

Appendix E
AIR QUALITY

**Draft Report
Air Quality Assessment Report for
AT&T Asia-America Gateway Cable
Installation Project
San Luis Obispo County**

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Table of Contents

Draft Report	Draft Air Quality Assessment Report for AT&T Asia- America Gateway Cable Installation Project, San Luis Obispo County, CA	1
	Executive Summary.....	1
	Findings.....	1
	Introduction.....	2
	Purpose.....	2
	Project Site Location.....	2
	Project Description.....	3
	Air Quality Assessment.....	5
	Environmental Setting.....	6
	Significance Thresholds.....	13
	Methodology.....	14
	Air Quality Impact Analysis.....	16
	Mitigation Measures.....	22
	Bibliography.....	24
	Printed References.....	24
	Figures.....	27
	Appendix A – Daily Emission Calculation Worksheets	
	Appendix B – Total Project Emission Calculation Worksheets	
	Appendix C – Total Project GHG Emissions Calculation Worksheet	

Tables

Table		Page
1	Emission-Generating Construction Equipment.....	4
2	Federal and State Ambient Air Quality Standards.....	8
3	Federal and State Attainment Status for South Coast Air Basin.....	9
4	Air Quality Data from Morro Bay Station (ARB 70072).....	12
5	Travel Distances of San Luis Obispo, CA to Hawaii Link	16
6	Daily Emissions for Construction of the AT&T Gateway Cable	17
7	Total Project Emissions for Construction of the AT&T Gateway Cable	19
8	Estimate of Regional Operational Greenhouse Gas Emissions (Tons, total project)	21

Acronyms and Abbreviations

$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
AB 32	Assembly Bill 32
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
Basin	South Coast Air Basin
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CO	carbon monoxide
CO ₂	carbon dioxide
DPM	diesel particulate matter
GHG	greenhouse gas
NAAQS	National Ambient Air Quality Standards
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
O ₃	Ozone
PM ₁₀	inhalable particulate matter
PM _{2.5}	fine particulate matter
ppm	parts per million by volume
SIP	State Implementation Plan
SLOCAPCD	San Luis Obispo County Air Pollution Control Agency
SO ₂	sulfur dioxide
TAC	toxic air contaminant
USEPA	U.S. Environmental Protection Agency

Draft Report Air Quality Assessment Report for AT&T Asia-America Gateway Cable Installation Project San Luis Obispo County, CA

Executive Summary

Findings

This report provides an analysis of potential air quality impacts related to the AT&T Asia-America Gateway Cable Installation Project from the AT&T San Luis Obispo Cable Station to offshore and international destinations such as Hawaii and Southeast Asia.

All analyses have been conducted to comply with the San Luis Obispo County (APCD) requirements for air quality assessments to satisfy California Environmental Quality Act (CEQA) requirements. The analyses findings are as follows.

- Temporary project construction work would occur over several consecutive days.
- Unmitigated emissions of nitrogen oxides (NO_x) during construction would exceed APCD regional thresholds.
- Unmitigated emissions of other air pollutants (reactive organic compounds, carbon monoxide, and particulate matter) during construction would be less than the CEQA thresholds.
- There are no practical ways to reduce NO_x emissions during construction to rates less than the CEQA significance thresholds. Therefore, AT&T proposes the following mitigation to offset the construction-related NO_x emissions:
 - AT&T will monitor actual fuel usage by the cable lay vessel, which is by far the largest NO_x emission source.

- Based on the monitored fuel usage, AT&T will calculate the actual NO_x emissions exceeding the CEQA threshold.
- AT&T will offset the actual NO_x exceedances by one of two methods:
 - Pay emission offset fees of \$16,000 per ton of actual NO_x emissions exceeding the CEQA threshold; or
 - Permanently replace an old diesel deck engine on a local marine vessel with a new, EPA-certified engine, and document that the new engine will be used a substantial amount of time within the ozone nonattainment area.
 - The preceding NO_x emission offsets will reduce the air quality impacts to less than significant after mitigation.
- The project's diesel particulate matter (DPM) emissions that would occur during construction would be temporary and emitted far from populated areas, so would not result in a significant health risk to the closest sensitive-receptor locations.
- The project's temporary emissions of greenhouse gases (GHG) would be an inconsequential fraction of the worldwide total emissions that are foreseen to cause global climate change. Therefore, GHG emissions would be less than significant.

Introduction

Purpose

The basic project purpose is to install telecommunication cables from the AT&T San Luis Obispo Cable Station to offshore and international destinations such as Hawaii and Southeast Asia.

Project Site Location

The project will include marine, shore-end, and terrestrial activities. Terrestrial activities will occur along an existing conduit system that extends from Montana de Oro State Park, which is located just south of Morro Bay, to the AT&T San Luis Obispo Cable Station, which is located just outside of San Luis Obispo. Shore-end activities will start at an existing manhole located within the Sandspit Beach parking lot at Montana de Oro State Park and then proceed seaward until a water depth of approximately 30 meters (98 feet). Marine activities will then occur along a predetermined course to destinations in Hawaii, Guam, and Southeast Asia. These three project components are further described below.

The project vicinity is shown in Figure 1.

Project Description

The terrestrial segment includes an existing conduit system (constructed in 1990) that starts at a beach manhole (installed in 2001) in the Sandspit Beach parking lot of Montana de Oro State Park and then traverses inland for a distance of approximately 16.9 km (10.5 miles) to the AT&T San Luis Obispo Cable Station (constructed in the 1960s). Beyond the Montana de Oro State Park boundaries, the conduit system exists entirely within private easements held by AT&T, with the exception of two road crossings at Pecho Valley Road and Clark's Gap Road. This route is commonly referred to as the "ridge" conduit system because it is located along the ridge of the hills just south of Los Osos Valley Road. The terrestrial segment activities include pulling a terrestrial fiber optic cable and a terrestrial power cable through the existing conduit system and installing a new ground bed. This segment may also include repairing sections of the conduit system, as necessary, to allow for installation of the new cable. In addition, some minor erosion will be repaired along the route. Other than these activities, no construction is anticipated for this segment of the project.

The shore-end segment includes the beach manhole described above and one 5 inch bore pipe (installed in 2001) that extends seaward from the beach manhole for a distance of approximately 670 meters (2,200 feet) from mean high tide and then terminates in a water depth of approximately 10 meters (33 feet). The shore-end segment activities include pulling one, self-powered marine cable through the existing beach manhole and pipe. This segment also includes diver burial of the marine cable from the end of the pipe until diver burial is not practical, which occurs at a water depth of approximately 30 meters (98 feet). Other than the installation of the proposed cable, no new construction is necessary for this segment of the project.

The marine segment involves the placement of the marine cable, via a combination of plow burial and direct bottom lay, along a predetermined course from the 30 meter (98 feet) water depth point described above to destinations in Hawaii, Guam, and Southeast Asia. The near-shore cable course will follow the "sand channel" route, which is where marine cables have been grouped since 2000. Utilizing the sand channel route provides for greater burial because of the soft bottom environment.

Table 1 lists the diesel-powered equipment to be used for cable laying, shore end, land-based and support services. The largest type of equipment listed in Table 1 is the cable lay vessel, which will come from the project area.

The activities listed in Table 1 would generally occur consecutively; as a result the daily emissions generated by these activities would not overlap. There would be overlap in the daily emissions for the following activities:

- Pipe preparation and pre-lay grapnel run activities would occur concurrently for up to three days.

- Near-shore cable installation and shore end construction activities would overlap for one day.
- Worker commuting would overlap with all activities

The activity durations provided in Table 1 are conservative estimates based on previous experience constructing similar projects. The entire project would be completed within a single calendar quarter and would likely only last six to eight weeks.

Table 1. Emission-Generating Construction Equipment

Activity/ Equipment Type	Number Active	Hours per Day	No. Workdays	Default HP	Default Load Factor
Pipe Preparation					
Primary Work Boat - Dive Platform	2	14	3	800	0.15
Secondary Work Boat - Anchor Support/Shuttle	2	14	3	350	0.37
Pre-lay Grapnel Run					
Vessel-of-Opportunity - Outside State Waters	2	20	5	800	0.2
Vessel-of-Opportunity - w/i State Waters	2	2	2	800	0.2
Offshore Cable Installation					
Cable Lay Vessel - Lay Cable/ Plow Cable	3	24	12	5950	0.25
Cable Lay Vessel - Plow Cable (w/in State waters)	3	24	1	5950	0.19
Near-Shore Cable Installation					
Cable Lay Vessel - Landing	2	14	1.5	5950	0.2
Primary Work Boat - Dive Platform	2	14	1	800	0.2
Secondary Work Boat - Anchor Support/Shuttle	2	14	1	350	0.26
Cable Lay Vessel - Near-Shore Lay	2	12	2	5950	0.5
Secondary Work Boat - Support, Patrol & Shuttle	2	14	2	350	0.5
Near-Shore Cable Retroburial					
Primary Work Boat - Dive Platform	2	14	4	800	0.18
Secondary Work Boat - Anchor Support/Shuttle	2	14	4	350	0.26
Cable Retroburial					
Cable Lay Vessel - ROV	3	24	6.5	5950	0.19
Cable Lay Vessel - ROV w/i State Waters	3	18	1.5	5950	0.19
Shore End Construction					

Bore Rig (Pipe Cleaning)	1	6	1	115	0.5
Crane	1	2	2	250	0.32
Backhoe	1	8	4	105	0.72
Power Winch	1	6	2	100	0.4
Compressor	1	2	2	40	0.48
Generator	1	3	10	50	0.74
Supply Truck	2	1	10	250	0.3

Land-Based Cable Pulling for Existing Conduit

Bobcat Skid Loader	1	10	25	80	0.72
Cable Truck	2	10	25	200	0.5
Pick-up Truck	3	10	25	150	0.5
Generator	2	10	25	50	0.74

Crew Commute Vehicles 11-person work force, each commutes 50 miles round trip

All activities are assumed to occur concurrently with the exceptions described below.

- 1 Pipe preparation and pre-lay grapnel run activities would occur concurrently for up to three days
- 2 Near-shore cable installation and shore end construction activities would overlap for one day.
- 3 Daily commute of work crew would overlap with all activities.

Air Quality Assessment

This air quality assessment includes a discussion of applicable significance criteria and analysis methodologies outlined in the following guidance documents:

- CEQA Air Quality Handbook,¹
- Off-Road 2007 Mobile Source Emission Factors,² and
- EMFAC 2007 (v2.3) Emission Factors (On-Road).

Based on these above-referenced guidance documents, this assessment evaluates the short-term construction-period impacts on localized and regional air quality that would result with implementation of the proposed project.

¹ SLOAPCD. 2003. CEQA Air Quality Handbook: A Guide for Assessing the Air Quality Impacts for Projects Subject to CEQA Review. Adopted April.

² ARB. 2006. Combined California ARB and USEPA standards for off-road compression ignition engines. Available: <<http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road%20Diesel%20Stds.xls>>.

Environmental Setting

Regulatory Setting

A number of statutes, regulations, plans, and policies have been adopted that address air quality issues. The proposed project site and vicinity are subject to air quality regulations developed and implemented at the federal, state, and local levels. At the federal level, the U.S. Environmental Protection Agency (USEPA) is responsible for implementation of the federal Clean Air Act (CAA). Some portions of the CAA (e.g., certain mobile-source and other requirements) are implemented directly by the USEPA. Other portions of the CAA (e.g., stationary-source requirements) are implemented by state and local agencies.

Authority for Current Air Quality Planning

A number of plans and policies have been adopted by various agencies that address air quality concerns. Those plans and policies that are relevant to the proposed project are discussed below.

Federal Clean Air Act

The CAA was first enacted in 1955 and has been amended numerous times in subsequent years (1963, 1965, 1967, 1970, 1977, and 1990). The CAA establishes federal air quality standards, known as National Ambient Air Quality Standards (NAAQS), and specifies future dates for achieving compliance. The CAA also mandates that the state submit and implement a State Implementation Plan (SIP) for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards will be met. The San Luis Obispo County is designated a nonattainment area for certain pollutants that are regulated under the CAA.

The 1990 amendments to the CAA identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones. The sections of the CAA that would most substantially affect the development of the proposed project include Title I (Nonattainment Provisions) and Title II (Mobile-Source Provisions).

Title I provisions were established with the goal of attaining the NAAQS for criteria pollutants. Table 2 shows the NAAQS currently in effect for each criteria pollutant. The NAAQS were amended in July 1997 to include an 8-hour standard for ozone (O₃) and adopt a NAAQS for fine particulate matter (PM_{2.5}). In general, air quality in the project area is good because sea breezes increase air flow. The Basin fails to meet national standards for O₃, inhalable particulate matter (PM₁₀), and PM_{2.5}, and therefore is considered a federal nonattainment area for those pollutants. Table 3 lists each criteria pollutant and their related attainment status.

Emission Standards for Off-road Diesel Engines

To reduce emissions from off-road diesel equipment, USEPA established a series of cleaner emission standards for new off-road diesel engines.³ Tier 1 standards were phased in from 1996 to 2000 (year of manufacture), depending on the engine horsepower category. Tier 2 standards were phased in from 2001 to 2006. Tier 3 standards will be phased in from 2006 to 2008. Tier 4 standards, which likely will require add-on emission control equipment to attain them, will be phased in from 2008 to 2015. These standards apply to construction and off-road equipment, but not marine vessels.

Emission Standards for Marine Diesel Engines

To reduce emissions from Category 1 (at least 50 horsepower [hp] but less than 5 liters per cylinder displacement) and Category 2 (5 to 30 liters per cylinder displacement) marine diesel engines, USEPA established emission standards for new engines, referred to as Tier 2 marine engine standards. The Tier 2 standards will be phased in from 2004 to 2007 (year of manufacture), depending on the engine size.⁴ For the proposed project, this rule is assumed to affect harbor craft but not oceangoing vessel auxiliary engines because the latter would likely be manufactured overseas and, therefore, would be exempt from the rule.

California Clean Air Act

The California Clean Air Act (CCAA), signed into law in 1988, requires all areas of the state to achieve and maintain the California Ambient Air Quality Standards (CAAQS) by the earliest practical date. The CAAQS incorporate additional standards for most of the NAAQS criteria pollutants and set standards for other pollutants recognized by the state. In general, the California standards are more health protective than the corresponding NAAQS. California has also set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Table 2 details the current CAAQS, while Table 3 provides the Basin's attainment status with respect to federal and state standards.

Global Warming Solutions Act of 2006 (AB 32)

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's greenhouse gas (GHG) emissions to: 1) 2000 levels by 2010; 2) 1990 levels by the 2020; and 3) 80% below the 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that the California Air Resources Board (ARB) create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing

³ USEPA. 2004. Regulatory Announcement - Clean Air Nonroad Diesel Rule. EPA420-F-04-032. May 2004.

