State of Oregon

Department of Environmental Quality Memorandum

Date: Nov. 16, 2021

To: Oregon Environmental Quality Commission

From: Leah Feldon, Deputy Director

Subject: Item H: LRAPA rulemakings for PM2.5 and PM10
Nov. 17-18, 2021, EQC meeting

Purpose of this item

The Lane Regional Air Protection Agency, LRAPA, is the sole remaining regional air authority in Oregon. When LRAPA updates its rules, state law requires that the commission approve the changes, which must be at least as stringent as the state rules for air quality. DEQ is proposing that the commission approve the redesignation, and related maintenance plans, for particulate matter reductions in the Oakridge and Westfir communities of Lane County.

DEQ recommendation

DEQ recommends that the Oregon Environmental Quality Commission:

- Approve the rule revisions seen in Attachments B and C to:
  - Redesignate the Oakridge-Westfir airshed as attainment for the national air quality health standards for fine particles (PM2.5); and include a 10-year maintenance plan to keep air quality within the PM2.5 health standards, and
  - Redesignate the Oakridge airshed as attainment for the 24-hour national ambient air quality standards (NAAQS) for course inhalable particles (PM10); and include a 10-year maintenance plan to keep air quality within the PM10 health standards.
- Approve incorporating these rule amendments into the Oregon Clean Air Act State Implementation Plan under OAR 340-200-0040; and
- Direct DEQ to submit the Oakridge-Westfir PM2.5 Redesignation Request and Maintenance Plan and the Oakridge PM10 Redesignation Request and Maintenance Plan, the City of Oakridge Ordinance No. 920 and Lane County Code 9.120-150 to the U.S. Environmental Protection Agency for approval.

Attachments

A. Staff reports for proposed PM2.5 and PM10 actions
- A1: PM2.5 actions
- A2: PM 10 actions

B. DEQ rule revisions

C. LRAPA rule revisions

D. LRAPA supporting materials

- D1: PM2.5 materials
- D2: PM10 materials

State of Oregon Department of Environmental Quality

Oregon Environmental Quality Commission Meeting

Nov. 17-18, 2021

Oakridge-Westfir $PM_{2.5}$ Redesignation Request and $PM_{2.5}$ Maintenance Plan

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Introduction

DEQ and the Lane Regional Air Protection Agency (LRAPA) propose permanent rule amendments to chapter 340 of the Oregon Administrative Rules to redesignate the Oakridge-Westfir airshed as attainment for the national air quality health standards for fine particles ($PM_{2.5}$) and include a 10-year maintenance plan to keep air quality within the $PM_{2.5}$ health standards.

Request for Other Options

Oregon must update its Clean Air Act State Implementation Plan to document that DEQ has the authority, regulations and enforcement capability to implement the current National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$. In addition to the redesignation of the Westfir-Oakridge airshed into attainment, a 10-year maintenance plan provides assurance that air quality programs are adequate to prevent future violation of the NAAQS.

Overview

DEQ and LRAPA are proposing to submit to the U.S. Environmental Protection Agency a request to redesignate the Oakridge-Westfir airshed from nonattainment to attainment with the 2006 National Ambient Air Quality Standard for fine particulate matter, diameter less than 2.5 microns.

With each $PM_{2.5}$ redesignation request, the Clean Air Act requires that states submit a revision of the applicable State Implementation Plan to provide for maintenance of the $PM_{2.5}$ NAAQS for at least 10 years after the redesignation. This is called a $PM_{2.5}$ Maintenance Plan. The 10-year maintenance period begins on the effective date of EPA's approval of the redesignation request, as published in the Federal Register.

DEQ and LRAPA propose to submit a revision to the State of Oregon SIP under OAR 340-200-0040. This proposed revision would:

- Redesignate the Oakridge-Westfir airshed as attainment for the $PM_{2.5}$ NAAQS; and
- Include a maintenance plan to keep air quality within the $PM_{2.5}$ health standards for at least 10 years after the redesignation.

EPA adopted more protective $PM_{2.5}$ health standards in 2006 as part of its periodic review of the NAAQS to ensure protection of public health. In 2009, EPA identified the Oakridge-Westfir airshed as an area not meeting the $PM_{2.5}$ health standards on worst winter days, and designated the area nonattaining for $PM_{2.5}$.

LRAPA completed and DEQ submitted an attainment plan in December 2012, which set December 31, 2015, as the target date to achieve attainment with the PM2.5 NAAQS. The Oakridge-Westfir area did not achieve attainment with the PM2.5 NAAQS by December 2015, but the attainment plan met the criteria for an extension of its attainment date, and EPA extended the attainment date until December 31, 2016. LRAPA updated the attainment plan and DEQ submitted to EPA the 2016 Oakridge-Westfir $PM_{2.5}$ Attainment Plan, after EQC adoption in

January 2017. In February 2018, EPA approved the 2016 attainment plan and found that the Oakridge-Westfir area was attaining the $PM_{2.5}$ NAAQS, based on quality-assured, quality-controlled, and certified ambient air monitoring data from the years 2014, 2015 and 2016.

In addition to the economic and community benefits of the Oakridge-Westfir area's redesignation to attainment, maintenance plan implementation would allow other programs to move forward. For example, the Smoke Safety Plan funded by DEQ could take effect. This Smoke Safety Plan allows the U.S. Forest Service and the Oregon Department of Forestry to conduct additional prescribed burning near Oakridge to help defend against devastating wildfires.

There are no major existing industrial sources within the area to be affected by the maintenance plan implementation. This proposed maintenance plan does not impose any new additional costs for new source review. Currently, new and expanding industrial sources within the Oakridge Nonattainment Area with emissions greater than 10 tons per year of $PM_{2.5}$ are required to install pollution control equipment based on the maximum degree of reduction (taking into account economic costs and environmental impacts), known as Best Available Control Technology, and to provide emission offsets. Oakridge first became subject to more stringent requirements for $PM_{2.5}$ in 2009, when EPA designated the Oakridge area as nonattainment for $PM_{2.5}$. The Oakridge area then became a "Reattainment Area" for $PM_{2.5}$ in 2018 so that any new or expanding industrial source in Oakridge is required to install Best Available Control Technology in lieu of the potentially more costly Lowest Achievable Emission Rate controls. New and expanding industrial sources are also required to obtain emission offsets (i.e., offset their emission increases with equal emission reductions from other sources) and model their emissions to demonstrate that the proposed increase from their facility will not jeopardize compliance with health standards. Costs for Best Available Control Technology controls vary widely depending on the type of process being controlled, and the associated cost of modeling analysis can range from $4,000 to $6,000 per model run. These potential costs are all existing costs resulting from existing requirements.

Health impacts: There are a number of studies linking $PM_{2.5}$ effects with respiratory causes and cardiac diseases. U.S. and Canadian studies report statistically significant relationships between an increase in $PM_{2.5}$ and an increase in hospitalizations for all respiratory causes, including chronic obstructive pulmonary disease, pneumonia and asthma. In addition to the greatly expanded body of evidence on hospitalization or emergency department visits for cardiovascular diseases, new epidemiologic studies have also reported associations between more subtle physiological changes in the cardiovascular system and short-term exposures to $PM_{2.5}$ concentrations (EPA, 2012). LRAPA expects that the proposed maintenance plan will have a positive effect on the health of Oakridge residents.

Statement of Need

What need would the proposed Maintenance Plan address?

The Oakridge-Westfir $PM_{2.5}$ Attainment Plan was adopted by LRAPA in 2016 and approved by EPA in February 2018, at which time, EPA also found that the Oakridge-Westfir area was attaining the $PM_{2.5}$ NAAQS. This proposed redesignation request and maintenance plan follows EPA's 2018 attainment finding and outlines the specific air pollution control strategies necessary to maintain the Oakridge-Westfir area compliance with the PM2.5 NAAQS.

If adopted, the proposed Oakridge-Westfir $PM_{2.5}$ Redesignation Request and Maintenance Plan and associated rule will be submitted to EPA for approval as part of Oregon's State Clean Air Act Implementation Plan.

How would the proposed rule address the need?

As follow-up to the Oakridge-Westfir $PM_{2.5}$ Attainment Plan and as required, the maintenance plan would ensure maintaining the $PM_{2.5}$ NAAQS in the Oakridge-Westfir area.

How will LRAPA know the rule addressed the need?

The $PM_{2.5}$ standard will be maintained during the 10-year maintenance period. The LRAPA air monitoring network will document that air quality in Oakridge meets the federal health standard.

Rules Affected, Authorities, Supporting Documents

Lead division

Lane Regional Air Protection Agency

Program or activity

Local air quality agency

Chapter 340 action

Amend OAR 340-200-0400

Statutory Authority - ORS				
468.020	468A.025	468A.035	468.A105	468.120
468.130				

Statutes Implemented - ORS				
468A.035	468A.135	468A.150		

Documents relied on for rulemaking

Document title	Document location
The federal Clean Air Act, EPA guidance for the development of attainment plans, guidance for the preparation of emissions inventories, and air quality modeling protocol.	www.lrapa.org Lane Regional Air Protection Agency 1010 Main Street Springfield, Oregon 97477
2016 Updated Oakridge-Westfir Attainment Plan	LRAPA website: https://www.lrapa.org/DocumentCenter/View/2108/Updated-Oakridge-Westfir-PM25-Attainment-Plan-EQC
Provisional Assessment of Recent Studies on Health Effects of Particulate Matter Exposure	EPA, 2012, EPA/600/R-12/056F. https://www3.epa.gov/ttn/naaqs/standards/pm/data/20121213psa.pdf

Fee Analysis

This rulemaking does not involve fees.

Statement of Fiscal and Economic Impact

Fiscal and Economic Impact

The proposed maintenance plan includes emission reduction strategies that can be implemented through rules and local ordinances. The proposed changes should not create barriers to economic growth. The largest impacts of this proposed plan will be to the wood-burning homeowner, as some of the emission reduction strategies may result in increased heating costs. However, the homeowner could also experience benefits as a result of the proposed plan through the improvement of air quality in Oakridge, potentially decreasing individual health care costs such as those related to asthma.

Statement of Cost of Compliance

State and federal agencies

The proposed rule has no fiscal or economic impact on state and federal agencies.

Local governments

The proposed rule has no fiscal or economic impact on local governments. However, maintenance plan implementation would include LRAPA continuing to fund the local air quality program with a combination of EPA Targeted Airshed Grant funds and local funds. This rulemaking will likely result in some direct negative economic impacts to the city government through the implementation and enforcement of the ordinance. However, the Oakridge Air Program that implements the TAG includes funding of a dedicated code enforcement officer for the City of Oakridge to offset those negative economic impacts.

Public

The proposed rule has no fiscal or economic impact on the public. However, maintenance plan implementation would include an existing city ordinance that increases restrictions on wood burning when weather conditions could lead to accumulation of particulate in the Oakridge area. The more curtailment (red) days called, the more costs could be accrued by wood-burning residents in terms of higher electric or oil heating costs. These heating costs are variable depending on the alternative heat source used, the number of curtailment days called during the winter heating season, the cost to purchase cordwood or the transportation costs for a homeowner to cut and haul wood. This additional cost for non-wood fuels could be offset by the positive economic impact of lower health care costs and fewer missed work days if Oakridge is able to maintain particulate levels below standards.

Large businesses - businesses with more than 50 employees

The proposed rule has no fiscal or economic impact on large businesses. However, maintenance plan implementation would include application of existing rules regarding new and expanding industry.

Small businesses – businesses with 50 or fewer employees

The proposed rule has no fiscal or economic impact on the small businesses. However, maintenance plan implementation would include potential costs from existing requirements.

Cost of Compliance for Small Businesses

a. Estimated number of small businesses and types of businesses and industries with small businesses subject to proposed rule.

There is one minor LRAPA-permitted source, a rock crusher, located in the area affected by the proposed rule and plan. No new industrial rules are included in the proposal. Reasonably available control technology and fugitive dust control requirements already apply to existing facilities.

b. Projected reporting, recordkeeping and other administrative activities, including costs of professional services, required for small businesses to comply with the proposed rule.

There is no expected cost from administrative activities and other professional services required of small businesses resulting from this proposed rule.

c. Projected equipment, supplies, labor and increased administration required for small businesses to comply with the proposed rule.

Home heating retailers and installers will not face new requirements for equipment, supplies, labor or administration unless there is a need to account for the added woodstove replacements. This effect would be indirect and offset by positive economic benefits of increased sales.

d. Describe how LRAPA involved small businesses in developing this proposed rule.

LRAPA did not involve small businesses in the development of this proposed rule as there is no expected impact on small businesses and other industry in the Oakridge-Westfir airshed.

Documents relied on for fiscal and economic impact

Document title	Document location
2012 Oakridge-Westfir Attainment Plan	LRAPA website: https://www.lrapa.org/DocumentCenter/View/1148/Oakridge_Fine_Particulate_Matter_Plan_10-31-2012_-_final
2016 Updated Oakridge-Westfir Attainment Plan	LRAPA website: https://www.lrapa.org/DocumentCenter/View/2108/Updated-Oakridge-Westfir-PM25-Attainment-Plan-EQC
Oakridge-Westfir PM2.5 Redesignation Request and PM2.5 Maintenance Plan	LRAPA website: https://www.lrapa.org/DocumentCenter/View/5428/Oakridge-Westfir-PM25-Redesignation-Request-and-Maintenance-Plan-FINAL-with-appendices
LRAPA Staff Report on the 2017 Industrial Air Permitting Rules that included classifying the Oakridge area as a "Reattainment Area"	http://www.lrapa.org/DocumentCenter/View/2899/LRAPA-2017-Permitting-Rules-Staff-Report?bidId=

Advisory committee fiscal review

LRAPA did not appoint an advisory committee for fiscal review in the development of this proposed rule as there is no expected fiscal impact or other adverse impact on small businesses and other industry in the Oakridge-Westfir airshed. However, LRAPA has a standing advisory committee that meets most months. LRAPA consulted their Citizens Advisory Committee for this rulemaking and presented a summary of the changes to the committee at their March 30, 2021 meeting. The committee members that attended the meeting agreed to the proposed changes and had questions about LRAPA's proposal. The requirement to discuss an advisory committee in this section is separate from and in addition to discussing the advisory committee in the Stakeholder Involvement section. The question to be addressed here is whether an advisory committee reviewed the fiscal impact statement.

Housing cost

As ORS 183.534 requires, LRAPA evaluated whether the proposed rules would have an effect on the development cost of a 6,000-square-foot parcel and construction of a 1,200-squarefoot detached, single-family dwelling on that parcel. LRAPA has determined that this proposed rulemaking will have no effect on the cost of development of a 6,000 square foot parcel and the construction of a 1,200 square foot detached single-family dwelling on that parcel.

Federal Relationship

This section complies with OAR 340-011-0029 and ORS 468A.327 to clearly identify the relationship between the proposed rules and applicable federal requirements.

The proposed rules add requirements additional to those in federal requirements. This rulemaking imposes additional requirements to implement the applicable federal requirements for compliance with particulate standards. Section 110 of the Clean Air Act, 42 U.S.C. §7410 requires DEQ/LRAPA to adopt a maintenance plan to reduce particulate matter of 2.5 micrometers and less ($PM_{2.5}$) so that the Oakridge area maintains compliance with the National Ambient Air Quality Standards (NAAQS). The plan must also show the area will continue to meet NAAQS in the future and provide contingency measures in case it fails. Federal requirements mandate adoption of a plan that demonstrates the area will reach attainment of the standard; however, the specific strategies to achieve the standard are not mandated.

The Oakridge $PM_{2.5}$ Maintenance Plan is a comprehensive mixture of emission reduction strategies consisting of local ordinances, LRAPA regulations, DEQ regulations, and non-regulatory elements including incentives and education. Residential wood combustion is the most significant contributor to $PM_{2.5}$ in Oakridge. The strategies targeting reduction in woodstove emissions include: revised woodstove curtailment levels to increase number of days when burning is restricted or prohibited, requiring removal of an uncertified woodstove upon sale of a home, tightening enforcement of wood stove curtailment, opacity limit on residential woodburning emissions, and expansion of educational efforts to reduce $PM_{2.5}$ from woodsmoke. The plan also requires public agencies to avoid prescribed burning if the smoke is expected to affect Oakridge.

If listed strategies fail to maintain attainment with the standard in the Oakridge area, a set of contingency strategies would become effective. These contingency measures include a stricter green-yellow-red advisory program, and prohibition of fireplace use not only on red days but also on yellow days.

Federal requirements set by EPA outline the procedures for preparing, adopting and submitting attainment plans, but Oregon has flexibility about how to meet the standards by establishing specific requirements.

What alternatives did LRAPA consider if any?

The proposed strategies in the Oakridge area maintenance plan continue the successful strategies included in the 2016 Attainment Plan. In developing the proposed strategies for the 2016 Oakridge plan, LRAPA, the advisory committee and Oakridge City officials considered a number of alternatives. The proposed strategies were recommended over alternatives based on evaluation of their technological feasibility and environmental, health, economic, and social impacts. The advisory committee recommended two sets of strategies: an initial set of strategies that brought the community into compliance with the federal $PM_{2.5}$ air quality standard by 2016 and a second set of contingency strategies, with stricter requirements for residents who use wood stoves, which would be implemented in the event that the federal $PM_{2.5}$ standard is exceeded in future years. Both sets of strategies are included in the Oakridge Maintenance Plan.

Land Use

Considerations

In adopting new or amended rules, ORS 197.180 and OAR 340-018-0070 require DEQ to determine whether the proposed rules significantly affect land use. If so, DEQ must explain how the proposed rules comply with state wide land-use planning goals and local acknowledged comprehensive plans.

Under OAR 660-030-0005 and OAR 340 Division 18, DEQ considers that rules affect land use if:

- The statewide land use planning goals specifically refer to the rule or program, or
- The rule or program is reasonably expected to have significant effects on:
- Resources, objects, or areas identified in the statewide planning goals, or
- Present or future land uses identified in acknowledge comprehensive plans

DEQ determined whether the proposed rules involve programs or actions that affect land use by reviewing its Statewide Agency Coordination plan. The plan describes the programs that DEQ determined significantly affect land use. DEQ considers that its programs specifically relate to the following statewide goals:

Goal	**Title**
5	Natural Resources, Scenic and Historic Areas, and Open Spaces
6	Air, Water and Land Resources Quality
11	Public Facilities and Services
16	Estuarine Resources
19	Ocean Resources

Statewide goals also specifically reference the following DEQ programs:

- Nonpoint source discharge water quality program – Goal 16
- Water quality and sewage disposal systems – Goal 16
- Water quality permits and oil spill regulations – Goal 19

Determination

LRAPA determined that these proposed rules do not affect land use under OAR 340-018-0030 or DEQ's State Agency Coordination Program.

EQC Prior Involvement

LRAPA shared information about a related rulemaking with the EQC at the Jan. 18, 2017, EQC meeting where the EQC approved the Oakridge area attainment plan.

Advisory Committee

Background

LRAPA has a standing Citizens Advisory Committee. The advisory committee provided feedback on the Oakridge-Westfir $PM_{2.5}$ Redesignation Request and $PM_{2.5}$ Maintenance Plan at their March 30, 2021 meeting. The committee includes representatives across Lane County from industry, agriculture, public health, and the general public. The committee's webpage is located at: https://www.lrapa.org/157/Advisory-Committee

The committee members were:

Citizens Advisory Committee	
Name	**Representing**
Jim Daniels – Chair	Large Industry
Kathleen Lamberg – Vice Chair	General Public
Kelly Wood	Industry
Paul Metzler	General Public
Evelina Davidova-Kamis	Industry
Terry Richardson	General Public
Link Smith	Fire Suppression
Jeff Carman	Public Health
Jack Carter	Industry
Gery Vander Meer (Absent)	General Public
Shane Ruddell (Absent)	Agriculture

Meeting notifications

LRAPA notified people about the advisory committee's activities by:

- Posting the meeting on the LRAPA website:
  - http://www.lrapa.org/AgendaCenter/ViewFile/Agenda/_03302021-159
- Sending a one-time notice to Citizen Advisory Committee subscribers to describe how to sign up for advisory committee meeting notices, and people who signed up for the advisory committee bulletin.
- Adding advisory committee announcements to LRAPA's calendar of public meetings at LRAPA Calendar.

Committee discussions

The Citizens Advisory Committee discussion began with questions of the work LRAPA has conducted in the Oakridge-Westfir to reach attainment. Questions were asked about the impact of wildfires on the airshed's ability to stay in attainment. Discussion was had on the impact on the community and if the redesignation would alter any of the home wood heating programs in Oakridge. No recommendations were made by the Citizens Advisory Committee.

Public Engagement

Public notice

LRAPA and DEQ provided notice of the proposed rulemaking and rulemaking hearing by:

- On July 30, 2021, filing notice with the Oregon Secretary of State for publication in the August 2021 Oregon Bulletin;
- Notifying the EPA by e-mail;
- Posting the Notice, Invitation to Comment and Draft Rules on the web page for this rulemaking, located at: http://www.lrapa.org/270/Proposed-Rules;
- Emailing approximately 20,730 interested parties on the following DEQ lists through GovDelivery:
    - Rulemaking
    - DEQ Public Notices
    - Air Quality Maintenance Plans
- Emailing 232 stakeholders on the LRAPA Rulemaking list NotifyMe
- Emailing the following key legislators
    - Senator Peter Courtney
    - Senator Lee Beyer
    - State Representative Tina Kotek
    - Representative Pam Marsh
- Emailing advisory committee members
- Posting on the DEQ event calendar: DEQ Calendar
- Publishing notice in the following newspapers:
    - Register Guard (Eugene) Aug. 1, 2021
    - Highway 58 Herald (Oakridge) Aug. 1, 2021

Public Hearing

LRAPA held one public hearing. LRAPA received no comments at the hearing. Later sections of this document include a summary of the 2 comments received during the open public comment period, LRAPA's responses, and a list of the commenters. Original comments are on file with LRAPA.

Prior to the hearing on Sept. 9, 2021, DEQ authorized LRAPA on behalf of the Environmental Quality Commission under OAR 137-001- 0030, Conduct of Rulemaking Hearings, to act as Hearings Officer for the public comment process of adopting these proposed plans as revisions to the State of Oregon Clean Air Act Implementation Plan. In the same letter dated Sept. 7, 2021, DEQ also determined the maintenance plan to be at least as stringent as comparable maintenance plans previously developed and adopted by DEQ.

Presiding Officer's Record

Hearing

Date	Sept. 9, 2021
Place	Via Zoom
Start Time	12:33 p.m.
End Time	12:43 p.m.
Presiding Officer	Board Chair Joe Pishioneri

Presiding Officer's Report

The presiding officer convened the hearing, summarized procedures for the hearing, and explained that LRAPA was recording the hearing. The presiding officer asked people who wanted to present verbal comments to sign the registration list, or if attending by phone, to indicate their intent to present comments. The presiding officer advised all attending parties interested in receiving future information about the rulemaking to sign up for LRAPA and/or GovDelivery email notices.

As Oregon Administrative Rule 137-001-0030 requires, the presiding officer summarized the content of the rulemaking notice.

No person presented any oral testimony or written comments.

Summary of Public Comments and LRAPA Responses

Public comment period

LRAPA accepted public comment on the proposed rulemaking from Aug. 1, 2021, until 12:43 p.m. on Sept. 9, 2021.

For public comments received by the close of the public comment period, the following table organizes comments into four categories with cross references to the commenter number. LRAPA's response follows the summary. Original comments are on file with LRAPA.

LRAPA changed the proposed rules in response to comments described in the response sections below.

Summary of Public Comment and Agency Response

Title of Rulemaking: Oakridge-Westfir $PM_{2.5}$ Maintenance Plan and redesignation Request
Prepared by: LRAPA Staff and Merlyn Hough
Date: October 8, 2021

Comment Period	The public comment period opened on Sunday, Aug. 1, 2021, and closed on Thursday, Sept. 9, 2021.
Organization of comments and responses	This document summarizes public comment received and LRAPA's responses on Oakridge $PM_{2.5}$ Maintenance Plan and Redesignation Request. A public hearing was held at the LRAPA Board meeting on Sept. 9, 2021. Comments are summarized by issue category. All persons who provided comments are listed at the back of this document and the comment/response number follows each commenter.
Total Number of Comments	Two comments were received during the comment period.

1. Clarification
a. Executive Summary
1.a.) Comment: Executive Summary • Include the 2006 24-hour PM2.5 standard within the contingency statement for a future reader's quick reference to contingency triggers.
Response: *LRAPA added "(35 µg/m^3)" to the Section 8.3 Contingency Plan.*
b. Emission inventories
1.b.) Comment: Appendix III (Emission Inventories for Future Years 2025 – 2035) • Add supporting information to the conclusion that fuel cleanliness is the primary reason for the expected reduction in motor vehicle emissions.

Response: *LRAPA added supporting information about federal requirements for progressively cleaner vehicles and fuels, and how EPA's MOVES model accounts for these federal requirements that result in expected emission reductions in motor vehicle emissions.*

c. Motor Vehicle Emission

1.c.) Comment: Appendix IV (Motor Vehicle Emissions Budget)

- Explain significant anticipated reductions in emissions between 2015 and 2025 from primary exhaust (Table D) (in particular, is reduction expected from diesel idling reduction and instituting a diesel inspection and maintenance program?)
- Include description of the MOVES modeling methodology for on road control measures to assist future readers (e.g. reduce need to find original MOVES files or descriptions in older plans).
- Include the safety margin calculation and show how motor vehicle budget connects with the overall PM2.5 budget and meeting NAAQS attainment.

Response: *Similar to the response to 1.b above, LRAPA added supporting information about federal requirements for progressively cleaner vehicles and fuels, and how EPA's MOVES model accounts for these federal requirements that result in expected emission reductions in motor vehicle emissions. LRAPA also added links to the MOVES input files and provided more detail on the safety margin calculation in how it relates to the Motor Vehicle Emission Budget (MVEB).*

d. Home Wood Heating Ordinances

1.d.) Comment: Appendix VI (Home Wood Heating Ordinances)
Please consider these comments at the time of ordinance updates or revisions.

- The "Oregon method" for measuring PM emissions is outdated and Division 21 rules are no longer on the books; the ordinance should reference current methods of woodstove emission measurement, such as EPA methods (e.g. https://www.epa.gov/sites/default/files/2017-08/documents/method_28.pdf).
- DEQ recommends keeping a list of the stove types at each location with Certificate of Compliance records; state in the ordinance that a certificate may be revoked if it is found that a non-certified stove has been installed.
- We noted a discrepancy with Oregon's Heat Smart rules: The ordinance states that woodstoves may stay on property offered for sale if they meet certain grams/hour requirements, whereas Heat Smart bans woodstoves that are not certified. Consider noting discrepancies with Heat Smart in communications about the ordinance to alleviate confusion about Heat Smart applicability.
- Consider clarifying in Section 3 that the ordinance applies to rental property. The title implies the section only applies upon sale of property, but subsection (1) indicates that un-certified devices contained on "Property to be sold *or* rented" must be removed.

Response: *LRAPA appreciates these comments and will reach out to the City of Oakridge and ask for future coordination on relevant HWH ordinances.*

	Commenter	Affiliation	Comment Response #
1	Oregon Department of Environmental Quality (DEQ) Air Quality Division Karen Font Williams – Air Quality Planner	DEQ Air Quality Division 700 NE Multnomah Street, Suite 600 Portland , Oregon 97232	1.a. – 1.d.

Implementation

Notification

The critical elements of the proposed plan are already in effect under the City of Oakridge Air Pollution Control Ordinances and ongoing programs of the Lane Regional Air Protection Agency (LRAPA).

The proposed rules would become effective upon filing on approximately Nov. 22, 2021 and would be submitted to EPA immediately thereafter. DEQ would notify LRAPA by email, and LRAPA would similarly notify the City of Oakridge.

Compliance and enforcement

LRAPA and Oakridge staff are already trained in the air monitoring, forecasting, compliance, enforcement and reporting functions necessary for implementation of the proposed plan.

Measuring, sampling, monitoring and reporting

The $PM_{2.5}$ standard will be maintained during the 10-year maintenance period. The LRAPA air monitoring network will document that air quality in Oakridge meets the federal health standard.

Five-Year Review

Requirement

Oregon law requires DEQ to review new rules within five years after EQC adopts them. The law also exempts some rules from review. DEQ determined whether the rules described in this report are subject to the five-year review. DEQ based its analysis on the law in effect when EQC adopted these rules.

Exemption from five-year rule review

The Administrative Procedures Act exempts all of the proposed rules from the five-year review because the proposed rules would amend or repeal an existing rule. ORS 183.405(4).

Accessibility Information

You may review copies of all documents referenced in this announcement at:
Lane Regional Air Protection Agency
1010 Main Street
Springfield, OR, 97477

To schedule a review of all websites and documents referenced in this announcement, call Robbye Robinson, PHONE NO. 877-285-7272, ext. 214 (toll-free) or Max Hueftle, PHONE NO. 877-285-7272, ext. 231 (toll-free)

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email deqinfo@deq.state.or.us.

State of Oregon Department of Environmental Quality

Oregon Environmental Quality Commission Meeting

Nov. 17-18, 2021

Oakridge PM_{10} Redesignation Request and PM_{10} Maintenance Plan

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Introduction

DEQ and the Lane Regional Air Protection Agency (LRAPA) propose permanent rule amendments to chapter 340 of the Oregon Administrative Rules to redesignate the Oakridge airshed as attainment for the national air quality health standards for coarse inhalable particles (PM_{10}) and include a 10-year maintenance plan to keep air quality within the PM_{10} health standards.

Request for Other Options

Oregon must update its Clean Air Act State Implementation Plan to document that DEQ has the authority, regulations, and enforcement capability to implement the current National Ambient Air Quality Standards (NAAQS) for PM_{10}. In addition to the redesignation of the Oakridge airshed into attainment, a 10-year maintenance plan provides assurance that air quality programs are adequate to prevent future violation of the NAAQS.

Overview

DEQ and LRAPA are proposing to submit to the U.S. Environmental Protection agency a request to redesignate the Oakridge airshed from nonattainment to attainment with the 24-hour National Ambient Air Quality Standard for coarse inhalable particles, diameter less than 10 microns.

With each PM_{10} redesignation request, the Clean Air Act requires that states submit a revision of the applicable State Implementation Plan to provide for maintenance of the PM_{10} NAAQS for at least 10 years after the redesignation. This is called a PM_{10} Maintenance Plan. The 10-year maintenance period begins on the effective date of EPA's approval of the redesignation request, as published in the Federal Register.

DEQ and LRAPA propose to submit a revision to the State of Oregon Clean Air Act Implementation Plan, referred to as the State implementation Plan (SIP) under OAR 340-200-0040. This proposed revision would:

- Redesignate the Oakridge airshed as attainment for the 24-hour PM_{10} NAAQS; and
- Include a maintenance plan to keep air quality within the PM_{10} health standards for at least 10 years after the redesignation.

EPA designated the area within the Oakridge Urban Growth Boundary nonattainment for PM_{10} and classified the area as moderate on January 20, 1994. The LRAPA Board of Directors adopted the Oakridge PM_{10} attainment plan at a hearing on Aug. 13, 1996. The Oregon Environmental Quality Commission subsequently adopted the Oakridge PM_{10} attainment plan on December 9, 1996, and DEQ submitted the plan to EPA. EPA approved the attainment plan on March 15, 1999 (64 FR 12751). The Oakridge area achieved PM_{10} attainment on schedule and on July 26, 2001, EPA published a clean data determination (CDD) and a finding of attainment for the Oakridge PM_{10} area (66 FR 38947). The Oakridge

PM_{10} maintenance plan and request for redesignation to attainment were purposely delayed until the attainment in Oakridge of the more restrictive and protective $PM_{2.5}$ NAAQS, which was achieved on December 31, 2016. EPA found that the Oakridge-Westfir area was attaining the $PM_{2.5}$ NAAQS in February 2018.

In addition to the economic and community benefits of the Oakridge area's redesignation to attainment, maintenance plan implementation would allow other programs to move forward. For example, the Smoke Safety Plan funded by DEQ could take effect. This Smoke Safety Plan allows the US. Forest Service and the Oregon Department of Forestry to conduct additional prescribed burning near the Oakridge to help defend against devastating wildfires.

There are no major existing industrial sources within the affected area, however new and expanding industrial sources within the Oakridge Nonattainment Area with emissions greater than 15 tons per year of PM_{10} are required to install pollution control equipment based on the maximum degree of reduction (taking into account economic costs and environmental impacts), known as Best Available Control Technology, and to provide emission offsets. Oakridge first became subject to more stringent requirements for PM_{10} in 1994, when EPA designated the Oakridge area as nonattainment for PM_{10}.

Additionally, the Oakridge area then became a "Reattainment Area" for $PM_{2.5}$ in 2018 so that any new or expanding industrial source in Oakridge is required to install Best Available Control Technology in lieu of the potentially more costly Lowest Achievable Emission Rate controls. New and expanding industrial sources are also required to obtain emission offsets (i.e., offset their emission increases with equal emission reductions from other sources) and model their emissions to demonstrate that the proposed increase from their facility will not jeopardize compliance with health standards. Costs for Best Available Control Technology controls vary widely depending on the type of process being controlled, and the associated cost of modeling analysis can range from $4,000 to $6,000 per model run. These potential costs, however, are all existing costs resulting from existing requirements. This proposed maintenance plan does not impose any new additional costs for new source review.

Statement of need

What need would the proposed Maintenance Plan address?

The Oakridge PM_{10} Attainment Plan was adopted by LRAPA in 1996 and approved by EPA in December 1999. EPA found the Oakridge area in attainment with the PM_{10} NAAQS on July 26, 2001, but LRAPA purposely delayed the PM_{10} redesignation request until the attainment in Oakridge of the more restrictive and protective $PM_{2.5}$ NAAQS, which was achieved on December 31, 2016. This proposed redesignation request and maintenance plan outlines the specific air pollution control strategies necessary to maintain the Oakridge area's compliance with the PM_{10} NAAQS.

If adopted, the proposed Oakridge PM_{10} Redesignation Request and Maintenance Plan and associated rule will be submitted to EPA for approval as part of Oregon's State Clean Air Act Implementation Plan.

How would the proposed Maintenance Plan address the need?

As follow-up to the Oakridge PM_{10} Attainment Plan and as required, the maintenance plan would ensure maintaining the National Ambient Air Quality Standard (NAAQS) for PM_{10} in the Oakridge area.

How will LRAPA know the rule addressed the need?

The PM_{10} standard will be maintained during the 10-year maintenance period. The LRAPA air monitoring network will document that air quality in Oakridge meets the federal health standard.

Rules Affected, Authorities, Supporting Documents

Lead division
Lane Regional Air Protection Agency

Program or activity
Local air quality agency

Chapter 340 action
Amend OAR 340-200-0400

Statutory Authority - ORS				
468.020	468A.025	468A.035	468A.105	468.120
468.130				

Statutes Implemented - ORS				
468A.035	468A.135	468A.150		

Documents relied on for rulemaking

Document title	Document location
The federal Clean Air Act, EPA guidance for the development of attainment plans, guidance for the preparation of emission inventories, and air quality modeling protocol.	www.lrapa.org Lane Regional Air Protection Agency 1010 Main Street Springfield, Oregon 97477

Fee Analysis

This rulemaking does not involve fees.

Statement of Fiscal and Economic Impact

Fiscal and Economic Impact

The proposed maintenance plan includes emission reduction strategies that can be implemented through rules and local ordinances. The proposed changes should not create barriers to economic growth. The largest impacts of this proposed plan will be to the wood-burning homeowner, as some of the emission reduction strategies may result in increased heating costs. However, the homeowner could also experience benefits as a result of the proposed plan through the improvement of air quality in Oakridge, potentially decreasing individual health care costs such as those related to asthma.

Statement of Cost of Compliance

State and federal agencies

The proposed rule has no fiscal or economic impact on state and federal agencies.

Local governments

The proposed rule has no fiscal or economic impact on local governments. However, maintenance plan implementation would include LRAPA continuing to fund the local air quality program with a combination of EPA Targeted Airshed Grant funds and local funds. This rulemaking will likely result in some direct negative economic impacts to the city government through the implementation and enforcement of the ordinance. However, the Oakridge Air Program that implements the TAG includes funding of a dedicated code enforcement officer for the City of Oakridge to offset those negative economic impacts.

Public

The proposed rule has no fiscal or economic impact on the public. However, maintenance plan implementation would include an existing city ordinance that increases restrictions on wood burning when weather conditions could lead to accumulation of particulate in the Oakridge area. The more curtailment (red) days called, the more costs could be accrued by wood-burning residents in terms of higher electric or oil heating costs. These heating costs are variable depending on the alternative heat source used, the number of curtailment days called during the winter heating season, the cost to purchase cordwood or the transportation costs for a homeowner to cut and haul wood. This additional cost for non-wood fuels could be offset by the positive economic impact of lower health care costs and fewer missed work days if Oakridge is able to maintain particulate levels below standards.

Large businesses - businesses with more than 50 employees

The proposed rule has no fiscal or economic impact on the large businesses. However, maintenance plan implementation would include application of existing rules regarding new and expanding industry.

Small businesses – businesses with 50 or fewer employees

The proposed rule has no fiscal or economic impact on the small businesses. However, maintenance plan implementation would include potential costs resulting from existing requirements.

Cost of Compliance for Small Businesses

a. Estimated number of small businesses and types of businesses and industries with small businesses subject to proposed rule.

There is one minor LRAPA-permitted source, a rock crusher, located in the area affected by the proposed rule and plan. No new industrial rules are included in the proposal. Reasonably available control technology and fugitive dust control requirements already apply to existing facilities.

b. Projected reporting, recordkeeping and other administrative activities, including costs of professional services, required for small businesses to comply with the proposed rule.

There is no expected cost from administrative activities and other professional services required of small businesses resulting from this proposed rule.

c. Projected equipment, supplies, labor and increased administration required for small businesses to comply with the proposed rule.

Home heating retailers and installers will not face new requirements for equipment, supplies, labor or administration unless there is a need to account for the added woodstove replacements. This effect would be indirect and offset by positive economic benefits of increased sales.

d. Describe how LRAPA involved small businesses in developing this proposed rule.

LRAPA did not involve small businesses in the development of this proposed rule as there is no expected impact on small businesses and other industry in the Oakridge airshed.

Documents relied on for fiscal and economic impact

Document title	Document location
1996 Oakridge-Westfir PM_{10} Attainment Plan	LRAPA website: https://www.lrapa.org/DocumentCenter/View/5690/Oregon-PM10-Nonattainment-Area---1996
Oakridge-Westfir PM_{10} Redesignation Request and PM_{10} Maintenance Plan	https://www.lrapa.org/DocumentCenter/View/5779/Oakridge-Westfir-PM10-Redesignation-Request-and-Maintenance-Plan-with-appendices
LRAPA Staff Report on the 2017 Industrial Air Permitting Rules that included classifying the Oakridge area as a "Reattainment Area"	http://www.lrapa.org/DocumentCenter/View/2899/LRAPA-2017-Permitting-Rules-Staff-Report?bidId=

Advisory committee fiscal review

LRAPA did not appoint a new advisory committee for fiscal review in the development of this proposed rule as there is no expected fiscal impact or other adverse impact on small businesses and other industry in the Oakridge airshed. However, LRAPA has a standing advisory committee that meets most months. LRAPA consulted their Citizens Advisory Committee for this rulemaking and presented a summary of the changes to the committee at their March 30, 2021 meeting. The committee members that attended the meeting agreed to the proposed changes and had questions about LRAPA's proposal.

Housing cost

As ORS 183.530 and .534 require, LRAPA evaluated whether the proposed rules would have an effect on the development cost of a 6,000-square-foot parcel and construction of a 1,200- square-foot detached, single-family dwelling on that parcel, but lacks specific information upon which it could accurately estimate potential increases. LRAPA has determined that this proposed rulemaking will have no effect on the cost of development of a 6,000 square foot parcel and the construction of a 1,200 square foot detached single family dwelling on that parcel.

Federal Relationship

This section complies with OAR 340-011-0029 and ORS 468A.327 to clearly identify the relationship between the proposed rules and applicable federal requirements.

The proposed rules add requirements additional to those in federal requirements. This rulemaking imposes additional requirements to implement the applicable federal requirements for compliance with particulate standards. Section 110 of the Clean Air Act, 42 U.S.C. §7410 requires DEQ/LRAPA to adopt a maintenance plan to reduce particulate matter of 10 micrometers and less (PM_{10}) so that the Oakridge area maintains compliance with the National Ambient Air Quality Standards (NAAQS). The plan must also show the area will continue to meet NAAQS in the future and provide contingency measures in case it fails. Federal requirements mandate adoption of a plan that demonstrates the area will reach attainment of the standard; however, the specific strategies to achieve the standard are not mandated.

The Oakridge PM_{10} Maintenance Plan is a comprehensive mixture of emission reduction strategies consisting of local ordinances, LRAPA regulations, DEQ regulations, and non-regulatory elements including incentives and education. Residential wood combustion is the most significant contributor to PM_{10} in Oakridge. The strategies targeting reduction in woodstove emissions include: revised woodstove curtailment levels to increase number of days when burning is restricted or prohibited, requiring removal of an uncertified woodstove upon sale of a home, tightening enforcement of wood stove curtailment, opacity limit on residential woodburning emissions, and expansion of educational efforts to reduce PM_{10} from woodsmoke. The plan also requires public agencies to avoid prescribed burning if the smoke is expected to affect Oakridge.

If listed strategies fail to maintain attainment with the standard in the Oakridge area, a set of contingency strategies would become effective. These contingency measures include a stricter green-yellow-red advisory program, and prohibition of fireplace use not only on red days but also on yellow days.

Federal requirements set by EPA outline the procedures for preparing, adopting and submitting attainment plans, but Oregon has flexibility about how to meet the standards by establishing specific requirements.

What alternatives did LRAPA consider if any?

The proposed strategies in the Oakridge area PM_{10} maintenance plan continue the successful strategies included in the 2016 $PM_{2.5}$ Attainment Plan. In developing the proposed strategies for the 2016 Oakridge plan, LRAPA, the advisory committee and Oakridge City officials considered a number of alternatives. The proposed strategies were recommended over alternatives based on evaluation of their technological feasibility and environmental, health, economic, and social impacts. The advisory committee recommended two sets of strategies: an initial set of strategies that brought the community into compliance with the federal $PM_{2.5}$ air quality standard by 2016 and a second set of contingency strategies, with stricter requirements for residents who use wood stoves, which would be implemented in the event that the federal $PM_{2.5}$ standard is exceeded in future years. Both sets of strategies are included in the $PM_{2.5}$ Oakridge Maintenance Plan and in the PM_{10} Oakridge Maintenance Plan.

Land Use

Considerations

In adopting new or amended rules, ORS 197.180 and OAR 340-018-0070 require DEQ to determine whether the proposed rules significantly affect land use. If so, DEQ must explain how the proposed rules comply with state wide land-use planning goals and local acknowledged comprehensive plans.

Under OAR 660-030-0005 and OAR 340 Division 18, DEQ considers that rules affect land use if:

- The statewide land use planning goals specifically refer to the rule or program, or
- The rule or program is reasonably expected to have significant effects on:
- Resources, objects, or areas identified in the statewide planning goals, or
- Present or future land uses identified in acknowledge comprehensive plans

DEQ determined whether the proposed rules involve programs or actions that affect land use by reviewing its Statewide Agency Coordination plan. The plan describes the programs that DEQ determined significantly affect land use. DEQ considers that its programs specifically relate to the following statewide goals:

Goal	Title
5	Natural Resources, Scenic and Historic Areas, and Open Spaces
6	Air, Water and Land Resources Quality
11	Public Facilities and Services
16	Estuarine Resources
19	Ocean Resources

Statewide goals also specifically reference the following DEQ programs:

- Nonpoint source discharge water quality program – Goal 16
- Water quality and sewage disposal systems – Goal 16
- Water quality permits and oil spill regulations – Goal 19

Determination

LRAPA determined that these proposed rules do not affect land use under OAR 340-018-0030 or DEQ's State Agency Coordination Program.

EQC Prior Involvement

LRAPA shared information about a related rulemaking with the EQC at the Dec. 9, 1996, EQC meeting where the EQC approved the Oakridge area PM_{10} attainment plan, and at the Jan. 18, 2017, EQC meeting where the EQC approved the Oakridge-Westfir area $PM_{2.5}$ attainment plan.

Advisory Committee

Background

LRAPA has a standing Citizens Advisory Committee. The advisory committee provided feedback on the very similar Oakridge-Westfir $PM_{2.5}$ Redesignation Request and $PM_{2.5}$ Maintenance Plan at their March 30, 2021 meeting. The committee includes representatives across Lane County from industry, agriculture, public health, and the general public. The committee's webpage is located at: https://www.lrapa.org/157/Advisory-Committee

The committee members were:

Citizens Advisory Committee	
Name	**Representing**
Jim Daniels - Chair	Large Industry
Kathleen Lamberg – Vice Chair	General Public
Kelly Wood	Industry
Paul Metzler	General Public
Evelina Davidova-Kamis	Industry
Terry Richardson	General Public
Link Smith	Fire Suppression
Jeff Carman	Public Health
Jack Carter	Industry
Gery Vander Meer (Absent)	General Public
Shane Ruddell (Absent)	Agriculture

Meeting notifications

LRAPA notified people about the advisory committee's activities by:

- Posting the meeting on the LRAPA website:
    - http://www.lrapa.org/AgendaCenter/ViewFile/Agenda/_03302021-159
- Sending a one-time notice to Citizen Advisory Committee subscribers to describe how to sign up for advisory committee meeting notices, and people who signed up for the advisory committee bulletin.
- Adding advisory committee announcements to LRAPA's calendar of public meetings at LRAPA Calendar.

Committee discussions

The Citizens Advisory Committee discussion began with questions of the work LRAPA has conducted in the Oakridge-Westfir to reach attainment. Questions were asked about the impact of wildfires on the airshed's ability to stay in attainment. Discussion was had on the impact on the community and if the redesignation would alter any of the home wood heating programs in Oakridge. No recommendations were made by the Citizens Advisory Committee.

Public Engagement

Public notice

LRAPA and DEQ provided notice of the proposed rulemaking and rulemaking hearing by:

- On July 30, 2021, Filing notice with the Oregon Secretary of State for publication in the August 2021 Oregon Bulletin;
- Notifying the EPA by mail;
- Posting the Notice, Invitation to Comment and Draft Rules on the web page for this rulemaking, located at: http://www.lrapa.org/270/Proposed-Rules;
- Emailing approximately 20,788 interested parties on the following DEQ lists through GovDelivery:
    - Rulemaking
    - Air Quality Maintenance Plans
    - DEQ Public Notices
    - New Source Performance Standards and National Emissions Standards for Hazardous Air Pollutants
- Emailing 232 stakeholders on the LRAPA Rulemaking list NotifyMe
- Emailing the following key legislators
    - Senator Peter Courtney
    - Senator Lee Beyer
    - Representative Tina Kotek
    - Representative Pam Marsh
- Emailing advisory committee members,
- Posting on the LRAPA event calendar: DEQ Calendar
- Publishing notice in the following newspapers:
    - Register Guard (Eugene) Aug. 1, 2021
    - Highway 58 Herald (Oakridge) Aug. 1, 2021

Public Hearing

LRAPA held one public hearing. LRAPA received no comments at the hearing. Later sections of this document include a summary of the two comments received during the open public comment period, LRAPA's responses, and a list of the commenters. Original comments are on file with LRAPA.

Prior to the hearing on Sept. 9, 2021, DEQ authorized LRAPA on behalf of the Environmental Quality Commission under OAR 137-001- 0030, Conduct of Rulemaking Hearings, to act as Hearings Officer for the public comment process of adopting these proposed plans as revisions to the State of Oregon Clean Air Act Implementation Plan. In the same letter dated Sept. 7, 2021, DEQ also determined the maintenance plan to be at least as stringent as comparable maintenance plans previously developed and adopted by DEQ.

Presiding Officers' Record

Hearing

Date	Sept. 9, 2021
Place	Via Zoom
Start Time	12:33 p.m.
End Time	12:43 p.m.
Presiding Officer	Board Chair Joe Pishioneri

Presiding Officer's Report

The presiding officer convened the hearing, summarized procedures for the hearing, and explained that LRAPA was recording the hearing. The presiding officer asked people who wanted to present verbal comments to sign the registration list, or if attending by phone, to indicate their intent to present comments. The presiding officer advised all attending parties interested in receiving future information about the rulemaking to sign up for GovDelivery email notices.

As Oregon Administrative Rule 137-001-0030 requires, the presiding officer summarized the content of the rulemaking notice.

No person presented any oral testimony or written comments.

Summary of Public Comments and LRAPA Responses

Public comment period

LRAPA accepted public comment on the proposed rulemaking from Aug. 1, 2021, until 12:43 p.m. on Sept. 9, 2021.

For public comments received by the close of the public comment period, the following table organizes comments into four categories with cross references to the commenter number. LRAPA's response follows the summary. Original comments are on file with LRAPA.

LRAPA changed the proposed rules in response to comments described in the response sections below.

Summary of Public Comment and Agency Response
Title of Rulemaking: Oakridge PM_{10} Maintenance Plan and Redesignation Request
Prepared by: LRAPA Staff and Merlyn Hough
Date: Oct. 8, 2021

Comment Period	The public comment period opened on Sunday, Aug. 1, 2021, and closed on Thursday, Sept. 9, 2021.
Organization of comments and responses	This document summarizes public comment received and LRAPA's responses on Oakridge PM_{10} Maintenance Plan and Redesignation Request. A public hearing was held at the LRAPA Board meeting on Sept. 9, 2021. Comments are summarized by issue category. All persons who provided comments are listed at the back of this document and the comment/response number follows each commenter.
Total Number of Comments	Two comments were received during the comment period.

1. Clarifications
a. Executive Summary
1.a.) Comment: Executive Summary • The motor vehicle emission PM10 budget (Table 16) for 2015 is lower than the 2015 MVEB for PM 2.5; Appendix IV explains this is due to different PM10 and PM2.5 nonattainment boundaries and we recommend including that explanation in the Executive Summary, as well. • Include the 2006 24-hour PM2.5 standard within the contingency statement for a future reader's quick reference to contingency triggers.
Response: *LRAPA added an explanation in Section 7 -Transportation Conformity of the maintenance plan and Appendix IV about the difference between the 2015 motor vehicle emission budget (MVEB) in*

the Executive Summary and Appendix IV being due to the different attainment boundaries for PM10 and PM2.5. LRAPA also "(35 μg/m³)" to the Section 8.3 Contingency Plan.

b. Motor Vehicle Emissions Budget

***1.b.) Comment*:** Appendix IV Motor Vehicle Emissions Budget

- Fix "Error! Reference source not found" on p. 2
- Consider including verification that PSU forecast used is approved by Oregon Office of Economic Analysis, as required by Executive Order No 97-22.
- Include the safety margin calculation and show how motor vehicle budget connects with the overall PM2.5 budget and meeting NAAQS attainment.

Response: *LRAPA fixed the reference error on page 2, added details and verification about the PSE population growth forecast, and added links to the MOVES input files and provided more detail on the safety margin calculation in how it relates to the Motor Vehicle Emission Budget (MVEB).*

2. Clarifications for plan

a. General Comments

2.a.) Comment: **General Comments:**

- The PM10 nonattainment area is the *Oakridge Urban Growth Boundary (UGB) Area* as defined in 40 CFR § 81.338. The maintenance plan refers to the area as the Oakridge-Westfir PM10 area throughout the plan. This may not be appropriate.

Response: *LRAPA agrees and replaced "Oakridge-Westfir" with "Oakridge" where appropriate as suggested.*

b. Background

***2.b.) Comment*:** Background (section 2, page 8):

- The purpose of the sentence at the bottom of this page is unclear - "The area of applicability for the maintenance plan is larger than the Oakridge UGB PM10 (Figure 2) and includes an area that contains the City of Oakridge and the small town of Westfir." Please explain what this statement means to the maintenance plan, attainment and projected emission inventories, and the motor vehicle emissions budget.
- Please refer to particles >10 μm in diameter as something other than "coarser-sized", as PM coarse is used to refer to PM10-PM2.5. Merlyn/Lance to look for these use ">10 μm"

Response: *LRAPA added an explanation about how the different nonattainment boundaries for PM2.5 and PM10 result in different aspects to the maintenance plans, emission inventories and MVEB and used different terminology when referring to particles >10 um.*

c. Monitoring (section 4)

2.c.) Comment: Monitoring (section 4):

- The sentence at the top of page 13, "LRAPA is proposing to replace the current PM10 monitoring with PM2.5 monitoring as a surrogate method upon approval of this PM10 redesignation request and PM10 maintenance plan," needs to be revised to reflect that the maintenance plan is the first step in getting approval for monitor removal. The maintenance plan should provide a specific, reproducible approach for representing PM10 air quality impacts in the absence of actual PM10 monitoring data, such as an explanation of the PM2.5 surrogate method to be used for verification of continued attainment.
- The maintenance plan should point to the Oregon Annual Network Plan (ANP) process for future approval of monitor removal.

- The maintenance plan should state the monitoring network approved in the ANP is what LRAPA commits to maintaining.

Response: *LRAPA revised the monitoring language in Section 4 Air Quality Monitoring as suggested.*

d. *Use of PM2.5 Monitoring as a Surrogate for PM10 Monitoring in the Future (section 4.2)*

2.d.) Comment: Use of PM2.5 Monitoring as a Surrogate for PM10 Monitoring in the Future (section 4.2):

- In establishing a PM2.5 surrogate method as a specific, reproducible approach for representing PM10 conditions, please provide the following items as justification, in line with similar previous justification demonstrations:
- Background on PM10 emission trends in the area.
- Background on ambient PM10 concentrations in the area (i.e., annual DVs).
- The fraction of PM10 that is PM2.5. Please reconsider the current approach of graduated bins, as the linear regression for "All PM Data" is disproportionately influenced by the few high values.
- A scatter plot of PM10 vs. PM2.5 showing the linear regression and correlation coefficient.
- The equation for the linear regression.
- If there are substantial seasonal or event-driven (e.g., wildfire smoke) differences in the PM10 to PM2.5 relationship, include analysis of the fraction of PM10 that is PM2.5, scatter plot, and linear regression for each case. If the PM2.5 to PM10 relationships are different under different circumstances, include a justification for using one over the others.
- Statement of the PM2.5 levels that correspond to PM10 contingency measure triggers in the maintenance plan.

Response: *LRAPA revised Section 4.2 as suggested.*

e. *Emission Inventories (section 5)*

2.e.) Comment: Emission Inventories (section 5):

- Footnote number 4 in Table 3 appears missing in the body of the table.
- Please provide supporting documentation for using a curtailment effectiveness of 25 percent
- It should be noted, in section 5.1 second sentence and throughout the document, that all groups excluding VOC were determined to be below the EPA Region 10 insignificance thresholds.
- Should section 5.2 be titled, "Condensable and Filterable PM10 Emissions" vs PM2.5 Emissions?

Response: *LRAPA: added a reference to footnote number 4 in the body of the table; a reference to the EPA Guidance Document for Residential Wood Combustion Emission Control Measures (EPA-450/2-89-015) to Appendix III -Future Inventories; clarified that VOC was also a precursor that was determined to be below the EPA Region 10 insignificance thresholds; and, corrected the title of Section 5.2 to include PM10 in lieu of PM2.5.*

f. Air Pollution Control Strategies (section 6):

2.f.) Comment: Air Pollution Control Strategies (section 6):

- In order to approve a redesignation to attainment, section 107(d)(3)(E)(iii) of the CAA requires the EPA to determine that the improvement in air quality is due to emissions reductions that are permanent and enforceable and that the improvement results from the implementation of the applicable SIP and applicable federal air pollution control regulations and other permanent and enforceable regulations. Section 6 mentions the control strategies from the 1996 PM10 attainment plan but does not specifically speak to them and their contribution to the improvement in air quality and their implementation status (e.g., the voluntary woodstove curtailment program, the grant funded buyback program, road sanding agreements and the paving of unpaved streets). These control strategies were all SIP approved and, as such, need to be included in the showing that "actual enforceable emission reductions are responsible for the air quality improvement."

Response: *LRAPA added a list of key control measures to Section 6 as suggested and confirmed the continued commitment from ODOT to use anti-icing chemicals to minimize the use of abrasives for traction in winter weather events. Jim Gamble, District 5 Manager of ODOT provided LRAPA a letter in that regard dated September 20, 2021.*

g. Maintenance of Air Quality Health Standards (section 8):

2.g.) Comment: Maintenance of Air Quality Health Standards (section 8):

- The first bullet commits to operation of the PM10 monitoring network during 2021-2035. If you would like the flexibility to remove the PM10 monitor in the future, please commit to continued operation of the PM10 monitoring network consistent with the approved Oregon ANP.
- Please coordinate section *8.2 Verification of Continued Maintenance of Standards* with section *4.2 Use of PM2.5 Monitoring as a Surrogate for PM10 Monitoring in the Future* regarding the reproducible approach for removing the PM10 monitor. The PM2.5 surrogate method for demonstrating verification of continued maintenance of the PM10 standard needs to be explained in this section.
- Please provide a statement that LRAPA will coordinate with ODEQ to submit annual "Verification of Continued Attainment" documentation once the PM2.5 surrogate method is implemented. Max added this statement in Section 8.1
- Please coordinate *section 8.3 Contingency Plan* with section *4.2 Use of PM2.5 Monitoring as a Surrogate for PM10 Monitoring in the Future* regarding the reproducible approach for removing the PM10 monitor. The PM2.5 surrogate trigger level for a 24-hour PM10 violation needs to be clearly identified.

