San Francisco CLEAN CONSTRUCTION ORDINANCE

Implementation Guide for San Francisco Public Projects





FINAL AUGUST 2015











Planning San Francisco









Table of Contents

Introduction to the Clean Construction Ordinance1
Health Impacts from Construction Activities4
Off-Road (Construction) Equipment Basics and Health Benefits5
How does the Clean Construction Ordinance Apply to My Project?8
Construction Emissions Minimization Plan- Equipment Inventory Template9
Construction Emissions Minimization Plan- Signage
Construction Emissions Minimization Plan- Certification Statement Template12
Resources

In April 2007, the City and County of San Francisco adopted an Ordinance requiring public projects to reduce emissions at construction sites starting in 2009. In March 2015, the City expanded the existing Ordinance to require public projects to further reduce emissions at construction sites in certain areas with high levels of background concentrations of air pollutants.

This guide describes the City's process for implementing the requirements of the expanded Clean Construction Ordinance, and resources to assist City Departments in meeting these requirements.

This guide provides an introduction to the Clean Construction requirements, describes health effects of common air pollutants, presents off-road (i.e., construction) equipment basics, describes the Clean Construction implementation process, provides a template of a Construction Emissions Minimization Plan, and presents additional resources and funding opportunities for upgrading equipment.

The San Francisco Clean Construction Ordinance is available at:

https://sfgov.legistar.com/Legislation.aspx (Board File Nos. 140805 AND 150526 or Ordinance No. 28-15)

This guide only applies to the Clean Construction Ordinance. Agencies and contractors are responsible for understanding other City regulations that apply to air quality such as:

- Construction Dust Control Requirements https://www.sfdph.org/dph/EH/Air/Dust.asp
- Enhanced Ventilation Requirements https://www.sfdph.org/dph/EH/Air/Article38. asp
- Maher Ordinance Requirements https://www.sfdph.org/dph/EH/HazWaste/ hazWasteSiteMitigation.asp

Introduction to the Clean Construction Ordinance

The City and County of San Francisco has long been a leader in protecting residents' public health. In a dense, urban center like San Francisco, construction sites can be located in areas of the City with high levels of background concentrations of air pollutants (Air Pollutant Exposure Zone, see page 3 Figure 2). In addition, these locations may be located close to sensitive uses, such as children and the elderly, who are more susceptible to the negative effects of air pollutants such as diesel particulate matter. According to the California Air Resources Board, off-road equipment such as construction equipment is the sixth largest source of diesel particulate matter emissions in California and can cause a public health risk and nuisance to sensitive populations.

Through the implementation of the requirements of the Clean Construction Ordinance, contractors for publicly-funded construction projects can substantially reduce their emissions and the associated public health risk at construction sites.

The Clean Construction Ordinance shall become operative on September 6, 2015, and shall apply to all contracts first advertised or initiated on or after this date. The Clean Construction Ordinance contains the following requirements for project sites in the Air Pollutant Exposure Zone (See Table 1 below and page 8 for requirements outside of the Air Pollutant Exposure Zone):

- 1. Equipment Requirements:
 - Use Tier 2 or higher engines and the most effective Verified Diesel Emission Control Strategies (VDECS) available for the engine type (Tier 4 engines automatically meet this requirement) as certified by the California Air Resources Board (ARB);
 - Prohibit portable diesel engines where access to alternative sources of power are available;
 - Restrict idling to two minutes; and
 - Properly maintain and tune equipment in accordance with manufacturer specifications.
- 2. Construction Emissions Minimization Plan (Emissions Plan) shall be prepared and include the following:
 - An equipment inventory which shall include estimates of the construction timeline by phase with description of each piece of off-

- road equipment required for each phase (See page 9);
- Signage indicating idling limits and engine/ Verified Diesel Emission Control Strategies requirements (See page 11); and
- Certification Statement (See page 12).
- 3. Monitoring shall begin at the start of construction activities and include:
 - Quarterly reports documenting compliance with the Emissions Plan which shall be maintained at the project site; and
 - Final report summarizing construction activities.

Required documents must be submitted to the head of the department (Department Head) funding the public project (e.g. San Francisco Public Works, San Francisco Public Utilities Commision, San Francisco Port, etc.). The Department Head is responsible for ensuring that all requirements of the Clean Construction Ordinance are met by the Contractor.

How do I...

