Lower Duwamish Waterway Upper Reach Remedial Action

Air Pollution and Odors Control Plan

Revision 5

October 7, 2024

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Quality information

Prepared by	Checked by	Verified by	Approved by	Contractor Approval
Rachel Johnson	Abby Chin, PE	Melissa McLaughlin	Kristine Carbonneau, PE	JC Clark

Revision History

Revision	Revision date	Details
0	June 12, 2024	
1	July 9, 2024	
2	July 19, 2024	
3	August 23, 2024	
4	August 28, 2024	
5	October 7, 2024	

Prepared for:

King County – WTD Construction
Shannon Phipps, Project Representative
2500 W Jameson Street
Seattle, WA 98199-1241

Prepared by:

AECOM
1111 Third Avenue
Suite 1600
Seattle, WA 98101
aecom.com

Prepared in association with:

Pacific Pile and Marine

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Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
BMP	Best management practices
DRF	Duwamish Reload Facility
EC	elemental carbon
EMB	Environmental Mitigation Binder
EPA	U.S. Environmental Protection Agency
CFR	Code of Federal Regulations
COI	Constituent of Interest
CQAP	Construciton Quality Assurance Plan
H_2S	hydrogen sulfide
LDW	Lower Duwamish Waterway
PCB	polychlorinated biphenyl
Plan	Air Pollution and Odors Control Plan
PPM	Pacific Pile & Marine
PSCAA	Puget Sound Clean Air Agency
RAWP	Remedial Action Work Plan
RCW	Revised Code of Washington
Site	Lower Duwamish Waterway Superfund Site
SMA	Sediment Management Area
TWA	time-weighted average
USC	United States Code
VOC	volatile organic compound
WAC	Washington Administrative Code

1. Introduction

This Air Pollution and Odors Control Plan (Plan) for the Lower Duwamish Waterway (LDW) Upper Reach describes requirements and procedures to be implemented for visible dust, fugitive odors, and diesel exhaust during remedial construction activities for the upper reach of the Lower Duwamish Waterway Superfund Site (Site) in King County, Washington.

The general scope of work includes the following:

- Mobilization of construction equipment and materials;
- Site preparation activities, including construction and setup of the staging and stockpile area(s), temporary erosion and sediment controls, water collection and treatment management practices, utility disconnection, and clearing/grubbing;
- Dredging, excavation, potential contingency re-dredging, barge dewatering, in-water transportation, transloading, upland transportation, and disposal of dredge material, dredge debris, identified debris, and pilings, from the Sediment Management Areas (SMAs);
- Placement of clean imported materials in and around the SMAs;
- Removal of pilings, bulkhead strengthening and reinforcement, replacing of piling with steel pipe, and installation of outfall energy dissipation structures; and
- Site restoration, cleanup, and demobilization.

1.1 Purpose

The purpose of this Plan is to identify, minimize, and mitigate project-related quality of life impacts associated with air quality that risk affecting the surrounding community and to perform the remedial action complying with federal, state, and local air quality standards. The following Site documents were used to prepare aspects of this Plan:

- 100% Remedial Design Volume II, Part I Construction Quality Assurance Plan for Lower Duwamish Waterway Upper Reach (Anchor QEA, 2024);
- Specification Section 01 33 00 (Submittals);
- Specification Section 01 35 43 (Environmental Procedures); and
- Specification Section 01 35 44 (Green Remediation Requirements).

Work for the Site will be performed in accordance with the plans and specifications or as directed by the Project Representative to execute this Plan.

1.2 Key Roles and Responsibilities

The Remedial Action Work Plan (RAWP) provides an organizational chart of key Site personnel, roles, and a summary of responsibilities. King County's Construction Quality Assurance Team will be responsible for performing all monitoring activities associated with diesel exhaust, odors related to hydrogen sulfide (H_2S), and dust as outlined in the Construction Quality Assurance Plan (Anchor QEA, 2024).

2. Performance Standards and Potential Sources

2.1 Performance Standards

Referenced standards applicable to this Air Pollution and Odors Control Plan include those stated in **Table 2-1** below.

