ESA

819 SE Morrison Street
Suite 310
Portland, OR 97214
503.274.2010 phone
503.274.2024 fax

esassoc.com

memorandum

date May 19, 2025

to Tim Brooks, Winterbook Planning; David Peters, City of Portland Water Bureau

from Phil Gleason, ESA | Environmental Science Associates

subject Portland Water Bureau Filtration Facility Project: Responses to AQ- and GHG-Related Post-Hearing Remand Submissions

Introduction

Under contract with Winterbrook Planning, Environmental Science Associates (ESA) has prepared this technical memorandum to respond to air quality (AQ) and greenhouse gas (GHG) related evidence entered into the land use record after the public Remand Hearing on April 16, 2025, for the Portland Water Bureau (PWB) Water Filtration Facility and Pipeline Project (Project). Specifically, this memorandum provides responses to AQ and GHG items contained in the "S" Exhibits.

ESA previously provided two technical memorandums, the:

(1) "Portland Water Bureau Filtration Facility Project: Operational Air Quality Analysis" memorandum prepared by Phil Gleason, dated April 15, 2025, which was included in the land use record as staff's **Exhibit N.61** (referred to hereafter as, "ESA's Operational AQ Analysis") (Multnomah County, 2025a).

(2) "Portland Water Bureau Filtration Facility Project: Response to AQ- and GHG-Related Testimony At or Prior to Hearing" memorandum prepared by Phil Gleason, dated May 5, 2025, which was included in the land use record as staff's **Exhibit S.35** (referred to hereafter as, "ESA's 1st AQ-GHG Response") (Multnomah County, 2025b).

This memorandum builds upon ESA's Operational AQ Analysis and ESA's 1st AQ-GHG Response, and uses defined terms and other concepts from those technical memorandums.

Responses to AQ and GHG Testimony for Exhibit "S"

Exhibit S.2 (David Shapiro Comments – 4.17.2025). Page 1, paragraphs 3 through 6 of Exhibit S.2 include the following AQ-related comments regarding Project fuel consumption; import and export of caking agent and residual solids, respectively; and Project effects to wildlife (Multnomah County, 2025c):

> "The reality is that this will be a highly impactful facility that will continue to be incredibly fuel dependent while operating… There will be daily removal of the caking agent. The caking agent will be truck in from a port in San Diego, having come from overseas…

> You will need an incredible amount of diesel needed (sic) to ship it in and bring it up to Boring…
>
> But after it does the job of filtering the water it will be spent and the spent caking agent will have to be removed and the PWB will put it on large trucks daily and send it down the small and winding roads that lead to I84…
>
> I spoke on behalf of the wildlife and I can assert that the operation of the PWB filtration plant will continue to do harm to the wildlife."

Response to Exhibit S.2 (Project Fuel Consumption)

Air quality emissions associated with the Project (and the underlying fuel sources that contribute to those emissions) were addressed in ESA's Operational AQ Analysis. Vehicle trips associated with the Project would consume gasoline and diesel during operation and diesel during emergency back-up generator (eBUG) operation (pg. 5, bullet 1, and pg. 5, paragraph 2 under "Diesel Particulate Matter (DPM) Analysis"; Multnomah County, 2025a). The Project would not utilize natural gas-fueled equipment. Instead, the Project has been designed to use electricity as its primary fuel source to accommodate operational needs. As further elaborated upon in ESA's 1st AQ-GHG Response, the Project includes numerous sustainability measures that: (1) increase the Project's energy efficiency, and (2) decrease reliance on non-renewable sources of energy (e.g., gasoline and diesel). These previous discussion points are summarized below.

- The Project's unique geographic location accommodates untreated water conveyance to the Facility via gravity instead of pumping the water to the Facility (pg. 3, paragraph 2; Multnomah County, 2025b). This gravity-fed solution is an energy-efficiency feature made possible based on the Filtration Facility's (Facility's) location.

- The Project would not include natural gas-fired boilers, instead treating water through electrically powered machinery and chemical agents (pg. 3, paragraph 2; Multnomah County, 2025b). The Project would benefit from legislative requirements (e.g., House Bill [HB] 2021), which would increase the amount of renewable electricity the Project uses as time passes.

- The Project includes two, level 2, public electric vehicle (EV) charging stations and one level 2 EV charging station for PWB fleet vehicles. The Project has also been designed to accommodate four additional public EV charging stations and two additional EV charging stations for PWB fleet vehicles (footnote 4 on pg. 4; Multnomah County, 2025b). These EV charging stations (and Project design to accommodate more in the future) furthers PWB's efforts to electrify their vehicle fleet and provides infrastructure to transition non-renewable fuel-based vehicles (e.g., gasoline and diesel cars/trucks) to EVs in the future.

- The Project would install a rooftop solar array that generates renewable electricity for the administration building, reducing the quantity of electricity sourced from the grid (pg. 4, paragraph 1; Multnomah County, 2025b).

Energy consumption is a necessary component of almost every land use development, and this Project is no exception. However, the Project has been designed in a sustainable manner to reduce energy consumption over the near- and long-term. The Project's design (1) leverages its unique geographic location to reduce fuel/energy consumption, (2) omits on-site equipment powered by non-renewable fuel sources used for typical day-to-day operations (and instead uses electrically powered equipment), and (3) provides on-site renewable energy generation with EV charging stations. The Project would consume fuel/energy as part of typical operations, but this consumption would occur in a sustainable manner, and the AQ emissions associated with the Project's energy demands would not adversely affect the natural environment, as documented in the land use record for the Project.

Response to Exhibit S.2 (Vendor Deliveries and Residual Off-haul Trips)

Vehicle trips associated with the Project, including vendor deliveries of the coagulant aid (referred to by the commenter as the "caking agent") and haul trips associated with residual off-haul, were evaluated in ESA's Operational AQ Analysis (see final bullet on pg. 2; Multnomah County, 2025a). ESA's Operational AQ Analysis accounted for vendor chemical deliveries coming from out of state (i.e., California and Washington). The emissions from these vehicle trips, even when combined with the Project's other emission sources and numerous other conservative assumptions made when developing the operational AQ emissions inventory, were determined to not have the potential to adversely affect natural resources (see Table 1 for the operational AQ emissions inventory and a discussion of the conservative assumptions made by ESA on pgs. 4 and 5; Multnomah County, 2025a).

It would have been inappropriate to include AQ emissions generated by oceangoing vessels (OGV)/barges in ESA's Operational AQ Analysis, because those emissions are directly attributable to the vendor that sells those chemicals. The Project's chemical demands would not necessitate an additional OGV/barge trip, and the Project is not proposing to directly import chemicals from overseas.

Furthermore, given the distance between out-of-state chemical vendors and the Facility site, it is unlikely that these vendors would send a truck that only delivers chemicals to the Facility. It is far more likely that any out-of-state vendor(s) would send a chemical delivery truck for several of their Oregon clients as a cost-saving measure on their end. In turn, this would reduce the quantity of trucking emissions directly attributable to the Project (i.e., if a chemical vendor delivery trip served two clients in Oregon, it could be appropriate to proportion the AQ emissions generated by the trip 50/50 between the end users). As a conservative measure, ESA did not account for any shared vendor delivery truck trips that may occur, instead allocating 100 percent of the AQ emissions from Project-serving trips to the Project itself. Even after accounting for this unlikely and conservative scenario, the AQ emissions associated with the Project would not have the potential to adversely affect natural resources, as described in ESA's Operational AQ Analysis (pgs. 4 and 5; Multnomah County, 2025a).

Mobile source emissions, including vendor deliveries of the coagulant aid (referred to by the commenter as the "caking agent") and haul trips associated with residual off-haul, were evaluated in ESA's Operational AQ Analysis and determined to not have the capacity to adversely affect natural resources.

Response to Exhibit S.2 (Harm to Wildlife)

The Project's ability to adversely affect natural resources with regard to wildlife exposure to Project-generated AQ emissions was evaluated in Response to Exhibit N.45 (see pgs. 4 through 6; Multnomah County, 2025b). As described in that response, the United States Environmental Protection Agency (EPA) has established Primary and Secondary National Ambient Air Quality Standards (NAAQS), with the latter having been adopted for the purposes of protecting public welfare (including animals, crops, and vegetation) from harmful effects of air pollution (EPA, 2017). The Project's AQ emissions, as evaluated in ESA's Operational AQ Analysis, would not exceed the *De Minimis Thresholds*, and therefore would not have the potential to cause or contribute to a violation of the Primary or Secondary NAAQS. Project-generated AQ emissions would not be emitted in such quantities that adverse harm would come to wildlife, and the Project would not adversely affect natural resources.

Exhibit S.3 (Amy Houchen Comments – 4.17.2025) and Exhibit S.4 (Westly Ward Comments – 4.18.2025). The second paragraphs of Exhibits S.2 and S.3 include the following identical language, asserting that the Project would cause irreparable harm to natural resources (Multnomah County, 2025d and 2025e):

> "Continued work and ultimate operation of this facility as scoped would cause irreparable harm to nearly 95 acres of agricultural natural resources, and LUBA has determined that the county failed to consider how the building process would affect these. Multnomah County staff themselves have said these natural resources include "functioning natural systems, … agricultural resources, and forests."

<u>Response to Exhibits S.3 and S.4 (Irreparable Harm to Natural Resources)</u>

The Project's AQ emissions have been evaluated and determined to not adversely affect natural resources. These analyses are included in the land use record as Exhibits N.61 and S.35 (Multnomah County, 2025a and 2025b). As detailed in ESA's Operational AQ Analysis and 1st AQ-GHG Response, the Project's AQ emissions would not exceed the *De Minimis Thresholds*, and therefore would not have the potential to cause or contribute to a violation of the Primary or Secondary NAAQS, which serve as nexuses for public health and welfare, respectively (see pgs. 2 through 5; Multnomah County, 2025a; and pgs. 4 through 6; Multnomah County, 2025b). Therefore, the Project emissions would not adversely affect natural resources, including natural systems, agricultural resources (to the extent they are natural resources), or forests.

Exhibit S.6 (John & Janet Edmonson Comments – 4.21.2025). Exhibit S.6 asserts that PWB did not prepare a natural resources inventory:

> "Also, PWB did not complete their due diligence in providing an inventory of natural resources nor took appropriate steps to mitigate any damage to natural resources as required in MCC 39.7515 (B) and the Multnomah County Plan" (pg. 2, paragraph 1; Multnomah County, 2025f).

<u>Response to Exhibit S.6 (Inventory of Natural Resources)</u>

The commenter is incorrect in their assertion that PWB failed to prepare an inventory of AQ natural resources. Exhibit N.61 provides a comprehensive inventory of the Project's AQ emissions and includes an analysis demonstrating that Project AQ emissions would not have the capacity to adversely affect natural resources (Multnomah County, 2025a). ESA's Operational AQ Analysis is further supplemented by the responses and analysis provided in Exhibit S.35 and the responses provided in this memorandum (Multnomah County, 2025b). The PWB exercised its due diligence in preparing an inventory of AQ emissions and no additional steps (e.g., mitigation) are required to demonstrate that Project emissions would not have an adverse effect on natural resources.

Exhibit S.10 (Susan Swinford Comments – 4.30.2025). Page 2, list item 5 of Exhibit S.10 contains the following comment regarding fugitive dust emissions from Project construction and operation:

> "Agricultural Resource Impacts: The MCCP definition specifically includes "agricultural resources" multco.us. Nearby farmland or grazing land will be affected. Dust from construction traffic and plant operations can coat crops or soil, and any chemical drift or accidental spill (e.g. herbicides, treatment chemicals) can contaminate fields… These impacts would degrade soil quality and crop viability (loss of agricultural capability)" (Multnomah County, 2025g).

<u>Response to Exhibit S.10 (Dust from Construction Traffic)</u>

The Hearings Officer held, and the Land Use Board of Appeals affirmed, that construction is not within the scope of the Proposed Use to be considered in this land use proceeding (Multnomah County, 2023 and LUBA, 2025). Therefore, this comment is irrelevant to this proceeding and to compliance with Multnomah County Code (MCC) 39.7515(B).

<u>Response to Exhibit S.10 (Dust from Plant Operations)</u>

This has been responded to in the land use record. ESA conducted a comprehensive analysis of fugitive dust emissions that could occur from Project operations, including dust from Facility (referred to as "plant" by the commenter), and determined that those emissions would not have the capacity to adversely affect nearby farm- or grazing-land. See ESA's Operational AQ Analysis for the methodology and data sources used to estimate AQ emissions, the AQ emissions inventory, and the analysis demonstrating that the Project would not have the capacity to adversely affect natural resources (pgs. 2 through 5; Multnomah County, 2025a). As detailed in ESA's Operational AQ Analysis, the Project's AQ emissions would not exceed the *De Minimis Thresholds*, and therefore would not have the potential to cause or contribute to a violation of the Primary NAAQS. This analysis is further expanded upon in the Response to Exhibit N.45, which provides further information on the Secondary NAAQS that serves as a nexus for public welfare (including animals, crops, and vegetation) (see pgs. 4 through 6; Multnomah County, 2025b). As detailed in that response, the Project's AQ emissions would not cause or contribute to a violation of the Secondary NAAQS and, therefore, the Project's AQ emissions would not adversely affect nearby farmland or grazing land (including degradation of soil quality and crop viability) as suggested by the commenter.

Exhibit S.11 (John Swinford Comments – 5.1.2025). Exhibit S.11 contains several comments on pages 1 through 3 that address dust, microclimate alteration, ecological balance and natural system resiliency, and impairment of natural systems (Multnomah County, 2025h).

> "Forests and agricultural lands may be weakened due to edge effects, hydrologic disruption, *dust, and microclimate alteration* caused by the facility's presence and activity" (pg. 1, list item 1, bullet 3; Multnomah County, 2025h; *emphasis* added by ESA).