...check if my project site is in the Air Pollutant Exposure Zone? See Page 3

...figure out how the Clean Construction Ordinance applies to my project? See Page 8

Table 1: Summary of Clean Construction Ordinance

	Outside Air Pollutant Exposure Zone	Within Air Pollutant Exposure Zone
Code	Administrative and Environment	Same
Applicability	Public Projects > 20 days in length	Same
Standard Best Management Practices (BMPs)	Tier 2 or VDECS and B20 biodiesel	Tier 2 and VDECS and Monitoring Plan
	Contract bids and specifications	Same
Enforcement	Individual City Departments	Same
Reporting/Technical Assistance	Department of Environment	Same
Waivers/Exceptions	Unavailability of equipment	Same

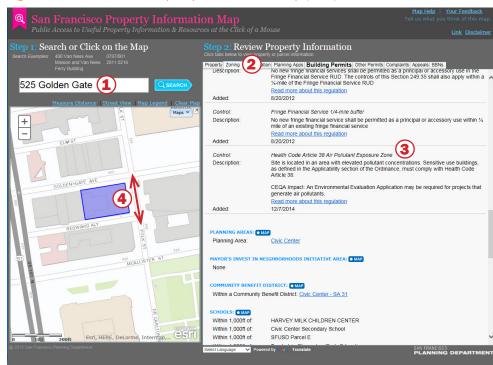
How do I...

...check if my project site is in the Air Pollutant Exposure Zone?

Access PIM (Figure 1) at: http://propertymap. sfplanning. org/?dept=planning

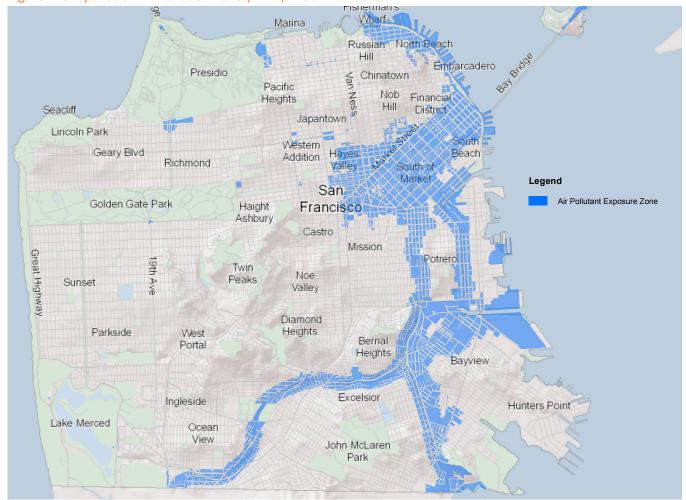
- 1 Enter address
- 2 Click on Zoning Tab
- (3) Check if in the APEZ
- 4 If public right-of-way project, check if adjacent parcel(s) in APEZ**

Figure 1: San Francisco Property Information Map (PIM)



^{**} Note: only those portions of public right-of-way project that are within the APEZ are subject to the additional APEZ requirements.

Figure 2: Snapshot of Air Pollution Zone (APEZ) in San Francisco*

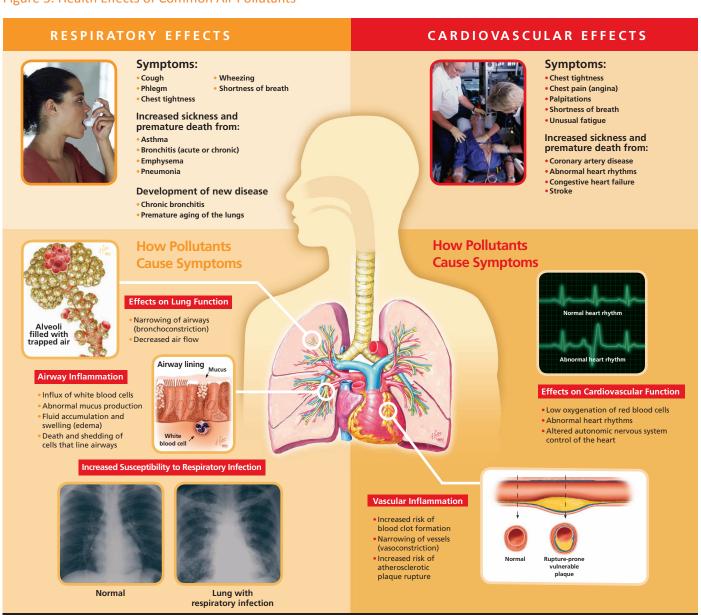


^{*} Access official map with notes at: https://www.sfdph.org/dph/files/EHSdocs/AirQuality/AirPollutantExposureZoneMap.pdf