⁴ USEPA. 1999. Control of Emissions of Air Pollution From New Marine Compression-Ignition Engines at or Above 37 kW; Final Rule. *Federal Register* 64(249):73,300--73,373.

AB 32, including the recommendations made by the state's Climate Action Team.

Table 2. Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS ^a	NAAQS ^b
Ozone (O ₃)	1 hour	0.09 ppm ^c	--
	8 hour	0.07 ppm	0.075 ppm
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm
	8 hour	9.0 ppm	9 ppm
Nitrogen Dioxide (NO ₂)	1 hour	0.18 ppm	--
	Annual	0.030 ppm	0.053 ppm
Sulfur Dioxide (SO ₂)	1 hour	0.25 ppm	--
	3 hour	--	0.5 ppm
	24 hour	0.04 ppm	0.14 ppm
	Annual	--	0.030 ppm
Inhalable Particulate Matter (PM ₁₀)	24 hour	50 µg/m ^{3c}	150 µg/m ³
	Annual	20 µg/m ³	--
Fine Particulate Matter (PM _{2.5})	24 hour	--	35 µg/m ³
	Annual	12 µg/m ³	15 µg/m ³

Notes:

^a The CAAQS for O₃, CO, SO₂ (1-hour and 24-hour), NO₂, PM₁₀, and PM_{2.5} are values not to be exceeded. All other California standards shown are values not to be equaled or exceeded.

^b The NAAQS, other than O₃ and those based on annual averages, are not to be exceeded more than once a year. The O₃ standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

^c ppm = parts per million by volume; µg/m³ = micrograms per cubic meter.

Source: California Air Resources Board, February 22, 2007.

Table 3. Federal and State Attainment Status for South Coast Air Basin

Pollutants	Federal Classification	State Classification
O ₃ (1-hour standard)	—	Nonattainment
O ₃ (8-hour standard)	Nonattainment, Severe-17	—
PM ₁₀	Serious Nonattainment	Nonattainment
PM _{2.5}	Nonattainment	Nonattainment
CO	Attainment	Attainment
NO ₂	Unclassified/Attainment	Attainment
SO ₂	Attainment	Attainment

Source: California Air Resources Board, compiled by Jones & Stokes, April 2008.

Heavy Duty Diesel Truck Idling Regulation

This ARB rule became effective in February 1, 2005, and it prohibits heavy-duty diesel trucks from idling for longer than 5 minutes at a time. Truck idling for longer than 5 minutes while queuing is allowed, however, provided the queue is located beyond 100 feet from any homes or schools.⁵

California Diesel Fuel Regulations

This rule sets sulfur limitations for diesel fuel sold in California for use in on-road and off-road motor vehicles.⁶ Harbor craft were originally excluded from the rule, but were later included by a 2004 rule amendment.⁷ Under this rule, diesel fuel used in motor vehicles except harbor craft has been limited to 500-ppm sulfur since 1993. The sulfur limit was reduced to 15 ppm beginning September 1, 2006. (A federal diesel rule similarly limited sulfur content nationwide for on-road vehicles to 15 ppm beginning October 15, 2006.)

Statewide Portable Equipment Registration Program (PERP)

The PERP establishes a uniform program to regulate portable engines and portable engine-driven equipment units.⁸ Once registered in the PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts. The PERP generally would apply to shore end and land-based construction equipment such as generators, compressors and power winches.

⁵ ARB. 2006. Commercial Idling Restrictions. Available: <<http://www.arb.ca.gov/toxics/idling/idling.htm>>.

⁶ ARB. 2004. California Diesel Fuel Regulations. Title 13, California Code of Regulations, Sections 2281-2285 and Title 17, California Code of Regulations, Section 93114. August 14, 2004.

⁷ ARB. 2005. Final Regulation Order. Proposed Extension of the California Standards for Motor Vehicle Diesel Fuel to Diesel Fuel Used for Intrastate Diesel-Electric Locomotives and Harbor Craft. August 4.

⁸ ARB. 2005. Regulation to Establish a Statewide Portable Equipment Registration Program. Effective September 1, 2005.

San Luis Obispo Air Pollution Control District

The San Luis Obispo County APCD (or District) is the local agency in San Luis Obispo County primarily responsible for attaining the air quality standards established by the California Air Resources Board and the U.S. Environmental Protection Agency. The APCD implements programs and regulations to control air pollution released from stationary sources within the District, as well as implementing programs to encourage alternative means of transportation. APCD has published a handbook (CEQA Air Quality Handbook, April 2003) to help local governments analyze and mitigate project-specific air quality impacts. This handbook provides standards, methodologies, and procedures for conducting air quality analyses in environmental impact reports and was used extensively in the preparation of this report. The APCD has established CEQA thresholds for the emissions of air pollutants by construction activities. The established threshold for Best Available Control Technology for construction equipment (CBACT) is 185 pounds per day of reactive organic gases (ROG) or nitrogen oxides (NO_x) or 2.5 tons of ROG or NO_x during a calendar quarter. If these thresholds are exceeded, mitigation measures, including offsets, may be required.

Through the attainment planning process, the APCD develops the *SLO County APCD Rules and Regulations* to regulate sources of air pollution in the SLO County. The APCD rules most pertinent to the proposed project are listed below. The emission sources associated with the proposed project are considered mobile sources. Therefore, they are not subject to the APCD rules that apply to stationary sources, such as Regulation VI - New Source Review and Regulation VII - New Source Review of Toxic Air Contaminants.

Existing Conditions

Local Land Use Near Construction Site

The beach manhole, the site at which the marine cable will be pulled through the existing pipe from 2,200 feet offshore, is located in the Sandspit Parking lot within Montana de Oro State Park. The parking lot is surrounded by a beach to the west and open lands to the north, south and east. The park features picnic areas and several types of campgrounds, ranging from primitive environmental campsites to family and group campgrounds. The beach manhole is located in the northern portion of the park, about 2 miles northeast of the park headquarters and main campground, as well as the nearest picnic area. The nearest campsite is the equestrian campsite located 0.5 miles to the southeast of the beach manhole. Hiking and equestrian trails originate from the Sandspit Parking Lot in which the beach manhole is located.

The nearest development to the beach manhole occurs in the town of Los Osos. From the beach manhole, it is 0.6 miles to the nearest residence, 1.1 miles to the nearest Senior housing and 1.5 miles to the nearest school/day care.

Existing Air Quality

The APCD maintains a network of air quality monitoring stations located throughout the County. The project site is located nearest to the Morro Bay permanent monitoring station. The monitoring station is located approximately five miles north of Montana de Oro State Park. Most criteria pollutants are monitored at the Long Beach Station, including O₃, NO, NO₂, NO_x, and PM₁₀. A summary of monitoring data for the last three most recent years (2004- 2006) is included in Table 4. The San Luis Obispo monitoring station is the next most proximate monitoring station, CO monitoring data from this station is included in Table 4.

Monitoring data, shown in Table 4, show the following pollutant trends: neither state nor national O₃ standards were exceeded during the 3-year period. CO and NO₂ concentrations are low, and also recorded no exceedances during the 3-year reporting period. Particulate (PM₁₀ and PM_{2.5}) concentrations are largely affected by meteorology and show some variability during the 3-year reporting period. The state 24-hour PM₁₀ standard was exceeded during one sampling event in 2006 during the Day F in the Angeles National Forest. The national PM_{2.5} standard was not exceeded during the 3-year period.

Table 4. Air Quality Data from Morro Bay Station (ARB 70072)

Pollutant Standards	2004	2005	2006
Ozone (O₃)			
<i>State standard (1-hour average = 0.09 ppm)</i>			
<i>National standard (8-hour average = 0.08 ppm)</i>			
Maximum concentration 1-hour period (ppm)	0.074	0.073	0.063
Maximum concentration 8-hour period (ppm)	ND	ND	0.056
Days state 1-hour standard exceeded	0	0	0
Days national 8-hour standard exceeded	0	0	0
Carbon Monoxide (CO)^a			
<i>State standard (8-hour average = 9 ppm)</i>			
<i>National standard (8-hour average = 9 ppm)</i>			
Maximum concentration 8-hour period (ppm)	2.6	2.6	1.1
Days state/national 8-hour standard exceeded	0	0	0
Nitrogen Dioxide (NO₂)			
<i>State standard (1-hour average = 0.18 ppm)</i>			
Maximum 1-hour concentration	0.044	0.047	0.046
Days state standard exceeded	0	0	0
Suspended Particulates (PM₁₀)			
<i>State standard (24-hour average = 50 µg/m³)</i>			
<i>National standard (24-hour average = 150 µg/m³)</i>			
Maximum 24-hour concentration	42.0	44.0	60.0
Annual arithmetic mean 24-hour concentration	18.0	16.3	16.1
Days exceeding state standard	0	0	6 ^b
Days exceeding national standard	0	0	0
Suspended Particulates (PM_{2.5})^a			
<i>National standard (24-hour average = 35 µg/m³)</i>			
Maximum 24-hour concentration	19.5	18.6	24.2
Days exceeding national standard ^a	0	0	0

Notes:

^a CO and PM_{2.5} data is from San Luis Obispo monitoring station, the next most proximate monitoring station.

^b PM₁₀ sampling occurs every 6 days, therefore a single PM₁₀ exceedence is statistically equated to 6 exceedance days.

Source: San Luis Obispo County Annual Air Quality Monitoring Reports 2004 – 2006. Available for download from <<http://www.slocleanair.org/air/annualreport.asp>>.

Significance Thresholds

Appendix G of the CEQA Guidelines presents guidance for making significance determinations. Appendix G states that a project would normally have a significant effect on the environment if it would:

- conflict with or obstruct implementation of the applicable air quality management plan;
- violate any 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 in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- expose sensitive receptors to substantial pollutant concentrations; or,
- create objectionable odors affecting a substantial number of people.

The CEQA Guidelines also state that the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the determinations above.

CEQA Construction Emission Thresholds

According to criteria set forth in the APCD CEQA Air Quality Handbook, project construction emissions could be considered significant and may require Best Available Control Technology (CBACT) and other mitigation measures, including offsets to reduce emission to avoid potential violations of State and Federal ambient air quality standards if any of the following were to occur.

- Regional emissions from both direct and indirect sources (including offsite haul trucks and worker commute vehicles) exceed any of the following APCD CBACT prescribed threshold levels:
 - 1) 185 pounds per day for reactive organic gases (ROG) or nitrogen oxides (NO_x), or
 - 2) 2.5 tons of ROG, NO_x or PM₁₀ during a calendar quarter (APCD 2003).
- Additional measures, such as offsets may also be required in addition to CBACT if any of these or the following threshold is exceeded:

- 1) 6 tons per calendar quarter of ROG or NO_x

The APCD does have the authority to require mitigation for projects that will not exceed mitigation thresholds if those projects will result in special circumstances, such as release of diesel PM emissions near a sensitive receptor.

Methodology

Construction Emissions

Tailpipe emissions were estimated based on the equipment inventory listed in Table 1. The equipment inventory and construction schedule were based on the emission source data for construction of the AT&T China-US Cable Network Project completed in 2000.

Emission factors for on-road haul trucks and worker commute vehicles were based on SCAQMD EMFAC 2007 emission factors (www.aqmd.gov/ceqa/handbook/onroad/onroad.html), assuming a 2008 construction year. Emission factors for off-road construction equipment were based on CARB's OFFROAD emission factor data, using an assumed 2008 construction year.

Uncontrolled tailpipe emission factors for diesel-powered marine tugs and support boats were developed based on USEPA's guidance document "Analysis of Commercial Marine Vessel emissions and Fuel Consumption Data (USEPA 2000)". These factors represent uncontrolled tailpipe emissions derived from the sum total of ships in operation in the year 2000. This factor provides a reasonable estimate for the emissions from the CS Global Sentinel, which is the cable lay vessel that likely will be used on this project.

Only a portion of the project activities will occur within state waters (within three nautical miles of the shore). As a result, emission calculations distinguish between activities within state waters versus activities which will occur outside state waters. SLOCAPCD emission thresholds then apply only to construction activity within state waters.

Toxic Air Contaminants Impacts during Construction

The proposed action consists of a temporary cable-laying project using diesel-powered equipment. The dominant toxic air contaminant (TAC) generated by diesel-powered construction equipment is DPM, which is a suspected carcinogen. Particulate emissions from construction equipment tailpipes were estimated using the methodology described previously. For this assessment, it was assumed that all particulate matter emitted by diesel-powered equipment is DPM.

Climate Change/Greenhouse Gas Emissions during Construction

The proposed action consists of a temporary cable laying project using diesel-powered equipment. Project-related GHG emissions were estimated by the following methods:

- The number of horsepower hours per year of construction equipment usage was estimated based on the equipment inventory listed in Table 1.
- The number of gallons of diesel fuel used to operate diesel-powered construction equipment was estimated using a factor of 0.05 gallons per horsepower-hour using USEPA's NONROAD2005 model.⁹
- The number of gallons of gasoline used by worker commute vehicles was estimated assuming an average passenger vehicle fuel economy of 20 miles per gallon.
- The following carbon dioxide emission factors for mobile source fuel combustion were used:¹⁰
 - Diesel fuel: 22.4 lbs per gallon.
 - Gasoline: 19.6 lbs per gallon.

For the GHG analysis only, emission calculations include those associated with cable laying operations beyond the continental shelf to Hawaii and for the cable landing in Hawaii. Travel Distances for each link of the route from San Luis Obispo to Hawaii are provided in table 5. The equipment used for the deep sea work and the Hawaii landing will be substantially similar to the work analyzed for the California portion of the work. The equipment would have similar basic fuel consumption characteristics. Therefore pounds of CO₂ emitted per mile for each activity or group of emission sources are assumed to be the same for the Hawaii landing. For the deep water link, it is conservatively assumed that the load factor for the cable laying vessel would be similar to the cable laying/plowing for offshore cable installation.

⁹ USEPA. 2005. User's Guide to Final NONROAD2005 Emission Model. EPA Report EPA/420-R-05-013. Last updated: December 2005. Available: <<http://www.epa.gov/otaq/nonrdmdl.htm>>. Accessed: June 2007.

¹⁰ Energy Information Agency. 2007. Voluntary Reporting of Greenhouse Gases Program, Fuel and Energy Source Codes and Emission Coefficients. Available: <<http://www.eia.gov.oiaf/1605/coefficients.html>>. Accessed: June 2007.

Table 5: Travel Distances of Links between San Luis Obispo, CA and Hawaii

Cable Project Link		Distance (km)
San Luis Obispo Cable Landing		
Terrestrial	Land based	16
	Shore End	N/A
Construction Cable Lay Vessel	Marine Support Vessels on continental shelf	96 96
	Deep Water Cable Laying	
Cable Lay Vessel		4000
Hawaii Cable Landing		
Terrestrial	Land based	1.6
	Shore End	N/A
Construction Cable Lay Vessel	Marine Support Vessels on continental shelf	36 36

Air Quality Impact Analysis

Construction Impacts

Regional Construction Emissions

Construction of the proposed project generates emissions through the use of marine vessels during placement and burial of the cable and heavy-duty construction equipment during shore end and land-based activities, through on-road haul trucks, and through vehicle trips generated from construction workers commuting to and from the project site.