Response: *LRAPA revised the language in Section 8 to reference the Oregon Annual Network Plan (ANP) as suggested; LRAPA did not revise Section 8.2 but will continue with PM10 monitoring until the EPA approval of the ANP; added the suggested language about the "Verification of Continued Attainment" in Section 8.1; and, revised Sections 8.3 and 4.2 as suggested.*

	Commenter	**Affiliation**	**Comment Response #**
1	Oregon Department of Environmental Quality (DEQ) Air Quality Division Karen Font Williams – Air Quality Planner	DEQ Air Quality Division 700 NE Multnomah Street, Suite 600 Portland, Oregon 97232	1.a. – 1.b.
2	United States Environmental Protection Agency (US EPA) – Air and Radiation Division Karl Pepple – Acting Section Chief	US EPA Region 10 1200 Sixth Avenue, Suite 155 Seattle, Washington 98101	2.a. – 2.g.

Re-Entrained Road Dust in the MVEB: It was discovered after LRAPA Board adoption and prior to proposed adoption by the EQC on November 18, 2021, that EPA regulations require the Motor Vehicle Emission Budget (MVEB) to include PM_{10} from Re-Entrained Road Dust. LRAPA revised the MVEB on November 5, 2021 to include Re-Entrained Road Dust and showed that the increases to the MVEB will not cause the area to exceed the NAAQS since the total projected emissions are still well below the 2015 base year.

Implementation

Notification

The critical elements of the proposed plan are already in effect under the City of Oakridge Air Pollution Control Ordinances and ongoing programs of the Lane Regional Air Protection Agency (LRAPA).

The proposed rules would become effective upon filing on approximately Nov. 22, 2021 and would be submitted to EPA immediately thereafter. DEQ would notify LRAPA by email, and LRAPA would similarly notify the City of Oakridge.

Compliance and enforcement

LRAPA and Oakridge staff are already trained in the air monitoring, forecasting, compliance, enforcement and reporting functions necessary for implementation of the proposed plan.

Measuring, sampling, monitoring and reporting

The PM_{10} standard will be maintained during the 10-year maintenance period. The LRAPA air monitoring network will document that air quality in Oakridge meets the federal health standard.

Five-Year Review

Requirement

Oregon law requires DEQ to review new rules within five years after EQC adopts them. The law also exempts some rules from review. DEQ determined whether the rules described in this report are subject to the five-year review. DEQ based its analysis on the law in effect when EQC adopted these rules.

Exemption from five-year rule review

The Administrative Procedures Act exempts all of the proposed rules from the five-year review because the proposed rules would amend or repeal an existing rule. ORS 183.405(4).

Accessibility Information

You may review copies of all documents referenced in this announcement at:
Lane Regional Air Protection Agency
1010 Main Street
Springfield, OR, 97477

To schedule a review of all websites and documents referenced in this announcement, call Robbye Robinson, PHONE NO. 877-285-7272, ext. 214 (toll-free) or Max Hueftle, PHONE NO. 877-285-7272, ext. 231.

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email deqinfo@deq.state.or.us.

State of Oregon Department of Environmental Quality

Draft Rules – Edits Highlighted

Key to Identifying Changed Text:

~~Strikethrough: Deleted Text~~
Underline: New/inserted text

Division 200
GENERAL AIR POLLUTION PROCEDURES AND DEFINITIONS

340-200-0040
State of Oregon Clean Air Act Implementation Plan

(1) This implementation plan, consisting of Volumes 2 and 3 of the State of Oregon Air Quality Control Program, contains control strategies, rules and standards prepared by DEQ and is adopted as the State Implementation Plan (SIP) of the State of Oregon under the FCAA, 42 U.S.C.A 7401 to 7671q.

(2) Except as provided in section (3), revisions to the SIP will be made under the EQC's rulemaking procedures in OAR 340 division 11 of this chapter and any other requirements contained in the SIP and will be submitted to the EPA for approval. The SIP was last modified by the EQC on ~~January 21~~November 18, 2021.

(3) Notwithstanding any other requirement contained in the SIP, DEQ may:

(a) Submit to the EPA any permit condition implementing a rule that is part of the federally-approved SIP as a source-specific SIP revision after DEQ has complied with the public hearings provisions of 40 C.F.R. 51.102; and

(b) Approve the standards submitted by LRAPA if LRAPA adopts verbatim, other than non-substantive differences, any standard that the EQC has adopted, and submit the standards to EPA for approval as a SIP revision.

(4) Revisions to the State of Oregon Clean Air Act Implementation Plan become federally enforceable upon approval by the EPA. If any provision of the federally approved State Implementation Plan conflicts with any provision adopted by the EQC, DEQ must enforce the more stringent provision.

Statutory/Other Authority: 468A & ORS 468.020
Statutes/Other Implemented: ORS 468A.035 & 468A.135
History:

DEQ 1-2021, amend filed 01/21/2021, effective 01/21/2021
DEQ 21-2020, amend filed 11/19/2020, effective 11/19/2020
DEQ 17-2020, amend filed 09/21/2020, effective 09/21/2020
DEQ 18-2019, amend filed 07/19/2019, effective 07/19/2019
DEQ 14-2019, amend filed 05/17/2019, effective 05/17/2019
DEQ 4-2019, amend filed 01/24/2019, effective 01/24/2019
DEQ 197-2018, amend filed 11/16/2018, effective 11/16/2018
DEQ 192-2018, amend filed 09/14/2018, effective 09/14/2018
DEQ 190-2018, amend filed 07/13/2018, effective 07/13/2018
DEQ 11-2018, amend filed 03/23/2018, effective 03/23/2018
DEQ 7-2017, f. & cert. ef. 7-13-17
DEQ 2-2017, f. & cert. ef. 1-19-17
DEQ 14-2015, f. & cert. ef. 12-10-15
DEQ 10-2015, f. & cert. ef. 10-16-15
DEQ 7-2015, f. & cert. ef. 4-16-15
DEQ 6-2015, f. & cert. ef. 4-16-15
DEQ 7-2014, f. & cert. ef. 6-26-14
DEQ 6-2014, f. & cert. ef. 3-31-14
DEQ 5-2014, f. & cert. ef. 3-31-14
DEQ 4-2014, f. & cert. ef. 3-31-14
DEQ 1-2014, f. & cert. ef. 1-6-14
DEQ 12-2013, f. & cert. ef. 12-19-13
DEQ 11-2013, f. & cert. ef. 11-7-13
DEQ 4-2013, f. & cert. ef. 3-27-13
DEQ 10-2012, f. & cert. ef. 12-11-12
DEQ 7-2012, f. & cert.ef 12-10-12
DEQ 1-2012, f. & cert. ef. 5-17-12
DEQ 18-2011, f. & cert. ef. 12-21-11
DEQ 5-2011, f. 4-29-11, cert. ef. 5-1-11
DEQ 2-2011, f. 3-10-11, cert. ef. 3-15-11
DEQ 1-2011, f. & cert. ef. 2-24-11
DEQ 14-2010, f. & cert. ef. 12-10-10
DEQ 5-2010, f. & cert. ef. 5-21-10
DEQ 2-2010, f. & cert. ef. 3-5-10
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DEQ 3-2007, f. & cert. ef. 4-12-07
DEQ 4-2006, f. 3-29-06, cert. ef. 3-31-06
DEQ 2-2006, f. & cert. ef. 3-14-06

DEQ 9-2005, f. & cert. ef. 9-9-05
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DEQ 35, f. 2-3-72, cert. ef. 2-15-72

State of Oregon Department of Environmental Quality

Draft Rules – Edits Incorporated

Division 200
GENERAL AIR POLLUTION PROCEDURES AND DEFINITIONS

340-200-0040
State of Oregon Clean Air Act Implementation Plan

(1) This implementation plan, consisting of Volumes 2 and 3 of the State of Oregon Air Quality Control Program, contains control strategies, rules and standards prepared by DEQ and is adopted as the State Implementation Plan (SIP) of the State of Oregon under the FCAA, 42 U.S.C.A 7401 to 7671q.

(2) Except as provided in section (3), revisions to the SIP will be made under the EQC's rulemaking procedures in OAR 340 division 11 of this chapter and any other requirements contained in the SIP and will be submitted to the EPA for approval. The SIP was last modified by the EQC on November 18, 2021.

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LRAPA Rules – Edits Highlighted

Key to Identifying Changed Text:

~~Strikethrough: Deleted Text~~
Underline: New/inserted text

LANE REGIONAL AIR PROTECTION AGENCY
TITLE 29

DESIGNATION OF AIR QUALITY AREAS

Section 29-0010 Definitions

The definitions in title 12 and this section apply to this title. If the same term is defined in this section and title 12, the definition in this section applies to this title. Definitions of boundaries in this section also apply to LRAPA Rules and Regulations.

(1) "Eugene-Springfield UGB" means the area within the bounds beginning at the Willamette River at a point due east from the intersection of East Beacon Road and River Loop No.1; thence southerly along the Willamette River to the intersection with Belt Line Road; thence easterly along Belt Line Road approximately one-half mile to the intersection with Delta Highway; thence northwesterly and then northerly along Delta Highway and on a line north from the Delta Highway to the intersection with the McKenzie River; thence generally southerly and easterly along the McKenzie River approximately eleven miles to the intersection with Marcola Road; thence southwesterly along Marcola Road to the intersection with 42nd Street; thence southerly along 42nd Street to the intersection with the northern branch of US Highway 126; thence easterly along US Highway 126 to the intersection with 52nd Street; thence north along 52nd Street to the intersection with High Banks Road; thence easterly along High Banks Road to the intersection with 58th Street; thence south along 58th Street to the intersection with Thurston Road; thence easterly along Thurston Road to the intersection with the western boundary of Section 36, T17S, R2W; thence south to the southwest corner of Section 36, T17S, R2W; thence west to the Springfield City Limits; thence following the Springfield City Limits southwesterly to the intersection with the western boundary of Section 2, T18S, R2W; thence on a line southwest to the Private Logging Road approximately one-half mile away; thence southeasterly along the Private Logging Road to the intersection with Wallace Creek; thence southwesterly along Wallace Creek to the confluence with the Middle Fork of the Willamette River; thence generally northwesterly along the Middle Fork of the Willamette River approximately seven and one-half miles to the intersection with the northern boundary of Section 11, T18S, R3W; thence west to the northwest corner of Section 10, T18S, R3W; thence south to the intersection with 30th Avenue; thence westerly along 30th Avenue to the intersection with the Eugene City Limits; thence following the Eugene City Limits first southerly then westerly then northerly and

finally westerly to the intersection with the northern boundary of Section 5, T18S, R4W; thence west to the intersection with Greenhill Road; thence north along Greenhill Road to the intersection with Barger Drive; thence east along Barger Drive to the intersection with the Eugene City Limits (Ohio Street); thence following the Eugene City Limits first north then east then north then east then south then east to the intersection with Jansen Drive; thence east along Jansen Drive to the intersection with Belt Line Road; thence northeasterly along Belt Line Road to the intersection with Highway 99; thence northwesterly along Highway 99 to the intersection with Clear Lake Road; thence west along Clear Lake Road to the intersection with the western boundary of Section 9, T17S, R4W; thence north to the intersection with Airport Road; thence east along Airport Road to the intersection with Highway 99; thence northwesterly along Highway 99 to the intersection East Enid Road; thence east along East Enid Road to the intersection with Prairie Road; thence southerly along Prairie Road to the intersection with Irvington Road; thence east along Irvington Road to the intersection with the Southern Pacific Railroad Line; thence southeasterly along the Southern Pacific Railroad Line to the intersection with Irving Road; thence east along Irving Road to the intersection with Kalmia Road; thence northerly along Kalmia Road to the intersection with Hyacinth Road; thence northerly along Hyancinth Road to the intersection with Irvington Road; thence east along Irvington Road to the intersection with Spring Creek; thence northerly along Spring Creek to the intersection with River Road; thence northerly along River Road to the intersection with East Beacon Drive; thence following East Beacon Drive first east then south then east to the intersection with River Loop No.1; thence on a line due east to the Willamette River and the point of beginning.

(2) “Oakridge PM2.5 ~~Nonattainment~~ Maintenance Area” means the area enclosed by the following: T21S, R2E, Sect 11 (NW Corner) east to T21S, R3E, Sect 11 (NE corner), south to T21S, R3E, Sect 23(SE Corner), west to T21S, R2E, Sect 23(SW corner) correctly back to T21S, R2E, Sect 11(NW corner).

(3) "Oakridge UGB" means the area enclosed by the following: Beginning at the northwest corner of Section 17, T21S, R3E and the city limits; thence south along the western boundary of Section 17, T21S, R3E along the city limits approximately 800 feet; thence southwesterly following the city limits approximately 750 feet; thence west along the city limits approximately 450 feet; thence northwesterly along the city limits approximately 450 feet; thence on a line south along the city limits approximately 250 feet; thence on a line east along the city limits approximately 100 feet; thence southwesterly along the city limits approximately 200 feet; thence on a line east along the city limits approximately 400 feet; thence on a line south along the city limits to the channel of the Willamette River Middle Fork; thence south-easterly up the Willamette River Middle Fork along the city limits approximately 7200 feet; thence exiting the Willamette River Middle Fork with the city limits in a northerly manner and forming a rough semicircle with a diameter of approximately one-half mile before rejoining the Willamette River Middle Fork; thence diverging from the city limits upon rejoining the Willamette River Middle Fork and moving southeasterly approximately 5600 feet up the Willamette River Middle Fork to a point on the river even with the point where Salmon Creek Road intersects with U.S. Highway 58; thence on a line east from the channel of the Willamette River Middle Fork across the intersection of Salmon Creek Road and U.S. Highway 58 to the intersection with the Southern Pacific Railroad Line; thence northerly along the Southern Pacific Railroad Line to the intersection with the northern boundary of Section 22, T21S, R3E; thence west along the

northern boundary of Section 22, T21S, R3E to the intersection with Salmon Creek Road; thence on a line north to the intersection with the Southern Pacific Railroad Line; thence east along the Southern Pacific Railroad Line approximately 600 feet; thence on a line north to the intersection with High Prairie Road; thence on a line west approximately 400 feet; thence on a line north to the intersection with the northern boundary of Section 15, T21S, R3E; thence west along the northern boundary of Section 15, T21S, R3E to the intersection with the southeastern corner of Section 9, T21S, R3E; thence north along the eastern boundary of Section 9, T21S, R3E approximately 1300 feet; thence on a line west approximately 1100 feet; thence on a line south to the intersection with West Oak Road; thence northwesterly along West Oak Road approximately 2000 feet; thence on a line south to the intersection with the northern boundary line of the city limits; thence westerly and northwesterly approximately 8000 feet along the city limits to the point of beginning.

Section 29-0020 Designation of Air Quality Control Regions

Oregon's thirty-six counties are divided into five AQCRs. The AQCR boundaries follow county lines, and there are no counties that belong to more than one AQCR. The five AQCRs are as follows:

(1) Portland Interstate AQCR, containing ten counties:

(a) Benton County;

(b) Clackamas County;

(c) Columbia County;

(d) Lane County;

(e) Linn County;

(f) Marion County;

(g) Multnomah County;

(h) Polk County;

(i) Washington County;

(j) Yamhill County.

(2) Northwest Oregon AQCR, containing three counties:

(a) Clatsop County;

(b) Lincoln County;

(c) Tillamook County.

(3) Southwest Oregon AQCR, containing five counties:

(a) Coos County;

(b) Curry County;

(c) Douglas County;

(d) Jackson County;

(e) Josephine County.

(4) Central Oregon AQCR, containing eight counties:

(a) Crook County;

(b) Deschutes County;

(c) Hood River County;

(d) Jefferson County;

(e) Klamath County;

(f) Lake County;

(g) Sherman County;

(h) Wasco County.

(5) Eastern Oregon AQCR, containing ten counties:

(a) Baker County;

(b) Gilliam County;

(c) Grant County;

(d) Harney County;

(e) Malheur County;

(f) Morrow County;

(g) Umatilla County;

(h) Union County;

(i) Wallowa County;

(j) Wheeler County.

Section 29-0030 Designation of Nonattainment Areas

The following areas are designated as Nonattainment Areas:

(1) ~~PM10 Nonattainment Areas:~~ [Reserved]

~~(a) The Oakridge Nonattainment Area for PM10 is the Oakridge UGB as defined in 29-0010.~~

~~(2) PM2.5 Nonattainment Areas:~~

~~(a) The Oakridge Nonattainment Area for PM2.5 is defined in 29-0010.~~

Section 29-0040 Designation of Maintenance Areas

The following areas are designated as Maintenance Areas:

(1) Carbon Monoxide Maintenance Areas:

(a) The Eugene Maintenance Area for carbon monoxide is the Eugene-Springfield UGB as defined in 29-0010.

(2) PM10 Maintenance Areas:

(a) The Eugene-Springfield Maintenance Area for PM10 is the Eugene-Springfield UGB as defined in 29-0010.

(b) The Oakridge Maintenance Area for PM10 is the Oakridge UGB as defined in 29-0010(3).

(3) PM2.5 Maintenance Areas:

(a) The Oakridge Maintenance Area for PM2.5 is defined in 29-0010(2).

Section 29-0050 Designation of Prevention of Significant Deterioration Areas

(1) All of the following areas which were in existence on August 7, 1977, and for which the 1990 Clean Air Act Amendments clarified, shall be Class I Areas and may not be redesignated:

(a) Mt. Hood Wilderness, as established by Public Law 88-577;

(b) Eagle Cap Wilderness, as established by Public Law 88-577;

(c) Hells Canyon Wilderness, as established by Public Law 94-199;

(d) Mt. Jefferson Wilderness, as established by Public Law 90-548;

(e) Mt. Washington Wilderness, as established by Public Law 88-577;

(f) Three Sisters Wilderness, as established by Public Law 88-577;

(g) Strawberry Mountain Wilderness, as established by Public Law 88-577;

(h) Diamond Peak Wilderness, as established by Public Law 88-577;

(i) Crater Lake National Park, as established by Public Law 32-202;

(j) Kalmiopsis Wilderness, as established by Public Law 88-577;

(k) Mountain Lake Wilderness, as established by Public Law 88-577;

(l) Gearhart Mountain Wilderness, as established by Public Law 88-577.

(2) All other areas, in Oregon are initially designated Class II, but may be redesignated as provided in 29-0060.

(3) The following areas may be redesignated only as Class I or II:

(a) An area which as of August 7, 1977, exceeded 10,000 acres in size and was a national monument, a national primitive area, a national preserve, a national recreational area, a national wild and scenic river, a national wildlife refuge, a national lakeshore or seashore; and

(b) A national park or national wilderness area established after August 7, 1977, which exceeds 10,000 acres in size.

(4) The extent of the areas referred to in section (1) and (3) shall conform to any changes in the boundaries of such areas which occurred between August 7, 1977, and April 15, 2015.

<u>Section 29-0060 Redesignation of Prevention of Significant Deterioration Areas</u>

(1) (a) All areas in Oregon, except as otherwise provided under 29-0050, are designated Class II as of December 5, 1974;

(b) Redesignation, except as otherwise precluded by 29-0050, may be proposed by LRAPA, as provided below, subject to approval by the EPA Administrator as a revision to the SIP.

(2) LRAPA may submit to the EPA Administrator a proposal to redesignate areas of the state Class I or II provided that:

(a) At least one public hearing has been held in accordance with procedures established in the SIP;

(b) Other states, Indian Governing Bodies, and Federal Land Managers whose lands may be affected by the proposed redesignation were notified at least 30 days prior to the public hearing;

(c) A discussion of the reasons for the proposed redesignation, including a satisfactory description and analysis of the health, environmental, economic, social and energy effects of the proposed redesignation, was prepared and made available for public inspection at least 30 days prior to the hearing and the notice announcing the hearing contained appropriate notification of the availability of such discussion;

(d) Prior to the issuance of notice respecting the redesignation of an area that includes any federal lands, LRAPA has provided written notice to the appropriate Federal Land Manager and afforded adequate opportunity, not in excess of 60 days to confer with LRAPA respecting the redesignation and to submit written comments and recommendations. In redesignating any area with respect to which any Federal Land Manager had submitted written comments and recommendations, LRAPA must have published a list of any inconsistency between such redesignation and such comments and recommendations together with the reasons for making such redesignation against the recommendation of the Federal Land Manager; and

(e) LRAPA has proposed the redesignation after consultation with the elected leadership of local general purpose governments in the area covered by the proposed redesignation.

(3) Any area other than an area to which 29-0050 refers may be redesignated as Class III if:

(a) The redesignation would meet the requirements of subsection (2);

(b) The redesignation, except any established by an Indian Governing Body, has been specifically approved by the Governor, after consultation with the appropriate committees of the legislature, if it is in session, or with the leadership of the legislature, if it is not in session, unless state law provides that the redesignation must be specifically approved by state legislation, and if general purpose units of local government representing a majority of the residents of the area to be redesignated enact legislation or pass resolutions concurring in the redesignation;

(c) The redesignation would not cause, or contribute to, a concentration of any regulated pollutant which would exceed any maximum allowable increase permitted under the classification of any other area or any ambient air quality standard; and

(d) Any permit application for any major stationary source or major modification, subject to review under subsection (1), which could receive a permit under this section only if the area in question were redesignated as Class III, and any material submitted as part of that application, were available insofar as was practicable for public inspection prior to any public hearing on redesignation of the area as Class III.

(4) Lands within the exterior boundaries of Indian Reservations may be redesignated only by the appropriate Indian Governing Body.

(5) The EPA Administrator may disapprove, within 90 days of submission, a proposed redesignation of any area only if the EPA Administrator finds, after notice and opportunity for public hearing, that such redesignation does not meet the procedural requirements of this paragraph or is inconsistent with 29-0050. If any such disapproval occurs, the classification of the area must be that which was in effect prior to the redesignation which was disapproved.

(6) If the EPA Administrator disapproves any proposed redesignation, LRAPA, as appropriate, may resubmit the proposal after correcting the deficiencies noted by the EPA Administrator.

Section 29-0070 Special Control Areas

The following areas are designated as Special Control Areas:

(1) Lane County;

(2) Within incorporated cities having a population of 4,000 or more, and within three miles of the corporate limits of any such city.

Section 29-0080 Motor Vehicle Inspection Boundary Designations

In addition to the area specified in ORS 815.300, pursuant to ORS 468A.390, the following geographical areas are designated as areas within which motor vehicles are subject to the requirement under ORS 815.300 to have a Certificate of Compliance issued pursuant to ORS 468A.380 to be registered or have the registration of the vehicle renewed.

(1) There are currently no geographic areas in Lane County subject to motor vehicle inspection programs.

Section 29-0090 Oxygenated Gasoline Control Areas

There currently are no oxygenated gasoline control areas in Lane County.

Designation of Areas

Section 29-0300 Designation of Sustainment Areas

(1) The Board may designate sustainment areas provided that LRAPA submits a request for designation that includes the following information:

(a) Monitoring data showing that an area is exceeding or has the potential to exceed an ambient air quality standard;

(b) A description of the affected area based on the monitoring data;

(c) A discussion and identification of the priority sources contributing to the exceedance or potential exceedance of the ambient air quality standard; and

(d) A discussion of the reasons for the proposed designation.

(2) Designation of sustainment areas:

(a) Reserved

(b) Reserved

(3) An area designated as a sustainment area under subsection (2) will automatically be reclassified immediately upon the EPA officially designating the area as a nonattainment area.

(4) The Board may rescind the designation based on a request by LRAPA. LRAPA will consider the following information for rescinding the designation:

(a) Whether at least three consecutive years of monitoring data shows the area is meeting the ambient air quality standard; and

(b) A request by a local government.

Section 29-0310 Designation of Reattainment Areas

(1) The Board may designate reattainment areas provided that LRAPA submits a request for designation that includes the following information:

(a) At least three consecutive years of monitoring data showing that an area that is currently designated by EPA as nonattainment is attaining an ambient air quality standard; and

(b) A discussion of the reasons for the proposed designation.

(2) Designation of reattainment areas:

(a) The Oakridge PM2.5 ~~Non attainment~~Maintenance area as defined in 29-0010(2) is designated as a reattainment area for PM2.5.

(b) Reserved.

(3) An area designated as a reattainment area under subsection (2) will automatically be reclassified immediately upon:

(a) The Board designating the area as a maintenance area and EPA officially designating the area as an attainment area; or

(b) The Board rescinding the designation based on a request by LRAPA. LRAPA will consider the following information for rescinding the designation:

(A) Monitoring data that shows the area is not meeting the ambient air quality standard; and

(B) A request by a local government.

Section 29-0320 Priority Sources

For the purposes of LRAPA title 38, priority sources are identified as follows:

(1) In the Oakridge reattainment area, uncertified residential wood fuel-fired devices. The offset values for replacement of uncertified residential wood fuel-fired devices are specified in OAR 340-240-0560.

(2) In any other area, LRAPA may identify priority sources during a specific permit action based on the sources addressed in the emission reduction strategies that were included in the attainment or maintenance plans for the area. The offset value for priority sources identified under this section must be determined by LRAPA. The offset values for replacement of uncertified residential wood fuel-fired devices in rules LRAPA develops for areas with unique air quality needs may only be used if LRAPA determines that the values reasonably apply to the geographical area in question.

LRAPA Rules – Edits Incorporated

LANE REGIONAL AIR PROTECTION AGENCY
TITLE 29

DESIGNATION OF AIR QUALITY AREAS

Section 29-0010 Definitions

The definitions in title 12 and this section apply to this title. If the same term is defined in this section and title 12, the definition in this section applies to this title. Definitions of boundaries in this section also apply to LRAPA Rules and Regulations.

(1) "Eugene-Springfield UGB" means the area within the bounds beginning at the Willamette River at a point due east from the intersection of East Beacon Road and River Loop No.1; thence southerly along the Willamette River to the intersection with Belt Line Road; thence easterly along Belt Line Road approximately one-half mile to the intersection with Delta Highway; thence northwesterly and then northerly along Delta Highway and on a line north from the Delta Highway to the intersection with the McKenzie River; thence generally southerly and easterly along the McKenzie River approximately eleven miles to the intersection with Marcola Road; thence southwesterly along Marcola Road to the intersection with 42nd Street; thence southerly along 42nd Street to the intersection with the northern branch of US Highway 126; thence easterly along US Highway 126 to the intersection with 52nd Street; thence north along 52nd Street to the intersection with High Banks Road; thence easterly along High Banks Road to the intersection with 58th Street; thence south along 58th Street to the intersection with Thurston Road; thence easterly along Thurston Road to the intersection with the western boundary of Section 36, T17S, R2W; thence south to the southwest corner of Section 36, T17S, R2W; thence west to the Springfield City Limits; thence following the Springfield City Limits southwesterly to the intersection with the western boundary of Section 2, T18S, R2W; thence on a line southwest to the Private Logging Road approximately one-half mile away; thence southeasterly along the Private Logging Road to the intersection with Wallace Creek; thence southwesterly along Wallace Creek to the confluence with the Middle Fork of the Willamette River; thence generally northwesterly along the Middle Fork of the Willamette River approximately seven and one-half miles to the intersection with the northern boundary of Section 11, T18S, R3W; thence west to the northwest corner of Section 10, T18S, R3W; thence south to the intersection with 30th Avenue; thence westerly along 30th Avenue to the intersection with the Eugene City Limits; thence following the Eugene City Limits first southerly then westerly then northerly and finally westerly to the intersection with the northern boundary of Section 5, T18S, R4W; thence west to the intersection with Greenhill Road; thence north along Greenhill Road to the intersection with Barger Drive; thence east along Barger Drive to the intersection with the Eugene City Limits (Ohio Street); thence following the Eugene City Limits first north then east then north then east then south then east to the intersection with Jansen Drive; thence east along Jansen Drive to the intersection with Belt Line Road; thence northeasterly along Belt Line Road

to the intersection with Highway 99; thence northwesterly along Highway 99 to the intersection with Clear Lake Road; thence west along Clear Lake Road to the intersection with the western boundary of Section 9, T17S, R4W; thence north to the intersection with Airport Road; thence east along Airport Road to the intersection with Highway 99; thence northwesterly along Highway 99 to the intersection East Enid Road; thence east along East Enid Road to the intersection with Prairie Road; thence southerly along Prairie Road to the intersection with Irvington Road; thence east along Irvington Road to the intersection with the Southern Pacific Railroad Line; thence southeasterly along the Southern Pacific Railroad Line to the intersection with Irving Road; thence east along Irving Road to the intersection with Kalmia Road; thence northerly along Kalmia Road to the intersection with Hyacinth Road; thence northerly along Hyancinth Road to the intersection with Irvington Road; thence east along Irvington Road to the intersection with Spring Creek; thence northerly along Spring Creek to the intersection with River Road; thence northerly along River Road to the intersection with East Beacon Drive; thence following East Beacon Drive first east then south then east to the intersection with River Loop No.1; thence on a line due east to the Willamette River and the point of beginning.

(2) "Oakridge PM2.5 Maintenance Area" means the area enclosed by the following: T21S, R2E, Sect 11 (NW Corner) east to T21S, R3E, Sect 11 (NE corner), south to T21S, R3E, Sect 23(SE Corner), west to T21S, R2E, Sect 23(SW corner) correctly back to T21S, R2E, Sect 11(NW corner).

(3) "Oakridge UGB" means the area enclosed by the following: Beginning at the northwest corner of Section 17, T21S, R3E and the city limits; thence south along the western boundary of Section 17, T21S, R3E along the city limits approximately 800 feet; thence southwesterly following the city limits approximately 750 feet; thence west along the city limits approximately 450 feet; thence northwesterly along the city limits approximately 450 feet; thence on a line south along the city limits approximately 250 feet; thence on a line east along the city limits approximately 100 feet; thence southwesterly along the city limits approximately 200 feet; thence on a line east along the city limits approximately 400 feet; thence on a line south along the city limits to the channel of the Willamette River Middle Fork; thence south-easterly up the Willamette River Middle Fork along the city limits approximately 7200 feet; thence exiting the Willamette River Middle Fork with the city limits in a northerly manner and forming a rough semicircle with a diameter of approximately one-half mile before rejoining the Willamette River Middle Fork; thence diverging from the city limits upon rejoining the Willamette River Middle Fork and moving southeasterly approximately 5600 feet up the Willamette River Middle Fork to a point on the river even with the point where Salmon Creek Road intersects with U.S. Highway 58; thence on a line east from the channel of the Willamette River Middle Fork across the intersection of Salmon Creek Road and U.S. Highway 58 to the intersection with the Southern Pacific Railroad Line; thence northerly along the Southern Pacific Railroad Line to the intersection with the northern boundary of Section 22, T21S, R3E; thence west along the northern boundary of Section 22, T21S, R3E to the intersection with Salmon Creek Road; thence on a line north to the intersection with the Southern Pacific Railroad Line; thence east along the Southern Pacific Railroad Line approximately 600 feet; thence on a line north to the intersection with High Prairie Road; thence on a line west approximately 400 feet; thence on a line north to the intersection with the northern boundary of Section 15, T21S, R3E; thence west along the northern boundary of Section 15, T21S, R3E to the intersection with the southeastern corner of

Section 9, T21S, R3E; thence north along the eastern boundary of Section 9, T21S, R3E approximately 1300 feet; thence on a line west approximately 1100 feet; thence on a line south to the intersection with West Oak Road; thence northwesterly along West Oak Road approximately 2000 feet; thence on a line south to the intersection with the northern boundary line of the city limits; thence westerly and northwesterly approximately 8000 feet along the city limits to the point of beginning.

Section 29-0020 Designation of Air Quality Control Regions

Oregon's thirty-six counties are divided into five AQCRs. The AQCR boundaries follow county lines, and there are no counties that belong to more than one AQCR. The five AQCRs are as follows:

(1) Portland Interstate AQCR, containing ten counties:

(a) Benton County;

(b) Clackamas County;

(c) Columbia County;

(d) Lane County;

(e) Linn County;

(f) Marion County;

(g) Multnomah County;

(h) Polk County;

(i) Washington County;

(j) Yamhill County.

(2) Northwest Oregon AQCR, containing three counties:

(a) Clatsop County;

(b) Lincoln County;

(c) Tillamook County.

(3) Southwest Oregon AQCR, containing five counties:

(a) Coos County;

(b) Curry County;

(c) Douglas County;

(d) Jackson County;

(e) Josephine County.

(4) Central Oregon AQCR, containing eight counties:

(a) Crook County;

(b) Deschutes County;

(c) Hood River County;

(d) Jefferson County;

(e) Klamath County;

(f) Lake County;

(g) Sherman County;

(h) Wasco County.

(5) Eastern Oregon AQCR, containing ten counties:

(a) Baker County;

(b) Gilliam County;

(c) Grant County;

(d) Harney County;

(e) Malheur County;

(f) Morrow County;

(g) Umatilla County;

(h) Union County;

(i) Wallowa County;

(j) Wheeler County.

Section 29-0030 Designation of Nonattainment Areas

The following areas are designated as Nonattainment Areas:

(1) [Reserved]

Section 29-0040 Designation of Maintenance Areas

The following areas are designated as Maintenance Areas:

(1) Carbon Monoxide Maintenance Areas:

(a) The Eugene Maintenance Area for carbon monoxide is the Eugene-Springfield UGB as defined in 29-0010.

(2) PM10 Maintenance Areas:

(a) The Eugene-Springfield Maintenance Area for PM10 is the Eugene-Springfield UGB as defined in 29-0010.

(b) The Oakridge Maintenance Area for PM10 is the Oakridge UGB as defined in 29-0010(3).

(3) PM2.5 Maintenance Areas:

(a) The Oakridge Maintenance Area for PM2.5 is defined in 29-0010(2).

Section 29-0050 Designation of Prevention of Significant Deterioration Areas

(1) All of the following areas which were in existence on August 7, 1977, and for which the 1990 Clean Air Act Amendments clarified, shall be Class I Areas and may not be redesignated:

(a) Mt. Hood Wilderness, as established by Public Law 88-577;

(b) Eagle Cap Wilderness, as established by Public Law 88-577;

(c) Hells Canyon Wilderness, as established by Public Law 94-199;

(d) Mt. Jefferson Wilderness, as established by Public Law 90-548;

(e) Mt. Washington Wilderness, as established by Public Law 88-577;

(f) Three Sisters Wilderness, as established by Public Law 88-577;

(g) Strawberry Mountain Wilderness, as established by Public Law 88-577;

(h) Diamond Peak Wilderness, as established by Public Law 88-577;

(i) Crater Lake National Park, as established by Public Law 32-202;

(j) Kalmiopsis Wilderness, as established by Public Law 88-577;

(k) Mountain Lake Wilderness, as established by Public Law 88-577;

(l) Gearhart Mountain Wilderness, as established by Public Law 88-577.

(2) All other areas, in Oregon are initially designated Class II, but may be redesignated as provided in 29-0060.

(3) The following areas may be redesignated only as Class I or II:

(a) An area which as of August 7, 1977, exceeded 10,000 acres in size and was a national monument, a national primitive area, a national preserve, a national recreational area, a national wild and scenic river, a national wildlife refuge, a national lakeshore or seashore; and

(b) A national park or national wilderness area established after August 7, 1977, which exceeds 10,000 acres in size.

(4) The extent of the areas referred to in section (1) and (3) shall conform to any changes in the boundaries of such areas which occurred between August 7, 1977, and April 15, 2015.

Section 29-0060 Redesignation of Prevention of Significant Deterioration Areas

(1) (a) All areas in Oregon, except as otherwise provided under 29-0050, are designated Class II as of December 5, 1974;

(b) Redesignation, except as otherwise precluded by 29-0050, may be proposed by LRAPA, as provided below, subject to approval by the EPA Administrator as a revision to the SIP.

(2) LRAPA may submit to the EPA Administrator a proposal to redesignate areas of the state Class I or II provided that:

(a) At least one public hearing has been held in accordance with procedures established in the SIP;

(b) Other states, Indian Governing Bodies, and Federal Land Managers whose lands may be affected by the proposed redesignation were notified at least 30 days prior to the public hearing;

(c) A discussion of the reasons for the proposed redesignation, including a satisfactory description and analysis of the health, environmental, economic, social and energy effects of the proposed redesignation, was prepared and made available for public inspection at least 30 days prior to the hearing and the notice announcing the hearing contained appropriate notification of the availability of such discussion;

(d) Prior to the issuance of notice respecting the redesignation of an area that includes any federal lands, LRAPA has provided written notice to the appropriate Federal Land Manager and afforded adequate opportunity, not in excess of 60 days to confer with LRAPA respecting the redesignation and to submit written comments and recommendations. In redesignating any area with respect to which any Federal Land Manager had submitted written comments and recommendations, LRAPA must have published a list of any inconsistency between such redesignation and such comments and recommendations together with the reasons for making such redesignation against the recommendation of the Federal Land Manager; and

(e) LRAPA has proposed the redesignation after consultation with the elected leadership of local general purpose governments in the area covered by the proposed redesignation.

(3) Any area other than an area to which 29-0050 refers may be redesignated as Class III if:

(a) The redesignation would meet the requirements of subsection (2);

(b) The redesignation, except any established by an Indian Governing Body, has been specifically approved by the Governor, after consultation with the appropriate committees of the legislature, if it is in session, or with the leadership of the legislature, if it is not in session, unless state law provides that the redesignation must be specifically approved by state legislation, and if general purpose units of local government representing a majority of the residents of the area to be redesignated enact legislation or pass resolutions concurring in the redesignation;

(c) The redesignation would not cause, or contribute to, a concentration of any regulated pollutant which would exceed any maximum allowable increase permitted under the classification of any other area or any ambient air quality standard; and

(d) Any permit application for any major stationary source or major modification, subject to review under subsection (1), which could receive a permit under this section only if the area in question were redesignated as Class III, and any material submitted as part of that application, were available insofar as was practicable for public inspection prior to any public hearing on redesignation of the area as Class III.

(4) Lands within the exterior boundaries of Indian Reservations may be redesignated only by the appropriate Indian Governing Body.

(5) The EPA Administrator may disapprove, within 90 days of submission, a proposed redesignation of any area only if the EPA Administrator finds, after notice and opportunity for public hearing, that such redesignation does not meet the procedural requirements of this paragraph or is inconsistent with 29-0050. If any such disapproval occurs, the classification of the area must be that which was in effect prior to the redesignation which was disapproved.

(6) If the EPA Administrator disapproves any proposed redesignation, LRAPA, as appropriate, may resubmit the proposal after correcting the deficiencies noted by the EPA Administrator.

Section 29-0070 Special Control Areas

The following areas are designated as Special Control Areas:

(1) Lane County;

(2) Within incorporated cities having a population of 4,000 or more, and within three miles of the corporate limits of any such city.

Section 29-0080 Motor Vehicle Inspection Boundary Designations

In addition to the area specified in ORS 815.300, pursuant to ORS 468A.390, the following geographical areas are designated as areas within which motor vehicles are subject to the requirement under ORS 815.300 to have a Certificate of Compliance issued pursuant to ORS 468A.380 to be registered or have the registration of the vehicle renewed.

(1) There are currently no geographic areas in Lane County subject to motor vehicle inspection programs.

Section 29-0090 Oxygenated Gasoline Control Areas

There currently are no oxygenated gasoline control areas in Lane County.

Designation of Areas

Section 29-0300 Designation of Sustainment Areas

(1) The Board may designate sustainment areas provided that LRAPA submits a request for designation that includes the following information:

(a) Monitoring data showing that an area is exceeding or has the potential to exceed an ambient air quality standard;

(b) A description of the affected area based on the monitoring data;

(c) A discussion and identification of the priority sources contributing to the exceedance or potential exceedance of the ambient air quality standard; and

(d) A discussion of the reasons for the proposed designation.

(2) Designation of sustainment areas:

(a) Reserved

(b) Reserved

(3) An area designated as a sustainment area under subsection (2) will automatically be reclassified immediately upon the EPA officially designating the area as a nonattainment area.

(4) The Board may rescind the designation based on a request by LRAPA. LRAPA will consider the following information for rescinding the designation:

(a) Whether at least three consecutive years of monitoring data shows the area is meeting the ambient air quality standard; and

(b) A request by a local government.

Section 29-0310 Designation of Reattainment Areas

(1) The Board may designate reattainment areas provided that LRAPA submits a request for designation that includes the following information:

(a) At least three consecutive years of monitoring data showing that an area that is currently designated by EPA as nonattainment is attaining an ambient air quality standard; and

(b) A discussion of the reasons for the proposed designation.

(2) Designation of reattainment areas:

(a) The Oakridge PM2.5 Maintenance area as defined in 29-0010(2) is designated as a reattainment area for PM2.5.

(b) Reserved.

(3) An area designated as a reattainment area under subsection (2) will automatically be reclassified immediately upon:

(a) The Board designating the area as a maintenance area and EPA officially designating the area as an attainment area; or

(b) The Board rescinding the designation based on a request by LRAPA. LRAPA will consider the following information for rescinding the designation:

(A) Monitoring data that shows the area is not meeting the ambient air quality standard; and

(B) A request by a local government.

Section 29-0320 Priority Sources

For the purposes of LRAPA title 38, priority sources are identified as follows:

(1) In the Oakridge reattainment area, uncertified residential wood fuel-fired devices. The offset values for replacement of uncertified residential wood fuel-fired devices are specified in OAR 340-240-0560.

(2) In any other area, LRAPA may identify priority sources during a specific permit action based on the sources addressed in the emission reduction strategies that were included in the attainment or maintenance plans for the area. The offset value for priority sources identified under this section must be determined by LRAPA. The offset values for replacement of uncertified residential wood fuel-fired devices in rules LRAPA develops for areas with unique air quality needs may only be used if LRAPA determines that the values reasonably apply to the geographical area in question.

OAKRIDGE-WESTFIR $PM_{2.5}$ REDESIGNATION REQUEST

AND $PM_{2.5}$ MAINTENANCE PLAN

October 7, 2021

Lane Regional Air Protection Agency
1010 Main Street
Springfield, Oregon 97477

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Executive Summary

The Lane Regional Air Protection Agency (LRAPA) proposes a revision to the State of Oregon Clean Air Act Implementation Plan, referred to as the State implementation Plan (SIP). This proposed revision would:

- Redesignate the Oakridge-Westfir airshed as attainment for the national air quality health standards for fine particles ($PM_{2.5}$); and
- Include a 10-year maintenance plan to keep air quality within the $PM_{2.5}$ health standards.

The U.S. Environmental Protection Agency (EPA) adopted more protective $PM_{2.5}$ health standards in 2006 as part of its periodic review of National Ambient Air Quality Standards (NAAQS) to ensure protection of public health. The Oakridge-Westfir airshed was identified as an area not meeting the $PM_{2.5}$ health standards on worst winter days, and was designated as a $PM_{2.5}$ nonattainment area in 2009.

In collaboration with the City of Oakridge, the Oregon Department of Environmental Quality (DEQ) and other stakeholders, LRAPA submitted a $PM_{2.5}$ attainment plan for the Oakridge-Westfir airshed in 2012 as a SIP revision, with amendments and updates in 2016. The Oakridge-Westfir attainment plan identified residential wood combustion (in certified and non-certified woodstoves, fireplaces and pellet stoves) as the major emission category causing violations of the $PM_{2.5}$ health standards on stagnant winter days, and outlined commitments for a number of strategies to replace non-certified woodstoves with cleaner burning units, improve firewood seasoning and woodstove operation to reduce $PM_{2.5}$ emissions, and to curtail residential wood combustion during air stagnation episodes.

The Oakridge-Westfir attainment plan was successful in achieving the $PM_{2.5}$ health standards on schedule in 2014-2016. EPA recognized compliance with the 3-year $PM_{2.5}$ standard and approved the Oakridge-Westfir attainment plan in February 2018.

Major wildfires in 2017 and 2020 caused summertime violations of the $PM_{2.5}$ health standards. These wildfires caused significant impacts on Oakridge-Westfir residents, but those violations are being addressed separately by LRAPA, Oregon DEQ, and EPA as part of the Exceptional Events review process. The Exceptional Events guidance developed by EPA, in consultation with other agencies and the public, is intended to prevent penalizing communities for events outside their control.

This proposed redesignation request outlines the specific actions taken in the Oakridge-Westfir area to successfully meet the federal Clean Air Act requirements and includes a maintenance plan to continue the critical air pollution control strategies during 2015-2035.

1. Introduction

The federal Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) and to periodically review and update these standards to protect public health. EPA adopts new standards after consultation with the Clean Air Scientific Advisory Committee (CASAC), a group of non-EPA scientists and medical professionals established by Congress.

In 1997, EPA adopted a daily (24-hr) $PM_{2.5}$ standard of 65 $\mu g/m^3$ and an annual $PM_{2.5}$ standard of 15 $\mu g/m^3$. However, subsequent national health studies supported more protective $PM_{2.5}$ health standards, and EPA adopted a 35 $\mu g/m^3$ 24-hour $PM_{2.5}$ standard in 2006 and a 12 $\mu g/m^3$ annual $PM_{2.5}$ standard in 2012.

Areas in violation of either of the $PM_{2.5}$ standards (based on the most recent three years of federal reference monitoring data) are designated as a Moderate Nonattainment Area by the EPA. Oakridge, Oregon, was designated as nonattainment for the daily $PM_{2.5}$ standard in 2009 based on a comparison of Oakridge data from 2006-2008 with the 2006 standard of 35 $\mu g/m^3$.

The Lane Regional Air Protection Agency (LRAPA), the City of Oakridge, and other stakeholders developed the Oakridge 2012 $PM_{2.5}$ Attainment Plan to meet the daily $PM_{2.5}$ standard by the Clean Air Act deadline of December 31, 2015. On October 21, 2016 (81 FR 72714 (PDF) the EPA approved the base year emission inventory, the description of the Oakridge-Westfir Nonattainment Area, and listing of the area as a Moderate Nonattainment Area. This plan did not meet the daily $PM_{2.5}$ standard by December 31, 2015 based on the 2013-2015 design value, thus requiring withdrawal of portions of the plan and EPA disapproval of other provisions. However, the area met the criteria for a for extending its attainment date by one year, and on July 18, 2016 (81 FR 46612 (PDF) the EPA extended the area's attainment date to December 31, 2016.

In response, the Lane Regional Air Protection Agency (LRAPA), the City of Oakridge, and other stakeholders developed the Oakridge 2016 $PM_{2.5}$ Attainment Plan ("2016 Plan") to bring air quality in Oakridge into compliance with the standard by December 31, 2016. The 2016 Plan was adopted by the LRAPA Board of Directors on November 10, 2016, approved and incorporated into the State of Oregon Clean Act Implementation Plan, referred to as the State Implementation Plan (SIP), by the Oregon Environmental Quality Commission (EQC) on January 18, 2017. The 2016 Plan was subsequently approved by the U.S. Environmental Protection Agency (EPA). In addition, the EPA made a finding of attainment and a clean data determination (CDD), based on 2014-2016 air monitoring data, on February 8, 2018 [83 FR 5537] effective March 12, 2018. Residential Wood Combustion (RWC) emissions from certified and non-certified woodstoves, fireplaces and pellet stoves were identified as the major source of $PM_{2.5}$ emissions on worst winter days contributing to violations of the 24-hour NAAQS for $PM_{2.5}$.

The federal Clean Air Act [in CAA §107(d)(3)(E)] allows areas to request redesignation of a nonattainment area to attainment if certain criteria are met. This redesignation request and maintenance plan address the Clean Air Act requirements and outlines how the Oakridge-Westfir airshed will continue to meet the $PM_{2.5}$ air quality health standards. The redesignation request and maintenance plan are organized as follows:

- **Background** – describing the airshed, and the historical $PM_{2.5}$ air pollution problem.
- **Redesignation Requirements** – demonstrating how this document fulfills the federal Clean Air Act requirements to redesignate the area to attainment.
- **Air Quality Monitoring** – summarizing the $PM_{2.5}$ monitoring data and trends.
- **Emission Inventories** – summarizing the major sources of $PM_{2.5}$ emissions for 2015, 2025, 2030, and 2035.
- **Air Pollution Control Strategies** – describing the key control measures to reduce $PM_{2.5}$ emissions in future years.
- **Transportation Conformity** – summarizing the motor vehicle emissions budget to limit onroad motor vehicle emissions from cars and trucks.
- **Maintenance of Air Quality Health Standards** – describing the commitment to continue monitoring, verify continued attainment, and the contingency plan.
- **Redesignation to Attainment** – describing the next steps in the process.

2. Background

Particulate matter (PM) is the general term used for a mixture of solid particles or liquid droplets found in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. These particles come in a wide range of sizes ("fine" or "respirable" particles are less than 2.5 micrometers in diameter and coarser-sized particles are larger than 2.5 micrometers), and originate from many different sources. Fine particles ($PM_{2.5}$) generally result from fuel combustion from residential fireplaces and woodstoves, pile and forest burning, industrial facilities, and motor vehicles. Coarse particles (PM_{10} and larger) are generally emitted from sources such as vehicles traveling on paved and unpaved roads, materials handling, and wood products operations, as well as wind-blown dust.

These particles can accumulate in the respiratory system and are associated with numerous negative health effects. Fine particles are most closely associated with such health effects as increased hospital admissions and emergency room visits for heart and lung disease, increased respiratory symptoms and disease, decreased lung function and premature death. Sensitive groups that are at greatest risk include the elderly, pregnant women, individuals with cardiopulmonary disease such as asthma, and children. EPA has established NAAQS for $PM_{2.5}$ at 35 micrograms per cubic meter ($\mu g/m^3$) for a daily (24-hour) standard and 12 $\mu g/m^3$ as an annual standard. Any value monitored above these levels, as defined by federal rules and guidance, is considered an exceedance. EPA uses the 98^{th} percentile of the 24-hr $PM_{2.5}$ within any given year and averages it over three calendar years. An exceedance of the average 98^{th}

percentile over three years greater than 35 μg/m^3 is considered a violation. An exceedance of the annual standard averaged over three years becomes a violation of the annual standard. If an area violates either standard, EPA designates it as a nonattainment area. This plan includes a demonstration of continuing attainment with both standards in Oakridge.

This document requests redesignation of the Oakridge-Westfir Nonattainment Area (NAA) to attainment for $PM_{2.5}$ (state classification will be “maintenance”), which has achieved the more protective national health standards adopted in 2006 and 2012. It is a plan to ensure Oakridge maintains compliance with the 24-hour and annual National Ambient Air Quality Standards for $PM_{2.5}$. This document complies with the applicable 1990 Federal Clean Air Act requirements and EPA rules, guidance and policies. The maintenance plan continues strategies to maintain the $PM_{2.5}$ standards during 2015-2035 and includes contingency measures should Oakridge not continue to meet air quality standards. To demonstrate "attainment" requires the collection of representative monitoring data using approved measuring instruments and procedures, with adequate quality assurance. EPA will review the plan to determine if it is approvable and publish its findings in the Federal Register. Redesignation to attainment is possible only after Oakridge has met the standards for three consecutive years and a maintenance plan is adopted by the LRAPA Board of Directors, the EQC and approved by EPA.

Oakridge lies in an alluvial plain in the foothills at the southern end of the Willamette River valley. The city is in Lane County, Oregon, approximately 45 miles east-southeast of Eugene, and 28 miles west of Willamette Pass, a summit of the Cascade Mountain Range. The city limits of present-day Oakridge include the historic City of Oakridge and, directly west, the area formerly known as Willamette City. Figure 1 shows the location of Oakridge in Lane County.

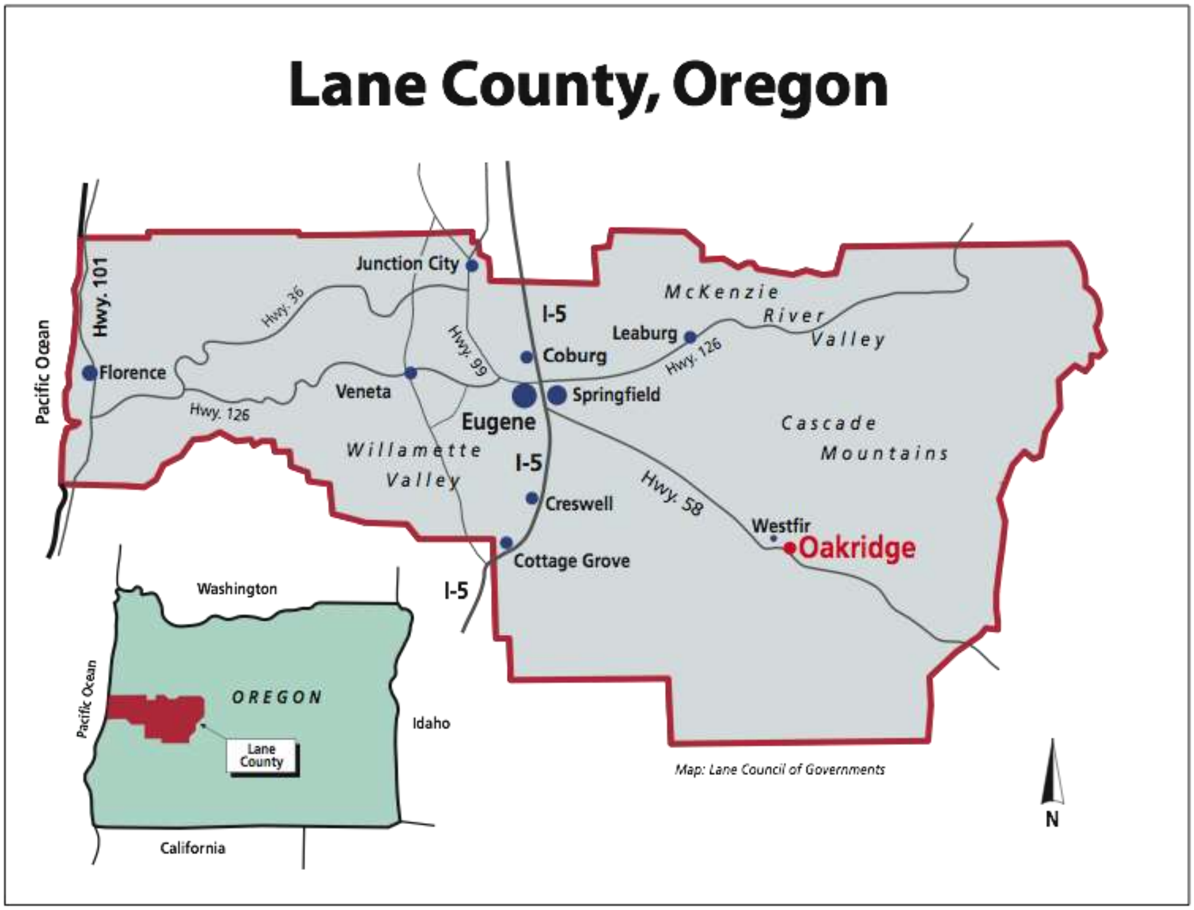

Figure 1: Oakridge Location in Lane County and Oregon.

The area of applicability for this attainment plan includes an area that contains the City of Oakridge and the small town of Westfir. **Error! Reference source not found.** shows the Oakridge non-attainment area.