Health Impacts from Construction Activities

Construction activities produce emissions that affect air quality. Scientific studies have found an association between exposure to particulate matter and significant human health problems, including: aggravated asthma; chronic bronchitis; reduced lung function; irregular heartbeat; heart attacks; and premature death in people with heart or lung disease. Exposure to diesel exhaust is an established cause of lung cancer. The US Environmental Protection Agency (EPA) has recognized that air pollution affects the public's health, especially sensitive groups, and can result in respiratory and cardiovascular effects as shown in Figure 3 below.

Figure 3: Health Effects of Common Air Pollutants



http://www.epa.gov/airnow/health-prof/common-air-pollutants-2011-lo.pdf

Off-Road (Construction) Equipment Basics and Health Benefits

Project construction involves the use of off-road equipment such as bore/drill rigs, cranes, crawler tractors, excavators, graders, off-highway tractors, off-highway trucks, other construction equipment, pavers, paving equipment, rollers, rough terrain forklifts, rubber-tired dozers, rubber-tired loaders, scrapers, skid steer loaders, surfacing equipment, tractors/loaders/backhoes, and trenchers.

Engines

Prior to 1994, there were no standards (Tier 0) to limit the amount of emissions from off-road equipment. In 1994, the EPA established emission standards for hydrocarbons, nitrogen oxides, carbon monoxide, and particulate matter to regulate new pieces of offroad equipment. These emission standards came to be known as Tier 1. Since that time, more stringent Tier 2, Tier 3, and Tier 4 (interim and final) standards were adopted by the EPA, as well as ARB. Each adopted emission standard was phased in over time (as shown on Table 2 on page 6). New engines built in 2015 across all horsepower (hp) sizes have to meet Tier 4 final emission standards. In other words, new manufactured engines cannot exceed the emissions established for Tier 4 Final. Out of the estimated 161,420 pieces of construction equipment used statewide, 59% are Tier 2 and above. This means that more than half of the equipment utilized statewide are newer and cleaner engines. Refer to Figure 4 on page 6 which illustrates engine tier availability in California.

Verified Diesel Emission Control Strategies (VDECS)

As stated above, the emission standards only apply to new engines. However, off-road equipment can last several years, even prior to Tier 1 emission standards being established (approximately 21% of off-road equipment). Verified diesel emission control strategies (VDECS) help to further reduce emissions from existing engines. VDECS are designed primarily for the reduction of diesel particulate matter emissions and have been

verified by the ARB. There are three levels of VDECS. The most effective VDECS (a device, system or strategy used to achieve the highest level of pollution control from an existing off-road vehicle) is the Level 3 VDECS. Tier 4 engines are not required to install VDECS since they already meet the emissions standards for lower tiered equipment with installed controls.

How do I...

...verify what level my engine is?

Contact: DOORS hotline at 877-593-6677 or Thien Tran* (Air Pollution Specialist at ARB) at 916-332-0517

...figure out what VDECS is appropriate for the different types of equipment and check the level of my VDECS?

Visit: http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm

* contact as of June 2015

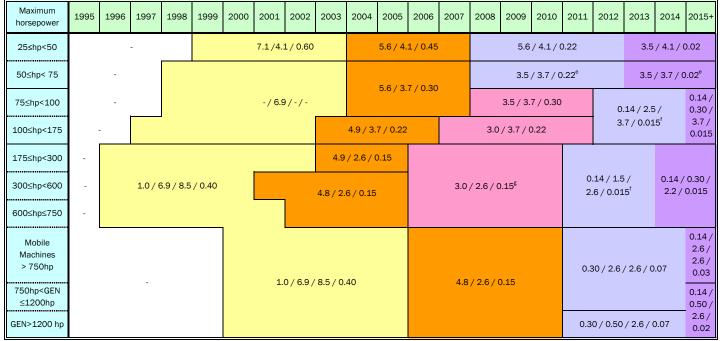
More Info: ARB In-Use Off-Road Diesel Vehicle Regulations

In July 2007, the ARB adopted the In-Use Off-Road Diesel Vehicle Regulation to reduce diesel particulate matter and oxides of nitrogen emissions from in-use existing off-road diesel vehicles in California. This regulation includes:

- Equipment labeling requirements
- Annual reporting of equipment
- Five minute (30 seconds 100 feet of schools) idling limit (applies to offroad and on-road diesel vehicles)
- Restrictions on adding older, and dirtier Tier 0 and Tier 1 vehicles to construction fleets.