Overall, construction is anticipated to occur during a single calendar quarter. In general, the total amount of construction emissions on any given day is determined by the duration and the intensity of construction activity occurring at any one time. As such, the emission forecasts provided herein reflect a specific set of conservative assumptions based on the expected construction scenario wherein the duration and number of work days projected for each activity include contingencies. The equipment usage estimate listed in Table 1 is also conservatively high. Because of these conservative assumptions, actual emissions could be less than those forecasted.

Table 6 shows estimated unmitigated daily emissions generated by each project activity. Appendix A includes emission calculation spreadsheets and emission factors used to calculate daily emissions. The maximum daily NOx emissions would occur during Near-shore Cable Installation with total combined emissions from this activity plus shore end construction and worker commuting of 2,162 pounds per day (lbs/day), which exceeds the APCD regional significance

threshold of 185 pounds per day. In addition, two other activities, Off-Shore Cable Installation and Cable Retroburial, will result in emissions in excess of the APCD significance threshold. It is important to note the proposed construction activities are of very short duration. The total duration of activities with emissions above the daily NO_x emissions significance threshold is conservatively estimated to be six days. Forecast unmitigated daily emissions of ROC, CO, PM₁₀, and SO₂ are less than the APCD thresholds. Mitigation to reduce or offset NO_x emissions is warranted based on the exceedance of the APCD threshold.

Table 6. Daily Emissions for Construction of the AT&T Gateway Cable
(Listed Items are NOT Simultaneous unless otherwise noted)

Daily Emissions	Emissions (lbs/day)				
	ROG	CO	NOx	PM10	SO2
Pipe Preparation¹					
Primary Work Boat - Dive Platform	6.3	30.9	69.7	2.0	11.8
Secondary Work Boat - Anchor Support/ Shuttle	1.8	13.5	65.6	1.7	12.7
<i>Total Activity Emissions (All w/in State Waters)</i>	<i>8.1</i>	<i>44.4</i>	<i>135.3</i>	<i>3.6</i>	<i>24.5</i>
Pre-Lay Grapple Run¹					
Vessel-of-Opportunity - Outside State Waters	7.8	44.1	124.8	3.4	22.4
Vessel-of-Opportunity - Inside State Waters	0.78	4.4	12.5	0.34	2.2
Total Activity Emissions	8.6	48.5	137.2	3.7	24.6
<i>Emissions (w/i State Waters)</i>	<i>0.78</i>	<i>4.4</i>	<i>12.5</i>	<i>0.3</i>	<i>2.2</i>
Offshore Cable Installation					
Cable Lay Vessel - Lay Cable/Plow Cable	94.0	590.3	2017.4	53.2	374.9
Cable Lay Vessel - Plow Cable/Plow Cable w/in State Waters	107.8	590.3	1601.7	43.7	284.9
Total Activity Emissions	201.8	1180.6	3619.1	96.9	659.7
<i>Emissions (w/i State Waters)</i>	<i>107.8</i>	<i>590.3</i>	<i>1601.7</i>	<i>43.7</i>	<i>284.9</i>
Near-Shore Cable Installation²					
Cable Lay Vessel - Landing	40.9	229.6	649.5	17.6	116.6
Primary Work Boat - Dive Platform	5.5	30.9	87.3	2.4	15.7
Secondary Work Boat - Anchor Support/ Shuttle	2.1	13.5	47.8	1.3	8.9
Cable Lay Vessel - Near-Shore Lay	22.2	196.8	1268.7	31.9	249.9
Secondary Work Boat - Support, Patrol & Shuttle	1.5	13.5	87.1	2.2	17.2
<i>Total Activity Emissions (All w/i State Waters)</i>	<i>72.1</i>	<i>484.2</i>	<i>2140.4</i>	<i>55.3</i>	<i>408.3</i>
Near-Shore Cable Retroburial					
Primary Work Boat - Dive Platform	5.8	30.9	80.2	2.2	14.1
Secondary Work Boat - Anchor Support/ Shuttle	2.1	13.5	47.8	1.3	8.9
<i>Total Activity Emissions (All w/i State Waters)</i>	<i>7.9</i>	<i>44.4</i>	<i>127.9</i>	<i>3.5</i>	<i>23.0</i>
Cable Retroburial					
Cable Lay Vessel - ROV	107.8	590.3	1601.7	43.7	284.9
Cable Lay Vessel - ROV w/in State Waters	80.9	442.7	1201.3	32.8	213.7
<i>Emissions (w/i State Waters)</i>	<i>80.9</i>	<i>442.7</i>	<i>1201.3</i>	<i>32.8</i>	<i>213.7</i>
Total Activity Emissions	188.7	1033.0	2803.0	76.5	498.6
Shore End Construction²					
Bore Rig	0.45	2.5	3.5	0.27	0.0036
Crane	0.35	3.0	2.0	0.056	0.0017
Backhoe	1.4	5.1	8.5	0.80	0.0064
Power Winch	0.33	0.91	3.3	0.12	0.0025
Compressor	0.18	0.47	0.44	0.044	0.0004
Generator	0.51	1.4	1.3	0.13	0.0012
Supply Truck	0.33	2.8	2.0	0.061	0.0016
<i>Total Activity Emissions (All w/i State Waters)</i>	<i>3.6</i>	<i>16.2</i>	<i>21.1</i>	<i>1.5</i>	<i>0.017</i>
Land-Based Cable Pulling for Existing Conduit					
Bobcat Skid Loader	1.4	4.9	8.1	0.76	0.0060
Cable Truck	9.3	24.7	23.1	2.3	0.021

Pick-up Truck	10.4	27.8	26.0	2.6	0.024
Generator	3.4	9.1	8.5	0.85	0.0078
<i>Total Activity Emissions (All w/i State Waters)</i>	24.5	66.5	65.7	6.5	0.058
Worker Commuting					
Worker Commute Tailpipe Emissions	0.75	6.4	0.63	0.048	
<i>Total Activity Emissions (All w/i State Waters)</i>	0.75	6.4	0.63	0.048	
Peak Daily Emissions Outside State Waters (lbs/day)	202	1181	3619	97	660
<i>Peak Daily Emissions Within State Waters (lbs/day)</i>	81	443	2162²	33	214
APCD Daily Significance Thresholds	185.0	NA	185	NA	NA

All activities are assumed to occur concurrently with the exceptions described below.

¹ The pipe preparation and pre-lay grapnel run activities would occur concurrently for up to three days. Additive daily NOx emissions for these two activities are estimated to be **148 lbs/day**, which is below the significance threshold.

² The near-shore cable installation and shore end construction activities would overlap for one day. Additive daily NOx emissions of these activities plus daily worker commuting are estimated to be **2,162 lbs/day**, which is above the significance threshold.

The proposed project is anticipated to be complete within a single calendar quarter. Table 7 shows estimated unmitigated total regional emissions generated by the project. Appendix B includes emission calculation spreadsheets and emission factors used to calculate total project emissions. Equipment included in the regional emission estimate includes marine vessels and support boats, on-land construction equipment, on-road highway trucks used to haul demolition debris to the disposal site, and worker commute vehicles. The uncontrolled emission estimates for marine vessels are based on pre-2000 emission factors and assume that none of the on-water equipment uses EPA Tier 2-compliant engines. The conservatively high estimate of total NOx emissions within state waters would be 5 tons, which exceeds the APCD regional significance threshold for total project emissions during a single calendar quarter by 2.5 tons. Forecast unmitigated total emissions of ROC, CO, PM₁₀, and SO₂ are less than the APCD CEQA thresholds.

Mitigation or offsets to reduce NOx emissions is warranted based on the exceedance of the APCD threshold.

Table 7. Total Project Emissions for Construction of the AT&T Gateway Cable

Daily Emissions	Emissions (tons)				
	VOC	CO	NO _x	PM10	SO ₂
Pipe Preparation					
Primary Work Boat - Dive Platform	0.010	0.046	0.10	0.0030	0.018
Secondary Work Boat - Anchor Support/ Shuttle	0.003	0.020	0.10	0.0025	0.019
Total Activity Emissions (All w/i State Waters)	0.012	0.067	0.20	0.0055	0.037
Pre-Lay Grapnel Run					
Vessel-of-Opportunity - Outside State Waters	0.020	0.110	0.31	0.0084	0.056
Vessel-of-Opportunity - Inside State Waters	0.0008	0.0044	0.012	0.0003	0.0022
Total Activity Emissions (w/i State Waters)	0.020	0.11	0.32	0.0088	0.058
Emissions (w/i State Waters)	0.0008	0.0044	0.012	0.0003	0.0022
Offshore Cable Installation					
Cable Lay Vessel - Lay Cable/Plow Cable	0.56	3.5	12.1	0.32	2.25
Cable Lay Vessel - Plow Cable/Plow Cable w/in State Waters	0.054	0.3	0.8	0.022	0.14
Total Activity Emissions (All outside State Waters)	0.62	3.8	12.9	0.34	2.4
Emissions (w/i State Waters)	0.054	0.30	0.80	0.022	0.14
Near-Shore Cable Installation					
Cable Lay Vessel - Landing	0.031	0.172	0.487	0.013	0.087
Primary Work Boat - Dive Platform	0.0027	0.015	0.044	0.0012	0.0078
Secondary Work Boat - Anchor Support/ Shuttle	0.0011	0.007	0.024	0.0006	0.0045
Cable Lay Vessel - Near-Shore Lay	0.022	0.197	1.27	0.032	0.250
Secondary Work Boat - Support, Patrol & Shuttle	0.0015	0.014	0.087	0.0022	0.017
Total Activity Emissions (All w/i State Waters)	0.058	0.405	1.91	0.049	0.367
Near-Shore Cable Retroburial					
Primary Work Boat - Dive Platform	0.012	0.062	0.16	0.0044	0.028
Secondary Work Boat - Anchor Support/ Shuttle	0.0042	0.027	0.10	0.0025	0.018
Total Activity Emissions (All w/i State Waters)	0.016	0.089	0.26	0.0069	0.046
Cable Retroburial					
Cable Lay Vessel - ROV	0.35	1.9	5.2	0.14	0.93
Cable Lay Vessel - ROV w/in State Waters	0.061	0.33	0.9	0.025	0.16
Emissions (w/i State Waters)	0.061	0.33	0.9	0.025	0.16
Total Activity Emissions	0.41	2.3	6.1	0.17	1.1
Shore End Construction					
Bore Rig	0.00022	0.0013	0.0018	0.00014	0.00000
Crane	0.00035	0.0030	0.0020	0.00006	0.00000
Backhoe	0.0029	0.010	0.017	0.0016	0.00001
Power Winch	0.00033	0.00091	0.0033	0.00012	0.00000
Compressor	0.00018	0.00047	0.0004	0.00004	0.00000
Generator	0.0026	0.0069	0.0064	0.00064	0.00001
Supply Truck	0.0017	0.014	0.0098	0.00030	0.00001
Total Activity Emissions (All w/i State Waters)	0.0082	0.037	0.041	0.0029	0.00003
Land-Based Cable Pulling for Existing Conduit					
Bobcat Skid Loader	0.02	0.06	0.10	0.010	0.00008
Cable Truck	0.12	0.31	0.29	0.029	0.00026

Pick-up Truck	0.13	0.35	0.32	0.032	0.00030
Generator	0.04	0.11	0.11	0.011	0.00010
Total Activity Emissions (All w/i State Waters)	0.31	0.83	0.82	0.081	0.00073
Worker Commuting					
Worker Commute Tailpipe Emissions	0.03	0.26	0.025	0.0019	
Total Activity Emissions (All w/i State Waters)	0.03	0.26	0.025	0.0019	
Total Project Emissions	1.5	7.9	22.6	0.7	4.0
Total Project Emissions (w/i State Waters)	0.55	2.32	4.97	0.19	0.76
APCD Significance Thresholds (per calendar quarter)	2.5	NA	2.5	2.5	NA

Local Construction Ambient Concentration Impacts

Most of the construction emissions listed in Table 6 and Table 7 would be generated by marine vessels operating off-shore, usually far from the nearest populated areas on the beach. Given the fact that the emissions would be generated for only a few days and given the fact that weather conditions at the beach are usually windy with good pollutant dispersion, it is reasonable to assume localized air pollutant concentrations caused by the temporary emissions would be unlikely to approach ambient air quality standards. Therefore, the ambient air quality impacts would be less than significant.

Climate Change/Greenhouse Gas Emissions

Because the emission sources associated with the proposed project are internal combustion engines, the predominant GHG emitted by the project would be carbon dioxide (CO₂). As a result, GHG emissions for this project are calculated based on estimated fuel usage. The GHG emissions listed in Table 8 would occur only during the brief construction period. Emission calculations are included in Appendix C. The proposed project would not include any operational emissions.

Because quantitative GHG guidelines including thresholds have not been developed by the APCD, these emissions are provided for information purposes only. According to a recent white paper by the Association of Environmental Professionals, “an individual project does not generate enough GHG emissions to significantly influence global climate change. Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHG emissions.” The temporary GHG emissions generated by the proposed construction project would be an inconsequentially small fraction of the worldwide GHG emissions during the brief construction period. Therefore, project-related impacts are expected to be less than significant because climate change would not occur directly from project emissions.

Table 8. Estimate of Regional Operational Greenhouse Gas Emissions (Tons, total project)

Project Component		Project Total Gallons of Fuel	Project Total CO ₂ Emissions (Tons)
San Luis Obispo Cable Landing			
Terrestrial	Land based	6,957.5	77.9
	Shore End	312.6	3.5
Construction	Marine Support Vessels	4,869.3	54.5
Cable Lay Vessel	on continental shelf	109,001.0	1,219.9
Deep Water Cable Laying			
Cable Lay Vessel		178,500.0	1,997.8
Hawaii Cable Landing			
Terrestrial	Land based	434.8	7.8
	Shore End	312.6	3.5
Construction	Marine Support Vessels	1,826.0	20.4
Cable Lay Vessel	on continental shelf	40,875.4	4,57.5
Total Project		342,776.6	3,842.8
SCAQMD Significance Threshold			No current threshold
Exceed Significance Threshold?			NA

Objectionable Odors

Operation of the proposed project would slightly and temporarily increase ambient air pollutant concentrations due to the combustion of diesel fuel. Some individuals may feel that diesel combustion emissions are objectionable, although quantifying the odorous impacts of these emissions to the public is difficult. The mobile nature of most project emission sources would help disperse proposed project emissions. Additionally, the distance between proposed project emission sources and the nearest residents is expected to be far enough to allow for adequate dispersion of these emissions to below objectionable odor levels. Therefore, this impact would be less than significant.