> "Unlike construction-related disturbances, which are temporary, the negative impacts associated with the operation of the facility will persist for decades. The noise, *activity*, lighting, vehicular access, chemical storage, and runoff will all become permanent features of the landscape, continuously affecting the area's

> ecological balance and reducing the function and resilience of its natural systems" (pg. 2, list item 3; Multnomah County, 2025h; *emphasis* added by ESA).
>
> "While the applicant may cite compliance with policies in the Comprehensive Plan's Natural Resources chapter, LUBA has made clear that this is not enough to demonstrate compliance with MCC 39.7515(B). The standard demands a *direct and site-specific evaluation of how the use, as operated, will impair natural systems*—regardless of broader policy alignment" (pg. 2, list item 4; Multnomah County, 2025h; *emphasis* added by ESA).
>
> "Using Dodge Park Boulevard to support an industrial-scale filtration facility—*including construction haul routes and long-term operational traffic—would result in dust*, noise, *visual degradation*, and increased roadway wear, directly conflicting with the NSBP's mission. It undermines the community's efforts to safeguard its natural heritage and weakens the *scenic and ecological value* of this federally recognized resource" (pg. 3, list item 6, paragraph 2; Multnomah County, 2025h; *emphasis* added by ESA).

<u>Response to Exhibit S.11 (Dust; pg. 1, list item 1, bullet 3 and pg. 3, list item 6, paragraph 2)</u>

As explained in "Response to Exhibit S.10 (Dust from Plant Operations), "…the Project's AQ emissions would not exceed the *De Minimis Thresholds*… that serve[s] as a nexus for public welfare (including animals, crops, and vegetation)."

Thus, potential adverse effects to ecology (including those associated with forests and agricultural lands) have already been addressed and responded to. In addition to addressing potential effects to animals, crops, and vegetation, the Secondary NAAQS also protect against decreased visibility, thereby addressing the commenter's visual degradation and scenic value concerns from an AQ perspective (EPA, 2017). Accordingly, the Project would not result in visual degradation or adversely affect natural resources with regard to scenic value, nearby forests, or agricultural lands.

<u>Response to Exhibit S.11 (Microclimate Alteration)</u>

It is unclear in what regard the commenter is suggesting that the Project would adversely affect forests or agricultural lands from a microclimate alteration standpoint. From a GHG perspective, the Project would not have the capacity to result in any such adverse changes. As described in ESA's 1st AQ-GHG Response, "[t]he effects of global climate change are the result of worldwide GHG emissions. Individual projects of certain sizes, like the one proposed, do not generate enough GHG emissions to meaningfully affect or influence global climate change, nor would the Project's CO_2 emissions separately affect natural resources in an adverse manner" (pgs. 1 and 2; Multnomah County, 2025b). The Project's GHG (or, for that matter, AQ) emissions would not result in any microclimate alterations that would adversely affect forests, agricultural lands, or any other natural resources.

<u>Response to Exhibit S.11 (Ecological Balance and Natural System Resiliency)</u>

The commenter's use of the term "activity" is broad and is not explicit in its applicability to AQ emissions; however, ESA has addressed the comment in this light to provide a thorough response to the commenter's concerns. The potential adverse effects of Project-generated AQ emissions and their capacity to affect the area's ecological balance and function/resiliency of its natural systems have been addressed in the land use record through ESA's analysis and responses provided in Exhibits N.61 and S.35, respectively (Multnomah County, 2025a and 2025b). As detailed in ESA's Operational AQ Analysis and 1st AQ-GHG Response, the Project's AQ emissions would not exceed the *De Minimis Thresholds*, and therefore would not have the potential to cause or contribute to a violation of the Primary or Secondary NAAQS, which serve as nexuses for public health and welfare, respectively (see pgs. 2 through 5; Multnomah County, 2025a; and pgs. 4 through 6; Multnomah County, 2025b). The Secondary NAAQS, in particular, establish pollutant concentration standards that protect against decreased visibility and damage to animals, crops, vegetation, and buildings (EPA, 2017). Accordingly, the Secondary NAAQS serve as a basis for evaluating potential adverse AQ effects on the plants and animals that comprise the local ecosystem. As evidenced in ESA's prior analyses and responses, the Project's AQ emissions would not adversely affect these natural resources, adversely affect the ecological balance, or reduce the function/resiliency of natural systems. See also the responses provided to Exhibit S.24, below, for further analysis that supports the conclusion that the Project would not adversely affect natural resources.

Response to Exhibit S.11 (Direct, Site-Specific Evaluation)

The commenter states that, "a direct and site-specific evaluation of how the use, as operated, will impair natural systems" is required. ESA's AQ Operational Analysis, 1st AQ-GHG Response, and the additional responses provided in this memorandum (e.g., Response to Exhibit S.24) provide a direct and site-specific evaluation of the Project's capacity to adversely affect AQ natural resources (Multnomah County, 2025a and 2025b). These analyses demonstrate that Project emissions would not adversely affect natural resources or otherwise impair natural systems.

Response to Exhibit S.11 (Construction Dust)

The Hearings Officer held, and the Land Use Board of Appeals affirmed, that construction is not within the scope of the Proposed Use to be considered in this land use proceeding (Multnomah County, 2023 and LUBA, 2025). Therefore, this comment is irrelevant to this proceeding and to compliance with MCC 39.7515(B).

Exhibit S.16 (Paul Willis Comments – 5.4.2025). Page 2, paragraph 2 of Exhibit S.16 contains the following comment related to operational AQ emissions and odors:

> "Plant operation air quality and odors are of concern. Ozone generation is part of the PWB's water filtration process. It was recently removed but said to be installed in the future. Ozone has an odor that some may find objectionable and is described as follows: Metallic; like a burning wire; like chlorine; a "clean" smell; sweet and pungent. Breathing ozone can result in various health effects, including, induction of respiratory symptoms; decrements in lung function and inflammation of airways; and with respiratory symptoms, such as coughing, throat irritation, pain burning or discomfort in chest when taking a deep breath and chest tightness, wheezing or shortness of breath. Exposure concentration and time duration will determine ozone's effects. Wildlife have a keen sense of smell and will avoid the area with the presence of ozone" (Multnomah County, 2025i).

<u>Response to Exhibit S.16 (Ozone Health Effects: Humans and Wildlife)</u>

The commenter summarizes potential adverse health effects associated with receptor exposure to ozone (O_3). These effects can occur based on receptor exposure to O_3 – these are the symptoms and conditions that have been (and continue to be) studied in depth by the scientific community and form the basis for the Primary NAAQS. However, the Project would not result in such conditions that elicit these adverse effects.

Ozonation as a water treatment process at the Facility is no longer part of the baseline Project, but the Facility has been designed to accommodate O_3 treatment as part of a future enhancement or expansion. Any ozonation system installed as part of future activities would be subject to environmental laws at the time that it is proposed and equipped with sensors and automatic shut offs that prevent O_3 from being directly emitted into the atmosphere by the Project. These contemplated, future activities and their potential to result in an adverse effect on natural resources have been addressed and responded to in the land use record (pg. 4, Multnomah County, 2022). Ozone injection contemplated as a future water treatment process would occur within a sealed concrete basin, kept under negative pressure to prevent gas in the headspace from escaping, and converted to molecular oxygen (O_2) via a catalyst prior to atmospheric discharge (pg. 4, Multnomah County, 2022). To be clear: the Project is not proposing to install any equipment as part of its current or future design that would directly generate and emit O_3 into the atmosphere under standard operating conditions. Rather, any O_3 generated at the Facility would specifically be used for water treatment purposes; confined within a closed system at the Facility; and equipped with sensors and automatic shut offs to prevent O_3 from being discharged into the atmosphere (pg. 4, Multnomah County, 2022).

The Project would not generate O_3 emissions during current or contemplated future operations that adversely affect natural resources.

<u>Response to Exhibit S.16 (Ozone Odors)</u>

As discussed in "Response to Exhibit S.16 (Ozone Health Effects: Humans and Wildlife)" above, the baseline Project being evaluated would not directly generate any O_3 emissions and contemplated activities involving ozonation as a water treatment process in the future would not discharge O_3 into the atmosphere. Thus, the Project would not generate odorous O_3 emissions, nor would the Project's use of O_3 have the capacity to adversely affect humans or natural resources (including wildlife) under current or future design.

Exhibit S.24 (Courter Response to N.61 – Operational Air Quality – 5.05.2025). Exhibit S.24 provides numerous comments on ESA's Operational AQ Analysis contained in the land use record as Exhibit N.61 (Multnomah County, 2025a and 2025j). The commenter's primary assertions are: (1) the Federal *De Minimis Thresholds* do not equate to a localized, no impact standard, (2) DPM and other pollutants have the potential to impact natural systems and rural communities, (3) no localized modeling of localized cumulative impacts was conducted, and (4) the Project has incorrectly relied upon regulatory compliance as a means of demonstrating the Project would avoid environmental harm.

ESA has included a markup of comments made in Exhibit S.24 as Attachment 1 to this memorandum to provide clear linkage to the issues raised by the commenter and the responses provided below:

Response to Exhibit S.24 (Comment S.24-1: Summary of AQ Analysis)

The commenter provides a high-level summary of ESA's Operational AQ Analysis. ESA does not endorse the summary as accurate. However, no specific topics or issues are raised in this comment that require response.

Response to Exhibit S.24 (Comment S.24-2: *De Minimis Thresholds* and Local No-Impact Standard)

The commenter has mischaracterized the *De Minimis Thresholds* as "broad benchmarks" and has further mischaracterized ESA's Operational AQ Analysis as "equat[ing]" the *De Minimis Thresholds* to what they characterize as a "local, no-impact" standard.

As described in ESA's Operational AQ Analysis:

> "The ODEQ does not maintain formal numeric thresholds for evaluating whether a project's criteria air pollutant emissions may adversely affect natural resources or hinder progress toward meeting AAQS. Therefore, to assess whether the Project could adversely affect natural resources from an air quality standpoint, the Project's criteria air pollutant emissions are compared against the *De Minimis Thresholds*" (Multnomah County, 2025a).

Given that ODEQ does not maintain formal numeric thresholds for assessing a project's criteria air pollutant emissions, nor are there other applicable quantitative AQ thresholds maintained by other agencies with jurisdiction over the Project, the use of the *De Minimis Thresholds* is an appropriate approach for assessing whether the Project's criteria air pollutant emissions may adversely affect natural resources or hinder progress toward meeting attainment under the NAAQS. ESA did not "equate" the *De Minimis Thresholds* with the local adversely affect standard, but rather used them as objective reference points to evaluate the potential for adverse effects. This is particularly appropriate, because the *De Minimis Thresholds* are established by the EPA through a process grounded in extensive scientific evidence and public health research. These thresholds are a key component of the General Conformity Rule (40 CFR Part 93, Subpart B), which ensures that federal actions in nonattainment or maintenance areas do not interfere with the purpose of achieving or maintaining the NAAQS. To determine the pollutant-specific *De Minimis Thresholds*, EPA evaluates a range of scientific data and regulatory considerations, including: (1) the severity of the area's nonattainment classification (e.g., marginal, moderate, serious, severe, or extreme) (2) the pollutant's potential to cause or exacerbate health effects (e.g., asthma, respiratory illness, cardiovascular disease, or premature death); and (3) the expected contribution of an individual project's emissions to overall regional AQ conditions. The threshold levels are informed by the broader NAAQS-setting process, which involves a comprehensive review of peer-reviewed health and atmospheric science literature, risk assessments, and exposure modeling. This process is overseen by the Clean Air Scientific Advisory Committee (CASAC), a federally chartered independent panel of scientists established under the Clean Air Act to provide expert advice to the EPA Administrator on the technical basis for NAAQS and related regulatory mechanisms. CASAC's role is critical in ensuring that the EPA's standards (including the *De Minimis Thresholds*) reflect the best available science and remain protective of both public health (primary standards) and public welfare (secondary standards), which include visibility, ecological impacts, and effects on materials.

The *De Minimis Thresholds* are appropriate reference points to identify whether projects have the capacity to adversely affect natural resources, because they are designed to determine if a project has the capacity to: (1) interfere with plans (i.e., State Implementation Plans, or "SIPs") to reduce ambient design value concentrations below the NAAQS, or (2) impede ongoing compliance with the NAAQS, as described in a maintenance plan. The *De Minimis Thresholds* applicable to projects vary by pollutant and the attainment status of the area for those pollutants. Under General Conformity regulations, projects that do not meet the *De Minimis Thresholds* are required to conduct further analysis (e.g., "hot spot" dispersion modeling) to demonstrate that the project's emissions would not: (1) cause or contribute to new violations of any NAAQS, (2) increase the frequency or severity of existing violations, or (3) delay timely attainment of any NAAQS, interim milestone, or reasonable further progress as defined in the SIP(s). The General Conformity Rule (and *De Minimis Thresholds* by association) focuses on regional AQ goals because the NAAQS (and associated SIPs) protect regional ambient AQ and ensure attainment across entire geographic areas, not just at a single receptor or location. Air quality conditions and corresponding effects (from a criteria air pollutant standpoint) are primarily a regional concern. Unlike other sources of environmental degradation that can be limited to a small area (e.g., an oil spill that has defined boundaries), AQ effects are observed over a broader scale and are influenced by wind and atmospheric conditions, as well as pollutant formation and transport. Therefore, criteria air pollutant analyses typically focus on regional effects rather than localized effects. The regional criteria air pollutant analysis conducted by ESA is appropriate for assessing potential adverse effects on natural resources from the Project, given the following:

- **Pollutant Transport:** Many criteria air pollutants (e.g., O_3 and $PM_{2.5}$) form and disperse over large areas, thereby contributing to regional concentrations, not just localized hotspots. For example, O_3 (from precursors – i.e., NOx and VOC) accumulates over several hours, depending on emission rates and meteorological conditions, meaning that NOx and VOC emissions generated by the Project would have ample time and space before O_3 accumulates (CARB, 2005). These temporal and geographic considerations provide evidence that O_3 concentrations generated by Project emission sources (i.e., through the emittance of O_3 precursors) would not be realized so much on a localized scale, but rather more broadly on a regional- and state-wide scale (i.e., after pollutants have dispersed into the atmosphere).[1] Emissions generated by a project contribute to regional concentrations, not just localized hotspots.