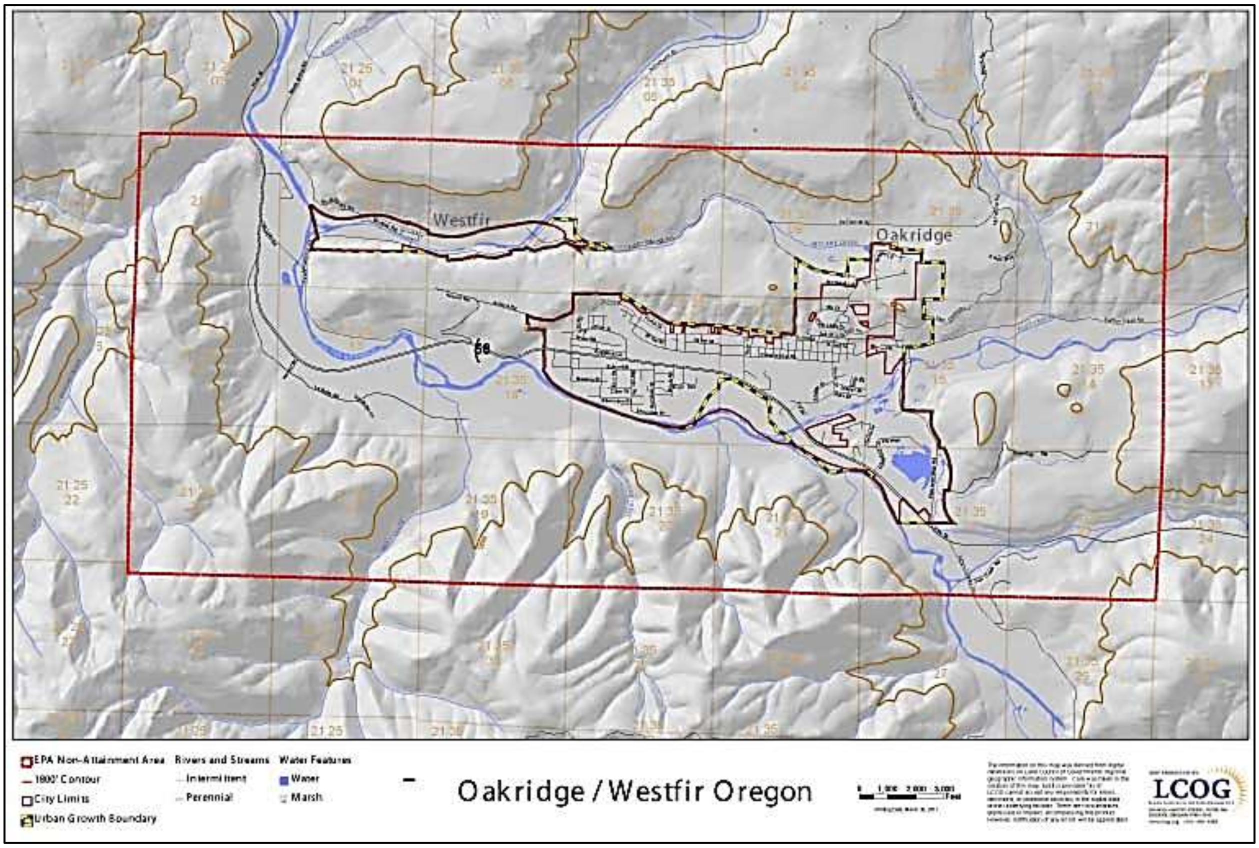

Figure 2: Oakridge-Westfir $PM_{2.5}$ Nonattainment Area Boundary Map.

The City of Oakridge (population 3,278 in 2019) is situated in a valley oriented east to west, where the middle fork of the Willamette River flows. Elevation of the area ranges from 1100 feet at the lower (west) end to 1600 feet with areas of densest population situated between 1100 feet and 1200 feet. Mountains rise on the north and south sides to 1700 feet and 1600 feet, respectively.

Westfir is a very small (population 254 in 2019) isolated rural mountain community that is located along the north fork of the Willamette River about 1 mile NW of Oakridge. Its elevation is about the same as Oakridge and it is surrounded by the same high mountains. Westfir and Oakridge are in opposite steep-sided river valleys separated by a 400-foot ridge. The Westfir valley is very narrow, only about a quarter mile across at its widest point, while the Oakridge valley is about one mile across at its widest point.

Nov. 17-18, 2021, EQC meeting

3. Redesignation Requirements

The federal Clean Air Act in Section 107 [CAA §107(d)(3)(E)] outlines the requirements the area must meet to redesignate the Oakridge-Westfir $PM_{2.5}$ NAA to attainment:

a. The area has attained the 2006 24-hour NAAQS.
b. The improvement in air quality is due to permanent and enforceable reductions in emissions.
c. The plan has a fully approved implementation plan under CAA §110(k).
d. The area has met the requirements of CAA §110 and Part D.
e. The area has a fully approved maintenance plan that ensures attainment of the NAAQS for at least ten years beyond redesignation.

With the EPA approval of this maintenance plan and redesignation request, the Oakridge-Westfir area will meet all the requirements for EPA to redesignate the area to attainment, as outlined in the following table.

Table 1: Federal Clean Air Act Requirements for Redesignation.

Clean Air Act Requirement	How Requirement is Met
a. The area has attained the 2006 24-hour NAAQS.	Quality-assured $PM_{2.5}$ data for the NAA for the 3-year period 2014-2016 indicated the NAA has attained the standards [83 FR 5537]. Data from 2014-2020 confirm the NAA continues to attain the standards, except for wildfire impacts addressed by Exceptional Events guidance. See Section 4 for more details.
b. The improvement in air quality is due to permanent and enforceable reductions in emissions.	Enforceable local and state strategies implemented in the attainment plan, primarily to reduce residential woodsmoke, have achieved the intended emission reductions. Federal measures continue to reduce motor vehicle and railroad emissions.
c. The plan has a fully approved implementation plan under CAA §110(k).	LRAPA, the City of Oakridge and other stakeholders developed and implemented the Oakridge 2016 $PM_{2.5}$ Attainment Plan to bring air quality in Oakridge into compliance with the standards by December 31, 2016. The 2016 Plan was adopted by the LRAPA Board on November 10, 2016, approved and incorporated into the SIP by the Oregon EQC on January 18, 2017, and subsequently approved by EPA, including a finding of attainment and a clean data determination (CDD) based on 2014-2016 air monitoring data, on February 8, 2018 [83 FR 5537] effective March 12, 2018.
d. The area has met the requirements of CAA §110 and Part D.	LRAPA and Oregon DEQ have met the requirements of CAA §110 and Part D. See https://www.epa.gov/sips-or. The most recent EPA approval of LRAPA programs was on October 5, 2018 (83 FR 50274).
e. The area has a fully approved maintenance plan that ensures attainment of the NAAQS for at least ten years beyond redesignation.	With the EPA approval of this maintenance plan and redesignation request, the Oakridge-Westfir NAA will have a fully approved maintenance plan ensuring continued attainment of standards for at least ten years beyond redesignation. See Sections 4-9 for more details.

4. Air Quality Monitoring

The Oakridge air monitoring station (Site Code WAC, AQS #410392013) has been located at the Willamette Activity Center (WAC) in the southwest portion of the city of Oakridge since 1989. Saturation monitoring studies have demonstrated the monitor is located in the area of maximum emissions and PM concentrations. The WAC station is part of the SLAMS (State and Local Air Monitoring Stations) network and meets all siting requirements and criteria for the monitoring objective of maximum population exposure at the neighborhood spatial scale.

The WAC sampling method for $PM_{2.5}$ has historically been the filter-based Federal Reference Method (FRM) operating on an every-3rd-day schedule. The current parameters measured at the WAC station include:

- PM_{10} with Federal Equivalent Method (continuous beta attenuation method),
- $PM_{2.5}$ with Federal Equivalent Method (continuous beta attenuation method),
- $PM_{2.5}$ with Federal Reference Method (FEM collocation requirement),
- Nephelometer (continuous optical backscatter),
- Wind Speed and Direction (continuous ultrasonic),
- Temperature (continuous platinum RTD at 2 meters and 10 meters height),
- Barometric Pressure (continuous electronic barometer), and
- Solar Radiation (continuous pyranometer).

Additional details, photos, and maps are included in the annual LRAPA Ambient Air Monitoring Network Plan; the following photos are taken from that Network Plan.

Figure 3: Oakridge Air Monitoring Station.

Figure 4: Oakridge Station Location.

Quality-assured data is submitted quarterly by LRAPA to Oregon DEQ and EPA within 60 days of the end of each calendar quarter. LRAPA is committed to continue EPA-approved $PM_{2.5}$

monitoring throughout the period of the maintenance plan as outlined in the biennial CAA §105 grant workplan and semi-annual progress reports.

The reporting of Oakridge PM concentrations was straightforward through 2016. Oakridge air quality in 2014-2016 met the NAAQS for $PM_{2.5}$, both the annual and the 24-hour standards, as projected in the 2016 Plan. However, large wildfires in Oregon and nearby states in 2017, and again in 2020, resulted in many major wildfire smoke impacts resulting in monitored $PM_{2.5}$ values above the 24-hour $PM_{2.5}$ standard in Oakridge and other Oregon communities that required documentation and submittal to EPA for review and approval as Exceptional Events. The LRAPA annual reports in 2017-2019 were expanded to include the $PM_{2.5}$ data with and without the days flagged as having had major wildfire smoke impacts. Pages 20 and 21 in the LRAPA 2019 Annual Report summarize the 2010-2019 concentrations without and with wildfire impacts. Similarly, page 58 of the Oregon DEQ Air Quality 2019 Annual Report summarizes the 2010-2019 concentrations in Oakridge and other Oregon communities without and with wildfire impacts.

Oakridge annual average $PM_{2.5}$ concentrations continued to meet the annual $PM_{2.5}$ NAAQS (12 µg/m^3) throughout 2006-2020 as documented in the 2016 Plan, the LRAPA Annual Reports, and EPA's Air Quality System (AQS), even with the wildfire impacts of 2017 and 2020.

The Exceptional Events (EE) rule and guidance developed by EPA, in consultation with other agencies and the public, is intended to prevent penalizing communities for events outside their control. State and local air agencies may flag days they believe have been influenced by exceptional events and submit a demonstration for EPA concurrence, however, EPA can approve wildfire smoke impacts (or other exceptional events) that have "regulatory significance." This means that EPA may not be able to approve all the EE days that are flagged by local, or state agencies.

The following series of tables and graph summarize the 2006-2020 data. The 3-year design values coded in red denote violation of the 35 ug/m3 NAAQS; green indicates attainment of the 35 ug/m3 NAAQS. Table 2 and Figure 5 display Oakridge $PM_{2.5}$ data with all flagged wildfire smoke impact days removed; whereas Table 3 displays Oakridge $PM_{2.5}$ data with only the 2017 and 2020 EEs with regulatory significance removed (which will be represented in future AQS after EPA approval of EEs). The different data sets used for Table 2 and Table 3 result in a difference of 1 ug/m3 for the 2016-2018 design value (from 30 ug/m3 to 29 ug/m3) and the 2017-2019 design value (from 35 ug/m3 to 34 ug/m3), and in a 3 ug/m3 difference for the 2018-2020 design value (from 34 ug/m3 to 31 ug/m3).

For completeness, both data sets are included here for review. The data in Table 2 and Figure 5 best describe the progress of the 2016 Plan. Table 3 will probably determine EPA's basis for approval of the redesignation request and maintenance plan.

Table 2: Oakridge $PM_{2.5}$ data with all flagged wildfire smoke impact days removed.

Year	98th %ile	Design Value 2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
2006	38.6													
2007	42.7	41												
2008	42.2		42											
2009	41.2			39										
2010	33.0				39									
2011	42.0					38								
2012	38.4						40							
2013	41.0							40						
2014	41.1								37					
2015	28.9									31				
2016	21.7										29			
2017	35.7											29		
2018	28.6												34	
2019	36.7													31
2020	26.2													

Legend:
Red indicates violation of NAAQS.
Green indicates attainment of NAAQS.

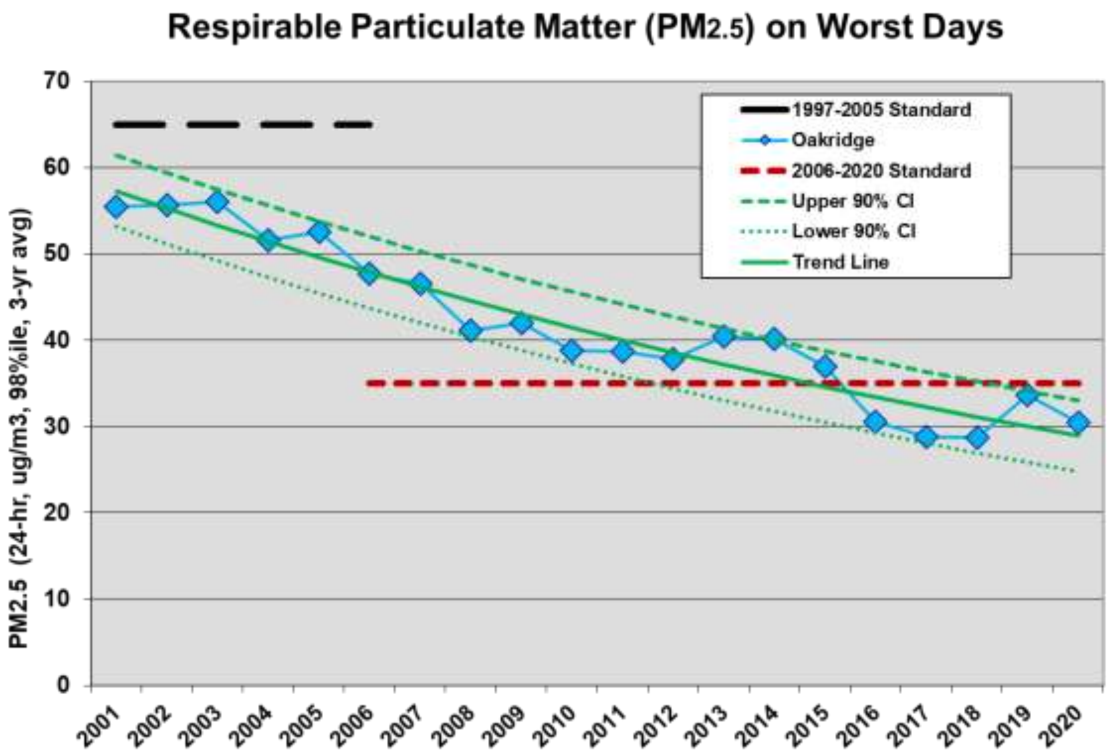

Figure 5: Oakridge data (from Table 2) with all flagged wildfire smoke impact days removed.

Table 3: Oakridge $PM_{2.5}$ data with 2017 and 2020 regulatory significant EEs removed.

Year	98th-%-ile	Design Value												
		2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
2006	38.6													
2007	42.7	41						Legend:						
2008	42.2		42					Red indicates violation of NAAQS.						
2009	41.2			39				Green indicates attainment of NAAQS.						
2010	33.0				39									
2011	42.0					38								
2012	38.4						40							
2013	41.0							40						
2014	41.1								37					
2015	28.9									31				
2016	21.7										29			
2017	35.7											30		
2018	33.2												35	
2019	36.7													34
2020	32.9													

An expanded discussion of the air monitoring data with additional details on the Exceptional Event review process is included in Appendix I: Ambient Air Quality Data Review.

5. Emission Inventories

As described in detail in the 2016 Plan, Residential Wood Combustion (RWC) emissions from certified and non-certified woodstoves, fireplaces and pellet stoves have been identified as the major source of $PM_{2.5}$ emissions on worst winter days contributing to violation of the 24-hour $PM_{2.5}$ NAAQS. The 2015 Attainment Year Emission Inventory from the 2016 Plan was used, with only minor adjustments based on more current or accurate information as outlined in Appendix II, as the 2015 Base Year $PM_{2.5}$ Emission Inventory for the 2015-2035 Oakridge-Westfir $PM_{2.5}$ Maintenance Plan. The 2015 Base Year $PM_{2.5}$ Emission Inventory is summarized in the following Table 4. Residential woodburning and other area source emissions on worst case days are lower than on typical season days due to woodburning curtailment and outdoor burning bans.

Table 4: 2015 Base Year Typical Season Day and Worst-Case Day $PM_{2.5}$ Emissions.

	-- lbs/per day --		Percent of Total NAA Emissions	
	Typical Season Day	Worst-Case Day	Typical Season Day	Worst-Case Day
Permitted Point Sources[1]				
Oakridge Sand & Gravel: Rock crushing operation	0.0	0.0	0.0%	0.0%
Oakridge Sand & Gravel: Cement plant	0.0	0.0	0.0%	0.0%
Stationary Area Sources				
Residential Wood Combustion: Fireplace[2][4]	38.5	31.7	7%	6%
Residential Wood Combustion: Non-Certified Woodstove/Insert[2][4]	108.4	89.4	18%	18%
Residential Wood Combustion: Certified Woodstove/Insert[2][4]	243.2	200.7	41%	40%
Pellet Stoves	7.3	8.0	1%	2%
All Other Stationary Area Sources	47.4	4.7	8%	1%
On-Road Sources				
On-Road: Exhaust, Brake, Tire[3]	30.7	37.8	5%	8%
Re-Entrained Road Dust	111.4	120.7	19%	24%
Nonroad Sources				
Union Pacific Railroad	2.9	2.9	0%	1%
	------	------		
Total, All Sources, lbs/day	**590**	**496**		

(1) Worst-case day = Permitted hourly (x24) operating capacity. *Updated by MLH on 09/17/2021.*

(2) Worst-case day = Peak Heating Degree Day.

(3) Updated with MOVES 2014a in May 2018.

(4) Based on RWC curtailment effectiveness of 25% on Worst-Case Day in 2015.

Growth is expected to be low in the Oakridge-Westfir area through 2035. Population, housing, and employment forecasts are expected to increase gradually. The 2019 Population Forecasts by the Population Research Center at Portland State University*see note below indicate total expected population growth in the Oakridge and Westfir Urban Growth Boundaries (UGBs) during 2010-2035 of only 0.4% (less than 0.02% average per year), increasing from 3,563 (3,308+255) to 3,578 (3,312+266) population over the 2010-2035 time period.

*Note: The Oregon legislature passed a law (ORS 195.033) in 2013 by way of HB 2253 that assigned the forecast creation task to the Population Research Center at Portland State University (PSU). In 2015, the Land Conservation and Development Commission adopted rules (OAR 660-032) to implement the new law.

The staff of the Lane Council of Governments (LCOG) periodically updates and summarizes the demographic information for Oakridge, Westfir and other Lane County communities, based on American Community Survey (ACS) data from the U.S. Census Bureau. The 2018 ACS data indicates 1,791 total housing units in Oakridge, of which 1,433 are occupied, with electric heat as the primary heat source in 1,027 of the occupied housing units, wood as the primary heat source in 340 of the occupied housing units, and 66 occupied housing units using other fuel or none. Similarly, the Westfir ACS data indicates 131 total housing units, of which 121 are occupied, with electric heat as the primary heat source in 66 of the occupied housing units, wood as the primary heat source in 39 of the occupied housing units, and 16 occupied housing units using other fuel or none.

Traffic growth in Vehicle-Miles-Traveled (VMT) is based on previous transportation modeling by Lane County, LCOG and ODOT in the Highway 58 corridor, as summarized in the following table. More detail about the VMT modeling is in the LCOG memorandum (link here) that summarizes the VMT data process LCOG completed in May of 2021 to update the VMT estimations previously used in the 2016 Updated Attainment Plan so that they are current and consistent with modeling guidance for this Maintenance Plan.

Table 5: Oakridge Projected Traffic Growth (Vehicle Miles Traveled, VMT) for 2015-2035.

Month	2015		2025		2030		2035	
	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
April	74,134	106,845	74,879	107,920	75,254	108,465	75,364	109,004
July	98,553	142,602	99,544	144,036	100,057	144,780	100,553	145,493
September	94,834	125,470	95,788	126,732	96,282	127,385	96,761	128,017
December	69,909	110,697	70,612	111,810	70,958	112,353	71,307	112,901
Total Annual	34,558,914		34,906,443		35,083,373		35,239,815	

The principal components for development and documentation for the 2015-2035 Maintenance Plan emission inventories are addressed in Appendix III: Emission Inventories for Future Years. Appendix III includes stationary permitted point sources, stationary area (non-permitted) sources, non-road mobile sources (railroads), on-road mobile sources, and emissions summaries. Inventory years for the Maintenance Plan include the 2015 Base Year and then Future Years 2025, 2030 and 2035. The geographic boundary for each inventory continues to be the Oakridge-Westfir NAA, as defined by the NAA boundary in the 2016 Plan and illustrated previously in Figure B.

The differences between the 2015 base year emission inventory and the maintenance years (2025, 2030, and 2035) emission inventories are the combination of increases due to growth factors and decreases due to emission control strategies. For example, motor vehicle emissions continue to decrease overall due to progressively cleaner gasoline and diesel fuels and motor vehicles and the transition to more zero-emission vehicles, but part of the emissions decrease will be offset by gradual growth in traffic volumes.

Exhaust, brake and tire emissions of $PM_{2.5}$ from motor vehicles were calculated by staff of the Oregon DEQ in 2018 for future years emissions (2025-2035). The $PM_{2.5}$ MOVES 2014a emission modeling results for 2015, 2025, 2030, and 2035 are summarized in the following table.

Table 6: Oakridge $PM_{2.5}$ MOVES 2014a emission modeling results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015 Total	PM2.5 Exhaust, Brake, Tire	15.4	19.6	17.0	22.8	16.9	20.8	16.6	22.2	17.6	22.2
2025 Total	PM2.5 Exhaust, Brake, Tire	5.3	6.7	6.1	8.0	6.0	7.3	5.6	7.3	6.1	7.3
2030 Total	PM2.5 Exhaust, Brake, Tire	4.4	5.9	5.5	7.5	5.4	6.7	4.2	6.1	5.1	6.1
2035 Total	PM2.5 Exhaust, Brake, Tire	3.8	5.1	4.8	6.6	4.6	5.8	3.7	5.3	4.4	5.3

The motor vehicle MOVES modeling results and the Motor Vehicle Emissions Budget (MVEB) are described in more detail in Appendix IV.

Railroad locomotive emissions will continue to decrease due to federal control measures. Industry emissions are minor so this did not have a major effect on the 2015 emissions or future emission inventories. The most significant category continues to be residential wood-heating; emissions were increased to reflect population and housing growth in future years, decreased due to non-certified woodstove replacements with cleaner burning units after 2015, and decreased due to improvements in public outreach regarding cleaner burning techniques and code enforcement programs for curtailment during stagnant air episodes.

The primary focus of the 2016 Plan and this 2015-2035 Maintenance Plan is to continue to reduce RWC emissions. The Oakridge Air Program, outlined in detail in Appendix V, continues and expands RWC strategies that have been effective over the past few decades. Much of the funding for the Oakridge Air Program is provided by an EPA Targeted Airshed Grant received by LRAPA in 2019, to be implemented during 2020-2024.

The core RWC strategies from the 2016 Plan continue, and are summarized in Section 6. The most significant of the RWC reductions from the Oakridge Air Program will be achieved during 2020-2024. The $PM_{2.5}$ emission inventories for the 2025, 2030 and 2035 future years, Typical Season Day and Worst Case Day, are compared to the 2015 Base Year $PM_{2.5}$ Emission Inventory in the following tables.

Table 7: Comparison of Base Year to Future Years Typical Season Day $PM_{2.5}$ Emissions.

Source Category	2015	2025	2030	2035
Residential Wood Combustion	397.3	316.7	316.6	316.1
Onroad Motor Vehicles	17.6	6.1	5.1	4.4
Re-Entrained Road Dust	16.8	16.9	17.0	17.0
Permitted Point Sources	0.0	0.5	0.5	0.5
Railroad Locomotives	2.7	2.7	2.7	2.7
Other Area Sources	47.4	47.4	47.4	47.4
Total $PM_{2.5}$ Emissions	**482**	**390**	**389**	**388**

Table 8: Comparison of Base Year to Future Years Worst Case Day $PM_{2.5}$ Emissions.

Source Category	2015	2025	2030	2035
Residential Wood Combustion	329.8	246.2	229.1	211.8
Onroad Motor Vehicles	22.2	7.3	6.1	5.3
Re-Entrained Road Dust	19.2	19.3	19.4	19.4
Permitted Point Sources	0.0	0.8	0.8	0.8
Railroad Locomotives	2.7	2.7	2.7	2.7
Other Area Sources	4.7	4.7	4.7	4.7
Total $PM_{2.5}$ Emissions	**379**	**281**	**263**	**245**

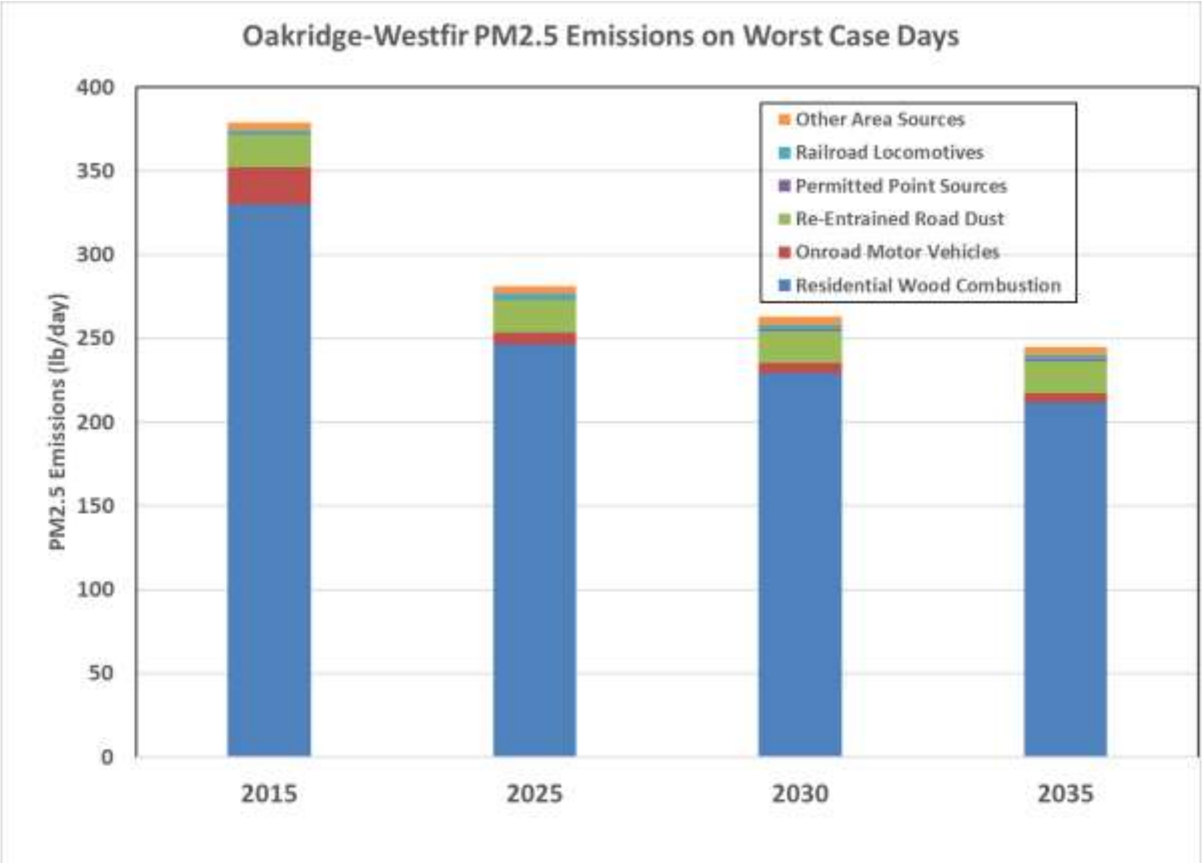

Figure 6: Worse Case Day $PM_{2.5}$ Emissions 2015-2035.

Precursor Emission Inventories (NO_X, VOC, SO_2, and NH_3)

Secondary particulate is an overall very minor contributor to the Oakridge $PM_{2.5}$ air pollution concentrations on worst winter days as summarized in the 2016 Attainment Plan. Historical speciated $PM_{2.5}$ filter analyses indicate that concentrations of all the precursor groups (nitrates, sulfates, ammonia, and volatile organic compounds [VOC])) were determined to be below the EPA Region 10 insignificance thresholds.

Precursor trends in the Lane County, Oregon, portion of the National Emission Inventories (NEIs for 2011, 2014, and 2017) for the major emission categories in the Oakridge-Westfir airshed indicate precursors are decreasing, indicating that precursor emissions would be even less significant contributors to $PM_{2.5}$ in the future.

In the preparation of the maintenance plan, LRAPA staff performed a more definitive analysis of the 2015 base year and the 2025-2035 future year precursor emissions (NO_X, VOC, SO_2, and NH_3). The 2015 precursor emissions are calculated in Appendix II and summarized in the following table.

Table 9: $PM_{2.5}$ and Precursor Emissions for Worst Case Day in 2015 Base Year.

	Worst Case Day PM2.5 and Precursor Emissions (lb/day)				
Source Category	**$PM_{2.5}$**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	329.8	41.6	307.8	6.6	17.3
Onroad Motor Vehicles	22.2	711.3	543.2	2.9	12.0
Re-Entrained Road Dust	19.2	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.7	0.1	5.2	0.1	0.1
Other Area Sources	4.7	0.5	13.4	0.4	0.9
Total Emissions	**379**	**753**	**870**	**10**	**30**

Most of the 2015 precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories (i.e., 74-99%), and these emission categories were evaluated in most detail for all years (2015, 2025, 2030, and 2035). Precursor emissions of NO_X, VOC, SO_2, and NH_3 are compared to $PM_{2.5}$ emissions on worst case days in 2015, 2025, 2030, and 2035 in the next series of tables.

Table 10: Comparison of Base Year to Future Years Worst Case Day NO_X Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	41.6	33.4	34.4	32.5
Onroad Motor Vehicles	711.3	193.1	127.9	108.8
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	8.7	8.7	8.7
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	0.5	0.5	0.5	0.5
Total NOx Emissions	**753**	**236**	**172**	**150**

Table 11: Comparison of Base Year to Future Years Worst Case Day VOC Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	307.8	165.9	151.7	137.1
Onroad Motor Vehicles	543.2	183.2	18.8	15.9
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	0.8	0.8	0.8
Railroad Locomotives	5.2	5.1	5.1	5.1
Other Area Sources	13.4	13.4	13.4	13.4
Total VOC Emissions	**870**	**368**	**190**	**172**

Table 12: Comparison of Base Year to Future Years Worst Case Day SO_2 Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	6.6	5.5	5.2	4.8
Onroad Motor Vehicles	2.9	1.4	1.2	1.2
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	0.4	0.4	0.4	0.4
Total SO_2 Emissions	**9.9**	**7.3**	**6.8**	**6.4**

Table 13: Comparison of Base Year to Future Years Worst Case Day NH_3 Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	17.3	12.6	11.7	10.9
Onroad Motor Vehicles	12.0	9.1	5.4	5.3
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	NA	NA	NA	NA
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	0.9	0.9	0.9	0.9
Total NH_3 Emissions	**30.3**	**22.7**	**18.1**	**17.1**

In summary, all the precursor emission categories (NO_X, VOC, SO_2, and NH_3) decrease during the 2015-2035 period. This is as expected since most of the precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories, and the precursor emissions are reduced by the same control strategies that reduce Residential Wood Combustion $PM_{2.5}$ emissions (e.g., progressively cleaner burning home heating units) and On-Road Motor Vehicle $PM_{2.5}$ emissions (e.g., progressively cleaner vehicles and fuels).

Condensable and Filterable $PM_{2.5}$ Emissions

In addition to the precursor assessment, LRAPA staff also did a more detailed analysis of the condensable and filterable fractions of the $PM_{2.5}$ emission inventory. Unfortunately, as reviewed in Appendix II, the EPA guidance indicates there is not reliable condensable-filterable information available for the major $PM_{2.5}$ emission categories in Oakridge-Westfir.

For example, condensable PM emissions are not an issue associated with mobile sources. The MOVES model used for these sectors produces primary emission estimates for PM, including particle components (e.g., elemental carbon and organic carbon) and gaseous hydrocarbons (e.g., VOC, non-methane organic gases). These pollutant metrics would include both “filterable” and “condensable” PM. These are currently not separable in MOVES, and for SIP inventory purposes, they can be reported as output from MOVES without additional modification. For Residential Wood Combustion, EPA-OAQPS staff confirmed that the condensable requirement for RWC is currently waived for RWC because the data is not available at present, so just the total $PM_{2.5}$ emissions should be reported.

The following table summarizes the unavailability or inapplicability of condensable-filterable information for the major sources of $PM_{2.5}$ emissions in Oakridge-Westfir:

Table 14: Availability and Applicability of PM2.5 Filterable & Condensable Emissions Information.

	2015 Worst Case Day PM2.5 Emissions (lb/day)			
Source Category	**Total $PM_{2.5}$**	**Filterable $PM_{2.5}$**	**Condensable PM2.5**	**Notes**
Residential Wood Combustion	329.8	NA	NA	Not available for RWC.
Onroad Motor Vehicles	22.2	NA	NA	Addressed in MOVES.
Re-Entrained Road Dust	19.2	NA	NA	Not applicable.
Permitted Point Sources	0.0	0.0	0.0	No activity in 2015.
Railroad Locomotives	2.7	NA	NA	Not available.
Other Area Sources	4.7	NA	NA	Not available for vegetative sources.
Total $PM_{2.5}$ Emissions	**379**	**NA**	**NA**	

6. Air Pollution Control Strategies

Residential wood combustion (RWC) emissions have been the major contributor to the historical $PM_{2.5}$ air pollution problems in Oakridge-Westfir and will continue to be the major source of $PM_{2.5}$ emissions in the future, as illustrated in the emission inventories in Figure C of the previous section.

The key long-term RWC strategies have been:

- the woodstove change-out programs replacing uncertified woodstoves with cleaner burning and more efficient home heating units;
- the Oregon and EPA woodstove certification programs requiring any new woodstoves installed since 1986 to be certified woodstoves; and
- the Oakridge ordinance and Oregon Heat Smart law requiring removal of uncertified woodstoves upon home sale.

The key short-term RWC strategies have been:

- mandatory woodburning curtailment program during air stagnation episodes;
- opacity standards to ensure clean burning woodstoves with reduced woodsmoke;
- increased availability of properly seasoned firewood, especially for exempt, low-income, and elderly households;
- expanded public outreach and improved woodstove operation to minimize woodsmoke.

The RWC control strategies from the 2016 Plan will be continued and expanded into the future as part of the Oakridge Air Program described in Appendix V. The city and county ordinances are included in Appendix VI, and the woodburning curtailment protocols are included in Appendix VII.

The key RWC strategies of the Oakridge Air Program described in Appendix V include:

- Home heating upgrades: Weatherization, home repairs, ductless heat pumps, certified woodstove upgrades to 145 homes;
- Expanded code enforcement, public outreach, and educational diversion program for first-time smoke violations;
- Community firewood program to ensure seasoned firewood with a reduced rate for low-income, senior, and disabled residents;
- Community and school education with curriculum by the Middle Fork Willamette Watershed Council in coordination with the Oakridge School District; and
- Air filters to improve HVAC systems of public buildings for community smoke shelters, and portable filters distributed through local health clinics for vulnerable residents, for use during summer wildfire smoke impacts or winter air stagnation woodstove smoke events.

Other emission sources are much less significant than the RWC emissions. Federal control measures on new cars, trucks and locomotives will continue to reduce mobile source emissions in future years, as summarized in Table C of the previous section and described in more detail in Appendix III and Appendix IV.

7. Transportation Conformity

Transportation Conformity addresses air pollution from on-road mobile sources such as cars and trucks. Federal transportation conformity regulations require the evaluation of on-road emissions from transportation plans and projects before their implementation. This ensures that on-road transportation activities will not cause or contribute to a violation of federal air quality health standards, worsen air quality, or delay the improvement of air quality.

The Motor Vehicle Emission Budgets (MVEBs) establish limits on the total emissions allowed from on-road mobile sources such as cars and trucks to ensure that future emissions from on-road mobile sources do not interfere with the continued maintenance of the $PM_{2.5}$ air quality health standards. MVEBs reflect the total on-road $PM_{2.5}$ emissions projected for 2025, 2030 and 2035 on winter weekend days during December, plus a portion of the available safety margin. A conservative margin of safety was added to the MVEB to accommodate uncertainty.

A safety margin is the amount by which the total projected $PM_{2.5}$ emissions from all sources are less than the total $PM_{2.5}$ emissions for the 2015 attainment year, the level required to demonstrate continued maintenance of the standard. A small portion of the inventory safety margin was allotted to the on-road motor vehicle emissions inventory projections to accommodate the wide array of assumptions that are factored into the calculation process. Since assumptions and models change over time, it is necessary to have a margin of safety that will accommodate technical uncertainties due to model updates and inputs into the EPA MOVES model and travel forecasting models, as well as potential changes to regional transportation plans.

The MVEBs for 2015 and future years are included in the following table. The basis for the MVEB safety margin is outlined in Appendix IV, and the major uncertainty factor was the range of VMT growth rates for various parts of Lane County.

Table 15: Oakridge $PM_{2.5}$ Motor Vehicle Emissions Budget (lb/day) for 2015-2035.

Motor Vehicle Emissions Budget (lb/day)		
Year	**Pollutant_Name**	**Worst Case Day**
2015 Total	PM2.5 Exhaust, Brake, Tire	**22.2**
2025 Total	PM2.5 Exhaust, Brake, Tire	**8.2**
2030 Total	PM2.5 Exhaust, Brake, Tire	**7.2**
2035 Total	PM2.5 Exhaust, Brake, Tire	**6.5**

8. Maintenance of Air Quality Health Standards

There are three key commitments to ensure maintenance of air quality health standards through at least 2035:

- Operation of the $PM_{2.5}$ monitoring network during 2021-2035;
- Verification of continued maintenance of the $PM_{2.5}$ air quality health standards; and
- Contingency plan to implement if necessary to ensure maintenance of $PM_{2.5}$ standards.

8.1 Commitment to Continue Air Monitoring Network

LRAPA will continue operation of the $PM_{2.5}$ monitoring network as outlined in the LRAPA Ambient Air Monitoring Network Plan and summarized in Section 4: Air Quality Monitoring of this document. Any modifications to the monitoring network will be done in consultation with Oregon DEQ and EPA Region 10.

8.2 Verification of Continued Maintenance of Standards

LRAPA will continue to provide quality-assured air quality data for the previous calendar quarter to Oregon DEQ to be uploaded to the EPA Air Quality System (AQS) within 60 days of the end of each quarter to verify continued compliance with the NAAQS. LRAPA will flag any days it considers to be influenced by Exceptional Events such as wildfire smoke impacts.

LRAPA will review the air monitoring results and design value each year to verify continued attainment. LRAPA will determine annually if Exceptional Events influenced the continued attainment of the 2006 24-hour $PM_{2.5}$ NAAQS and need to be documented. If needed, Exceptional Events documentation will be coordinated with Oregon DEQ and submitted to EPA Region 10 for review.

8.3 Contingency Plan

The 2016 Plan included contingency strategies that would have gone into effect if the $PM_{2.5}$ standards had not been fully achieved by December 31, 2016. Since the Oakridge-Westfir airshed demonstrated attainment of the 3-year $PM_{2.5}$ standards during 2014-2016 by the December 31, 2016 attainment date, the contingency plan did not need to be implemented.

Therefore, the same contingency plan is included in this $PM_{2.5}$ Maintenance Plan. If the $PM_{2.5}$ design value in future years indicates violation of the 2006 24-hour $PM_{2.5}$ standard (35 µg/m^3), after consideration of any Exceptional Events, the following contingency strategies, or equivalent, will be implemented by LRAPA and the City of Oakridge:

- Stricter green-yellow-red advisory program, with more red advisory days each winter, by reducing the red advisory thresholds by 3 µg/m^3 $PM_{2.}$; this is projected to increase the average number of potential red advisory days by three to five additional days per year.
- Prohibition of fireplace use on yellow advisory days (in addition to the existing prohibition on red advisory days).

While these measures do not need to be fully adopted by LRAPA prior to the occurrence of a NAAQS violation, LRAPA commits to adopt and implement the necessary contingency measures as expeditiously as possible. LRAPA will require adoption of the contingency measures no later than six months and implementation of such corrective action no later than one year after a violation based on confirmed quality assured data. Any contingency measures adopted and implemented will become part of the next revised maintenance plan submitted to the EPA for approval.

LRAPA will evaluate all appropriate data to determine the cause of the elevated levels of PM2.5, and whether the elevated levels are likely to continue. This may include air quality data, meteorological data, evaluation of wood smoke programs, information on unusual weather events (e.g., wildfires or winter power outages), and other data to try to determine the cause of the violation. This evaluation will occur within three months of the determination of a violation. Where appropriate, LRAPA will follow the EPA exceptional events rules and guidance if it is determined that an exceptional event contributed to the violation.

Using these contingency strategies to increase curtailment effectiveness is expected to reduce RWC emissions by about 42 lb/day and reduce $PM_{2.5}$ concentrations by an additional 2.8 µg/m^3 on worst case days, as outlined in the 2016 Plan.

9. Redesignation to Attainment

As outlined in Section 3: Redesignation Requirements of this document, the EPA approval of this maintenance plan and redesignation request will satisfy the final requirements of the federal Clean Air Act in Section 107 [CAA §107(d)(3)(E)] and the Oakridge-Westfir NAA will then have a fully approved maintenance plan ensuring continued attainment of standards for at least ten years beyond redesignation.

This would begin a 20-year planning cycle designed to ensure that the Oakridge-Westfir airshed remains in continued attainment with the national $PM_{2.5}$ air quality health standards. This maintenance plan covers the first ten years of that planning cycle. The Clean Air Act requires a second 10-year maintenance plan in the future to complete the 20-year planning cycle.

MLH/MKH:rcr (10/07/2021)

Appendix I: Ambient Air Quality Data Review

Oakridge-Westfir $PM_{2.5}$ Maintenance Area

March 2021

Lane Regional Air Protection Agency (LRAPA)

Monitoring of Particulate Matter (PM) in the Oakridge-Westfir Area

The Oakridge air monitoring station (Site Code WAC, AQS #410392013) has been located at the Willamette Activity Center (WAC) in the southwest portion of the city of Oakridge since 1989. Saturation monitoring studies have demonstrated the monitor is located in the area of maximum emissions and PM concentrations. The WAC station is part of the SLAMS (State and Local Air Monitoring Stations) network and meets all siting requirements and criteria for the monitoring objective of maximum population exposure at the neighborhood spatial scale. LRAPA is committed to continued operation of the air quality monitors at the Oakridge site, consistent with the ODEQ Annual Air Monitoring Network Plan.

The WAC sampling method for $PM_{2.5}$ has historically been the filter-based Federal Reference Method (FRM) operating on an every-3rd-day schedule. The current parameters measured at the WAC station include:

- PM_{10} with Federal Equivalent Method (continuous beta attenuation method),
- $PM_{2.5}$ with Federal Equivalent Method (continuous beta attenuation method),
- $PM_{2.5}$ with Federal Reference Method (FEM collocation requirement),
- Nephelometer (continuous optical backscatter),
- Wind Speed and Direction (continuous ultrasonic),
- Temperature (continuous platinum RTD at 2 meters and 10 meters height),
- Barometric Pressure (continuous electronic barometer), and

- Solar Radiation (continuous pyranometer).

Additional details, photos, and maps are included in the annual LRAPA Ambient Air Monitoring Network Plan; the following photos are taken from that Network Plan.

Oakridge WAC Air Monitoring Station. **WAC Station Location.**

Quality-assured data is submitted quarterly by LRAPA to ODEQ and EPA within 60 days of the end of each calendar quarter.

The reporting of Oakridge PM concentrations was straightforward through 2016. Oakridge air quality in 2014-2016 met the national ambient air quality health standard (NAAQS) for $PM_{2.5}$ as projected in the Oakridge 2016 $PM_{2.5}$ Attainment Plan ("2016 Plan"). The 2016 Plan was adopted by the LRAPA Board of Directors on November 10, 2016, approved and incorporated into the State Implementation Plan (SIP) by the Oregon Environmental Quality Commission (EQC) on January 18, 2017. Residential Wood Combustion (RWC) emissions from certified and non-certified woodstoves, fireplaces and pellet stoves were identified as the major source of $PM_{2.5}$ emissions on worst winter days contributing to violation of the $PM_{2.5}$ air quality standards. The U.S. Environmental Protection Agency (EPA) approved the 2016 Plan on February 18, 2018 [83 FR 5537] effective March 12, 2018; the EPA approval included a finding of attainment and a clean data determination based on the 2014-2016 $PM_{2.5}$ concentrations.

Exceptional Events

However, large wildfires in Oregon and nearby states in 2017, and again in 2020, resulted in many major wildfire smoke impacts in Oakridge and other Oregon communities that required documentation and submittal to EPA for review and approval as Exceptional Events. The LRAPA annual reports in 2017-2019 were expanded to include the $PM_{2.5}$ data with and without the days flagged as having had major wildfire smoke impacts. Pages 20 and 21 in the LRAPA 2019 Annual Report summarize the 2010-2019 concentrations without and with wildfire impacts. Similarly, page 29 of the 2020 Oregon Annual Ambient Criteria Pollutant Air Monitoring

Network Plan summarizes the 2017-2019 design values in Oakridge and other Oregon communities without and with wildfire impacts.

The Exceptional Events (EE) rule and guidance developed by EPA, in consultation with other agencies and the public, is intended to prevent penalizing communities for events outside their control. State and local air agencies may identify (or flag) days they believe have been influenced by exceptional events, such as wildfire smoke, and submit a demonstration for EPA concurrence, however, EPA can only allow exclusion of exceptional events that have "regulatory significance." This means that EPA may not be able to approve all the flagged EE days submitted by local, or state agencies, and can result in a third set of data residing in EPA's Air Quality System (AQS); the AQS data will be less than or equal to the data with wildfire impacts, and greater than or equal to the data with all wildfire impacts removed as EEs.

State and local air agencies now have considerably more extensive experience with EEs during wildfires. It is LRAPA's recommendation that the EPA, and state and local air agencies, reevaluate the EE rule and guidance. But in the meantime, LRAPA will refer to the following four sets of air quality data for the Oakridge area for recent years:

1. Complete data including flagged wildfire impact days. This data compilation is important to report because it reflects the air pollution impacts experienced by the community. But it could penalize the community with nonattainment restrictions for events outside their control, which the EE guidance is intended to avoid.
2. Data with all flagged wildfire impact days removed. This data compilation best illustrates the air quality improvement trends from successful implementation of the air pollution control strategies in the attainment plan.
3. Data with flagged wildfire impact days removed only if they have regulatory significance (AQS). This data compilation protects the community from being penalized with some nonattainment restrictions for events outside their control, but it can confuse the air quality improvement trends and can change over time due to the form of the 3-year design value. It can also cause other complications in monitoring costs, new source review, and economic development.
4. Further AQS variations based on the timing of EE exclusions. If EEs in the most recent year are reviewed by local and state agencies and EPA in a timely manner, the regulatory significance will be based on the most recent three years (i.e., the most recent year plus the two previous years). But the regulatory significance may change over the next two years. That was the case during the review of EEs in 2017. The final determination of EEs in 2017 was based on the 3-year average 98^{th} percentiles not only for 2015-2017, but also for 2016-2018 and 2017-2019. Similarly, EPA's initial determination of EEs in 2020 will probably be based on regulatory significance in 2018-2020, but may need to be updated for regulatory significance in 2019-2021 and 2020-2022.

Further discussion is outside the scope of this appendix; this is intended to explain why four sets of data are provided in this appendix. The following series of four tables summarize the

2000-2020 data. The 3-year design values coded in gray denote the data prior to the EPA adoption of the 35 ug/3 standard in 2006. (Prior to 2006, the NAAQS was 65 ug/m3.) Red denotes violation of the 35 ug/m3 NAAQS; green indicates attainment of the 35 ug/m3 NAAQS; yellow indicates violation of the 35 ug/m3 NAAQS due to flagged exceptional events due to wildfire smoke impacts.

Table A. Complete Oakridge data including flagged wildfire smoke impact days.

Year	98th-%-ile	Design Value																		
		2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
2000	52.0																			
2001	59.5	56																		
2002	55.4		56																	
2003	53.3			52																
2004	46.1				53															
2005	58.4					48														
2006	38.6						47													
2007	42.7							41												
2008	42.2								42											
2009	41.2									39										
2010	33.0										39									
2011	42.0											38								
2012	38.4												40							
2013	41.0													40						
2014	41.1														37					
2015	28.9															31				
2016	21.7																46			
2017	86.2																	47		
2018	33.2																		52	
2019	36.7																			86
2020	189.5																			

Legend:
Gray indicates compliance with 1997 NAAQS (65 ug/m3) but not compliance with later 2006 NAAQS (35 ug/m3).
Red indicates violation of 2006 NAAQS (35 ug/m3).
Green indicates attainment of 2006 NAAQS (35 ug/m3).
Yellow indicates EE review still needed.

Table B. Oakridge data with all flagged wildfire smoke impact days removed.

Year	98th %ile	Design Value 2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
2000	52.0																			
2001	59.5	56																		
2002	55.4		56																	
2003	53.3			52																
2004	46.1				53															
2005	58.4					48														
2006	38.6						47													
2007	42.7							41												
2008	42.2								42											
2009	41.2									39										
2010	33.0										39									
2011	42.0											38								
2012	38.4												40							
2013	41.0													40						
2014	41.1														37					
2015	28.9															31				
2016	21.7																29			
2017	35.7																	29		
2018	28.6																		34	
2019	36.7																			31
2020	26.2																			

Legend:
Gray indicates compliance with 1997 NAAQS (65 ug/m3) but not compliance with later 2006 NAAQS (35 ug/m3).
Red indicates violation of 2006 NAAQS (35 ug/m3).
Green indicates attainment of 2006 NAAQS (35 ug/m3).

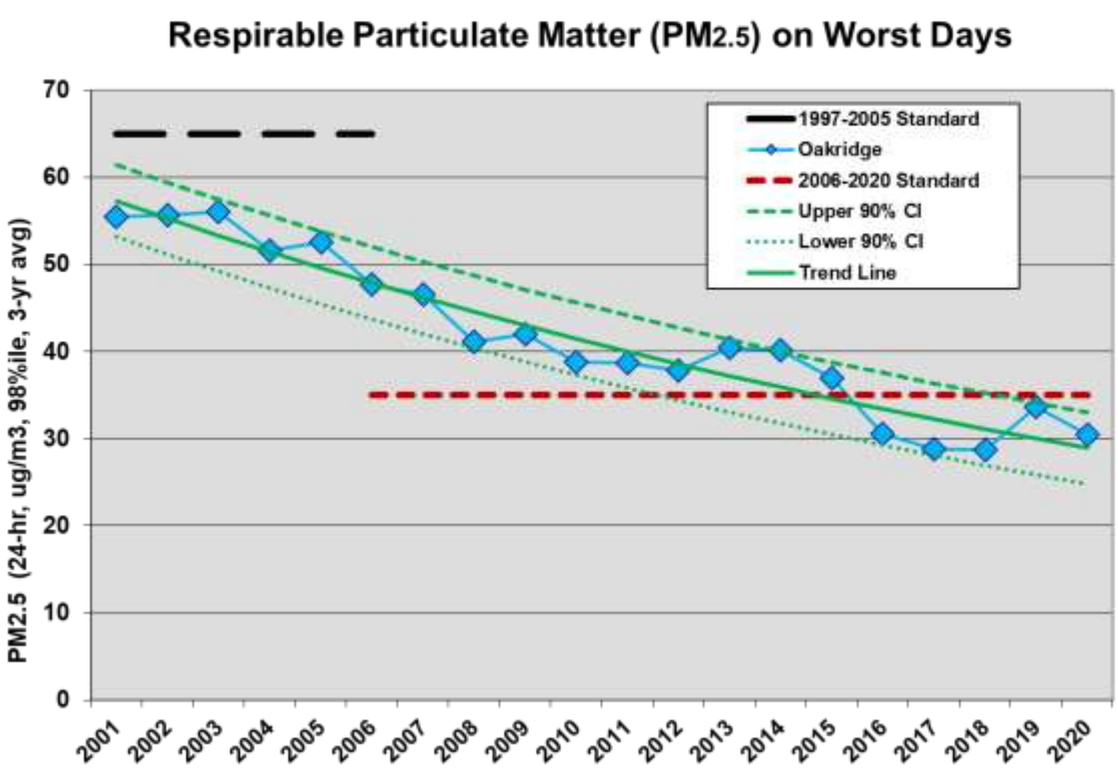

Figure 1. Oakridge data (from Table B) with all flagged wildfire smoke impact days removed.

Table C. Oakridge data with 2017 regulatory significant EEs removed (current AQS).

		Design Value																		
Year	98th-%-ile	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
2000	52.0																			
2001	59.5	56																		
2002	55.4		56																	
2003	53.3			52																
2004	46.1				53															
2005	58.4					48														
2006	38.6						47													
2007	42.7							41												
2008	42.2								42											
2009	41.2									39										
2010	33.0										39									
2011	42.0											38								
2012	38.4												40							
2013	41.0													40						
2014	41.1														37					
2015	28.9															31				
2016	21.7																29			
2017	35.7																	30		
2018	33.2																		35	
2019	36.7																			86
2020	189.5																			

Legend:
Gray indicates compliance with 1997 NAAQS (65 ug/m3)
but not compliance with later 2006 NAAQS (35 ug/m3).
Red indicates violation of 2006 NAAQS (35 ug/m3).
Green indicates attainment of 2006 NAAQS (35 ug/m3).
Yellow indicates EE review still needed.

Table D. Oakridge data with 2017 and 2020 regulatory significant EEs removed (future AQS).

Year	98th-%-ile	Design Value																		
		2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	2015-2017	2016-2018	2017-2019	2018-2020
2000	52.0																			
2001	59.5	56																		
2002	55.4		56																	
2003	53.3			52																
2004	46.1				53															
2005	58.4					48														
2006	38.6						47													
2007	42.7							41												
2008	42.2								42											
2009	41.2									39										
2010	33.0										39									
2011	42.0											38								
2012	38.4												40							
2013	41.0													40						
2014	41.1														37					
2015	28.9															31				
2016	21.7																29			
2017	35.7																	30		
2018	33.2																		35	
2019	36.7																			34
2020	32.9																			

<u>Legend</u>:
Gray indicates compliance with 1997 NAAQS (65 ug/m3)
but not compliance with later 2006 NAAQS (35 ug/m3).
Red indicates violation of 2006 NAAQS (35 ug/m3).
Green indicates attainment of 2006 NAAQS (35 ug/m3).

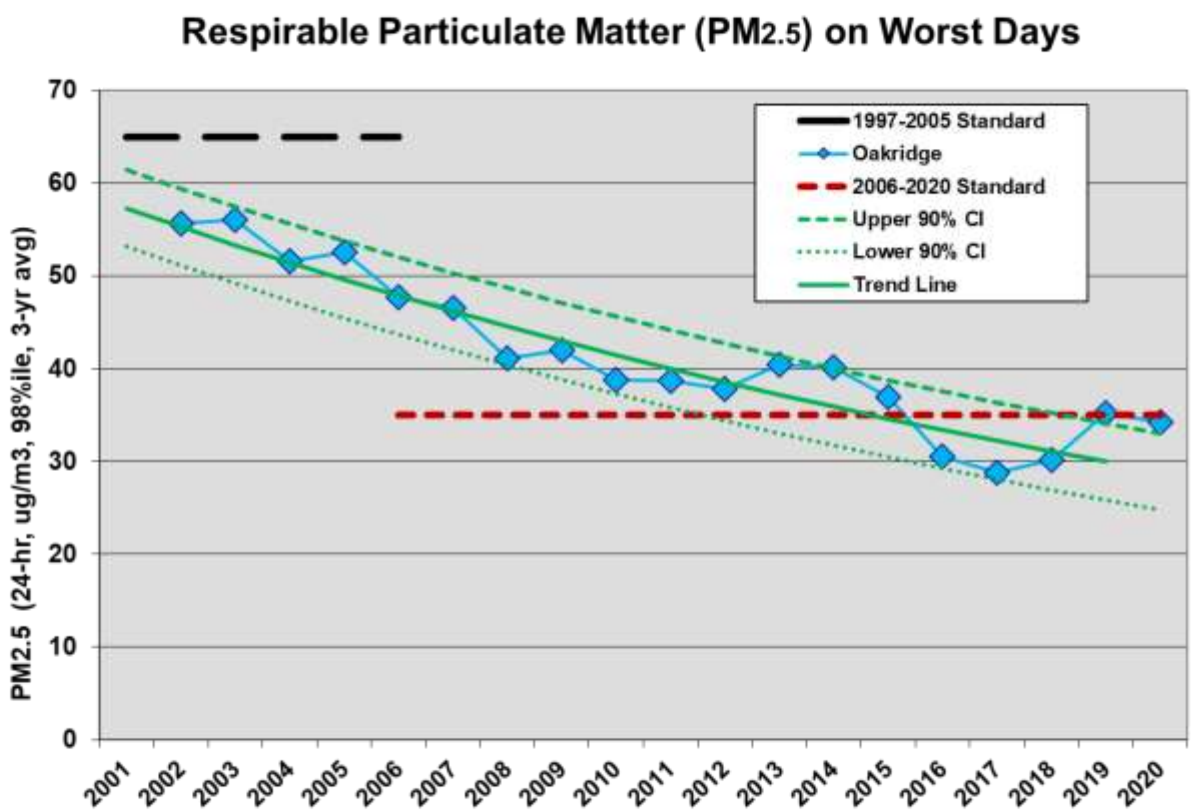

Figure 2. Oakridge data with 2017 and 2020 regulatory significant EEs removed (future AQS).

Conclusions

LRAPA believes that Table B (illustrated in Figure 1) best indicates the air quality improvement trend reflecting the progress of the Oakridge-Westfir Attainment Plan. Table A best describes the air pollution impacts on residents of the Oakridge airshed, including the major wildfire smoke impacts in 2017 and 2020.

Tables C and D reflect the AQS data after EPA's approved of EEs based on regulatory significance. EPA's approval of EEs based on regulatory significance protects the community from being penalized with some nonattainment restrictions for events outside their control, but it does not recognize the full emission reductions and air quality improvements achieved by the Oakridge-Westfir Attainment Plan. EPA can only concur on flagged data that brings the design value to 35 ug/m3 and not below that. As a result, the regulatory significance requirement results in design values at or just below the 35 ug/m3 NAAQS regardless of how effective the Oakridge-Westfir Attainment Plan has been or will be in the future.