Cumulative Impacts

Cumulative impacts to air quality could occur as a result of air pollutant emissions from mobile, area, and stationary sources attributed to the proposed project's temporary construction emissions in combination with other cumulative projects throughout the Basin. However, cumulative thresholds for air quality are the same as those used when considering a project-specific air quality impact because the thresholds are related to a project's contribution to the regional air quality baseline. If a project would result in exceedances of daily regional emission limits, then it can be considered to contribute to cumulatively considerable air quality impacts.

The proposed mitigation measures would offset temporary construction emissions whose daily and quarterly emission rates exceed the SLOCAPCD CEQA thresholds. Therefore, the cumulative air quality impacts would be less than significant after mitigation.

Mitigation Measures

Mitigation measures proposed by the project proponent are proposed to reduce or offset NO_x emissions from cable laying activities.

On-Shore Construction Equipment and Trucks

- Maintain equipment and vehicle engines in good condition and in proper tune as per manufacturers' specifications.
- Prohibit heavy-duty construction vehicles from idling at any given location for longer than 5 minutes, both on and off site, to be consistent with state law.
- Reroute construction trucks away from congested streets.

Harbor craft for temporary cable laying activities

As listed in Table 6 and Table 7 most of the NO_x emissions would be generated by the cable lay vessel, which is a special ship that would be brought to the region only for the immediate duration of the construction project. A minor fraction of the emissions would be generated by local "vessels of opportunity" used as support boats. Only a very small fraction of the overall NO_x emissions would be generated by on-land, non-road equipment and on-road commute vehicles and delivery trucks.

AT&T will focus the mitigation on the cable lay vessel. There is no practical way to reduce NO_x emission rates from the cable lay vessel or the "vessels of

opportunity” for a short-duration construction project. Therefore, AT&T proposes to mitigate NO_x emissions exceeding CEQA thresholds by offsetting the actual uncontrolled emissions, rather than attempting to reduce uncontrolled emission rates. AT&T proposes the following mitigation measures.

The assumed marine vessel usage rates listed in Table 1 are conservatively high, and likely result in a considerable over-estimate of the actual NO_x emission rates. The cable lay vessel is by far the major emission source on the days when daily NO_x emissions exceed CEQA thresholds. Therefore, AT&T will track the actual fuel consumption for the cable lay vessel on days when that vessel operates within state waters. Engine usage for the cable lay vessel (expressed as brake hp-hours per day) will be derived from the recorded fuel usage using a brake-specific fuel consumption factor of 0.053 gallons per hp-hour (based on the similar factor used by the EPA NONROAD emission model).

Based on the recorded cable lay vessel engine usage, AT&T will submit a progress report to SLOAPCD specifying the actual NO_x emissions by the cable lay vessel and all other support equipment, for each day the cable lay vessel operates within state waters. Emission calculation spreadsheets similar to those shown in Appendix A will be used to calculate the actual emissions. Based on that progress report, AT&T will document the actual tons of NO_x emissions exceeding the CEQA thresholds.

AT&T will offset the actual NO_x exceedances by either of two optional methods: monetary offset payments, or funding replacement of a local diesel engine. If AT&T elects to use a monetary offset payment, it will pay SLOCAPCD \$16,000 per ton of actual NO_x emissions exceeding the CEQA threshold.

If AT&T elects to fund replacement of an existing marine engine, they will locate a marine vessel within the County that currently uses an old, high-emission diesel engine. AT&T will notify SLOCAPCA of the engine to be replaced, and document the size and forecast annual usage for the replacement engine. The new replacement engine shall be certified as EPA Tier 3 or better.

The emission offsets provided by either of the two optional methods will reduce the NO_x emission impacts during construction to less than significant after mitigation.

Bibliography

Printed References

- California Air Resources Board (ARB). 2007. Proposed Early Actions to Mitigate Climate Change in California. April 20.
- . 2006a. Combined California ARB and U.S. EPA standards for off-road compression ignition engines. Available: <http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road%20Diesel%20Stds.xls>.
- . 2006b. Commercial Idling Restrictions. Available: <http://www.arb.ca.gov/toxics/idling/idling.htm>.
- . 2006d. Off-Road Emissions Inventory Program. OFFROAD2007. Available: <http://www.arb.ca.gov/msei/offroad/offroad.htm>.
- . 2006e. EMFAC2007 Release. Available: http://www.arb.ca.gov/msei/onroad/latest_version.htm.
- . 2006f. Air Quality Data Statistics. Available: <http://www.arb.ca.gov/adam/welcome.html>.
- . 2006g. Health Effects of Diesel Exhaust Particulate Matter. March.
- . 2006h. OFFROAD2007 Emissions Model. Available: <http://www.arb.ca.gov/msei/msei.htm>.
- . 2005b. Final Regulation Order. Proposed Extension of the California Standards for Motor Vehicle Diesel Fuel to Diesel Fuel Used for Intrastate Diesel-Electric Locomotives and Harbor Craft. August 4.
- . 2005c. Regulation to Establish a Statewide Portable Equipment Registration Program. Effective September 1, 2005.
- . 2004a. California Diesel Fuel Regulations. Title 13, California Code of Regulations, Sections 2281-2285 and Title 17, California Code of Regulations, Section 93114. August 14, 2004.
- . 2004c. Staff Report: Airborne Toxic Control Measure for Diesel-Fueled Portable Engines. Available: <http://www.arb.ca.gov/regact/porteng/isor.pdf>.
- . 2004d. Staff Report: Proposed Regulatory Amendments Extending the California Standards for Motor Vehicle Diesel Fuel to Diesel Fuel Used in

Harborcraft and Intrastate Locomotives. Available:
<<http://www.arb.ca.gov/regact/carblohc/isor.pdf>>.

———. 2002. EMFAC2007 On-road Mobile Source Emissions Estimation Model. Available: <http://www.arb.ca.gov/msei/on-road/latest_version.htm>.

California Climate Action Registry (CCAR), 2007. *California Climate Action Registry General Reporting Protocol*. Version 2.2. March.

California Environmental Protection Agency (CalEPA). 2006. Climate Action Team Report to Governor Schwarzenegger and the California Legislature. Available:
<http://www.climatechange.ca.gov/climate_action_team/reports/index.html>. March.

Energy Information Agency. 2007. Voluntary Reporting of Greenhouse Gases Program, Fuel and Energy Source Codes and Emission Coefficients. Available: <<http://www.eia.gov/oiaf/1605/coefficients.html>>. Accessed: June 2007.

U.S. Environmental Protection Agency (USEPA). 2006. AirData. Available: <<http://www.epa.gov/aqspubl1/>>.

———. 2005. User's Guide to Final NONROAD2005 Emission Model. EPA Report EPA/420-R-05-013. Last updated: December 2005. Available: <<http://www.epa.gov/otaq/nonrdmdl.htm>>. Accessed: June 2007.

———. 2004. Regulatory Announcement - Clean Air Nonroad Diesel Rule. EPA420-F-04-032. May 2004.

———. 2003. Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines. EPA420-R-03-008. Washington, D.C.

———. 2000a. Regulatory Announcement - Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements. EPA420-F-00-057. December 2000.

———. 2000b. Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data. EPA Report 4-20-R-08-002. February 2000.

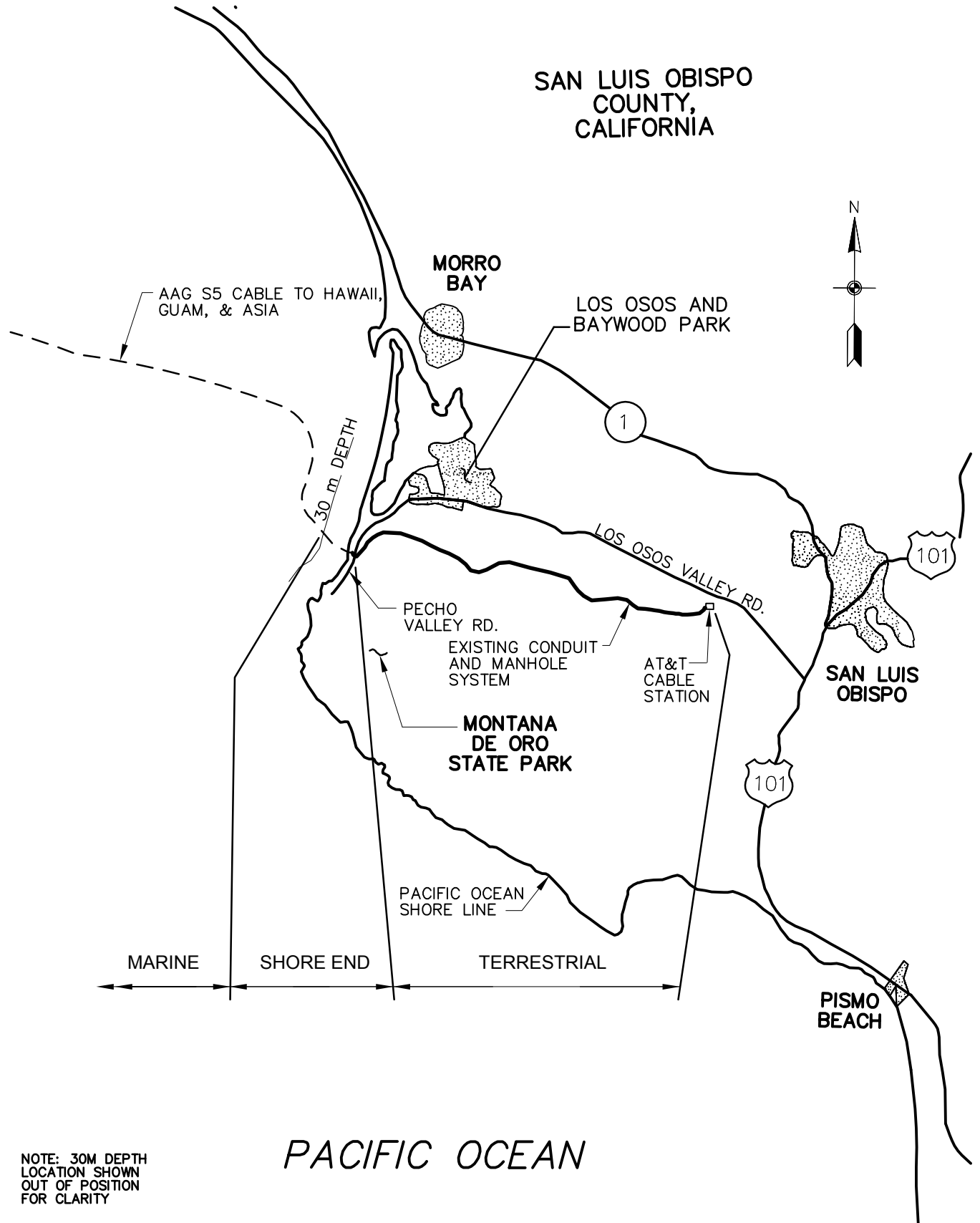
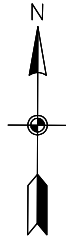
———. 1999. Control of Emissions of Air Pollution From New Marine Compression-Ignition Engines at or Above 37 kW; Final Rule. *Federal Register* 64(249):73,300--73,373.

———. 1995. Compilation of Air Pollutant Emission Factors, AP-42, Volume I. Section 13.2.3, Heavy Construction Operations. Available: <<http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s02-3.pdf>>.

Western Regional Climate Center. 2007. Los Angeles Area, California Climate Summaries. Long Beach, California (045082). Available: <<http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca5082>>. Accessed: October 10, 2007.

Figures

SAN LUIS OBISPO COUNTY,
CALIFORNIA



AAG S5 CABLE TO HAWAII,
GUAM, & ASIA

MORRO
BAY

LOS OSOS AND
BAYWOOD PARK

30 m. DEPTH

LOS OSOS VALLEY RD.

PECHO
VALLEY RD.

EXISTING CONDUIT
AND MANHOLE
SYSTEM

AT&T
CABLE
STATION

SAN LUIS
OBISPO

MONTANA
DE ORO
STATE PARK

PACIFIC OCEAN
SHORE LINE

MARINE

SHORE END

TERRESTRIAL

PISMO
BEACH

PACIFIC OCEAN

NOTE: 30M DEPTH
LOCATION SHOWN
OUT OF POSITION
FOR CLARITY



ASIA AMERICA GATEWAY
CABLE NETWORK
SAN LUIS OBISPO LANDING
VICINITY MAP



DATE: 5/25/07

SCALE: 1: 200,000

DWG. NO. FIGURE 1

Appendix A

Daily Emission Calculation Worksheets

Table 1a. Daily Emissions for Construction of the AT&T Gateway Cable (Listed Items are NOT Simultaneous)

(Yellow-highlighted items are within State Waters)

Daily Emissions	Emissions (lbs/day)				
	VOC	CO	NOx	PM10	SO2
Pipe Preparation					
Primary Work Boat - Dive Platform	6.3	30.9	69.7	2.0	11.8
Secondary Work Boat - Anchor Support/ Shuttle	1.8	13.5	65.6	1.7	12.7
Total Activity Emissions (All w/in State Waters)	8.1	44.4	135.3	3.6	24.5
Pre-Lay Grapnel Run					
Vessel-of-Opportunity - Outside State Waters	7.8	44.1	124.8	3.4	22.4
Vessel-of-Opportunity - Inside State Waters	0.78	4.4	12.5	0.34	2.2
Total Activity Emissions	8.6	48.5	137.2	3.7	24.6
Emissions (w/i State Waters)	0.78	4.4	12.5	0.3	2.2
Offshore Cable Installation					
Cable Lay Vessel - Lay Cable/Plow Cable	94.0	590.3	2017.4	53.2	374.9
Cable Lay Vessel - Plow Cable/Plow Cable w/in State Waters	107.8	590.3	1601.7	43.7	284.9
Total Activity Emissions	201.8	1180.6	3619.1	96.9	659.7
Emissions (w/i State Waters)	107.8	590.3	1601.7	43.7	284.9
Near-Shore Cable Installation					
Cable Lay Vessel - Landing	40.9	229.6	649.5	17.6	116.6
Primary Work Boat - Dive Platform	5.5	30.9	87.3	2.4	15.7
Secondary Work Boat - Anchor Support/ Shuttle	2.1	13.5	47.8	1.3	8.9
Cable Lay Vessel - Near-Shore Lay	22.2	196.8	1268.7	31.9	249.9
Secondary Work Boat - Support, Patrol & Shuttle	1.5	13.5	87.1	2.2	17.2
Total Activity Emissions (All w/i State Waters)	72.1	484.2	2140.4	55.3	408.3
Near-Shore Cable Retroburial					
Primary Work Boat - Dive Platform	11.6	61.7	160.4	4.4	28.2
Secondary Work Boat - Anchor Support/ Shuttle	4.2	27.0	95.5	2.5	17.8
Total Activity Emissions (All w/i State Waters)	15.8	88.7	255.9	6.9	46.1
Cable Retroburial					
Cable Lay Vessel - ROV	107.8	590.3	1601.7	43.7	284.9
Cable Lay Vessel - ROV w/in State Waters	80.9	442.7	1201.3	32.8	213.7
Emissions (w/i State Waters)	80.9	442.7	1201.3	32.8	213.7
Total Activity Emissions	188.7	1033.0	2803.0	76.5	498.6
Shore End Construction					
Bore Rig	0.45	2.5	3.5	0.27	0.0036
Crane	0.35	3.0	2.0	0.056	0.0017
Backhoe	1.4	5.1	8.5	0.80	0.0064
Power Winch	0.33	0.91	3.3	0.12	0.0025
Compressor	0.18	0.47	0.44	0.044	0.0004
Generator	0.51	1.4	1.3	0.13	0.0012
Supply Truck	0.33	2.8	2.0	0.061	0.0016
Total Activity Emissions (All w/i State Waters)	3.6	16.2	21.1	1.5	0.017
Land-Based Cable Pulling for Existing Conduit					
Bobcat Skid Loader	1.4	4.9	8.1	0.76	0.0060
Cable Truck	9.3	24.7	23.1	2.3	0.021
Pick-up Truck	10.4	27.8	26.0	2.6	0.024
Generator	3.4	9.1	8.5	0.85	0.0078
Total Activity Emissions (All w/i State Waters)	24.5	66.5	65.7	6.5	0.058
Worker Commuting					
Worker Commute Tailpipe Emissions	0.75	6.4	0.63	0.048	
Total Activity Emissions (All w/i State Waters)	0.75	6.4	0.63	0.048	
Peak Daily Emissions Outside State Waters (lbs/day)	202	1181	3619	97	660
Peak Daily Emissions Within State Waters (lbs/day)	81	443	2140	33	214
APCD Daily Significance Thresholds	185.0	NA	185	NA	NA

