APPENDIX C
AIR QUALITY

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AIR QUALITY

1.0 AFFECTED ENVIRONMENT

1.1 STUDY METHODS

The focus of the air quality analysis is on U.S. EPA criteria air pollutants, including carbon monoxide (CO), nitrogen oxide ($NO_{x)}$, sulfur dioxide (SO_2), and particulate matter ($PM_{10}/PM_{2.5}$). Ozone-forming emissions were addressed through the analysis of volatile organic compounds (VOCs), which are also known as reactive organic gases (ROGs) and NO_x. Lead (Pb) was not included in the emission inventory calculations because: (1) the Crescent City area is in attainment for Pb, and (2) since the prohibition of Pb as an additive in liquid fuels, Pb has ceased to be a major transportation related pollutant.

1.2 EXISTING ENVIRONMENTAL CONDITIONS

The Generalized Study Area (GSA) is located in Del Norte County, which is in the North Coast Air Basin (NCAB), a five-county area in northern California. The NCAB includes the entire counties of Del Norte, Trinity, Humboldt, Mendocino, and the northern part of Sonoma County. Federal, state, and local agencies share the regulation and management of ambient air quality conditions. Under the National Environmental Policy Act (NEPA), the Federal Aviation Administration (FAA) is the lead federal agency and is responsible for the assessment of air quality impacts associated with airports as well as compliance with the General Conformity Rule (U.S. EPA, 1993) under the Clean Air Act Amendments (CAAA) (U.S. Congress, 1990). **Table 1.2-1** provides a summary of the agencies and their roles and responsibilities in the GSA.

As discussed above, a variety of federal, state, and local regulations are used to protect and manage air quality conditions in Del Norte County, and the Crescent City area. Based on these regulations, the criteria and standards described below were used to evaluate the potential air quality impacts in this Draft EA. U.S. EPA has established National Ambient Air Quality Standards (NAAQS) to protect public health, the environment, and the quality of life from the effects of air pollution. The standards have been set for the following criteria pollutants: CO, Pb, NOx, O_3, PM_{10}, and $PM_{2.5}$, and SO_x.

1.2.1 Federal Standards and Criteria

The federal standards and criteria that apply to the RSA Project include demonstrating compliance with the NAAQS and the *de minimis* thresholds listed in the General Conformity Rule. The NAAQS are listed in **Table 1.2-2.**

Based on the attainment/nonattainment status of an area, pollutant-specific emissions thresholds apply as described in the Federal General Conformity Rule (40 CFR 93.153). Since Del Norte County is in attainment for all NAAQS, no federal pollutant–specific emissions thresholds apply to this area.

Table 1.2-1
Agencies Involved in the CEC Terminal Project EA/EIR Air Quality Assessment

Agency	Roles and Responsibilities
U.S. Environmental Protection Agency (U.S. EPA)	*Federal agency* – Sets national clean air policies under the Clean Air Act (CAA); promulgates the National Ambient Air Quality Standards (NAAQS); and reviews and approves State Implementation Plans (SIPs). Also regulates aircraft emissions. (All of California is within U.S. EPA Region 9, headquarters are in San Francisco.)
Federal Aviation Administration (FAA)	*Federal agency* – Responsible for preparing EA under NEPA for proposed FAT Master Plan projects and compliance with the General Conformity Rule of the CAA. (Offices are in San Francisco and Los Angeles.)
California Air Resources Board (CARB)	*State agency* – Establishes state-wide clean air policies and rules; promulgates the California Ambient Air Quality Standards (CAAQS), regulates mobile source emissions (i.e., motor vehicles); and conducts ambient air monitoring throughout California. Also involved in the preparation of state and regional SIPs. (Headquarters are in Sacramento.)
North Coast Unified Air Quality Management District (NCUAQMD)	*Regional agency* – Issues operating permits, monitors ambient air quality, develops and enforces local air quality rules and regulations, develops air quality plans, implements control strategies, and prepares periodic emissions inventories under the federal and state CAA. (Office is in Eureka.)
Del Norte Local Transportation Commission	*Local agency* – The Metropolitan Planning Organization (MPO) responsible for regional surface transportation planning activities related to air quality. (Office is in Crescent City.)