For completeness, all four data sets are included here for review. LRAPA will continue to use Table B (illustrated in Figure 1) for describing the progress of the Oakridge-Westfir Attainment Plan. Unless and until EPA revises the EE guidance regarding regulatory significance, Table D (as illustrated in Figure 2) will probably determine EPA's basis for approval of the redesignation request and maintenance plan.

LG:MLH:mlh (03/30/2021)

LRAPA
Lane Regional Air Protection Agency

Appendix II: $PM_{2.5}$ Emission Inventory for 2015 Base Year

Oakridge-Westfir $PM_{2.5}$ Maintenance Area Emission Inventory for 2015 Base Year

October 7, 2021

Lane Regional Air Protection Agency
1010 Main Street
Springfield, Oregon 97477

Updating Base Year to 2015 Emission Inventory (from 2008)

The 1990 Clean Air Act contains provisions on the required development of emission inventories for designated areas that failed or have failed in the past to meet the National Ambient Air Quality Standards (NAAQS). The Oakridge-Westfir Nonattainment Area (NAA) is a designated NAAQS $PM_{2.5}$ nonattainment area. This emission inventory is provided as a part of the State of Oregon revisions to its State Implementation Plan (SIP) to formulate a strategy to maintain the NAAQS.

The $PM_{2.5}$ emission inventories for the Oakridge area for 2008 (Base Year) and 2015 (Attainment Year) were included in the Oakridge 2016 $PM_{2.5}$ Attainment Plan ("2016 Plan"). The 2016 Plan was adopted by the LRAPA Board of Directors on November 10, 2016, approved and incorporated into the State Implementation Plan (SIP) by the Oregon Environmental Quality Commission (EQC) on January 18, 2017, and approved by the U.S. Environmental Protection Agency (EPA) on February 8, 2018 [83 FR 5537] effective March 12, 2018. Residential Wood Combustion (RWC) emissions from certified and non-certified woodstoves, fireplaces and pellet stoves were identified as the major source of $PM_{2.5}$ emissions on worst winter days contributing to violation of the national ambient air quality health standard (NAAQS) for $PM_{2.5}$.

The principal components for development and documentation for the 2015-2035 Oakridge-Westfir $PM_{2.5}$ Maintenance Plan emission inventories have been addressed in this document, which includes stationary permitted point sources, stationary area (non-permitted) sources, non-road mobile sources (railroads), on-road mobile sources, and emissions summaries. Inventory years include review and confirmation (or updated revision) of the 2015 attainment year emission inventory as the new base year for the maintenance plan attainment year, and then the projected 2025-2035 emission inventories for the maintenance period. The geographic boundary for each inventory is the Oakridge-Westfir NAA, as defined by the NAA boundary in the 2016 Plan.

In this document the terms *annual*, *typical season day*, and *worst-case day* emissions are used to categorize the estimated emissions for a particular time period. The annual emissions are a total amount of emissions for the source category that occurred throughout the year, represented in tons per year (tpy). The typical season day emissions represent an average daily emission value occurring from November 1st through the end of February. This four-month time period is considered to be the PM season, and is when the PM standard is usually violated. The worst-case day emissions are the highest daily emissions estimated for the PM season, and represent a day during the PM season when emissions generating activity is at its highest. For emission inventory purposes, the worst-case day is equivalent to the 98th-percentile design value (DV) day. Typical season day and worst-case day emissions are represented in pounds per day (lbs/day).

The emission calculation protocols are included in the supporting documents for the 2016 Plan, and the prior 2012 Oakridge-Westfir $PM_{2.5}$ Attainment Plan ("2012 Plan"), and are not duplicated here. The 2008-2011-2014 National Emission Inventories (NEIs) for Lane County were used as the starting point for calculating both $PM_{2.5}$ emissions and $PM_{2.5}$ precursor emissions for the Oakridge-Westfir $PM_{2.5}$ nonattainment area. The initial Oakridge-Westfir emissions were estimated by applying appropriate emission allocation factors (e.g., relative population, housing, vehicle miles of travel, land area, etc.) to the Lane County $PM_{2.5}$ and precursor emission categories. The significant (and insignificant) source categories during the winter $PM_{2.5}$ problem season were identified in Appendix D-5 of the 2012 Plan.

Secondary particulate is an overall very minor contributor to the Oakridge $PM_{2.5}$ air pollution concentrations on worst winter days as summarized in both the 2012 Plan and the 2016 Plan. Each of the precursor groups (nitrates, sulfates, ammonia, and volatile organic compounds [VOC])) was determined in the 2016 Plan to be below the EPA Region 10 insignificance threshold of 1.3 ug/m3:

- Nitrate + ammonia = 0.16 ug/m3 + 0.01 ug/m3 = 0.17 ug/m3 < 1.3 ug/m3.
- Sulfate = 0.43 ug/m3 < 1.3 ug/m3.
- VOC = 1.17 ug/m3 < 1.3 ug/m3.

Therefore, the LRAPA emission inventory analysis focused in most detail on the significant $PM_{2.5}$ particulate sources during the winter season in Oakridge-Westfir, notably residential woodburning emissions from woodstoves, fireplaces and pellet stoves.

Description of Maintenance Area

Oakridge, Oregon lies in an alluvial plain in the foothills at the southern end of the Willamette River valley. The city is in Lane County, Oregon, approximately 45 miles east-southeast of Eugene, and 28 miles west of Willamette Pass, the summit of the Cascade Mountain Range.

The city limits of present-day Oakridge include the historic City of Oakridge and, directly west, the area formerly known as Willamette City. Figure 1 shows the location of Oakridge in Lane County; **Error! Reference source not found.** shows the map of the Oakridge-Westfir non-attainment area.

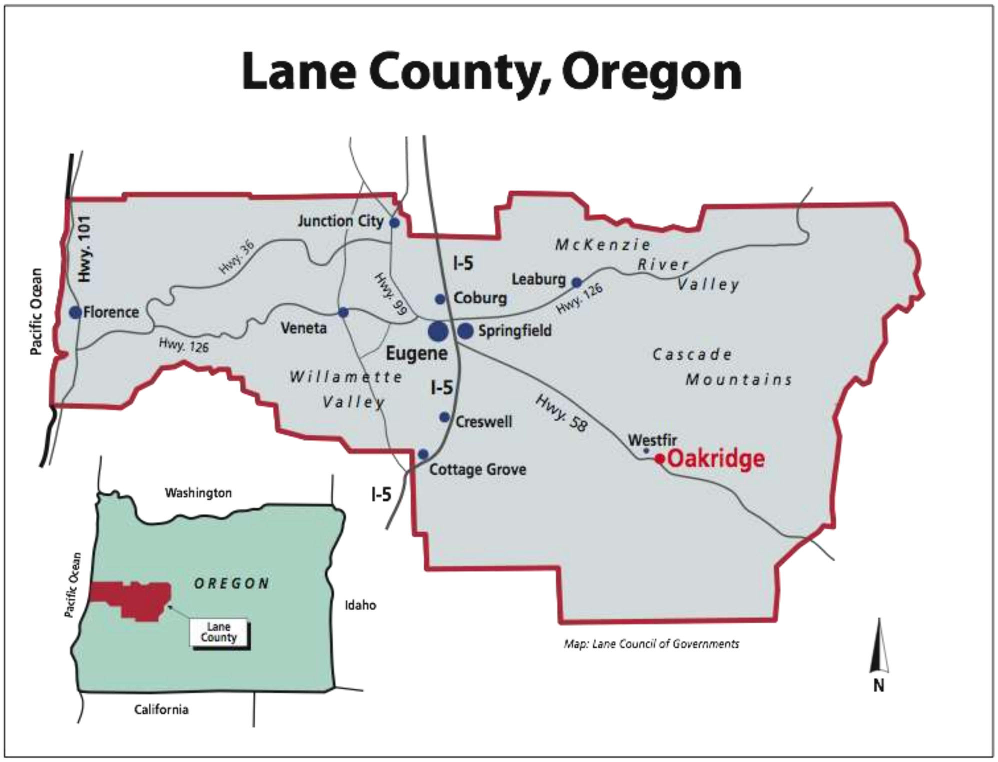

Figure A: Oakridge Location in Lane County, Oregon.

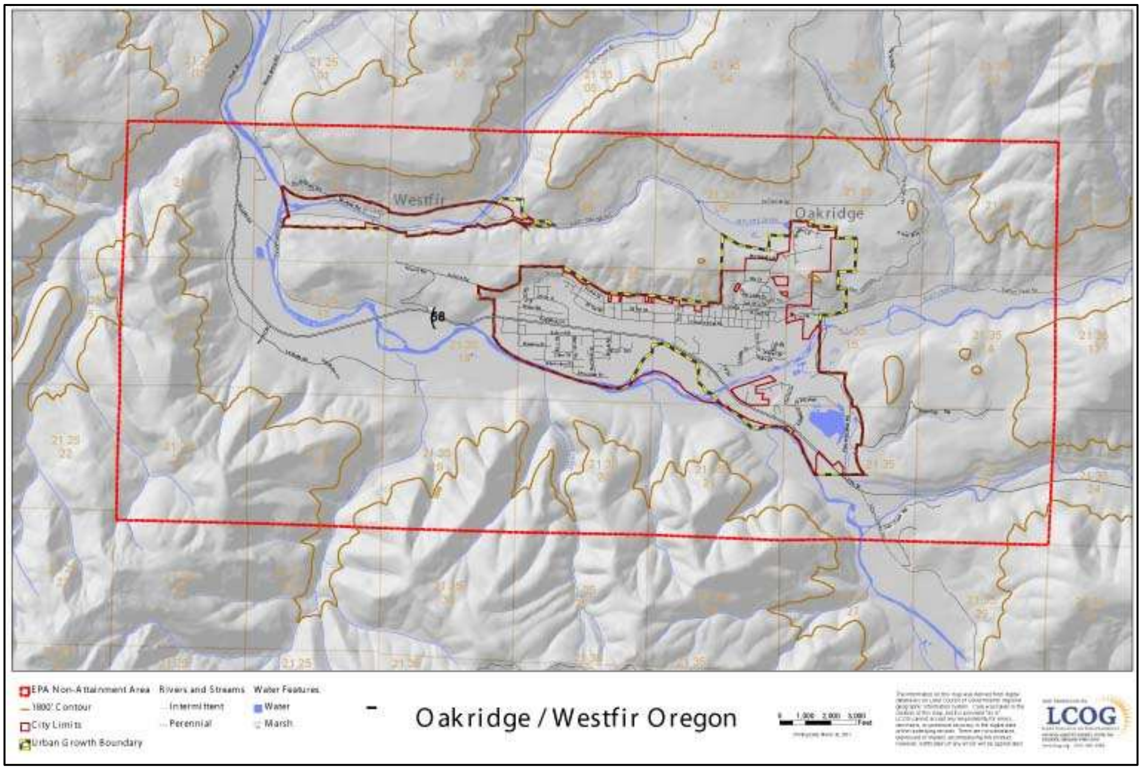

Figure B: $PM_{2.5}$ Nonattainment Area Map.

The City of Oakridge is situated in a valley oriented east-west, through which flows the middle fork of the Willamette River. Elevation of the area ranges from 1100 feet at the lower (west) end to 1600 feet with areas of densest population situated between 1100 feet and 1200 feet. Mountains rise on the north and south sides to 1700 feet and 1600 feet, respectively.

Westfir is a very small (population 335) isolated rural mountain community that is located along the north fork of the Willamette River about one mile NW of Oakridge. Its elevation is about the same as Oakridge and it is surrounded by the same high mountains. Westfir and Oakridge are in separate steep sided river valleys separated by a 400-foot ridge. The Westfir valley is very narrow, only about a quarter mile across at its widest point, while the Oakridge valley is about one mile across at its widest point.

2016 Attainment Plan Base Year Emission Inventory (2008)

The base year emission inventory was used as the starting point for the attainment demonstration in the 2016 Plan. This inventory included sources in the nonattainment area during the 2008 baseline year. The 2008 emission inventory is summarized in Figure C.
The emissions inventory on worst winter days is of most interest since the $PM_{2.5}$ concentrations measured in Oakridge did not meet the current 24-hour $PM_{2.5}$ standard during 2006-2008 and the peak $PM_{2.5}$ concentrations occur on cold, stagnant days during the November-February wood-heating season.

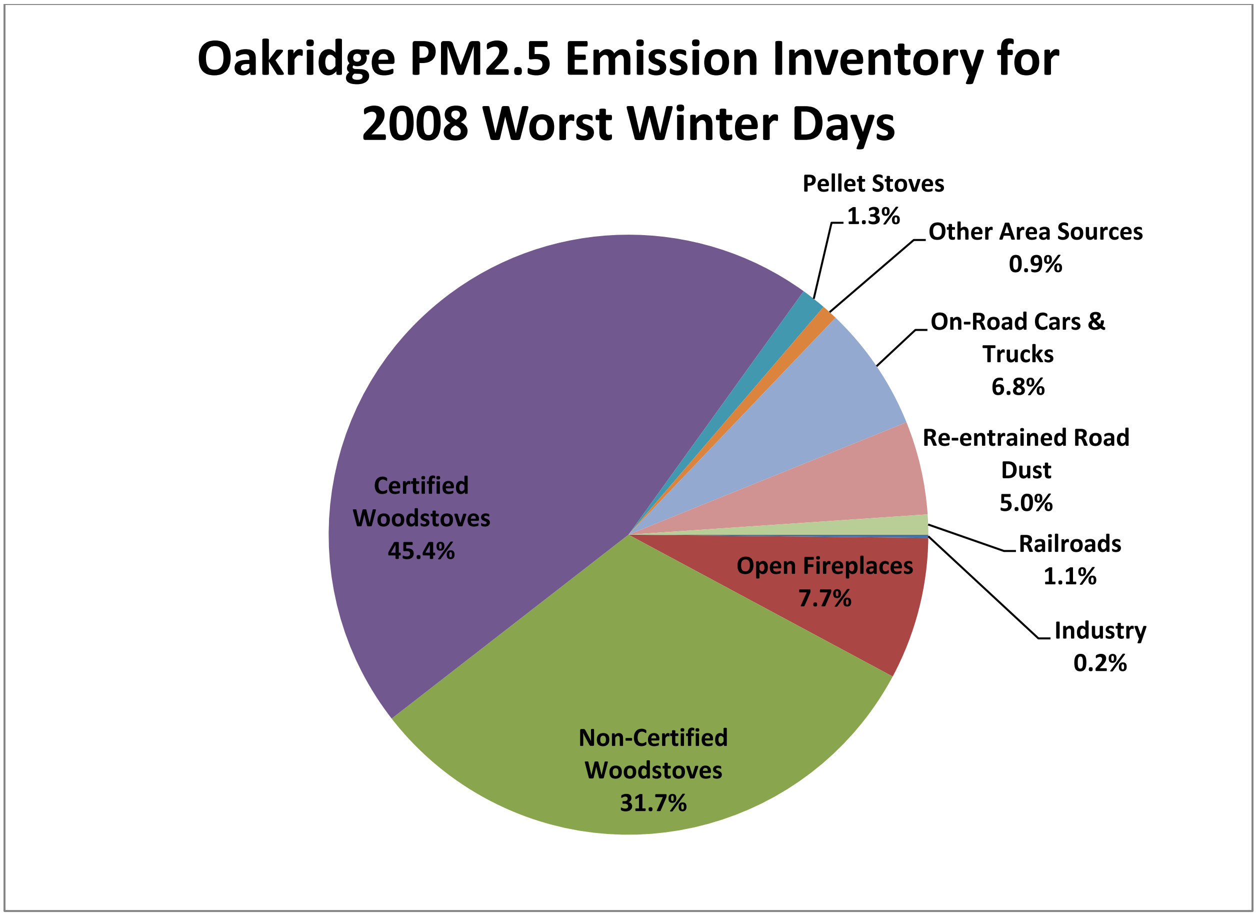

Figure C: **Oakridge $PM_{2.5}$ Emission Inventory for 2008 Worst Winter Days**

Residential wood-heating emissions (from certified and non-certified woodstoves, fireplaces, and pellet stoves) accounted for about 86% of the emissions on worst winter days in the 2008 Base Year, as illustrated in Figure C.

2016 Attainment Plan Attainment Year Emission Inventory (2015)

The attainment year inventory is the emission inventory for the 2015 year that the area attained the $PM_{2.5}$ standard (2014-2016). The attainment year emission inventory was based on the 2008 emissions inventory, growth between 2008 and 2015, and the emission reduction strategies that were implemented during 2008-2015.

The 2008 base year emission inventory and the projected 2015 emission inventory in the 2016 Plan estimated that the Worst Case Day emissions would be reduced from 552 lb/day to 397 lb/day during 2008-2015, and the $PM_{2.5}$ concentration would be improved from 39.5 µg/m^3 in 2008 (based on the 2006-2010 Design Value) to 29.3 µg/m^3 by 2015. In hindsight, the projected 2015 emission inventory was reasonably accurate, but additional refinements have been made to the 2015 emission inventory to represent actual 2015 emissions and to provide the new base year for the maintenance plan.

2016 Attainment Plan Comparison of 2008 to 2015 Emissions

The emission inventory shows an overall decrease in emissions for the attainment year (2015) based on the effectiveness of the emission control strategies.

In Oakridge, the worst-day $PM_{2.5}$ concentration in the 2006-2010 baseline period (i.e., the Design Value) was 39.5 micrograms per cubic meter ($\mu g/m^3$). The emission reductions between the 2008 Base Year and the 2015 Attainment Year needed to be sufficient to reduce the worst-day $PM_{2.5}$ concentration to less than 35 $\mu g/m^3$ as a 3-year average by 2014-2016.

The differences in the 2008 and 2015 emission inventories are the combination of increases due to growth factors and decreases due to emission control strategies. For example, motor vehicle emissions decreased overall due to progressively cleaner gasoline and diesel fuels and motor vehicles, but part of the emissions decrease was offset by gradual growth in traffic volumes. Industry emissions were conservatively increased to reflect operation at maximum capacity in 2015, but both industrial sources are minor so this did not have a major effect on the 2015 inventory. The most significant category is residential wood-heating; emissions were increased to reflect population growth during 2008-2015, decreased due to non-certified woodstove replacements with cleaner burning units during 2009-2014, and decreased due to improvements in the programs for curtailment during stagnant air episodes.

The long-term programs to replace non-certified woodstoves with cleaner burning units have been critical to the significant improvement in Oakridge $PM_{2.5}$ concentrations during 2000-2015. In addition, the combined emission reduction of these programs more than offset the growth in population and housing between 2008 and 2015, with a net RWC emission reduction of about 35 lb/day on typical season days and 38 lb/day on worst-case days.

The key short-term RWC strategy is a strengthened mandatory curtailment program to reduce fireplace and woodstove emissions by 25% on red days. The number of red days varies by year based on weather and meteorology, and should decrease over time due to the success of the long-term emission reduction programs; the baseline number of red days was an average of 20 red days per year (based on the number of days above 30 $\mu g/m^3$ $PM_{2.5}$ during 2005-2011). This reduced RWC emissions by 107 lb/day and reduced future $PM_{2.5}$ concentrations below the 35 $\mu g/m^3$ $PM_{2.5}$ standard on worst-case days during 2014-2016.

The emission reductions between the 2008 Base Year and the 2015 Attainment Year were modeled to reduce the worst-day $PM_{2.5}$ concentration from 39.5 $\mu g/m^3$ in 2008 (based on the 2006-2010 Design Value) to 29.3 $\mu g/m^3$ by 2015. As published in the 2016 LRAPA Annual Report and certified in EPA's Air Quality System (AQS) database, the 98th percentile $PM_{2.5}$ concentration measured in Oakridge during calendar year 2015 was 28.9 $\mu g/m^3$ and the 3-year 98th percentile $PM_{2.5}$ concentration in 2014-2016 was 31 $\mu g/m^3$; these measured levels confirmed that the projected 2015 $PM_{2.5}$ emission inventory was reasonable and demonstrated attainment by the December 31, 2016 attainment date.

Review and Confirmation of 2015 Emission Inventory

The 2015 emission inventory will be the new Base Year Emission Inventory for maintenance planning purposes. The 2015 emission inventory in the 2016 Plan was reevaluated with the benefit of emission information available subsequent to the preparation of the initially projected 2015 inventory. A few minor adjustments, based on more current and accurate information, have been made to the 2015 $PM_{2.5}$ emission inventory as discussed in the following sections.

Industrial Point Sources

LRAPA maintains data on industrial point source emissions in Lane County. The two existing industrial sources in the Oakridge-Westfir area are minor industrial sources of $PM_{2.5}$ emissions. The facilities are a portable rock crusher and a ready-mix concrete plant owned and operated by Oakridge Sand & Gravel.

These two minor sources together emit less than one ton per year of $PM_{2.5}$ emissions and contribute less than 1% to the base year and future year emission inventories. These two minor sources are well below the LRAPA significant emission rate (SER) for $PM_{2.5}$ of 10 tons per year. The Reasonably Available Control Technology requirements and emission factors are reviewed in the 2016 Plan.

The initial 2015 attainment year emissions for these two facilities were conservatively based on the maximum allowable production rates identified in the facility permit applications and the LRAPA-issued permits. The typical season day emissions were based on the annual maximum production capacity and the worst-day emissions were based on the daily maximum production capacity. The rock crusher has a production capacity of 3,600 tons per day (potential $PM_{2.5}$ emissions of 4 lb/day) and 300,000 tons per year (potential $PM_{2.5}$ emissions of 360 lb/year). The ready-mix concrete plant has a production capacity of 480 cubic yards per day (potential $PM_{2.5}$ emissions of 14 lb/day) and 30,000 cubic yards per year (potential $PM_{2.5}$ emissions of 90 lb/year).

The Oakridge Sand & Gravel ready-mix concrete plant and rock crusher did not operate in Oakridge in 2015; any rock crushing was done at the Hale Valley quarry site near Noti, Oregon, which is 50+ miles distant from Oakridge. Therefore, the actual concrete plant and rock crusher emissions in 2015 were zero and the 2015 emission inventory has been adjusted accordingly.

Residential Wood Combustion

Residential wood combustion (RWC) is a common way to heat homes in Oregon. As outlined under the general growth projections, the Lane Council of Governments (LCOG) periodically updates and summarizes the demographic information for Oakridge, Westfir and other Lane County communities, based on American Community Survey (ACS) data from the U.S. Census Bureau. The 2018 ACS data indicates 1,791 total housing units in Oakridge, of which 1,433 are occupied, with electric heat as the primary heat source in 1,027 of the occupied housing units, wood as the primary heat source in 340 of the occupied housing units, and 66 occupied housing units using other fuel or none. Similarly, the Westfir ACS data indicates 131 total housing units, of which 121 are occupied, with electric heat as the primary heat source in 66 of the occupied housing units, wood as the primary heat source in 39 of the occupied housing units, and 16 occupied housing units using other fuel or none. Home heating sources other than electricity or wood are considered insignificant, with the number of estimated units less than the margin of error in the ACS survey; for example, the estimated number of "other fuel" in Oakridge in 2018 was 15 homes, but the margin or error was +/- 28 homes.

Natural gas is not available in Oakridge-Westfir, thus the reliance on electricity and wood for most home heating. More detailed home wood heating surveys have been done during 2009-2015 by LRAPA, DEQ and the South Willamette Forest Collaborative (SWFC) in Oakridge to provide more details on primary and secondary use of wood for home heating, average number of cords burned per year, certified and non-certified woodstoves, pellet stoves, etc. The composite result of the various surveys is that most homes in Oakridge-Westfir rely on some combination of electricity and wood (primary or secondary) for home heating.

The various surveys provided LRAPA with information on how many homes use various types of wood-heating devices, the amount of wood burned, and other information on wood-heating practices. The Oakridge wood use was updated for the 2015 attainment year (the new base year for the maintenance plan) as summarized in the following table. The wood use numbers in 2015 (calculated in 2016) still appear reasonable and no adjustments were made to the RWC emissions in the 2015 emission inventory.

Table A: Oakridge 2015 Residential Wood Use.

Woodburning Device	2015 Wood Fuel Use (Households)	2015 Wood Fuel Use (tons/HH)	2015 Wood Fuel Use (tons/year)
Oakridge NAA			
21-04-008-100 Fireplace without Insert	123	1.6	195.6
21-04-008-320 Certified Non-Cat Wood-Stove	287	3.0	846.9
21-04-008-330 Certified Cat Wood-Stove	62	3.0	183.0
21-04-008-310 Conv Wood Stove	66	3.0	194.8
21-04-008-230 Fireplace Insert Cert Catalyst	27	3.0	79.7
21-04-008-220 Fireplace Insert Cert Non-Cat	125	3.0	368.9
21-04-008-210 Fireplace Insert Conv.	78	3.0	230.2
21-04-008-400 Exempt Pellet Stove	238	1.2	276.1
21-04-008-510 Central Furnace	0	0.0	0.0
Total	1,006		2,375

The LRAPA 2009-2010 survey report, data, and additional RWC emission calculation details are included in the 2012 Plan and 2016 Plan.

Other Area Sources

The only other area source category with potential significant emissions is outdoor burning. Outdoor burning is banned in Lane County for fire safety reasons during the June-September fire season and is banned in Oakridge for air quality reasons during November-February. There are 1,756 households in the Oakridge-Westfir nonattainment area. The LRAPA survey indicates that 28% of the households (about 492 households) burn yard debris (weighted average of 3 cubic yards per household) during the Fall and Spring months. The yard debris is a mix of leaves and brush with an estimated average density of 312.5 pounds per cubic yard using conversion factors (250-375 lb/yard) from OAR 340-097-0110. AP-42 emission factors are 17-38 lb/ton, or an average of 27.5 lb/ton. The total amount of yard debris burned is calculated to be 230.6 tons per year with $PM_{2.5}$ emissions of 3.2 tons per year. Typical season days emissions are calculated to be 47.4 lb/day on the approximately 135 days per year during the Spring and Fall burning seasons. Although outdoor burning is banned during November-February, LRAPA and

Oakridge occasionally receive complaints of outdoor burning on banned days, so outdoor burning emissions are conservatively calculated at 10% (4.7 lb/day) on worst-case days during November-February. No adjustments were made to the outdoor burning emissions in the 2015 emission inventory.

Mobile and Nonroad Sources

The U.S. Environmental Protection Agency's (EPA's) MOtor Vehicle Emission Simulator (MOVES) is a state-of-the-science emission modeling system that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases, and air toxics. MOVES is used by state and local agencies to estimate nitrogen oxides (NOx), particulate matter ($PM_{2.5}$ and PM_{10}), volatile organic compounds (VOCs), carbon monoxide (CO), and other pollutants/precursors from cars, trucks, buses, and motorcycles for State Implementation Plan (SIP) purposes and conformity determinations outside of California. MOVES incorporates the latest data on vehicle populations, travel activity, and emission rates as well as updated fuel supply information at the county level, and accounts for vehicle starts and idling. MOVES is considered the most accurate tool for estimating emissions from the transportation sector for most purposes.

EPA has adopted federal requirements for progressively cleaner vehicles and cleaner fuels under the authority of the federal Clean Air Act since 1970. As a result of EPA's regulatory programs and various state regulations, motor vehicles and their fuels (both gasoline and diesel) sold today in the U.S. are far cleaner than vehicles and fuels produced in previous decades. The emission-reduction benefits of these requirements for cleaner vehicles and cleaner fuels are quantified at the county level in MOVES.

Exhaust, brake wear and tire wear emissions of $PM_{2.5}$ from motor vehicles were calculated by staff of the Oregon Department of Environmental Quality (DEQ) in 2016 based on MOVES 2014a for years 2008 and 2015. Road dust emissions were estimated using EPA's AP-42 formulas for both paved roads (see AP-42 Section 13.2.1 for Paved Roads and Section 13.2.2 for Unpaved Roads).

Traffic growth in Vehicle-Miles-Traveled (VMT) was based on previous transportation modeling by LCOG and ODOT in the Highway 58 corridor and revised with this plan (see LCOG's explanation of VMT revisions). The 2015 exhaust, brake wear and tire wear emissions of $PM_{2.5}$ from motor vehicles were modeled again by DEQ staff in 2018 as part of the forecasting of future years emissions (2025-2035). Federal control measures included in the MOVES2014a modeling are all federal measures that affect the fleets and fuels used in future years once implemented by EPA. Examples of federal control measures include requirements for cleaner engines and fuels. The 2015 modeling results were consistent with the previous work for the 2016 Plan; therefore, no adjustments were made to the motor vehicle emissions in the 2015 emission inventory. The re-entrained road dust calculations were rechecked with AP-42 protocols, updated with the latest LCOG VMT numbers, and compared for consistency with the Lane County portion of the NEIs for 2014 and 2017.

Emissions from railroads were provided by Union Pacific Railroad staff using the EPA NONROAD2008a emissions protocol for the 2012 Plan. The three or four key factors affecting future railroad locomotive emissions are:

- The gross ton-miles hauled by rail; this fluctuates with the economy, but is on an overall increasing trend.
- The fuel efficiency in gross ton-miles per gallon; this has increased significantly over the past decade, from perhaps 900 gross ton-miles per gallon to about 1000 gross ton-miles per gallon; future improvements will probably be smaller.
- Locomotive turnover, as Uncontrolled (pre-1973) and Tier 0 (1973-2001) locomotives are replaced by Tier 1, 2, 3 and 4 locomotives; this turnover will continue in future years until most line-haul locomotives are replaced with Tier 4 (with earlier tiers retired, or relegated to local switchyards, etc.).
- A fourth factor, affecting some parts of the country, is the decreasing amount of gross ton-miles by coal trains.

The National Emission Inventories (NEIs) for Lane County, Oregon, indicate the combined factors have resulted in a significant decrease from 2008 to 2014:

Table B: **Lane County $PM_{2.5}$ locomotive emissions from NEI for 2008, 2011, and 2014.**

2014 Emissions Inventory - Lane County	
EI Sector	Lane County Emission (tons)
Mobile - Locomotives	18.26

2011 Emissions Inventory - Lane County	
EI Sector	Lane County Emission (tons)
Mobile - Locomotives	31.75

2008 Emissions Inventory - Lane County	
EI Sector	Lane County Emission (tons)
Mobile - Locomotives	40.09

More recent railroad emissions data from 2016-2017, and consultations with national experts at Illinois EPA and LADCO, indicate that railroad emissions continue to decrease overall; for example, the preliminary 2017 NEI emissions for Lane County are 18.00 tons. In June 2018, Matt Harrell at Illinois EPA (matthew.harrell@Illinois.gov) reviewed the FRA traffic density data used for the 2008 and 2014 v2 NEI inventories; rail traffic on the Union Pacific line that passes through Oakridge decreased 29.9% between 2007 and 2014. The latest 2016 traffic density data shows a 33.6% decrease from 2007 levels. At the same time, Union Pacific's fuel efficiency increased from 974.6 to 1006.2 gross ton-miles/gallon. Lastly, due to fleet mix turnover, Union Pacific's weighted $PM_{2.5}$ emission factors decreased almost 22%. Matt Harrell concluded that maintaining railroad emissions at 2014 levels is indeed a conservative assumption, given that all three of these key factors have decreased by considerable amounts within the Oakridge area.

In the 2012 Plan and 2016 Plan, railroad emission projections for 2015 were conservatively estimated at 2008 levels. In the Oakridge maintenance plan, the railroad emissions are reduced from 2008 to 2015 based on the 2008-2011-2014 NEI data.

Other non-road mobile sources were categorized by LRAPA as insignificant in Oakridge-Westfir during the $PM_{2.5}$ winter season as summarized in the 2016 Plan.

Updated 2015 Emission Inventory as the New Base Year

Minor adjustments were made to the 2015 Attainment Year $PM_{2.5}$ Emission Inventory in the 2016 Plan, based on more current or accurate information available in hindsight, as discussed in the previous discussions of Industrial and Locomotives emissions, and actual 2015 VMT as provided by LCOG. With these minor adjustments, the 2015 $PM_{2.5}$ Emission Inventory in the following table becomes the new Base Year $PM_{2.5}$ Emission Inventory for the 2015-2035 Maintenance Plan.

Table C: Actual 2015 Typical Season Day and Worst-Case Day $PM_{2.5}$ Emissions.

	-- lbs/per day --		Percent of Total NAA Emissions	
	Typical Season Day	Worst-Case Day	Typical Season Day	Worst-Case Day
Permitted Point Sources(1)				
Oakridge Sand & Gravel: Rock crushing operation	0.0	0.0	0.0%	0.0%
Oakridge Sand & Gravel: Cement plant	0.0	0.0	0.0%	0.0%
Stationary Area Sources				
Residential Wood Combustion: Fireplace(2)(4)	38.5	31.7	8%	8%
Residential Wood Combustion: Non-Certified Woodstove/Insert(2)(4)	108.4	89.4	22%	24%
Residential Wood Combustion: Certified Woodstove/Insert(2)(4)	243.2	200.7	50%	53%
Pellet Stoves	7.3	8.0	2%	2%
All Other Stationary Area Sources	47.4	4.7	10%	1%
On-Road Sources				
On-Road: Exhaust, Brake, Tire(3)	17.6	22.2	4%	6%
Re-Entrained Road Dust	16.8	19.2	3%	5%
Nonroad Sources				
Union Pacific Railroad	2.7	2.7	1%	1%
	------	------		
Total, All Sources, lbs/day	**482**	**379**		
(1) Worst-case day = Permitted hourly (x24) operating capacity.			*Updated by MLH on 09/20/2021.*	
(2) Worst-case day = Peak Heating Degree Day.				
(3) Updated with MOVES 2014a in May 2018.				
(4) Based on RWC curtailment effectiveness of 25% on Worst-Case Day in 2015.				

The 2015 $PM_{2.5}$ emission adjustments between the projected 2015 emissions in the 2016 Plan and the actual 2015 emissions in Table C are not considered significant, but were important to ensure consistency with the forecasted future year (2025-2035) $PM_{2.5}$ emission inventories. To illustrate, the 2015 $PM_{2.5}$ emissions in the 2015 Attainment Year were modeled in the 2016 Plan to reduce to reduce the worst-day $PM_{2.5}$ concentration to 29.3 µg/m^3 by 2015. Using the same model, the 2015 $PM_{2.5}$ emissions in the 2015 Base Year (Table C) were modeled to reduce to reduce the worst-day $PM_{2.5}$ concentration to 28.8 µg/m^3. As published in the 2016 LRAPA

Annual Report and certified in EPA's Air Quality System (AQS) database, the 98th percentile $PM_{2.5}$ concentration measured in Oakridge during calendar year 2015 was 28.9 µg/m^3. The differences in the 2015 modeled $PM_{2.5}$ concentrations are insignificant and well within the accuracy and precision of either the monitoring or modeling methods.

The 2015 $PM_{2.5}$ Emission Inventory in Table C is used as the Base Year for forecasting and calculating the future year (2025-2035) $PM_{2.5}$ emission inventories in Appendix III.

Precursor Emissions (NOx, VOC, SO_2, and NH_3)

Secondary particulate is an overall very minor contributor to the Oakridge $PM_{2.5}$ air pollution concentrations on worst winter days as summarized in both the 2012 Plan and the 2016 Plan. Each of the precursor groups (nitrates, sulfates, ammonia, and volatile organic compounds [VOC]) was determined in the 2016 Plan to be below the EPA Region 10 insignificance threshold of 1.3 ug/m3:

- Nitrate + ammonia = 0.16 ug/m3 + 0.01 ug/m3 = 0.17 ug/m3 < 1.3 ug/m3.
- Sulfate = 0.43 ug/m3 < 1.3 ug/m3.
- VOC = 1.17 ug/m3 < 1.3 ug/m3.

In the initial assessment in the 2016 Plan, LRAPA staff reviewed the decreasing precursor trends in the Lane County, Oregon, portion of the National Emission Inventories (NEIs for 2008, and 2011, and 2014) for the major emission categories in Oakridge-Westfir and concluded that precursor emissions would be even less significant contributors to $PM_{2.5}$ in the future. The 2017 NEI further supported this conclusion.

In response to preliminary EPA review comments, LRAPA staff performed a more definitive analysis of 2015 precursor emissions (NO_X, VOC, SO_2, and NH_3) in preparation for forecasting future year precursor emissions (2025-2035) in Appendix III. The 2015 precursor emissions are summarized in the following tables. Some precursor categories were not applicable (NA).

Table D: $PM_{2.5}$ and Precursor Emissions for Typical Season Day in 2015 Base Year.

	Typical Season Day PM2.5 and Precursor Emissions (lb/day)				
Source Category	**$PM_{2.5}$**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	397.3	50.4	373.0	7.7	20.7
Onroad Motor Vehicles	17.6	613.6	522.7	2.4	9.7
Re-Entrained Road Dust	16.8	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.7	0.1	5.2	0.1	0.1
Other Area Sources	47.4	5.1	134.0	3.5	9.3
Total Emissions	**482**	**669**	**1035**	**14**	**40**

Table E: $PM_{2.5}$ and Precursor Emissions for Worst Case Day in 2015 Base Year.

	Worst Case Day PM2.5 and Precursor Emissions (lb/day)				
Source Category	**$PM_{2.5}$**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	329.8	41.6	307.8	6.6	17.3
Onroad Motor Vehicles	22.2	711.3	543.2	2.9	12.0
Re-Entrained Road Dust	19.2	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.7	0.1	5.2	0.1	0.1
Other Area Sources	4.7	0.5	13.4	0.4	0.9
Total Emissions	**379**	**753**	**870**	**10**	**30**

Most of the 2015 precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories (i.e., 74-99%), as shown in the following two tables.

Table F: Percentage by Category of $PM_{2.5}$ and Precursor Emissions for Typical Season Day in 2015.

	Typical Season Day PM2.5 and Precursor Emissions (%)				
Source Category	**$PM_{2.5}$**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	82.4%	7.5%	36.0%	56.4%	52.1%
Onroad Motor Vehicles	3.7%	91.7%	50.5%	17.4%	24.4%
Re-Entrained Road Dust	3.5%	NA	NA	NA	NA
Permitted Point Sources	0.0%	0.0%	0.0%	0.0%	NA
Railroad Locomotives	0.6%	0.0%	0.5%	0.4%	0.1%
Other Area Sources	9.8%	0.8%	12.9%	25.7%	23.4%
Total Emissions	**100%**	**100%**	**100%**	**100%**	**100%**

Table G: Percentage by Category of $PM_{2.5}$ and Precursor Emissions for Worst Case Day in 2015.

	Worst Case Day PM2.5 and Precursor Emissions (%)				
Source Category	**$PM_{2.5}$**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	87.1%	5.5%	35.4%	66.7%	57.2%
Onroad Motor Vehicles	5.9%	94.4%	62.5%	29.2%	39.6%
Re-Entrained Road Dust	5.1%	NA	NA	NA	NA
Permitted Point Sources	0.0%	0.0%	0.0%	0.0%	NA
Railroad Locomotives	0.7%	0.0%	0.6%	0.6%	0.2%
Other Area Sources	1.3%	0.1%	1.5%	3.6%	3.1%
Total Emissions	**100%**	**100%**	**100%**	**100%**	**100%**

Since most of the 2015 precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories (i.e., 74-99%), these emission categories were evaluated in more detail. The following tables summarize the $PM_{2.5}$ and precursor emission calculations for Residential Wood Combustion.

Table H: $PM_{2.5}$ Emissions from Residential Wood Combustion in 2015 Base Year.

(1) Woodburning Device	(2) 2015 Wood Fuel Use (tons/yr)	(3) $PM_{2.5}$ EF (lbs/ton)	(4) Relative HDD	(5) Activity (days/wk)	$PM_{2.5}$ Emissions Annual (6) Annual (tons/yr)	PM Season (7) Typical Day (lb/day)	PM Season (8) Worst Case Day (lb/day)	(9) Worst Case Day 25% Advisory Controlled (lbs/day)
Oakridge NAA								
21-04-008-100 Fireplace without Insert	195.6	23.6	1.10	7	2.3	38	42	32
21-04-008-320 Certified Non-Cat Wood-Stove	846.9	19.6	1.10	7	8.3	138	152	114
21-04-008-330 Certified Cat Wood-Stove	183.0	20.4	1.10	7	1.9	31	34	26
21-04-008-310 Conv Wood Stove	194.8	30.6	1.10	7	3.0	50	55	41
21-04-008-230 Fireplace Insert Cert Catalyst	79.7	20.4	1.10	7	0.8	14	15	11
21-04-008-220 Fireplace Insert Cert Non-Cat	368.9	19.6	1.10	7	3.6	60	66	50
21-04-008-210 Fireplace Insert Conv.	230.2	30.6	1.10	7	3.5	59	65	48
21-04-008-400 Exempt Pellet Stove	276.1	3.1	1.10	7	0.4	7	8	8
21-04-008-510 Central Furnace	0.0	27.6	1.10	7	0.0	0	0	0
Total	2,375				23.8	397	437	**330**

Notes:

1) Woodburning Device categories are from the 2010 Oakridge Wood Burning Survey Results and subsequent heating unit replacements verified by LRAPA.
2) Woodburning Fuel Use estimates are from the 2010 Oakridge Wood Burning Survey Results.
3) Residential Wood Combustion PM2.5 emission factors and references:

scc	factor, lb/ton fuel burned	Reference
2104008100	23.6	1
2104008210	30.6	1
2104008220	19.6	1
2104008230	20.4	1
2104008310	30.6	1
2104008320	19.6	1
2104008330	20.4	1
2104008400	3.06	3
2104008510	27.6	3
2104008610	27.6	3
2104008700	23.6	3
2104009000	28.4	2

Reference 1: US EPA. Documentation For The 2002 Base Year National Emission Inventory For Hazardous Air Pollutants

Reference 2: Li, Victor S., and Rosenthal, Steven. “Content and emissions characteristics of Artificial Wax Firelogs.” Paper presented at the 15th International Emission Inventory Conference. New Orleans, Lousiana. May 15th-18th, 2006.

Reference 3: Houck, James E., Eagle, Brian N. Control Analysis and Documentation for Residential Wood Combustion in the MANE-VU Region. Prepared for MARAMA. December 19, 2006.

4) Heating Degree Days calculated from LRAPA meteorological monitoring site at Willamette Activity Center (WAC) in Oakridge.
5) Klamath Falls and Oakridge survey results indicate activity occurs throughout the week.
6) Annual emissions [tons/year] = (2010 Survey Wood Fuel Use [tons/year] * emission factor [lbs/ton]) / 2000 [lbs/ton].
7) Typical PM_{10} Season Day Emissions [lbs/day] =

   (Annual Emissions [tons/year] * 2000 [lbs/ton]) / (120 heating days per season) without a weight for day of week fuel burned.

8) Worst Case Day Emissions [lbs/day] typical season day * worst-case day multiplier (based on peak/average HDD).

(9) Advisory controlled emissions based on woodburning curtailment compliance surveys during 2007-2011 with 25% compliance with 2012 strategy.

(10) Lane Electric reported heat pump installations of: 15 in 2012, 15 in 2013, 22 in 2014, and 36 in 2015.

(11) HeatSmart reported four non-certified woodstoves were removed in Oakridge during 2010-2015, assumed replacement with certified units.

Table I: NOx Emissions from Residential Wood Combustion in 2015 Base Year.

(1) Woodburning Device	(2) 2015 Wood Fuel Use (Households)	(3) NOx EF (lbs/ton)	(4) Relative HDD	(5) Activity (days/wk)	NOx Emissions Annual (6) Annual (tons/yr)	PM Season (7) Typical Day (lb/day)	(8) Worst Case Day (lb/day)	(9) Worst Case Day 25% Advisory Controlled (lbs/day)
Oakridge NAA								
21-04-008-100 Fireplace without Insert	195.6	2.6	1.10	7	0.3	4	5	3
21-04-008-320 Certified Non-Cat Wood-Stove	846.9	2.3	1.10	7	1.0	16	18	13
21-04-008-330 Certified Cat Wood-Stove	183.0	2.0	1.10	7	0.2	3	3	3
21-04-008-310 Conv Wood Stove	194.8	2.8	1.10	7	0.3	5	5	4
21-04-008-230 Fireplace Insert Cert Catalyst	79.7	2.0	1.10	7	0.1	1	1	1
21-04-008-220 Fireplace Insert Cert Non-Cat	368.9	2.3	1.10	7	0.4	7	8	6
21-04-008-210 Fireplace Insert Conv.	230.2	2.8	1.10	7	0.3	5	6	4
21-04-008-400 Exempt Pellet Stove	276.1	3.8	1.10	7	0.5	9	10	7
21-04-008-510 Central Furnace	0.0	1.8	1.10	7	0.0	0	0	0
Total	2,375				3.0	50	55	**42**

Notes:
1) Woodburning Device categories are from the 2010 Oakridge Wood Burning Survey Results and subsequent heating unit replacements verified by LRAPA.
2) Woodburning Fuel Use estimates are from the 2010 Oakridge Wood Burning Survey Results.
3) Residential Wood Combustion NOx emission factors and references:

scc	factor, lb/ton fuel burned	Reference
2104008100	2.6	1
2104008210	2.8	1
2104008220	2.3	3
2104008230	2.0	1
2104008310	2.8	1
2104008320	2.3	3
2104008330	2.0	1
2104008400	3.8	3
2104008510	1.8	3
2104008610	1.8	3
2104008700	2.6	1
2104009000	7.7	2

Reference 1: US EPA. Documentation For The 2002 Base Year National Emission Inventory For Hazardous Air Pollutants
Reference 2: Li, Victor S., and Rosenthal, Steven. "Content and emissions characteristics of Artificial Wax Firelogs." Paper presented at the 15th International Emission Inventory Conference. New Orleans, Lousiana. May 15th-18th, 2006.
Reference 3: Houck, James E., Eagle, Brian N. Control Analysis and Documentation for Residential Wood Combustion in the MANE-VU Region. Prepared for MARAMA. December 19, 2006.

4) Heating Degree Days calculated from LRAPA meteorological monitoring site at Willamette Activity Center (WAC) in Oakridge.
5) Klamath Falls and Oakridge survey results indicate activity occurs throughout the week.
6) Annual emissions [tons/year] = (2010 Survey Wood Fuel Use [tons/year] * emission factor [lbs/ton]) / 2000 [lbs/ton].
7) Typical PM_{10} Season Day Emissions [lbs/day] =

(Annual Emissions [tons/year] * 2000 [lbs/ton]) / (120 heating days per season) without a weight for day of week fuel burned.

8) Worst Case Day Emissions [lbs/day] typical season day * worst-case day multiplier (based on peak/average HDD).
(9) Advisory controlled emissions based on woodburning curtailment compliance surveys during 2007-2011 with 25% compliance with 2012 strategy.

Table J: VOC Emissions from Residential Wood Combustion in 2015 Base Year.

(1) Woodburning Device	(2) 2015 Wood Fuel Use (Households)	(3) VOC EF (lbs/ton)	(4) Relative HDD	(5) Activity (days/wk)	VOC Emissions Annual (6) Annual (tons/yr)	PM Season (7) Typical Day (lb/day)	(8) Worst Case Day (lb/day)	(9) Worst Case Day 25% Advisory Controlled (lbs/day)
Oakridge NAA								
21-04-008-100 Fireplace without Insert	123	18.9	1.10	7	1.2	31	34	25
21-04-008-320 Certified Non-Cat Wood-Stove	287	12.0	1.10	7	1.7	85	93	70
21-04-008-330 Certified Cat Wood-Stove	62	15.0	1.10	7	0.5	23	25	19
21-04-008-310 Conv Wood Stove	66	53.0	1.10	7	1.7	86	95	71
21-04-008-230 Fireplace Insert Cert Catalyst	27	15.0	1.10	7	0.2	10	11	8
21-04-008-220 Fireplace Insert Cert Non-Cat	125	12.0	1.10	7	0.8	37	41	30
21-04-008-210 Fireplace Insert Conv.	78	53.0	1.10	7	2.1	102	112	84
21-04-008-400 Exempt Pellet Stove	238	0.0	1.10	7	0.0	0	0	0
21-04-008-510 Central Furnace	0	11.7	1.10	7	0.0	0	0	0
Total	1,006				8.1	373	410	**308**

Notes:
1) Woodburning Device categories are from the 2010 Oakridge Wood Burning Survey Results and subsequent heating unit replacements verified by LRAPA.
2) Woodburning Fuel Use estimates are from the 2010 Oakridge Wood Burning Survey Results.
3) Residential Wood Combustion VOC emission factors and references:

SCC	factor, lb/ton fuel burned	Reference
2104008100	18.9	1
2104008210	53	1
2104008220	12	3
2104008230	15	1
2104008310	53	1
2104008320	12	3
2104008330	15	1
2104008400	0.041	3
2104008510	11.7	3
2104008610	11.7	3
2104008700	18.9	1
2104009000	39.56	2

Reference 1: US EPA. Documentation For The 2002 Base Year National Emission Inventory For Hazardous Air Pollutants
Reference 2: Li, Victor S., and Rosenthal, Steven. “Content and emissions characteristics of Artificial Wax Firelogs.” Paper presented at the 15th International Emission Inventory Conference. New Orleans, Lousiana. May 15th-18th, 2006.
Reference 3: Houck, James E., Eagle, Brian N. Control Analysis and Documentation for Residential Wood Combustion in the MANE-VU Region. Prepared for MARAMA. December 19, 2006.

4) Heating Degree Days calculated from LRAPA meteorological monitoring site at Willamette Activity Center (WAC) in Oakridge.
5) Klamath Falls and Oakridge survey results indicate activity occurs throughout the week.
6) Annual emissions [tons/year] = (2010 Survey Wood Fuel Use [tons/year] * emission factor [lbs/ton]) / 2000 [lbs/ton].
7) Typical PM_{10} Season Day Emissions [lbs/day] =

   (Annual Emissions [tons/year] * 2000 [lbs/ton]) / (120 heating days per season) without a weight for day of week fuel burned.

8) Worst Case Day Emissions [lbs/day] typical season day * worst-case day multiplier (based on peak/average HDD).
(9) Advisory controlled emissions based on woodburning curtailment compliance surveys during 2007-2011 with 25% compliance with 2012 strategy.
(10) Lane Electric reported heat pump installations of: 15 in 2012, 15 in 2013, 22 in 2014, and 36 in 2015.
(11) HeatSmart reported four non-certified woodstoves were removed in Oakridge during 2010-2015, assumed replacement with certified units.

Table K: SO2 Emissions from Residential Wood Combustion in 2015 Base Year.

(1) Woodburning Device	(2) 2015 Wood Fuel Use (tons/year)	(3) SO2 EF (lbs/ton)	(4) Relative HDD	(5) Activity (days/wk)	SO2 Emissions Annual (6) Annual (tons/yr)	SO2 Emissions PM Season (7) Typical Day (lb/day)	SO2 Emissions PM Season (8) Worst Case Day (lb/day)	(9) Worst Case Day 25% Advisory Controlled (lbs/day)
Oakridge NAA								
21-04-008-100 Fireplace without Insert	195.6	0.4	1.10	7	0.0	1	1	1
21-04-008-320 Certified Non-Cat Wood-Stove	846.9	0.4	1.10	7	0.2	3	3	2
21-04-008-330 Certified Cat Wood-Stove	183.0	0.4	1.10	7	0.0	1	1	1
21-04-008-310 Conv Wood Stove	194.8	0.4	1.10	7	0.0	1	1	1
21-04-008-230 Fireplace Insert Cert Catalyst	79.7	0.4	1.10	7	0.0	0	0	0
21-04-008-220 Fireplace Insert Cert Non-Cat	368.9	0.4	1.10	7	0.1	1	1	1
21-04-008-210 Fireplace Insert Conv.	230.2	0.4	1.10	7	0.0	1	1	1
21-04-008-400 Exempt Pellet Stove	276.1	0.3	1.10	7	0.0	1	1	1
21-04-008-510 Central Furnace	0.0	2.0	1.10	7	0.0	0	0	0
Total	2,375				0.5	8	9	**7**

Notes:
1) Woodburning Device categories are from the 2010 Oakridge Wood Burning Survey Results and subsequent heating unit replacements verified by LRAPA.
2) Woodburning Fuel Use estimates are from the 2010 Oakridge Wood Burning Survey Results.
3) Residential Wood Combustion SO2 emission factors and references:

scc	factor, lb/ton fuel burned	Reference
2104008100	0.4	1
2104008210	0.4	1
2104008220	0.4	3
2104008230	0.4	1
2104008310	0.4	1
2104008320	0.4	3
2104008330	0.4	1
2104008400	0.32	3
2104008510	2.03	3
2104008610	2.03	3
2104008700	0.4	1
2104009000	unknown	--

Reference 1: US EPA. Documentation For The 2002 Base Year National Emission Inventory For Hazardous Air Pollutants
Reference 2: Li, Victor S., and Rosenthal, Steven. "Content and emissions characteristics of Artificial Wax Firelogs." Paper presented at the 15th International Emission Inventory Conference. New Orleans, Lousiana. May 15th-18th, 2006.
Reference 3: Houck, James E., Eagle, Brian N. Control Analysis and Documentation for Residential Wood Combustion in the MANE-VU Region. Prepared for MARAMA. December 19, 2006.

4) Heating Degree Days calculated from LRAPA meteorological monitoring site at Willamette Activity Center (WAC) in Oakridge.
5) Klamath Falls and Oakridge survey results indicate activity occurs throughout the week.
6) Annual emissions [tons/year] = (2010 Survey Wood Fuel Use [tons/year] * emission factor [lbs/ton]) / 2000 [lbs/ton].
7) Typical PM_{10} Season Day Emissions [lbs/day] =
(Annual Emissions [tons/year] * 2000 [lbs/ton]) / (120 heating days per season) without a weight for day of week fuel burned.
8) Worst Case Day Emissions [lbs/day] typical season day * worst-case day multiplier (based on peak/average HDD).
(9) Advisory controlled emissions based on woodburning curtailment compliance surveys during 2007-2011 with 25% compliance with 2012 strategy.
(10) Lane Electric reported heat pump installations of: 15 in 2012, 15 in 2013, 22 in 2014, and 36 in 2015.
(11) HeatSmart reported four non-certified woodstoves were removed in Oakridge during 2010-2015, assumed replacement with certified units.

Table L: NH3 Emissions from Residential Wood Combustion in 2015 Base Year.

(1) Woodburning Device	(2) 2015 Wood Fuel Use (tons/year)	(3) NH3 EF (lbs/ton)	(4) Relative HDD	(5) Activity (days/wk)	NH3 Emissions Annual (6) Annual (tons/yr)	NH3 Emissions PM Season (7) Typical Day (lb/day)	NH3 Emissions PM Season (8) Worst Case Day (lb/day)	(9) Worst Case Day 30% Advisory Controlled (lbs/day)
Oakridge NAA								
21-04-008-100 Fireplace without Insert	195.6	1.8	1.10	7	0.2	3	3	2
21-04-008-320 Certified Non-Cat Wood-Stove	846.9	0.9	1.10	7	0.4	6	7	5
21-04-008-330 Certified Cat Wood-Stove	183.0	0.9	1.10	7	0.1	1	2	1
21-04-008-310 Conv Wood Stove	194.8	1.7	1.10	7	0.2	3	3	2
21-04-008-230 Fireplace Insert Cert Catalyst	79.7	0.9	1.10	7	0.0	1	1	0
21-04-008-220 Fireplace Insert Cert Non-Cat	368.9	0.9	1.10	7	0.2	3	3	2
21-04-008-210 Fireplace Insert Conv.	230.2	1.7	1.10	7	0.2	3	4	3
21-04-008-400 Exempt Pellet Stove	276.1	0.3	1.10	7	0.0	1	1	1
21-04-008-510 Central Furnace	0.0	1.8	1.10	7	0.0	0	0	0
Total	2,375				1.2	21	23	**17**

Notes:
1) Woodburning Device categories are from the 2010 Oakridge Wood Burning Survey Results and subsequent heating unit replacements verified by LRAPA.
2) Woodburning Fuel Use estimates are from the 2010 Oakridge Wood Burning Survey Results.
3) Residential Wood Combustion NH3 emission factors and references:

scc	factor, lb/ton fuel burned	Reference
2104008100	1.8	1
2104008210	1.7	1
2104008220	0.9	3
2104008230	0.9	1
2104008310	1.7	1
2104008320	0.9	3
2104008330	0.9	1
2104008400	0.3	3
2104008510	1.8	3
2104008610	1.8	3
2104008700	1.8	1
2104009000	unknown	--

Reference 1: US EPA. Documentation For The 2002 Base Year National Emission Inventory For Hazardous Air Pollutants
Reference 2: Li, Victor S., and Rosenthal, Steven. "Content and emissions characteristics of Artificial Wax Firelogs." Paper presented at the 15th International Emission Inventory Conference. New Orleans, Lousiana. May 15th-18th, 2006.
Reference 3: Houck, James E., Eagle, Brian N. Control Analysis and Documentation for Residential Wood Combustion in the MANE-VU Region. Prepared for MARAMA. December 19, 2006.

