		24-hour (NAAQS is 35 µg/m^3) (No separate Cal. standard)				Annual (NAAQS is 15 µg/m^3) (Cal. standard is 12 µg/m^3)				
		Max.[c]	Exc.[d]	3-yr average[e]	NAAQS violation?[f]	Avg.[g]	3-yr average[h]	NAAQS violation?[i]		
Vallejo	121,435	38.9	5	36	yes	9.7	9.8	no	142,000 (0.4 mi.)	Wood burning Major oil refineries
Concord	125,864	39.0	1	33	no	8.4	8.7	no	242,000 (1.8 mi.)	Major oil refineries
Oakland	430,666	36.3	1	NA[k]	NA	9.3	NA	NA	155,000 (1.0 mi.)	Major shipping port International airport Large industrial sites
San Francisco	856,095	35.6	1	27	no	9.7	9.4	no	224,000 (0.3 mi.)	Industrial sites
Livermore	85,312	45.7	4	34	no	9.2	9.4	no	166,000 (0.9 mi.)	No industrial sources
Fremont	218,128	39.3	1	27	no	9.4	9.2	no	142,000 (1.0 mi.)	Industrial sites Salt production plant
Redwood City	78,568	31.7	0	28	no	8.7	8.7	no	194,000 (0.3 mi.)	Industrial sites
Santa Rosa	163,436	29.0	0	28	no	8.4	8.2	no	120,000 (0.6 mi.)	No industrial sources

[a] most recent population estimate, as reported in the BAAQMD *2009 Air Monitoring Network Report*
[b] micrograms per cubic meter
[c] the highest average contaminant concentration over a 24-hour period, from midnight to midnight
[d] the number of days during the year for which the monitoring station recorded contaminant concentrations exceeding the national standard of 35 µg/m^3
[e] the three-year average of the annual 98th percentiles of the individual 24-hour $PM_{2.5}$ concentrations
[f] a NAAQS violation occurs when the three-year average of the annual 98th percentiles of the individual 24-hour PM2.5 concentrations exceed 35 µg/m^3
[g] the yearly average (arithmetic mean) of the readings taken at the monitoring station
[h] the three-year average of the quarterly averages of $PM_{2.5}$
[i] a NAAQS violation occurs when the three-year average of the quarterly averages of $PM_{2.5}$ exceeds 15 µg/m^3
[j] most current available average annual daily traffic volume on the nearest major arterial or highway
[k] the Oakland monitoring site has not yet been operating for 3 years, so 3-year averages are not available and NAAQS violations cannot be determined

Transportation sources do not appear to be major contributors to $PM_{2.5}$ concentrations at the air quality measurement stations in the Bay Area. This is supported by the absence in the *Transportation-Air Quality Conformity Analysis for the Transportation 2035 Plan & 2011 Transportation Improvement Program* of any transportation control measures (TCMs) specifically addressing PM_{10} or $PM_{2.5}$. Further, a review of the monitoring data in Table 2 suggests that those locations that have the highest ambient concentrations of $PM_{2.5}$ are generally located in less populated suburban areas with lower ADT on the nearest major roadway.

For example, the Vallejo location is situated in a community of about 121,000 people, with approximately 142,000 ADT on the nearest highway located four-tenths of a mile from the monitoring site. This location recorded the highest three-year average $PM_{2.5}$ concentration in the Bay Area, exceeded the 24-hour $PM_{2.5}$ standard on five occasions during 2009, and has resulted in the only violation of the 24-hour $PM_{2.5}$ NAAQS in the Bay Area. According to BAAQMD, the primary source of $PM_{2.5}$ at this monitoring site is wood burning in the wintertime, which is exacerbated by valley drainage winds from the Napa Valley, and shallow temperature inversions.

The second highest three-year average $PM_{2.5}$ concentration was measured at the Livermore monitoring station, which is situated in a community of about 85,000 people, with approximately 166,000 ADT on the nearest highway located nearly a mile from the monitoring station. This location recorded four daily exceedances of the 24-hour $PM_{2.5}$ standard in 2009, although the three-year average concentration is slightly below the NAAQS.

By contrast, the San Francisco monitoring station is situated in a community of over 850,000 people, with approximately 224,000 ADT on the nearest highway located just over one-quarter mile from the monitoring station. This location recorded one of the lowest three-year average 24-hour $PM_{2.5}$ concentrations in the Bay Area and only one daily exceedance of the 24-hour $PM_{2.5}$ standard in 2009. Similarly, the Oakland monitoring station is situated a community of more than 430,000 people, with approximately 155,000 ADT on the nearest highway located about one mile from the monitoring station. This location also recorded one daily exceedance of the 24-hour $PM_{2.5}$ standard in 2009. The Oakland monitoring station has not been operating long enough to calculate a three-year average for comparison with the NAAQS, but available data from the past two years suggests that the average is trending below the NAAQS and will likely meet the standard when the 2010 data is available for inclusion in the calculation.