Table 1b. AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines DAILY

In-Water Dredging Exhaust Emission Factors (OFFROAD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type		Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)				Total HP	HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
							VOC	CO	NOx	PM10					
Pipe Preparation															
Primary Work Boat - Dive Platform	==>	2	14	1	800	0.15	0.86	4.17	9.41	0.266	1600	3360	168	5000	11.760
Secondary Work Boat - Anchor Support/ Shuttle	==>	2	14	1	350	0.37	0.22	1.69	8.21	0.21	700	3626	181	5000	12.691
Pre-Lay Grapnel Run															
Vessel-of-Opportunity - Outside State Waters	==>	2	20	1	800	0.2	0.56	3.12	8.84	0.24	1600	6400	320	5000	22.400
Vessel-of-Opportunity - Inside State Waters	==>	2	2	1	800	0.2	0.56	3.12	8.84	0.24	1600	640	32	5000	2.240
Offshore Cable Installation															
Cable Lay Vessel - Lay Cable/Plow Cable	==>	3	24	1	5950	0.25	0.40	2	9	0.23	17850	107100	5355	5000	374.850
Cable Lay Vessel - Plow Cable/Plow Cable w/in State Water	==>	3	24	1	5950	0.19	0.60	3.29	8.93	0.24	17850	81396	4070	5000	284.886
Near-Shore Cable Installation															
Cable Lay Vessel - Landing	==>	2	14	1	5950	0.2	0.56	3.12	8.84	0.24	11900	33320	1666	5000	116.620
Primary Work Boat - Dive Platform	==>	2	14	1	800	0.2	0.56	3.12	8.84	0.24	1600	4480	224	5000	15.680
Secondary Work Boat - Anchor Support/ Shuttle	==>	2	14	1	350	0.26	0.38	2.40	8.50	0.22	700	2548	127	5000	8.918
Cable Lay Vessel - Near-Shore Lay	==>	2	12	1	5950	0.5	0.14	1.25	8.06	0.20	11900	71400	3570	5000	249.900
Secondary Work Boat - Support, Patrol & Shuttle	==>	2	14	1	350	0.5	0.14	1.25	8.06	0.20	700	4900	245	5000	17.150
Near-Shore Cable Retroburial															
Primary Work Boat - Dive Platform	==>	2	14	1	800	0.18	0.65	3	9	0.25	1600	4032	202	5000	14.112
Secondary Work Boat - Anchor Support/ Shuttle	==>	2	14	1	350	0.26	0.38	2	9	0.22	700	2548	127	5000	8.918
Cable Retroburial															
Cable Lay Vessel - ROV	==>	3	24	1	5950	0.19	0.60	3.29	8.93	0.24	17850	81396	4070	5000	284.886
Cable Lay Vessel - ROV w/in State Waters	==>	3	18	1	5950	0.19	0.60	3.29	8.93	0.24	17850	61047	3052	5000	213.665
Shore End Construction															
Bore Rig	==>	1	6	1	115	0.5	0.59	3.33	4.66	0.36	115	345	17	15	0.004
Crane	==>	1	2	1	250	0.32	1.00	9	6	0.16	250	160	8	15	0.002
Backhoe	==>	1	8	1	105	0.72	1.08	4	6	0.60	105	605	30	15	0.006
Power Winch	==>	1	6	1	100	0.4	0.62	2	6	0.24	100	240	12	15	0.003
Compressor	==>	1	2	1	40	0.48	2.10	6	5	0.52	40	38	2	15	0.000
Generator	==>	1	3	1	50	0.74	2.10	6	5	0.52	50	111	6	15	0.001
Supply Truck	==>	2	1	1	250	0.3	1.00	8.50	5.91	0.18	500	150	8	15	0.002
Land-Based Cable Pulling for Existing Conduit															
Bobcat Skid Loader	==>	1	10	1	80	0.72	1.08	4	6	0.60	80	576	29	15	0.006
Cable Truck	==>	2	10	1	200	0.5	2.10	6	5	0.52	400	2000	100	15	0.021
Pick-up Truck	==>	3	10	1	150	0.5	2.10	6	5	0.52	450	2250	113	15	0.024
Generator	==>	2	10	1	50	0.74	2.10	6	5	0.52	100	740	37	15	0.008
		50	Total Equip		108190	Total HP	0.89					475408	23770		1638.7513

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AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD DAILY

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs		0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet		0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Pipe Preparation Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type		Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)				Total HP
							VOC	CO	NOx	PM10	
Pipe Preparation											
Primary Work Boat - Dive Platform	==>	2	14	1	800	0.15	0.86	4.17	9.41	0.266	1600
Secondary Work Boat - Anchor Support/ Shuttle	==>	2	14	1	350	0.37	0.22	1.69	8.21	0.21	700
		4	Total Equip		2300	Total HP	0.54				

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
3360	168	5000	11.760
3626	181	5000	12.691
6986	349		24.4510

AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD Efs)

Daily Emissions	Emissions (lbs/day)				
	VOC	CO	NOx	PM10	SO2
Pipe Preparation					
Primary Work Boat - Dive Platform	6.3	30.9	69.7	2.0	11.8
Secondary Work Boat - Anchor Support/ Shuttle	1.8	13.5	65.6	1.7	12.7
Total Activity Emissions (All w/in State Waters)	8.1	44.4	135.3	3.6	24.5
Total Daily Emissions (lbs/day)	8.1	44.4	135.3	3.6	24.5

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AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD DAILY

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs		0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet		0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Pre-Lay Grapnel Run Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type		Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)				Total HP
							VOC	CO	NOx	PM10	
Pre-Lay Grapnel Run											
Vessel-of-Opportunity - Outside State Waters	==>	2	20	1	800	0.2	0.56	3.12	8.84	0.24	1600
Vessel-of-Opportunity - Inside State Waters	==>	2	2	1	800	0.2	0.56	3.12	8.84	0.24	1600
		4	Total Equip		3200	Total HP	0.56				

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
6400	320	5000	22.400
640	32	5000	2.240
7040	352		24.6400

AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD EFs)

Daily Emissions	Emissions (lbs/day)				
	VOC	CO	NOx	PM10	SO2
Pre-Lay Grapnel Run					
Vessel-of-Opportunity - Outside State Waters	7.8	44.1	124.8	3.4	22.4
Vessel-of-Opportunity - Inside State Waters	0.78	4.4	12.5	0.34	2.2
Total Activity Emissions	8.6	48.5	137.2	3.7	24.6
Emissions (w/ State Waters)	0.78	4.4	12.5	0.34	2.2
Total Daily Emissions (lbs/day)	8.6	48.5	137.2	3.7	24.6

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AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD DAILY

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs		0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet		0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Offshore Cable Installation Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type	Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)					Total HP
						VOC	CO	NOx	PM10		
Offshore Cable Installation											
Cable Lay Vessel - Lay Cable/Plow Cable	3	24	1	5950	0.25	0.40	2	9	0.23		17850
Cable Lay Vessel - Plow Cable/Plow Cable w/in State Water	3	24	1	5950	0.19	0.60	3.29	8.93	0.24		17850
	6	Total Equip		35700	Total HP	0.64					

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
107100	5355	5000	374.850
81396	4070	5000	284.886
188496	9425		659.7360

AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD EFs)

Daily Emissions	Emissions (lbs/day)				
	VOC	CO	NOx	PM10	SO2
Offshore Cable Installation					
Cable Lay Vessel - Lay Cable/Plow Cable	94.0	590.3	2017	53.2	374.9
Cable Lay Vessel - Plow Cable/Plow Cable w/in State Water	107.8	590.3	1602	43.7	284.9
Total Activity Emissions	201.8	1180.6	3619.1	96.9	659.7
Emissions (w/i State Waters)	107.8	590.3	1602	43.7	284.9
Total Daily Emissions (lbs/day)	201.8	1180.6	3619.1	96.9	659.7

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AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD DAILY

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs		0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet		0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Near-Shore Cable Installation Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type	Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)					Total HP
						VOC	CO	NOx	PM10		
Near-Shore Cable Installation											
Cable Lay Vessel - Landing	2	14	1	5950	0.2	0.56	3.12	8.84	0.24	11900	
Primary Work Boat - Dive Platform	2	14	1	800	0.2	0.56	3.12	8.84	0.24	1600	
Secondary Work Boat - Anchor Support/ Shuttle	2	14	1	350	0.26	0.38	2.40	8.50	0.22	700	
Cable Lay Vessel - Near-Shore Lay	2	12	1	5950	0.5	0.14	1.25	8.06	0.20	11900	
Secondary Work Boat - Support, Patrol & Shuttle	2	14	1	350	0.5	0.14	1.25	8.06	0.20	700	
	10	Total Equip		26800	Total HP	0.35					

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
33320	1666	5000	116.620
4480	224	5000	15.680
2548	127	5000	8.918
71400	3570	5000	249.900
4900	245	5000	17.150
116648	5832		408.2680

AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD EFs)

Daily Emissions	Emissions (lbs/day)				
	VOC	CO	NOx	PM10	SO2
Near-Shore Cable Installation					
Vessel-of-Opportunity - Landing	40.9	229.6	649.5	17.6	116.6
Primary Work Boat - Dive Platform	5.5	30.9	87.3	2.4	15.7
Secondary Work Boat - Anchor Support/ Shuttle	2.1	13.5	47.8	1.3	8.9
Vessel-of-Opportunity - Near-Shore Lay	22.2	196.8	1268.7	31.9	249.9
Secondary Work Boat - Support, Patrol & Shuttle	1.5	13.5	87.1	2.2	17.2
Total Activity Emissions (All w/ State Waters)	72.1	484.2	2140.4	55.3	408.3
Total Daily Emissions (lbs/day)	72.1	484.2	2140.4	55.3	408.3

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AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD DAILY

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs		0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet		0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Near-Shore Cable Retroburial Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type		Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)				Total HP
							VOC	CO	NOx	PM10	
Near-Shore Cable Retroburial											
Primary Work Boat - Dive Platform	==>	2	14	2	800	0.18	0.65	3	9	0.25	1600
Secondary Work Boat - Anchor Support/ Shuttle	==>	2	14	2	350	0.26	0.38	2	9	0.22	700
		4	Total Equip		2300	Total HP	0.51				

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
8064	403	5000	28.224
5096	255	5000	17.836
13160	658		46.0600

AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD EFs)

Daily Emissions	Emissions (lbs/day)				
	VOC	CO	NOx	PM10	SO2
Near-Shore Cable Retroburial					
Primary Work Boat - Dive Platform	11.6	61.7	160	4.4	28.2
Secondary Work Boat - Anchor Support/ Shuttle	4.2	27.0	96	2.5	17.8
Total Activity Emissions (All w/ State Waters)	15.8	88.7	256	6.9	46.1
Total Daily Emissions (lbs/day)	15.8	88.7	256	6.9	46.1

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AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD DAILY

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs		0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet		0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Cable Retroburial Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type		Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)				Total HP
							VOC	CO	NOx	PM10	
Cable Retroburial											
Cable Lay Vessel - ROV	==>	3	24	1	5950	0.19	0.60	3.29	8.93	0.24	17850
Cable Lay Vessel - ROV w/in State Waters	==>	3	18	1	5950	0.19	0.60	3.29	8.93	0.24	17850
		6	Total Equip		35700	Total HP	0.64				

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
81396	4070	5000	284.886
61047	3052	5000	213.665
142443	7122		498.5505

AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD Efs)

Daily Emissions	Emissions (lbs/day)				
	VOC	CO	NOx	PM10	SO2
Cable Retroburial					
Cable Lay Vessel - ROV	107.8	590.3	1601.7	43.7	284.9
Cable Lay Vessel - ROV w/in State Waters	80.9	442.7	1201.3	32.8	213.7
Emissions (w/in State Waters)	80.9	442.7	1201.3	32.8	213.7
Total Activity Emissions	188.7	1033.0	2803.0	76.5	498.6
Total Daily Emissions (lbs/day)	188.7	1033.0	2803.0	76.5	498.6

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AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD DAILY

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs	==>	0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet	==>	0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Shore End Construction Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type	Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)				Total HP
						VOC	CO	NOx	PM10	
Shore End Construction										
Bore Rig	1	6	1	115	0.5	0.59	3.33	4.66	0.36	115
Crane	1	2	1	250	0.32	1.00	9	6	0.16	250
Backhoe	1	8	1	105	0.72	1.08	4	6	0.60	105
Power Winch	1	6	1	100	0.4	0.62	2	6	0.24	100
Compressor	1	2	1	40	0.48	2.10	6	5	0.52	40
Generator	1	3	1	50	0.74	2.10	6	5	0.52	50
Supply Truck	2	1	1	250	0.3	1.00	8.50	5.91	0.18	500
	8	Total Equip		1160	Total HP	0.64				

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
345	17	15	0.004
160	8	15	0.002
605	30	15	0.006
240	12	15	0.003
38	2	15	0.000
111	6	15	0.001
150	8	15	0.002
1649	82		0.0173

AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD EFs)