- **SIP Consistency:** The General Conformity framework ensures that projects do not undermine the emission reduction strategies and budgets contained in the SIP, which is the legally binding roadmap for regional attainment.

- **Cumulative Management:** Conformity is one part of a larger, regional-scale AQ management system. It helps coordinate federal actions with state and local efforts to meet the NAAQS across an entire nonattainment or maintenance area.

As described in ESA's Operational AQ Analysis, "a project's emissions are limited to attainment, nonattainment, and maintenance areas before being compared to the *De Minimis Thresholds*" (pg. 4; Multnomah County, 2025a). The Project is located within an area that has a "maintenance" designation for O_3 and CO and an "attainment" designation for all other criteria air pollutants (pgs. 4 and 5; Multnomah County, 2025a). Figures showing the geographic extents of the O_3 and CO maintenance areas are provided in Attachment 2 and described below:

---

1 Existing emission sources upwind of the Project site (i.e., from Portland, OR and Vancouver, WA) would have a greater influence on O_3 concentration at and near the Project than the Project's emission sources (Barna, et al., 2001).

- **Ozone Maintenance Area: Portland-Vancouver Air Quality Maintenance Area (AQMA).** The Portland-Vancouver AQMA for O_3 encompasses a bi-state region, including parts of Multnomah, Clackamas, and Washington counties in Oregon, as well as Clark County in Washington (ODEQ, ND).

- **Carbon Monoxide Maintenance Area: Portland Metro.** The Portland Metro CO Maintenance Area primary covers the Portland Metropolitan region, including the central and downtown areas (ODEQ, 2004).

Therefore, while the commenter may characterize the *De Minimis Thresholds* as being "broad benchmarks," that framing fails to acknowledge that the *De Minimis Thresholds*: (1) serve as screening criteria to identify whether projects have the capacity to interfere with SIPs and NAAQS attainment goals, which are based on geographic areas established by the EPA, (2) are appropriate given the manner in which criteria air pollutants form and disperse, (3) are responsive to the attainment status of the area in which the project is located, decreasing in value based on the severity of the nonattainment / maintenance designation, and (4) are regional, based on the nature of NAAQS and intent to protect AQ conditions beyond a single receptor or location.

To characterize the *De Minimis Thresholds*, General Conformity Rule, or NAAQS as "broad benchmarks" is a gross mischaracterization of their regulatory function and scientific basis, as each is rooted in statutorily mandated processes, rigorous technical analysis, and enforceable standards designed to protect public health and the environment. Nonetheless, to further refute and respond to the commenter's claims that the *De Minimis Thresholds* do not address localized effects, ESA has prepared a supplemental analysis of the Project's on-site criteria air pollutant emissions, which evaluates the capacity of those emissions to adversely affect AQ at nearby sensitive receptor locations based on the Localized Significance Thresholds (LSTs) adopted by the South Coast Air Quality Management District (SCAQMD) in California.

The SCAQMD LSTs represent the maximum NOx, CO, PM_{10}, and $PM_{2.5}$ emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent and applicable NAAQS or California AAQS (CAAQS). For operational emissions, the LST methodology takes into account several factors, including (1) the existing ambient AQ in each Source Receptor Area (SRA),[2] (2) the size of the project (in acres), and (3) how far operational activities are from the nearest sensitive receptor. Although the LSTs have been specifically developed for the SCAB (i.e., the geographic region in California that the SCAQMD has jurisdiction over), including areas with severe nonattainment conditions, they serve as a conservative test when applied in regions like Multnomah County. Given the cleaner air, lower baseline pollutant levels, and more favorable dispersion conditions in the Pacific Northwest, even the least stringent LSTs from SCAQMD provide a health- and natural resource-protective objective screening tool for evaluating localized, operational AQ-related effects. Furthermore, the CAAQS are generally more stringent (i.e., the pollutant concentration standards are lower) than the NAAQS, meaning that the use of LSTs for the Project (which are based on the most stringent and applicable NAAQS or CAAQS, as described previously) provides an even more conservative assessment of potential adverse effects that could occur under Project operation.

---

[2] The SCAQMD has divided the South Coast Air Basin (SCAB) into 38 SRAs, which are geographically designated AQ modeling zones used to evaluate air pollutant concentrations and exposure across the SCAQMD's jurisdiction. This analysis utilizes the LSTs developed for SRA 30 (Coachella Valley), because it shares similar characteristics as the Project (e.g., low-density, semi-rural area).

Table 1 presents the Project's daily operational AQ emissions inventory, which was developed using the same data sources and methodology described in ESA's AQ Operational Analysis (pgs. 2 and 3; Multnomah County, 2025a).[3]

TABLE 1
ONSITE, DAILY PROJECT OPERATIONAL CRITERIA POLLUTANT EMISSIONS

Emission Source	Criteria Air Pollutant (Pounds per Year)			
	NOx	**CO**	**$PM_{2.5}$[a]**	**PM_{10}[a]**
Mobile Sources[b]	3.39	3.57	1.08	6.05
eBUGs[c]	171.70	32.34	4.53	4.53
Dry Chemical Transfer[d]	0	0	0.06	0.06
Total	**175.10**	**35.90**	**5.67**	**10.64**
SCAQMD Operational LST for SRA 30 [e]	547	10,178	9	27
SCAQMD Operational LST Exceeded?	No	No	No	No

SOURCE: Developed by ESA, 2025, see Attachment 3; SCAQMD, 2009

ACRONYMS: NOx = oxides of nitrogen; VOC = volatile organic compounds; CO = carbon monoxide; SOx = oxides of sulfur; $PM_{2.5}$ = particulate matter with a diameter of less than 2.5 microns; PM_{10} = particulate matter with a diameter of less than 10 microns.

NOTES:

a. Includes PM emissions from vehicle exhaust, tire- and brake-wear, on- and off-road fugitive dust, and fugitive dust from material transfer.

b. As a conservative practice, ESA included a quarter mile of off-site vehicle travel in the emissions estimate to capture potential idling emissions and emissions generated by vehicles operating in the immediate vicinity of the Project site.

c. The daily eBUG emissions estimates conservatively assume both eBUGs at the Facility would be run for 4.2 hours to accommodate monthly testing and maintenance (i.e., one twelfth of the 50 hours assumed for annual operation and maintenance [O&M] in ESA's Operational AQ Analysis [Multnomah County, 2025a]).

d. The fugitive dust emissions from dry chemical transfer would be almost entirely abated by emission control devices (bag filters) installed on each of the silos.

e. The LSTs presented in this table reflect those established for a 5-acre site at a distance of 200 meters. This is conservative and appropriate, given that the site is greater than 5 acres (the maximum Project size provided by the LST methodology and LSTs increase with the size of the Project) and that majority of the Project's on-site emissions would be located toward the center of the site, away from property lines. Furthermore, there is a general on-site buffer between Project property lines and the locations where on-site emissions would be primarily generated.

As shown in Table 1, the Project's daily operational AQ emissions would not exceed the SCAQMD LSTs applied to the Project, further demonstrating that the Project would not have the potential to have a localized adverse effect on AQ natural resources, even if the Project were to be constructed in Southern California, which suffers from some of the most degraded AQ conditions in the nation (particularly with regard to O_3 and $PM_{2.5}$ pollution).

Notwithstanding the analysis and evidence presented above, the commenter is incorrect in their assertion that Multnomah County's rural land use planning codes establish a "localized, no impact standard." The legal basis for this proceeding is MCC 39.7515(B), which states, "Will not adversely affect natural resources." There is no mention of "local" or "no impact" in that portion of the MCC. The issue at hand is not the potential for an environmental effect to occur, but whether that potential effect would be "adverse." As discussed previously in this response, the NAAQS are established by the EPA based on extensive scientific research and health-based evidence. ESA's analysis has not, "relied upon regulatory compliance as a stand-in for environmental safety" as

3 ESA notes that neither this commenter nor any other commenter cited any concerns or objections to the methodology or data sources employed to estimate the Project's operational AQ emissions inventory presented in ESA's Operational AQ Analysis (Multnomah County, 2025a).

purported by the commenter later in their letter. The regulatory standards included in ESA's Project-specific analysis – including the *De Minimis Thresholds,* NAAQS, and SCAQMD LSTs – provide evidentiary, performance-based thresholds on which an objective analysis of the Project's capacity to adversely affect natural resources can be conducted. It is clearly evidenced in this memorandum (and land use record) that the Project would not exceed the *De Minimis Thresholds* or SCAQMD LSTs, thusly demonstrating that the Project would not have the capacity to cause or contribute to a NAAQS violation or otherwise affect AQ natural resources in an adverse manner.

Response to Exhibit S.24 (Comment S.24-3: Adverse Effects of AQ Emissions and Diesel Particulate Matter)

The commenter states that, "[l]ow levels of diesel particulate matter or other pollutants have the potential to accumulate or impact nearby natural systems (e.g. riparian buffers, wildlife corridors) and rural communities when evaluated on a long-term or cumulative basis" (Multnomah County, 2025j). Evidence already in the record and further evidence provided in this response demonstrate that the Project's DPM emissions would not adversely affect natural resources on a long-term or cumulative basis. This response is organized as follows: (1) DPM: Human Health Risks, (2) Criteria Air Pollutant: Human Health Risks, (3) DPM: Natural System Risks, (4) Criteria Air Pollutant: Natural System Risks.

(1) DPM: Human Health Risks

Pages 5 through 7 of ESA's Operational AQ Analysis address the potential adverse effects of human exposure to DPM (Multnomah County, 2025a). ESA's analysis identifies three aspects that support the conclusions reached, including:

- **Project Truck Trip Generation.** ESA's analysis identifies that most of the Project's heavy-duty diesel-fueled truck trips (i.e., vendor deliveries and haul truck trips) would be widely dispersed off site and away from receptors close to the Project (pg. 5; Multnomah County, 2025a). Thus, the actual quantity of DPM emissions generated at and in the immediate vicinity of the Facility by Project-generated truck trips would be a very minor fraction of the particulate matter (PM) emissions shown in Table 1 of ESA's Operational AQ Analysis (pg. 4; Multnomah County, 2025a).[4] Table 2 on page 6 of ESA's Operational AQ Analysis then compares the Project's heavy-duty truck trip generation estimates to the policy recommendation and screening criterion issued by the California Air Resources Board (CARB) and City of County of San Francisco (SF), respectively. ESA's analysis demonstrates that the Project's heavy-duty, average-daily trips (9.3 daily trips) would be substantially less than the CARB policy recommendation (100 daily trips) and SF criterion (350 daily trips). ESA's analysis also explains that the SF screening criterion are for, "minor, low-impact sources that do not pose a significant health impact even in combination with other nearby sources" (pg. 6; Multnomah County, 2025a). To provide further elaboration on this matter: the SF mobile-source health risk screening criteria reflect the vehicle activity levels that would be required to result in an increased risk of 1 excess cancers per million population.

---

[4] As calculated using ESA's AQ Operational Analysis, Attachment 1, Sheet 5, Table MS-5, the total annual on-site mileage associated with chemical deliveries would be approximately 220 vehicle miles traveled (VMT). Conducting a similar calculation for the annual off-site VMT for chemical delivery trucks yields a value of approximately 118,448 annual VMT, or collectively 118,708 annual VMT when combining both on- and off-site VMT. This means that annual on-site VMT from chemical deliveries comprises less than 0.2% of total DPM emissions generated by this type of trucking activity. This analysis is intended to be illustrative of how few emissions would be generated on-site compared to off-site, and does not capture the full range of heavy-duty truck trips generated by the Project, including those made by refuse trucks and non-chemical vendor deliveries (e.g., FedEx).

Given that the Project's heavy-duty truck trip generation is less than three percent of the SF screening value, the risk associated with the Project's heavy-duty truck trips would be substantially less than SF's definition of "minor, low-impact sources."

- **eBUG Proximity to Sensitive Receptors and Meteorological Influence.** ESA's analysis highlights key considerations associated with eBUG operation that would reduce the quantity of DPM emissions that disperse toward the nearest sensitive receptor locations (i.e., residences), including the fact that (1) the Facility's eBUGs would be located approximately 1,700 and 875 feet from the nearest sensitive receptor locations, giving pollutants time and space to disperse (i.e., become less concentrated) before reaching receptor locations, and (2) prevailing winds would transport and disperse eBUG-generated DPM emissions to the southeast away from sensitive receptor locations, which are located west and north of the Facility (pgs. 6 and 7; Multnomah County, 2025a).

- **Cleaner Air Oregon Program (CAO Program).** ESA concludes the DPM discussion in Exhibit N.61 by explaining the regulatory process the Project's eBUGs would undergo while seeking AQ permits through the CAO Program, as well as key considerations that would influence the risks from these sources. To be clear: ESA's conclusion in Exhibit N.61 – that the Project would not adversely affect natural resources – was not based on regulatory compliance with the CAO Program. As elaborated further below, however, the CAO Program does establish a quantitative threshold that serves as a nexus for correlating the Project's DPM emissions to risks that could be considered to adversely affect natural resources.

As explained in ESA's Operational AQ Analysis, "All new sources applying for an ACDP (including the eBUGs) are evaluated under the CAO Program to assess whether DPM emissions exceed the *applicable screening threshold* listed in Oregon Administrative Rule (OAR) 340-245-8010 Table 1" (*emphasis added by* ESA; pg. 7; Multnomah County, 2025a). The screening threshold referred to is part of a larger, tiered framework approach employed by ODEQ for regulating excess lifetime cancer risks from new and existing facilities that seek permits from the CAO Program. This tiered framework includes a Toxics Lowest Achievable Emission Rate (TLAER) cancer risk threshold that is the same quantitative threshold used by other AQ regulatory entities for determining whether a project could have an adverse effect (ODEQ, 2021a; BAAQMD, 2023; and SCAQMD, 2023).[5] Projects that exceed this threshold are required to implement mitigation through emission controls or other means. Projects that are below this threshold are not required to implement measures to reduce emissions or corresponding risks. Therefore, this threshold is an appropriate performance standard on which ESA's analysis and conclusions can be based.