4) Heating Degree Days calculated from LRAPA meteorological monitoring site at Willamette Activity Center (WAC) in Oakridge.
5) Klamath Falls and Oakridge survey results indicate activity occurs throughout the week.
6) Annual emissions [tons/year] = (2010 Survey Wood Fuel Use [tons/year] * emission factor [lbs/ton]) / 2000 [lbs/ton].
7) Typical PM_{10} Season Day Emissions [lbs/day] =

(Annual Emissions [tons/year] * 2000 [lbs/ton]) / (120 heating days per season) without a weight for day of week fuel burned.

8) Worst Case Day Emissions [lbs/day] typical season day * worst-case day multiplier (based on peak/average HDD).
(9) Advisory controlled emissions based on woodburning curtailment compliance surveys during 2007-2011 with 25% compliance with 2012 strategy.
(10) Lane Electric reported heat pump installations of: 15 in 2012, 15 in 2013, 22 in 2014, and 36 in 2015.
(11) HeatSmart reported four non-certified woodstoves were removed in Oakridge during 2010-2015, assumed replacement with certified units.

The other major category of 2015 precursor emissions is On-Road Motor Vehicles. The following tables summarize the $PM_{2.5}$ and precursor emission calculations for On -Road Motor Vehicles from the MOVES modeling.

Table M: $PM_{2.5}$ and Precursor Emissions (lb/day) from On-Road Motor Vehicles in 2015 Base Year.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Ammonia (NH3)	8.0	11.6	10.7	15.5	10.3	13.6	7.6	12.0	9.7	12.0
2015	Oxides of Nitrogen (NOx)	539.7	671.8	669.7	861.0	642.4	765.6	535.5	711.3	613.6	711.3
2015	Primary Exhaust PM2.5 - Total	13.8	17.6	15.2	20.3	15.1	18.5	15.1	20.2	15.8	20.2
2015	Primary PM2.5 - Brakewear Particulate	1.1	1.4	1.3	1.7	1.3	1.5	1.1	1.4	1.2	1.4
2015	Primary PM2.5 - Tirewear Particulate	0.5	0.6	0.6	0.8	0.6	0.7	0.4	0.7	0.5	0.7
2015	Sulfur Dioxide (SO2)	2.0	2.8	2.6	3.7	2.5	3.2	2.0	2.9	2.4	2.9
2015	Volatile Organic Compounds	507.5	508.0	530.7	558.9	523.5	526.4	533.3	543.2	522.7	543.2
2015 Total		**1072.5**	**1213.8**	**1230.8**	**1461.9**	**1195.6**	**1329.6**	**1094.9**	**1291.6**	**1166.0**	**1291.6**

The 2015 precursor emissions related to Residential Wood Combustion and On-Road Motor Vehicles calculated in Tables H through M account for 74-99% of the precursor emissions, depending on the precursor category (NO_X, VOC, SO_2, or NH_3). The less significant source categories of precursor emissions in Tables D and E were calculated from the 2015 activity levels and appropriate emission factors from the 2014 and 2017 NEIs. As indicated in Tables D and E, some of these precursor categories were not applicable (e.g., Re-Entrained Road Dust for NOx, VOC, SO2, and NH3). The $PM_{2.5}$ and precursor emissions are projected for future years (2025, 2030, and 2035) in Appendix III.

Condensable and Filterable $PM_{2.5}$ Emissions

In addition to the precursor assessment, LRAPA staff also did a more detailed analysis of the condensable and filterable fractions of the $PM_{2.5}$ emission inventory. Unfortunately, the EPA guidance indicates there is not reliable condensable-filterable information available for the major $PM_{2.5}$ emission categories in Oakridge-Westfir.

For examples, condensable PM emissions are not an issue associated with mobile sources. The MOVES model used for these sectors produces primary emission estimates for PM, including particle components (e.g., elemental carbon and organic carbon) and gaseous hydrocarbons (e.g., VOC, non-methane organic gases). These pollutant metrics would include both “filterable” and “condensable” PM. These are currently not separable in MOVES, and for SIP inventory purposes, they can be reported as they are output from MOVES without additional modification.

For Residential Wood Combustion, EPA-OAQPS staff confirmed that the condensable requirement for RWC is currently waived for RWC because the data is not available at present, so just the total $PM_{2.5}$ emissions should be reported.

The following summarizes the unavailability or inapplicability of condensable-filterable information for the major sources of $PM_{2.5}$ emissions in Oakridge-Westfir:

Table N: Availability and Applicability of $PM_{2.5}$ Filterable & Condensable Emissions Information.

	2015 Typical Season Day PM2.5 Emissions (lb/day)			
Source Category	**Total PM2.5**	**Filterable PM2.5**	**Condensable PM2.5**	**Notes**
Residential Wood Combustion	397.3	NA	NA	Not available for RWC.
Onroad Motor Vehicles	17.6	NA	NA	Addressed in MOVES.
Re-Entrained Road Dust	16.8	NA	NA	Not applicable.
Permitted Point Sources	0.0	0.0	0.0	No activity in 2015.
Railroad Locomotives	2.7	NA	NA	Not available.
Other Area Sources	47.4	NA	NA	Not available for vegetative sources.
Total PM2.5 Emissions	**482**	**NA**	**NA**	

	2015 Worst Case Day PM2.5 Emissions (lb/day)			
Source Category	**Total PM2.5**	**Filterable PM2.5**	**Condensable PM2.5**	**Notes**
Residential Wood Combustion	329.8	NA	NA	Not available for RWC.
Onroad Motor Vehicles	22.2	NA	NA	Addressed in MOVES.
Re-Entrained Road Dust	19.2	NA	NA	Not applicable.
Permitted Point Sources	0.0	0.0	0.0	No activity in 2015.
Railroad Locomotives	2.7	NA	NA	Not available.
Other Area Sources	4.7	NA	NA	Not available for vegetative sources.
Total PM2.5 Emissions	**379**	**NA**	**NA**	

Confirmation of Updated 2015 $PM_{2.5}$ Emissions Inventory

In summary, the updated 2015 $PM_{2.5}$ and precursors emissions inventories are outlined previously in Tables D and E and repeated below. These inventories were used as the new 2015 Base Year for calculating future year (2025, 2030, and 2035) emission inventories for the Oakridge-Westfir $PM_{2.5}$ Maintenance Plan in Appendix III.

Table D: $PM_{2.5}$ and Precursor Emissions for Typical Season Day in 2015 Base Year.

	Typical Season Day PM2.5 and Precursor Emissions (lb/day)				
Source Category	**$PM_{2.5}$**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	397.3	50.4	373.0	7.7	20.7
Onroad Motor Vehicles	17.6	613.6	522.7	2.4	9.7
Re-Entrained Road Dust	16.8	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.7	0.1	5.2	0.1	0.1
Other Area Sources	47.4	5.1	134.0	3.5	9.3
Total Emissions	**482**	**669**	**1035**	**14**	**40**

Table E: $PM_{2.5}$ and Precursor Emissions for Worst Case Day in 2015 Base Year.

	Worst Case Day PM2.5 and Precursor Emissions (lb/day)				
Source Category	**$PM_{2.5}$**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	329.8	41.6	307.8	6.6	17.3
Onroad Motor Vehicles	22.2	711.3	543.2	2.9	12.0
Re-Entrained Road Dust	19.2	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.7	0.1	5.2	0.1	0.1
Other Area Sources	4.7	0.5	13.4	0.4	0.9
Total Emissions	**379**	**753**	**870**	**10**	**30**

MLH:mlh (09/17/2021)

Appendix III: $PM_{2.5}$ Emission Inventories for Future Years

Oakridge-Westfir $PM_{2.5}$ Maintenance Area Emission Inventories for 2025, 2030 and 2035

October 7, 2021

Lane Regional Air Protection Agency
1010 Main Street
Springfield, Oregon 97477

Forecasting Future Year Emission Inventories

The 1990 Clean Air Act contains provisions on the required development of emission inventories for designated areas that failed or have failed in the past to meet the National Ambient Air Quality Standards (NAAQS). The Oakridge-Westfir Nonattainment Area (NAA) is a designated NAAQS $PM_{2.5}$ nonattainment area. This emission inventory is provided as a part of the State of Oregon revisions to its State Implementation Plan (SIP) to formulate a strategy to maintain the NAAQS.

The $PM_{2.5}$ emission inventory for the Oakridge area for 2015 was included in the Oakridge 2016 $PM_{2.5}$ Attainment Plan ("2016 Plan") and updated in Appendix II with only minor adjustments based on more current information. The 2016 Plan was adopted by the LRAPA Board of Directors on November 10, 2016, approved and incorporated into the State Implementation Plan (SIP) by the Oregon Environmental Quality Commission (EQC) on January 18, 2017, and approved by the U.S. Environmental Protection Agency (EPA) on February 8, 2018 [83 FR 5537] effective March 12, 2018. Residential Wood Combustion (RWC) emissions from certified and non-certified woodstoves, fireplaces and pellet stoves were identified as the major source of $PM_{2.5}$ emissions on worst winter days contributing to violation of the national ambient air quality health standard (NAAQS) for $PM_{2.5}$.

The principal components for development and documentation for the 2020-2035 Oakridge-Westfir $PM_{2.5}$ Maintenance Plan emission inventories have been addressed in this document, which includes stationary permitted point sources, stationary area (non-permitted) sources, non-road mobile sources (railroads), on-road mobile sources, and emissions summaries. Inventory years include the 2015 emission inventory as the new base year (Appendix II) for the maintenance plan, and then the projected 2025-2035 emission inventories for the maintenance period. The geographic boundary for each inventory is the Oakridge-Westfir NAA, as defined by the NAA boundary in the 2016 Plan.

In this document the terms *annual*, *typical season day*, and *worst-case day* emissions are used to categorize the estimated emissions for a particular time period. The annual emissions are a total amount of emissions for the source category that occurred throughout the year, represented in tons per year (tpy). The typical season day emissions represent an average daily emission value occurring from November 1st through the end of February. This four-month time period is considered to be the PM season, and is when the PM standard is usually violated. The worst-case day emissions are the highest daily emissions estimated for the PM season, and represent a day during the PM season when emissions generating activity is at its highest. For emission inventory purposes, the worst-case day is equivalent to the 98th-percentile design value (DV) day. Typical season day and worst-case day emissions are represented in pounds per day (lbs/day).

The emission calculation protocols are included in the supporting documents for the 2016 Plan, and the prior 2012 Oakridge-Westfir $PM_{2.5}$ Attainment Plan ("2012 Plan"), and are not duplicated here. The significant (and insignificant) source categories during the winter $PM_{2.5}$ problem season were identified in Appendix D-5 of the 2012 Plan.

Secondary particulate is an overall very minor contributor to the Oakridge $PM_{2.5}$ air pollution concentrations on worst winter days as summarized in both the 2012 Plan and the 2016 Plan. Each of the precursor groups (nitrates, sulfates, ammonia, and volatile organic compounds [VOC]) was determined in the 2016 Plan to be below the EPA Region 10 insignificance threshold of 1.3 ug/m3:

- Nitrate + ammonia = 0.16 ug/m3 + 0.01 ug/m3 = 0.17 ug/m3 < 1.3 ug/m3.
- Sulfate = 0.43 ug/m3 < 1.3 ug/m3.
- VOC = 1.17 ug/m3 < 1.3 ug/m3.

Therefore, the LRAPA emission inventory analysis focused in most detail on the significant $PM_{2.5}$ particulate sources during the winter season in Oakridge-Westfir, notably residential woodburning emissions from woodstoves, fireplaces and pellet stoves.

Description of Maintenance Area

Oakridge, Oregon lies in an alluvial plain in the foothills at the southern end of the Willamette River valley. The city is in Lane County, Oregon, approximately 45 miles east-southeast of Eugene, and 28 miles west of Willamette Pass, the summit of the Cascade Mountain Range. The city limits of present-day Oakridge include the historic City of Oakridge and, directly west, the area formerly known as Willamette City. Figure 1 shows the location of Oakridge in Lane County; **Error! Reference source not found.** shows the map of the Oakridge-Westfir non-attainment area.

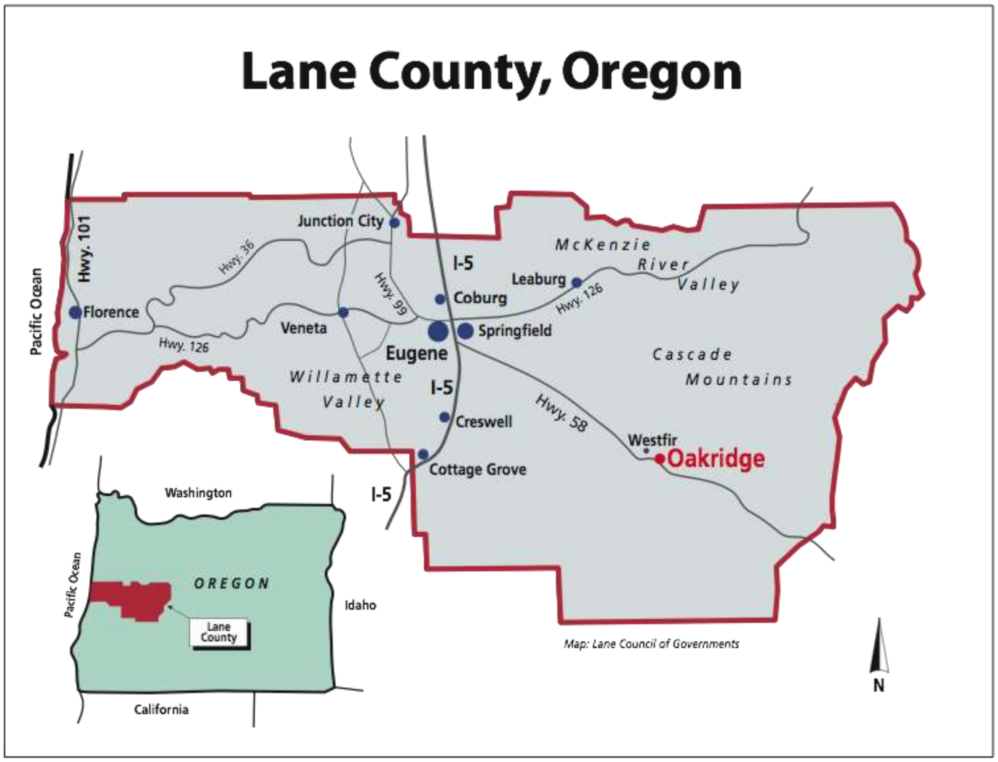

Figure A: Oakridge Location in Lane County, Oregon.

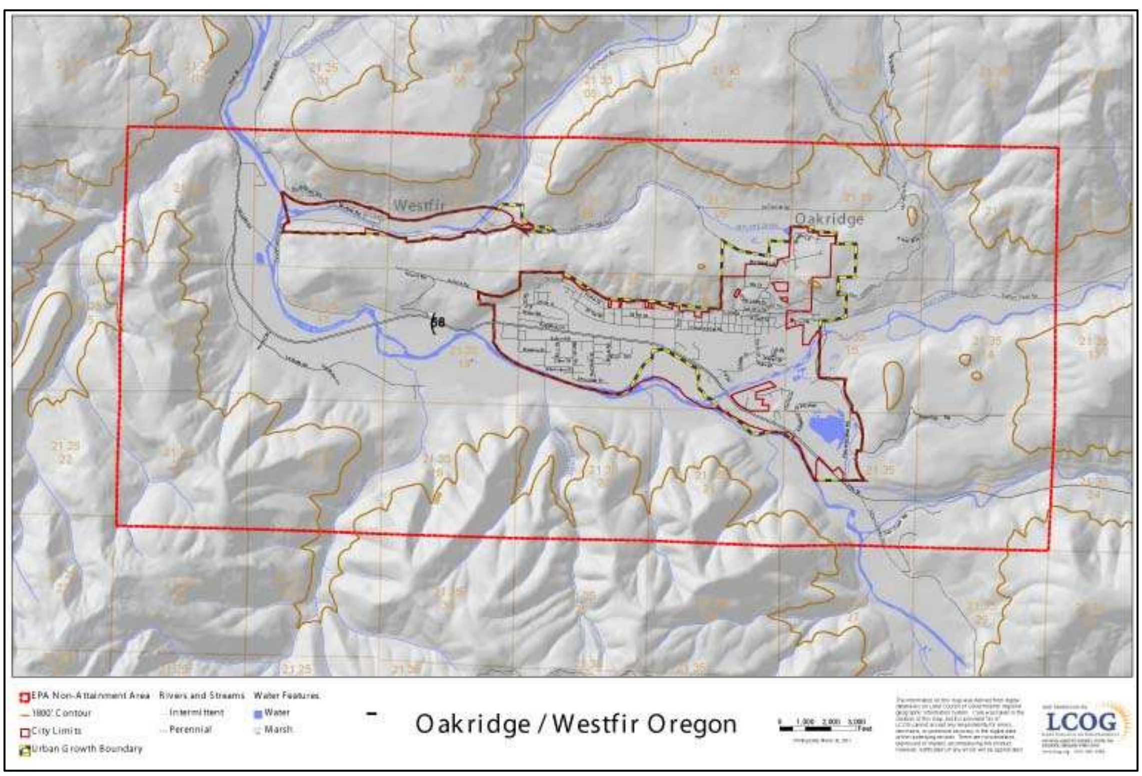

Figure B: $PM_{2.5}$ Nonattainment Area Map.

The City of Oakridge is situated in a valley oriented east-west, through which flows the middle fork of the Willamette River. Elevation of the area ranges from 1100 feet at the lower (west) end to 1600 feet with areas of densest population situated between 1100 feet and 1200 feet. Mountains rise on the north and south sides to 1700 feet and 1600 feet, respectively.

Westfir is a very small (population 335) isolated rural mountain community that is located along the north fork of the Willamette River about one mile NW of Oakridge. Its elevation is about the same as Oakridge and it is surrounded by the same high mountains. Westfir and Oakridge are in separate steep sided river valleys separated by a 400-foot ridge. The Westfir valley is very narrow, only about a quarter mile across at its widest point, while the Oakridge valley is about one mile across at its widest point.

2016 Attainment Plan Base Year Emission Inventory (2015)

The base year emission inventory was used as the starting point for the maintenance demonstration. The 2015 emission inventory from Appendix II is summarized in Table A.

Table A: Actual 2015 Typical Season Day and Worst-Case Day $PM_{2.5}$ Emissions.

	-- lbs/per day --		Percent of Total NAA Emissions	
	Typical Season Day	Worst-Case Day	Typical Season Day	Worst-Case Day
Permitted Point Sources(1)				
Oakridge Sand & Gravel: Rock crushing operation	0.0	0.0	0.0%	0.0%
Oakridge Sand & Gravel: Cement plant	0.0	0.0	0.0%	0.0%
Stationary Area Sources				
Residential Wood Combustion: Fireplace(2)(4)	38.5	31.7	8%	8%
Residential Wood Combustion: Non-Certified Woodstove/Insert(2)(4)	108.4	89.4	22%	24%
Residential Wood Combustion: Certified Woodstove/Insert(2)(4)	243.2	200.7	50%	53%
Pellet Stoves	7.3	8.0	2%	2%
All Other Stationary Area Sources	47.4	4.7	10%	1%
On-Road Sources				
On-Road: Exhaust, Brake, Tire(3)	17.6	22.2	4%	6%
Re-Entrained Road Dust	16.8	19.2	3%	5%
Nonroad Sources				
Union Pacific Railroad	2.7	2.7	1%	1%
	------	------		
Total, All Sources, lbs/day	**482**	**379**		
(1) Worst-case day = Permitted hourly (x24) operating capacity.			*Updated by MLH on 09/20/2021.*	
(2) Worst-case day = Peak Heating Degree Day.				
(3) Updated with MOVES 2014a in May 2018.				
(4) Based on RWC curtailment effectiveness of 25% on Worst-Case Day in 2015.				

The emissions inventory on worst winter days is of most interest since the $PM_{2.5}$ concentrations measured in Oakridge do not meet the current 24-hour $PM_{2.5}$ standard and the peak $PM_{2.5}$ concentrations occur on cold, stagnant days during the November-February wood-heating season. Residential wood-heating emissions (from certified and non-certified woodstoves, fireplaces, and pellet stoves) accounted for about 88% of the emissions on worst winter days in the 2015 Base Year, as shown in the last column of Table A.

Maintenance Years (2025, 2030, 2035) Emission Inventories

The principal components for development and documentation for the 2020 Maintenance Plan emission inventories have been addressed in this document, which includes stationary permitted point sources, stationary area (non-permitted) sources, non-road mobile sources (railroads), on-road mobile sources, and emissions summaries. Inventory years for the Maintenance Plan include the 2015 Base Year and then Future Years 2025, 2030 and 2035. The geographic boundary for each inventory continues to be the Oakridge-Westfir NAA, as defined by the NAA boundary in the 2016 Plan and illustrated previously in Figure B.

The differences between the 2015 base year emission inventory and the maintenance years (2025, 2030, and 2035) emission inventories are the combination of increases due to growth factors and decreases due to emission control strategies. For example, motor vehicle emissions continue to decrease overall due to progressively cleaner gasoline and diesel fuels and motor vehicles and the transition to more zero-emission vehicles, but part of the emissions decrease will be offset by gradual growth in traffic volumes. Industry emissions are minor so this did not have a major effect on the 2015 emissions or future emission inventories. The most significant category continues to be residential wood-heating; emissions were increased to reflect population and housing growth in future years, decreased due to non-certified woodstove replacements with cleaner burning units after 2015, and decreased due to improvements in public outreach regarding cleaner burning techniques and code enforcement programs for curtailment during stagnant air episodes.

Overall Growth Projections

Growth is expected to be low in the Oakridge-Westfir area through 2035. Population, housing, and employment forecasts are expected to increase gradually. The 2019 Population Forecasts by the Population Research Center at Portland State University[*see note below] indicate total expected population growth in the Oakridge and Westfir Urban Growth Boundaries (UGBs) during 2010-2035 of only 0.4% (less than 0.02% average per year), increasing from 3,563 (3,308+255) to 3,578 (3,312+266) population over the 2010-2035 time period.

*Note: The Oregon legislature passed a law (ORS 195.033) in 2013 by way of HB 2253 that assigned the forecast creation task to the Population Research Center at Portland State University (PSU). In 2015, the Land Conservation and Development Commission adopted rules (OAR 660-032) to implement the new law.

The staff of the Lane Council of Governments (LCOG) periodically updates and summarizes the demographic information for Oakridge, Westfir and other Lane County communities, based on American Community Survey (ACS) data from the U.S. Census Bureau. The 2018 ACS data indicates 1,791 total housing units in Oakridge, of which 1,433 are occupied, with electric heat as the primary heat source in 1,027 of the occupied housing units, wood as the primary heat source in 340 of the occupied housing units, and 66 occupied housing units using other fuel or none. Similarly, the Westfir ACS data indicates 131 total housing units, of which 121 are occupied, with electric heat as the primary heat source in 66 of the occupied housing units,

wood as the primary heat source in 39 of the occupied housing units, and 16 occupied housing units using other fuel or none.

Traffic growth in Vehicle-Miles-Traveled (VMT) is based on previous transportation modeling by LCOG, Lane County and ODOT in the Highway 58 corridor, as summarized in the following table. More detail about the VMT modeling is in the LCOG memorandum (link here) that summarizes the VMT data process LCOG completed in May of 2021 to update the VMT estimations previously used in the 2016 Updated Attainment Plan so that they are current and consistent with modeling guidance for this Maintenance Plan.

Table B: **Oakridge Projected Traffic Growth (Vehicle Miles of Travel, VMT) for 2015-2035.**

Daily and Annual VMT by Month								
Month	2015		2025		2030		2035	
	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
April	74,134	106,845	74,879	107,920	75,254	108,465	75,364	109,004
July	98,553	142,602	99,544	144,036	100,057	144,780	100,553	145,493
September	94,834	125,470	95,788	126,732	96,282	127,385	96,761	128,017
December	69,909	110,697	70,612	111,810	70,958	112,353	71,307	112,901
Total Annual	34,558,914		34,906,443		35,083,373		35,239,815	

The Future Traffic Forecasting Methodology is based on Technical Memorandum #6 (December 23, 2014) by DKS Associates for the Lane County Transportation System Plan (TSP) update: Lane County TSP_Future Forecasting Methodolgy_TM 6_Draft (12-23-14).pdf. VMT growth in various portions of Lane County was projected to range from 0.1% to 2.7% annual growth rate. The VMT growth rate in the Oakridge corridor, consistent with the low growth projections for population, housing and employment, is projected at 0.1% per year; this is the basis for the VMT projections by LCOG in Table B.

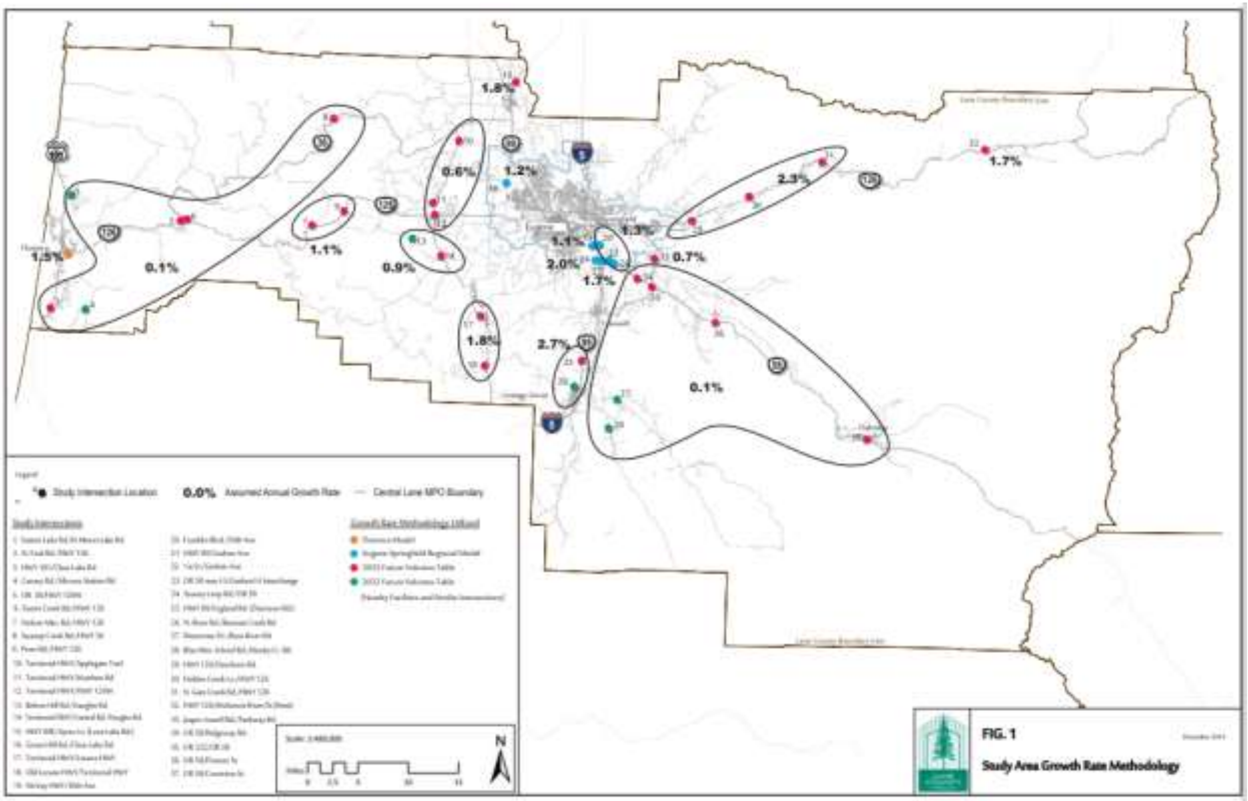

Figure C: Lane County Traffic Growth Rate Methodology.

Industrial Point Sources

LRAPA maintains data on industrial point source emissions in Lane County. The two existing industrial sources in the Oakridge-Westfir area are minor industrial sources of $PM_{2.5}$ emissions. The facilities are a portable rock crusher and a ready-mix concrete plant owned and operated by Oakridge Sand & Gravel.

These two minor sources together emit less than one ton per year of $PM_{2.5}$ emissions and contribute less than 1% to the base year and future year emission inventories. These two minor sources are well below the LRAPA significant emission rate (SER) for $PM_{2.5}$ of 10 tons per year. The Reasonably Available Control Technology requirements and emission factors are reviewed in the 2016 Plan.

The maximum allowable production rates are identified in the facility permit applications and the LRAPA-issued permits. The rock crusher has a production capacity of 3,600 tons per day (potential $PM_{2.5}$ emissions of 4 lb/day) and 300,000 tons per year (potential $PM_{2.5}$ emissions of 360 lb/year). The ready-mix concrete plant has a production capacity of 480 cubic yards per day (potential $PM_{2.5}$ emissions of 14 lb/day) and 30,000 cubic yards per year (potential $PM_{2.5}$ emissions of 90 lb/year).

The Oakridge Sand & Gravel ready-mix concrete plant permit was terminated on January 24, 2014, so the concrete plant $PM_{2.5}$ emissions will be 0.00 pounds per day in 2025, 2030 and 2035.

The Oakridge Sand & Gravel rock crusher did not operate in Oakridge in 2012-2016; any rock crushing was done at the Hale Valley quarry site near Noti, Oregon, which is 50+ miles distant from Oakridge. The only rock crushing done in Oakridge during 2008-2017 during the November-February season-of-concern was in January- February 2011, with 16.3 pounds of $PM_{2.5}$ emissions in January 2011 and 12.2 pounds of emissions in February 2011. For future (2025, 2030, 2035) typical season day, the estimated emissions are conservatively based on the January-February 2011 average of 14.3 pounds per month or 0.48 pounds per day. For future (2025, 2030, 2035) worst-case day, the estimated emissions are conservatively based on the January 2011 $PM_{2.5}$ emissions of 16.3 pounds per month, or 0.82 pounds per day (at 20 production days per month).

Residential Wood Combustion

Residential wood combustion (RWC) is a common way to heat homes in Oregon. As outlined under the general growth projections, the Lane Council of Governments periodically updates and summarizes the demographic information for Oakridge, Westfir and other Lane County communities, based on American Community Survey (ACS) data from the U.S. Census Bureau. The 2018 ACS data indicates 1,791 total housing units in Oakridge, of which 1,433 are occupied, with electric heat as the primary heat source in 1,027 of the occupied housing units, wood as the primary heat source in 340 of the occupied housing units, and 66 occupied housing units using other fuel or none. Similarly, the Westfir ACS data indicates 131 total housing units, of which 121 are occupied, with electric heat as the primary heat source in 66 of the occupied housing units, wood as the primary heat source in 39 of the occupied housing units, and 16 occupied housing units using other fuel or none. Home heating sources other than electricity or wood are considered insignificant, with the number of estimated units less than the margin of error in the ACS survey; for example, the estimated number of “other fuel” in Oakridge in 2018 was 15 homes, but the margin or error was +/- 28 homes.

Natural gas is not available in Oakridge-Westfir, thus the reliance on electricity and wood for most home heating. More detailed home wood heating surveys have been done during 2009-2015 by LRAPA, DEQ and the South Willamette Forest Collaborative (SWFC) in Oakridge to provide more details on primary and secondary use of wood for home heating, average number of cords burned per year, certified and non-certified woodstoves, pellet stoves, etc. The composite result of the various surveys is that most homes in Oakridge-Westfir rely on some combination of electricity and wood (primary or secondary) for home heating.

The various surveys provided LRAPA with information on how many homes use various types of wood-heating devices, the amount of wood burned, and other information on wood-heating practices. The Oakridge wood use for the 2015 base year is summarized in the following table.

Table C: Oakridge 2015 Residential Wood Use.

Woodburning Device	2015 Wood Fuel Use (Households)	2015 Wood Fuel Use (tons/HH)	2015 Wood Fuel Use (tons/year)
Oakridge NAA			
21-04-008-100 Fireplace without Insert	123	1.6	195.6
21-04-008-320 Certified Non-Cat Wood-Stove	287	3.0	846.9
21-04-008-330 Certified Cat Wood-Stove	62	3.0	183.0
21-04-008-310 Conv Wood Stove	66	3.0	194.8
21-04-008-230 Fireplace Insert Cert Catalyst	27	3.0	79.7
21-04-008-220 Fireplace Insert Cert Non-Cat	125	3.0	368.9
21-04-008-210 Fireplace Insert Conv.	78	3.0	230.2
21-04-008-400 Exempt Pellet Stove	238	1.2	276.1
21-04-008-510 Central Furnace	0	0.0	0.0
Total	1,006		2,375

The LRAPA 2009-2010 survey report, data, and additional RWC emission calculation details are included in the 2012 Plan and 2016 Plan. The detailed 2015 RWC emission calculations are summarized in the following table.

Table D: Oakridge 2015 Residential Wood Combustion (RWC) $PM_{2.5}$ Emissions.

(1) Woodburning Device	(2) 2015 Wood Fuel Use (tons/yr)	(3) $PM_{2.5}$ EF (lbs/ton)	(4) Relative HDD	(5) Activity (days/wk)	$PM_{2.5}$ Emissions Annual (6) Annual (tons/yr)	PM Season (7) Typical Day (lb/day)	PM Season (8) Worst Case Day (lb/day)	(9) Worst Case Day 25% Advisory Controlled (lbs/day)
Oakridge NAA								
21-04-008-100 Fireplace without Insert	195.6	23.6	1.10	7	2.3	38	42	32
21-04-008-320 Certified Non-Cat Wood-Stove	846.9	19.6	1.10	7	8.3	138	152	114
21-04-008-330 Certified Cat Wood-Stove	183.0	20.4	1.10	7	1.9	31	34	26
21-04-008-310 Conv Wood Stove	194.8	30.6	1.10	7	3.0	50	55	41
21-04-008-230 Fireplace Insert Cert Catalyst	79.7	20.4	1.10	7	0.8	14	15	11
21-04-008-220 Fireplace Insert Cert Non-Cat	368.9	19.6	1.10	7	3.6	60	66	50
21-04-008-210 Fireplace Insert Conv.	230.2	30.6	1.10	7	3.5	59	65	48
21-04-008-400 Exempt Pellet Stove	276.1	3.1	1.10	7	0.4	7	8	8
21-04-008-510 Central Furnace	0.0	27.6	1.10	7	0.0	0	0	0
Total	2,375				23.8	397	437	**330**

Notes:
1) Woodburning Device categories are from the 2010 Oakridge Wood Burning Survey Results and subsequent heating unit replacements verified by LRAPA.
2) Woodburning Fuel Use estimates are from the 2010 Oakridge Wood Burning Survey Results.
3) Residential Wood Combustion PM2.5 emission factors and references:

SCC	factor, lb/ton fuel burned	Reference
2104008100	23.6	1
2104008210	30.6	1
2104008220	19.6	1
2104008230	20.4	1
2104008310	30.6	1
2104008320	19.6	1
2104008330	20.4	1
2104008400	3.06	3
2104008510	27.6	3
2104008610	27.6	3
2104008700	23.6	3
2104009000	28.4	2

Reference 1: US EPA. Documentation For The 2002 Base Year National Emission Inventory For Hazardous Air Pollutants
Reference 2: Li, Victor S., and Rosenthal, Steven. "Content and emissions characteristics of Artificial Wax Firelogs." Paper presented at the 15th International Emission Inventory Conference. New Orleans, Lousiana. May 15th-18th, 2006.
Reference 3: Houck, James E., Eagle, Brian N. Control Analysis and Documentation for Residential Wood Combustion in the MANE-VU Region. Prepared for MARAMA. December 19, 2006.

4) Heating Degree Days calculated from LRAPA meteorological monitoring site at Willamette Activity Center (WAC) in Oakridge.
5) Klamath Falls and Oakridge survey results indicate activity occurs throughout the week.
6) Annual emissions [tons/year] = (2010 Survey Wood Fuel Use [tons/year] * emission factor [lbs/ton]) / 2000 [lbs/ton].
7) Typical PM_{10} Season Day Emissions [lbs/day] =

(Annual Emissions [tons/year] * 2000 [lbs/ton]) / (120 heating days per season) without a weight for day of week fuel burned.

8) Worst Case Day Emissions [lbs/day] typical season day * worst-case day multiplier (based on peak/average HDD).
(9) Advisory controlled emissions based on woodburning curtailment compliance surveys during 2007-2011 with 25% compliance with 2012 strategy.
(10) Lane Electric reported heat pump installations of: 15 in 2012, 15 in 2013, 22 in 2014, and 36 in 2015.
(11) HeatSmart reported four non-certified woodstoves were removed in Oakridge during 2010-2015, assumed replacement with certified units.

The primary focus of the 2016 Plan and this 2021 Maintenance Plan is to continue to reduce RWC emissions. The Oakridge Air Program, outlined in detail in Appendix V, continues and expands RWC strategies that have been effective over the past few decades. Much of the funding for the Oakridge Air Program is provided by an EPA Targeted Airshed Grant received by LRAPA in 2019, to be implemented during 2020-2024. The key RWC strategies include:

- Home heating upgrades: Weatherization, home repairs, ductless heat pumps, certified woodstove upgrades to 145 homes;
- Expanded code enforcement, public outreach, and educational diversion program for first-time smoke violations;
- Community firewood program to ensure seasoned firewood with a reduced rate for low-income, senior, and disabled residents;
- Community and school education with curriculum by the Middle Fork Willamette Watershed Council in coordination with the Oakridge School District; and
- Air filters to improve HVAC systems of public buildings for community smoke shelters, and portable filters distributed through local health clinics for vulnerable residents, for use during summer wildfire smoke impacts or winter air stagnation woodstove smoke events.

The core RWC strategies from the 2016 Plan continue. The city and county ordinances are included in Appendix VI, and the woodburning curtailment protocols are included in Appendix VII. The most significant of the RWC reductions from the Oakridge Air Program will be achieved during 2020-2024 and are reflected in the 2025 Oakridge-Westfir RWC Emission Inventory.

Table E: Oakridge 2025 Projected Residential Wood Combustion (RWC) $PM_{2.5}$ Emissions.

(1)	(2)	(2)	(2)	(3)	(4)	(4)	(4)	(5)	$PM_{2.5}$ Emissions Annual	PM Season		(9)
									(6)	(7)	(8)	Worst Case Day 30% Advisory Controlled (lbs/day)
Woodburning Device	2025 Wood Fuel Use (Households)	2025 Wood Fuel Use (tons/HH)	2025 Wood Fuel Use (tons/year)	$PM_{2.5}$ EF (lbs/ton)	Average Heating Degree Days (HDD)	Peak 2% Heating Degree Days (HDD)	Relative HDD	Activity (days/wk)	Annual (tons/yr)	Typical Day (lb/day)	Worst Case Day (lb/day)	
Oakridge NAA												
21-04-008-100 Fireplace without Insert	123	1.6	195.6	23.6	26	28	1.10	7	2.3	38	42	30
21-04-008-320 Certified Non-Cat Wood-Stove	363	2.5	907.5	19.6	26	28	1.10	7	8.9	148	163	114
21-04-008-330 Certified Cat Wood-Stove	78	2.5	195.0	20.4	26	28	1.10	7	2.0	33	36	26
21-04-008-310 Conv Wood Stove	7	3.0	21.0	30.6	26	28	1.10	7	0.3	5	6	4
21-04-008-230 Fireplace Insert Cert Catalyst	31	2.5	77.5	20.4	26	28	1.10	7	0.8	13	14	10
21-04-008-220 Fireplace Insert Cert Non-Cat	159	2.5	397.5	19.6	26	28	1.10	7	3.9	65	71	50
21-04-008-210 Fireplace Insert Conv.	8	3.0	24.0	30.6	26	28	1.10	7	0.4	6	7	5
21-04-008-400 Exempt Pellet Stove	238	1.2	276.1	3.1	26	28	1.10	7	0.4	7	8	8
21-04-008-510 Central Furnace	0	0.0	0.0	27.6	26	28	1.10	7	0.0	0	0	0
Total	1,007		2,094						19.0	316	348	**246**

Less significant RWC reductions from the Oakridge Air Program will be achieved after 2024, as reflected in the 2030 and 2035 Oakridge-Westfir RWC Emission Inventories. The Oakridge Air Program is expected to gradually increase compliance with the woodburning curtailment program from 30% to 40% between 2025 and 2035; this is a conservative projection based on the 30-50% compliance demonstrated in other Oregon and western states communities. The EPA Guidance Document for Residential Wood Combustion Emission Control Measures (EPA-450/2-89-015) outlines historical curtailment compliance rates in communities of the Pacific Northwest of 16-50% for voluntary programs and 38-90% for mandatory programs over time.

Table F: Oakridge 2030 Projected Residential Wood Combustion (RWC) $PM_{2.5}$ Emissions.

(1)	(2)	(2)	(2)	(3)	(4)	(4)	(4)	(5)	$PM_{2.5}$ Emissions			(9)
									Annual	PM Season		Worst Case
	2030	2030	2030		Average	Peak 2%			(6)	(7)	(8)	Day 35%
	Wood Fuel	Wood Fuel	Wood Fuel	$PM_{2.5}$	Heating	Heating				Typical	Worst Case	Advisory
Woodburning	Use	Use	Use	EF	Degree Days	Degree Days	Relative	Activity	Annual	Day	Day	Controlled
Device	(Households)	(tons/HH)	(tons/year)	(lbs/ton)	(HDD)	(HDD)	HDD	(days/wk)	(tons/yr)	(lb/day)	(lb/day)	(lbs/day)
Oakridge NAA												
21-04-008-100 Fireplace without Insert	123	1.6	195.6	23.6	26	28	1.10	7	2.3	38	42	28
21-04-008-320 Certified Non-Cat Wood-Stove	365	2.5	912.5	19.6	26	28	1.10	7	8.9	149	164	107
21-04-008-330 Certified Cat Wood-Stove	80	2.5	200.0	20.4	26	28	1.10	7	2.0	34	37	24
21-04-008-310 Conv Wood Stove	5	3.0	15.0	30.6	26	28	1.10	7	0.2	4	4	3
21-04-008-230 Fireplace Insert Cert Catalyst	33	2.5	82.5	20.4	26	28	1.10	7	0.8	14	15	10
21-04-008-220 Fireplace Insert Cert Non-Cat	160	2.5	400.0	19.6	26	28	1.10	7	3.9	65	72	47
21-04-008-210 Fireplace Insert Conv.	6	3.0	18.0	30.6	26	28	1.10	7	0.3	5	5	3
21-04-008-400 Exempt Pellet Stove	238	1.2	276.1	3.1	26	28	1.10	7	0.4	7	8	8
21-04-008-510 Central Furnace	0	0.0	0.0	27.6	26	28	1.10	7	0.0	0	0	0
Total	1,010		2,100						19.0	316	348	**229**

Table G: Oakridge 2035 Projected Residential Wood Combustion (RWC) $PM_{2.5}$ Emissions.

(1)	(2)	(2)	(2)	(3)	(4)	(4)	(4)	(5)	$PM_{2.5}$ Emissions			(9)
									Annual	PM Season		Worst Case
	2035	2035	2035		Average	Peak 2%			(6)	(7)	(8)	Day 40%
	Wood Fuel	Wood Fuel	Wood Fuel	$PM_{2.5}$	Heating	Heating				Typical	Worst Case	Advisory
Woodburning	Use	Use	Use	EF	Degree Days	Degree Days	Relative	Activity	Annual	Day	Day	Controlled
Device	(Households)	(tons/HH)	(tons/year)	(lbs/ton)	(HDD)	(HDD)	HDD	(days/wk)	(tons/yr)	(lb/day)	(lb/day)	(lbs/day)
Oakridge NAA												
21-04-008-100 Fireplace without Insert	123	1.6	195.6	23.6	26	28	1.10	7	2.3	38	42	28
21-04-008-320 Certified Non-Cat Wood-Stove	367	2.5	917.5	19.6	26	28	1.10	7	9.0	150	165	99
21-04-008-330 Certified Cat Wood-Stove	82	2.5	205.0	20.4	26	28	1.10	7	2.1	35	38	23
21-04-008-310 Conv Wood Stove	3	3.0	9.0	30.6	26	28	1.10	7	0.1	2	3	2
21-04-008-230 Fireplace Insert Cert Catalyst	35	2.5	87.5	20.4	26	28	1.10	7	0.9	15	16	10
21-04-008-220 Fireplace Insert Cert Non-Cat	162	2.5	405.0	19.6	26	28	1.10	7	4.0	66	73	44
21-04-008-210 Fireplace Insert Conv.	3	3.0	9.0	30.6	26	28	1.10	7	0.1	2	3	2
21-04-008-400 Exempt Pellet Stove	238	1.2	276.1	3.1	26	28	1.10	7	0.4	7	8	8
21-04-008-510 Central Furnace	0	0.0	0.0	27.6	26	28	1.10	7	0.0	0	0	0
Total	1,013		2,105						18.9	316	347	**214**

Other Area Sources

The only other area source category with potential significant emissions is outdoor burning. Outdoor burning is banned in Lane County for fire safety reasons during the June-September fire season and is banned in Oakridge for air quality reasons during November-February. There are 1,756 households in the Oakridge-Westfir nonattainment area. The LRAPA survey indicates that 28% of the households (about 492 households) burn yard debris (weighted average of 3 cubic yards per household) during the Fall and Spring months. The yard debris is a mix of leaves and brush with an estimated average density of 312.5 pounds per cubic yard using conversion factors (250-375 lb/yard) from OAR 340-097-0110. AP-42 emission factors are 17-38 lb/ton, or an average of 27.5 lb/ton. The total amount of yard debris burned is calculated to be 230.6 tons per year with $PM_{2.5}$ emissions of 3.2 tons per year. Typical season days emissions are estimated to be 47.4 lb/day on the approximately 135 days per year during the Spring and Fall burning seasons. Although outdoor burning is banned during November-February, LRAPA and Oakridge occasionally receive complaints of outdoor burning on banned days, so outdoor burning emissions are conservatively estimated at 10% (4.7 lb/day) on worst-case days during November-February.

Mobile and Nonroad Sources

The U.S. Environmental Protection Agency's (EPA's) MOtor Vehicle Emission Simulator (MOVES) is a state-of-the-science emission modeling system that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases, and air toxics. MOVES is used by state and local agencies to estimate nitrogen oxides (NOx), particulate matter ($PM_{2.5}$ and PM_{10}), volatile organic compounds (VOCs), carbon monoxide (CO), and other pollutants/precursors from cars, trucks, buses, and motorcycles for State Implementation Plan (SIP) purposes and conformity determinations outside of California. MOVES incorporates the latest data on vehicle populations, travel activity, and emission rates as well as updated fuel supply information at the county level, and accounts for vehicle starts and idling. MOVES is considered the most accurate tool for estimating emissions from the transportation sector for most purposes.

EPA has adopted federal requirements for progressively cleaner vehicles and cleaner fuels under the authority of the federal Clean Air Act since 1970. As a result of EPA's regulatory programs and various state regulations, motor vehicles and their fuels (both gasoline and diesel) sold today in the U.S. are far cleaner than vehicles and fuels produced in previous decades. The emission-reduction benefits of these requirements for cleaner vehicles and cleaner fuels are quantified at the county level in MOVES.

Exhaust, brake wear and tire wear emissions of $PM_{2.5}$ from motor vehicles were calculated by staff of the Oregon Department of Environmental Quality (DEQ) in 2016 based on MOVES 2014a for years 2008 and 2015. Road dust emissions were estimated using EPA's AP-42 formulas for both paved roads (see AP-42 Section 13.2.1 for Paved Roads and Section 13.2.2 for Unpaved Roads).

Traffic growth in Vehicle-Miles-Traveled (VMT) was based on previous transportation modeling by LCOG and ODOT in the Highway 58 corridor and revised with this plan (see LCOG's explanation of VMT revisions). The 2015 exhaust, brake wear and tire wear emissions of $PM_{2.5}$ from motor vehicles were modeled again by DEQ staff in 2018 as part of the forecasting of future years emissions (2025-2035). Road dust emissions were estimated again in 2021 using EPA's AP-42 formulas for both paved roads (see AP-42 Section 13.2.1 for Paved Roads and Section 13.2.2 for Unpaved Roads) and updated VMT data for 2015 and 2020.

Federal control measures included in the MOVES2014a modeling are all federal measures that affect the fleets and fuels used in future years once implemented by EPA. Examples of federal control measures include requirements for cleaner engines and fuels.

The $PM_{2.5}$ MOVES 2014a emission modeling results for 2015, 2025, 2030, and 2035 are summarized in the following table. The 2030 MOVES input files (that also include the 2015 and 2025 inputs) are all available in this link. The 2035 MOVES input files are all available in this link.

Table H: Oakridge $PM_{2.5}$ MOVES 2014a emission modeling combined results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015 Total	PM2.5 Exhaust, Brake, Tire	15.4	19.6	17.0	22.8	16.9	20.8	16.6	22.2	17.6	22.2
2025 Total	PM2.5 Exhaust, Brake, Tire	5.3	6.7	6.1	8.0	6.0	7.3	5.6	7.3	6.1	7.3
2030 Total	PM2.5 Exhaust, Brake, Tire	4.4	5.9	5.5	7.5	5.4	6.7	4.2	6.1	5.1	6.1
2035 Total	PM2.5 Exhaust, Brake, Tire	3.8	5.1	4.8	6.6	4.6	5.8	3.7	5.3	4.4	5.3

The more detailed categories of the $PM_{2.5}$ MOVES 2014a emission modeling results for 2015, 2025, 2030, and 2035 are in the following table.

Table I: Oakridge $PM_{2.5}$ MOVES 2014a emission modeling results (lb/day) by category for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Primary Exhaust PM2.5 - Total	13.8	17.6	15.2	20.3	15.1	18.5	15.1	20.2	15.8	20.2
2015	Primary PM2.5 - Brakewear Particulate	1.1	1.4	1.3	1.7	1.3	1.5	1.1	1.4	1.2	1.4
2015	Primary PM2.5 - Tirewear Particulate	0.5	0.6	0.6	0.8	0.6	0.7	0.4	0.7	0.5	0.7
2015 Total		**15.4**	**19.6**	**17.0**	**22.8**	**16.9**	**20.8**	**16.6**	**22.2**	**17.6**	**22.2**
2025	Primary Exhaust PM2.5 - Total	3.6	4.5	4.0	5.3	4.0	4.8	3.9	5.0	4.1	5.0
2025	Primary PM2.5 - Brakewear Particulate	1.2	1.5	1.4	1.8	1.4	1.7	1.2	1.6	1.3	1.6
2025	Primary PM2.5 - Tirewear Particulate	0.5	0.7	0.7	0.9	0.6	0.8	0.5	0.7	0.6	0.7
2025 Total		**5.3**	**6.7**	**6.1**	**8.0**	**6.0**	**7.3**	**5.6**	**7.3**	**6.1**	**7.3**
2030	Primary Exhaust PM2.5 - Total	2.3	3.2	3.0	4.2	2.9	3.7	2.2	3.3	2.7	3.3
2030	Primary PM2.5 - Brakewear Particulate	1.7	2.1	2.0	2.6	1.9	2.4	1.6	2.2	1.9	2.2
2030	Primary PM2.5 - Tirewear Particulate	0.4	0.6	0.5	0.8	0.5	0.7	0.4	0.6	0.5	0.6
2030 Total		**4.4**	**5.9**	**5.5**	**7.5**	**5.4**	**6.7**	**4.2**	**6.1**	**5.1**	**6.1**
2035	Primary Exhaust PM2.5 - Total	1.7	2.4	2.2	3.2	2.2	2.8	1.6	2.5	2.0	2.5
2035	Primary PM2.5 - Brakewear Particulate	1.7	2.1	2.0	2.6	2.0	2.4	1.6	2.2	1.9	2.2
2035	Primary PM2.5 - Tirewear Particulate	0.4	0.6	0.5	0.8	0.5	0.7	0.4	0.6	0.5	0.6
2035 Total		**3.8**	**5.1**	**4.8**	**6.6**	**4.6**	**5.8**	**3.7**	**5.3**	**4.4**	**5.3**

The MOVES 2014a emission modeling for 2015, 2025, 2030, and 2035 also included $PM_{2.5}$ precursor emission results. The precursor emissions are summarized in the following tables.

Table J: Oakridge NOx MOVES 2014a emission modeling results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Oxides of Nitrogen (NOx)	539.7	671.8	669.7	861.0	642.4	765.6	535.5	711.3	613.6	711.3
2025	Oxides of Nitrogen (NOx)	154.8	182.7	183.3	225.6	177.8	203.5	155.0	193.1	171.2	193.1
2030	Oxides of Nitrogen (NOx)	87.5	121.8	108.7	153.0	106.6	137.8	84.4	127.9	103.2	127.9
2035	Oxides of Nitrogen (NOx)	74.6	103.7	92.3	132.7	90.6	117.0	71.9	108.8	87.8	108.8

Table K: Oakridge VOC MOVES 2014a emission modeling results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Volatile Organic Compounds	507.5	508.0	530.7	558.9	523.5	526.4	533.3	543.2	522.7	543.2
2025	Volatile Organic Compounds	170.6	169.5	167.6	175.2	168.2	168.4	182.3	183.2	173.7	183.2
2030	Volatile Organic Compounds	13.2	18.3	17.8	24.9	16.8	21.6	12.6	18.8	15.7	18.8
2035	Volatile Organic Compounds	11.2	15.4	14.9	21.4	14.1	18.2	10.6	15.9	13.2	15.9

Table L: Oakridge SO_2 MOVES 2014a emission modeling results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Sulfur Dioxide (SO2)	2.0	2.8	2.6	3.7	2.5	3.2	2.0	2.9	2.4	2.9
2025	Sulfur Dioxide (SO2)	1.0	1.3	1.2	1.7	1.2	1.5	0.9	1.4	1.1	1.4
2030	Sulfur Dioxide (SO2)	0.8	1.2	1.1	1.6	1.1	1.4	0.8	1.2	1.0	1.2
2035	Sulfur Dioxide (SO2)	0.8	1.1	1.1	1.6	1.0	1.3	0.8	1.2	1.0	1.2

Table M: Oakridge NH_3 MOVES 2014a emission modeling results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Ammonia (NH3)	8.0	11.6	10.7	15.5	10.3	13.6	7.6	12.0	9.7	12.0
2025	Ammonia (NH3)	6.1	8.8	8.1	11.8	7.8	10.3	5.7	9.1	7.4	9.1
2030	Ammonia (NH3)	3.6	5.2	4.8	6.9	4.6	6.1	3.4	5.4	4.4	5.4
2035	Ammonia (NH3)	3.6	5.1	4.7	7.0	4.6	6.0	3.4	5.3	4.3	5.3

Railroad Emissions

Emissions from railroads were provided by Union Pacific Railroad staff using the EPA NONROAD2008a emissions protocol for the 2012 Plan.

The three or four key factors affecting future railroad locomotive emissions are:

- The gross ton-miles hauled by rail; this fluctuates with the economy, but is on an overall increasing trend.

- The fuel efficiency in gross ton-miles per gallon; this has increased significantly over the past decade, from perhaps 900 gross ton-miles per gallon to about 1000 gross ton-miles per gallon; future improvements will probably be smaller.
- Locomotive turnover, as Uncontrolled (pre-1973) and Tier 0 (1973-2001) locomotives are replaced by Tier 1, 2, 3 and 4 locomotives; this turnover will continue in future years until most line-haul locomotives are replaced with Tier 4 (with earlier tiers retired, or relegated to local switchyards, etc.).
- A fourth factor, affecting some parts of the country, is the decreasing amount of gross ton-miles by coal trains.

The National Emission Inventories (NEIs) for Lane County, Oregon, indicate the combined factors have resulted in a significant decrease from 2008 to 2014:

Table N: Lane County $PM_{2.5}$ locomotive emissions from NEI for 2008, 2011, and 2014.

2014 Emissions Inventory - Lane County	
EI Sector	Lane County Emission (tons)
Mobile - Locomotives	18.26

2011 Emissions Inventory - Lane County	
EI Sector	Lane County Emission (tons)
Mobile - Locomotives	31.75

2008 Emissions Inventory - Lane County	
EI Sector	Lane County Emission (tons)
Mobile - Locomotives	40.09

More recent railroad emissions data from 2016-2017, and consultations with national experts at Illinois EPA and LADCO, indicate that railroad emissions continue to decrease overall; for example, the preliminary 2017 NEI emissions for Lane County are 18.00 tons. In June 2018, Matt Harrell at Illinois EPA (matthew.harrell@Illinois.gov) reviewed the FRA traffic density data used for the 2008 and 2014 v2 NEI inventories; rail traffic on the Union Pacific line that passes through Oakridge decreased 29.9% between 2007 and 2014. The latest 2016 traffic density data shows a 33.6% decrease from 2007 levels. At the same time, Union Pacific's fuel efficiency increased from 974.6 to 1006.2 gross ton-miles/gallon. Lastly, due to fleet mix turnover, Union Pacific's weighted $PM_{2.5}$ emission factors decreased almost 22%. Matt Harrell concluded that maintaining railroad emissions at 2014 levels for 2015-2035 is indeed a conservative assumption, given that all three of these key factors have decreased by considerable amounts within the Oakridge area.

In the Oakridge maintenance plan, the railroad emissions are reduced from 2008 to 2015 based on the 2008-2011-2014 NEI data. Future years (2025-2035) are based on the 2014-2017 NEI data.