Table 2-1. Reference Standards

Reference	Title
40 Code of Federal Regulations (CFR) 50	Clean Air Act
40 United States Code (USC) 7401-7671q	Clean Air Act
Puget Sound Clean Air Agency (PSCAA) Section 9	Emission Standards
PSCAA Section 15	Nonroad Engines
Revised Code of Washington (RCW) 70.94	Washington Clean Air Act
Washington Administrative Code (WAC) 173-400	Washington Clean Air Act

To protect the surrounding community from diminished air quality, PPM will comply with federal, state, and local air quality standards during construction activities. To reduce engine emissions from construction equipment, air quality performance requirements follow the air emission standards defined in the EPA's Tier System (EPA, 2022) for fossil fuel consumption. Air pollution tier requirements and usage (number of hours) for each type of equipment anticipated to be used at the Site are provided in **Table 2-2**.

2.1.1 Site Specific Requirements

The air quality impacts from Site activities on the adjacent community include visible dust, fugitive odors, and diesel exhaust. Dust concerns include impacts to property as well as inhalation of dust, diesel exhaust and contaminants adhered to dust. Fugitive odors present a potential quality of life issue for receptors in proximity to the Site. Specific requirements pertaining to visible dust, fugitive odors (H_2S), and diesel exhaust are as follows (Anchor QEA, 2024):

- Visible Dust
    - To comply with PSCAA Regulation I, Section 9.15, "no visible dust" shall be allowed at the Site perimeter, identified in the Construction Quality Assurance Plan as the shoreline boundary when the Contractor is working over water and upland property boundaries
    - when the Contractor is working on land.
- Fugitive Odors (H_2S)
    - To comply with Washington Administrative Code (WAC) 173-460-150, the performance standard for H_2S will be a daily 24-hour TWA of 2 $\mu g/m^3$ at the Site perimeter.
- Diesel Exhaust
    - Although there are no enforced or regulated criteria for diesel particulate matter, the American Conference of Governmental Industrial Hygienists (ACGIH) recommends a threshold limit for elemental carbon (EC) of 20 $\mu g/m^3$ as an 8-hour time-weighted average (TWA). The proposed diesel exhaust criteria limit for this Site will follow the ACGIH recommended value.

2.2 Potential Air Pollution and Odor Generating Sources

Typical Site work configurations including locations of potential diesel exhaust, odors (H_2S), and dust generating sources are identified for SMA-5 (**Figure 1**) and in-water work (**Figure 2).** The locations of generating sources identified in **Figure 2** will change as work progresses through each SMA. Air pollution generating Site activities are included in the following Tables.

Table 2-2. Diesel Exhaust Producing Equipment:

Diesel Exhaust Producing Equipment	Associated Site Operation
Excavators used for dredging and material placement	Dredging & Placement
Barges, Tugboats, and other small workboats	In-Water Operations
Upland Construction Equipment	SMA-5
Haul Trucks, locomotives, and barges/tugboats	Material Transportation
Duwamish Reload Facility (DRF) equipment	Transload Facility

Table 2-3. Potential Dust Producing Activities:

Potential Dust Producing Activities	Associated Site Operation
Excavation of dry soil (Sediment Management Area [SMA] 5)	SMA-5
Stockpiling of impacted material (e.g. sediment, soil, and debris)	SMA-5 and Transload Facility
Handling of dredged sediment during the dewatering process	In-Water Operations and Dredging
Loading and unloading of impacted material	SMA-5 and Transload Facility
Transporting of uncovered impacted materials	SMA-5 and Transload Facility
Equipment and vehicle decontamination procedures	In-Water Operations and SMA-5
Vehicle tracking of particles during transportation	Material Transportation

Table 2-4. Potential Fugitive Odors Producing Activities:

Potential Fugitive Odors Producing Activities	Associated Site Operation
Dredging of sediment that contains decaying organic matter (H_2S)	Dredging
Excavation of dry soil (SMA 5)	SMA-5
Handling of dredged sediment during the dewatering process	In-Water Operations and Dredging
Loading and unloading of impacted material	SMA-5 and Transload Facility
Impacted material stockpiles	SMA-5 and Transload Facility

2.3 Air Pollution and Odors Generating Equipment

Construction equipment proposed for use at the Site will meet the minimum EPA Tier engine requirements per Specification Section 01 35 44 (Green Remediation Requirements). Use of air pollution generating equipment at the Site will be limited to the hours of 7:00 a.m. and 7:00 p.m. for weekdays and 9:00 a.m. and 7:00 p.m. for weekends and legal holidays to the extent possible. Due to the excavation requirements of SMA-5, air pollution generating equipment will be operated during the low tide hours which will

generally be during the nighttime hours of 6:00 pm to 6:00 am. The Green Remediation Plan outlines the air pollution generating equipment proposed for use at the Site, the construction activities conducted with the equipment, the estimated hours of operation, and required engine Tier. Engine Tiers consider manufacturing year and horsepower as defined by EPA's Tier system (EPA, 2022) as:

- Pre-Tier Engines: All equipment manufactured prior to 1996; it is assumed that this equipment was produced without a requirement to meet specific air emission standards.
- Tier 1 Engines: Equipment manufactured between 1997 and 2005. Exact applicability date depends on horsepower.
- Tier 2 Engines: Equipment manufactured between 2001 and 2010. Exact applicability date depends on horsepower.
- Tier 3 Engines: Equipment manufactured between 2006 and 2011. Exact applicability date depends on horsepower.
- Tier 4 Engines: Equipment manufactured in 2008 and later. Exact applicability date depends on horsepower.

3. Prevention and Mitigation Measures

This section describes best management practices (BMPs) that will be implemented by PPM during remedial activities to reduce and control the production of fugitive odors, dust, and diesel exhaust. Prevention and mitigation measures have been categorized by Site operation including in-water operations, dredging and placement, SMA-5 remediation, material transportation, and DRF. Prevention includes measures that will be implemented at all times during Site operations and mitigation includes measures that will be selected from and implemented in response to community complaints, air quality exceedances, and/or at the Project Representatives request. Potential air pollution generating sources associated with each Site operation is provided in **Tables 2-2, 2-3,** and **2-4.**

3.1 In-Water Operations

To limit air quality impacts related to fugitive odors, dust, and diesel exhaust emissions during in-water Site operations the following prevention and mitigation measures will be implemented:

- Prevention
    - Equipment will go through a thorough pre-construction inspection and systems check prior to the start of the construction season. Any deficiencies or issues will be flagged and addressed prior to utilization on the project.
    - Equipment inspections will be performed daily before use and regular maintenance will be scheduled to ensure peak operating efficiency.
    - Tugboats on the project will utilize diesel particulate filters in their propulsion systems to capture and control diesel particulate emissions, see the Green Remediation Plan (Appendix M of the RAWP) for more details .
    - Effective fleet management will be performed by planning to minimize fuel consumption through:
        - efficient transportation routes based on current and forecasted weather and tidal conditions
        - hauling of fully loaded barges when feasible to maximize material moved per trip and minimize overall barge trips for the project
        - Slow steaming of barge loads at speeds slower than the speed limit to reduce fuel consumption and emissions
        - Utilizing high horse-powered tugs to mitigate high revolutions per minute conditions that burn more fuel and release more emissions
- Mitigation
    - "If diesel exhaust emissions are determined to be excessive by the Project Representative based on a time weighted average in accordance with the Construction Quality Assurance Plan, PPM will repair or replace the vehicle or equipment Vessel positioning will be adjusted as needed.
    - Operating procedures and/or methods will be modified to eliminate minor problematic conditions, such as adjusting the idle RPM of equipment.
    - Production of activities causing the exceedance could be reduced by 10% to assess the impact of the particular piece of equipment on air quality.
    - Activities causing the exceedance will be limited to time periods when preferred meteorological conditions exist, such as favorable prevailing wind direction or low temperatures.

If monitoring conducted by the King County's Construction Quality Assurance Team determines that exceedances are continuing, operations causing the exceedance will cease and a path forward will be discussed with the Project Representative.

3.2 Dredging & Placement

To limit air quality impacts related to fugitive odors, dust, and diesel exhaust emissions during dredging & placement, Site operations the following prevention and mitigation measures will be implemented:

- Prevention
    - Smoke, dust, or other contaminants will not be discharged into the atmosphere that violate the regulations of the authorities having jurisdiction.
    - Equipment will go through a thorough pre-construction inspection and systems check prior to the start of the construction season. Any deficiencies or issues will be flagged and addressed prior to utilization on the project.
    - Equipment inspections will be performed daily before use and regular maintenance will be scheduled to ensure peak operating efficiency.
    - Use of the Hitachi EX1200-6 will be prioritized over other excavators due to it being a newer model equipped with a high-pressure common rail system. This technology enhances fuel injection, which improves combustion efficiency, reduces emissions, and increases overall engine performance. All excavators used for dredging will be equipped with Diesel Particulate Filters.
    - Workers will have their fuel paid for by PPM if they elect to carpool. Workers that commute via public transportation will have their fares paid by PPM.
- Mitigation
    - "If diesel exhaust emissions are determined to be excessive by the Project Representative based on a time weighted average in accordance with the Construction Quality Assurance Plan, PPM will repair or replace the vehicle or equipment Vessel positioning will be adjusted as needed.
    - Operating procedures and/or methods will be modified to eliminate minor problematic conditions, such as adjusting the idle RPM of equipment.
    - Production of activities causing the exceedance of dust, odors, or diesel exhaust could be reduced by 10% to identify a problematic piece of equipment for replacement.
    - Activities causing the exceedance will be limited to time periods when preferred meteorological conditions exist, such as favorable prevailing wind direction or low temperatures.

If monitoring conducted by the King County's Construction Quality Assurance Team determines that exceedances are continuing, operations causing the exceedance will cease and a path forward will be discussed with the Project Representative.

3.3 SMA-5

To limit air quality impacts related to fugitive odors, dust, and diesel exhaust emissions during SMA-5 excavation, Site operations the following prevention and mitigation measures will be implemented:

- Prevention
    - Equipment will go through a thorough pre-construction inspection and systems check prior to the start of the construction season. Any deficiencies or issues will be flagged and addressed prior to utilization on the project.

  - Equipment inspections will be performed daily before use and regular maintenance will be scheduled to ensure peak operating efficiency.
  - All excavators and loaders used for SMA5 will be equipped with Diesel Particulate Filters.
  - Sediment emitting odors will be transported off site immediately as soon as they are removed from the excavation areas.
  - Tires and trucks will be cleaned via a wheel wash to remove sediment, before leaving the site.
  - Dust nuisance will be minimized as needed by sweeping the site daily with a powered street sweeper brush.

- Mitigation
  - "If diesel exhaust emissions are determined to be excessive by the Project Representative based on a time weighted average in accordance with the Construction Quality Assurance Plan, PPM will repair or replace the vehicle or equipment Adjustment of haul routes.
  - Above-water excavation will be stopped, dependent on Site conditions.
  - The size of open excavation will be limited, dependent on Site conditions.
  - Stockpiles with be covered with plastic sheeting if stockpiles are the source of exceedance.
  - Additional sweeping of any paved areas will be performed.
  - Applying water directly to stockpiles to suppress fugitive dust and odors; pollution control for SMA5 is also described in the Erosions and Sediment Control Plan.
  - Dredge spoil stockpiles would be covered when not in use to mitigate dust or odor. Odor agents could also be utilized if sheeting proves ineffective.
  - Operating procedures and/or methods will be modified to eliminate minor problematic conditions, such as adjusting the idle RPM of equipment.
  - Production of activities causing the exceedance could be reduced to identify a problematic piece of equipment or activity and then mitigation measures would be created to address
  - Activities causing the exceedance will be limited to time periods when preferred meteorological conditions exist, such as favorable prevailing wind direction or low temperatures.

If monitoring conducted by the King County's Construction Quality Assurance Team determines that exceedances are continuing, operations causing the exceedance will cease and a path forward will be discussed with the Project Representative.

3.4 Material Transportation

To limit air quality impacts related to fugitive odors, dust, and diesel exhaust emissions during SMA-5 Site operations the following prevention and mitigation measures will be implemented:

- Prevention
  - Effective fleet management will be performed by planning to minimize fuel consumption through efficient transportation routes and transfer of only full loads when feasible
  - Idling time of on-road vehicles, including delivery and haul trucks, will be limited to 5 minutes maximum.
  - PPM will encourage safe driving techniques (such as avoiding rapid acceleration, braking, and excessive speeds).

- Truckloads and railcars of impacted material will be covered.
- Loading areas will be cleaned daily with a street sweeper to reduce vehicles tracking material offsite.
- When operating dump trucks or other heavy construction equipment on paved streets and roadways, the streets immediately adjacent to the Site entrances/exits will be cleaned with a powered street sweeper as needed at the end of each workday and as directed by the Project Representative.
- Staging trucks so load outs could occur more efficiently without startups or shutdowns between trucks.
- During dry weather paved areas will be swept daily.