Similar to the Project's mobile-source health risk assessment, which demonstrated that Project's heavy-duty truck trips as being substantially below the SF screening criterion, the Project does not involve the types of operational activities, nor would it generate DPM emissions, that have the potential to exceed the "no adverse effect on natural resources" quantitative threshold (from a human health standpoint in this context). Projects that have the potential to exceed this quantitative threshold and result in an adverse effect on natural resources typically include industrial facilities involving the following types of land uses and activities: metal plating and finishing,

---

5 The BAAQMD and SCAQMD identify these thresholds as CEQA "thresholds of significance." In this context under CEQA, projects resulting in cancer risks that are below the "thresholds of significance" would be assigned a "less than significant" impact designation, which is the equivalent as not having the potential to "adversely affect natural resources" in this land use proceeding.

fiberglass and composite manufacturing, asphalt and roofing plants, wood preserving facilities, foundries and metal casting operations, concrete batch plants, plastic and foam manufacturing, etc. The Project does not involve such activities, nor would the Project's eBUGs generate such quantities of DPM emissions that would result in an adverse effect on natural resources. For example, ODEQ issued an AQ permit for a data center involving the operation of 49 eBUGs in Hillsboro, and the sources at that facility were located approximately 850 feet from the nearest sensitive receptor (compared to the Facility's two eBUGs that are 1,700 and 875 feet from the nearest sensitive receptors described on pg. 6; Multnomah County, 2025a). Each generator at the Hillsboro facility met EPA Tier II certification standards (i.e., the same engine tier as the eBUGs proposed for the Facility) and was approximately 3,000 kW in size (147,000 kW of total facility capacity) (ODEQ, 2021b).[6] The Hillsboro data center involved substantially more DPM-generating activity than that proposed by the Project, and that facility did not exceed the TLAER quantitative threshold. This example illustrates that EPA Tier II certified eBUGs (even 49 of them together, though the Project only has two) have the capacity to remain below the TLAER threshold.

The Project would not generate DPM emissions that adversely affect natural resources. ESA has not used regulatory compliance to demonstrate such an effect would not occur; rather, the CAO Program establishes an objective, quantitative threshold on which potential adverse effects may be assessed that is further supported by thresholds maintained by other AQ regulatory agencies. ESA's analysis demonstrates that the Project is not the type of facility that would generate adverse effects and involves substantially less DPM generating activities than other permitted facilities that would be determined to have "no adverse effect on natural resources," based on the TLAER threshold. Furthermore, the nearest sensitive receptors in proximity to the Facility are sufficiently far away and located either perpendicular to prevailing winds (i.e., crosswind) or upwind of the site, meaning that maximum DPM concentrations from Project activities would not occur at these receptor locations; they would occur downwind of the site (i.e., to the southeast) on land uninhabited by human receptors.[7] The Project would not adversely affect natural resources from Project-generated DPM emissions.

Furthermore, in order for a Project to have a cumulative adverse effect on natural resources from DPM emissions, the Project would need to be within a DPM-burdened area. These types of DPM-burdened areas typically include neighborhoods adjacent to major DPM generating activities, such as: ports, large industrial sources (e.g., refineries), rail yards, distribution center clusters (e.g., high density of warehouses), and freeways / highways that have a high volume of diesel trucks. In contrast, the Project is located within a rural area that generally experiences clean air, as evidenced by the region having "attainment" and "maintenance" designations for criteria air pollutants (see pg. 2; Multnomah County, 2025a). Tractors, trucks, and other sources of DPM in the vicinity of the Project do not involve the same level of activity (or generate comparable DPM emissions) as the aforementioned sources that would cause the Project's individual effects to be cumulatively considerable. The Project's DPM emissions would not result in a cumulative adverse effect on natural resources.

[6] In contrast, the Facility's eBUGs would have a combined system capacity of approximately 5,250 kW, less than four (4) percent of the Hillsboro data center's eBUG capacity.

[7] For context – human health risks associated with DPM exposure are based on long-term exposure (typically 30 years) and averaging periods (typically 70 years) at a fixed location where sensitive receptors may be present for extended duration (e.g., residences) (OEHHA, 2015). For this reason, annual, prevailing winds are appropriate for characterizing the most likely locations where maximum DPM concentrations would occur.

As evidenced above, the Project's DPM emissions would not have the potential to adversely affect natural resources on a short-, long-term, or cumulative basis.

(2) Criteria Air Pollutant: Human Health Risks

See ESA's "Response to Exhibit S.24 (Comment S.24-2: De Minimis Thresholds and Local No-Impact Standard)" provided above. The Project's AQ emissions would exceed neither the *De Minimis Thresholds* nor SCAQMD LSTs, both of which provide a direct nexus to human health risks associated with receptor exposure to Project AQ emissions. By their very nature, the *De Minimis Thresholds* and SCAQMD LSTs account for existing AQ conditions and therefore provide both a project-level and cumulative assessment of Project effects. Furthermore, in developing its California Environmental Quality Act (CEQA) significance thresholds, the SCAQMD considered the emission levels at which a Project's individual emissions would be cumulatively considerable (SCAQMD, 1993). The Project would not exceed the SCAQMD LSTs, supporting the conclusion that the Project would not have an adverse, cumulative effect on natural resources. The Project's criteria air pollutant emissions would not have the potential to adversely affect natural resources on a short-, long-term, or cumulative basis.

(3) DPM: Natural System Risks

The commenter cites concerns that "low levels of diesel particulate matter or other pollutants have the potential to accumulate or impact nearby natural systems (e.g. riparian buffers, wildlife corridors) and rural communities when evaluated on a long-term or cumulative basis" and specifies natural resources as including "air, water, and habitat" (Multnomah County, 2025j). The commenter's use of "other pollutants" is vague and lacks specificity. In light of the commenter's vagueness, ESA has interpreted "other pollutants" as meaning (a) the "the toxic constituents of DPM," which is responded to here, and (b) "criteria air pollutants," which is addressed in the next subsection response, "(4) Criteria Air Pollutant: Natural System Risks."

While DPM does contain toxic constituents (including polycyclic aromatic hydrocarbons [PAHs], trace metals [e.g., arsenic, nickel, chromium], and VOCs [e.g., formaldehyde, acrolein]), these pollutants make up only a small portion of total particulate mass. A detailed chemical analysis of particulate emissions from heavy-duty diesel engines found that approximately 82% of DPM is carbon based, with trace inorganic elements comprising around 6%, and PAHs accounting for just 0.03% of total mass (Jin et al., 2014).

DPM is primarily composed of very fine particles, with over 90% of DPM being comprised of PM that is less than 1 micron (µm) in diameter, falling well within the $PM_{2.5}$ size range (CARB, ND). Because these particles are so small, they have long atmospheric residence times on the order of days to weeks, allowing them to be transported tens to hundreds of kilometers from their source as they disperse in the atmosphere (EPA, 1997). These characteristics mean that very little of the DPM emitted by sources settles to the ground or on waters in the vicinity of where it is released; instead, most DPM stays airborne and disperses over a broad area before eventually depositing via dry deposition, dilution, or rainfall at locations farther away. This limited deposition of DPM in the immediate vicinity of its emission source is a direct result of its fine particle size and prolonged suspension in air (EPA, 1997). Furthermore, as mentioned in the preceding paragraph, the mass fraction of toxic constituents in DPM is minuscule, meaning that even less of the quantity of DPM that is deposited has actual toxicological properties.

Given the low amount of overall Project DPM emissions, the low mass fraction of toxic constituents in DPM, slow deposition of $PM_{2.5}$ over rural surfaces, and that fine PM (i.e., DPM in this context) has only nominal deposition in proximity of where it is released, Project DPM emissions would not result in an adverse effect on natural systems or natural resources.

(4) Criteria Air Pollutant: Natural System Risks

This has been addressed in the land use record. As detailed in ESA's Operational AQ Analysis, the Project's AQ emissions would not exceed the *De Minimis Thresholds*, and therefore would not have the potential to cause or contribute to a violation of the Primary NAAQS. This analysis is further elaborated on in ESA's Response to Exhibit N.45, which provides further information on the Secondary NAAQS that serves as a nexus for public welfare (including animals, crops, and vegetation) (see pgs. 4 through 6; Multnomah County, 2025b). As detailed in that response, the Project's AQ emissions would not cause or contribute to a violation of the Secondary NAAQS and, therefore, the Project's AQ emissions would not adversely affect natural resources, including natural systems.

Furthermore, compared to the Project's pre-development use, the Project's post-development use may reduce the quantity of PM emitted at the site. Windblow fugitive dust from agricultural operations (e.g., tilling, plowing, and vehicle travel on dirt roads) contains a much larger proportion of coarse particulate matter (i.e., PM_{10}), with some of the dust being comprised of particulates that are even greater in size than PM_{10}. These heavier dust particles (i.e., PM_{10} and PM greater than 10 microns) rapidly settle out of the atmosphere due to gravity – typically depositing on surfaces or waters within minutes to hours of becoming airborne – and usually fall to the ground within a relatively short distance of their source as a result (EPA, 1997). Field measurements and analysis conducted by researchers confirm that a significant fraction of windblown dust drops out very close to its origin. For example, in one study, roughly one-third of the suspended dust from an eroding farm field was found to deposit within the first few hundred meters downwind of the field (Hagen et al., 2006). Consequently, agricultural activities are a major contributor to localized PM deposition in rural areas – the coarse, soil-derived particles tend to accumulate on nearby fields, waters, and surfaces rather than travel long distances. In many rural regions (such as California's Central Valley), windblown dust from farming operations dominates PM mass in the local air, which underscores how most of the dust generated by agricultural activities is confined to the vicinity of its source(s) due to rapid deposition (Adebiyi et al., 2025). In contrast, very little PM would be generated by the Project under post-development conditions. Most vehicle travel occurring at the Facility would happen on paved surfaces, and unpaved roads at the Facility site would be comprised of gravel. As discussed in ESA's Operational AQ Analysis, "…AP-42 explicitly acknowledges that adding gravel to a dirt road is a control mechanism to reduce fugitive dust emissions" (pg. 5, Multnomah County, 2025a). The Project's other sources that would generate PM_{10} emissions would do so on an infrequent basis (e.g., routine O&M of the eBUGs and dry chemical silo filling), and those emissions would not be substantial compared to those associated with typical agricultural operations.

The Project's AQ emissions would not adversely affect natural resources, including natural systems. Further, Project post-development conditions are likely to improve AQ conditions from a PM_{10} standpoint compared to pre-development conditions.

Response to Exhibit S.24 (Comment S.24-4: Localized Cumulative Impact Modeling)

The commenter is incorrect in their assertion that ESA has not included quantified modeling of localized cumulative impacts. As described in "Response to Exhibit S.24 (Comment S.24-2: *De Minimis Thresholds* and Local No-Impact Standard)", the *De Minimis Thresholds* are responsive to the attainment status of the area in which the project is located, decreasing in value based on the severity of the nonattainment / maintenance designation, thereby directly taking into account existing AQ conditions. ESA also provided a supplemental, localized impact analysis using the SCAQMD LST methodology, and this analysis also demonstrates that the Project would not adversely affect natural resources.[8] Both the *De Minimis Thresholds* and SCAQMD LSTs are based on Primary AAQS, thereby also addressing the less stringent Secondary NAAQS that have been adopted with the intent of protecting of public welfare (including animals, crops, and vegetation).

Additionally, ESA did not, "ignore the possibility that prevailing wind patterns or season atmospheric conditions could concentrate pollutants downwind in areas protected under county land use codes" as suggested by the commenter (Multnomah County, 2025j). The DPM analysis contained in ESA's Operational AQ Analysis highlighted the most likely annual dispersion characteristics for Project emission sources, based on annual meteorological conditions. It is implicit in this analysis that annual dispersion characteristics would result in higher pollutant concentrations downwind of the site (i.e., in the direction that winds would typically transport pollutants) rather than upwind of the site. See also ESA's "Response to Exhibit S.24 (Comment S.24-3: Adverse Effects of AQ Emissions and Diesel Particulate Matter)," sub-response "(1) DPM: Human Health Risks" for a discussion of cumulative human health risk from DPM. The presentation of annualized wind conditions near the Project is appropriate in this context because health risks from DPM are based on long-term, consistent exposure (OEHHA, 2015). ESA has provided thorough and comprehensive analyses and responses, clearly demonstrating that the Project's DPM emissions would not adversely affect human receptors or natural resources.

Thus, ESA has addressed localized cumulative impacts through both quantitative and qualitative means, and these analyses provide evidence that the Project would not adversely affect natural resources.

Response to Exhibit S.24 (Comment S.24-5: Reliance on Regulatory Compliance)

The commenter purports that ESA has relied upon, "regulatory compliance as a stand-in for environmental safety;" however, this is simply untrue (Multnomah County, 2025j). The *De Minimis Thresholds*, SCAQMD LSTs, and the discussion of DPM risks are based on clear and science-based performance standards that provide objective, third-party thresholds to inform ESA's conclusion that Project emissions would not have the capacity to adversely affect natural resources. As described in "Response to Exhibit S.24 (Comment S.24-3: Adverse Effects of AQ Emissions and Diesel Particulate Matter)," the CAO Program discussion provides important context regarding the regulatory process under which the Project's eBUGs would be permitted, and forms a nexus to correlate the Project's DPM emissions to human health risks, establishing a quantitative basis for what level of risk could be considered to adversely affect natural resources. ESA has clearly articulated the reasons why the

---

8 As provided in "Response to Exhibit S.24 (Comment S.24-2: *De Minimis Thresholds* and Local No-Impact Standard)" the SCAQMD LST methodology accounts for the existing ambient AQ in each SRA. The use of SCAQMD's LST is conservative, given that AQ conditions in the SCAB are worse than those at, and in the vicinity of, the Project. This means that if LSTs were to be developed for Multnomah County / the geographic area in which the Project is located, using the same methodology employed by the SCAQMD, that the quantitative LST values would be higher than those in the SCAB (including the SRA on which the LST analysis in this memorandum is based).