Other non-road mobile sources were categorized by LRAPA as insignificant in Oakridge-Westfir during the $PM_{2.5}$ winter season as summarized in the 2016 Plan.

Total $PM_{2.5}$ Emission Inventories for Future Years

The various categories of $PM_{2.5}$ emissions for 2025, 2030 and 2035 are combined in the following series of tables for comparison with the 2015 Base Year $PM_{2.5}$ Emission Inventory in Table A.

Table O: Projected 2025 Typical Season Day and Worst-Case Day $PM_{2.5}$ Emissions.

	-- lbs/per day --		Percent of Total NAA Emissions	
	Typical Season Day	Worst-Case Day	Typical Season Day	Worst-Case Day
Permitted Point Sources[(1)]				
Oakridge Sand & Gravel: Rock crushing operation	0.5	0.8	0.1%	0.3%
Oakridge Sand & Gravel: Cement plant	0.0	0.0	0.0%	0.0%
Stationary Area Sources				
Residential Wood Combustion: Fireplace[(2)(4)]	38.5	29.6	10%	11%
Residential Wood Combustion: Non-Certified Woodstove/Insert[(2)(4)]	11.5	8.8	3%	3%
Residential Wood Combustion: Certified Woodstove/Insert[(2)(4)]	259.5	199.8	66%	71%
Pellet Stoves	7.3	8.0	2%	3%
All Other Stationary Area Sources	47.4	4.7	12%	2%
On-Road Sources				
On-Road: Exhaust, Brake, Tire[(3)]	6.1	7.3	2%	3%
Re-Entrained Road Dust	16.9	19.3	4%	7%
Nonroad Sources				
Union Pacific Railroad	2.7	2.7	1%	1%
	------	------		
Total, All Sources, lbs/day	**390**	**281**		
(1) Worst-case day = Permitted hourly (x24) operating capacity.			*Updated by MLH on 06/19/2021.*	
(2) Worst-case day = Peak Heating Degree Day.				
(3) Updated with MOVES 2014a in May 2018.				
(4) Based on curtailment effectiveness of 30% in 2025.				

Table P: Projected 2030 Typical Season Day and Worst-Case Day $PM_{2.5}$ Emissions.

	-- lbs/per day --		Percent of Total NAA Emissions	
	Typical Season Day	Worst-Case Day	Typical Season Day	Worst-Case Day
Permitted Point Sources(1)				
Oakridge Sand & Gravel: Rock crushing operation	0.5	0.8	0.1%	0.3%
Oakridge Sand & Gravel: Cement plant	0.0	0.0	0.0%	0.0%
Stationary Area Sources				
Residential Wood Combustion: Fireplace(2)(4)	38.5	27.5	10%	10%
Residential Wood Combustion: Non-Certified Woodstove/Insert(2)(4)	8.4	6.0	2%	2%
Residential Wood Combustion: Certified Woodstove/Insert(2)(4)	262.4	187.6	67%	71%
Pellet Stoves	7.3	8.0	2%	3%
All Other Stationary Area Sources	47.4	4.7	12%	2%
On-Road Sources				
On-Road: Exhaust, Brake, Tire(3)	5.1	6.1	1%	2%
Re-Entrained Road Dust	17.0	19.4	4%	7%
Nonroad Sources				
Union Pacific Railroad	2.7	2.7	1%	1%
	------	------		
Total, All Sources, lbs/day	**389**	**263**		
(1) Worst-case day = Permitted hourly (x24) operating capacity.			*Updated by MLH on 06/19/2021.*	
(2) Worst-case day = Peak Heating Degree Day.				
(3) Updated with MOVES 2014a in May 2018.				
(4) Based on curtailment effectiveness of 35% in 2030.				

Table Q: Projected 2035 Typical Season Day and Worst-Case Day $PM_{2.5}$ Emissions.

	-- lbs/per day --		Percent of Total NAA Emissions	
	Typical Season Day	Worst-Case Day	Typical Season Day	Worst-Case Day
Permitted Point Sources(1)				
Oakridge Sand & Gravel: Rock crushing operation	0.5	0.8	0.1%	0.3%
Oakridge Sand & Gravel: Cement plant	0.0	0.0	0.0%	0.0%
Stationary Area Sources				
Residential Wood Combustion: Fireplace(2)(4)	38.5	25.4	10%	10%
Residential Wood Combustion: Non-Certified Woodstove/Insert(2)(4)	4.6	3.0	1%	1%
Residential Wood Combustion: Certified Woodstove/Insert(2)(4)	265.7	175.4	68%	72%
Pellet Stoves	7.3	8.0	2%	3%
All Other Stationary Area Sources	47.4	4.7	12%	2%
On-Road Sources				
On-Road: Exhaust, Brake, Tire(3)	4.4	5.3	1%	2%
Re-Entrained Road Dust	17.0	19.4	4%	8%
Nonroad Sources				
Union Pacific Railroad	2.7	2.7	1%	1%
	------	------		
Total, All Sources, lbs/day	**388**	**245**		
(1) Worst-case day = Permitted hourly (x24) operating capacity.			*Updated by MLH on 06/19/2021.*	
(2) Worst-case day = Peak Heating Degree Day.				
(3) Updated with MOVES 2014a in May 2018.				
(4) Based on curtailment effectiveness of 40% in 2035.				

$PM_{2.5}$ Emission Inventories for Future Years – Comparison to Base Year

The $PM_{2.5}$ emission inventories for the 2025, 2030 and 2035 future years, Typical Season Day and Worst Case Day, are compared to the 2015 Base Year $PM_{2.5}$ Emission Inventory in the following tables and figures.

Table R: Comparison of Base Year to Future Years Typical Season Day $PM_{2.5}$ Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	397.3	316.7	316.6	316.1
Onroad Motor Vehicles	17.6	6.1	5.1	4.4
Re-Entrained Road Dust	16.8	16.9	17.0	17.0
Permitted Point Sources	0.0	0.5	0.5	0.5
Railroad Locomotives	2.7	2.7	2.7	2.7
Other Area Sources	47.4	47.4	47.4	47.4
Total $PM_{2.5}$ Emissions	**482**	**390**	**389**	**388**

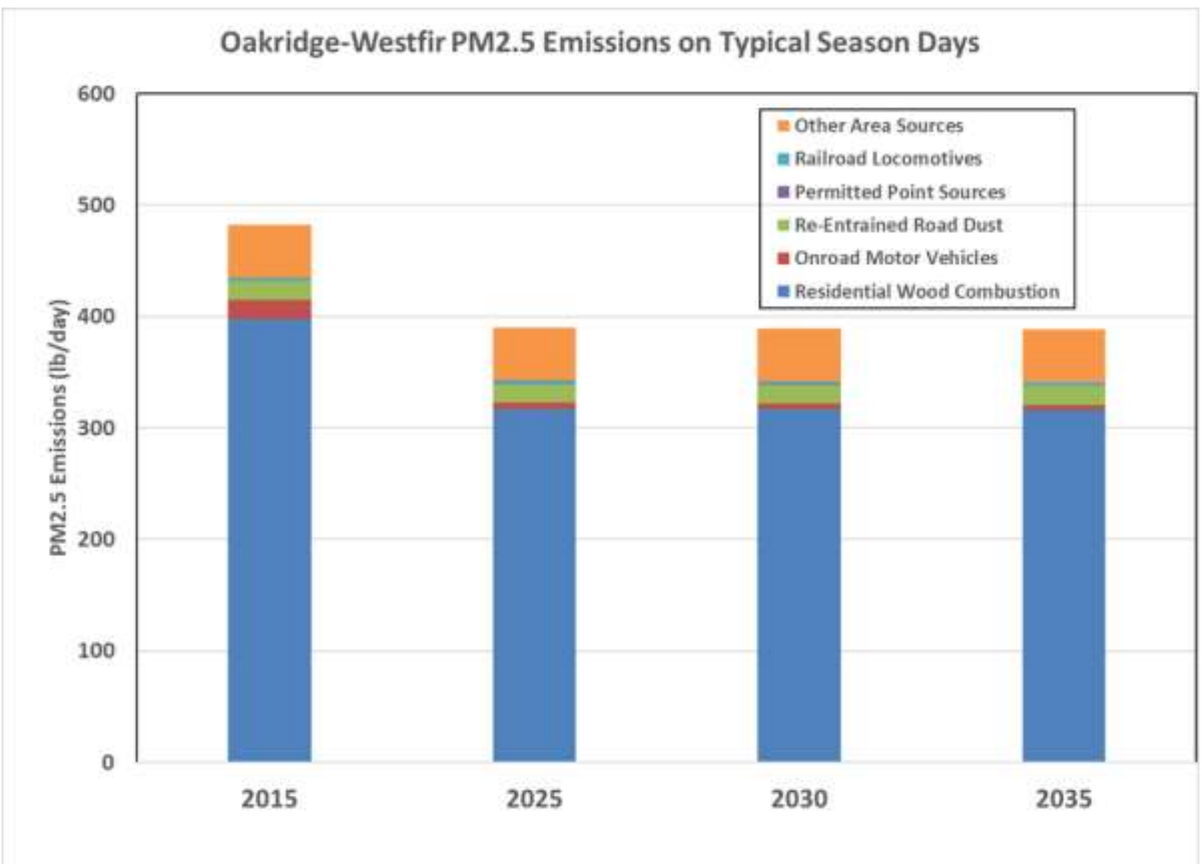

Figure D: Typical Season Day $PM_{2.5}$ Emissions 2015-2035.

Table S: Comparison of Base Year to Future Years Worst Case Day $PM_{2.5}$ Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	329.8	246.2	229.1	211.8
Onroad Motor Vehicles	22.2	7.3	6.1	5.3
Re-Entrained Road Dust	19.2	19.3	19.4	19.4
Permitted Point Sources	0.0	0.8	0.8	0.8
Railroad Locomotives	2.7	2.7	2.7	2.7
Other Area Sources	4.7	4.7	4.7	4.7
Total $PM_{2.5}$ Emissions	**379**	**281**	**263**	**245**

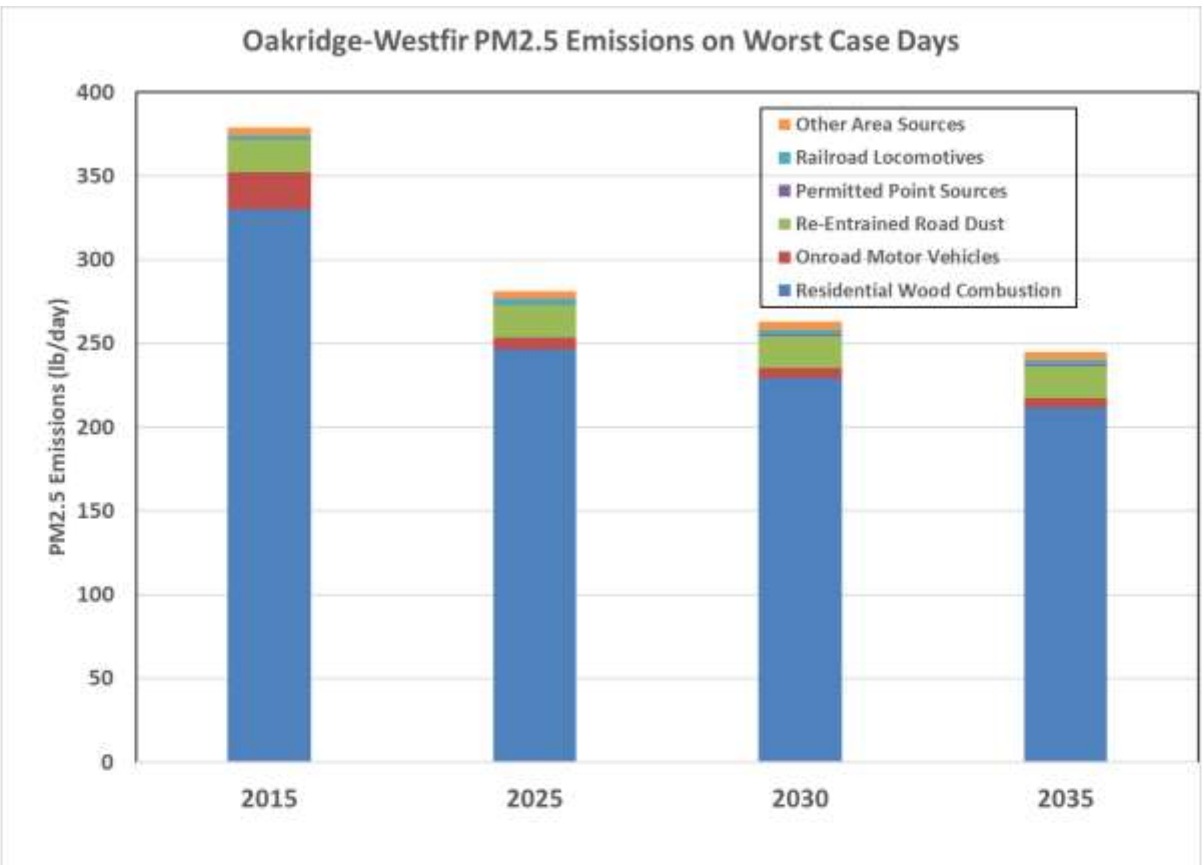

Figure E: Worst Case Day $PM_{2.5}$ Emissions 2015-2035.

In summary, the future year $PM_{2.5}$ emissions in 2025, 2030 and 2035 are significantly lower than the 2015 Attainment Year (Base Year) emissions. Thus the current $PM_{2.5}$ strategies are expected to keep the Oakridge-Westfir airshed well within the $PM_{2.5}$ 24-hour NAAQS through 2035.

Precursor Emission Inventories (NO_X, VOC, SO_2, and NH_3): 2015-2035

Secondary particulate is an overall very minor contributor to the Oakridge $PM_{2.5}$ air pollution concentrations on worst winter days as summarized in both the 2012 Plan and the 2016 Plan. Each of the precursor groups (nitrates, sulfates, ammonia, and volatile organic compounds [VOC]) was determined in the 2016 Plan to be below the EPA Region 10 insignificance threshold of 1.3 ug/m3:

- Nitrate + ammonia = 0.16 ug/m3 + 0.01 ug/m3 = 0.17 ug/m3 < 1.3 ug/m3.
- Sulfate = 0.43 ug/m3 < 1.3 ug/m3.
- VOC = 1.17 ug/m3 < 1.3 ug/m3.

In the initial assessment in the 2016 Plan, LRAPA staff reviewed the decreasing precursor trends in the Lane County, Oregon, portion of the National Emission Inventories (NEIs for 2008, and 2011, and 2014) for the major emission categories in Oakridge-Westfir and concluded that precursor emissions would be even less significant contributors to $PM_{2.5}$ in the future. The 2017 NEI further supported this conclusion.

In response to preliminary EPA review comments, LRAPA staff performed a more definitive analysis of the 2015 base year and the 2025-2035 future year precursor emissions (NO_X, VOC, SO_2, and NH_3). The 2015 precursor emissions are calculated in Appendix II and summarized in the following tables. [The tables in this precursor emissions section are by number (rather than letter) to distinguish this series from the previous $PM_{2.5}$ emissions section.] Some precursor categories were not applicable (NA).

Table 1: $PM_{2.5}$ and Precursor Emissions for Typical Season Day in 2015 Base Year.

	Typical Season Day PM2.5 and Precursor Emissions (lb/day)				
Source Category	**$PM_{2.5}$**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	397.3	50.4	373.0	7.7	20.7
Onroad Motor Vehicles	17.6	613.6	522.7	2.4	9.7
Re-Entrained Road Dust	16.8	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.7	0.1	5.2	0.1	0.1
Other Area Sources	47.4	5.1	134.0	3.5	9.3
Total Emissions	**482**	**669**	**1035**	**14**	**40**

Table 2: $PM_{2.5}$ and Precursor Emissions for Worst Case Day in 2015 Base Year.

	Worst Case Day PM2.5 and Precursor Emissions (lb/day)				
Source Category	**PM2.5**	**NOx**	**VOC**	**SO2**	**NH3**
Residential Wood Combustion	329.8	41.6	307.8	6.6	17.3
Onroad Motor Vehicles	22.2	711.3	543.2	2.9	12.0
Re-Entrained Road Dust	19.2	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.7	0.1	5.2	0.1	0.1
Other Area Sources	4.7	0.5	13.4	0.4	0.9
Total Emissions	**379**	**753**	**870**	**10**	**30**

Most of the 2015 precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories (i.e., 74-99%), as shown in the following two tables.

Table 3: Percentage by Category of $PM_{2.5}$ and Precursor Emissions for Typical Season Day in 2015.

	Typical Season Day PM2.5 and Precursor Emissions (%)				
Source Category	**PM2.5**	**NOx**	**VOC**	**SO2**	**NH3**
Residential Wood Combustion	82.4%	7.5%	36.0%	56.4%	52.1%
Onroad Motor Vehicles	3.7%	91.7%	50.5%	17.4%	24.4%
Re-Entrained Road Dust	3.5%	NA	NA	NA	NA
Permitted Point Sources	0.0%	0.0%	0.0%	0.0%	NA
Railroad Locomotives	0.6%	0.0%	0.5%	0.4%	0.1%
Other Area Sources	9.8%	0.8%	12.9%	25.7%	23.4%
Total Emissions	**100%**	**100%**	**100%**	**100%**	**100%**

Table 4: Percentage by Category of $PM_{2.5}$ and Precursor Emissions for Worst Case Day in 2015.

	Worst Case Day PM2.5 and Precursor Emissions (%)				
Source Category	**PM2.5**	**NOx**	**VOC**	**SO2**	**NH3**
Residential Wood Combustion	87.1%	5.5%	35.4%	66.7%	57.2%
Onroad Motor Vehicles	5.9%	94.4%	62.5%	29.2%	39.6%
Re-Entrained Road Dust	5.1%	NA	NA	NA	NA
Permitted Point Sources	0.0%	0.0%	0.0%	0.0%	NA
Railroad Locomotives	0.7%	0.0%	0.6%	0.6%	0.2%
Other Area Sources	1.3%	0.1%	1.5%	3.6%	3.1%
Total Emissions	**100%**	**100%**	**100%**	**100%**	**100%**

Since most of the 2015 precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories (i.e., 74-99%), these emission categories were evaluated in more detail for all years (2015, 2025, 2030, and 2035). The On-Road Motor Vehicle precursor emissions were included previously in the MOVES emission modeling results (Tables J, K, L, and M). The detailed spreadsheets for Residential Wood Combustion are provided in a supplementary Excel attachment and include separate spreadsheets for each future year (2025, 2030, and 2035) and each precursor category (NO_X, VOC, SO_2, and NH_3) in the same format as included in Appendix II for the 2015 base year, but using the activity levels and other parameters from Tables E, F, and G above. The following tables summarize the base year and future years precursor spreadsheet calculations. Odd-numbered tables compare typical season day precursor emissions; even-numbered tables compare worst case day precursor emissions.

Table 5: Comparison of Base Year to Future Years Typical Season Day NOx Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	50.4	43.4	43.4	43.4
Onroad Motor Vehicles	613.6	171.2	103.2	87.8
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	5.1	5.1	5.1
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	5.1	5.1	5.1	5.1
Total NOx Emissions	**669**	**225**	**157**	**142**

Table 6: Comparison of Base Year to Future Years Worst Case Day NOx Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	41.6	33.4	34.4	32.5
Onroad Motor Vehicles	711.3	193.1	127.9	108.8
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	8.7	8.7	8.7
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	0.5	0.5	0.5	0.5
Total NOx Emissions	**753**	**236**	**172**	**150**

Table 7: Comparison of Base Year to Future Years Typical Season Day VOC Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	373.0	215.3	212.0	207.7
Onroad Motor Vehicles	522.7	173.7	15.7	13.2
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	0.4	0.4	0.4
Railroad Locomotives	5.2	5.1	5.1	5.1
Other Area Sources	134.0	134.0	134.0	134.0
Total VOC Emissions	**1035**	**529**	**367**	**360**

Table 8: Comparison of Base Year to Future Years Worst Case Day VOC Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	307.8	165.9	151.7	137.1
Onroad Motor Vehicles	543.2	183.2	18.8	15.9
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	0.8	0.8	0.8
Railroad Locomotives	5.2	5.1	5.1	5.1
Other Area Sources	13.4	13.4	13.4	13.4
Total VOC Emissions	**870**	**368**	**190**	**172**

Table 9: Comparison of Base Year to Future Years Typical Season Day SO_2 Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	7.7	6.8	6.8	6.8
Onroad Motor Vehicles	2.4	1.1	1.0	1.0
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	3.5	3.5	3.5	3.5
Total SO_2 Emissions	**13.7**	**11.5**	**11.4**	**11.4**

Table 10: Comparison of Base Year to Future Years Worst Case Day SO_2 Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	6.6	5.5	5.2	4.8
Onroad Motor Vehicles	2.9	1.4	1.2	1.2
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	0.4	0.4	0.4	0.4
Total SO_2 Emissions	**9.9**	**7.3**	**6.8**	**6.4**

Table 11: Comparison of Base Year to Future Years Typical Season Day NH3 Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	20.7	16.1	16.1	16.0
Onroad Motor Vehicles	9.7	7.4	4.4	4.3
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	NA	NA	NA	NA
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	9.3	9.3	9.3	9.3
Total NH3 Emissions	**39.8**	**32.8**	**29.8**	**29.6**

Table 12: **Comparison of Base Year to Future Years Worst Case Day NH3 Emissions (lb/day).**

Source Category	2015	2025	2030	2035
Residential Wood Combustion	17.3	12.6	11.7	10.9
Onroad Motor Vehicles	12.0	9.1	5.4	5.3
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	NA	NA	NA	NA
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	0.9	0.9	0.9	0.9
Total NH3 Emissions	**30.3**	**22.7**	**18.1**	**17.1**

In summary, all the precursor emission categories (NO_X, VOC, SO_2, and NH_3) decrease during the 2015-2035 period. This is as expected since most of the precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories (i.e., 74-99% in 2015) reviewed in Appendix II, and the precursor emissions are reduced by the same control strategies that reduce Residential Wood Combustion $PM_{2.5}$ emissions (e.g., progressively cleaner burning home heating units) and On-Road Motor Vehicle $PM_{2.5}$ emissions (e.g., progressively cleaner vehicles and fuels).

Condensable and Filterable $PM_{2.5}$ Emissions

In addition to the precursor assessment, LRAPA staff also did a more detailed analysis of the condensable and filterable fractions of the $PM_{2.5}$ emission inventory. Unfortunately, as reviewed in Appendix II, the EPA guidance indicates there is not reliable condensable-filterable information available for the major $PM_{2.5}$ emission categories in Oakridge-Westfir.

For examples, condensable PM emissions are not an issue associated with mobile sources. The MOVES model used for these sectors produces primary emission estimates for PM, including particle components (e.g., elemental carbon and organic carbon) and gaseous hydrocarbons (e.g., VOC, non-methane organic gases). These pollutant metrics would include both "filterable" and “condensable” PM. These are currently not separable in MOVES, and for SIP inventory purposes, they can be reported as they are output from MOVES without additional modification.

For Residential Wood Combustion, EPA-OAQPS staff confirmed that the condensable requirement for RWC is currently waived for RWC because the data is not available at present, so just the total $PM_{2.5}$ emissions should be reported.

The following table (repeated from Appendix II) summarizes the unavailability or inapplicability of condensable-filterable information for the major sources of $PM_{2.5}$ emissions in Oakridge-Westfir:

Table 13: Availability and Applicability of $PM_{2.5}$ Filterable & Condensable Emissions Information.

	2015 Typical Season Day PM2.5 Emissions (lb/day)			
Source Category	**Total PM2.5**	**Filterable PM2.5**	**Condensable PM2.5**	**Notes**
Residential Wood Combustion	397.3	NA	NA	Not available for RWC.
Onroad Motor Vehicles	17.6	NA	NA	Addressed in MOVES.
Re-Entrained Road Dust	16.8	NA	NA	Not applicable.
Permitted Point Sources	0.0	0.0	0.0	No activity in 2015.
Railroad Locomotives	2.7	NA	NA	Not available.
Other Area Sources	47.4	NA	NA	Not available for vegetative sources.
Total PM2.5 Emissions	**482**	**NA**	**NA**	

	2015 Worst Case Day PM2.5 Emissions (lb/day)			
Source Category	**Total PM2.5**	**Filterable PM2.5**	**Condensable PM2.5**	**Notes**
Residential Wood Combustion	329.8	NA	NA	Not available for RWC.
Onroad Motor Vehicles	22.2	NA	NA	Addressed in MOVES.
Re-Entrained Road Dust	19.2	NA	NA	Not applicable.
Permitted Point Sources	0.0	0.0	0.0	No activity in 2015.
Railroad Locomotives	2.7	NA	NA	Not available.
Other Area Sources	4.7	NA	NA	Not available for vegetative sources.
Total PM2.5 Emissions	**379**	**NA**	**NA**	

MLH:mlh (10/7/2021)

Appendix IV: $PM_{2.5}$ Motor Vehicle Emission Inventories for Future Years and Motor Vehicle Emissions Budget (MVEB)

October 7, 2021

Lane Regional Air Protection Agency
1010 Main Street
Springfield, Oregon 97477

Forecasting Future Year Motor Vehicle Emission Inventories

Growth Projections

Growth is expected to be low in the Oakridge-Westfir area through 2035. Population, housing, and employment forecasts are expected to increase gradually. The 2019 Population Forecasts by the Population Research Center at Portland State University*see note below indicate total expected population growth in the Oakridge and Westfir Urban Growth Boundaries (UGBs) during 2010-2035 of only 0.4% (less than 0.02% average per year), increasing from 3,563 (3,308+255) to 3,578 (3,312+266) population over the 2010-2035 time period.

*Note: The Oregon legislature passed a law (ORS 195.033) in 2013 by way of HB 2253 that assigned the forecast creation task to the Population Research Center at Portland State University (PSU). In 2015, the Land Conservation and Development Commission adopted rules (OAR 660-032) to implement the new law.

The staff of the Lane Council of Governments (LCOG) periodically updates and summarizes the demographic information for Oakridge, Westfir and other Lane County communities, based on American Community Survey (ACS) data from the U.S. Census Bureau.

The emission calculation protocols are included in the supporting documents for the 2016 Plan, and the prior 2012 Oakridge-Westfir $PM_{2.5}$ Attainment Plan ("2012 Plan"). The 2008-2011-2014 National Emission Inventories (NEIs) for Lane County were used as the starting point for calculating both $PM_{2.5}$ emissions and $PM_{2.5}$ precursor emissions for the Oakridge-Westfir $PM_{2.5}$ nonattainment area. The initial Oakridge-Westfir emissions were estimated by applying appropriate emission allocation factors (e.g., relative population, housing, vehicle miles of travel, land area, etc.) to the Lane County $PM_{2.5}$ and precursor emission categories. The significant (and insignificant) source categories during the winter $PM_{2.5}$ problem season were identified in Appendix D-5 of the 2012 Plan.

The comparison of the 2008-2011-2014 NEIs indicates that the anthropogenic precursor emissions are decreasing significantly over time. Based on the 2008-2014 trends, LRAPA expects the 2015-2035 precursor emissions to be even lower than the 2014 precursor emissions. Secondary particulate is an overall very minor contributor to the Oakridge $PM_{2.5}$ air pollution concentrations on worst winter days as summarized in both the 2012 Plan and the 2016 Plan. For example, as outlined in Table 6 of the 2016 Plan, sulfates contribute only 1.1% and nitrates contribute only 0.4% on the top 25% high $PM_{2.5}$ concentration days. Rather, the major $PM_{2.5}$ contributor is organic carbon (88%), primarily from residential wood combustion.

Table A: Contribution by speciated components, based on results of SANDWICH analysis for the top 25% high concentration winter (October-March) days (Table 6 from 2016 Plan).

Parameter	Sulfate	Nitrate	OC	EC	Water	NH3	OPP
Percent	1.1	0.4	88.4	7.6	1.4	0.03	1.1
ug/m3	0.43	0.16	34.46	2.95	0.54	0.01	0.44

Each of the precursor groups in Table 6 was determined to be below the EPA Region 10 insignificance threshold of 1.3 ug/m3:

- Nitrate + ammonia = 0.16 ug/m3 + 0.01 ug/m3 = 0.17 ug/m3 < 1.3 ug/m3.
- Sulfate = 0.43 ug/m3 < 1.3 ug/m3.
- VOC = 1.17 ug/m3 < 1.3 ug/m3.

Traffic growth in Vehicle-Miles-Traveled (VMT) is based on previous transportation modeling by LCOG and the Oregon Department of Transportation (ODOT) in the Highway 58 corridor, as summarized in the following table.

Table B: Oakridge Projected Traffic Growth (Vehicle Miles of Travel, VMT) for 2015-2035.

Daily and Annual VMT by Month								
Month	2015		2025		2030		2035	
	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
April	74,134	106,845	74,879	107,920	75,254	108,465	75,364	109,004
July	98,553	142,602	99,544	144,036	100,057	144,780	100,553	145,493
September	94,834	125,470	95,788	126,732	96,282	127,385	96,761	128,017
December	69,909	110,697	70,612	111,810	70,958	112,353	71,307	112,901
Total Annual	34,558,914		34,906,443		35,083,373		35,239,815	

The Future Traffic Forecasting Methodology is based on Technical Memorandum #6 (December 23, 2014) by DKS Associates for the Lane County Transportation System Plan (TSP) update: Lane County TSP_Future Forecasting Methodolgy_TM 6_Draft (12-23-14).pdf. VMT growth in various portions of Lane County was projected to range from 0.1% to 2.7% annual growth rate. The VMT growth rate in the Oakridge corridor, consistent with the low growth projections for population, housing and employment, is projected at 0.1% per year; this is the basis for the VMT projections by LCOG in Table B.

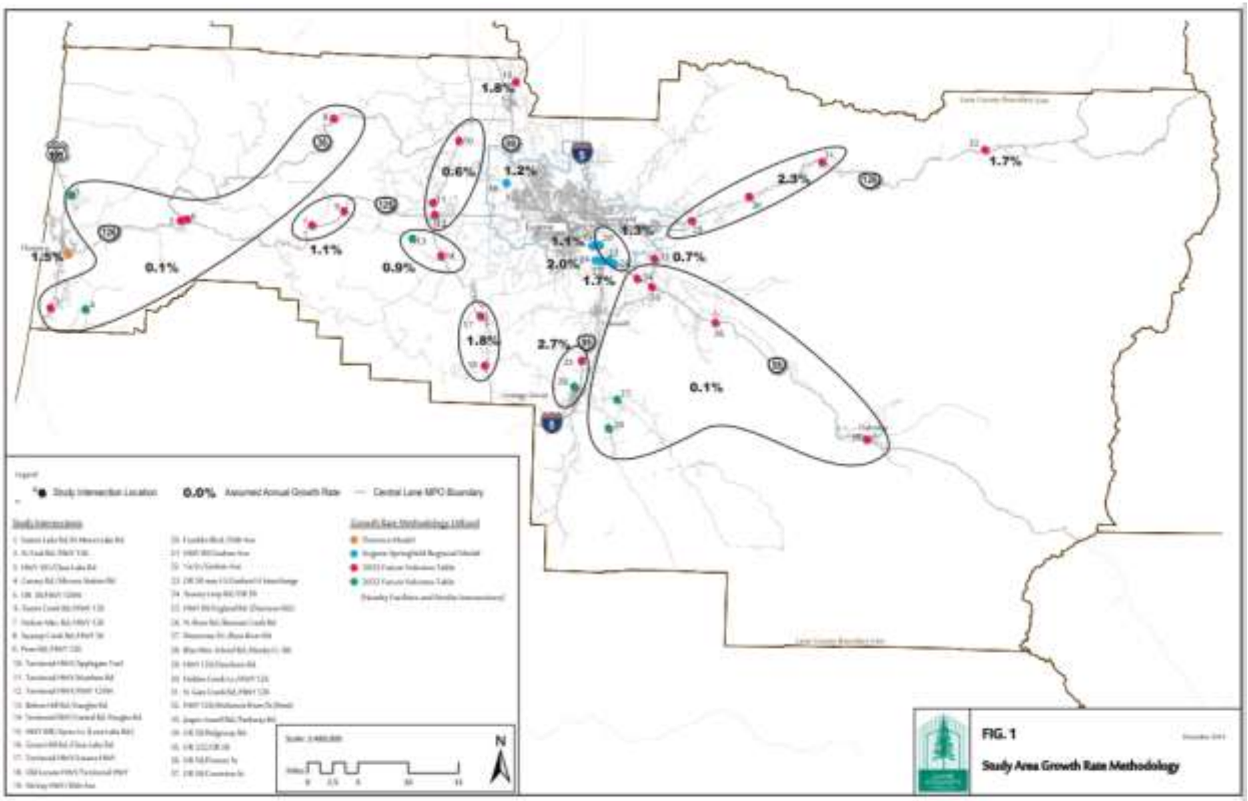

Figure A: Lane County Traffic Growth Rate Methodology.

Mobile Sources

The U.S. Environmental Protection Agency's (EPA's) MOtor Vehicle Emission Simulator (MOVES) is a state-of-the-science emission modeling system that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases, and air toxics. MOVES is used by state and local agencies to estimate nitrogen oxides (NOx), particulate matter ($PM_{2.5}$ and PM_{10}), volatile organic compounds (VOCs), carbon monoxide (CO), and other pollutants/precursors from cars, trucks, buses, and motorcycles for State Implementation Plan (SIP) purposes and conformity determinations outside of California. MOVES incorporates the latest data on vehicle populations, travel activity, and emission rates as well as updated fuel supply information at the county level, and accounts for vehicle starts and idling. MOVES is considered the most accurate tool for estimating emissions from the transportation sector for most purposes.

EPA has adopted federal requirements for progressively cleaner vehicles and cleaner fuels under the authority of the federal Clean Air Act since 1970. As a result of EPA's regulatory programs and various state regulations, motor vehicles and their fuels (both gasoline and diesel) sold today in the U.S. are far cleaner than vehicles and fuels produced in previous decades. The emission-reduction benefits of these requirements for cleaner vehicles and cleaner fuels are quantified at the county level in MOVES.

Exhaust, brake wear and tire wear emissions of $PM_{2.5}$ from motor vehicles were calculated by staff of the Oregon Department of Environmental Quality (DEQ) in 2016 based on MOVES 2014a for years 2008 and 2015. Traffic growth in Vehicle-Miles-Traveled (VMT) was based on previous transportation modeling by LCOG and ODOT in the Highway 58 corridor and revised with this plan (see LCOG's explanation of VMT revisions). The 2015 exhaust, brake wear and tire wear emissions of $PM_{2.5}$ from motor vehicles were modeled again by DEQ staff in 2018 as part of the forecasting of future years emissions (2025-2035). Road dust emissions were estimated again in 2021 using EPA's AP-42 formulas for both paved roads (see AP-42 Section 13.2.1 for Paved Roads and Section 13.2.2 for Unpaved Roads) and updated VMT data for 2015 and 2020.

Federal control measures included in the MOVES2014a modeling are all federal measures that affect the fleets and fuels used in future years once implemented by EPA. Examples of federal control measures include requirements for cleaner engines and fuels.

The $PM_{2.5}$ MOVES 2014a emission modeling results for 2015, 2025, 2030, and 2035 are summarized in the following table. The 2030 MOVES input files (that also include the 2015 and 2025 inputs) are all available in this link. The 2035 MOVES input files are all available in this link.

Table C: Oakridge $PM_{2.5}$ MOVES 2014a emission modeling combined results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015 Total	PM2.5 Exhaust, Brake, Tire	15.4	19.6	17.0	22.8	16.9	20.8	16.6	22.2	17.6	22.2
2025 Total	PM2.5 Exhaust, Brake, Tire	5.3	6.7	6.1	8.0	6.0	7.3	5.6	7.3	6.1	7.3
2030 Total	PM2.5 Exhaust, Brake, Tire	4.4	5.9	5.5	7.5	5.4	6.7	4.2	6.1	5.1	6.1
2035 Total	PM2.5 Exhaust, Brake, Tire	3.8	5.1	4.8	6.6	4.6	5.8	3.7	5.3	4.4	5.3

The more detailed categories of the $PM_{2.5}$ MOVES 2014a emission modeling results for 2015, 2025, 2030, and 2035 are in the following table.

Table D: Oakridge $PM_{2.5}$ MOVES 2014a emission modeling results (lb/day) by category for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Primary Exhaust PM2.5 - Total	13.8	17.6	15.2	20.3	15.1	18.5	15.1	20.2	15.8	20.2
2015	Primary PM2.5 - Brakewear Particulate	1.1	1.4	1.3	1.7	1.3	1.5	1.1	1.4	1.2	1.4
2015	Primary PM2.5 - Tirewear Particulate	0.5	0.6	0.6	0.8	0.6	0.7	0.4	0.7	0.5	0.7
2015 Total		**15.4**	**19.6**	**17.0**	**22.8**	**16.9**	**20.8**	**16.6**	**22.2**	**17.6**	**22.2**
2025	Primary Exhaust PM2.5 - Total	3.6	4.5	4.0	5.3	4.0	4.8	3.9	5.0	4.1	5.0
2025	Primary PM2.5 - Brakewear Particulate	1.2	1.5	1.4	1.8	1.4	1.7	1.2	1.6	1.3	1.6
2025	Primary PM2.5 - Tirewear Particulate	0.5	0.7	0.7	0.9	0.6	0.8	0.5	0.7	0.6	0.7
2025 Total		**5.3**	**6.7**	**6.1**	**8.0**	**6.0**	**7.3**	**5.6**	**7.3**	**6.1**	**7.3**
2030	Primary Exhaust PM2.5 - Total	2.3	3.2	3.0	4.2	2.9	3.7	2.2	3.3	2.7	3.3
2030	Primary PM2.5 - Brakewear Particulate	1.7	2.1	2.0	2.6	1.9	2.4	1.6	2.2	1.9	2.2
2030	Primary PM2.5 - Tirewear Particulate	0.4	0.6	0.5	0.8	0.5	0.7	0.4	0.6	0.5	0.6
2030 Total		**4.4**	**5.9**	**5.5**	**7.5**	**5.4**	**6.7**	**4.2**	**6.1**	**5.1**	**6.1**
2035	Primary Exhaust PM2.5 - Total	1.7	2.4	2.2	3.2	2.2	2.8	1.6	2.5	2.0	2.5
2035	Primary PM2.5 - Brakewear Particulate	1.7	2.1	2.0	2.6	2.0	2.4	1.6	2.2	1.9	2.2
2035	Primary PM2.5 - Tirewear Particulate	0.4	0.6	0.5	0.8	0.5	0.7	0.4	0.6	0.5	0.6
2035 Total		**3.8**	**5.1**	**4.8**	**6.6**	**4.6**	**5.8**	**3.7**	**5.3**	**4.4**	**5.3**

The MOVES 2014a emission modeling for 2015, 2025, 2030, and 2035 also included $PM_{2.5}$ precursor emission results. The precursor emissions are summarized in the following tables.

Table E: Oakridge NO_X MOVES 2014a emission modeling results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Oxides of Nitrogen (NOx)	539.7	671.8	669.7	861.0	642.4	765.6	535.5	711.3	613.6	711.3
2025	Oxides of Nitrogen (NOx)	154.8	182.7	183.3	225.6	177.8	203.5	155.0	193.1	171.2	193.1
2030	Oxides of Nitrogen (NOx)	87.5	121.8	108.7	153.0	106.6	137.8	84.4	127.9	103.2	127.9
2035	Oxides of Nitrogen (NOx)	74.6	103.7	92.3	132.7	90.6	117.0	71.9	108.8	87.8	108.8

Table F: Oakridge VOC MOVES 2014a emission modeling results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Volatile Organic Compounds	507.5	508.0	530.7	558.9	523.5	526.4	533.3	543.2	522.7	543.2
2025	Volatile Organic Compounds	170.6	169.5	167.6	175.2	168.2	168.4	182.3	183.2	173.7	183.2
2030	Volatile Organic Compounds	13.2	18.3	17.8	24.9	16.8	21.6	12.6	18.8	15.7	18.8
2035	Volatile Organic Compounds	11.2	15.4	14.9	21.4	14.1	18.2	10.6	15.9	13.2	15.9

Table G: Oakridge SO_2 MOVES 2014a emission modeling results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Sulfur Dioxide (SO2)	2.0	2.8	2.6	3.7	2.5	3.2	2.0	2.9	2.4	2.9
2025	Sulfur Dioxide (SO2)	1.0	1.3	1.2	1.7	1.2	1.5	0.9	1.4	1.1	1.4
2030	Sulfur Dioxide (SO2)	0.8	1.2	1.1	1.6	1.1	1.4	0.8	1.2	1.0	1.2
2035	Sulfur Dioxide (SO2)	0.8	1.1	1.1	1.6	1.0	1.3	0.8	1.2	1.0	1.2

Table H: Oakridge NH_3 MOVES 2014a emission modeling results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Ammonia (NH3)	8.0	11.6	10.7	15.5	10.3	13.6	7.6	12.0	9.7	12.0
2025	Ammonia (NH3)	6.1	8.8	8.1	11.8	7.8	10.3	5.7	9.1	7.4	9.1
2030	Ammonia (NH3)	3.6	5.2	4.8	6.9	4.6	6.1	3.4	5.4	4.4	5.4
2035	Ammonia (NH3)	3.6	5.1	4.7	7.0	4.6	6.0	3.4	5.3	4.3	5.3

Motor Vehicle Emissions Budget (MVEB)

The Oakridge worst-case day $PM_{2.5}$ emission inventory is based on winter weekend days during December. The Motor Vehicle Emission Budget (MVEB) for 2015 was included in the 2016 Plan as 22.2 lb/day on worst case days.

The MVEB reflects the total on-road $PM_{2.5}$ emissions projected for 2025, 2030 and 2035 plus a portion of the available safety margin. A conservative margin of safety was added to the MVEB to accommodate uncertainty.

A safety margin is the amount by which the total projected $PM_{2.5}$ emissions from all sources are less than the total emissions for the 2015 attainment year, the level required to demonstrate continued maintenance of the standard. A small portion of the inventory safety margin was allotted to the on-road motor vehicle emissions inventory projections to accommodate the wide array of assumptions that are factored into the calculation process. Since assumptions and models change over time, it is necessary to have a margin of safety that will accommodate technical uncertainties due to model updates and inputs into the EPA MOVES model and travel forecasting models, as well as potential changes to regional transportation plans.

As outlined in Figure A, the VMT growth rates in various parts of Lane County are projected at 0.1% to 2.7% per year through 2036. The growth rate for the Oakridge-Westfir-Hwy58 corridor is currently projected to be at the low end of this range, 0.1% per year. If the actual 2015-2035 VMT growth rate was to be closer to the median (1.3% per year) in Figure A, this would significantly increase motor vehicle emissions in 2025-2035. This median Lane County VMT growth projection was used to adjust the 2025-2035 MVEB and use a small portion of the inventory safety margin for this purpose.

The Worst Case Day $PM_{2.5}$ emissions in Table C were increased by the difference between the projected VMT growth rate in Oakridge-Westfir (0.1% per year) and the median Lane County VMT growth rate (1.3% per year), or a difference of 1.2% per year. The Worst Case Day $PM_{2.5}$ emissions were increased for 2025 were increased by a factor of 1.12 (i.e., additional annual growth rate of 1.2% for ten years), 2030 emissions by a factor of 1.18, and 2035 emissions by a factor of 1.24.

The respective MVEB growth rate factors for PM2.5 using 2015 base year and the 1.2% VMT growth rate were calculated as follows:

- 2025 Growth Rate Factor = 1.0 + (1.2% per year x 10 years) = 1.12
- 2030 Growth Rate Factor = 1.0 + (1.2% per year x 15 years) = 1.18
- 2035 Growth Rate Factor = 1.0 + (1.2% per year x 20 years) = 1.24

The MVEB Growth Rates for PM2.5 are calculated as follows using the respective VMT Growth Rate Factors and Oakridge-Westfir PM2.5 MOVES 2014a adjusted results in Tables C & D were calculated as follows:

- 2025 MVEB = 2025 MOVES 2014a UGB-adjusted result (7.3 lb/day) x 2025 Growth Rate Factor (1.12) = 8.2 lb/day
- 2030 MVEB = 2030 MOVES 2014a UGB-adjusted result (6.1 lb/day) x 2030 Growth Rate Factor (1.18) = 7.2 lb/day
- 2035 MVEB = MOVES 2014a UGB-adjusted result (5.3 lb/day) x 2035 Growth Rate Factor (1.24) = 6.5 lb/day

The resultant MVEB for future years are outlined in the following table.

Table I: Oakridge $PM_{2.5}$ Motor Vehicle Emissions Budget (lb/day) for 2015-2035.

Motor Vehicle Emissions Budget (lb/day)		
Year	**Pollutant_Name**	**Worst Case Day**
2015 Total	PM2.5 Exhaust, Brake, Tire	**22.2**
2025 Total	PM2.5 Exhaust, Brake, Tire	**8.2**
2030 Total	PM2.5 Exhaust, Brake, Tire	**7.2**
2035 Total	PM2.5 Exhaust, Brake, Tire	**6.5**

Even with the safety margin applied to the MVEB in future years, the budgets still demonstrate maintenance of the NAAQS. Since 2015 is the new base year, and attainment with the standard was achieved for 2014-2016, emissions in future years need to be below the 2015 base year to maintain compliance with the NAAQS.

As shown in the table below (Table S from Appendix III), even with the safety margins applied, the area will still meet the NAAQs since the MVEB increases including the safety margins will be well below the 2015 base year.

Table J: Comparison of Base Year to Future Years Worst Case Day $PM_{2.5}$ Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	329.8	246.2	229.1	211.8
Onroad Motor Vehicles	22.2	7.3	6.1	5.3
Re-Entrained Road Dust	19.2	19.3	19.4	19.4
Permitted Point Sources	0.0	0.8	0.8	0.8
Railroad Locomotives	2.7	2.7	2.7	2.7
Other Area Sources	4.7	4.7	4.7	4.7
Total $PM_{2.5}$ Emissions	**379**	**281**	**263**	**245**

Using 2025 as an example, increasing the contribution of PM2.5 from Onroad Motor Vehicles from 7.3 lb/day (i.e., without safety margin applied) to 8.2 lb/day (i.e., with the safety margin applied), results in total PM2.5 emissions of 282.1 lb/day which is less than the 379 lb/day in the 2015 base year.

Interagency Consultation

Consultation about the MVEB is required by Oregon (OAR 340-252-0060) and EPA (40 CFR 93.118(e)(4)(ii)) rules. This consultation is required to occur among federal, State, and local agencies and before the maintenance plan is submitted to EPA. LRAPA participates in the Oregon Interagency Consultation (IAC) group and provided a summary of the MVEB and the safety margin concept proposal at the July 28, 2021 meeting. The entire draft plan and appendices for both PM10 and PM2.5 were sent to the IAC, including EPA Region 10, on July 29, 2021 for their review.

On July 30, 2021 EPA provided comments from their second early engagement review to LRAPA. All of the EPA comments and suggested changes were investigated, considered and included in the plans and appendices.

VMT

In reviewing and responding to comments after the public comment period ended, it was discovered that the VMT used in the MOVES2014a modeling in 2018 was different and lower for 2015 and 2020 than the newer VMT provided to LRAPA by LCOG (Lane Council of Governments) in May of 2021. Table K below compares the differences between the two sets of VMT data:

Table K: Comparison of VMT used in 2018 MOVES2014a Modeling and VMT Provided in 2021.

Year	2018 MOVES input VMT	2021 VMT	% Increase	Ratio
2015	30,168,182	34,558,914	14.55	1.1455
2025	33,153,338	34,906,443	5.29	1.0529
2030	35,083,532	35,083,373	0.00	1.0000
2035	35,257,520	35,239,815	-0.05	0.9995

The Re-Entrained Road Dust category is dependent on the VMT, but it is calculated based on AP-42 formulas and this plan includes the new VMT provided by LCOG in 2021 already.

However, since the 2018 MOVES2014a model outputs for the Onroad Motor Vehicles category used in this maintenance plan are based on lower VMT in 2015 and 2020, LRAPA is demonstrating that the increases from using the 2021 VMT would still be within the MVEB.

Applying the VMT ratios from Table K to the MOVES 2014a UGB-adjusted results for each future year shows that the increase is still less than the MVEB:

- 2025 MVEB Demonstration = 2025 MOVES 2014a UGB-adjusted result (7.3 lb/day) x 1.0529 = 7.7 lb/day which is less than the 8.2 lb/day in the MVEB
- 2030 MVEB Demonstration = 2030 MOVES 2014a UGB-adjusted result (6.1 lb/day) x 1.00 = 6.1 lb/day which is less than the 7.2 lb/day in the MVEB
- 2035 MVEB Demonstration = 2035 MOVES 2014a UGB-adjusted result (5.3 lb/day) x 0.9995 = 5.2 lb/day which is less than the 6.5 lb/day in the MVEB

MLH:mlh (10/07/2021)

Appendix V: Oakridge Air Targeted Airshed Grant Overview

Overview

Challenge and progress: For the last three decades, the health of residents in Oakridge in rural Oregon, has been compromised due to poor air quality from high concentrations of PM2.5 during the winter months and from wildfire smoke as climate change progresses. Local climate and topography (the city sits in a bowl of ridgelines) make the Oakridge area prone to wintertime temperature inversions, low wind speeds and poor atmospheric dispersion which exacerbates the concentrations of smoke from uncertified woodstoves and improper burning techniques (more than 80% of PM2.5 is attributed to woodsmoke in winter). The City of Oakridge's airshed is moving into attainment and has made considerable progress since 2007, where the 24-hour PM2.5 measurement was 47 micrograms per cubic meter (μg/m3). This progress is due to community stakeholders working programmatically and individually to improve air quality.

Program intent, goals and approach: The Oakridge Air program will advance efforts to permanently reduce particulate matter. The project will span five years between 2019 and 2024 to establish the infrastructure and programs that can sustain those reductions for the next generation of Oakridge residents. It is the expressed goal of this project to decrease and sustain the 24-hour PM2.5 count to below 30 μg/m3. Specifically, project stakeholders are eager to move toward "finishing the job." Historically, the stakeholders have disproportionately contributed resources to this effort (versus other communities they are supposed to serve) and have exhausted their ability to contribute dollars. However, stakeholders are resolute in their continued contribution to seeing this air quality issue resolved. This program will prioritize efforts to target low-income populations and those that suffer from environmental injustice.

Permanent	Operational - Ongoing	Episodic
Ductless Heat Pumps (DHP)	Community firewood program	Curtailment
Certified woodstove replacements	Education - small, hot, low/no damper fires	Air filters - schools and residences
Weatherization	Opacity	

Oakridge Air strategies: The Oakridge Air efforts are divided into seven specific strategies:

- Home Heating Upgrades
- Community Firewood Program
- Community and School Education
- Cleaner Indoor Air
- Code Enforcement
- Air Quality Monitoring
- Coordination

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	1. Home Heating Upgrades	2. Community Firewood Program	3. Local Code Enforcement	4. School Education	5. Cleaner Indoor Air	6. Air Quality Monitoring	7. Coordination and Project Management
Summary elements	Provide more than 145 homes with: • Weatherization and home repairs • Ductless or ducted heat pumps • Certified woodstoves	• Provide 200 cords annually of clean, seasoned dry wood to the community • Reach senior, disabled, and low-income residents • Provide clean burning education	• Hire/employ a designated code enforcement officer • Provide compliance and enforcement program with education focused diversion program • Report code enforcement results	• Develop lessons and class activities for local schools	• HVAC system retrofits for public buildings to act as cleaner air spaces for students and public • Air purifier distribution to vulnerable residents	• Increase PM2.5 monitoring to daily • EPA approved PM monitor • Install and monitor low-cost air sensors to measure PM levels • Data analysis comparing health to smoke PM data	• Program management, coordination and collaboration for all project tasks • Develop community education materials and outreach via multiple approaches and platforms • Inter-agency coordination
Project managers	Rick Zylstra, Upgrades Coordinator, South Willamette Solutions	Inbound LLC, City of Oakridge, Southern Willamette Forest Collaborative	Oakridge Police Department, LRAPA	Middle Fork Willamette Watershed Council (MFWWC), Good Company	Oakridge School District, Orchid Health, Nova, City of Oakridge, Good Company	Lane Regional Air Protection Agency	Good Company
Project costs Total $4,938,190	Total: $3,009,000 (60% of total) *Weatherization / home repair: $1,232,500* *Ductless heat pumps: $652,500* *Certified wood/pellet stoves: $580,000;* *Upgrades Coordinator: $326,500*	Total: $300,500 (6% of total) *Processing equipment $121,000* *Site improvements $35,000* *Transportation of source stock $69,500* *Purchase of wood: $20,000* *Wood delivery: $30,000* *Administration $25,000*	Total: $355,000 (over 5 years) (7% of total)	Total: 115,200 (2% of total)	Total: $239,900 (5% of total) *Air purifiers: $169,900* *School HVAC upgrades: $70,000*	Total: $393,590 (8% of total) *Staff time: $248,251;* *Conference travel $4,188;* *Sampling filters $12,612; EPA approved FRM Continuous PM Monitor: $21,200* *Low cost PM sensors: $5,000;* Indirect $35,311 Fringe: $67,028	Total: $525,000 (over 5 years) (10% of total)

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1. Home Heating Upgrades – 60% of total

Project Description and Outcomes:

- Provide weatherization upgrades and repairs to 145 or more homes to reduce the need for more wood heat.
- Install non-wood heating options such as ducted or ductless heat pumps to 145 or more homes to provide local emission-free heat.
- Replace 145 or more uncertified woodstoves with certified woodstoves or certified pellet stoves for resiliency to a community that frequently experiences power outages and has no access to natural gas.

Approach:

- *Upgrades coordinator:* Rick Zylstra, upgrades coordinator, working on behalf of South Willamette Solutions and contractor coordinator to LRAPA, connects qualified Oakridge residents to the program and evaluate their qualification status for the program. The RUC will be responsible for liaising between residents, hired contractors, Good Company and LRAPA.
- *Prioritization of residences:* Residents will be evaluated for qualifications for this program. A decision scoring sheet was developed to assist the Oakridge Air program to prioritize residences. Prioritization factors include: proximity to heaviest polluted areas, sole source wood heat/uncertified woodstoves, and income.
- *Audit and quality control inspections:* Once accepted, an energy audit will be completed to determine the need and scale of the upgrades and replacements. Reports will be produced per household on available and selected upgrades. Quality control inspections will be held after all upgrades by qualified inspectors.
- *Pilot phase:* The initial work in 2020-2021 is to develop a pilot that can serve to ensure the best functionality and process to meet the bar for residents, contractors, partners and funders.

Additional Details:

- *Serving mobile/manufactured homes:* Stick-built homes will be prioritized but this program does not exclude mobile homes. Due to the low stock of affordable housing in Oakridge, mobile homes are sometimes the only available residential option for low-income residents.
- *Removal of uncertified woodstoves:* As part of the residential upgrades, all homes in the program will be required to remove all uncertified woodstoves. Replacements can be a heat pump and/or a certified woodstove or certified pellet stove. Proof of destruction will be provided with removed uncertified woodstoves.
- *Carbon monoxide detector:* All homes with solid fuel burning devices will also be provided a mandatory Carbon Monoxide (CO) detector to be installed in their homes.

2. Community Firewood Program – 6% of total

Project Description and Outcomes: The expansion of the Community Firewood Program (CFP) will increase accessibility to clean, seasoned dry firewood for residents to burn instead of wet, green wood. The CFP will bolster a partnership between the Southern Willamette Forest Collaborative (SWFC), Inbound LLC, and the City of Oakridge. The CFP will provide more dry, seasoned firewood to members in the Oakridge community that choose to burn wood but cannot afford or have regular access to dry, seasoned firewood. Burning dry wood is the easiest solution for community members to burn clean. In a location like Oakridge, where electric outages are common and alternative heat sources not very accessible or possible, wood burning becomes a necessity. Without the ability to burn dry, seasoned wood, many people turn to burning whatever they have available – wet or green wood or even garbage, if situations get desperate. The CFP provides cords of well-seasoned, dry wood at greatly reduced rates for community members who meet low income or accessibility requirements.

Approach:

- *Relocation of the processing facility and facility upgrades:* In 2020, the CFP relocated the processing facility from the City's old public works building to the Oakridge Industrial Park. The City has made retrofits to the industrial park facility including retrofits like improving the building drainage with new gutters, electrical upgrades, and securing the site with fencing ($35,000).
- *Firewood sourcing and transportation:* This aspect allocates resources for source wood purchase to guarantee enough stock for firewood production and processing. The CFP bids on decks of wood from logging activities by the US Forest Service or private landowners and the Oregon Department of Forestry. The wood is then hauled, processed, and seasoned properly before being sold.
- *Firewood processing equipment:* The CFP purchased yard equipment for the processing and transportation of wood including a new Tajfun log processor and log loader, used Catepillar 279D skidsteer with new 78" HD grapple, used Champ forklift, and new 2020 Lamar dump trailer.
- *Firewood delivery:* Delivery costs have been met with resistance from the community, especially for lower-income residents who already face challenges with the higher costs of heating during the winter. Subsidize deliveries for seniors, disabled, and low-income residents.
- *Administrative functions*: South Willamette Solutions is the primary manager (with support from Good Company) to track labor, site process efficiency and implement best practices.