Table 1.2-2
National Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS	NCUAQMD Attainment Status
Carbon monoxide	1 hour	35 ppm/40,000 µg/m^{3} [3/a]	Attainment
	8 hour	9 ppm/10,000 µg/m^{3} [3/a]	
Lead	Rolling 3-Month Average	0.15 ppm [b]	Attainment
	Quarterly	1.5 ppm [b]	
Nitrogen Dioxide	Annual	0.05 ppm/100 µg/m^{3} [3/b]	Attainment
Ozone	1 hour	0.12 ppm [c]	Attainment
	8 hour	0.075 ppm [d]	Attainment
Particulate Matter with a diameter ≤ 10 micrometers	24 hour	150 ppm[a]	
Particulate Matter with a diameter ≤ 2.5 micrometers	24 hour	35 ppm [e]	
	Annual	15 ppm [f]	Attainment
Sulfur Dioxide	24 hour	0.14 ppm [a]	Attainment
	Annual	0.03 ppm [b]	
	3 hour	0.5 ppm/1,300 µg/m^{3} [3/b]	

Source: U.S. EPA

Notes:
[a] Not to be exceeded more than once a year.
[b] Not to exceed this level.
[c] Not to be at or above this level on more than three days over 3 years. (Applies only in limited areas)
[d] The average of the annual 4th highest daily 8-hour maximum over a three-year period is not to exceed this level.
[e] The 3-year average of the 98th percentile for each population-oriented monitor within an area is not to exceed this level.
[f] The 3-year average of the annual arithmetic mean from single or multiple monitors within an area is not to exceed this level.
µg/m^{3} = micrograms per cubic meter
NAAQS = National Ambient Air Quality Standards
NCUAQMD = North Coast Unified Air Quality Management District
ppm = parts per million

The project would have a significant air quality impact if it would:

1. Cause an exceedance of one or more NAAQS for any of the time periods analyzed.

1.2.2 Air Quality Monitoring Data

The NCUAQMD and CARB operate ambient air monitoring sites as part of their state and local air monitoring programs. These stations are intended to sample and record outdoor levels of the U.S. EPA criteria air pollutants discussed above. Ambient air quality monitors allow the managing air agency to determine compliance with the NAAQS and to evaluate the effectiveness of pollution control measures. There is only one air monitoring station in the general vicinity of the Airport. It is 2.9 miles east of the airport and only measures PM_{10} concentrations. **Table 1.2-3** presents the highest recorded PM_{10} levels from 2004 through 2007 at the Crescent City monitor. No air monitoring stations are located directly on or adjacent to CEC. While a number of other air quality monitoring stations are in northern California, these pollutant measurements are considered to be not representative of local conditions at the Airport, as they are located over 60 miles away.

Table 1.2-3
PM_{10} Air Monitoring Data Summary for the Crescent City Area

Year	Highest Recorded PM_{10} Concentrations ($\mu g/m^3$)	
	24-Hour	Annual
2004	42	18
2005	30	18
2006	41	15
2007	**44**	**13**
NAAQS	**150**	**50 (Standard revoked 12/17/06)**

Source: U.S. EPA AirsData, 2007.

Notes: $\mu g/m^3$ = micrograms per cubic meter
Data for 4 years was provided due to the lack of observations (only 14) in 2005.

Based on these data, the highest recorded PM_{10} 24-hour concentration was 44 $\mu g/m^3$, recorded in 2007. The highest recorded PM_{10} annual average concentration was 18 $\mu g/m^3$, also recorded in 2004 and again in 2005.

1.2.3 Attainment/Nonattainment Status

Based on air monitoring data and in accordance with the CAA Amendments of 1977, all areas within the United States are designated with respect to NAAQS as "attainment, nonattainment, maintenance, or unclassifiable." An area with air quality better than the NAAQS is designated as being in attainment, while an area with air quality worse than the NAAQS is designated as being in nonattainment. An area may be designated as unclassifiable when there is a temporary lack of data on which to form a basis to determine attainment status. Nonattainment areas are further classified as extreme, severe, serious, moderate, and marginal by the degree of non-compliance with the NAAQS. Finally, areas that are reclassified from nonattainment to attainment are designated as maintenance. The NCAB has been designated by U.S. EPA as in "attainment" or "unclassified" for all of the U.S. EPA "criteria" air pollutants for which there are NAAQS (U.S. EPA, 2006).