For more information: http://arb.ca.gov/msprog/ordiesel/ordiesel.htm

Table 2: California Air Resources Board and United States Environmental Protection Agency Off-Road Compression-Ignition (Diesel) Engine Standards^a

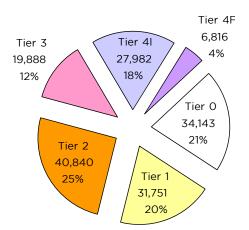


Source: derived from California Air Resources Board, http://www.arb.ca.gov/msprog/ordiesel/documents/Off-Road_Diesel_Stds.xls.

- a) When ARB and USEPA standards differ, the standards shown here represent the more stringent of the two.
- b) Standards given for all sizes of Tier 1 engines are hydrocarbons/oxides of nitrogen (NOx)/carbon monoxide (CO)/particulate matter (PM) in grams per brakehorspower per hour (g/bhp-hr).
- c) Standards given for all sizes of Tier 2 and Tier 3 engines, and Tier 4 engines below 75 horsepower are non-methane hydrocarbons (NMHC)+NOx/CO/PM in g/bhp-hr.
- d) Standards given for Tier 4 engines above 75 horsepower are NMHC/NOx/CO/PM in g/bhp-hr.
- e) Engine families in this power category may alternately meet Tier 3 PM standards (0.30 g/bhp-hr) from 2008-2011 in exchange for introducing final PM standards in 2012.
- f) The implementation schedule shown is the three-year alternate NOx approach. Other schedules are available.
- g) Certain manufacturers have agreed to comply with these standards by 2005.



Figure 4: 2014 Statewide All Fleet Sizes (Pieces of Equipment)



Total Pieces of Equipment: 161,420

Key:

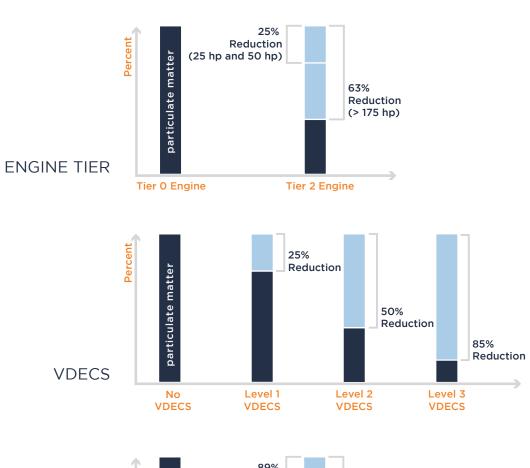
XX,XXX = Total pieces of equipment in that tier XX% = Percent of total pieces of equipment in that tier

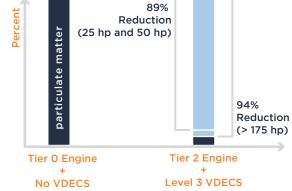
Particulate Matter Reduction and Health Benefits

An engine is required at a minimum to meet Tier 2 emission standards. This is required for all City projects regardless of location. This will result in between a 25 percent (25 hp and 50 hp) and 63 percent (greater than 175 hp) reduction in particulate matter emissions. Compared to Tier 1 standards, Tier 2 (and above) standards help to reduce emissions and contribute to cleaner air and a healthy community.