Worker Commute Tailpipe Emissions

Miles/round trip	==>	50			
trips/day	==>	11			
Number of Light Duty Trucks	==>	1			
Number of Days	==>	1			
		ROG	CO	NOx	PM10
EMFAC EFs (grams/mile)		0.49	4.8	0.499	0.039
Start Emission Rate (grams/trip)		1.8	22.88	0.84	0.02
Hot Soak (grams/trip)		0.22			
Evaporative Running Loss (grams/mile)		0.09			

Daily Emissions	Emissions (lbs/day)				
	VOC	CO	NOx	PM10	SO2
Shore End Construction					
Bore Rig	0.4	2.5	4	0.3	0.004
Crane	0.4	3.0	2	0.1	0.002
Backhoe	1.4	5.1	9	0.8	0.006
Power Winch	0.3	0.9	3	0.1	0.003
Compressor	0.2	0.5	0	0.0	0.000
Generator	0.5	1.4	1	0.1	0.001
Supply Truck	0.3	2.8	2	0.1	0.002
Total Activity Emissions (All w/i State Waters)	3.6	16.2	21.1	1.5	0.017
Worker Commute Tailpipe Emissions	0.75	6.4	0.63	0.048	
Total Daily Emissions (lbs/day)	3.6	16.2	21.1	1.5	0.02

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AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD DAILY

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs	==>	0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet	==>	0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Land-Based Cable Pull Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type		Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)				Total HP
							VOC	CO	NOx	PM10	
Land-Based Cable Pulling for Existing Conduit											
Bobcat Skid Loader	==>	1	10	1	80	0.72	1.08	4	6	0.60	80
Cable Truck	==>	2	10	1	200	0.5	2.10	6	5	0.52	400
Pick-up Truck	==>	3	10	1	150	0.5	2.10	6	5	0.52	450
Generator	==>	2	10	1	50	0.74	2.10	6	5	0.52	100
		8	Total Equip		1030	Total HP	0.68				

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
576	29	15	0.006
2000	100	15	0.021
2250	113	15	0.024
740	37	15	0.008
5566	278		0.0584

AT&T Pacific Gateway Project; Marine Vessels Max-Daily Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD EFs)

Daily Emissions	Emissions (lbs/day)				
	VOC	CO	NOx	PM10	SO2
Land-Based Cable Pulling for Existing Conduit					
Bobcat Skid Loader	1.4	4.9	8	0.8	0.006
Cable Truck	9.3	24.7	23	2.3	0.021
Pick-up Truck	10.4	27.8	26	2.6	0.024
Generator	3.4	9.1	9	0.9	0.008
Total Activity Emissions (All w/i State Waters)	24.5	66.5	65.7	6.5	0.058
Total Daily Emissions (lbs/day)	24.5	66.5	66	6.5	0.058

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Equipment Type	2004 Emission Rate (gm/bhp-hr) JMW			
	ROG	CO	NOx	PM10
Bore/Drill Rigs	1.04	8.84	7.18	0.17
Concrete/Industrial Saws	1.00	6.57	8.74	0.42
Cranes	1.00	8.50	6.41	0.29
Crawler Tractors	1.00	6.57	8.73	0.42
Crushing/Proc. Equipment	1.00	6.57	8.74	0.42
Excavators	1.00	8.50	6.27	0.26
Graders	1.00	8.06	6.94	0.32
Off-Highway Tractors	1.00	6.57	8.74	0.42
Off-Highway Trucks	1.00	8.06	6.94	0.32
Other Construction Equipment	1.00	6.57	8.74	0.42
Pavers	1.00	8.50	6.35	0.28
Paving Equipment	1.00	6.57	8.74	0.42
Rollers	1.00	8.50	6.35	0.28
Rough Terrain Forklifts	1.00	8.49	6.35	0.28
Rubber Tired Dozers	1.00	6.57	8.74	0.42
Rubber Tired Loaders	1.00	8.52	6.36	0.28
Scrapers	1.00	7.40	7.74	0.37
Signal Boards	1.00	6.57	8.74	0.42
Skid Steer Loaders	1.00	8.50	6.03	0.21
Surfacing Equipment	1.00	6.57	8.74	0.42
Tractors/Loaders/Backhoes	1.00	6.57	8.74	0.41
Trenchers	1.00	8.50	6.27	0.26

Equipment Type	2005 Emission Rate (gm/bhp-hr) jmw			
	ROG	CO	NOx	PM10
Bore/Drill Rigs	1.00	6.57	5.34	0.13
Concrete/Industrial Saws	1.00	6.84	8.37	0.40
Cranes	1.00	8.50	6.29	0.26
Crawler Tractors	1.00	6.85	8.37	0.39
Crushing/Proc. Equipment	1.00	6.85	8.37	0.40
Excavators	1.00	8.50	6.11	0.23
Graders	1.00	8.50	6.35	0.28
Off-Highway Tractors	1.00	6.84	8.37	0.40
Off-Highway Trucks	1.00	8.50	6.35	0.28
Other Construction Equipment	1.00	6.84	8.37	0.39
Pavers	1.00	8.50	6.22	0.25
Paving Equipment	1.00	6.84	8.37	0.40
Rollers	1.00	8.50	6.21	0.25
Rough Terrain Forklifts	1.00	8.49	6.21	0.25
Rubber Tired Dozers	1.00	6.85	8.37	0.40
Rubber Tired Loaders	1.00	8.52	6.23	0.25
Scrapers	1.00	7.76	7.25	0.33
Signal Boards	1.00	6.84	8.37	0.40
Skid Steer Loaders	1.00	8.50	5.79	0.16
Surfacing Equipment	1.00	6.85	8.37	0.39
Tractors/Loaders/Backhoes	1.00	6.85	8.37	0.40
Trenchers	1.00	8.50	6.12	0.23

Equipment Type	2007 Emission Rate (gm/bhp-hr) jmw corrected			
	ROG	CO	NOx	PM10
Bore/Drill Rigs	1.00	4.65	5.20	0.09
Concrete/Industrial Saws	1.00	7.40	7.62	0.34
Cranes	1.00	8.50	6.04	0.21
Crawler Tractors	1.00	7.40	7.63	0.34
Crushing/Proc. Equipment	1.00	7.40	7.63	0.34
Excavators	1.00	8.50	5.80	0.16
Graders	1.00	8.50	6.13	0.23
Off-Highway Tractors	1.00	7.40	7.62	0.34
Off-Highway Trucks	1.00	8.50	6.13	0.23
Other Construction Equipment	1.00	7.40	7.63	0.34
Pavers	1.00	8.50	5.94	0.19
Paving Equipment	1.00	7.39	7.63	0.34
Rollers	1.00	8.50	5.94	0.19
Rough Terrain Forklifts	1.00	8.49	5.93	0.19
Rubber Tired Dozers	1.00	7.40	7.63	0.34
Rubber Tired Loaders	1.00	8.52	5.95	0.19
Scrapers	1.00	8.50	6.26	0.26
Signal Boards	1.00	7.40	7.63	0.34
Skid Steer Loaders	1.00	8.50	5.79	0.16
Surfacing Equipment	1.00	7.40	7.63	0.34
Tractors/Loaders/Backhoes	1.00	7.40	7.63	0.34
Trenchers	1.00	8.50	5.80	0.16

Equipment Type	2009 Emission Rate (gm/bhp-hr) jmw corrected			
	ROG	CO	NOx	PM10
Bore/Drill Rigs	1.00	7.03	5.20	0.13
Concrete/Industrial Saws	1.00	7.95	6.88	0.29
Cranes	1.00	8.50	5.80	0.16
Crawler Tractors	1.00	7.95	6.88	0.29
Crushing/Proc. Equipment	1.00	7.95	6.88	0.29
Excavators	1.00	8.50	5.80	0.16
Graders	1.00	8.50	5.91	0.18
Off-Highway Tractors	1.00	7.95	6.89	0.29
Off-Highway Trucks	1.00	8.50	5.91	0.18
Other Construction Equipment	1.00	7.95	6.88	0.29
Pavers	1.00	8.50	5.80	0.16
Paving Equipment	1.00	7.94	6.88	0.29
Rollers	1.00	8.50	5.80	0.16
Rough Terrain Forklifts	1.00	8.49	5.79	0.16
Rubber Tired Dozers	1.00	7.95	6.88	0.29
Rubber Tired Loaders	1.00	8.52	5.81	0.16
Scrapers	1.00	8.50	6.08	0.22
Signal Boards	1.00	7.95	6.88	0.29
Skid Steer Loaders	1.00	8.50	5.79	0.16
Surfacing Equipment	1.00	7.95	6.89	0.29
Tractors/Loaders/Backhoes	1.00	7.95	6.88	0.29
Trenchers	1.00	8.50	5.80	0.16

bore rig (this sheet)	1.00	7.03	5.20	0.13
bore rig (jims calc)	0.588633	3.325927	4.656196	0.357299
crane	1.00	8.50	5.80	0.16
Backhoe	1.083758	3.826444	6.406391	0.599997
Power winch	0.619346	1.724844	6.185372	0.236116
Generator, compresso	2.101522	5.605432	5.231525	0.522326
Generator, compresso	2.101522	5.605432	5.231525	0.522326
supply truck (aka off hi	1.00	8.50	5.91	0.18

	ROG	Exha CO	Exha NOx	Exha CO2	Exha SO2	Exha PM	Exha CH4	Exha
Bore rig	0.588633	3.325927	4.656196	526.7352	0.006179	0.357299	0.053111	
Backhoe	1.083758	3.826444	6.406391	523.8785	0.006145	0.599997	0.097786	
Power winch	0.619346	1.724844	6.185372	529.1231	0.005954	0.236116	0.055883	
Generator, compresso	2.101522	5.605432	5.231525	516.8273	0.006681	0.522326	0.189617	

Fugitive Dust Emission Factors (Without Controls)

Category	Wt (tons)	Speed (mph)	Silt (%)	Moisture (%)	No. wheels	Silt loading (g/m2)	Uncontr. EF	Units	AP-42 Section
Dump trucks on unpaved road	10	20	5	2.45	6		1.17	lbs/VMT	13.2.2-1
Pickup truck on unpaved public road	4	25	5	2.45	4		0.68	lbs/VMT	13.2.2-1
Batch loading: Load trucks, dump from trucks							0.0222	lbs/T	Table 11.9-4. Adjusted by 0.6 to convert TSP to PM10 (App. B-2).
Bulldozer operation			6.9	7.9			0.753	lbs/hr	Table 11.9-1
Dump Trucks on paved roads (local dusty road)	18					3	0.306	lbs/VMT	13.2-1
Dump Trucks on paved roads (regional highways)	18					0.4	0.083	lbs/VMT	13.2-1
Rock crusher w/spray bar							0.0007	lbs/ton	11.19.2
Screening & conveyors w/ spray bar							0.00118	lbs/ton	11.19.2

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Appendix B
Total Project Emission Calculation Worksheets

Table 2a: Total Project Emissions for Construction of the AT&T Gateway Cable

Daily Emissions	Emissions (tons)				
	VOC	CO	NOx	PM10	SO2
Pipe Preparation					
Primary Work Boat - Dive Platform	0.010	0.046	0.10	0.0030	0.018
Secondary Work Boat - Anchor Support/ Shuttle	0.003	0.020	0.10	0.0025	0.019
Total Activity Emissions (All w/i State Waters)	0.012	0.067	0.20	0.0055	0.037
Pre-Lay Grapnel Run					
Vessel-of-Opportunity - Outside State Waters	0.020	0.110	0.31	0.0084	0.056
Vessel-of-Opportunity - Inside State Waters	0.0008	0.0044	0.012	0.0003	0.0022
Total Activity Emissions	0.020	0.11	0.32	0.0088	0.058
Emissions (w/i State Waters)	0.0008	0.0044	0.012	0.0003	0.0022
Offshore Cable Installation					
Cable Lay Vessel - Lay Cable/Plow Cable	0.56	3.5	12.1	0.32	2.25
Cable Lay Vessel - Plow Cable/Plow Cable w/in State Waters	0.054	0.3	0.8	0.022	0.14
Total Activity Emissions (All outside State Waters)	0.62	3.8	12.9	0.34	2.4
Emissions (w/i State Waters)	0.054	0.30	0.80	0.022	0.14
Near-Shore Cable Installation					
Cable Lay Vessel - Landing	0.031	0.172	0.487	0.013	0.087
Primary Work Boat - Dive Platform	0.0027	0.015	0.044	0.0012	0.0078
Secondary Work Boat - Anchor Support/ Shuttle	0.0011	0.007	0.024	0.0006	0.0045
Cable Lay Vessel - Near-Shore Lay	0.022	0.197	1.27	0.032	0.250
Secondary Work Boat - Support, Patrol & Shuttle	0.0015	0.014	0.087	0.0022	0.017
Total Activity Emissions (All w/i State Waters)	0.058	0.405	1.91	0.049	0.367
Near-Shore Cable Retroburial					
Primary Work Boat - Dive Platform	0.012	0.062	0.16	0.0044	0.028
Secondary Work Boat - Anchor Support/ Shuttle	0.0042	0.027	0.10	0.0025	0.018
Total Activity Emissions (All w/i State Waters)	0.016	0.089	0.26	0.0069	0.046
Cable Retroburial					
Cable Lay Vessel - ROV	0.35	1.9	5.2	0.14	0.93
Cable Lay Vessel - ROV w/in State Waters	0.061	0.33	0.9	0.025	0.16
Emissions (w/i State Waters)	0.061	0.33	0.9	0.025	0.16
Total Activity Emissions	0.41	2.3	6.1	0.17	1.1
Shore End Construction					
Bore Rig	0.00022	0.0013	0.0018	0.00014	0.00000
Crane	0.00035	0.0030	0.0020	0.00006	0.00000
Backhoe	0.0029	0.010	0.017	0.0016	0.00001
Power Winch	0.00033	0.00091	0.0033	0.00012	0.00000
Compressor	0.00018	0.00047	0.0004	0.00004	0.00000
Generator	0.0026	0.0069	0.0064	0.00064	0.00001
Supply Truck	0.0017	0.014	0.0098	0.00030	0.00001
Total Activity Emissions (All w/i State Waters)	0.0082	0.037	0.041	0.0029	0.00003
Land-Based Cable Pulling for Existing Conduit					
Bobcat Skid Loader	0.02	0.06	0.10	0.010	0.00008
Cable Truck	0.12	0.31	0.29	0.029	0.00026
Pick-up Truck	0.13	0.35	0.32	0.032	0.00030
Generator	0.04	0.11	0.11	0.011	0.00010
Total Activity Emissions (All w/i State Waters)	0.31	0.83	0.82	0.081	0.00073
Worker Commuting					
Worker Commute Tailpipe Emissions	0.03	0.26	0.025	0.0019	
Total Activity Emissions (All w/i State Waters)	0.03	0.26	0.025	0.0019	
Total Project Emissions	1.5	7.9	22.6	0.7	4.0
Total Project Emissions (w/i State Waters)	0.55	2.32	4.97	0.19	0.76
APCD Significance Thresholds (per calendar quarter)	2.5	NA	2.5	2.5	NA