3. Local Code Enforcement – 7% of total

Project Description and Outcomes: The City of Oakridge's police department is authorized to regulate the city code determining the home wood heating rules in Oakridge. The City's code enforcement officer is a subawarded position with the City of Oakridge, and responsible for the compliance on home wood heating advisory rules. They would also expand the education and diversion program for violators. The code enforcement officer will have the proper training including EPA Method 9 to enforce the local smoke opacity limit code, daily home wood heating advisories, and respond to complaints from residents. The officer will also be a key player in the education and on-the-ground outreach point of contact with the community around proper burning methods and alternative heating sources. Violators, especially first-time violators, may be subject to a fine or a larger educational approach-including a diversion program created by the Oakridge Police Department, LRAPA and Good Company. Repeat offenders may be subject to larger fines and less leniency.

Approach:

- Strengthening local code enforcement with designated code enforcement officer with frequent EPA method 9 opacity trainings and clean burning requirements.

- Enhanced compliance and diversion program: the Oakridge municipal court manages a diversion program for first-time offenders, offering an educational course instead of a fine.
- Reporting of code enforcement activities to show number of contacts, enforcement actions and results.

4. School Education – 2% of total

Project Description and Outcomes: Oakridge Air works with the Middle Fork Willamette Watershed Council (MFWWC), to focus on K-12 education in Oakridge, and integrate air quality and science/STEM learning. The mission of the Middle Fork Willamette Watershed Council is to work with communities for a healthy Middle Fork Willamette Watershed through environmental education and habitat restoration. MFWWC has served the Oakridge community with their Watershed Education Program for over 10 years. MFWWC's established contacts and connections pair well with the clean air message and PM2.5 reduction this Oakridge Air is looking to achieve.

Approach:

- MFWWC will collaborate with Oakridge School District teachers and administrators to develop a series of air quality classes that aligns with Next Generation Science Standards (NGSS). The program will utilize best practices for science education and pull from the array of air quality curriculum currently available, to create a locally-relevant original program that is useful to teachers and engaging for students.
- MFWWC will consult with teachers (establish grades to focus on based on teacher capacity, curriculum integration), discuss feasibility for implementation, review established curriculum - pilot with a few select teachers, explore ways to integrate with K-12 standards.
- MFWWC will coordinate with teachers and administrators to schedule a presentation at the all-school assembly and classroom visits. Following the presentation, the council will teach a 1-hour classroom lesson in each 4th, 5th, and 6th grade classroom (6 total classes). MFWWC will deliver an air quality curriculum for all Oakridge students including hands-on classroom lessons tied to NGSS and take-home materials for students to share with parents (two classes per grade level per year for estimated 52 lessons per year taught for complete K-12 program).

5. Cleaner Indoor Air – 5% of total

Project Description and Outcomes: This program aspect moves to install air filtration for residences and public spaces to reduce the impact of $PM_{2.5}$ on residents' health. In times of poor air quality, whether it is from woodsmoke from home heating or from wildfire, the population currently cannot escape the air without leaving their community. While other efforts will decrease wintertime PM2.5 from home-heating, only indoor air filtration can effectively counteract the impacts from PM2.5 year-round, especially with the increase in dry-season wildfires and during extremely cold days during the winter where electric heat struggles to properly warm the home. This effort targets specific public access places where vulnerable populations may be more adversely impacted by smoke such as schools and community buildings (library, City hall, police department). The goal is to have enough air purifiers to provide most homes in Oakridge with needed refuge from inescapable smoke during wildfires or winter woodsmoke events.

Approach:

- *School and cleaner air spaces:* Retrofit HVAC system at elementary and high school to MERV 13 air filtration for regular, ongoing air filtration for students but also to use as cleaner air spaces.
- *Standalone air purifiers and replacement filters for vulnerable populations:* The remaining budget is reserved for residents and public spaces. These purifiers are purchased in bulk and distributed based on medical need –

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cardiac and respiratory issues – using a prioritization method identifying vulnerable populations where residents with pre-existing health conditions, residence location (proximity to highest concentration of smoke), and income. Residents will sign contracts stating that the filters will not be sold or taken if the home is sold within the grant period.

6. Air Quality Monitoring – 8% of total

Project Description and Outcomes:

- Increase current PM2.5 monitoring frequency from 1 in 3 days to daily on the existing $PM_{2.5}$ FRM monitor.
- Collocate a continuous EPA approved FEM PM2.5 monitor for hourly data collection at the existing location of the FRM PM2.5 monitor. The FEM PM2.5 monitor wasl installed during the first year of the program.
- Install 20 PurpleAir (PA) PM monitors inside and outside to determine the $PM_{2.5}$ Reduction of the indoor air filters, referenced in Section 5 above. The PA PM monitors will be located at a variety of sites, including schools, the library, and select private residences. One PA PM sensor will be located inside and another PA PM sensor outside 10 different locations, totaling 20 monitors. The air quality data from inside versus outside sensor will then be compared to determine the effective reduction of PM2.5 the air filters provide. Initial indoor baseline PM2.5 levels for each site will be determined during the upcoming home wood heating season. Sites where the PA monitors are located will not have air filters installed for the 2019 home wood heating season. This will give a baseline for comparison in future years when the air filters have been installed. A simple QAPP will be developed to ensure the validity of the PA monitor data and its use.
- Use public schools, and local health officials and clinics, to anonymously track health data in relation to air emissions data.
- Attended the EPA's Hearth, Patio and BBQ 2020 Expo/Training in March of 2020 with two LRAPA staff to train/expand understanding of air quality monitoring and wood smoke mitigation.

7. Coordination and Project Management – 10% of total

Project Description and Outcomes: Good Company serves as the program manager for Oakridge Air, a contract coordinator to LRAPA. At a highest level, Good Company serves to maintain inter-agency coordination, ensure schedules and timelines for critical paths or dependencies are being met and coordinate across strategic programs. Good Company assists South Willamette Solutions homes heating upgrade team in coordination with LRAPA. Additionally, Good Company coordinates meetings with local and regional partners. Good Company will also serve as the main project manager and oversee the delivery of individual tasks for the community firewood program, local code enforcement and cleaner indoor air program elements. Good Company coordinates monthly and quarterly meetings with the core and general woodsmoke mitigation groups. Additionally, Good Company oversees program tracking and provides updates on a monthly/quarterly basis to LRAPA, Oakridge City Council and the LRAPA Board of Directors. Apart from these main strategic roles, Good Company provides expertise and manage the community and school education components of the project such as assist in Oakridge becoming a Firewise community.

Approach:

- Lead inter-agency coordination between the City of Oakridge, Lane Regional Air Protection Agency, Oregon Department of Environmental Quality, US EPA, US Forest Service, Lane Electric Co-Op, Homes for Good housing authority, and other local non-profit and business partners. Host monthly meetings with stakeholders with reporting and updates.
- Coordinate with and oversee the Residential Upgrade Coordinator (RUC) position and residential heating upgrades.

Oakridge Air

- Lead for expanding the firewood program in coordination with Southern Willamette Forest Collaborative (SWFC). Organizing the sale and education of clean fuel for wood burning.
- Lead on the local code enforcement strengthening and diversion program creation with City of Oakridge Police Department. Create educational course instead of fines for diversion program.
- Community and school education about wood burning advisories, wood burning techniques and alternative heating. School education paired with the Middle Fork Willamette Watershed Council.
- Lead on the air filter project with City of Oakridge and Oakridge School District.
- Provide monthly and quarterly report updates to the LRAPA Board of Directors, Oakridge City Council and other stakeholders. Send reports to LRAPA.
- Develop an electronic version of a "How-to-Guidebook" for replication of projects in other $PM_{2.5}$ non-attainment communities.

Justin Overdevest, Good Company (01/28/2021)

Appendix VI: Oakridge and Lane County Air Pollution Control Ordinances

The Oakridge City Air Pollution Control Ordinances were revised to be more protective as the national air quality health standards were expanded from PM_{10} to $PM_{2.5}$, the $PM_{2.5}$ standards were tightened in 2006, and the 2012 and 2016 $PM_{2.5}$ Attainment Plans were adopted. The history is summarized here:

Time Period In Effect	Oakridge Ordinance	Ordinance Date	Emission Inventories
2007-2012	#889	04-Oct-07	2008-2012
2012-2015	#903	15-Nov-12	2013-2015
2015-2016	#914	15-Oct-15	2016
2016-2035	#920	20-Oct-16	2017-2035

In addition, the Lane County Code 9.120-9.150 was revised on February 19, 2017 to require essentially the same opacity limits and episodic curtailment requirements (as Oakridge City Ordinance No. 920) in the unincorporated Urban Growth Boundary (UGB) around the city limits of the City of Oakridge.

The current City of Oakridge Ordinance No. 920 and Lane County Code 9.120-150 are included in this Appendix VI.

Merlyn Hough (February 15, 2021)

Ordinance No.920

AN ORDINANCE AMENDING SECTION 7 OF ORDINANCE 914 AND ADOPTING NEW STANDARDS FOR THE OAKRIDGE AIR POLLUTION CONTROL PROGRAM

WHEREAS, The health, safety and welfare of the citizens of the City of Oakridge are adversely affected by the degradation of air quality and violations of federal ambient air quality standards, as measured by the Lane Regional Air Protection Agency (LRAPA), occur periodically in the City of Oakridge; and

WHEREAS, Wood and other solid fuel combustion for space heating produces particulate matter and other emissions which are physically harmful and aesthetically unpleasant, and which contribute to the degradation of air quality andthe violation of federal ambient air quality standards; and

WHEREAS, The periodic restriction of the use of solid fuel burning devices will improveair quality and LRAPA has the expertise to determine when such air quality is at such a level that such restriction is necessary to preserve the health, safety and welfare of the citizens of the City of Oakridge; and

WHEREAS, The Federal Government has recently lowered the thresholds under which conditions are defined; and

WHEREAS, The City of Oakridge wishes to develop the following rules and regulations in an effort to comply with LRAPA regulations and to protect its citizens from harmful air particulates.

NOW, THEREFORE THE CITY OF OAKRIDGE ORDAINS AS FOLLOWS:

Section One. Definitions.

For the purpose of this section the following definitions apply:

(1) "City Administrator" means City Administrator or designee, including, if the City Administrator so designates, LRAPA.

(2) "EPA method" means 40 CFR Part 60, Subpart AAA, Sections 60.531, 60.534 and 60.535.

(3) "Fireplace" means a solid fuel burning device with an air/fuel ratio of greater that thirty which is a permanent structural feature of a building. A fireplace is made up of a concealed masonry or metal flue, and a masonry or metal firebox enclosed in decorative masonry or other building materials. (Cannot operate on Red or Yellow Advisory days effective 10-01-2017 if attainment is not met).

(4) "Green Advisory" means a 24 hour period beginning at 4:00 p.m. when PM 10 levels are forecast by LRAPA to be less than 100 micrograms per cubic meter and PM 2.5 levels are forecast to be less than 20 micrograms per cubic meter.

(5) "LRAPA" means Lane Regional Air Protection Agency, a regional air quality control authority established under the provisions of, and with authority and powers derived from, Oregon Revised Statutes 468A.100 et seq.

(6) "Opacity" means the degree to which an emission reduces transmission of light or obscures the view of an object in the background.

(7) "Oregon method" means Oregon Department of Environmental Quality "Standard Method for Measuring the Emissions and Efficiencies of Woodstoves", Sections 1 through 8 and O.A.R. Chapter 340. Division 21 Sections 100, 130, 140, 145, 160, 161,163,164,165.

(8) "Pellet stove" means an enclosed solid fuel burning device designed and operated to burn manufactured solid fuel and having an air-to-fuel ratio greater than 35-to1 as determined by the federal test method described in 40 CFR Part 60.534.

(9) "Person" means any individual, partnership, corporation, association, governmental subdivision or public or private organization of any charter.

(10) "Person in Charge of Property" means an agent, occupant, lessee, tenant, contract purchase, or other person having possession or control of property.

(11) "PM 2.5" means solid or liquid particulate matter (excluding uncombined water) with an aerodynamic diameter less than or equal to 2.5 micrometers.

(12) "PM 10" means solid or liquid particulate matter (excluding uncombined water) with an aerodynamic diameter less than or equal to 10 micrometers.

(13) "Red Advisory" means a 24 hour period beginning at 4:00 p.m. when PM 1O levels are forecast by LRAPA to be greater than or equal to 125 micrograms per cubic meter,or when PM 2.5 levels are forecast by LRAPA to be greater than or equal to 25 micrograms per cubic meter, within the Oakridge Area General Plan Urban Growth Boundary.(22 Micrograms effective 10-01-2017 if attainment not met).

(14) "Seasoned wood" means wood of any species that has been sufficiently dried so as to contain twenty percent or less moisture by weight.

(15) "Sole source of heat" means one or more solid fuel burning devices that:

(a) Constitutes the only source of heat in a private residence for purpose of space heating, or

(b) Constitutes the main source of heat in a private residence where the residence is equipped with a heating system that is only minimally sufficient to keep the plumbing from freezing.

(16) "Solid fuel burning device" means any device designed or operated to burn solid fuel for the heating of the interior of a building, including, but not limited to, solid fuel burning stove, fireplaces or wood stoves of any nature, combinations fuel furnaces or boilers used for space heating which can burn solid fuel, and solid fuel burning cooking stoves. "Solid fuel burning device" does not include natural gas fired artificial fireplaces.

(17) "Visible Emissions" means the reduction in transmission of light or the obscuring of the view of an object in the background caused by the air pollutants emitted by the heating device. This does not include the visual distortion caused by the heated air emitted by the heating device.

(18) "Yellow Advisory" means a 24 hour period beginning at 4:00 p.m. when PM 10 levels are forecast by LRAPA to be greater than or equal to 100 micrograms per cubic meter but less than 125 micrograms per cubic meter, or when PM 2.5 levels are forecast to be greater than or equal to 20 micrograms per cubic meter but less than 25 micrograms per cubic meter.

(19) Wood heating advisory season can commence as early as October 1 and end as late as May 31st, as set by the City of Oakridge City Council and LRAPA Board.

Section Two. Solid Fuel Burning Devices - Prohibitions.

(1) No person in charge of property during a Red Advisory shall operate or allow to be operated a solid fuel burning device which emits visible emissions into the air outside of the building housing the device, unless the person has been granted an exemption to use the device by the City Administrator.

(2) Within the City, no person in charge of property shall at any time allow to be initiated or maintained in a solid fuel burning device the burning of any fuel other than seasoned wood; prohibited materials include plastics, wire insulation, petroleum by-products, petroleum-treated materials, rubber products, animal remains or animal or vegetable matter resulting from the handling, preparation, cooking or service of food, wood with a moisture content greater than twenty percent moisture by weight, or any other material which normally emits dense smoke, noxious odors, or hazardous air contaminants.

(3) No person in charge of property shall operate or allow to be operated a solid-fuel

burning device which discharges emissions that are of an opacity greater than 20%. This provision does not apply to the emissions during the building of a new fire, for aperiod or periods aggregating no more than ten minutes in any 4-hour period.

Section Three. Solid Fuel Burning Devices Upon Sale of the Property.

(1) After June 30, 2003, all un-certified solid fuel burning devices contained on Property to be sold or rented must be removed from the property or rendered permanently inoperable unless otherwise exempted by this ordinance or the person in charge of the property is granted an exemption by the City Administrator.

(2) The following solid fuel burning devices may remain on a property to be sold:

(a) Woodstoves if the emissions do not exceed:

(i) 6.0 grams per hour weighted average when tested in conformance with the Oregon Method; or

(ii) 5.5 grams per hour weighted average when tested in conformance with the EPA method.

(b) Commercially manufactured pellet stoves that have not been tested, but were installed prior to June 30, 2003.

(c) Fireplaces operated in accordance with Section Two of this ordinance.

(d) Wood-fired, forced-air combustion furnaces that primarily heat living space, through indirect heat transfer using forced-air duct work or pressurized water systems.

(3) Within the City, it is unlawful for any person to complete, or allow the completion of the sale, transfer or conveyance of any real property unless a Certificate of Compliance is filed with the City Recorder's Office.

(4) Once a certificate of Compliance has been filed for a property, another certificate is not needed if the number and type of stoves on the real property matches what is on file at the City. The City shall list properties with Certificates of Compliance on the internet. A copy of the list must be available at the City for inspection.

(5) The Certificate of Compliance must state that either:

(a) there are no solid fuel burning devices on the property; or

(b) any solid fuel burning devices on the property meet the requirements of this section.

(6) The Certificate of Compliance must be in a format specified by the City and must be signed by the seller (s), and, if any sold fuel burning devices will remain on the property, a certified City inspector.

(7) The Certificate of Compliance does not constitute a warranty or guarantee by the City or its agents that the Solid Fuel Burning Device on the property meets any other standards of operation, efficiency or safety, except the emission standards contained in this Ordinance.

Section Four. Solid Fuel Burning Devices Prohibited.

After December 31, 2008, a person or persons may not install or use any solid fuel burning device in any structure within the City except for certified wood stoves, certified pellet stoves with emissions that do not exceed 1.0 gram per hour, weighted average when tested in conformance with the EPA Method, or a fireplace which is not a sole source of heat, operated in accordance with Section Two of this Ordinance.

Section Five. Solid Fuel Burning Devices - Exemptions.

Not withstanding the prohibitions set forth in this Ordinance, a person in charge of property may retain in their home or operate a solid fuel burning device during a Green, Yellow or Red Advisory, if that person has previously obtained one of the following exemptions from the City Administrator:

(a) Sole source of heat exemption. Persons in charge of property who signs a sworn statement that their solid fuel burning device is the sole source of heat for their residence are eligible for a sole source of heat exemption. The City may inspect to verify this fact, and to insure that the solid fuel burning device is certified, in its discretion. This exemption shall expire on July 1 of each year and must be renewed annually thereafter.

(b) Economic need exemption. Persons in charge of property who demonstrate an economic need to burn solid fuel for space-heating purposes by qualifying for energy assistance according to economic guidelines established by the U.S. Office of Management and Budget under the low income energy assistance program, as administered in Oakridge by the CDC, are eligible for an economic need permit. The City may insure that the solid fuel burning device is certified at its discretion. This exemption shall expire on July 1 of each year and must be renewed annually thereafter.

Section Six. Enforcement.

(a) In addition to, and not in lieu of any other enforcement mechanism authorized by the Oakridge City Code, upon a determination that a person has violated this Ordinance, the City Administrator or his/her designee may impose upon the violator and any other person in charge of the property, an administrative penalty not greater than $500.00.

(b) Each day's violation of a provision of this Ordinance constitutes a separate offense punishable by the penalty set forth above.

(c) The City Administrator or his/her designee is also hereby authorized to designate LRAPA to enforce and administer the provisions of this code, including LRAPA's use of administrative and hearing procedures adopted by LRAPA in its duly promulgated regulations.

Section Seven. Contingency Measures

Reserved.

Note: Oakridge does not meet federal health-based standards for fine particulate (PM2.s) and was designated a non-attainment area by the Environmental Protection Agency (EPA) on October 8, 2009. An attainment plan was developed for Oakridge in 2012 containing contingency measures that would be implemented if Oakridge did not meet the PM2.s standard by the EPA Clean Air Act 2014 deadline. Oakridge did not meet the PM 2.5 standard by the EPA Clean Air Act 2014 deadline and the contingencymeasures in the 2012 plan are incorporated into earlier sections of this ordinance.

A supplemental plan with additional strategies and contingency measures was developed during 2016. If the EPA makes a finding that the Oakridge nonattainmentarea failed to attain the 2006 24-hour PM 2.5 standard by the applicable attainmentdate, the following requirements will automatically go into effect for the October 1st, 2017 Wood Heating Season.

(1) The Red Advisory criteria in Section One (13) is reduced to forecasted PM 2.5 levels of 22 Micrograms per cubic meter; and

(2) Fireplace use Section One (3) is prohibited during both Yellow Advisory and Red Advisory periods.

The reading of this ordinance is by title only approved on the 20th day of October, 2016.

Approved and signed by the Mayor on the 20th day of October, 2016.

City of Oakridge

James B. Coey, Mayor

Attested:

Susan LaDuke, City Recorder

Ayes: 6
Nays: 0

RESTRICTION ON USE OF SOLID FUEL SPACE HEATING DEVICES

9.120 Purpose and Findings.

(1) The health, safety and welfare of the citizens of Lane County are adversely affected by the degradation of air quality. Violations of federal ambient air quality standards, as measured by the Lane Regional Air Protection Agency (LRAPA), occur periodically in Lane County.

(2) Wood and other solid fuel combustion for space heating produces particulate matter and other emissions which are physically harmful and aesthetically unpleasant, and which contribute to the degradation of air quality and the violation of federal ambient air quality standards.

(3) Periodic restriction of the use of solid fuel space heating devices will improve air quality. LRAPA has the expertise to determine when such air quality is at such a level that such restriction is necessary to preserve the health, safety and welfare of the citizens of Lane County.

(4) It is the intent of Lane County that the penalty section of this ordinance not take effect until November 1, 1991. *(Revised by Ordinance No. 9-90, Effective 1.18.91; 1-10, 6.11.10)*

9.125 Definitions.

As used herein, the following words and phrases have the meanings ascribed:

Green Advisory for Eugene-Springfield Area. A 24-hour period beginning at 4:00 p.m. when PM10 levels are forecast by LRAPA to be less than 100 micrograms per cubic meter and PM2.5 levelsare forecast to be less than 25 micrograms per cubic meter, within the Eugene/Springfield Metropolitan Area General Plan Urban Growth Boundary.

Green Advisory for Oakridge Area. A 24-hour period beginning at 4:00 p.m. when PM10 levels are forecast by LRAPA to be less than 100 micrograms per cubic meter and PM2.5 levels are forecast to be less than 20 micrograms per cubic meter, within the Oakridge Urban Growth Boundary.

Lane Regional Air Protection Agency. A regional air quality control authority established under the provisions of and with the authority and powers derived from ORS 468.500 et seq. (renumbered 468A.100 through 468A.180 in 1991)

Opacity. The degree to which an emission reduces transmission of light or obscures the view of an object in the background.

Pellet Stove. An enclosed solid fuel space heating device designed and operated to burn manufactured solid fuel and having an air-to-fuel ratio greater than 35-to-1 as determined by the federal test method described in 40 CFR Part 60.534

Person. Any individual, partnership, corporation, association, governmental subdivision or public or private organization of any character.

Person in Charge of Property. An owner, agent, occupant, lessee, tenant, contract purchaser, or other person having possession or control of property.

PM2.5. Solid or liquid particulate matter (excluding uncombined water) with an aerodynamic diameter less than or equal to 2.5 micrometers.

PM10. Solid or liquid particulate matter (excluding uncombined water) with an aerodynamic diameter less than or equal to 10 micrometers.

Sole Source of Heat. A solid fuel space heating device which constitutes the only source of heating in a private residence. A solid fuel space heating device shall not be considered to be the sole source of heat if the private residence is equipped with any permanently-installed furnace or heating system utilizing oil, natural gas, electricity or propane.

Solid Fuel Space Heating Device. Any device designed or operated to burn solid fuel for the heating of the interior of a building, including, but not limited to, solid fuel burning stoves, fireplaces or wood stoves of any nature, combination fuel furnaces or boilers used for space heating which can burn solid fuel, and solid fuel burning cooking stoves. "Solid fuel space heating device" does not include natural gas-fired artificial fireplaces.

Red Advisory:

Eugene-Springfield Area. A 24-hour period beginning at 4:00 p.m. when PM10 levels are forecast by LRAPA to be greater than or equal to 125 micrograms per cubic meter, or when PM2.5 levels are forecast by LRAPA to be greater than or equal to 30 micrograms per cubic meter within theEugene/Springfield Metropolitan Area General Plan Urban Growth Boundary.
Oakridge Area. A 24-hour period beginning at 4:00 p.m. when PM10 levels are forecast byLRAPA to be greater than or equal to 125 micrograms per cubic meter, or when PM2.5 levels are forecastby LRAPA to be greater than or equal to 25 micrograms per cubic meter within the Oakridge Urban Growth Boundary.
Visible Emissions. The reduction in transmission light or the obscuring of the view of an object in the background caused by the air pollutants emitted by the heating device. This does not include the visual distortion caused by the heated air emitted by the heating device.
Yellow Advisory:
Eugene-Springfield Area. A 24-hour period beginning at 4:00 p.m. when PM10 levels are forecast by LRAPA to be greater than or equal to 100 micrograms per cubic meter but less than 125 micrograms per cubic meter, or when PM2.5 levels are forecast to be greater than or equal to 20 micrograms per cubic meter but less than 25 micrograms per cubic meter, within the Eugene/Springfield Metropolitan Area General Plan Urban Growth Boundary.
Oakridge Area. A 24-hour period beginning at 4:00 p.m. when PM10 levels are forecast byLRAPA to be greater than or equal to 100 micrograms per cubic meter but less than 125 micrograms per cubic meter, or when PM2.5 levels are forecast to be greater than or equal to 25 micrograms per cubic meter but less than 30 micrograms per cubic meter, within the Oakridge Urban Growth Boundary. *(Revised by Ordinance No. 9-90, Effective 1.18.91; 1-00, 4.12.00; 13-03, 10.23.03; 1-10, 6.11.10; 16-10, 2.9.17)*

9.130 Area of Applicability.
These Lane Code sections 9.120 through 9.150 apply to the unincorporated areas within the Eugene, Springfield, and Oakridge Urban Growth Boundaries.*(Revised by Ordinance No. 9-90, Effective 1.18.91; 13-03, 10.23.03; 16-10, 2.9.17)*

9.135 Prohibitions.

(1) Red Advisory. A person in charge of property violates this section 9.135(1) if the person during a Red Advisory operates or allows to be operated a solid fuel space heating device which emits visible emissions into the air outside of the building housing the device unless the person in charge of the property has been granted an exemption to use the device by LRAPA.

(2) Visible Emissions Limitations for Eugene-Springfield Area. A person in charge of property violates this section 9.135(2) if the person operates or allows to be operated a solid fuel space heating device which discharges emissions that are of an opacity greater than forty (40) percent. This provision does not apply to the emissions during the building of a new fire, for a period or periods aggregating no more than ten (10) minutes in any four (4) hour period.

(3) Visible Emissions Limitations for Oakridge Area. A person in charge of property violates this section 9.135(3) if the person operates or allows to be operated a solid fuel space heating device which discharges emissions that are of an opacity greater than twenty (20) percent. This provision does not apply to the emissions during the building of a new fire, for a period or periods aggregating no more than ten (10) minutes in any four (4) hour period.

(4) Prohibited Materials. A person in charge of property violates this section 9.135(4) if the person at any time allows to be initiated or maintained in a solid fuel space heating device the burning of any plastics, wire insulation, petroleum by-products (with the exception of natural-gas-fueled log lighters), petroleum treated materials, rubber products, animal remains, or animal or vegetable matter resulting from the handling, preparation, cooking, or service of food, or of any other material which normally emits dense smoke, noxious odors, or hazardous air contaminants. *(Revised by Ordinance No. 9-90, Effective 1.18.91; 1-00, 4.12.00; 13-03, 10.23.03; 16-10, 2.9.17)*

9.140 Exemption for Economic Need.
Exemption from LC 9.135 above for Red Advisories may be obtained from LRAPA for economic need. Persons in charge of property who satisfy criteria established under the Low Income Energy Assistance Program as administered by the Lane County Housing Authority and as established by the United States Department of Energy are exempt from LC 9.135 above for Red Advisories. Individual exemptions shall expire on July 1 of each year and must be renewed annually. *(Revised by Ordinance No. 9-90, Effective 1.18.91; 1-00, 4.12.00; 16-10, 2.9.17)*

9.145 Enforcement.
The Board of County Commissioners designates LRAPA and delegates to LRAPA authority to enforce the prohibitions contained herein. The investigation, initiations of proceedings, adjudication of a failure to comply and appeal of such are regulated by the adopted administrative and hearing procedures of LRAPA set forth in its Rules and Regulations.
The County retains the right to investigate and enforce the terms of this ordinance. Existing citation, complaint, violation, or failure to comply procedures applicable to the County may be utilized to prosecute such failures to comply. *(Revised by Ordinance No. 9-90, Effective 1.18.91; 1-00, 4.12.00; 16-10, 2.9.17)*

9.150 Penalties.
A person who violates any provision of LC 9.135 above is subject to administrative enforcement pursuant to LC Chapter 5, including a monetary penalty of a minimum of $50 to a maximum of $500 for each day in which such failure to comply occurs. This remedy is cumulative and is in addition to any and all other remedies available to Lane County. *(Revised by Ordinance No. 9-90, Effective 1.18.91; 1-00, 4.12.00; 16-10, 2.9.17)*

Appendix VII: Oakridge Home Wood Heating Curtailment Protocol

Guidelines for the Oakridge Home Wood Heating Advisories

Home Wood Heating (HWH) advisories are issued in Oakridge from October 1st through May 31st of each HWH season. The most critical months of the HWH season being November through February. The description below follows the current Oakridge City Ordinance, No. 920, adopted October 20, 2016.

The Oakridge City Ordinances were revised to be more protective as the national air quality health standards were expanded from PM_{10} to $PM_{2.5}$, the $PM_{2.5}$ standards were tightened in 2006, and the 2012 and 2016 $PM_{2.5}$ Attainment Plans were adopted. The history is summarized here:

Time Period In Effect	Oakridge Ordinance	Ordinance Date	Emission Inventories
2007-2012	#889	04-Oct-07	2008-2012
2012-2015	#903	15-Nov-12	2013-2015
2015-2016	#914	15-Oct-15	2016
2016-2035	#920	20-Oct-16	2017-2035

In addition, the Lane County Code 9.120-9.150 was revised on February 19, 2017 to require essentially the same requirements (as Oakridge City Ordinance No. 920) in the Urban Growth Boundary around the City of Oakridge.

A HWH advisory is issued each day for each 24-hour period during the HWH season. The 24-hour period begins at 16:00 hours and ends at 15:59 hours, local time, the following day. The HWH advisory is publicized on the LRAPA website and via a recorded message on a dedicated HWH advisory phone line.

For Yellow Advisories LRAPA may decide to use official press releases and social media to further publicize the advisory. For Red Advisories LRAPA issues a press release and uses social media for publicity. During a Red Advisory LRAPA may also choose to employ an automated calling system that plays a pre-recorded message letting Oakridge residents know of the upcoming Red Advisory and its restrictions.

- A “Green Advisory” is issued when predicted PM levels for the upcoming 24-hour period, beginning at 16:00 hours meet the following criteria. PM_{10} levels are forecast by LRAPA to be < 100 ug/m3 and $PM_{2.5}$ levels are forecast to be < 20 ug/m3.

- A "Yellow Advisory" is issued when predicted PM levels for the upcoming 24-hour period, beginning at 16:00 hours meet the following criteria. PM_{10} levels are forecast by LRAPA to be ≥ 100 ug/m3 but < 125 ug/m3, or when $PM_{2.5}$ levels are forecast to be ≥ 20 ug/m3 but < 25 ug/m3.

- A "Red Advisory" is issued when predicted PM levels for the upcoming 24-hour period, beginning at 16:00 hours meet the following criteria. PM_{10} levels are forecast by LRAPA to be ≥ 125 ug/m3, or when $PM_{2.5}$ levels are forecast by LRAPA to be ≥ 25 ug/m3.

During a Red Advisory, visible emissions are prohibited from any solid fuel burning device, unless the person has been granted an exemption to use the device by the City of Oakridge Administrator.

Regardless of whether the HWH advisory is Green, Yellow, or Red, no person is allowed to operate a solid fuel burning device which discharges emissions that are of an opacity greater than 20%, even with the above exemption. This provision does not apply to the emissions during the building of a new fire, for a period or periods aggregating no more than ten minutes in any 4-hour period.

The below table shows how the advisory trigger levels have changed over time.

	2007-2011	2007-2011	2012-2014	2012-2014	2015-Current	2015-Current
HWH Advisory	PM_{10} ug/m3	$PM_{2.5}$ ug/m3	PM_{10} ug/m3	$PM_{2.5}$ ug/m3	PM_{10} ug/m3	$PM_{2.5}$ ug/m3
Green	< 100	< 25	< 100	< 20	< 100	< 20
Yellow	≥ 100, < 125	≥ 25, < 30	≥ 100, < 125	≥ 20, < 25	≥ 100, < 125	≥ 20, < 25
Red, Stage I	≥ 125, < 150	≥ 30, < 35	≥ 125, < 150	≥ 25, < 30	≥ 125*	≥ 25*
Red, Stage II	> 150	≥ 35	> 150	≥ 30		

* in 2015 the two-stage red advisory was replaced with a single red advisory

Lance Giles and Merlyn Hough (February 15, 2021)

Oakridge PM_{10} Redesignation Request and PM_{10} Maintenance Plan

November 5, 2021

Lane Regional Air Protection Agency
1010 Main Street
Springfield, Oregon 97477

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Executive Summary

The Lane Regional Air Protection Agency (LRAPA) proposes a revision to the State of Oregon Clean Air Act Implementation Plan, referred to as the State implementation Plan (SIP). This proposed revision would:

- Redesignate the Oakridge airshed as attainment for the 24-hour national ambient air quality standards (NAAQS) for course inhalable particles (PM_{10}); and
- Include a 10-year maintenance plan to keep air quality within the PM_{10} health standards.

The Oakridge Urban Growth Boundary (UGB) was designated nonattainment for PM_{10} and classified as moderate by the U.S. Environmental Protection Agency (EPA) on January 20, 1994. The Oakridge PM_{10} attainment plan was adopted by the LRAPA Board of Directors at a hearing on August 13, 1996. The Oakridge PM_{10} attainment plan was subsequently adopted by the Oregon Environmental Quality Commission (EQC) on December 9, 1996, and submitted to EPA. EPA approved the plan on March 15, 1999 (64 FR 12751). The Oakridge PM_{10} strategies were successful in achieving the PM_{10} standards on schedule. On July 26, 2001, EPA published a clean data determination (CDD) and a finding of attainment for the Oakridge PM_{10} area (66 FR 38947).

The Oakridge PM_{10} maintenance plan and request for redesignation to attainment was purposely delayed until the attainment in Oakridge of the more restrictive and protective $PM_{2.5}$ NAAQS which was achieved on December 31, 2016. EPA made a finding of $PM_{2.5}$ attainment and a clean data determination (CDD), based on 2014-2016 air monitoring data, on February 8, 2018 [83 FR 5537] effective March 12, 2018.

The PM_{10} and $PM_{2.5}$ air pollution problems in Oakridge are closely related, and the proposed PM_{10} maintenance plan relies heavily on the $PM_{2.5}$ control strategies implemented during the 2016 $PM_{2.5}$ attainment plan and proposed in the 2021 $PM_{2.5}$ maintenance plan.

The 1996 Oakridge UGB PM_{10} attainment plan and the 2016 Oakridge-Westfir $PM_{2.5}$ attainment plan both identified residential wood combustion (in certified and non-certified woodstoves, fireplaces and pellet stoves) as the major emission category causing historical violations of the PM_{10} and $PM_{2.5}$ health standards on stagnant winter days, and outlined commitments for a number of strategies to replace non-certified woodstoves with cleaner burning units, improve firewood seasoning and woodstove operation to reduce PM_{10} and $PM_{2.5}$ emissions, and to curtail residential wood combustion during air stagnation episodes.

Major wildfires in 2017 and 2020 caused summertime violations of the PM_{10} and $PM_{2.5}$ health standards. These wildfires caused significant impacts on Oakridge residents, but those violations are being addressed separately by LRAPA, Oregon DEQ, and EPA as part of the Exceptional Events review process. The Exceptional Events guidance developed by EPA, in consultation with other agencies and the public, is intended to prevent penalizing communities for events outside their control.

This proposed PM_{10} redesignation request outlines the specific actions taken in the Oakridge area to successfully meet the federal Clean Air Act requirements and includes a maintenance plan to continue the critical air pollution control strategies during 2015-2035.

1. Introduction

The federal Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) and to periodically review and update these standards to protect public health. EPA adopts new standards after consultation with the Clean Air Scientific Advisory Committee (CASAC), a group of non-EPA scientists and medical professionals established by Congress.

In 1987, EPA adopted a daily (24-hr) PM_{10} NAAQS of 150 $\mu g/m^3$ and an annual PM_{10} NAAQS of 50 $\mu g/m^3$. Areas in violation of either the daily or annual PM_{10} standards (based on the most recent three years of federal reference monitoring data) were designated as a Moderate Nonattainment Areas by EPA. Oakridge, Oregon, was designated as nonattainment for the daily PM_{10} standard on January 20, 1994 based on a comparison of Oakridge data from 1990-1993 with the 24-hour PM_{10} standard of 150 $\mu g/m^3$.

The Oakridge Urban Growth Boundary (UGB) was designated nonattainment for the 24-hour PM_{10} NAAQS and classified as moderate by the U.S. Environmental Protection Agency (EPA) on January 20, 1994. LRAPA submitted a draft Oakridge PM_{10} attainment plan to EPA Region 10 for stringency review during early 1996. The Oakridge PM_{10} attainment plan was adopted by the LRAPA Board of Directors at a hearing on August 13, 1996. The Oakridge PM_{10} attainment plan was subsequently adopted by the Oregon Environmental Quality Commission (EQC) on December 9, 1996, and submitted to EPA. EPA approved the plan on March 15, 1999 (64 FR 12751). The plan relied on smoke and dust control strategies needed to assure attainment of the PM_{10} NAAQS. The Oakridge PM_{10} strategies were successful in achieving the PM_{10} standards on schedule. On July 26, 2001, EPA published a clean data determination (CDD) and a finding of attainment for the Oakridge PM_{10} area (66 FR 38947).

The Oakridge PM_{10} maintenance plan and request for redesignation to attainment was purposely delayed until the attainment in Oakridge of the more restrictive and protective $PM_{2.5}$ NAAQS which was achieved on December 31, 2016. EPA made a finding of $PM_{2.5}$ attainment and a clean data determination (CDD), based on 2014-2016 air monitoring data, on February 8, 2018 [83 FR 5537] effective March 12, 2018.

The PM_{10} and $PM_{2.5}$ air pollution problems in Oakridge are closely related. Most of the smoke (i.e., combustion-related) components are similar for both PM_{10} and $PM_{2.5}$; the major differences are in the dust components since a higher percentage of dust falls within the PM_{10} size range compared to the $PM_{2.5}$ size range. Overall, the $PM_{2.5}$ NAAQS is more protective and thus the $PM_{2.5}$ control strategies are more stringent than would be necessary to just meet the

PM_{10} NAAQS. Therefore, the proposed PM_{10} maintenance plan relies heavily on the $PM_{2.5}$ control strategies implemented during the 2016 $PM_{2.5}$ attainment plan and proposed in the 2021 $PM_{2.5}$ maintenance plan.

The federal Clean Air Act [in CAA §107(d)(3)(E)] allows areas to request redesignation of a nonattainment area to attainment if certain criteria are met. This redesignation request and maintenance plan address the Clean Air Act requirements and outlines how the Oakridge-Westfir airshed will continue to meet the $PM_{2.5}$ air quality health standards. The redesignation request and maintenance plan are organized as follows:

- **Background** – describing the airshed, and the historical PM_{10} air pollution problem.
- **Redesignation Requirements** – demonstrating how this document fulfills the federal Clean Air Act requirements to redesignate the area to attainment.
- **Air Quality Monitoring** – summarizing the PM_{10} monitoring data and trends.
- **Emission Inventories** – summarizing the major sources of PM_{10} emissions for 2015, 2025, 2030, and 2035.
- **Air Pollution Control Strategies** – describing the key control measures to reduce PM_{10} emissions in future years.
- **Transportation Conformity** – summarizing the motor vehicle emissions budget to limit onroad motor vehicle emissions from cars and trucks.
- **Maintenance of Air Quality Health Standards** – describing the commitment to continue monitoring, verify continued attainment, and the contingency plan.
- **Redesignation to Attainment** – describing the next steps in the process.

2. Background

Particulate matter (PM) is the general term used for a mixture of solid particles or liquid droplets found in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. These particles come in a wide range of sizes; “fine” or “respirable” particles are less than 2.5 micrometers in diameter, “inhalable” particles are less than 10 micrometers, and coarser-sized particles are larger than 10 micrometers; and these particles and originate from many different sources. Fine particles ($PM_{2.5}$) generally result from fuel combustion from residential fireplaces and woodstoves, pile and forest burning, industrial facilities, and motor vehicles. Coarser particles (PM_{10} and larger) are generally emitted from sources such as vehicles traveling on paved and unpaved roads, materials handling, and wood products operations, as well as wind-blown dust.

These particles can accumulate in the respiratory system and are associated with numerous negative health effects. Fine particles are most closely associated with such health effects as increased hospital admissions and emergency room visits for heart and lung disease, increased respiratory symptoms and disease, decreased lung function and premature death. Sensitive groups that are at greatest risk include the elderly, pregnant women, individuals with cardiopulmonary disease such as asthma, and children. EPA has established NAAQS for PM_{10} at 150 micrograms per cubic meter ($\mu g/m^3$) for a daily (24-hour) standard, and $PM_{2.5}$ at 35 micrograms per cubic meter ($\mu g/m^3$) for a daily (24-hour) standard and 12 $\mu g/m^3$ as an annual standard. Any value monitored above these levels, as defined by federal rules and guidance, is considered an exceedance. For the 24-hour PM_{10} standard, EPA allows no more than one exceedance per year averaged over a 3-year period; for the $PM_{2.5}$ standard, EPA uses the 98th percentile of the 24-hour $PM_{2.5}$ within any given year and averages it over three calendar years. An exceedance of the annual standard averaged over three years becomes a violation of the annual standard. If an area violates either standard, EPA designates it as a nonattainment area. This plan includes a demonstration of continuing attainment with PM_{10} standards in Oakridge.

This document requests redesignation of the Oakridge UGB PM_{10} Nonattainment Area (NAA) to attainment for PM_{10} (state classification will be "maintenance"). It is a plan to ensure Oakridge maintains compliance with the 24-hour and annual National Ambient Air Quality Standards for PM_{10}. This document complies with the applicable 1990 Federal Clean Air Act requirements and EPA rules, guidance and policies. The maintenance plan continues strategies to maintain the PM_{10} standards during 2015-2035 and includes contingency measures should Oakridge not continue to meet air quality standards. To demonstrate "attainment" requires the collection of representative monitoring data using approved measuring instruments and procedures, with adequate quality assurance. EPA will review the plan to determine if it is approvable and publish its findings in the Federal Register. Redesignation to attainment is possible only after Oakridge has met the standards for three consecutive years and a maintenance plan is adopted by the LRAPA Board of Directors, the EQC and approved by EPA.

Oakridge lies in an alluvial plain in the foothills at the southern end of the Willamette River valley. The city is in Lane County, Oregon, approximately 45 miles east-southeast of Eugene, and 28 miles west of Willamette Pass, a summit of the Cascade Mountain Range. The city limits of present-day Oakridge include the historic City of Oakridge and, directly west, the area formerly known as Willamette City. Figure 1 shows the location of Oakridge in Lane County.

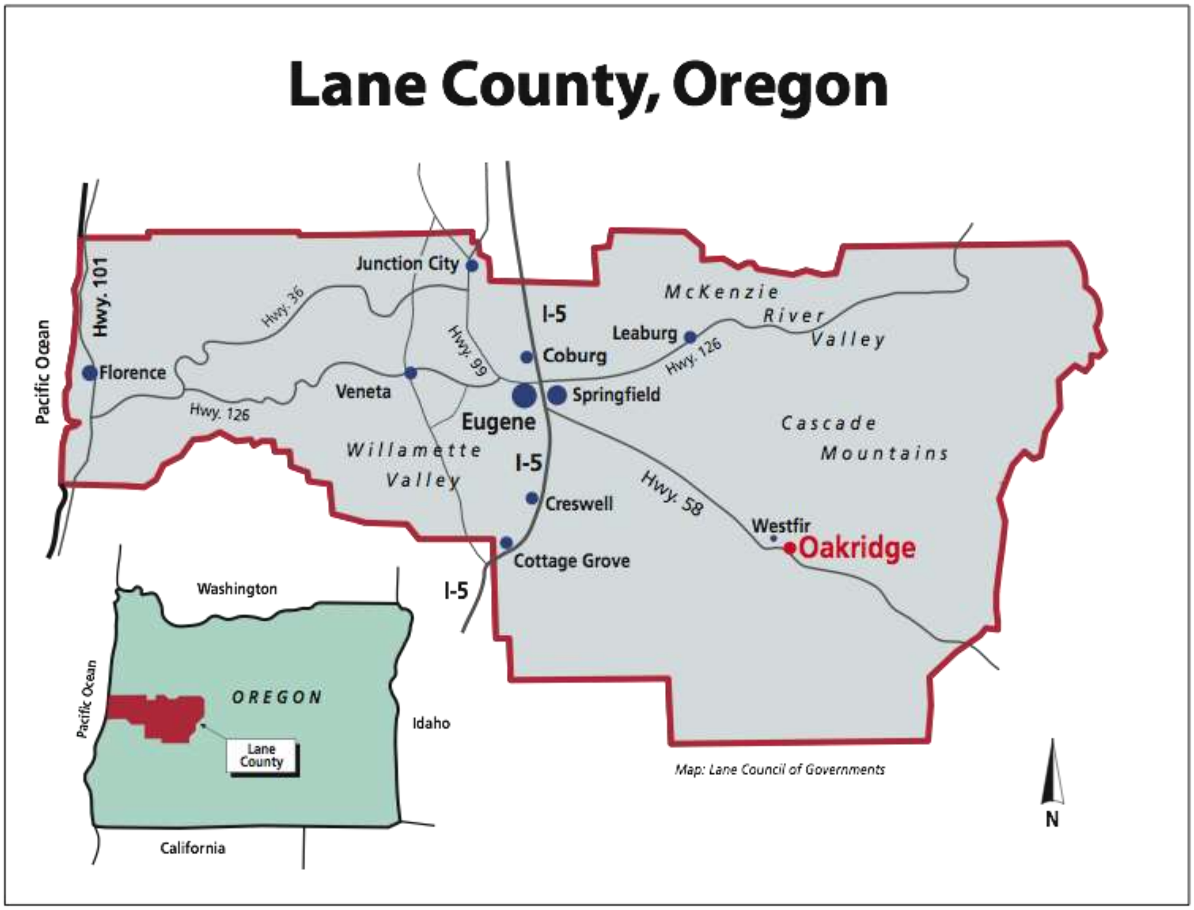


Figure 1: Oakridge Location in Lane County and Oregon.

The area of applicability for this maintenance plan is larger than the Oakridge UGB PM_{10} (Figure 2) and includes an area that contains the City of Oakridge and the small town of Westfir. Figure 3 shows the Oakridge-Westfir $PM_{2.5}$ NAA.

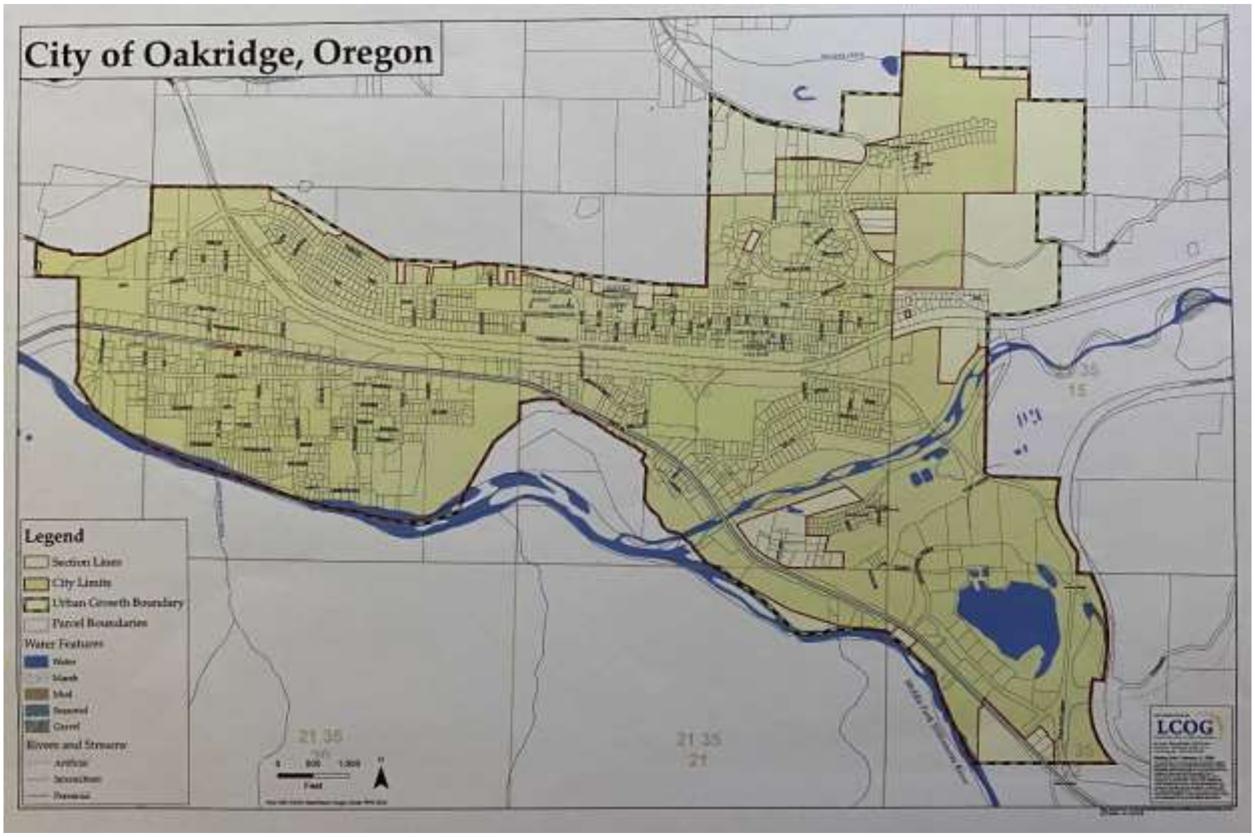


Figure 2: Oakridge UGB PM_{10} Nonattainment Area Boundary Map.

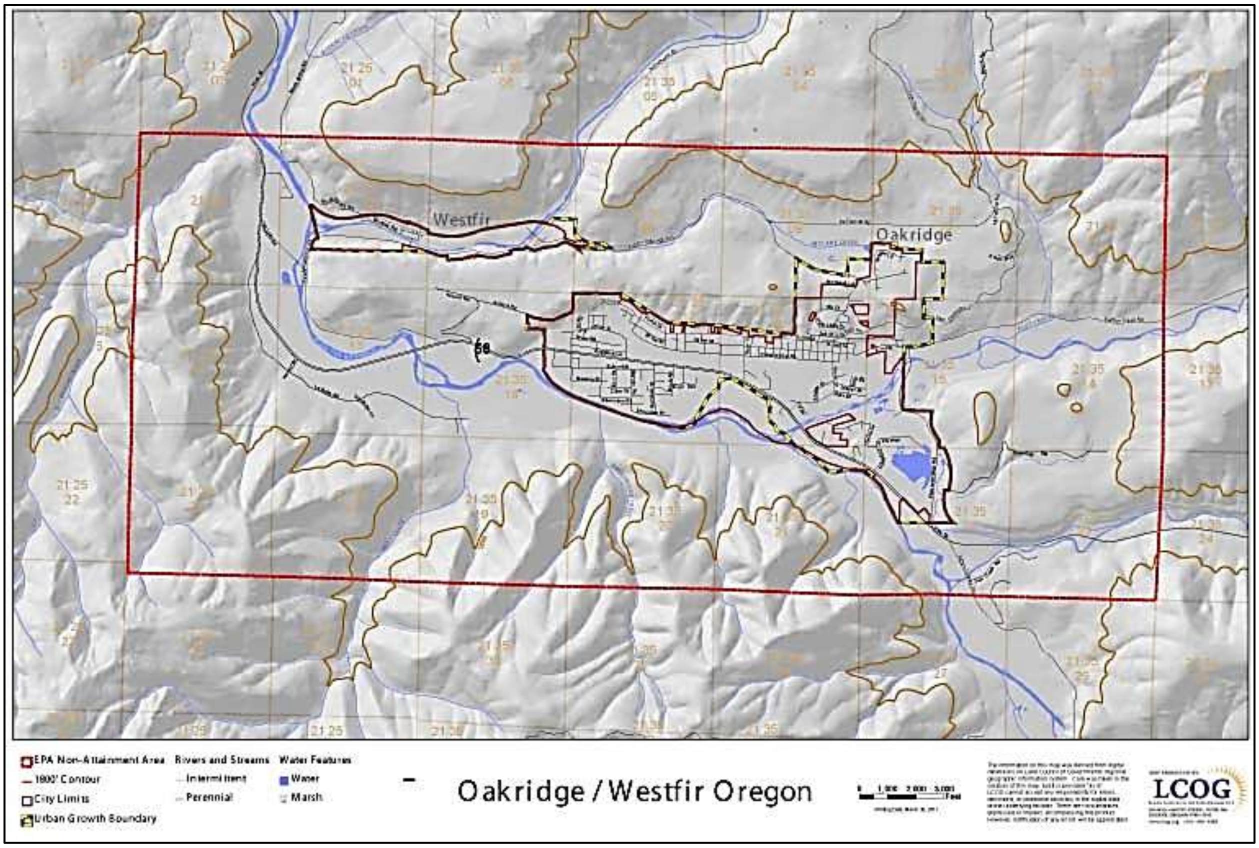


Figure 3: Oakridge-Westfir $PM_{2.5}$ Nonattainment Area Map.

The City of Oakridge (population 3,278 in 2019) is situated in a valley oriented east to west, where the middle fork of the Willamette River flows. Elevation of the area ranges from 1100 feet at the lower (west) end to 1600 feet with areas of densest population situated between 1100 feet and 1200 feet. Mountains rise on the north and south sides to 1700 feet and 1600 feet, respectively.

Westfir is a very small (population 254 in 2019) isolated rural mountain community that is located along the north fork of the Willamette River about 1 mile NW of Oakridge. Its elevation is about the same as Oakridge and it is surrounded by the same high mountains. Westfir and Oakridge are in opposite steep-sided river valleys separated by a 400-foot ridge. The Westfir valley is very narrow, only about a quarter mile across at its widest point, while the Oakridge valley is about one mile across at its widest point.

3. Redesignation Requirements

The federal Clean Air Act in Section 107 [CAA §107(d)(3)(E)] outlines the requirements the area must meet to redesignate the Oakridge UGB PM_{10} NAA to attainment:

a. The area has attained the 24-hour NAAQS.
b. The improvement in air quality is due to permanent and enforceable reductions in emissions.
c. The plan has a fully approved implementation plan under CAA §110(k).
d. The area has met the requirements of CAA §110 and Part D.
e. The area has a fully approved maintenance plan that ensures attainment of the NAAQS for at least ten years beyond redesignation.

With the EPA approval of this maintenance plan and redesignation request, the Oakridge UGB area will meet all the requirements for EPA to redesignate the area to attainment, as outlined in the following table.

Table 1: Federal Clean Air Act Requirements for Redesignation.

Clean Air Act Requirement	How Requirement is Met
a. The area has attained the 24-hour NAAQS.	Quality-assured PM_{10} data for the NAA for the 3-year period 1996-1998 indicated the NAA has attained the standards [66 FR 38947]. Data from 1996-2020 confirm the NAA continues to attain the standards, except for wildfire impacts addressed by Exceptional Events guidance. See Section 4 for more details.
b. The improvement in air quality is due to permanent and enforceable reductions in emissions.	Enforceable local and state strategies implemented in the attainment plan, primarily to reduce residential woodsmoke, have achieved the intended emission reductions. Federal measures continue to reduce motor vehicle and railroad emissions.
c. The plan has a fully approved implementation plan under CAA §110(k).	LRAPA, the City of Oakridge and other stakeholders developed and implemented the 1996 Oakridge PM_{10} attainment plan. This attainment plan was adopted by the LRAPA Board of Directors, included in the SIP by the Oregon Environmental Quality Commission (EQC), and submitted to EPA. EPA approved the plan on March 15, 1999 (64 FR 12751). The Oakridge PM_{10} strategies were successful in achieving the PM_{10} standards on schedule. On July 26, 2001, EPA published a clean data determination (CDD) and a finding of attainment for the Oakridge PM_{10} area (66 FR 38947).
d. The area has met the requirements of CAA §110 and Part D.	LRAPA and Oregon DEQ have met the requirements of CAA §110 and Part D. See https://www.epa.gov/sips-or. The most recent EPA approval of LRAPA programs was on October 5, 2018 (83 FR 50274).
e. The area has a fully approved maintenance plan that ensures attainment of the NAAQS for at least ten years beyond redesignation.	With the EPA approval of this maintenance plan and redesignation request, the Oakridge UGB PM_{10} NAA will have a fully approved maintenance plan ensuring continued attainment of standards for at least ten years beyond redesignation. See Sections 4-9 for more details.