Figure 5: Engine and VDECS Particulate Matter Reduction

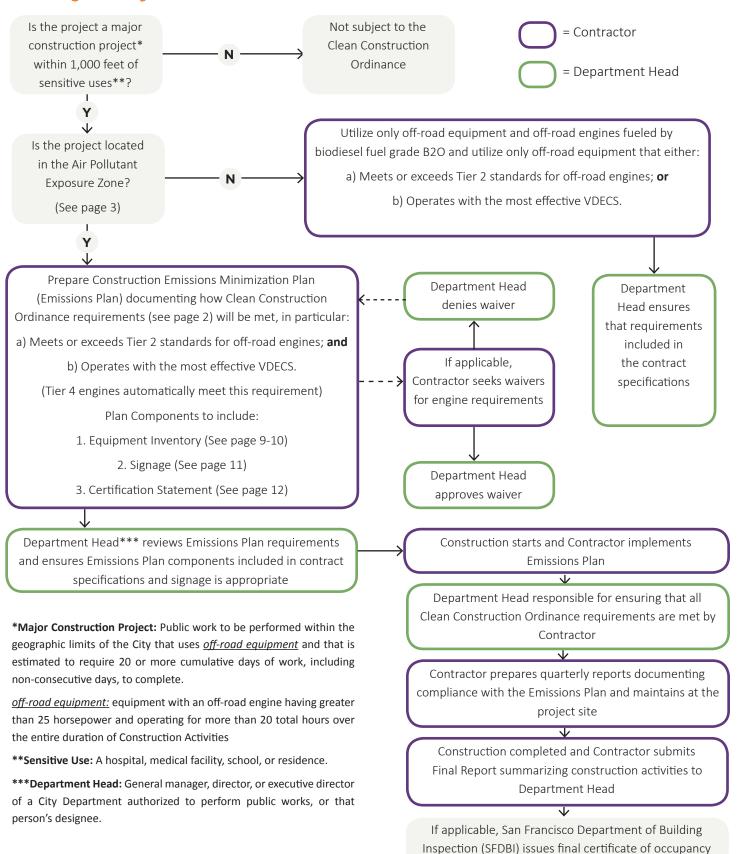
Level 3 VDECS, which are required for City projects in the APEZ, will result in an additional 85 percent reduction in particulate matter emissions. Therefore, requiring a Tier 2 engine with a Level 3 VDECS will result in between an 89 percent (25 hp and 50 hp) and 94 percent (greater than 175 hp) reduction in particulate matter emissions. Reduced particulate matter improves air quality and reduces the health effects associated with air pollutants.





ENGINE TIER + VDECS

How does the Clean Construction Ordinance Apply to My Project?



Construction Emissions Minimization Plan - Equipment Inventory Template

	Example Inventory Equipment List* * This sheet is partially based on the Sacramento Air Quality Management District Model Equipment List, January 201																										
				ent District Model Equi	pment List, January	201																					
		Date (mm-dd-yyyy) ntractor (Company):						Projects	Project Name: ed Start Up Date:																		
		ntractor (Yes or No)				Estimate	ed days equipm	ent will be us	ed on the project																		
	Primary Col	itractor (Yes or No)					(sta	rt to finish. no	t contract days):																		
		Mailing Address				Project Lo	ocation (address	s or extension	of street work):																		
	Equipment	List Contact Person						On-site	Contact Person:																		
		Phone #:							Phone #:																		
1	Construction Emission Minimization Plan Notes: The Construction Emission Minimization Plan Notes: The Construction Emission Minimization Plan (Notes) against a different equation of construction activities. Complete this equipment inventory list, which is a component of the CEMP, prior to stating construction, qualerly during construction, qualerly during construction activities, and a final report within six month of the completion of construction activities. Include all advoctmatcation and their experient on his circ on aspectate leaf preferred. Other components of the CEMP (i.e., diling restrictions, prohibition of portable desel engines, maintenance and turing, signs) shall be detailed separately and submitted for approval prior to starting construction. See Figure 6 on Page 10																										
			EQUIPMENT LIST															ESTIMAT	TES - FOR FIRST	T SUBMISSION O	F CEMP	MP ACTUALS - USE FOR QUARTERLY REPORTING					
CONTRACTOR NAME	CONSTRUCTION PHASE [®]	Exception Seeking (i applicable)*		Equipment	Equipment Identification	Engine Model	Engine		Engine Serial Number	Verified Die			esel Emission Control Strategy (if applicable)					Alternative Fuel (if applicable)		Other	Other Fuels		Quarterly (Insert Quarter of Reporting)			Cumulative Totals (To-Date)	
			Equipment Type*	Manufacturer	Identification Number ^a	Year	Certification (Tier Rating)	Horsepower		Technology Type	Serial Number	Make	Model	Manufacturer	ARB Verification Number Level	Installation Date	Hour Meter Reading on Installation Date	Туре	Estimated Fuel Usage ^b	Fuel Usage (separate from Alternative Fuels) ^b	Total Hours of Operation ^c	Alternative Fuels Type	Alternative Fuel Usage ^b	Fuel Usage (separate from Alternative Fuels) ^b	Total Hours of Operations	Total Hours of Fuel Usage ^b	Total Hours of Operation ^c
						_		1						_													
. Provide to the nea	or further information irest 10 units a piece of off-road ec		pt from the requi	irements of the C	EMP, the piece of	of equipment mu	st either be less	s than 25 hp c	or operate less th	an 20 hours ov	er the entire du	ration of cons	truction activiti	es (i.e., you can n	ot separate the	hours by pha	se to be exemp	t).									