1.2.4 Sources of Air Pollutant Emissions

Most airports (including CEC) generate air emissions from the following general source categories: aircraft; ground service equipment (GSE); motor vehicles traveling to, from, and moving about the airport site; fuel storage and transfer facilities; a variety of stationary sources (i.e., steam boilers, back-up generators, etc.); an assortment of aircraft maintenance activities (i.e., painting, cleaning, and repair); an assortment of routine airfield, roadway, and building maintenance activities (i.e., cleaning, painting, and repair); and periodic construction activities for new projects or improvements to existing facilities. **Table 1.2-4** summarizes the sources of air emissions typically found at airports, the pollutants they emit, and their characteristics. Emissions due to fuel storage and handling activities are not included in this air quality assessment because aircraft operations do not change between the No Action and Proposed Project Alternative or Alternative G, and there is no change to these emissions.

Table 1.2-4
Typical Airport-Related Sources of Air Emission

Sources	Pollutants	Characteristics
Aircraft	• CO • HC • NO_x • PM • SO_2	Exhaust products of fuel combustion that vary greatly depending on aircraft engine type, power setting, and period of operation. Except for short periods of takeoff and approach, aircraft altitude precludes measurable offsite ground-level impacts.
Motor vehicles	• CO • HC • NO_x • PM • SO_2	Exhaust products of fuel combustion from passenger and employee traffic approaching, departing, and moving about the airport site. Emissions vary greatly depending on vehicle type, distance traveled, operating speed, and ambient conditions.
Ground service equipment (GSE)	• CO • HC • NO_x • PM • SO_2	Exhaust products of fuel combustion from service trucks, tow tugs, belt loaders, and other portable equipment.
Fuel storage and transfer facilities	• HC	Formed from the evaporation and vapor displacement of fuel from storage tanks, and fuel transfer facilities. Emissions vary with fuel usage, type of storage tank, refueling method, fuel type, vapor recovery, climate, and ambient temperature.
Stationary source facilities	• CO • HC • NO_x • PM • SO_2	Exhaust products of fossil fuel combustion from boilers dedicated to indoor heating requirements and emissions from incinerators used for waste reduction. Emissions are generally well-controlled with operational techniques and post-burn collection methods.
Construction activities	• CO • HC • NO_x • PM • SO_2	Construction activities at airports represent temporary sources of emissions primarily associated with the exhaust from construction equipment, dust generated during construction activities and land clearing, and evaporative volatile organic compounds (VOC) from asphalt paving operations.

Note: Although there are no NAAQS for hydrocarbons (HC), they are included in this analysis as they are considered to be one of the precursors to the formation of ozone. VOC are a subset of HC.

2.0 IMPACT ASSESSMENT

2.1 METHODOLOGY

This air quality analysis was prepared in support of the RSA Project EA and is consistent with federal guidelines: the 1990 CAA Amendments; NAAQS for criteria air pollutants; FAA Order 1050.1E CHG 1 (FAA, 2006a), *Environmental Impacts: Policies and Procedures* (Section 2, *Air Quality*); FAA Order 5050.4B (FAA, 2006b); NEPA's *Implementing Instructions for Airport Actions*; the FAA document A*ir Quality Procedures for Civilian Airports and Air Force Bases* (FAA, 1997) and its 2004 Addendum (FAA, 2004); and the requirements of the U.S. Environmental Protection Agency (U.S. EPA) Region 9.

Analysis of construction related emissions was conducted for the estimated five-month RSA Project construction period using the Urban Emission Model (URBEMIS) 2007, version 9.2.4. URBEMIS was developed by the California Air Resources Board to calculate emissions for various construction projects.

The focus of the air quality analysis is on U.S. EPA criteria air pollutants, including CO, NO_x, sulfur dioxide (SO_2) and PM_{10}/$PM_{2.5}$. Ozone-forming precursor emissions were addressed through the analysis of VOC, which are also known as reactive organic gases (ROG), and NO_x. Lead (Pb) was not included in the emission inventory calculations because: (1) the Crescent City area is in attainment for Pb, and (2) since the prohibition of Pb as an additive in liquid fuels, Pb has ceased to be a major transportation related pollutant.