- Mitigation
  - "If diesel exhaust emissions are determined to be excessive by the Project Representative based on a time weighted average in accordance with the Construction Quality Assurance Plan, PPM will repair or replace the vehicle or equipment Adjustment of haul routes as necessary.
  - Operating procedures and/or methods will be modified to eliminate minor problematic conditions, such applying water or environmentally safe suppressants to materials before and during transportation to minimize dust generation
  - Activities causing the exceedance will be limited to time periods when preferred meteorological conditions exist, such as favorable prevailing wind direction or low temperatures.

If monitoring conducted by the King County's Construction Quality Assurance Team determines that exceedances are continuing, operations causing the exceedance will cease and a path forward will be discussed with the Project Representative.

3.5 DRF

To limit air quality impacts related to fugitive odors, dust, and diesel exhaust emissions during Site operations at the DRF the following prevention and mitigation measures will be implemented:

- Prevention
  - Smoke, dust, or other contaminants will not be discharged into the atmosphere that violate the regulations of the authorities having jurisdiction. Smoke, dust, engine exhaust fumes, or other contaminants will be prevented from entering building spaces by directing them away from building intake plenums, building doors, or openings. Note: the excavator used at the DRF transload facility for offloading dredge material is electric.
  - Equipment inspections will be performed daily before use and regular maintenance will be scheduled to ensure peak operating efficiency.
  - Effective fleet management will be performed by planning to minimize fuel consumption through efficient transportation routes, transfer of only full loads when feasible, and selection of vehicles.
  - Truckloads and railcars of impacted material will be covered.
  - Loading areas are fully contained, there will be no vehicle traffic moving through the loading areas to minimize dust.
  - Dust nuisance will be minimized by wetting (with water spray) unpaved traffic lanes and soil/sediment stockpiles.
  - During dry weather paved areas will be swept daily.
- Mitigation

- If diesel exhaust emissions are determined to be excessive by the Project Representative, PPM will recommend to DRF that they repair the vehicle or equipment.
- Performing additional sweeping of any paved areas.
- PPM will recommend operating procedures and/or methods to be modified to eliminate minor problematic conditions.

4. Quality Control

4.1 Documentation

The Project Engineer will be responsible for documenting the following information for each air monitoring event:

- Date/time;
- Weather information;
- Reason for monitoring event including the generating source;
- If monitoring event was in response to community complaint(s), details of the complaint(s) shall be documented including:
  - Time of complaint,
  - Location complaint is in reference to,
  - Generating source of complaint, and
  - Summary of the complaint received.
- Location of monitoring event;
- Results of monitoring;
- Summary of response actions taken, effectiveness, and duration if the monitoring event was due to community complaint(s); and
- Summary of communications with the Project Representative including the time that the complaint(s) were addressed if the monitoring event was in response to complaint(s).

4.2 Reporting

The Construction Quality Control Officer will compile the documentation outlined in **Section 4.1** into the following reports and include the information summarized below at a minimum.

Daily Construction Reports, due the morning of the next workday, will include the following information:

- Document compliance with air pollution requirements, associated issues, and community complaints as applicable;
- Equipment operating hours and engine tier for each Site activity;
- BMPs implemented; and
- Response actions taken to address community complaints or Project Representative requests.

Weekly Construction Reports, due the Monday morning of the following work week, will include the following information:

- Summary of compliance with air pollution requirements, associated issues, and community

complaints as applicable;

- Equipment total operating hours and engine tier for each Site activity;
- BMPs implemented;
- Response actions taken to address community complaints or Project Representative requests;
- Summary of communication with the Project Representative regarding compliance with this Plan;
- Summary of outstanding issues; and
- Photographs documenting Site activities and mitigation measures.

Monthly Air Pollution Compliance Summary Reports, due within 8 working days after the end of each month, will include the following information:

- Brief summary of monitoring events;
- Brief summary of community complaints received and mitigation measures implemented to address complaints, if applicable; and
- Equipment total operating hours and associated engine tier used for each Site activity.

5. References

Anchor QEA, 2024. 100% Remedial Design Volume II, Part I Construction Quality Assurance Plan for Lower Duwamish Waterway Upper Reach. Anchor QEA. January 2024.

EPA, 2022. Emission standards reference guide for on-road and nonroad vehicles and engines [online]. US Environmental Protection Agency. Updated August 5, 2022. Available from: https://www.epa.gov/emission-standards-reference-guide.