For comparison, the proposed Hercules ITC location is situated in a community of about 25,000 people, with approximately 182,000 ADT on the nearest highway located about one mile from the proposed site. Based on surrounding population, proximity to major highways, and proximity to major sources of $PM_{2.5}$, the Hercules ITC location would be most similar to the area surrounding the Redwood City and Concord air quality monitoring station. Those monitoring stations measured maximum 24-hour $PM_{2.5}$ concentrations of 31.7 $\mu g/m^3$ and 39.0 $\mu g/m^3$, respectively, in 2009, with three-year averages of 28 $\mu g/m^3$ and 33 $\mu g/m^3$, respectively. Both of the calculated three-year averages met the NAAQS. All measured concentrations of the annual standard at both monitoring stations met the NAAQS and the California standard.

Disregarding the surrounding population size, the San Francisco and Oakland monitoring stations also have similar characteristics, in terms of proximity to major transportation facilities

and major $PM_{2.5}$ sources, to the Hercules ITC area. Those monitoring stations measured maximum 24-hour PM2.5 concentrations of 35.6 µg/m^3 and 36.3 µg/m^3, respectively, in 2009, with a calculated three-year average of 27 µg/m^3 at the San Francisco monitoring station, which meets the NAAQS. As mentioned above, the Oakland monitoring station has not been operating long enough to calculate a three-year average for comparison with the NAAQS, but available data from the past two years suggests that the average is trending below the NAAQS and will likely meet the standard when the 2010 data is available for inclusion in the calculation. All measured concentrations of the annual standard at both monitoring stations met the NAAQS and the California standard.

As part of the *Transportation-Air Quality Conformity Analysis for the Transportation 2035 Plan & 2011 Transportation Improvement Program*, the MTC estimated and compared Build and No Build scenario emissions of $PM_{2.5}$ for 2015, 2025, and 2035. The applicable conformity test for $PM_{2.5}$ is the Build/No Build test, in which the emissions from the RTP and TIP (Build scenario) must be less than or equal to emissions from the transportation system under current programs (No Build scenario). The Hercules ITC is included in the Build scenario used for the comparison to determine conformity. Results of the conformity test, shown in Table 3, indicated that the total vehicle-related emissions of $PM_{2.5}$ and the NO_x precursor associated with the implementation of the RTP and TIP are projected to be lower than those for the current transportation system for each of the years of analysis and are, therefore, in conformity.

Table 3. Emissions comparison for the Build/No Build test for $PM_{2.5}$ (in tons per day)

	2015		2025		2035	
	No Build	**Build**	**No Build**	**Build**	**No Build**	**Build**
$PM_{2.5}$	5.92	5.66	5.87	5.78	6.36	6.14
NO_x	112.63	109.55	60.36	60.16	42.87	42.85

Notes: Emissions are for wintertime only
Source: MTC, 2010b.

Discussion and Conclusion

Nearby transit stations most similar to the proposed Hercules ITC are the Martinez, Emeryville, and Oakland Jack London stations. Of the $PM_{2.5}$ monitoring stations in the Bay Area, the site characteristics of the Redwood City and Concord monitoring stations most closely resemble those characteristics projected for the Hercules ITC area now and into the future. Further, the San Francisco and Oakland monitoring stations are located in larger communities, but have similar proximity to major transportation facilities and major $PM_{2.5}$ emission sources. Based on the review of these similar transit stations and $PM_{2.5}$ monitoring stations, it is unlikely that the proposed Hercules ITC project would cause or contribute to an exceedance of the $PM_{2.5}$ standards. This conclusion is based on the following findings:

- Diesel bus and train emissions are not major contributors to ambient concentrations of $PM_{2.5}$ in the Bay Area. According to EPA emission summaries, all on-road motor vehicles, including a small percentage of diesel buses, accounts for about 12.6% of total $PM_{2.5}$

emissions in the Bay Area. Similarly, all non-road equipment, which includes heavy construction equipment, aircraft, and ships, as well as trains, accounts for only 6.2% of total $PM_{2.5}$ emissions in the Bay Area (EPA 2005).

- Residential wood combustion and industrial processes are the largest sources of $PM_{2.5}$ emissions in the Bay Area, accounting for more than half (53.5%) of all emissions of $PM_{2.5}$ (EPA 2005).
- Ambient $PM_{2.5}$ monitoring in areas most similar to the Hercules ITC project site were below the NAAQS and California standards.
- The Build/No Build emission test conducted by MTC for the RTP and TIP conformity analysis demonstrated that emissions from the Build scenario, which includes the proposed Hercules ITC, would be lower than the No Build scenario.

The proposed Hercules ITC would increase local and regional mobility and transportation options by providing new and expanded transit services with multi-modal connections that would encourage use of public transit. The Hercules ITC would provide bus-to-train connections and provide car commuters with access to new transit options that would divert traffic from Interstate-80, the most congested corridor in the Bay Area. An expanded and more convenient transit system with new train, bus, and trail connections to existing transit services would provide commuters with more options and reduce car usage and its associated impacts.

In summary, the proposed project would have the anticipated net effect of reducing the regional impacts on air quality from those that would occur if the proposed Hercules ITC were not completed. This conformity determination meets all of the applicable CAA Section 176(c) requirements for federally funded or approved transportation projects. Specifically, the requirements for particulate matter hot-spot analyses are codified at 40 C.F.R. § 93.116 and § 93.123. By meeting these regulatory requirements, as well as other requirements in the conformity regulations, this conformity determination demonstrates compliance with the requirements of CAA Section 176(a)(1).

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