Table 2b - AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines TOTAL

		marine	96 km												
		land base	10 miles	other landings only 1-mile											
In-Water Dredging Exhaust Emission Factors (OFFROAD Efs for Non-Road; EPA Efs for Marine Diesel)															
Equipment Type		Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 EF (gm/bhp-hr)				Total HP	HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
Pipe Preparation															
Primary Work Boat - Dive Platform	==>	2	14	3	800	0.15	0.86	4.17	9.41	0.266	1600	10080	504	5000	35.280
Secondary Work Boat - Anchor Support/ Shuttle	==>	2	14	3	350	0.37	0.22	1.69	8.21	0.21	700	10878	544	5000	38.073
Pre-Lay Grapnel Run															
Vessel-of-Opportunity - Outside State Waters	==>	2	20	5	800	0.2	0.56	3.12	8.84	0.24	1600	32000	1600	5000	112.000
Vessel-of-Opportunity - Inside State Waters	==>	2	2	2	800	0.2	0.56	3.12	8.84	0.24	1600	1280	64	5000	4.480
Offshore Cable Installation															
Cable Lay Vessel - Lay Cable/Plow Cable	==>	3	24	12	5950	0.25	0.40	2	9	0.23	17850	1285200	64260	5000	4498.200
Cable Lay Vessel - Plow Cable/Plow Cable w/in State Waters	==>	3	24	1	5950	0.19	0.60	3.29	8.93	0.24	17850	81396	4070	5000	284.886
Near-Shore Cable Installation															
Cable Lay Vessel - Landing	==>	2	14	1.5	5950	0.2	0.56	3.12	8.84	0.24	11900	49980	2499	5000	174.930
Primary Work Boat - Dive Platform	==>	2	14	1	800	0.2	0.56	3.12	8.84	0.24	1600	4480	224	5000	15.680
Secondary Work Boat - Anchor Support/ Shuttle	==>	2	14	1	350	0.26	0.38	2.40	8.50	0.22	700	2548	127	5000	8.918
Cable Lay Vessel - Near-Shore Lay	==>	2	12	2	5950	0.5	0.14	1.25	8.06	0.20	11900	142800	7140	5000	499.800
Secondary Work Boat - Support, Patrol & Shuttle	==>	2	14	2	350	0.5	0.14	1.25	8.06	0.20	700	9800	490	5000	34.300
Near-Shore Cable Retroburial															
Primary Work Boat - Dive Platform	==>	2	14	4	800	0.18	0.65	3	9	0.25	1600	16128	806	5000	56.448
Secondary Work Boat - Anchor Support/ Shuttle	==>	2	14	4	350	0.26	0.38	2	9	0.22	700	10192	510	5000	35.672
Cable Retroburial															
Cable Lay Vessel - ROV	==>	3	24	7	5950	0.19	0.60	3.29	8.93	0.24	17850	529074	26454	5000	1851.759
Cable Lay Vessel - ROV w/in State Waters	==>	3	18	1.5	5950	0.19	0.60	3.29	8.93	0.24	17850	91571	4579	5000	320.497
Shore End Construction															
Bore Rig	==>	1	6	1	115	0.5	0.59	3.33	4.66	0.36	115	345	17	15	0.004
Crane	==>	1	2	2	250	0.32	1.00	9	6	0.16	250	320	16	15	0.003
Backhoe	==>	1	8	4	105	0.72	1.08	4	6	0.60	105	2419	121	15	0.025
Power Winch	==>	1	6	2	100	0.4	0.62	2	6	0.24	100	480	24	15	0.005
Compressor	==>	1	2	2	40	0.48	2.10	6	5	0.52	40	77	4	15	0.001
Generator	==>	1	3	10	50	0.74	2.10	6	5	0.52	50	1110	56	15	0.012
Supply Truck	==>	2	1	10	250	0.3	1.00	8.50	5.91	0.18	500	1500	75	15	0.016
Land-Based Cable Pulling for Existing Conduit															
Bobcat Skid Loader	==>	1	10	25	80	0.72	1.08	4	6	0.60	80	14400	720	15	0.151
Cable Truck	==>	2	10	25	200	0.5	2.10	6	5	0.52	400	50000	2500	15	0.525
Pick-up Truck	==>	3	10	25	150	0.5	2.10	6	5	0.52	450	56250	2813	15	0.591
Generator	==>	2	10	25	50	0.74	2.10	6	5	0.52	100	18500	925	15	0.194
		42	Total Equip		107160	Total HP	0.71					2283658	121140		7970.9884

Table 2b - AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines

Dump/Delivery Truck Tailpipe Emission Factors	Delivery Trucks		Water Truck		
	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5
Miles/round trip	0	0	0	0	0
Round trips/day	0	0	0	0	0
Number of Trucks	1	0	0	0	0
Number of Days	1	0	0	0	0
Gallons @ 5 mi/gal	0	0	0	0	0
	ROG	CO	NOx	PM10	
EMFAC HDDV (grams/mile)	0.37	1.53	6.22	0.45	

Gallons (5 mils/gal) Fuel S ppm lbs SO2

0 15 0.000

Worker Commute Tailpipe Emissions				
Miles/round trip	50			
trips/day	11			
Number of Light Duty Trucks	1			
Number of Days	81			
	ROG	CO	NOx	PM10
EMFAC EFs (grams/mile)	0.49	4.8	0.499	0.039
Start Emission Rate (grams/trip)	1.8	22.88	0.84	0.02
Hot Soak (grams/trip)	0.22			
Evaporative Running Loss (grams/mile)	0.09			

Cable lay Vessel Fuel Consumption 109001.025

VOC from Paving (non-cutback asphalt)

Acre/yr	EF, lbs/ac	VOC, tpy
0	2.62	0.00

Based on non-cutback asphalt, emission factor = 2.62 lbs VOC per acre based on Sacramento AQMD (Jones & Stokes , 2003)

VOCs from Architectural Painting

Parameter	Single Family Units	Multi Family Units	Comm + Indust Bldg Floor Area
Items Painted Per Year	0	0	0
Painted area per unit	0	0	0
VOC Content of Paint, g/L	100	100	500
VOC Emissions, tons/yr	0.0	0.0	0.0

Based on emission factor of 0.0185 lbs VOC per sq. ft. of painted surface, normalized to 1 mil paint thickness and 250 g/L VOC content. "Square footage factor" accounts for painted surface area exceeding architectural floor space square footage (Jones & Stokes 2003)

Project CO2 Emissions (Lbs)
2711606
Project CO2 Emissions (short Tons)
1355.8

Cable Lay Vessel CO2 Emissions (lbs)	2439879	Cable Lay Vessel CO2 Emissions (Short Tons)	0.899791
Cable Lay Vessel CO2 Emissions (Short Tons)	1219.939		

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AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQM) TOTAL

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs		0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet		0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Pipe Preparation Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type	Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)					Total HP
						VOC	CO	NOx	PM10		
Pipe Preparation											
Primary Work Boat - Dive Platform	2	14	3	800	0.15	0.86	4.17	9.41	0.266	1600	
Secondary Work Boat - Anchor Support/ Shuttle	2	14	3	350	0.37	0.22	1.69	8.21	0.21	700	
	4	Total Equip		2300	Total HP	0.54					

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
10080	504	5000	35.280
10878	544	5000	38.073
20958	1048		73.3530

AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD Efs)

Daily Emissions	Emissions (tons)				
	VOC	CO	NOx	PM10	SO2
Pipe Preparation					
Primary Work Boat - Dive Platform	0.010	0.046	0.10	0.0030	0.018
Secondary Work Boat - Anchor Support/ Shuttle	0.0027	0.020	0.10	0.0025	0.019
Total Activity Emissions (All w/in State Waters)	0.012	0.067	0.20	0.0055	0.037
Total Daily Emissions (tons)	0.012	0.067	0.20	0.0055	0.037

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AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQM) TOTAL

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs		0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet		0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Pre-Lay Grapnel Run Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type		Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)				Total HP
							VOC	CO	NOx	PM10	
Pre-Lay Grapnel Run											
Vessel-of-Opportunity - Outside State Waters	==>	2	20	5	800	0.2	0.56	3.12	8.84	0.24	1600
Vessel-of-Opportunity - Inside State Waters	==>	2	2	2	800	0.2	0.56	3.12	8.84	0.24	1600
		4	Total Equip		3200	Total HP	0.56				

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
32000	1600	5000	112.000
1280	64	5000	4.480
33280	1664		116.4800

AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD EFs)

Daily Emissions	Emissions (tons)				
	VOC	CO	NOx	PM10	SO2
Pre-Lay Grapnel Run					
Vessel-of-Opportunity - Outside State Waters	0.020	0.11	0.31	0.0084	0.056
Vessel-of-Opportunity - Inside State Waters	0.0008	0.0044	0.012	0.00034	0.0022
Total Activity Emissions	0.020	0.11	0.32	0.0088	0.058
Emissions (w/ State Waters)	0.00078	0.0044	0.012	0.00034	0.0022
Total Daily Emissions (tons)	0.020	0.11	0.32	0.0088	0.058

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AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQM) TOTAL

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs		0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet		0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Offshore Cable Installation Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type	Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)					Total HP
						VOC	CO	NOx	PM10		
Offshore Cable Installation											
Cable Lay Vessel - Lay Cable/Plow Cable	==> 3	24	12	5950	0.25	0.40	2	9	0.23	17850	
Cable Lay Vessel - Plow Cable/Plow Cable w/in State Waters	==> 3	24	1	5950	0.19	0.60	3.29	8.93	0.24	17850	
	6	Total Equip		35700	Total HP	0.64					

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
1285200	64260	5000	4498.200
81396	4070	5000	284.886
1366596	68330		4783.0860

AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD EFs)

Daily Emissions	Emissions (tons)				
	VOC	CO	NOx	PM10	SO2
Offshore Cable Installation					
Cable Lay Vessel - Lay Cable/Plow Cable	0.56	3.5	12.1	0.32	2.25
Cable Lay Vessel - Plow Cable/Plow Cable w/in State Waters	0.054	0.3	0.8	0.022	0.14
Total Activity Emissions	0.62	3.8	12.9	0.34	2.4
Emissions (w/i State Waters)	0.054	0.30	0.80	0.022	0.14
Total Daily Emissions (tons)	0.62	3.8	12.9	0.34	2.4

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AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQM) TOTAL

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs	==>	0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet	==>	0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Near-Shore Cable Installation Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type	Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)					Total HP
						VOC	CO	NOx	PM10		
Near-Shore Cable Installation											
Cable Lay Vessel - Landing	2	14	1.5	5950	0.2	0.56	3.12	8.84	0.24	11900	
Primary Work Boat - Dive Platform	2	14	1	800	0.2	0.56	3.12	8.84	0.24	1600	
Secondary Work Boat - Anchor Support/ Shuttle	2	14	1	350	0.26	0.38	2.40	8.50	0.22	700	
Cable Lay Vessel - Near-Shore Lay	2	12	2	5950	0.5	0.14	1.25	8.06	0.20	11900	
Secondary Work Boat - Support, Patrol & Shuttle	2	14	2	350	0.5	0.14	1.25	8.06	0.20	700	
	10	Total Equip		26800	Total HP	0.35					

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
49980	2499	5000	174.930
4480	224	5000	15.680
2548	127	5000	8.918
142800	7140	5000	499.800
9800	490	5000	34.300
209608	10480		733.6280

AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD EFs)

Daily Emissions	Emissions (tons)				
	VOC	CO	NOx	PM10	SO2
Near-Shore Cable Installation					
Cable Lay Vessel - Landing	0.031	0.17	0.49	0.013	0.087
Primary Work Boat - Dive Platform	0.0027	0.015	0.044	0.0012	0.0078
Secondary Work Boat - Anchor Support/ Shuttle	0.0011	0.0068	0.024	0.0006	0.0045
Cable Lay Vessel - Near-Shore Lay	0.022	0.20	1.27	0.032	0.25
Secondary Work Boat - Support, Patrol & Shuttle	0.0015	0.014	0.087	0.0022	0.017
Total Activity Emissions (All w/ State Waters)	0.058	0.40	1.91	0.049	0.37
Total Daily Emissions (tons)	0.058	0.40	1.91	0.049	0.37

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AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQM) TOTAL

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs		0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet		0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Near-Shore Cable Retroburial Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type		Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)				Total HP
							VOC	CO	NOx	PM10	
Near-Shore Cable Retroburial											
Primary Work Boat - Dive Platform	==>	2	14	4	800	0.18	0.65	3	9	0.25	1600
Secondary Work Boat - Anchor Support/ Shuttle	==>	2	14	4	350	0.26	0.38	2	9	0.22	700
		4	Total Equip		2300	Total HP	0.51				

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
16128	806	5000	56.448
10192	510	5000	35.672
26320	1316		92.1200

AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD EFs)

Daily Emissions	Emissions (tons)				
	VOC	CO	NOx	PM10	SO2
Near-Shore Cable Retroburial					
Primary Work Boat - Dive Platform	0.012	0.062	0.16	0.0044	0.028
Secondary Work Boat - Anchor Support/ Shuttle	0.0042	0.027	0.10	0.0025	0.018
Total Activity Emissions (All w/ State Waters)	0.016	0.089	0.26	0.0069	0.046
Total Daily Emissions (tons)	0.016	0.089	0.26	0.0069	0.046

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AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQM) TOTAL

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs		0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet		0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Cable Retroburial Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type		Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)				Total HP
							VOC	CO	NOx	PM10	
Cable Retroburial											
Cable Lay Vessel - ROV	==>	3	24	7	5950	0.19	0.60	3.29	8.93	0.24	17850
Cable Lay Vessel - ROV w/in State Waters	==>	3	18	1.5	5950	0.19	0.60	3.29	8.93	0.24	17850
		6	Total Equip		35700	Total HP	0.64				

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
529074	26454	5000	1851.759
91571	4579	5000	320.497
620645	31032		2172.2558

AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD EFs)

Daily Emissions	Emissions (tons)				
	VOC	CO	NOx	PM10	SO2
Cable Retroburial					
Cable Lay Vessel - ROV	0.35	1.9	5.2	0.14	0.93
Cable Lay Vessel - ROV w/in State Waters	0.061	0.33	0.90	0.025	0.16
Emissions (w/in State Waters)	0.061	0.33	0.90	0.025	0.16
Total Activity Emissions	0.41	2.3	6.1	0.17	1.1
Total Daily Emissions (tons)	0.41	2.3	6.1	0.17	1.1

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AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQM) TOTAL