Project's AQ emissions would not adversely affect human health, natural systems, or surrounding agricultural lands. The Project's AQ emissions would not exceed the *De Minimis Thresholds* or SCAQMD LSTs, which provide a direct link between the Project's AQ emissions and the Secondary NAAQS that have been adopted to address the protection of public welfare (including animals, crops, and vegetation). Again, these thresholds are not presented as "regulatory compliance" but instead as an objective means by which to assess the magnitude of the Project's effects and whether such effects would reach a level considered in scientific and regulatory contexts to be adverse. ESA has provided further evidence that the Project's DPM emissions would not have the potential to adversely affect natural systems (or surrounding agricultural lands by association) based on the low mass fraction of toxic constituents in DPM, slow deposition of $PM_{2.5}$ over rural surfaces, and that a nominal amount of DPM emissions end up in proximity of where they are emitted.

ESA has not relied upon regulatory compliance as a stand-in for environmental safety and has provided quantitative and qualitative analysis demonstrating that Project AQ emissions would not adversely affect natural resources.

<u>Response to Exhibit S.24 (Comment S.24-6: Conclusion)</u>

The commenter concludes their letter by asserting that ESA's analysis, "… does not equate to compliance with local land use law or community expectations for zero degradation of environmental quality" (Multnomah County, 2025j). However, as discussed at the beginning of the response to this comment letter, the MCC does not establish a "localized, no impact standard." The legal basis for this proceeding is MCC 39.7515(B), which states, "will not adversely affect natural resources." There is no mention of "local" or "no impact" in that portion of the MCC. The issue at hand is not the potential for an environmental effect to occur, but whether that potential effect would be "adverse." ESA has provided comprehensive analyses and responses clearly demonstrating that Project emissions would not result in an adverse effect on natural resources.

References

The following references were used in the preparation of this memorandum.

Adebiyi, A.A., Kibria, M.M., Abatzoglou, J.T. et al. (Abebiyi et al.), 2025. Fallowed agricultural lands dominate anthropogenic dust sources in California. Commun Earth Environ 6, 324 (2025). Published April 2025. https://doi.org/10.1038/s43247-025-02306-0

Bay Area Air Quality Management District (BAAQMD), 2023. California Environmental Quality Act Air Quality Guidelines, Chapter 3 "Thresholds of Significance." Last updated April 20, 2023. https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa-guidelines-2022/ceqa-guidelines-chapter-3-thresholds_final_v2-pdf.pdf?rev=a976830cce0c4a6bb624b020f72d25b3&sc_lang=en

Mike Barna, Brian Lamb & Hal Westberg (Barna, et al.), 2001 Modeling the Effects of VOC/NOx Emissions on Ozone Synthesis in the Cascadia Airshed of the Pacific Northwest, Journal of the Air & Waste Management Association, 51:7, 1021-1034, DOI: 10.1080/10473289.2001.10464330

California Air Resources Board (CARB), 2005. "Review of the California Ambient Air Quality Standard for Ozone." Staff Report. Sacramento, CA. March 11, 2005. https://ww2.arb.ca.gov/sites/default/files/barcu/regact/ozone05/isorv2.pdf#:~:text=reaction%202%20is%20usually%20the,emission%20rates%20and%20meteorological%20conditions

California Air Resources Board (CARB), ND. Overview: Diesel Exhaust & Health. Background. Web. Accessed May 14, 2025. https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health#:~:text=Image%3A%20smoking%20heavy,effects%20of%20the%20air%20pollutants

United States Environmental Protection Agency (EPA), 1997. "Regulatory Impact Analysis for the Particulate Matter and Ozone National Ambient Air Quality Standards and Proposed Regional Haze Rule." https://www3.epa.gov/ttn/naaqs/standards/pm/ria/riach-01.pdf

United States Environmental Protection Agency (EPA), 2017. "Air Quality Designations 101: Initial Area Designations for the National Ambient Air Quality Standards" Website. July 25, 2017. Accessed May 4, 2025. https://www.epa.gov/sites/default/files/2017-09/documents/webinar.naaqs_designas.july_2017.pdf?

Hagen, L.J., Van Pelt, R.S., Zobeck, T.M., & Retta, A. (Hagen et al.), 2006. Dust Deposition Near an Eroding Source Field. Published online 26 July 2006 in Wiley InterScience. DOI: 10.1002/esp.1386. https://infosys.ars.usda.gov/WindErosion/publications/pdf/DustDepositionNearAnErodingSourceField.pdf#:~:text=deposition,Hagen

Taosheng Jin, Liang Qu, Shuangxi Liu, Jiajia Gao, Jun Wang, Fang Wang, Pengfei Zhang, Zhipeng Bai, Xiaohong Xu (Jin et al.), 2014. Chemical characteristics of particulate matter emitted from a heavy duty diesel engine and correlation among inorganic and PAH components, Fuel, Volume 116, 2014, Pages 655-661, ISSN 0016-2361. https://www.sciencedirect.com/science/article/pii/S001623611300817X

State of Oregon Land Use Board of Appeals (LUBA), 2025. LUBA No. 2023-086 Final Opinion and Order. January 22, 2025. https://multco.us/file/m.25_luba_no._2023-086_order/download

Multnomah County, 2022. Exhibit A.53: E.5 Filtration Facility Odor Considerations. Memorandum Prepared by Stantec. Subject: Filtration Facility Odor Considerations. August 29, 2022. https://multco.us/file/e.5_filtration_facility_odor_considerations/download

Multnomah County, 2023. "Notice of Hearings Officer Decision." Case No. T3-2022-16220. November 29, 2023. https://multco.us/file/t3-2022-16220_hearings_officer%27s_decision-0/download

Multnomah County, 2025a. Exhibit N.61: PWB Operational Air Quality Analysis 4.15.2025. Memorandum Prepared by Environmental Science Associates. April 15, 2025. https://multco.us/file/n.61_pwb_operational_air_quality_analysis_4.15.2025/download

Multnomah County, 2025b. Exhibit S.35: PWB Response to AQ & GHG Related Testimony. Memorandum Prepared by Environmental Science Associates. May 5, 2025. https://multco.us/file/s.35_pwb_response_to_aq_%26_ghg_related_testimony/download

Multnomah County, 2025c. Exhibit S.2: David Shapiro Comments 4.17.2025. April 17, 2025. https://multco.us/file/s.2_david_shapiro_comments_4.17.2025/download

Multnomah County, 2025d. Exhibit S.3: Amy Houchen Comments - 4.17.2025. April 17, 2025. https://multco.us/file/s.3_amy_houchen_comments_-_4.17.2025/download

Multnomah County, 2025e. Exhibit S.4: Westly Ward Comments - 4.18.2025. April 18, 2025. https://multco.us/file/s.4_wesley_ward_comments_-_4.18.2025/download

Multnomah County, 2025f. Exhibit S.6: John and Janet Edmonson Comments - 4.21.2025. April 21, 2025. https://multco.us/file/s.6_john_%26_janet_edmondson_comments_-_4.21.2025/download

Multnomah County, 2025g. Exhibit S.10: Susan Swinford Comments - 4.30.2025. April 30, 2025. https://multco.us/file/s.10_susan_swinford_comments_-_4.30.2025/download

Multnomah County, 2025h. Exhibit S.11: John Swinford Comments - 5.01.2025. May 1, 2025. https://multco.us/file/s.11_john_swinford_comments_-_5.01.2025/download

Multnomah County, 2025i. Exhibit S.16: Paul Willis Comments - 5.05.2025. May 5, 2025. https://multco.us/file/s.16_paul_willis_comments_-_5.05.2025/download

Multnomah County, 2025j. Exhibit S.24: Courter Response to N.61 - Operational Air Quality - 5.05.2025. May 5, 2025. https://multco.us/file/s.24_courter_response_to_n.61_-_operational_air_quality_-_5.05.2025/download

Oregon Department of Environmental Quality (ODEQ), 2004. Appendix D9-1 Portland Area Carbon Monoxide Monitoring Network. September 2004. https://www.oregon.gov/deq/FilterDocs/pdxCOmap.pdf

Oregon Department of Environmental Quality (ODEQ), 2021a. OAR 340-245-8010 Table 1 Risk Action Levels. Last updated November 17, 2021. Web. Accessed online May 14, 2025. Available online: https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=283416

Oregon Department of Environmental Quality (ODEQ), 2021b. Air Contaminant Discharge Permit. Permit No. 34-025-ST-01. Issued August 30, 2021. https://deqonline.deq.state.or.us/AQPermitsonline/34-0245-ST-01_P_2021.PDF

Oregon Department of Environmental Quality (ODEQ), ND. Map of Portland and Vancouver AQMA. https://www.oregon.gov/deq/FilterDocs/pdxaqma.pdf

California Office of Environmental Health Hazard Assessment (OEHHA), 2015. Air Toxic Hot Spots Program Risk Assessment Guidelines. February 2015. https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

South Coast Air Quality Management District (SCAQMD), 1993. Air Quality Analysis Handbook. Diamond Bar, CA. 1993. Available online at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook

South Coast Air Quality Management District (SCAQMD), 2009. Final Localized Significance Threshold Methodology Appendix C - Mass Rate LST Look-up Table. http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/appendix-c-mass-rate-lst-look-up-tables.pdf?sfvrsn=2

South Coast Air Quality Management District (SCAQMD), 2023. South Coast AQMD Air Quality Significance Thresholds. Revised March 2023. https://www.aqmd.gov/docs/default-source/ceqa/handbook/south-coast-aqmd-air-quality-significance-thresholds.pdf?sfvrsn=25

Attachment 1
Markup of Exhibit S.24:
Courter Response to Exhibit N.61

MEMORANDUM

To: Liz Fancher, Hearings Officer – T3-2022-16220

Date: *5/5/2025*

From: Ian Courter, Lauren Courter

RE: Response to N.61: *Operational Air Quality Analysis*, prepared by Phil Gleason, Environmental Science Associates, April 15, 2025

SUMMARY OF AIR QUALITY ANALYSIS

Environmental Science Associates (ESA) conducted an operational air quality analysis for the Water Filtration Facility and Pipelines Project. The analysis found that air pollutant emissions from facility operations, including those from mobile sources, emergency backup generators, and dry chemical transfers, will remain well below federal thresholds. Emission estimates accounted for worst-case conditions and showed minimal risk of health impacts from diesel particulate matter (DPM). The site's size and location contribute to dispersing emissions effectively, and the project complies with applicable state and federal air quality regulations. ESA concluded that the project will not adversely affect air quality or natural resources during its operation. S.24-1

RESPONSE TO AIR QUALITY ANALYSIS

While the ESA report concludes that operational emissions from the Bull Run Water Filtration Facility will not exceed federal thresholds, this standard alone does not satisfy the more stringent land use requirements set forth by Multnomah County. Federal "De Minimis" thresholds are designed as broad benchmarks and do not equate to the localized, no impact standard embedded in Multnomah County's rural land use planning codes related to approval criteria for community services—especially in areas designated for resource protection or within proximity to significant environmental features, such as Johnson Creek. S.24-2

Multnomah County land use policy, particularly in unincorporated and environmentally sensitive areas like those **west of the Sandy River**, emphasizes **no adverse effects on natural resources. Natural resources includes air, water, and habitat**. Low levels of diesel particulate matter or other pollutants have the potential to accumulate or impact nearby natural systems (e.g. riparian buffers, wildlife corridors) and rural communities when evaluated on a long-term or cumulative basis. S.24-3

The ESA report acknowledges that emissions were estimated conservatively but does not include **quantified modeling of localized cumulative impacts**, especially for sensitive receptors such as residents, agricultural uses, or ecological habitats nearby. Moreover, while the report highlights dispersion due to the large site size, this assumption ignores the possibility that prevailing wind S.24-4 patterns or seasonal atmospheric conditions could concentrate pollutants downwind in areas protected under county land use codes. S.24-4 con't

Reliance on regulatory compliance as a stand-in for environmental safety falls short of the county's strict condition, which requires projects to show not just regulatory compliance but clear avoidance of environmental harm. The **Cleaner Air Oregon** program does allow projects to proceed under risk thresholds, but Multnomah County's zoning overlays and development conditions imposes stricter requirements for projects in natural resource or EFU (Exclusive Farm Use) and MUA-20 (Multiple Use Agriculture) zones. S.24-5