Figure 6: Snapshot of Equipment Inventory Template

CONSTRUCTION PHASE [®]		EQUIPMENT LIST															
	Exception Seeking (if applicable) ^a	Equipment Type ^a	Equipment Manufacturer	Equipment Identification Number ^a	Engine Model Year	Engine Certification (Tier Rating)	Horsepower	Engine Serial Number	Verified Diesel Emission Control Strategy (if applicable)								
									Technology Type	Serial Number	Make	Model	Manufacturer	ARB Verification Number Level	Instal D:		
1	2	3		4		5								6			



CONSTRUCTION PHASES: Demolition Site Preparation Grading **Building Construction** Architectural Coatings Paving Other



EXCEPTION SEEKING (if applicable): Technically Infeasible Not Effective Hazard Emergency



EQUIPMENT TYPE: Paving Equipment Surfacing Equipment Bore/Drill Rigs Rollers Tractors/Loaders/ Cranes Rough Terrain Backhoes Crawler Tractors Forklifts Trenchers **Rubber Tired Dozers** Other Equipment Excavators

Rubber Tired Graders Off-Highway Tractors Loaders Off-Highway Trucks Scrapers

Skid Steer Loaders Pavers







ENGINE CERTIFICATION (TIER RATING):

Tier 2 Tier 3

Tier 4 Interim Tier 4 Final



ARB VERIFICATION NUMBER LEVEL:

Level 1 Level 2 Level 3

Construction Emissions Minimization Plan - Signage

Figure 7: Idling Restriction Sign Template



Clean Construction Requirements:

The Contractor shall post at the construction site a legible and visible sign summarizing the Construction Emissions Plan and shall explain how to request to inspect the Emissions Plan. The Contractor shall post at least one copy of the sign in a visible location on each side of the construction site facing a public right-of-way.

Recommended Size: 11"x17"

Idling:

A legible and visible idling sign shall be posted in English, Spanish, and Chinese in designated queuing areas and at the construction site to remind operators of the idling limit

Recommended Size: 11"x17"

Figure 8: Clean Construction Requirements Sign Template

NOTICE

PROJECT SUBJECT TO CLEAN CONSTRUCTION ORDINANCE

San Francisco Environment Code Section 25.5

All off-road equipment shall have Tier 2 engines and Level 3 (or higher) VDECS

OR

Tier 4 engines

The Public may ask to inspect the Project's Construction Emissions Minimization Plan at any time during work hours.

Project Site Contact: Jane Doe Jane Doe Construction 555-555-5555 JaneDoe@Construction.com Contract Department Contact: John Doc City Department 555-555-5555 John.Doe@sfgov.org

Construction Emissions Minimization Plan -Certification Statement Template

Contract Specifications and Certification Statement

The Department Head shall ensure that all applicable requirements of the Construction Minimization Plan have been incorporated into the contract specifications. The contract shall include a statement (Certification Statement) that the Contractor agrees to comply fully with the Emissions Plan and acknowledges that a significant violation of the Emissions Plan shall constitute a material breach of contract.

Figure 9: Certification Statement Template

Emissions Plan Certification Statement I hereby certify that: 1. The off-road equipment identified in the Emissions Plan meets the engine standards in the Clean Construction Ordinance (Chapter 25 of the Environment Code). 2. All of the requirements in the Plan will be followed and will be incorporated into the contract 3. A significant violation of the Emissions Plan shall constitute a material breach of the contract. Any discrepancy to the Clean Construction Ordinance requirements will be reported to the Department Head immediately I understand that the construction site is subject to random and scheduled inspection to verify the requirements of the Emissions Plan. I certify to the best of my knowledge that I will comply with the items listed above and that I am legally authorized signatory or designee for the Applicant. Signature Title Print Name Company Name Phone Number Company Address

Resources

Templates and Handouts

Download Templates, including:

- Equipment Inventory Template (as discussed on Page 9-10)
- Signs (as discussed on Page 11)
- Certification Template (as discussed on Page 12)
- Notice of Clean Construction Requirements Handout Template (See Page 14)