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs		0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet		0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Shore End Construction Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type		Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)				Total HP
							VOC	CO	NOx	PM10	
Shore End Construction											
Bore Rig	==>	1	6	1	115	0.5	0.59	3.33	4.66	0.36	115
Crane	==>	1	2	2	250	0.32	1.00	9	6	0.16	250
Backhoe	==>	1	8	4	105	0.72	1.08	4	6	0.60	105
Power Winch	==>	1	6	2	100	0.4	0.62	2	6	0.24	100
Compressor	==>	1	2	2	40	0.48	2.10	6	5	0.52	40
Generator	==>	1	3	10	50	0.74	2.10	6	5	0.52	50
Supply Truck	==>	2	1	10	250	0.3	1.00	8.50	5.91	0.18	500
		8	Total Equip		1160	Total HP	0.64				

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
345	17	15	0.004
320	16	15	0.003
2419	121	15	0.025
480	24	15	0.005
77	4	15	0.001
1110	56	15	0.012
1500	75	15	0.016
6251	313		0.0656

AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD EFs)

Worker Commute Tailpipe Emissions

Miles/round trip	==>	50			
trips/day	==>	11			
Number of Light Duty Trucks	==>	1			
Number of Days	==>	81			
			ROG	CO	NOx
EMFAC EFs (grams/mile)			0.49	4.8	0.499
Start Emission Rate (grams/trip)			1.8	22.88	0.84
Hot Soak (grams/trip)			0.22		
Evaporative Running Loss (grams/mile)			0.09		

Daily Emissions	Emissions (tons)				
	VOC	CO	NOx	PM10	SO2
Shore End Construction					
Bore Rig	0.0002	0.0013	0.0018	0.0001	0.0000
Crane	0.000	0.003	0.002	0.000	0.0000
Backhoe	0.003	0.010	0.017	0.002	0.0000
Power Winch	0.000	0.001	0.003	0.000	0.0000
Compressor	0.000	0.000	0.000	0.000	0.0000
Generator	0.003	0.007	0.006	0.001	0.0000
Supply Truck	0.002	0.014	0.010	0.000	0.0000
Total Activity Emissions (All w/ State Waters)	0.0082	0.037	0.041	0.0029	0.00003
Worker Commute Tailpipe Emissions	0.030	0.26	0.025	0.0019	
Total Daily Emissions (tons)	0.0082	0.037	0.041	0.0029	0.00003

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AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQM) TOTAL

Construction Site Fugitive PM-10 Emission Factors

Construction days/year	==>	1	
Fugitive Dust Emission Factor From Soil Loading & Dumping (lbs/ton)	==>	0.011	AP-42 for material dumping (50% reduction for large rock size)
Earthwork Volume/year (cys/day)	==>	0	cy/day
Average Daily Acres of Construction	==>	0.00	Applies SCAQMD fugitive dust factor of 10 lbs/acre/day (Jones & Stokes 2003)
Dozer Hours/Year for Fugitive Dust Calcs	==>	0	Applies AP-42 fugitive dust factor
Building volume to be demolished, cubic feet	==>	0	Applies SCAQMD emission factor of 0.00042 lbs PM10/cf

Land-Based Cable Pull Exhaust Emission Factors (SCAQMD Efs for Non-Road; EPA Efs for Marine Diesel)

Equipment Type	Number of Vehicles	Hours per Day	No. of days	Default HP	Default Load Factor	2008 SCAQMD EF (gm/bhp-hr)				Total HP
						VOC	CO	NOx	PM10	
Land-Based Cable Pulling for Existing Conduit										
Bobcat Skid Loader	1	10	25	80	0.72	1.08	4	6	0.60	80
Cable Truck	2	10	25	200	0.5	2.10	6	5	0.52	400
Pick-up Truck	3	10	25	150	0.5	2.10	6	5	0.52	450
Generator	2	10	25	50	0.74	2.10	6	5	0.52	100
	8	Total Equip		1030	Total HP	0.68				

HP-hr	Gallons (0.05 gal/hp-hr)	Fuel S ppm	lbs SO2
14400	720	15	0.151
50000	2500	15	0.525
56250	2813	15	0.591
18500	925	15	0.194
139150	6958		1.4611

AT&T Pacific Gateway Project; Marine Vessels Total Project Emissions for Unregulated (Tier-0) Marine Diesel Engines: (SCAQMD EFs)

Daily Emissions	Emissions (tons)				
	VOC	CO	NOx	PM10	SO2
Land-Based Cable Pulling for Existing Conduit					
Bobcat Skid Loader	0.0172	0.0607	0.1017	0.0095	0.0001
Cable Truck	0.116	0.309	0.288	0.029	0.0003
Pick-up Truck	0.130	0.348	0.324	0.032	0.0003
Generator	0.043	0.114	0.107	0.011	0.0001
Total Activity Emissions (All w/ State Waters)	0.31	0.83	0.82	0.081	0.00073
Total Daily Emissions (tons)	0.31	0.83	0.82	0.081	0.00073

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Equipment Type	2004 Emission Rate (gm/bhp-hr) JMW			
	ROG	CO	NOx	PM10
Bore/Drill Rigs	1.04	8.84	7.18	0.17
Concrete/Industrial Saws	1.00	6.57	8.74	0.42
Cranes	1.00	8.50	6.41	0.29
Crawler Tractors	1.00	6.57	8.73	0.42
Crushing/Proc. Equipment	1.00	6.57	8.74	0.42
Excavators	1.00	8.50	6.27	0.26
Graders	1.00	8.06	6.94	0.32
Off-Highway Tractors	1.00	6.57	8.74	0.42
Off-Highway Trucks	1.00	8.06	6.94	0.32
Other Construction Equipment	1.00	6.57	8.74	0.42
Pavers	1.00	8.50	6.35	0.28
Paving Equipment	1.00	6.57	8.74	0.42
Rollers	1.00	8.50	6.35	0.28
Rough Terrain Forklifts	1.00	8.49	6.35	0.28
Rubber Tired Dozers	1.00	6.57	8.74	0.42
Rubber Tired Loaders	1.00	8.52	6.36	0.28
Scrapers	1.00	7.40	7.74	0.37
Signal Boards	1.00	6.57	8.74	0.42
Skid Steer Loaders	1.00	8.50	6.03	0.21
Surfacing Equipment	1.00	6.57	8.74	0.42
Tractors/Loaders/Backhoes	1.00	6.57	8.74	0.41
Trenchers	1.00	8.50	6.27	0.26

Equipment Type	2005 Emission Rate (gm/bhp-hr) jmw			
	ROG	CO	NOx	PM10
Bore/Drill Rigs	1.00	6.57	5.34	0.13
Concrete/Industrial Saws	1.00	6.84	8.37	0.40
Cranes	1.00	8.50	6.29	0.26
Crawler Tractors	1.00	6.85	8.37	0.39
Crushing/Proc. Equipment	1.00	6.85	8.37	0.40
Excavators	1.00	8.50	6.11	0.23
Graders	1.00	8.50	6.35	0.28
Off-Highway Tractors	1.00	6.84	8.37	0.40
Off-Highway Trucks	1.00	8.50	6.35	0.28
Other Construction Equipment	1.00	6.84	8.37	0.39
Pavers	1.00	8.50	6.22	0.25
Paving Equipment	1.00	6.84	8.37	0.40
Rollers	1.00	8.50	6.21	0.25
Rough Terrain Forklifts	1.00	8.49	6.21	0.25
Rubber Tired Dozers	1.00	6.85	8.37	0.40
Rubber Tired Loaders	1.00	8.52	6.23	0.25
Scrapers	1.00	7.76	7.25	0.33
Signal Boards	1.00	6.84	8.37	0.40
Skid Steer Loaders	1.00	8.50	5.79	0.16
Surfacing Equipment	1.00	6.85	8.37	0.39
Tractors/Loaders/Backhoes	1.00	6.85	8.37	0.40
Trenchers	1.00	8.50	6.12	0.23

Equipment Type	2007 Emission Rate (gm/bhp-hr) jmw corrected			
	ROG	CO	NOx	PM10
Bore/Drill Rigs	1.00	4.65	5.20	0.09
Concrete/Industrial Saws	1.00	7.40	7.62	0.34
Cranes	1.00	8.50	6.04	0.21
Crawler Tractors	1.00	7.40	7.63	0.34
Crushing/Proc. Equipment	1.00	7.40	7.63	0.34
Excavators	1.00	8.50	5.80	0.16
Graders	1.00	8.50	6.13	0.23
Off-Highway Tractors	1.00	7.40	7.62	0.34
Off-Highway Trucks	1.00	8.50	6.13	0.23
Other Construction Equipment	1.00	7.40	7.63	0.34
Pavers	1.00	8.50	5.94	0.19
Paving Equipment	1.00	7.39	7.63	0.34
Rollers	1.00	8.50	5.94	0.19
Rough Terrain Forklifts	1.00	8.49	5.93	0.19
Rubber Tired Dozers	1.00	7.40	7.63	0.34
Rubber Tired Loaders	1.00	8.52	5.95	0.19
Scrapers	1.00	8.50	6.26	0.26
Signal Boards	1.00	7.40	7.63	0.34
Skid Steer Loaders	1.00	8.50	5.79	0.16
Surfacing Equipment	1.00	7.40	7.63	0.34
Tractors/Loaders/Backhoes	1.00	7.40	7.63	0.34
Trenchers	1.00	8.50	5.80	0.16

Equipment Type	2009 Emission Rate (gm/bhp-hr) jmw corrected			
	ROG	CO	NOx	PM10
Bore/Drill Rigs	1.00	7.03	5.20	0.13
Concrete/Industrial Saws	1.00	7.95	6.88	0.29
Cranes	1.00	8.50	5.80	0.16
Crawler Tractors	1.00	7.95	6.88	0.29
Crushing/Proc. Equipment	1.00	7.95	6.88	0.29
Excavators	1.00	8.50	5.80	0.16
Graders	1.00	8.50	5.91	0.18
Off-Highway Tractors	1.00	7.95	6.89	0.29
Off-Highway Trucks	1.00	8.50	5.91	0.18
Other Construction Equipment	1.00	7.95	6.88	0.29
Pavers	1.00	8.50	5.80	0.16
Paving Equipment	1.00	7.94	6.88	0.29
Rollers	1.00	8.50	5.80	0.16
Rough Terrain Forklifts	1.00	8.49	5.79	0.16
Rubber Tired Dozers	1.00	7.95	6.88	0.29
Rubber Tired Loaders	1.00	8.52	5.81	0.16
Scrapers	1.00	8.50	6.08	0.22
Signal Boards	1.00	7.95	6.88	0.29
Skid Steer Loaders	1.00	8.50	5.79	0.16
Surfacing Equipment	1.00	7.95	6.89	0.29
Tractors/Loaders/Backhoes	1.00	7.95	6.88	0.29
Trenchers	1.00	8.50	5.80	0.16

bore rig (this sheet)	1.00	7.03	5.20	0.13
bore rig (jims calc)	0.588633	3.325927	4.656196	0.357299
crane	1.00	8.50	5.80	0.16
Backhoe	1.083758	3.826444	6.406391	0.599997
Power winch	0.619346	1.724844	6.185372	0.236116
Generator, compresso	2.101522	5.605432	5.231525	0.522326
Generator, compresso	2.101522	5.605432	5.231525	0.522326
supply truck (aka off hi	1.00	8.50	5.91	0.18

	ROG	Exha CO	Exhaus NOX	Exhai CO2	Exhat SO2	Exhai PM	Exhaus CH4	Exhau
Bore rig	0.588633	3.325927	4.656196	526.7352	0.006179	0.357299	0.053111	
Backhoe	1.083758	3.826444	6.406391	523.8785	0.006145	0.599997	0.097786	
Power winch	0.619346	1.724844	6.185372	529.1231	0.005954	0.236116	0.055883	
Generator, compresso	2.101522	5.605432	5.231525	516.8273	0.006681	0.522326	0.189617	

Fugitive Dust Emission Factors (Without Controls)

Category	Wt (tons)	Speed (mph)	Silt (%)	Moisture (%)	No. wheels	Silt loading (g/m ²)	Uncontr. EF	Units	AP-42 Section
Dump trucks on unpaved road	10	20	5	2.45	6		1.17	lbs/VMT	13.2.2-1
Pickup truck on unpaved public road	4	25	5	2.45	4		0.68	lbs/VMT	13.2.2-1
Batch loading: Load trucks, dump from trucks							0.0222	lbs/T	Table 11.9-4. Adjusted by 0.6 to convert TSP to PM10 (App. B-2).
Bulldozer operation			6.9	7.9			0.753	lbs/hr	Table 11.9-1
Dump Trucks on paved roads (local dusty road)	18					3	0.306	lbs/VMT	13.2-1
Dump Trucks on paved roads (regional highways)	18					0.4	0.083	lbs/VMT	13.2-1
Rock crusher w/spray bar							0.0007	lbs/ton	11.19.2
Screening & conveyors w/ spray bar							0.00118	lbs/ton	11.19.2

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Appendix C
**Total Project GHG Emission Calculation
Worksheet**

Appendix C

CO2 Emissions Per mile - San Luis Obispo

	Distance Traveled (km)	Total Fuel Consumed (gal)	CO2 Emissions		Emission Rate	unit
			(lbs)	(tons)		
San Luis Obispo Cable Landing						
Terrestrial						
a) Land based	16	6957.5	155736.7	77.9	4.9 ton/km	
b) Shore End Construction	N/A	312.6	6996.1	3.5	3.5 ton/landing	
Marine Support Vessels	96	4869.3	108994.4	54.5	0.57 ton/km	
Cable Lay Vessel						
a) on continental shelf	96	109001.0	2439878.4	1219.9	12.7 ton/km	
Sub total		121140.4		1355.8		
Deep Water Cable Laying						
a) Cable Lay Vessel	4000	178500.0	3995544.0	1997.8	0.50 ton/km	
Sub total		178500.0		1997.8		
Hawaii Cable Landing						
Terrestrial						
a) Land based	1.6	434.8	9733.5	7.8		
b) Shore End Construction	N/A		7000.0	3.5		
Marine Support Vessels	36.0	1826.0	40872.9	20.4		
Cable Lay Vessel						
a) on continental shelf	36.0	40875.4	914954.4	457.5		
Sub total		43136.2		489.2		
Total Project		342776.6		3842.8		

Assumptions

- 1) Main Cable Ship in deep water lays cable at a rate of 120KM/day and operates 24 hours per day. Total length of deepwater portion between CA and Hawaii is 4,000kr
- 2) Default load factor for the Cable Lay Vessel during deep water cable laying activities would be the same as it is during cable laying/plowing for offshore cable installati
As a result fuel consumption during deep water cable installation would be as follows:

Number of Vehicles	Hours per Day	Default HP	Default Load Factor	Cable Lay Rate (km/day)	No. of days	HP-hr	Gallons (0.05 gal/hp-hr)
1	24	5950	0.25	120	33.3	1190000.0	59500.0

- 3) Shore end construction associated with a cable landing in Hawaii would be the same as in San Luis Obispo thus a ton/km emission rate in not necessary.
- 4) Distance from the landing point to the cable station in Hawaii is 1.6 km (1 mile)