2.1.1 Quantification of Construction Emissions

Construction of the various elements of the terminal replacement project represent temporary sources of air pollutant emissions, the types and amounts of which would vary in time and by location depending on the nature of the operation, the level of activity, and the local weather conditions. These emissions are primarily associated with the exhaust products from construction equipment; the disturbance and movement of earthen materials, and various forms of solid waste and debris and building materials. Even though these construction-related emissions are temporary, they are presented here for disclosure purposes. The construction requirements for the RSA project would involve a variety of air emissions sources including off-road construction vehicles, machinery, and equipment. Construction activities are associated with site preparation, earth-moving, material handling. The pollutants evaluated in this analysis were NO_x, PM_{10}, $PM_{2.5}$, ROG, and CO.

For the purposes of this analysis, construction equipment was limited to off-road equipment and vehicles. Off-road equipment would be used to move and grade fill materials, hydroseed, and otherwise maintain the RSA Project site. These include a wide array of scrapers, loaders, dozers, cranes, and off-road haul trucks. **Table 2.1-1** shows the assumed construction equipment, the number of pieces required, and the number of days each equipment type would be used for the RSA for each runway.

2.1.1.1 Equipment Activity Levels

Activity levels are defined as the hours of operation for a piece of equipment over a given time, and load factors are the engine performance demands, as a percentage of maximum power. Equipment activity

Table 2.1-1
RSA Project Construction Equipment and Phasing

Construction Activity	Equipment Type	Rwy End 11 (Alt A and G)		Rwy End 29 (Alt A and G)		Rwy End 35 (Alt A and G)		Rwy End 17 (Alt A)		Rwy End 17 (Alt G)	
		Days	Pieces	Days	Pieces	Days	Pieces	Days	Pieces	Days	Pieces
Clearing and Grubbing	200 hp Dozer	6	2	6	2	—	—	—	—	—	—
Borrow Excavation and Embankment	Track Mounted Excavator (2.5 CY Bucket)	—	—	14	2	4	1	4	1	—	—
	22 CY Off-Road Dump Truck	—	—	14	2	4	1	4	1	—	—
	200 hp Dozer	—	—	14	2	4	1	4	1	—	—
	Sheepsfoot Roller	—	—	14	1	4	1	4	1	—	—
Excavation and Embankment	200 hp Dozer	28	2	10	2	—	—	—	—	—	—
	Sheepsfoot Roller	28	1	10	1	—	—	—	—	—	—
Fine Grading	Motor Grader	6	2	6	2	1	1	1	1	—	—
Pavement Marking	Pavement Marking Machine	—	—	—	—	—	—	—	—	1	1
Threshold Light Base Cans and Conduits	1/2 CY Tractor Loader/Backhoe	—	—	—	—	—	—	—	—	4	1
	Front Loader	—	—	—	—	—	—	—	—	4	1
	24” Vibrating Roller	—	—	—	—	—	—	—	—	4	1
	8 CY Ready-Mix Truck	—	—	—	—	—	—	—	—	4	1
MALSR Light Base Cans and Conduits	1/2 CY Tractor Loader/Backhoe	30	1	—	—	—	—	—	—	—	—
	Front Loader	30	1	—	—	—	—	—	—	—	—
	24” Vibrating Roller	30	1	—	—	—	—	—	—	—	—
	8 CY Ready-Mix Truck	30	2	—	—	—	—	—	—	—	—
Electrical Fixture Installation	Light Truck	14	4	—	—	—	—	—	—	2	4
	Generator	14	4	—	—	—	—	—	—	2	4
Revegetation/Remove ESCs	Hydro-Mulch Sprayer	6	1	6	1	1	1	1	1	—	—
	Water Truck	6	1	6	1	1	1	1	1	—	—