Visit: https://www.sfdph.org/dph/EH/Air/default.asp

Incentive Programs

The Carl Moyer Air Quality Standards Attainment Program provides monetary grants to private companies and public agencies to clean up their heavy-duty engines/equipment. Carl Moyer Program is administered locally by the Bay Air Area Quality Management District (BAAQMD). The Carl Moyer Program provides incentives to cover the incremental cost of purchasing engines and equipment that are cleaner than required by law. Eligible projects include offroad vehicle engine repowers, retrofits and equipment replacements; on-road truck replacements or retrofits; marine and locomotive engine replacements; lightduty vehicle scrap programs; and, agricultural engine replacements and retrofits. The Program provides funds for significant near-term reductions in nitrogen oxide emissions, reactive organic gases, and particulate matter emissions.

For more information regarding the Carl Moyer Program: www.baaqmd.gov/moyer

Technical Assistance to Local Businesses

The San Francisco Department of the Environment will provide technical assistance to businesses verified as Local Business Enterprises (LBEs) by the Human Rights Commission, and other local businesses in securing available local, State, and Federal public incentive funding to retrofit, repower, or replace offroad equipment or off-road engines operated by such businesses within the City.

Fact Sheets and More Information

The City of San Francisco wants to help improve air quality through cleaner construction equipment. For more information, please see the following resources:

California Air Resources Board (ARB)

- Knowledge Center for the Off-Road Diesel Vehicle Regulation: http://www.arb.ca.gov/ msprog/ordiesel/knowcenter.htm
- Summary of Verified Diesel Emission Control Strategies: http://www.arb.ca.gov/diesel/ verdev/vt/cvt.htm
- Retrofit Device Verification Database (Landing Page): http://www.arb.ca.gov/diesel/verdev/ vdb/vdb.php

Environmental Protection Agency (EPA)

- Diesel Particulate Filter General Information Technical Bulletin (May 2010): http://www. epa.gov/cleandiesel/documents/420f10029. pdf
- Diesel Particulate Filter Installation Technical Bulletin (May 2010): http://www.epa.gov/ cleandiesel/documents/420f10028.pdf
- Diesel Particulate Filter Operation and Maintenance Technical Bulletin (May 2010): http://www.epa.gov/cleandiesel/ documents/420f10027.pdf

Other

• Clean Diesel ClearingHouse: http://tool.cleandieselclearinghouse.org

Notice of Clean Construction Ordinance Requirements for Publicly-Funded Projects

This is a publicly-funded major construction project located in the City of San Francisco; therefore, it is required to conform to the Clean Construction Ordinance (San Francisco Environment Code Section 25.5).

Projects <u>located</u> in the Air Pollutant Exposure Zone must comply with the following requirements:

Equipment Requirements:

- Use Tier 2 or higher engines and the most effective Verified Diesel Emission Control Strategies (Tier 4 engines automatically meet this requirement) for the engine type as certified by the Air Resources Board (ARB);
- Prohibit portable diesel engines where access to alternative sources of power are available;
- Restrict idling to two minutes; and
- Properly maintain and tune equipment in accordance with manufacturer specifications.

Construction Emissions Minimization Plan shall be prepared and include the following:

- An equipment inventory which shall include estimates of the construction timeline by phase with description of each piece of off-road equipment required for each phase;
- Signage indicating idling limits and engine/Verified Diesel Emission Control Strategies requirements; and
- Certification Statement.

Monitoring shall begin at the start of construction activities and include:

- Quarterly reports documenting compliance with the Emissions Plan which shall be maintained at the project site; and
- Final report summarizing construction activities.

Projects <u>not located</u> in the Air Pollutant Exposure Zone must comply with the following requirements:

Equipment Requirements:

Utilize only off-road equipment and off-road engines fueled by biodiesel fuel grade B2O and utilize only off-road equipment that either meets or exceeds Tier 2 standards for off-road engines or operates with the most effective VDECS as certified by ARB.

Documentation must be submitted to the head of the department (Department Head) authorized to perform Public Works. The Department Head will be contacted by the inspector if the project is in violation of the Ordinance. Violations may be punishable by refusal to certify the award of contract; suspension of a contract, withholding of City funds; recession of contract; debarment; and any other remedy authorized in law or equity.

Thank you for your attention to this notice. Please direct any questions concerning this notice to the [Name], [Department Name] at (415) XXX-XXXX or XXXXXXXXSfgov.org.

For more information, please visit https://www.sfdph.org/dph/EH/Air/default.asp