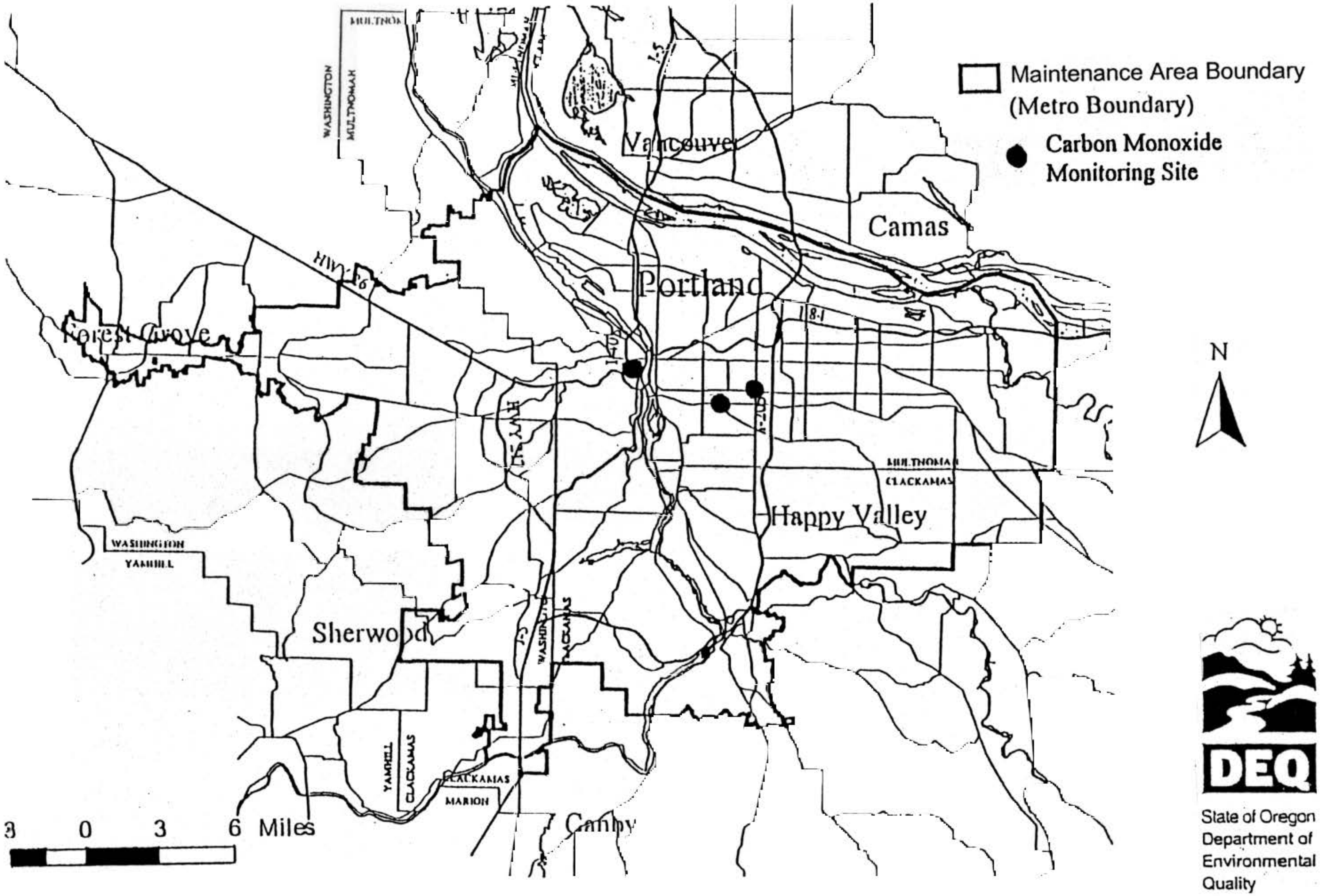
CONCLUSION

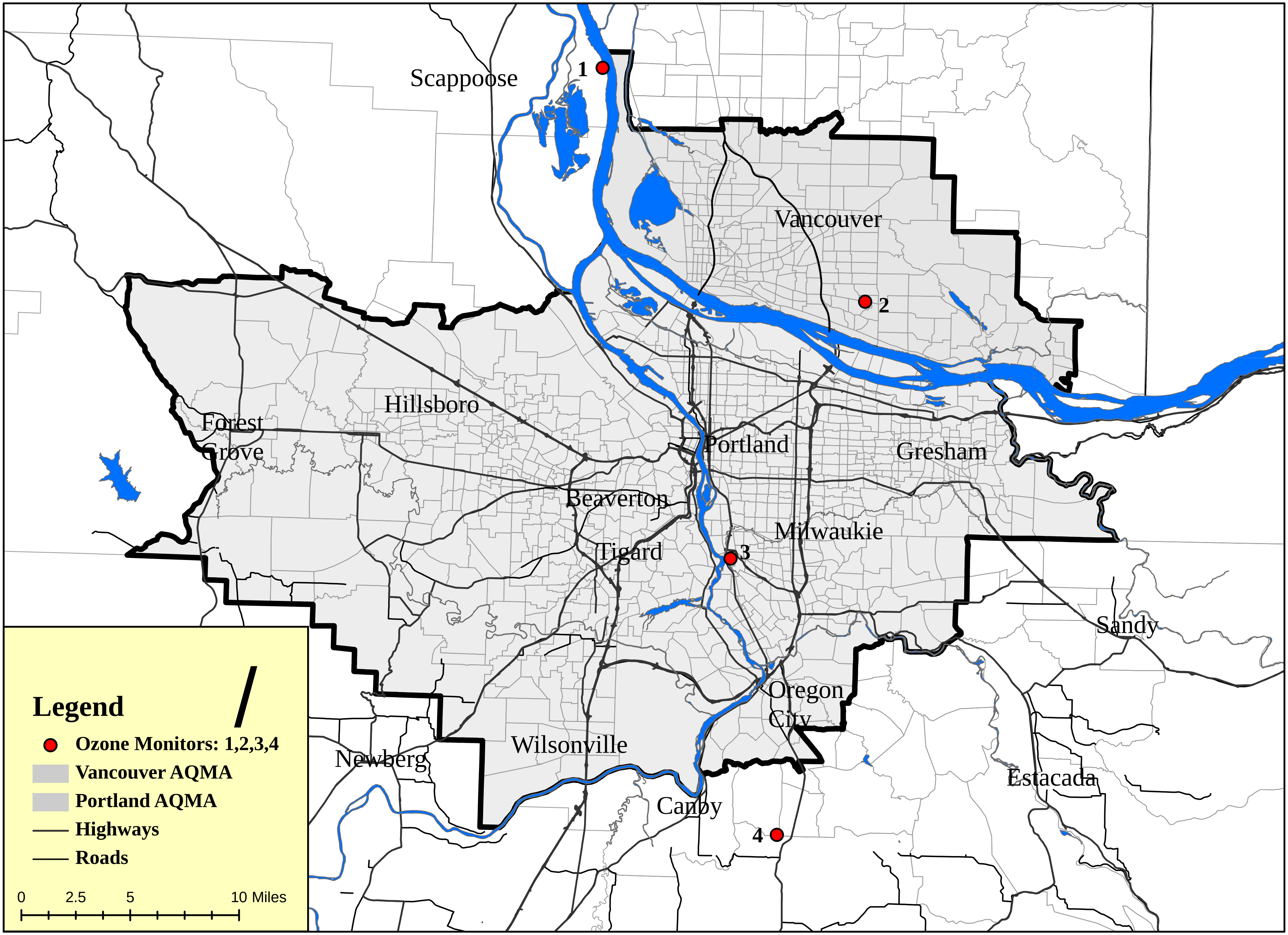
While the filtration facility may meet federal air quality regulations, this does not equate to compliance with local land use law or community expectations for **zero degradation of environmental quality**. S.24-6

Attachment 2

Ozone and Carbon Monoxide Attainment Maps

Appendix D9-1 Portland Area Carbon Monoxide Monitoring Network




Scappoose
1
Vancouver
2
Hillsboro
Forest Grove
Portland
Gresham
Beaverton
Milwaukie
Tigard
3
Sandy
Oregon City
Wilsonville
Newberg
Estacada
Canby
4
Legend
Ozone Monitors: 1,2,3,4
Vancouver AQMA
Portland AQMA
Highways
Roads
0
2.5
5
10 Miles

Attachment 3
Supplemental, Localized, Operational Air Quality Emission Calculations

City of Portland Water Bureau

Filtration Facility Project

Supplemental, Daily Operational Air Quality Calculations

Prepared by: **Environmental Science Associates**
May 2025

Table SUM-1: Summary of Project Operational Air Quality Emissions

Source	Emission Totals (Pounds per Day)			
	NOx	CO	PM2.5	PM10
Mobile Sources	3.39	3.57	1.08	6.05
Emergency Back Up Generators	171.70	32.34	4.53	4.53
Fugitive Emissions from Dry Chemical Transfer	0	0	0.06	0.06
Total	**175.10**	**35.90**	**5.67**	**10.64**
SCAQMD LST for SRA 30 @ 200 Meters	547	10,178	9	27
Threshold Exceeded?	No	No	No	No

Source: SCAQMD, 2009

Table DCT-1: Conversion Factors

lbs/ton
2000

Table DCT-2: Filtration Facility Operations

Weekdays	261
Annual Work Days for Delivery	261

Note: Assumes dry chemical deliveries 5 days per week; does not include holidays.

Table DCT-3: PM Emissions Factors (Material Transfer)

Process	PM10 Emission Factors (lbs/ton)		PM2.5 Emission Factors (lbs/ton)[a]	
	Unabated	Abated	Unabated	Abated
Soda Ash: Pneumatic unloading to elevated storage silo[b]	1.1	0.0049	1.1	0.0049
Salt: Pneumatic unloading to elevated storage silo[c]	0.47	0.00034	0.47	0.00034

Sources: EPA, 2026a; AP-42, Table 11.12-2

a AP-42 does not provide separate emission factors for PM2.5; thus, calculations assume the same emission rates for PM2.5 as PM10.

b Emissions from soda ash are considered to be representative of cement supplement unloading to elevated storage silo.

c Emissions from salt are considered to be representative of cement unloading to elevated storage silo

Table DCT-4: Annual Material Throughput for Soda Ash and Salt

Material	Annual Throughput (Pounds)	Daily Throughput (US tons)
Soda Ash	6,800,000	13
Salt	780,000	1

Source: Stantec, 2025a

Table DCT-5: Soda Ash and Salt Fugitive Emissions (Annual)

Material	Abated PM10 Emissions		Abated PM2.5 Emissions	
	Pounds	US tons	Pounds	US tons
Soda Ash	0.06	0.00	0.06	0.00
Salt	0.00	0.00	0.00	0.00
Total	0.06	0.00	0.06	0.00

Table GEN-1: General Assumptions

Engine size provided = engine power input (i.e. hp = bhp)

Table GEN-2: Standard Conversion Factors

Units / Conversion	Value
hp / kW	1.34102
g / lbs	453.592
lbs / US Short ton	2000

Table GEN-3: Generator Information

Generator[a]	Size (kW)	Size (bhp)[b]	Engine Tier	Daily O&M Use (hrs)	Annual O&M Use (hrs)	Annual Non-O&M Use (hrs)	Annual Use (Total)	Fuel Tank Size (gal)	50% Load Consumption Rate (gal / hr)	Full Load Consumption Rate (gal / hr)	Emergency Runtime Capacity (hrs)
FF: Gen1	2500	3353	Tier II	4.2	50	168	218	4500	91.1	173.1	26.00
FF: Gen2	2750	3688	Tier II	4.2	50	168	218	4500	91.1	173.1	26.00
IT: Gen3	50	96	Tier III	4.2	50	168	218	250	2.9	5.3	47.17

Sources: CM/GC Services, 2024; Cummins, 2019; OOEM, ND

a FF = Filtration Facility; IT = Intertie

b The bhp for IT: Gen3 was specifically identified in Cummins, 2019

Table GEN-4: Tier 2 Emission Factors

Emission Factors						
(g / hp-hr)[a]						g / gal[b]
NOx	VOC	CO	PM2.5	PM10	SOx	SOx
5.31	0.27	1	0.14	0.14	8.09E-03	4.52E-06

Sources: EPA, 2025a, 2025b, and 2025c

a Emfacs for NOx, VOC, CO and PM based on EPA, 2025a for the size of generator proposed; SOx emission factors based on EPA, 2025b

b EPA, 2025c for engines <600hp.

Table GEN-5: Tier 3 Emission Factors

Emission Factors						
(g / hp-hr)[a]						g / gal[b]
NOx	VOC	CO	PM2.5	PM10	SOx	SOx
3.59	0.23	1	0.18	0.18	8.09E-03	4.52E-06

Sources: EPA, 2025a, 2025b, and 2025c

a Emfacs for NOx, VOC, CO and PM based on EPA, 2025a for the size of generator proposed; SOx emission factor for generators >600hp based on EPA, 2025b

b EPA, 2025c for engines <600hp.

Table GEN-5: Emissions Calculations (Daily O&M)

Generator	Engine Size (bhp)	Load Factor	Daily Runtime (hrs)	Gallons Consumed	Emission Totals (g / yr)						Daily Emission Totals (Pounds)					
					NOx	VOC	CO	PM2.5	PM10	SOx	NOx	VOC	CO	PM2.5	PM10	SOx
FF: Gen1	3353	0.50	4.2	379.6	37087.6	1885.8	6984.5	977.8	977.8	56.5	81.76	4.16	15.40	2.16	2.16	0.12
FF: Gen2	3688	0.50	4.2	379.6	40796.3	2074.4	7682.9	1075.6	1075.6	62.2	89.94	4.57	16.94	2.37	2.37	0.14
IT: Gen3	96	0.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0.00	0.00	0.00	0.00	0.00	0.00
										Total	**171.70**	**8.73**	**32.34**	**4.53**	**4.53**	**0.26**

Table GEN-6: Emissions Calculations for Report Comination (Total)

Generator	Emission Totals (US short tons / yr)					
	NOx	VOC	CO	SOx	PM2.5	PM10
FF: Gen1	81.76	4.16	15.40	0.12	2.16	2.16
FF: Gen2	89.94	4.57	16.94	0.14	2.37	2.37
IT: Gen3	0.00	0.00	0.00	0.00	0.00	0.00
Total	**171.70**	**8.73**	**32.34**	**0.26**	**4.53**	**4.53**

Table MS-1: Mobile Source Emissions Summary

Vehicle Trip Type	Daily Exhaust and Fugitive Dust Emissions (Pounds)									
	NOx	VOC	CO	SOx	PM2.5			PM10		
					Exhaust	Dust	Total	Exhaust	Dust	Total
Employee Commute	0.01	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.02	0.02
Chemical Deliveries	3.35	0.17	3.35	0.01	0.10	0.65	0.75	0.24	2.60	2.84
Refuse Trucks	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.01
PWB Fleet	0.01	0.00	0.01	0.00	0.00	0.32	0.32	0.00	3.17	3.17
Non-Chemical Vendor Deliveries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Total	**3.39**	**0.17**	**3.57**	**0.01**	**0.11**	**0.98**	**1.08**	**0.24**	**5.81**	**6.05**

Table MS-2: Standard Conversions

Grams / Lbs	Lbs / US Short ton
453.592	2000

Table MS-3: Exhaust Mobile Source Emission Calculations for Passenger Vehicles (Gasoline) and Passenger Trucks (Gasoline and Diesel)

Vehicle Category	Number of Trips (One-way)	Daily Mileage Breakdown: Rural				Total Daily Mileage		Exhaust Emission Rates (Unrestricted; grams / mile)[a]						Exhaust Emission Rates (Restricted; grams / mile)[b]						Daily Exhaust Emissions (grams)						Daily Exhaust Emissions (Pounds)					
		On-site (Unrestricted)[a]		Off-site: Paved																											
	Weekday	Paved	Unpaved	Unrestricted[a]	Restricted[b]	Unrestricted[a]	Restricted[b]	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10
Passenger Vehicles	50.00	6.25	0.00	12.50	0.00	18.75	0.00	0.07	0.04	2.22	0.00	0.00	0.02	0.08	0.04	2.53	0.00	0.00	0.01	1.29	0.83	41.58	0.03	0.08	0.29	0.00	0.00	0.09	0.00	0.00	0.00
Passenger Trucks	50.00	6.25	0.00	12.50	0.00	18.75	0.00	0.13	0.05	2.20	0.00	0.01	0.02	0.13	0.04	2.68	0.00	0.00	0.01	2.51	0.99	41.20	0.04	0.11	0.32	0.01	0.00	0.09	0.00	0.00	0.00
																									Commute Exhaust Emissions Sub-Total	0.0	0.0	0.2	0.0	0.0	0.0

Sources: Global Transportation Engineering, 2022; Portland Water Bureau, 2025

a "Unrestricted" refers to all other rural roads (e.g., county roads, local streets) with direct property access. Typically lower-speed and more stop-and-go.

b "Restricted" refers to highways/freeways in rural areas with limited access (e.g., no direct property access) that are designed for higher-speed travel.