Table 2.1-1
RSA Project Construction Equipment and Phasing

Construction Activity	Equipment Type	Rwy End 11 (Alt A and G)		Rwy End 29 (Alt A and G)		Rwy End 35 (Alt A and G)		Rwy End 17 (Alt A)		Rwy End 17 (Alt G)	
		Days	Pieces	Days	Pieces	Days	Pieces	Days	Pieces	Days	Pieces
	Light Truck	6	1	6	1	1	1	1	1	—	—
Miscellaneous	Light Truck	90	4	42	4	6	4	6	4	7	2
	Flat-Bed Semi (Equipment Delivery)	90	1	—	—	—	—	—	—	—	—
	Compressor	90	1	42	1	6	1	6	1	7	1
	Generator	90	1	42	1	6	1	6	1	7	1
	Pump	90	1	42	1	6	1	6	1	7	1
	Water Truck	90	1	42	1	6	1	6	1	—	—

Source: URS, 2010.

Notes:
— = Not Applicable
MALSR = Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
CY = cubic yards
hp = horsepower
ESC = erosion sediment control

levels were based on the estimated construction equipment requirements and the schedule for the RSA Project. Knowledgeable construction engineers associated with the project reviewed the work cycles for each type of equipment to arrive at an estimated average activity level for each piece of equipment by day and hour of activity. The estimated activity level for each piece of equipment may vary depending on the project component under construction.

2.1.1.2 Construction-Related Emissions

It was assumed that no construction-related activities (and thus no project-related air pollutant emissions) would be associated with the No Action Alternative. Under both the Proposed Project Alternative and Alternative G, construction-related emissions associated with each project component were computed using the latest version of CARB's. Urban Emission Model (URBEMIS) 2007, version 9.2.4. URBEMIS was developed by the California Air Resources Board to calculate emissions for various construction projects. This model computes the appropriate California-specific emissions factors and equipment load factors for off-road equipment.

2.2 FINDINGS

The RSA Project would not result in a change to aircraft fleet mix, operations, or any other activity at the Airport that would lead to an increase in the emission of air pollutants. However, a temporary increase in emissions associated with project construction is anticipated. All airport construction activities are proposed to be performed in compliance with FAA's Advisory Circular AC 150/5370-10B, *Standards for Specifying Construction of Airports*. The construction requirements for both the Proposed Project Alternative and Alternative G would involve a variety of air emissions sources including off-road construction vehicles, machinery, and equipment. Construction activities are associated with site preparation, land clearing/grading, paving, and material handling. For construction-related emissions, the primary objective for presenting these results is to disclose construction-related impacts. The pollutants included in this inventory are CO, ROG, NO_x, PM_{10}, $PM_{2.5}$, and SO_2.

2.2.1 Alternative A (Proposed Project Alternative)

Total construction-related emissions were prepared for 2010, the year in which construction activities are expected to occur. Construction emissions were calculated based on the estimated construction phasing schedule and equipment anticipated to be necessary for project construction. These results are provided in **Table 2.2-1.** Construction-related emissions for all pollutants in each of the years analyzed would be below the *de minimis* values established under the General Conformity Rule (40 CFR Part 93.153). Therefore, there would be no significant air quality impacts are anticipated due to construction.

Table 2.2-1
Construction Emissions – Alternative A

Year	Pollutant (Tons per Year)					
	CO	**ROG**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**
2010	30.58	7.64	67.31	24.54	5.24	0.002
De Minimis Values	*100*	*100*	*100*	*100*	*100*	*100*

Source: URS, 2010.

Notes:
CO = carbon monoxide
NO_X = oxides of nitrogen
PM_{10} = particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = particulate matter less than 10 micrometers in diameter
ROG = reactive organic gas
SO_2 = sulfur dioxide

2.2.2 Alternative G (Cut and Fill Displaced Threshold Alternative)

Table 2.2-2 shows construction emissions under Alternative G. Because emissions under Alternative G do not change compared to the Proposed Project, no significant impact is anticipated.

Table 2.2-2
Construction Emissions – Alternative G

Year	Pollutant (Tons per Year)					
	CO	**ROG**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**
2010	30.58	7.64	67.31	24.54	5.24	0.002
De Minimis Values	*100*	*100*	*100*	*100*	*100*	*100*

Source: URS, 2010.

Notes:
CO = carbon monoxide
NO_X = nitrogen oxides
PM_{10} = particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = particulate matter less than 10 micrometers in diameter
ROG = reactive organic gas
SO_2 = sulfur dioxide

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