Table MS-4: Fugitive Dust Mobile Source Emission Calculations for Passenger Vehicles and Trucks

Vehicle Category	Number of Trips (One-way)	Daily Mileage Breakdown: Rural				Total Daily Mileage		Fugitive Dust Emission Factors Paved (g / mi)		Fugitive Dust Emission Factors Unpaved (lbs / mi)		Daily Fugitive Dust Emissions (grams)		Daily Fugitive Dust Emissions (Pounds)	
		On-site (Unrestricted)[a]		Off-site: Paved											
	Weekday	Paved	Unpaved	Unrestricted[a]	Restricted[b]	Paved	Unpaved	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10
Passenger Vehicles	50	6.25	0	12.5	0	18.75	0	0.05	0.21	27.18	271.78	1.00	3.98	0.00	0.01
Passenger Trucks	50	6.25	0	12.5	0	18.75	0	0.05	0.21	27.18	271.78	1.00	3.98	0.00	0.01
													Commute Fugitive Dust Emissions Subtotal	0.00	0.02

Sources: Global Transportation Engineering, 2022; Portland Water Bureau, 2025

a "Unrestricted" refers to all other rural roads (e.g., county roads, local streets) with direct property access. Typically lower-speed and more stop-and-go.

b "Restricted" refers to highways/freeways in rural areas with limited access (e.g., no direct property access) that are designed for higher-speed travel.

Table MS-5: Exhaust Mobile Source Emission Calculations for Chemical Deliveries (Diesel Fuel)

Vehicle Category	Number of Trips (One-way)	Daily Mileage Breakdown: Rural				Total Daily Mileage		Exhaust Emission Rates (Unrestricted; grams / mile)[a]						Exhaust Emission Rates (Restricted; grams / mile)[b]						Daily Exhaust Emissions (grams)						Daily Exhaust Emissions (Pounds)					
		On-site (Unrestricted)[a]		Off-site: Paved																											
	Weekday	Paved	Unpaved	Unrestricted[a]	Restricted[b]	Unrestricted[a]	Restricted[b]	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10
Single Unit Short-Haul Truck[c]	1.56	0.38	0.00	374.40	0.00	374.78	0.00	0.81801	0.05815	0.81801	0.00249	0.03184	0.06869	0.64658	0.04726	0.6627	0.0025	0.02272	0.04458	306.5784662	21.79393702	306.5784662	0.93250204	11.9318278	25.74383595	0.7	0.0	0.7	0.0	0.0	0.1
Combination Unit Short-Haul Truck[d]	1.6	0.39	0.00	384.00	0.00	384.39	0.00	2.11375	0.09284	2.11375	0.00489	0.05985	0.15058	1.83713	0.08769	1.25161	0.00484	0.04195	0.10068	812.5132948	35.68678666	812.5132948	1.878731687	23.00656514	57.88036849	1.8	0.1	1.8	0.0	0.1	0.1
Combination Unit Long-Haul Truck[e]	0.56	0.14	0.00	134.40	0.00	134.54	0.00	2.96039	0.13583	2.96039	0.00512	0.0906	0.18845	2.65805	0.12527	1.43903	0.00506	0.06831	0.13014	398.2843178	18.27360754	398.2843178	0.688862815	12.18888112	25.35346324	0.9	0.0	0.9	0.0	0.0	0.1
																									Chemical Delivery Exhaust Emissions Sub-Total	3.3	0.2	3.3	0.0	0.1	0.2

Sources: Stantec, 2021, 2025b, and 2025c

a "Unrestricted" refers to all other rural roads (e.g., county roads, local streets) with direct property access. Typically lower-speed and more stop-and-go.

b "Restricted" refers to highways/freeways in rural areas with limited access (e.g., no direct property access) that are designed for higher-speed travel.

c "Single Unit Short-Haul Trucks" refers to trucks where the cab and cargo are on the same chassis, and the trip distance is less than 200 miles.

d "Combination Unit Short-Haul Trucks" refers to trucks where the cab and cargo are separate (e.g., cab with a trailor), and the trip distance is less than 200 miles.

e "Combination Unit Long-Haul Trucks" refers to trucks where the cab and cargo are separate (e.g., cab with a trailor), and the trip distance is more than 200 miles.

Table MS-6: Fugitive Dust Mobile Source Emission Calculations for Chemical Deliveries

Vehicle Category	Number of Trips (One-way)	Daily Mileage Breakdown: Rural				Total Daily Mileage		Fugitive Dust Emission Factors Paved (g / mi)		Fugitive Dust Emission Factors Unpaved (lbs / mi)		Daily Fugitive Dust Emissions (grams)		Daily Fugitive Dust Emissions (Pounds)	
		On-site (Unrestricted)[a]		Off-site: Paved											
	Weekday	Paved	Unpaved	Unrestricted[a]	Restricted[b]	Paved	Unpaved	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10
Single Unit Short-Haul Truck[c]	1.56	0.38	0.00	374.40	0.00	374.78	0	0.33	1.32	0.08	0.75	123.76	495.02	0.27	1.09
Combination Unit Short-Haul Truck[d]	1.6	0.39	0.00	384.00	0.00	384.39	0	0.33	1.32	0.08	0.75	126.93	507.72	0.28	1.12
Combination Unit Long-Haul Truck[e]	0.56	0.14	0.00	134.40	0.00	134.54	0	0.33	1.32	0.08	0.75	44.43	177.70	0.10	0.39
													Chemical Delivery Dust Emissions Subtotal	0.65	2.60

Sources: Stantec, 2021, 2025b, and 2025c

a "Unrestricted" refers to all other rural roads (e.g., county roads, local streets) with direct property access. Typically lower-speed and more stop-and-go.

b "Restricted" refers to highways/freeways in rural areas with limited access (e.g., no direct property access) that are designed for higher-speed travel.

c "Single Unit Short-Haul Trucks" refers to trucks where the cab and cargo are on the same chassis, and the trip distance is less than 200 miles.

d "Combination Unit Short-Haul Trucks" refers to trucks where the cab and cargo are separate (e.g., cab with a trailor), and the trip distance is less than 200 miles.

e "Combination Unit Long-Haul Trucks" refers to trucks where the cab and cargo are separate (e.g., cab with a trailor), and the trip distance is more than 200 miles.

Table MS-7: Exhuast Mobile Source Emission Calculations for Refuse Trucks (Diesel Fuel)

Vehicle Category	Number of Trips (One-way)	Daily Mileage Breakdown: Rural				Total Daily Mileage		Exhaust Emission Rates (Unrestricted; grams / mile)[a]						Exhaust Emission Rates (Restricted; grams / mile)[b]						Daily Exhaust Emissions (grams)						Daily Exhaust Emissions (Pounds)					
		On-site (Unrestricted)[a]		Off-site: Paved																											
	Weekday	Paved	Unpaved	Unrestricted[a]	Restricted[b]	Unrestricted[a]	Restricted[b]	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10
Refuse Truck	3.6	0.63	0.00	3.60	0.00	4.23	0.00	2.4383	0.11983	2.4383	0.00486	0.07747	0.17178	2.06837	0.1048	1.20315	0.00496	0.04863	0.09255	10.3239801	0.507367856	10.3239801	0.020581564	0.328008527	0.727315458	0.0	0.0	0.0	0.0	0.0	0.0

Sources: Global Transportation Engineering, 2022

a "Unrestricted" refers to all other rural roads (e.g., county roads, local streets) with direct property access. Typically lower-speed and more stop-and-go.

b "Restricted" refers to highways/freeways in rural areas with limited access (e.g., no direct property access) that are designed for higher-speed travel.

Table MS-8: Fugitive Dust Mobile Source Emission Calculations for Refuse Trucks

Vehicle Category	Number of Trips (One-way)	Daily Mileage Breakdown: Rural				Total Daily Mileage		Fugitive Dust Emission Factors Paved (g / mi)		Fugitive Dust Emission Factors Unpaved (lbs / mi)		Daily Fugitive Dust Emissions (grams)		Daily Fugitive Dust Emissions (Pounds)	
		On-site (Unrestricted)[a]		Off-site: Paved											
	Weekday	Paved	Unpaved	Unrestricted[a]	Restricted[b]	Paved	Unpaved	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10
Refuse Truck	3.6	0.634090909	0	3.6	0	4.23	0	0.33	1.32	0.08	0.75	1.40	5.59	0.00	0.01

Sources: Global Transportation Engineering, 2022

a "Unrestricted" refers to all other rural roads (e.g., county roads, local streets) with direct property access. Typically lower-speed and more stop-and-go.

b "Restricted" refers to highways/freeways in rural areas with limited access (e.g., no direct property access) that are designed for higher-speed travel.

Table MS-9: Exhuast Mobile Source Emission Calculations for PWB Fleet (Diesel Fuel)

Vehicle Category	Number of Trips (One-way)	Daily Mileage Breakdown: Rural				Total Daily Mileage		Exhaust Emission Rates (Unrestricted; grams / mile)[a]						Exhaust Emission Rates (Restricted; grams / mile)[b]						Daily Exhaust Emissions (grams)						Daily Exhaust Emissions (Pounds)					
		On-site (Unrestricted)[a]		Off-site: Paved																											
	Weekday	Paved	Unpaved	Unrestricted[a]	Restricted[b]	Unrestricted[a]	Restricted[b]	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10
Light Commerical Trucks	10	1.76	5.28	2.50	0.00	9.55	0.00	0.54278	0.07768	0.54278	0.00148	0.02783	0.04632	0.1297	0.03866	1.80973	0.00226	0.0054	0.01307	5.181060577	0.741502123	5.181060577	0.014152097	0.265632537	0.442137356	0.0	0.0	0.0	0.0	0.0	0.0

Sources: Portland Water Bureau, 2025

a "Unrestricted" refers to all other rural roads (e.g., county roads, local streets) with direct property access. Typically lower-speed and more stop-and-go.

b "Restricted" refers to highways/freeways in rural areas with limited access (e.g., no direct property access) that are designed for higher-speed travel.

Table MS-10: Fugitive Dust Mobile Source Emission Calculations for PWB Fleet

Vehicle Category	Number of Trips (One-way)	Daily Mileage Breakdown: Rural				Total Daily Mileage		Fugitive Dust Emission Factors Paved (g / mi)		Fugitive Dust Emission Factors Unpaved (lbs / mi)		Daily Fugitive Dust Emissions (grams)		Daily Fugitive Dust Emissions (Pounds)	
		On-site (Unrestricted)[a]		Off-site: Paved											
	Weekday	Paved	Unpaved	Unrestricted[a]	Restricted[b]	Paved	Unpaved	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10
Light Commerical Trucks	10	1.76	5.28	2.5	0	4.26	5.28	0.05	0.21	27.18	271.78	143.84	1437.04	0.32	3.17

Sources: Portland Water Bureau, 2025

a "Unrestricted" refers to all other rural roads (e.g., county roads, local streets) with direct property access. Typically lower-speed and more stop-and-go.

b "Restricted" refers to highways/freeways in rural areas with limited access (e.g., no direct property access) that are designed for higher-speed travel.

Table MS-11: Exhuast Mobile Source Emission Calculations for Non-Chemical Vendor Deliveries (Diesel Fuel)

Vehicle Category	Number of Trips (One-way)	Daily Mileage Breakdown: Rural				Total Daily Mileage		Exhaust Emission Rates (Unrestricted; grams / mile)[a]					
		On-site (Unrestricted)[a]		Off-site: Paved									
	Weekday	Paved	Unpaved	Unrestricted[a]	Restricted[b]	Unrestricted[a]	Restricted[b]	NOx	VOC	CO	SOx	PM2.5	PM10
Single Unit Short-Haul Truckc	2	0.35	0.00	2.00	0.00	2.35	0.00	0.81801	0.05815	0.81801	0.00249	0.03184	0.06869

Vehicle Category	Exhaust Emission Rates (Restricted; grams / mile)[b]						Daily Exhaust Emissions (grams)						Daily Exhaust Emissions (Pounds)					
	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10	NOx	VOC	CO	SOx	PM2.5	PM10
Single Unit Short-Haul Truckc	0.64658	0.04726	0.6627	0.0025	0.02272	0.04458	1.924190973	0.136786179	1.924190973	0.005852701	0.074888219	0.161577091	0.0	0.0	0.0	0.0	0.0	0.0

Sources: Portland Water Bureau, 2025

a "Unrestricted" refers to all other rural roads (e.g., county roads, local streets) with direct property access. Typically lower-speed and more stop-and-go.

b "Restricted" refers to highways/freeways in rural areas with limited access (e.g., no direct property access) that are designed for higher-speed travel.

Table MS-12: Fugitive Dust Mobile Source Emission Calculations for Non-Chemical Deliveries

Vehicle Category	Number of Trips	Daily Mileage Breakdown: Rural				Total Daily Mileage		Fugitive Dust Emission Factors Paved (g / mi)		Fugitive Dust Emission Factors Unpaved (lbs / mi)		Daily Fugitive Dust Emissions (grams)		Daily Fugitive Dust Emissions (Pounds)	
		On-site (Unrestricted)[a]		Off-site: Paved											
	Weekday	Paved	Unpaved	Unrestricted[a]	Restricted[b]	Paved	Unpaved	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10
Single Unit Short-Haul Truckc	2	0.352272727	0	2	0	2.35	0.00	0.33	1.32	0.08	0.75	0.78	3.11	0.00	0.01

Sources: Portland Water Bureau, 2025

a "Unrestricted" refers to all other rural roads (e.g., county roads, local streets) with direct property access. Typically lower-speed and more stop-and-go.

b "Restricted" refers to highways/freeways in rural areas with limited access (e.g., no direct property access) that are designed for higher-speed travel.

Table MSEF-1: Rural Unrestricted Vehicle Emission Factors (Exhaust and Tire- and Brake-wear)[a]

	NOx	VOC[b]	CO	SOx	PM2.5	PM10[c]
	g/mile					
Passenger Car, Gas	0.069	0.044	2.218	0.002	0.004	0.015
Passenger Truck, Gas + Diesel	0.134	0.053	2.198	0.002	0.006	0.017
Light Commercial Truck, Diesel	0.543	0.078	0.543	0.001	0.028	0.046
Refuse Trucks, Diesel	2.438	0.120	2.438	0.005	0.077	0.172
Single Unit Short-Haul Truck, Diesel	0.818	0.058	0.818	0.002	0.032	0.069
Combination Short-Haul Truck, Diesel	2.114	0.093	2.114	0.005	0.060	0.151
Combination Long-Haul Truck, Diesel	2.960	0.136	2.960	0.005	0.091	0.188

a From MOVES5 for Multnomah, OR; speed and model years aggregated. Road type rural unrestricted.

b Non-methane Organic Compounds

c PM10 and PM2.5 includes brakewear and tirewear

Table MSEF-2: Rural Restricted Vehicle Emission Factors (Exhaust and Tire- and Brake-wear)[a]

	NOx	VOC[b]	CO	SOx	PM2.5	PM10[c]
	g/mile					
Passenger Car, Gas	0.075	0.036	2.526	0.002	0.003	0.010
Passenger Truck, Gas + Diesel	0.129	0.043	2.684	0.002	0.004	0.010
Light Commercial Truck, Diesel	0.130	0.039	1.810	0.002	0.005	0.013
Refuse Trucks, Diesel	2.068	0.105	1.203	0.005	0.049	0.093
Single Unit Short-Haul Truck, Diesel	0.647	0.047	0.663	0.002	0.023	0.045
Combination Short-Haul Truck, Diesel	1.837	0.088	1.252	0.005	0.042	0.101
Combination Long-Haul Truck, Diesel	2.658	0.125	1.439	0.005	0.068	0.130

a From MOVES5 for Multnomah, OR; speed and model years aggregated. Road type rural restricted.

b Non-methane Organic Compounds

c PM10 and PM2.5 includes brakewear and tirewear

Table MSEF-3: Paved Road Emission Factors (Vendor and Refuse Trucks)

Variable	PM10	PM2.5	
k =	1	0.25	particle size multiplier, g/VMT [Table 13.2-1.1]
sL =	0.03	0.03	road surface silt loading (g/m2) [Table 13.2.1-2]
W =	30	30	Assumes, on average, chemical and waste off-haul trucks would weigh approximately 30 tons.
EF =	1.321	0.330	g/VMT

Equation: $EF = k(sL)^{0.90} \times W^{1.02}$

Source: EPA, 2011; AP-42, Section 13.2.1: Paved Roads

Table MSEF-4: Paved Road Emission Factors (Passenger Cars & Trucks + Light Commercial Trucks)

Variable	PM10	PM2.5	
k =	1	0.25	particle size multiplier, g/VMT [Table 13.2-1.1]
sL =	0.03	0.03	road surface silt loading (g/m2) [Table 13.2.1-2]
W =	5	5	GVWR capped at 10,000 lbs for Light Commercial Trucks
EF =	0.212	0.053	g/VMT

Equation: $EF = k(sL)^{0.90} \times W^{1.02}$

Source: EPA, 2011; AP-42, Section 13.2.1: Paved Roads

Table MSEF-5: Unpaved Road PM10 Emission Factors (Vendor and Refuse Trucks)

Variable	Value	
Average Vehicle Weight (tons)	30	Assumes, on average, chemical and waste off-haul trucks would weigh approximately 30 tons.
Silt Content (%)	6.4	Value for municipal solid waste landfills.
P, Number of days with Precip >0.01 inches	161	From NOAA's Climate Data Online for Station US1ORCC0093 near Sandy, OR
Default Emission Factor (lb/mile)	1.34	
Low-Speed Emission Factor (lb/mile)	0.75	Reduced for low speeds; accounts for a 44% reduction assuming truck speeds are limited to 15 mph or less (Countless Environmental, 2006)

Equation: Emission Factor [lb/mi] = 1.5 x (silt content [%] / 12)^0.9 x (average vehicle weight [tons] / 3)^0.45 x (365-P)/365

Sources: EPA, 2006b; AP-42, Section 13.2.2, Table 13.2.2-1, Reference for Silt Content: Average for a Service Road associated with the project.
Countless Environmental, 2006
NOAA, 2025

Table MSEF-6: Unpaved Road PM2.5 Emission Factor (Vendor and Refuse Trucks)

Variable	Value	
Average Vehicle Weight (tons)	30	Assumes, on average, chemical and waste off-haul trucks would weigh approximately 30 tons.
Silt Content (%)	6.4	Value for municipal solid waste landfills.
P, Number of days with Precip >0.01 inches	161	From NOAA's Climate Data Online for Station US1ORCC0093 near Sandy, OR
Default Emission Factor (lb/mile)	0.13	
Low-Speed Emission Factor (lb/mile)	0.08	Reduced for low speeds; accounts for a 44% reduction assuming truck speeds are limited to 15 mph or less (Countless Environmental, 2006)

Equation: Emission Factor [lb/mi] = 0.15 x (silt content [%] / 12)^0.9 x (average vehicle weight [tons] / 3)^0.45 x (365-P)/365

Sources: EPA, 2006b; AP-42, Section 13.2.2, Table 13.2.2-1, Reference for Silt Content: Average for a Service Road associated with the project.
Countless Environmental, 2006
NOAA, 2025

Table MSEF-7: Calculation of Unpaved Road PM10 Emission Factor (Passenger Vehicles & Trucks + Light Commerical Trucks)

Variable	Value	
Average Vehicle Weight (tons)	5	GVWR capped at 10,000 lbs for Light Commercial Trucks
Silt Content (%)	6.4	Value for municipal solid waste landfills.
P, Number of days with Precip >0.01 inches	161	From NOAA's Climate Data Online for Station US1ORCC0093 near Sandy, OR
Default Emission Factor (lb/mile)	0.60	
Low-Speed Emission Factor (lb/mile)	0.34	Reduced for low speeds; accounts for a 44% reduction assuming truck speeds are limited to 15 mph or less (Countless Environmental, 2006)

Equation: Emission Factor [lb/mi] = 1.5 x (silt content [%] / 12)^0.9 x (average vehicle weight [tons] / 3)^0.45 x (365-P)/365

Sources: EPA, 2006b; AP-42, Section 13.2.2, Table 13.2.2-1, Reference for Silt Content: Average for a Service Road associated with the project.
Countless Environmental, 2006
NOAA, 2025

Table MSEF-8: Calculation of Unpaved Road PM2.5 Emission Factor (Passenger Vehicles & Trucks + Light Commerical Trucks)

Variable	Value	
Average Vehicle Weight (tons)	5	GVWR capped at 10,000 lbs for Light Commercial Trucks
Silt Content (%)	6.4	Value for municipal solid waste landfills.
P, Number of days with Precip >0.01 inches	161	From NOAA's Climate Data Online for Station US1ORCC0093 near Sandy, OR
Emission Factor (lb/mile)	0.06	
Emission Factor (lb/mile)	0.03	Reduced for low speeds; accounts for a 44% reduction assuming truck speeds are limited to 15 mph or less (Countless Environmental, 2006)

Equation: Emission Factor [lb/mi] = 0.15 x (silt content [%] / 12)^0.9 x (average vehicle weight [tons] / 3)^0.45 x (365-P)/365

Sources: EPA, 2006b; AP-42, Section 13.2.2, Table 13.2.2-1, Reference for Silt Content: Average for a Service Road associated with the project.
Countless Environmental, 2006
NOAA, 2025

Table TGS-1: Updated Trip Generation Information

Vehicle Type	Number of Round Trips[a]			Number of One-Way Trips[a]		
	Daily	Weekly	Monthly	Daily	Weekly	Monthly
Passenger Vehicles[b]				100		
Chemical Deliveries[c]			37.2	1.9		
Refuse Trucks[b]		9		6.4		
PWB Vehicle Fleet[d]		35				
Non-Chemical Vendor Deliveries[d]		7		1		
Heavy-duty Truck Trip Subtotal[e]				**9.3**		

Sources: Global Transportation Engineering, 2022; Portland Water Bureau, 2025; Stantec, 2021 and 2025b

a Values that are underlined reflect raw data supplied by sources

b From Global Transportation Engineering, 2022

c From Stantec, 2021 and 2025a

d From Portland Water Bureau, 2025

e Reflects only heavy-duty truck trips associated with Project operation

Short Reference	Long Reference
CM/GC, 2024	CM/GC Services (CM/GC), 2024. "Section 26 32 13 - Standby Power Generation". May 2024.
Countless Environmental, 2006	Countless Environmental, 2006. WRAP Fugitive Dust Handbook. September 7, 2006.
Cummins, 2019	Cummins Inc. (Cummins), 2019. Specification Sheet for Diesel Generator Set QSB5 Series Engine 50-125 kW Standby EPA Tier 3 Emissions.
EPA, 2006b	United States Environmental Protection Agency (EPA), 2006b. AP-42: Compilation of Air Emissions Factors from Stationary Sources. Section 13.2.2: Unpaved Roads. November 2006.
EPA, 2011	United States Environmental Protection Agency (EPA), 2011. AP-42: Compilation of Air Emissions Factors from Stationary Sources. Section 13.2.1: Paved Roads. January 2011.
EPA, 2025a	United States Environmental Protection Agency (EPA), 2025a. "nonroad-compression-ignition-2011-present.xlsx." March 2025.
EPA, 2025b	United States Environmental Protection Agency (EPA), 2025b. AP-42: Compilation of Air Emissions Factors from Stationary Sources. Section 3.4: Large Stationary Diesel and All Stationary Dual-fuel Engines. April 2025
EPA, 2025c	United States Environmental Protection Agency (EPA), 2025c. AP-42: Compilation of Air Emissions Factors from Stationary Sources. Section 3.3: Gasoline and Diesel Industrial Engines. April 2025
Globe Transportation Engineering, 2022	Globe Transportation Engineering, 2022. Memorandum: Portalnd Water Bureau Bull Run Filtration Project Traffic Impact Analysis. September 2, 2022.
NOAA, 2025	National Oceanic and Atmospheric Administration (NOAA), 2025. National Centers for Environmental Information. Climate Data Online Request 3978032 for Station US1ORCC0093. April 1, 2025.
OOEM, ND	Oregon Office of Emergency Management (OOEM), ND. "2021 February Winter Storm Spotlight". Website. Accessed April 11, 2025. https://storymaps.arcgis.com/stories/150aa3d2141645da84c476d8ee9ee0e8?
Portland Water Bureau, 2025	Portland Water Bureau, 2025. Personal Communication. Call between Portland Water Bureau's Michelle Cheek and Lyda Hakes, and ESA's Phil Gleason. April 2, 2025.
SCAQMD, 2009	South Coast Air Quality Management District (SCAQMD), 2009. Localized Significance Thresholds Appendix C - Mass Rate LST Look-up Tables. October 21, 2009. https://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/appendix-c-mass-rate-lst-look-up-tables.pdf?sfvrsn=8e641d61_2
Stantec, 2021	Stantec, 2021. Final Basis of Design Report for the Bull Run Treatment Projects. Prepared for the Portland Water Bureau. May 2021.
Stantec, 2025a	Stantec, 2025a. Personal Communication. Email. Subject: RE: Filtration Facility - ESA AQ Request for Information (URGENT). Stantec's Mark Graham to ESA's Phil Gleason. April 3, 2025.
Stantec, 2025b	Stantec, 2025b. Personal Communication. Call between Stantec's Mark Graham; Portland Water Bureau's Michelle Cheek, Lyda Hakes, David Peters, Christopher Bowker and Thomas Gilman; and ESA's Phil Gleason. April 3, 2025.
Stantec, 2025c	Stantec, 2025c. Personal Communication. Email. Subject: Filtration Facility - ESA Request for Information (URGENT) - ATTORNEY CLIENT PRIVILEGE. From Stantec's Mark Graham to ESA's Phil Gleason. April 3, 2025.