4. Air Quality Monitoring

The Oakridge air monitoring station (Site Code WAC, AQS #410392013) has been located at the Willamette Activity Center (WAC) in the southwest portion of the city of Oakridge since 1989. Saturation monitoring studies have demonstrated the monitor is located in the area of maximum emissions and PM concentrations. The WAC station is part of the SLAMS (State and Local Air Monitoring Stations) network and meets all siting requirements and criteria for the monitoring objective of maximum population exposure at the neighborhood spatial scale.

The WAC sampling method for PM_{10} has historically been the filter-based Federal Reference Method (FRM) operating on an every-6th-day schedule. The current parameters measured at the WAC station include:

- PM_{10} with Federal Equivalent Method (continuous beta attenuation method),
- $PM_{2.5}$ with Federal Equivalent Method (continuous beta attenuation method),
- $PM_{2.5}$ with Federal Reference Method (FEM collocation requirement),
- Nephelometer (continuous optical backscatter),
- Wind Speed and Direction (continuous ultrasonic),
- Temperature (continuous platinum RTD at 2 meters and 10 meters height),
- Barometric Pressure (continuous electronic barometer), and
- Solar Radiation (continuous pyranometer).

Additional details, photos, and maps are included in the annual LRAPA Ambient Air Monitoring Network Plan; the following photos are taken from that Network Plan.

Figure 4: Oakridge Air Monitoring Station.

Figure 5: Oakridge Station Location.

Quality-assured data is submitted quarterly by LRAPA to Oregon DEQ and EPA within 60 days of the end of each calendar quarter. LRAPA is committed to continue EPA-approved $PM_{2.5}$ monitoring throughout the period of the maintenance plan as outlined in the biennial CAA §105 grant workplan and semi-annual progress reports; however, LRAPA is proposing to replace the current PM_{10} monitoring with $PM_{2.5}$ monitoring as a surrogate method. The specifics of the proposal and the approach for producing reproducible PM_{10} data by using $PM_{2.5}$ as a surrogate are outlined in Appendix I: Ambient Air Quality Data Review. Using $PM_{2.5}$ monitoring as a surrogate for PM_{10} is dependent on the approval of this maintenance plan and the Oregon Annual Network Plan (ANP). LRAPA commits to maintaining the monitoring network in Oakridge as outlined and approved in the ANP.

The reporting of Oakridge PM concentrations was straightforward through 2016. However, major wildfires in 2017 and 2020 caused summertime violations of the 24-hour PM_{10} and $PM_{2.5}$ health standards. The Oakridge PM_{10} data for 1988-2020 is outlined in the following figure, illustrating the unprecedented impacts during exceptional wildfire smoke events in 2017 and 2020.

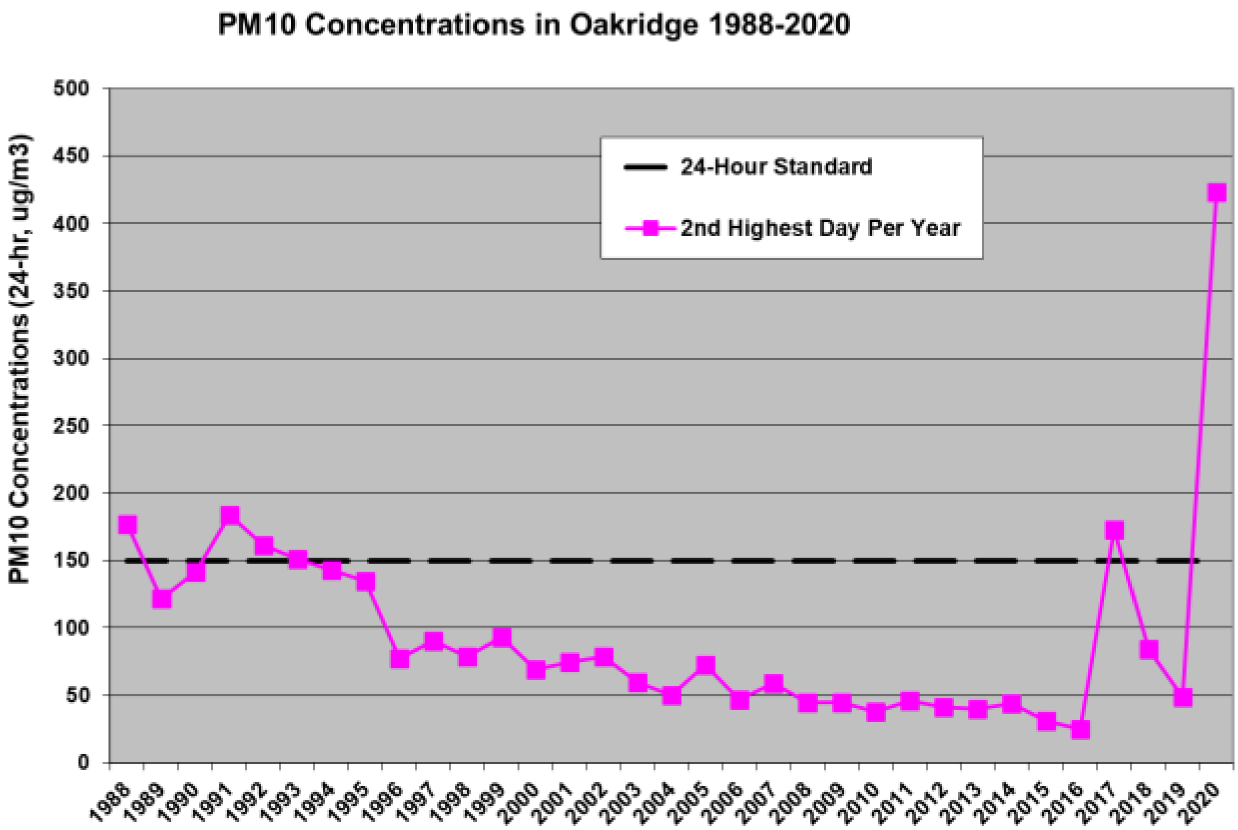


Figure 6: Oakridge PM10 Concentrations at WAC Station Location During 1988-2020.

These wildfires caused significant impacts on Oakridge residents, but those violations are being addressed separately by LRAPA, ODEQ, and EPA as part of the Exceptional Events review process. The Exceptional Events guidance developed by EPA, in consultation with other agencies and the public, is intended to prevent penalizing communities for events outside their control.

4.1 Exceptional Events

Large wildfires in Oregon and nearby states in 2017, and again in 2020, resulted in many major wildfire smoke impacts in Oakridge and other Oregon communities that required documentation and submittal to EPA for review and approval as Exceptional Events. The LRAPA annual reports in 2017-2020 were expanded to include the PM_{10} data with and without the days flagged as having had major wildfire smoke impacts. Pages 25 and 26 in the LRAPA 2020 Annual Report summarize the 2011-2020 PM_{10} concentrations without and with wildfire impacts; pages 23 and 24 summarize the 2011-2020 $PM_{2.5}$ concentrations without and with wildfire impacts. Similarly, page 28 of the 2020 Oregon Annual Ambient Criteria Pollutant Air Monitoring Network Plan summarizes the 2017-2019 design values in Oakridge and other Oregon communities without and with wildfire impacts. The following figure reviews the Oakridge data excluding all flagged wildfire days.

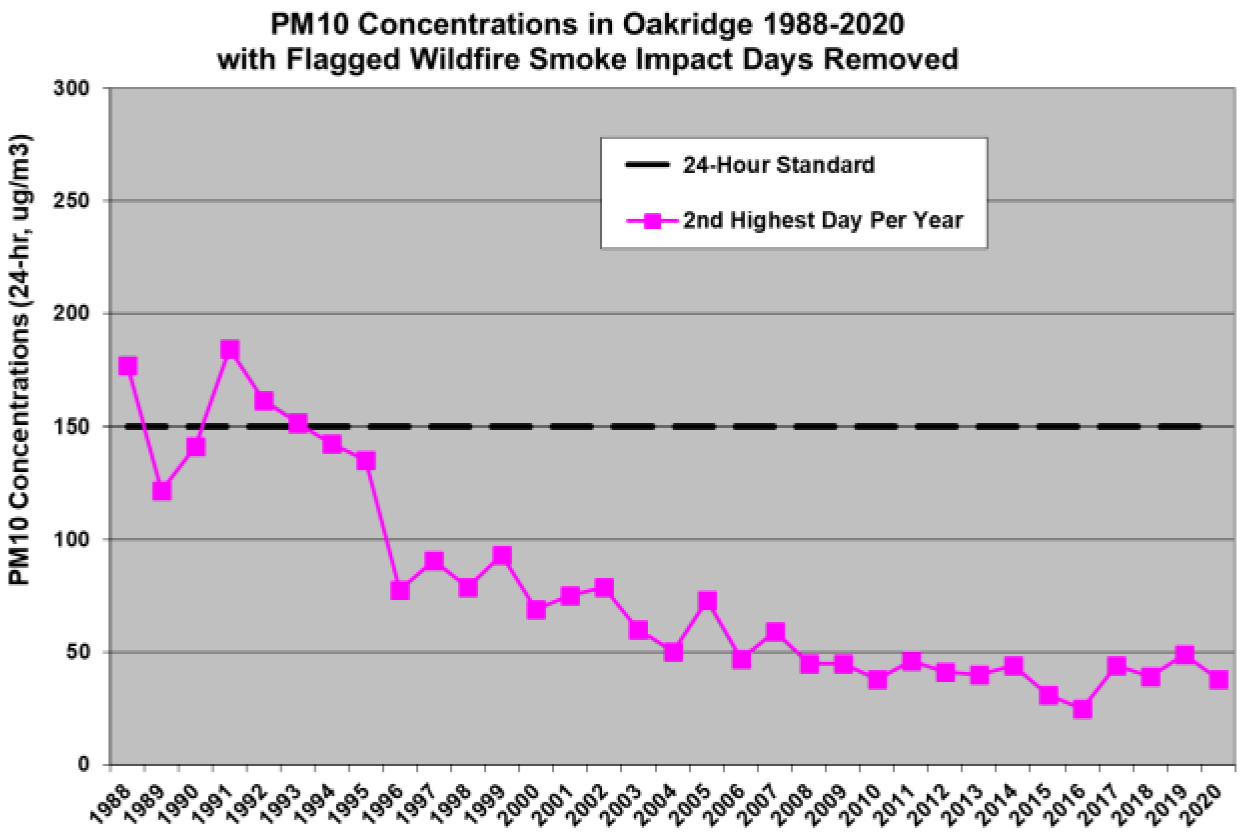


Figure 7: Oakridge PM10 Concentrations During 1988-2020 Excluding Wildfire Impact Days.

The Exceptional Events (EE) rule and guidance developed by EPA, in consultation with other agencies and the public, is intended to prevent penalizing communities for events outside their control. State and local air agencies may identify (or flag) days they believe have been influenced by exceptional events, such as wildfire smoke, and submit a demonstration for EPA concurrence, however, EPA can only allow exclusion of exceptional events that have "regulatory significance." This means that EPA may not be able to approve all the flagged EE days submitted by local, or state agencies.

State and local air agencies now have considerably more extensive experience with EEs during wildfires. LRAPA will refer to the following sets of air quality data for the Oakridge area for recent years:

1. Complete data including flagged wildfire impact days. This data compilation (Figure 6) is important to report because it reflects the air pollution impacts experienced by the community. But it could penalize the community with nonattainment restrictions for events outside their control, which the EE guidance is intended to avoid. In 2017, there were four exceedances of the 24-Hour PM_{10} standard during wildfire smoke events; even though there were no exceedances in 2015, 2016, 2018 or 2019, the four exceedances in 2017 resulted in 3-year average exceedance rates of 1.7 per year in 2015-2017, 2016-2018, and 2017-2019, greater than the 1.0 per year allowed by the 24-hour PM_{10} NAAQS. Similarly, the eight exceedances during wildfire smoke events in 2020 resulted in 3-year average exceedance rates of 2.7 per year in 2018-2020, 2019-2021, and 2020-2022, even if there are no additional wildfire impacts in 2021 or 2022.
2. Data with all flagged wildfire impact days removed. This data compilation (Figure 7) best illustrates the air quality improvement trends from successful implementation of the air pollution control strategies in the attainment plan. With all flagged wildfire smoke impacts removed, the exceedance rate would be 0.0 per year, in compliance with the 24-Hour PM_{10} NAAQS.
3. Data with flagged wildfire impact days removed only if they have regulatory significance. This data compilation is expected to be the basis of EPA finding a clean data determination (CDD) and EPA approval of the redesignation of the Oakridge UGB as attainment for the PM_{10} NAAQS. If EPA approves the EEs with regulatory significance in 2020, this would reduce the 3-year average exceedance rate to 0.7 per year in 2018-2020, in compliance with the 1.0 per year allowed by the 24-Hour PM_{10} NAAQS. The resultant 2018-2020 data in the EPA Air Quality System (AQS) after EPA review and approval would be between the data in Figures 6 and 7, and could change in the future if EEs are experienced in 2021 or 2022 thus requiring re-evaluation of regulatory significance of the 2020 exceedances.

LRAPA and ODEQ are advancing the EE proposal for 2020 in parallel with the Oakridge PM_{10} and $PM_{2.5}$ maintenance plans and requests for redesignation to attainment. An expanded discussion of the air monitoring data with additional details on the Exceptional Event review process is included in Appendix I: Ambient Air Quality Data Review.

4.2 Use of PM2.5 Monitoring as a Surrogate for PM10 Monitoring in the Future

The $PM_{2.5}$ health standards adopted by EPA in 2006 as part of its periodic review and update of the NAAQS are much more protective of public health than the PM_{10} NAAQS based on the size distribution of particulate matter in the airsheds of Oregon. This is especially the case in Oakridge, which has an extremely high $PM_{2.5}$ to PM_{10} ratio, as can be seen in Table 2. A detailed explanation is given in Appendix I: Ambient Air Quality Data Review.

Table 2: Oakridge $PM_{2.5}$ to PM_{10} Ratios and Statistics, 1999-2020

	Data Points	PM2.5 / PM10	RMSE	Stdev %	m	b	r2
All PM_{10} Data	2793	74.3%	0.804	30.97%	1.046	3.344	0.960
All PM_{10} Data, Exc. Wildfire*	2783	74.2%	0.804	31.01%	1.006	3.824	0.890
Fall/Winter PM_{10} Data	1731	86.1%	0.895	24.41%	1.065	1.574	0.950
Spring/Summer PM_{10} Data, Exc. Wildfire*	1052	54.5%	0.626	30.69%	1.213	4.653	0.669
Wildfire PM_{10} Data (Jun-Sep)	687	50.4%	0.609	34.18%	1.059	6.667	0.981

*Excludes PM10 Wildfire Data > 100 ug/m3

The $PM_{2.5}$ NAAQS is much more protective of public health than the PM_{10} NAAQS. The $PM_{2.5}$ NAAQS would be exceeded long before the PM_{10} NAAQS, thus more quickly triggering EE analysis or implementation of contingency measures in the PM maintenance plans.

Therefore, LRAPA intends to propose in a future update of the Oregon Annual Network Plan (ANP) to discontinue PM_{10} monitoring, and to use $PM_{2.5}$ monitoring as a surrogate for PM_{10}. LRAPA implementation of the $PM_{2.5}$ monitoring as a surrogate for PM_{10} would not occur until after EPA approval of $PM_{2.5}$ monitoring as a surrogate for PM_{10} in the updated ANP and EPA approval of the Oakridge PM_{10} maintenance plan and request to redesignate Oakridge as attainment for the PM_{10} NAAQS. The details and specifics of the surrogate monitoring are outlined in Appendix I: Ambient Air Quality Data Review.

5. Emission Inventories

The PM_{10} and $PM_{2.5}$ air pollution problems in Oakridge are closely related and the PM_{10} and $PM_{2.5}$ emission inventories are more similar than different. Most of the smoke (i.e., combustion-related) components are similar for both PM_{10} and $PM_{2.5}$; the major differences are in the dust components since a higher percentage of dust falls within the PM_{10} size range compared to the $PM_{2.5}$ size range.

The Oakridge PM_{10} (1996) and $PM_{2.5}$ (2016) attainment plans were very similar; both identified residential wood combustion (in certified and non-certified woodstoves, fireplaces and pellet stoves) as the major emission category causing violations of the PM_{10} and $PM_{2.5}$ health standards on stagnant winter days, and outlined commitments for a number of strategies to replace non-certified woodstoves with cleaner burning units, improve firewood seasoning and woodstove operation to reduce PM emissions, and to curtail residential wood combustion during air stagnation episodes. Therefore, where possible, the Oakridge PM_{10} and $PM_{2.5}$ maintenance plans are closely synchronized, including the PM and precursor emission inventories and control strategies.

The 2015 Base Year PM_{10} Emission Inventory from Appendix II is summarized in the following table. Residential woodburning and other area source emissions on worst case days are lower than on typical season days due to woodburning curtailment and outdoor burning bans.

Table 3: 2015 Base Year Typical Season Day and Worst-Case Day PM_{10} Emissions.

	-- lbs/per day --		Percent of Total NAA Emissions	
	Typical Season Day	Worst-Case Day	Typical Season Day	Worst-Case Day
Permitted Point Sources[(1)]				
Oakridge Sand & Gravel: Rock crushing operation	0.0	0.0	0.0%	0.0%
Oakridge Sand & Gravel: Cement plant	0.0	0.0	0.0%	0.0%
Stationary Area Sources				
Residential Wood Combustion: Fireplace[(2)(4)]	38.5	31.7	7%	6%
Residential Wood Combustion: Non-Certified Woodstove/Insert[(2)(4)]	108.4	89.4	18%	18%
Residential Wood Combustion: Certified Woodstove/Insert[(2)(4)]	243.2	200.7	41%	40%
Pellet Stoves	7.3	8.0	1%	2%
All Other Stationary Area Sources	47.4	4.7	8%	1%
On-Road Sources				
On-Road: Exhaust, Brake, Tire[(3)]	30.7	37.8	5%	8%
Re-Entrained Road Dust	111.4	120.7	19%	24%
Nonroad Sources				
Union Pacific Railroad	2.9	2.9	0%	1%
	------	------		
Total, All Sources, lbs/day	**590**	**496**		

(1) Worst-case day = Permitted hourly (x24) operating capacity. *Updated by MLH on 09/17/2021.*
(2) Worst-case day = Peak Heating Degree Day.
(3) Updated with MOVES 2014a in May 2018.
(4) Based on RWC curtailment effectiveness of 25% on Worst-Case Day in 2015.

Growth is expected to be low in the Oakridge area through 2035. Population, housing, and employment forecasts are expected to increase gradually. The 2019 Population Forecasts by the Population Research Center at Portland State University*see note below indicate total expected population growth in the Oakridge and Westfir Urban Growth Boundaries (UGBs) during 2010-2035 of only 0.4% (less than 0.02% average per year), increasing from 3,563 (3,308+255) to 3,578 (3,312+266) population over the 2010-2035 time period.

*Note: The Oregon legislature passed a law (ORS 195.033) in 2013 by way of HB 2253 that assigned the forecast creation task to the Population Research Center at Portland State University (PSU). In 2015, the Land Conservation and Development Commission adopted rules (OAR 660-032) to implement the new law.

The staff of the Lane Council of Governments (LCOG) periodically updates and summarizes the demographic information for Oakridge, Westfir and other Lane County communities, based on American Community Survey (ACS) data from the U.S. Census Bureau. The 2018 ACS data indicates 1,791 total housing units in Oakridge, of which 1,433 are occupied, with electric heat as the primary heat source in 1,027 of the occupied housing units, wood as the primary heat source in 340 of the occupied housing units, and 66 occupied housing units using other fuel or none. Similarly, the Westfir ACS data indicates 131 total housing units, of which 121 are occupied, with electric heat as the primary heat source in 66 of the occupied housing units,

wood as the primary heat source in 39 of the occupied housing units, and 16 occupied housing units using other fuel or none.

Traffic growth in Vehicle-Miles-Traveled (VMT) is based on previous transportation modeling by Lane County, LCOG and ODOT in the Highway 58 corridor, as summarized in the following table for the Oakridge-Westfir NAA. More detail about the VMT modeling is in the LCOG memorandum (link here) that summarizes the VMT data process LCOG completed in May of 2021 to update the VMT estimations previously used in the 2016 Updated Attainment Plan so that they are current and consistent with modeling guidance for this Maintenance Plan.

Table 4: Oakridge Projected Traffic Growth (Vehicle Miles Traveled, VMT) for 2015-2035.

Month	2015		2025		2030		2035	
	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
April	74,134	106,845	74,879	107,920	75,254	108,465	75,364	109,004
July	98,553	142,602	99,544	144,036	100,057	144,780	100,553	145,493
September	94,834	125,470	95,788	126,732	96,282	127,385	96,761	128,017
December	69,909	110,697	70,612	111,810	70,958	112,353	71,307	112,901
Total Annual	34,558,914		34,906,443		35,083,373		35,239,815	

The principal components for development and documentation for the 2015-2035 Maintenance Plan emission inventories are addressed in Appendix III: Emission Inventories for Future Years. Appendix III includes stationary permitted point sources, stationary area (non-permitted) sources, non-road mobile sources (railroads), on-road mobile sources, and emissions summaries. Inventory years for the Maintenance Plan include the 2015 Base Year and then Future Years 2025, 2030 and 2035. The geographic boundary for each inventory continues to be the Oakridge-Westfir NAA, as defined by the NAA boundary in the 2016 Plan and illustrated previously in Figure 3.

The differences between the 2015 base year emission inventory and the maintenance years (2025, 2030, and 2035) emission inventories are the combination of increases due to growth factors and decreases due to emission control strategies. For example, motor vehicle emissions continue to decrease overall due to progressively cleaner gasoline and diesel fuels and motor vehicles and the transition to more zero-emission vehicles, but part of the emissions decrease will be offset by gradual growth in traffic volumes.

Exhaust, brake and tire emissions of $PM_{2.5}$ from motor vehicles were calculated by staff of the Oregon DEQ in 2018 for future years emissions (2025-2035). The PM_{10} MOVES 2014a emission modeling results for 2015, 2025, 2030, and 2035 are summarized in the following table.

Table 5: Oakridge PM_{10} MOVES 2014a emission modeling combined results (lb/day) for 2015-2035

Year	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015 Total	Total PM10 Exhaust, Brake, Tire	26.8	34.6	30.7	41.0	30.3	37.3	27.8	37.8	30.7	37.8
2025 Total	Total PM10 Exhaust, Brake, Tire	16.9	21.7	20.0	26.5	19.6	24.0	16.7	22.9	19.2	22.9
2030 Total	Total PM10 Exhaust, Brake, Tire	18.6	24.3	22.6	30.1	22.1	27.2	17.9	25.1	21.2	25.1
2035 Total	Total PM10 Exhaust, Brake, Tire	18.0	23.5	21.9	29.6	21.3	26.3	17.4	24.3	20.6	24.3

The motor vehicle MOVES modeling results and the Motor Vehicle Emissions Budget (MVEB) are described in more detail in Appendix IV.

Railroad locomotive emissions will continue to decrease due to federal control measures. Industry emissions are minor so this did not have a major effect on the 2015 emissions or future emission inventories. The most significant category continues to be residential wood-heating; emissions were increased to reflect population and housing growth in future years, decreased due to non-certified woodstove replacements with cleaner burning units after 2015, and decreased due to improvements in public outreach regarding cleaner burning techniques and code enforcement programs for curtailment during stagnant air episodes.

The primary focus of this 2015-2035 Maintenance Plan is to continue to reduce RWC emissions. The Oakridge Air Program, outlined in detail in Appendix V, continues and expands RWC strategies that have been effective over the past few decades. Much of the funding for the Oakridge Air Program is provided by an EPA Targeted Airshed Grant received by LRAPA in 2019, to be implemented during 2020-2024.

The core RWC strategies continue and are summarized in Section 6. The most significant of the RWC reductions from the Oakridge Air Program will be achieved during 2020-2024. The $PM_{2.5}$ emission inventories for the 2025, 2030 and 2035 future years, Typical Season Day and Worst Case Day, are compared to the 2015 Base Year PM_{10} Emission Inventory in the following tables and figure.

Table 6: Comparison of Base Year to Future Years Typical Season Day PM_{10} Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	397.3	316.7	316.6	316.1
Onroad Motor Vehicles	30.7	19.2	21.2	20.6
Re-Entrained Road Dust	111.4	111.8	112.0	112.2
Permitted Point Sources	0.0	8.0	8.0	8.0
Railroad Locomotives	2.9	2.9	2.9	2.9
Other Area Sources	47.4	47.4	47.4	47.4
Total PM_{10} Emissions	**590**	**506**	**508**	**507**

Table 7: Comparison of Base Year to Future Years Worst Case Day PM_{10} Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	329.8	246.2	229.1	211.8
Onroad Motor Vehicles	37.8	22.9	25.1	24.3
Re-Entrained Road Dust	120.7	121.2	121.4	121.7
Permitted Point Sources	0.0	13.7	13.7	13.7
Railroad Locomotives	2.9	2.9	2.9	2.9
Other Area Sources	4.7	4.7	4.7	4.7
Total PM_{10} Emissions	**496**	**412**	**397**	**379**

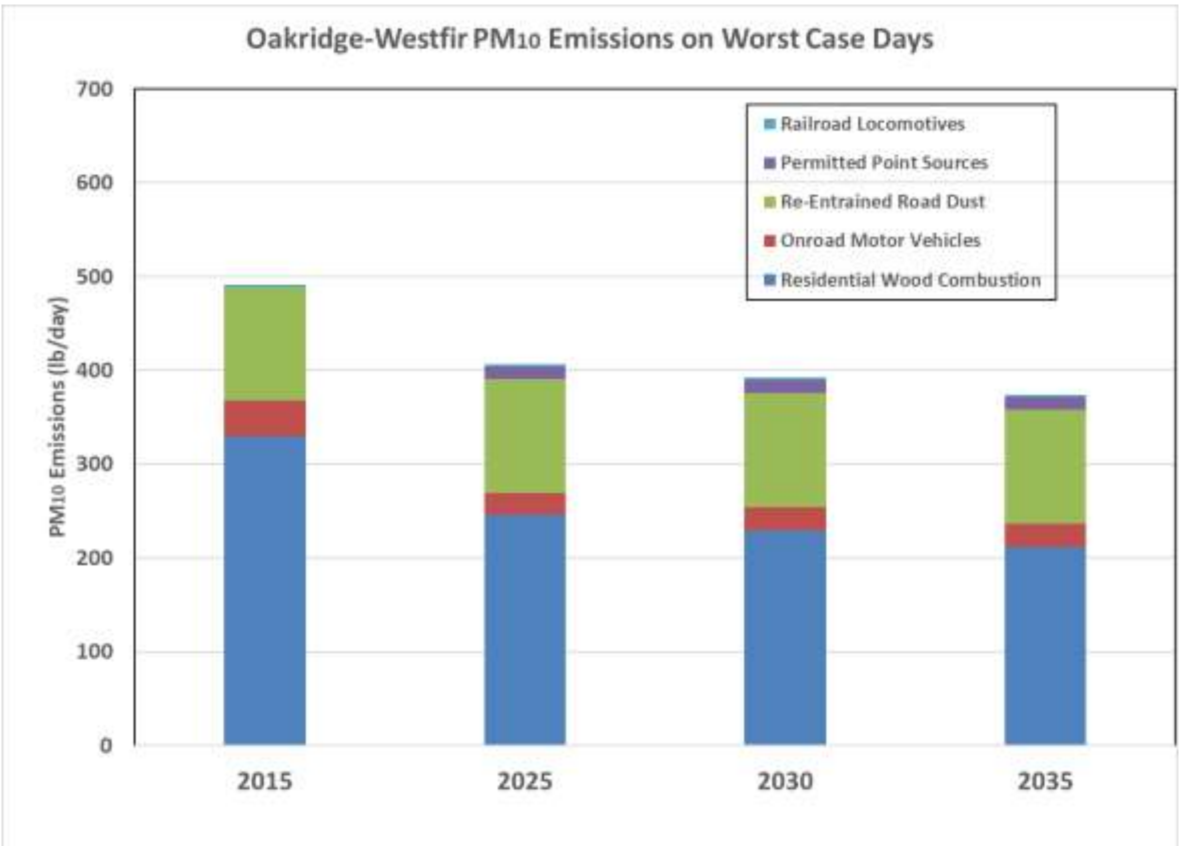


Figure 8: Worst Case Day PM_{10} Emissions 2015-2035.

5.1 Precursor Emission Inventories (NOX, VOC, SO2, and NH3)

Secondary particulate is an overall very minor contributor to the Oakridge PM_{10} and $PM_{2.5}$ air pollution concentrations on worst winter days as summarized in the 2016 $PM_{2.5}$ Attainment Plan. Historical speciated $PM_{2.5}$ filter analyses indicate that concentrations of the relevant precursor groups (nitrates, sulfates, ammonia, and volatile organic compounds [VOC]) were determined to be below the EPA Region 10 insignificance thresholds.

Precursor trends in the Lane County, Oregon, portion of the National Emission Inventories (NEIs for 2011, 2014, and 2017) for the major emission categories in the Oakridge-Westfir airshed indicate precursors are decreasing, indicating that precursor emissions would be even less significant contributors to PM_{10} and $PM_{2.5}$ in the future.

In the preparation of the maintenance plan, LRAPA staff performed a more definitive analysis of the 2015 base year and the 2025-2035 future year precursor emissions (NO_X, VOC, SO_2, and NH_3). The 2015 precursor emissions are calculated in Appendix II and summarized in the following table.

Table 8: PM_{10} and Precursor Emissions for Worst Case Day in 2015 Base Year.

	Worst Case Day PM_{10} and Precursor Emissions (lb/day)				
Source Category	**PM_{10}**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	329.8	41.6	307.8	6.6	17.3
Onroad Motor Vehicles	37.8	711.3	543.2	2.9	12.0
Re-Entrained Road Dust	120.7	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.9	0.1	5.2	0.1	0.1
Other Area Sources	4.7	0.5	13.4	0.4	0.9
Total Emissions	**496**	**753**	**870**	**10**	**30**

Most of the 2015 precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories (i.e., 73-99%), and these emission categories were evaluated in most detail for all years (2015, 2025, 2030, and 2035). Precursor emissions of NO_X, VOC, SO_2, and NH_3 are compared to PM_{10} emissions on worst case days in 2015, 2025, 2030, and 2035 in the next series of tables.

Table 9: Comparison of Base Year to Future Years Worst Case Day NOx Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	41.6	33.4	34.4	32.5
Onroad Motor Vehicles	711.3	193.1	127.9	108.8
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	8.7	8.7	8.7
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	0.5	0.5	0.5	0.5
Total NOx Emissions	**753**	**236**	**172**	**150**

Table 10: Comparison of Base Year to Future Years Worst Case Day VOC Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	307.8	165.9	151.7	137.1
Onroad Motor Vehicles	543.2	183.2	18.8	15.9
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	0.8	0.8	0.8
Railroad Locomotives	5.2	5.1	5.1	5.1
Other Area Sources	13.4	13.4	13.4	13.4
Total VOC Emissions	**870**	**368**	**190**	**172**

Table 11: Comparison of Base Year to Future Years Worst Case Day SO_2 Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	6.6	5.5	5.2	4.8
Onroad Motor Vehicles	2.9	1.4	1.2	1.2
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	0.4	0.4	0.4	0.4
Total SO_2 Emissions	**9.9**	**7.3**	**6.8**	**6.4**

Table 12: Comparison of Base Year to Future Years Worst Case Day NH_3 Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	17.3	12.6	11.7	10.9
Onroad Motor Vehicles	12.0	9.1	5.4	5.3
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	NA	NA	NA	NA
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	0.9	0.9	0.9	0.9
Total NH_3 Emissions	**30.3**	**22.7**	**18.1**	**17.1**

In summary, all the precursor emission categories (NO_X, VOC, SO_2, and NH_3) decrease during the 2015-2035 period. This is as expected since most of the precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories, and the precursor emissions are reduced by the same control strategies that reduce Residential Wood Combustion PM_{10} and $PM_{2.5}$ emissions (e.g., progressively cleaner burning home heating units) and On-Road Motor Vehicle PM_{10} and $PM_{2.5}$ emissions (e.g., progressively cleaner vehicles and fuels).

5.2 Condensable and Filterable PM_{10} Emissions

In addition to the precursor assessment, LRAPA staff also did a more detailed analysis of the condensable and filterable fractions of the PM_{10} and $PM_{2.5}$ emission inventories. Unfortunately, as reviewed in Appendix II, the EPA guidance indicates there is not reliable condensable-filterable information available for the major PM_{10} and $PM_{2.5}$ emission categories in Oakridge and the Oakridge-Westfir area.

For example, condensable PM emissions are not an issue associated with mobile sources. The MOVES model used for these sectors produces primary emission estimates for PM, including particle components (e.g., elemental carbon and organic carbon) and gaseous hydrocarbons (e.g., VOC, non-methane organic gases). These pollutant metrics would include both "filterable" and "condensable" PM. These are currently not separable in MOVES, and for SIP inventory purposes, they can be reported as output from MOVES without additional modification. For Residential Wood Combustion, EPA-OAQPS staff confirmed that the condensable requirement for RWC is currently waived for RWC because the data is not available at present, so just the total PM_{10} and $PM_{2.5}$ emissions should be reported.

The following table summarizes the unavailability or inapplicability of condensable-filterable information for the major sources of PM_{10} emissions in Oakridge:

Table 13: Availability and Applicability of PM_{10} Filterable & Condensable Emissions Information.

	2015 Worst Case Day PM_{10} Emissions (lb/day)			
Source Category	Total PM_{10}	Filterable PM_{10}	Condensable PM_{10}	Notes
Residential Wood Combustion	329.8	NA	NA	Not available for RWC.
Onroad Motor Vehicles	37.8	NA	NA	Addressed in MOVES.
Re-Entrained Road Dust	120.7	NA	NA	Not applicable.
Permitted Point Sources	0.0	0.0	0.0	No activity in 2015.
Railroad Locomotives	2.9	NA	NA	Not available.
Other Area Sources	4.7	NA	NA	Not available for vegetative sources.
Total PM_{10} Emissions	**496**	**NA**	**NA**	

6. Air Pollution Control Strategies

Residential wood combustion (RWC) emissions have been the major contributor to the historical PM_{10} and $PM_{2.5}$ air pollution problems in the Oakridge-Westfir area and Oakridge UGB and will continue to be the major source of PM_{10} and $PM_{2.5}$ emissions in the future, as illustrated in the emission inventories in Figure 8 of the previous section.

The key long-term RWC strategies have been:

- the woodstove change-out programs replacing uncertified woodstoves with cleaner burning and more efficient home heating units;
- the Oregon and EPA woodstove certification programs requiring any new woodstoves installed since 1986 to be certified woodstoves; and
- the Oakridge ordinance and Oregon Heat Smart law requiring removal of uncertified woodstoves upon home sale.

The key short-term RWC strategies have been:

- mandatory woodburning curtailment program during air stagnation episodes;
- opacity standards to ensure clean burning woodstoves with reduced woodsmoke;
- increased availability of properly seasoned firewood, especially for exempt, low-income, and elderly households;
- expanded public outreach and improved woodstove operation to minimize woodsmoke.

The key control measures in the Oakridge PM_{10} Attainment Plan approved by EPA, effective May 14, 1999, were:

- Accelerated Woodstove Replacement Program through grants and loans (1993-1994);
- Aggressive Voluntary Residential Wood Burning Curtailment (1996);
- Use of Anti-icing Chemicals by ODOT in Oakridge to minimize winter sanding; and
- Road Paving Program (1991-1995).

The Oakridge PM_{10} control measures were fully implemented and were successful in achieving the PM_{10} standards on schedule. On July 26, 2001, EPA published a finding of PM_{10} attainment for the Oakridge PM_{10} area (66 FR 38947).

The four key PM_{10} control measures have been continued (use of anti-icing chemicals to minimize winter sanding), or completed (1991-1995 road paving projects and 1993-1994 uncertified woodstove replacements), or expanded (additional uncertified woodstove replacements in 2009 using EPA funds and in 2010-2011 using American Recovery and Reinvestment Act funds), or strengthened (voluntary curtailment replaced with mandatory curtailment as part of the $PM_{2.5}$ attainment strategy under City of Oakridge Ordinances #903 in October 2012, #914 in October 2015, and #920 in October 2016).

The RWC control strategies from the 1996 PM_{10} and 2016 $PM_{2.5}$ attainment plans will be continued and expanded into the future as part of the Oakridge Air Program described in Appendix V. The city and county ordinances are included in Appendix VI, and the woodburning curtailment protocols are included in Appendix VII.

The key RWC strategies of the Oakridge Air Program described in Appendix V include:

- Home heating upgrades: Weatherization, home repairs, ductless heat pumps, certified woodstove upgrades to 145 homes;
- Expanded code enforcement, public outreach, and educational diversion program for first-time smoke violations;
- Community firewood program to ensure seasoned firewood with a reduced rate for low-income, senior, and disabled residents;
- Community and school education with curriculum by the Middle Fork Willamette Watershed Council in coordination with the Oakridge School District; and
- Air filters to improve HVAC systems of public buildings for community smoke shelters, and portable filters distributed through local health clinics for vulnerable residents, for

use during summer wildfire smoke impacts or winter air stagnation woodstove smoke events.

Other emission sources are much less significant than the RWC emissions. Federal control measures on new cars, trucks and locomotives will continue to reduce mobile source emissions in future years, as summarized in Table 7 of the previous section and described in more detail in Appendix III and Appendix IV.

7. Transportation Conformity

Transportation Conformity addresses air pollution from on-road mobile sources such as cars and trucks. Federal transportation conformity regulations require the evaluation of on-road emissions from transportation plans and projects before their implementation. This ensures that on-road transportation activities will not cause or contribute to a violation of federal air quality health standards, worsen air quality, or delay the improvement of air quality.

The Motor Vehicle Emission Budgets (MVEBs) establish limits on the total emissions allowed from on-road mobile sources such as cars and trucks to ensure that future emissions from on-road mobile sources do not interfere with the continued maintenance of the $PM_{2.5}$ air quality health standards. MVEBs reflect the total on-road $PM_{2.5}$ emissions projected for 2025, 2030 and 2035 on winter weekend days during December, plus a portion of the available safety margin. A conservative margin of safety was added to the MVEB to accommodate uncertainty.

A safety margin is the amount by which the total projected $PM_{2.5}$ emissions from all sources are less than the total $PM_{2.5}$ emissions for the 2015 attainment year, the level required to demonstrate continued maintenance of the standard. A small portion of the inventory safety margin was allotted to the on-road motor vehicle emissions inventory projections to accommodate the wide array of assumptions that are factored into the calculation process. Since assumptions and models change over time, it is necessary to have a margin of safety that will accommodate technical uncertainties due to model updates and inputs into the EPA MOVES model and travel forecasting models, as well as potential changes to regional transportation plans.

As noted throughout this PM_{10} maintenance plan, the PM_{10} and $PM_{2.5}$ air pollution problems in Oakridge are closely related and therefore, where possible, the Oakridge PM_{10} and $PM_{2.5}$ maintenance plans are closely synchronized, including the PM and precursor emission inventories and control strategies. The overall emission inventories for PM_{10} and $PM_{2.5}$ (and the PM precursors) in the maintenance plans are based on the larger Oakridge-Westfir area in Figure 3 for consistency. But the EPA guidance on MVEBs very specifically indicates each MVEB (PM_{10} and $PM_{2.5}$) must be based on its respective nonattainment area boundary, so the PM_{10} and $PM_{2.5}$ are calculated specifically for their respective nonattainment area boundaries. The nonattainment area boundary for PM_{10} is the Oakridge UGB shown in Figure 2; and the nonattainment area boundary for $PM_{2.5}$ is a rectangular boundary surrounding the Oakridge-Westfir communities shown in Figure 3.

In order to calculate the PM_{10} MVEB for the Oakridge UGB, LCOG staff provided VMT specific to the Oakridge UGB, a subset of the VMT traffic provided previously in Table 4, as outlined in the following table. The methodology is reviewed in Appendix IV.

Table 14: Oakridge Projected VMT Traffic Growth for 2015-2035 in Oakridge UGB.

	2015		2025		2030		2035	
Month	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
April	35,215	50,235	35,569	50,740	35,753	51,001	35,929	51,250
July	43,275	61,936	43,710	62,559	43,925	62,866	44,145	63,180
September	42,042	55,138	42,464	55,692	42,672	55,966	42,882	56,242
December	33,834	52,970	34,175	53,502	34,338	53,747	34,512	54,018
Total Annual	15,761,044		15,919,488		15,997,800		16,077,360	

This UGB-specific VMT was then used to calculate the corresponding PM_{10} emissions, as a subset of the PM_{10} emissions provided previously in Table 5, as outlined in the following table.

Table 15: Oakridge PM_{10} MOVES 2014a UGB-adjusted results (lb/day) for 2015-2035.

Year	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015 Total	Total PM10 Exhaust, Brake, Tire	12.2	15.8	14.0	18.7	13.8	17.0	12.7	17.2	14.0	17.2
2025 Total	Total PM10 Exhaust, Brake, Tire	7.7	9.9	9.1	12.1	8.9	10.9	7.6	10.4	8.8	10.4
2030 Total	Total PM10 Exhaust, Brake, Tire	8.5	11.1	10.3	13.7	10.1	12.4	8.2	11.5	9.7	11.5
2035 Total	Total PM10 Exhaust, Brake, Tire	8.2	10.7	10.0	13.5	9.7	12.0	7.9	11.1	9.4	11.1

Based on the PM_{10} worst case day emissions in Table 15 above and the PM_{10} worst case day Re-Entrained Road Dust emissions in Table N of Appendix IV, the PM_{10} MVEBs for 2015 and future years are included in the following table. The basis for the MVEB safety margin is outlined in Appendix IV, and the major uncertainty factor was the range of VMT growth rates for various parts of Lane County.

Table 16: Oakridge PM_{10} Motor Vehicle Emissions Budget (lb/day) for 2015-2035.

Year	Pollutant_Name	Worst Case Day (lb/day)
2015 Total	**Total PM10 Exhaust, Brake, Tire, Re-Entrained Road Dust**	**138.9**
2025 Total	**Total PM10 Exhaust, Brake, Tire, Re-Entrained Road Dust**	**147.4**
2030 Total	**Total PM10 Exhaust, Brake, Tire, Re-Entrained Road Dust**	**156.8**
2035 Total	**Total PM10 Exhaust, Brake, Tire, Re-Entrained Road Dust**	**164.7**

It should be noted that the MVEBs for PM_{10} are lower than the MVEBs for $PM_{2.5}$ even though the emissions per mile are greater for PM_{10} than for $PM_{2.5}$; this is because the PM_{10} MVEBs are based on the lower VMT in the smaller Oakridge UGB in Figure 2, whereas the $PM_{2.5}$ MVEBs are based on the higher VMT in the larger Oakridge-Westfir area in Figure 3. More detailed explanation is included in Appendix IV.

8. Maintenance of Air Quality Health Standards

There are three key commitments to ensure maintenance of air quality health standards through at least 2035:

- Operation of the PM_{10} monitoring network during 2021-2035;
- Verification of continued maintenance of the PM_{10} air quality health standards; and
- Contingency plan to implement if necessary to ensure maintenance of PM_{10} standards.

8.1 Commitment to Continue Air Monitoring Network

LRAPA will continue operation of the PM_{10} monitoring network as outlined in the LRAPA Ambient Air Monitoring Network Plan (as part of the Oregon Annual Network Plan or ANP) and summarized in Section 4: Air Quality Monitoring of this document until EPA approval of this redesignation request and maintenance plan. LRAPA implementation of the surrogate method outlined in Section 4.2 will not occur until EPA approval of the ANP. Any further modifications to the monitoring network will be done in consultation with Oregon DEQ and EPA Region 10.

8.2 Verification of Continued Maintenance of Standards

LRAPA will continue to provide quality-assured air quality data for the previous calendar quarter to Oregon DEQ to be uploaded to the EPA Air Quality System (AQS) within 60 days of the end of each quarter to verify continued compliance with the NAAQS. LRAPA will flag any days it considers to be influenced by Exceptional Events such as wildfire smoke impacts.

LRAPA will review the air monitoring results and design value each year to verify continued attainment. LRAPA will determine annually if Exceptional Events influenced the continued attainment of the 24-hour PM_{10} NAAQS and need to be documented. If needed, Exceptional Events documentation will be coordinated with Oregon DEQ and submitted to EPA Region 10 for review.

8.3 Contingency Plan

The 2016 Plan included contingency strategies that would have gone into effect if the $PM_{2.5}$ standards had not been fully achieved by December 31, 2016. Since the Oakridge-Westfir airshed demonstrated attainment of the 3-year $PM_{2.5}$ standards during 2014-2016 by the December 31, 2016 attainment date, the contingency plan did not need to be implemented.

Therefore, the same contingency plan is included in this PM_{10} Maintenance Plan. As discussed in Section 4.2, a $PM_{2.5}$ concentration of 35 µg/m^3 is equivalent to a PM_{10} concentration of about 40 µg/m^3, well below the PM_{10} standard of 150 µg/m^3. If the $PM_{2.5}$ design value in future years indicates violation of the 24-hour $PM_{2.5}$standard (35 µg/m^3), after consideration of any Exceptional Events, the following contingency strategies, or equivalent, will be implemented by LRAPA and the City of Oakridge:

- Stricter green-yellow-red advisory program, with more red advisory days each winter, by reducing the red advisory thresholds by 3 µg/m^3 $PM_{2.5}$; this is projected to increase the average number of potential red advisory days by three to five additional days per year.
- Prohibition of fireplace use on yellow advisory days (in addition to the existing prohibition on red advisory days).

While these measures do not need to be fully adopted by LRAPA prior to the occurrence of a NAAQS violation, LRAPA commits to adopt and implement the necessary contingency measures as expeditiously as possible. As discussed in Section 4.1, the $PM_{2.5}$ NAAQS is more protective than the PM_{10} NAAQS, so the contingency plan for $PM_{2.5}$ is more likely to be implemented than for PM_{10}. LRAPA will require adoption of the contingency measures no later than six months and implementation of such corrective action no later than one year after a violation based on confirmed quality assured data. Any contingency measures adopted and implemented will become part of the next revised maintenance plan submitted to the EPA for approval.

LRAPA will evaluate all appropriate data to determine the cause of the elevated levels of PM_{10} and $PM_{2.5}$, and whether the elevated levels are likely to continue. This may include air quality data, meteorological data, evaluation of wood smoke programs, information on unusual weather events (e.g. wildfires or winter power outages), and other data to try to determine the cause of the violation. This evaluation will occur within three months of the determination of a violation. Where appropriate, LRAPA will follow the EPA exceptional events rules and guidance if it is determined that an exceptional event contributed to the violation.

Using these contingency strategies to increase curtailment effectiveness is expected to reduce RWC emissions by about 42 lb/day and reduce PM_{10} and $PM_{2.5}$ concentrations by an additional 2.8 µg/m^3 on worst case days, as outlined in the 2016 Plan.

9. Redesignation to Attainment

As outlined in Section 3: Redesignation Requirements of this document, the EPA approval of this maintenance plan and redesignation request will satisfy the final requirements of the federal Clean Air Act in Section 107 [CAA §107(d)(3)(E)] and the Oakridge UGB will then have a fully approved PM_{10} maintenance plan ensuring continued attainment of standards for at least ten years beyond redesignation.

This would begin a 20-year planning cycle designed to ensure that the Oakridge UGB airshed remains in continued attainment with the national PM_{10} air quality health standards. This maintenance plan covers the first ten years of that planning cycle. The Clean Air Act requires a second 10-year maintenance plan in the future to complete the 20-year planning cycle.

MLH/MKH:rcr (10/07/2021)

Appendix I: Ambient Air Quality Data Review

Oakridge PM_{10} Maintenance Area

July 2021

Lane Regional Air Protection Agency (LRAPA)

Monitoring of Particulate Matter (PM) in the Oakridge Area

The Oakridge air monitoring station (Site Code WAC, AQS #410392013) has been located at the Willamette Activity Center (WAC) in the southwest portion of the city of Oakridge since 1989. Saturation monitoring studies have demonstrated the monitor is located in the area of maximum emissions and PM concentrations. The WAC station is part of the SLAMS (State and Local Air Monitoring Stations) network and meets all siting requirements and criteria for the monitoring objective of maximum population exposure at the neighborhood spatial scale. LRAPA is committed to continued operation of the air quality monitors at the Oakridge site, consistent with the Oregon Department of Environmental Quality (ODEQ) Annual Air Monitoring Network Plan.

The WAC sampling method for PM_{10} has historically been the filter-based Federal Reference Method (FRM) operating on an every-6th-day schedule. The current parameters measured at the WAC station include:

- PM_{10} with Federal Equivalent Method (continuous beta attenuation method),
- $PM_{2.5}$ with Federal Equivalent Method (continuous beta attenuation method),
- $PM_{2.5}$ with Federal Reference Method (FEM collocation requirement),
- Nephelometer (continuous optical backscatter),
- Wind Speed and Direction (continuous ultrasonic),
- Temperature (continuous platinum RTD at 2 meters and 10 meters height),
- Barometric Pressure (continuous electronic barometer), and

- Solar Radiation (continuous pyranometer).

Additional details, photos, and maps are included in the annual LRAPA Ambient Air Monitoring Network Plan; the following photos are taken from that Network Plan.

Figure 1: Oakridge WAC Air Monitoring Station.

Figure 2: WAC Station Location.

Quality-assured data is submitted quarterly by LRAPA to ODEQ and the U.S. Environmental Protection Agency (EPA) within 60 days of the end of each calendar quarter.

The air quality in Oakridge has steadily improved over the past 30 years with comprehensive strategies to reduce the measured concentrations of particulate matter and to address the adoption of progressively more protective national air quality health standards.

The Oakridge Urban Growth Boundary (UGB) was designated nonattainment for PM_{10} and classified as moderate by EPA on January 20, 1994. LRAPA submitted a draft Oakridge PM_{10} attainment plan to EPA Region 10 for stringency review during early 1996. The Oakridge PM_{10} attainment plan was adopted by the LRAPA Board of Directors at a hearing on August 13, 1996. The Oakridge PM_{10} attainment plan was subsequently adopted by the Oregon Environmental Quality Commission (EQC) on December 9, 1996, and submitted to EPA. EPA approved the plan on March 15, 1999 (64 FR 12751). The plan relied on control strategies needed to assure attainment of the PM_{10} National Ambient Air Quality Standards (NAAQS).

The Oakridge PM_{10} strategies were successful in achieving the PM_{10} standards on schedule. On July 26, 2001, EPA published a finding of attainment for the Oakridge PM_{10} area (66 FR 38947). The Oakridge PM_{10} data for 1988-2016 is outlined in the following figure; there were no exceedances of the PM_{10} standards during 1994-2016, and by 2016 the PM_{10} concentrations in Oakridge were about 80% below the 24-hour PM_{10} standard. The "2nd Highest Day Per Year" is a good overall indicator of compliance with the 24-hour PM_{10} standard; if the "2nd Highest Day Per Year" data remains below the 24-hour PM_{10} standard line, then it ensures compliance with the "no more than one exceedance per year averaged over a 3-year period" requirement of the 24-hour PM_{10} standard.

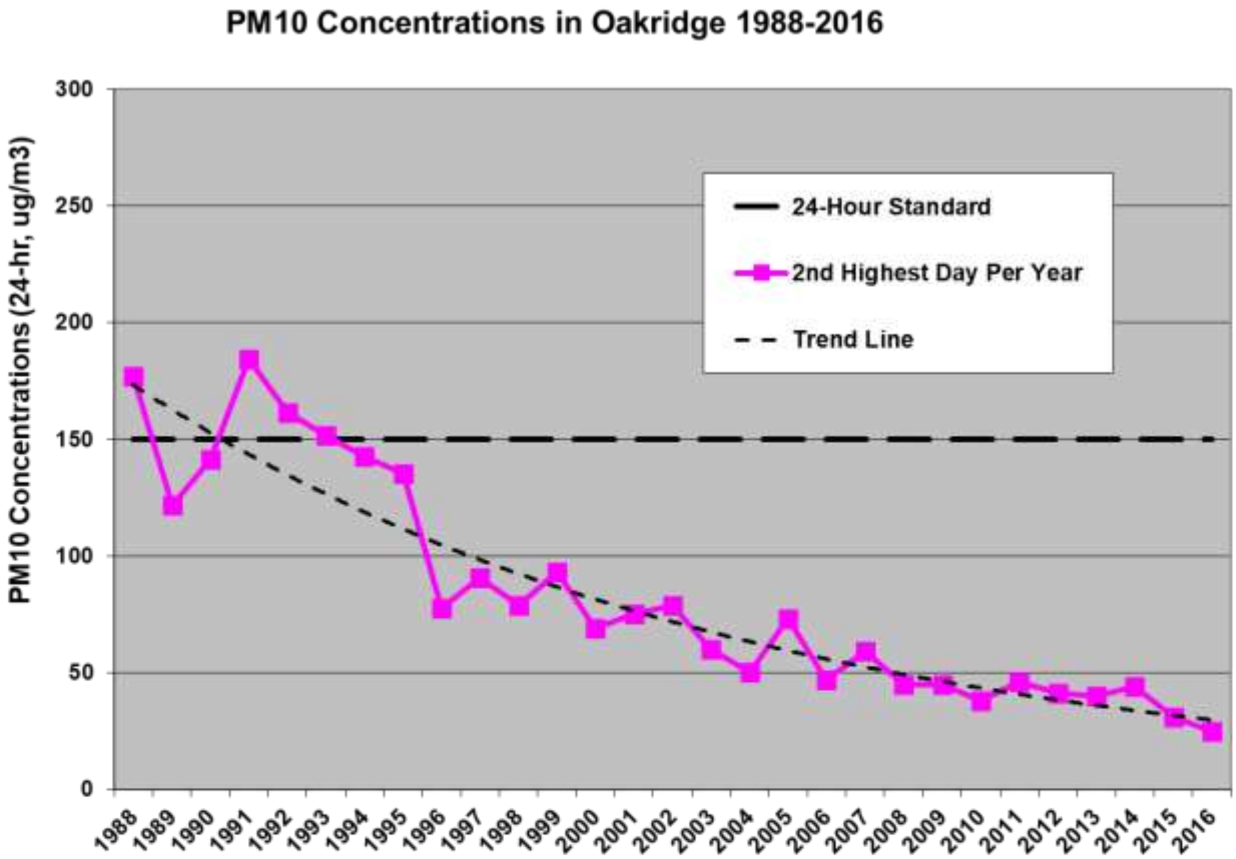


Figure 3: Oakridge PM10 Concentrations at WAC Station Location During 1988-2016.

Meanwhile, EPA adopted more protective $PM_{2.5}$ health standards in 1997 and 2006 as part of its periodic review and update of National Ambient Air Quality Standards (NAAQS), as required by the federal Clean Air Act, to ensure protection of public health. The Oakridge area met the initial 1997 $PM_{2.5}$ standards but not the subsequent more protective 2006 $PM_{2.5}$ standards. Based on 2006-2008 data, the Oakridge-Westfir airshed was identified as an area not meeting the $PM_{2.5}$ health standards on worst winter days, and was designated as a $PM_{2.5}$ nonattainment area in 2009. LRAPA purposely postponed the proposed redesignation of the Oakridge area as attainment for PM_{10} until the $PM_{2.5}$ standard was also attained, in order to not confuse the public or other stakeholders.

In collaboration with the City of Oakridge, the ODEQ and other stakeholders, LRAPA submitted a $PM_{2.5}$ attainment plan for the Oakridge-Westfir airshed in 2012 as a SIP revision, with amendments and updates in 2016. The Oakridge-Westfir attainment plan identified residential wood combustion (in certified and non-certified woodstoves, fireplaces and pellet stoves) as the major emission category causing violations of the $PM_{2.5}$ health standards on stagnant winter days, and outlined commitments for a number of strategies to replace non-certified woodstoves with cleaner burning units, improve firewood seasoning and woodstove operation to reduce $PM_{2.5}$ emissions, and to curtail residential wood combustion during air stagnation episodes.

The Oakridge-Westfir attainment plan was successful in achieving the $PM_{2.5}$ health standards in 2014-2016. EPA recognized compliance with the 3-year $PM_{2.5}$ standard and approved the Oakridge-Westfir attainment plan in February 2018. LRAPA has prepared a request for redesignation to $PM_{2.5}$ attainment for the Oakridge-Westfir airshed and a $PM_{2.5}$ maintenance plan; this document is part of a companion request for redesignation to PM_{10} attainment for the Oakridge Urban Growth Boundary (UGB) and a PM_{10} maintenance plan.

The reporting of Oakridge PM concentrations was straightforward through 2016. However, major wildfires in 2017 and 2020 caused summertime violations of the 24-hour PM_{10} and $PM_{2.5}$ health standards. The Oakridge PM_{10} data for 1988-2020 is outlined in the following figure, illustrating the unprecedented impacts during exceptional wildfire smoke events in 2017 and 2020. Excluding wildfire influenced data, there have been no exceedances of the PM_{10} NAAQS since 1995

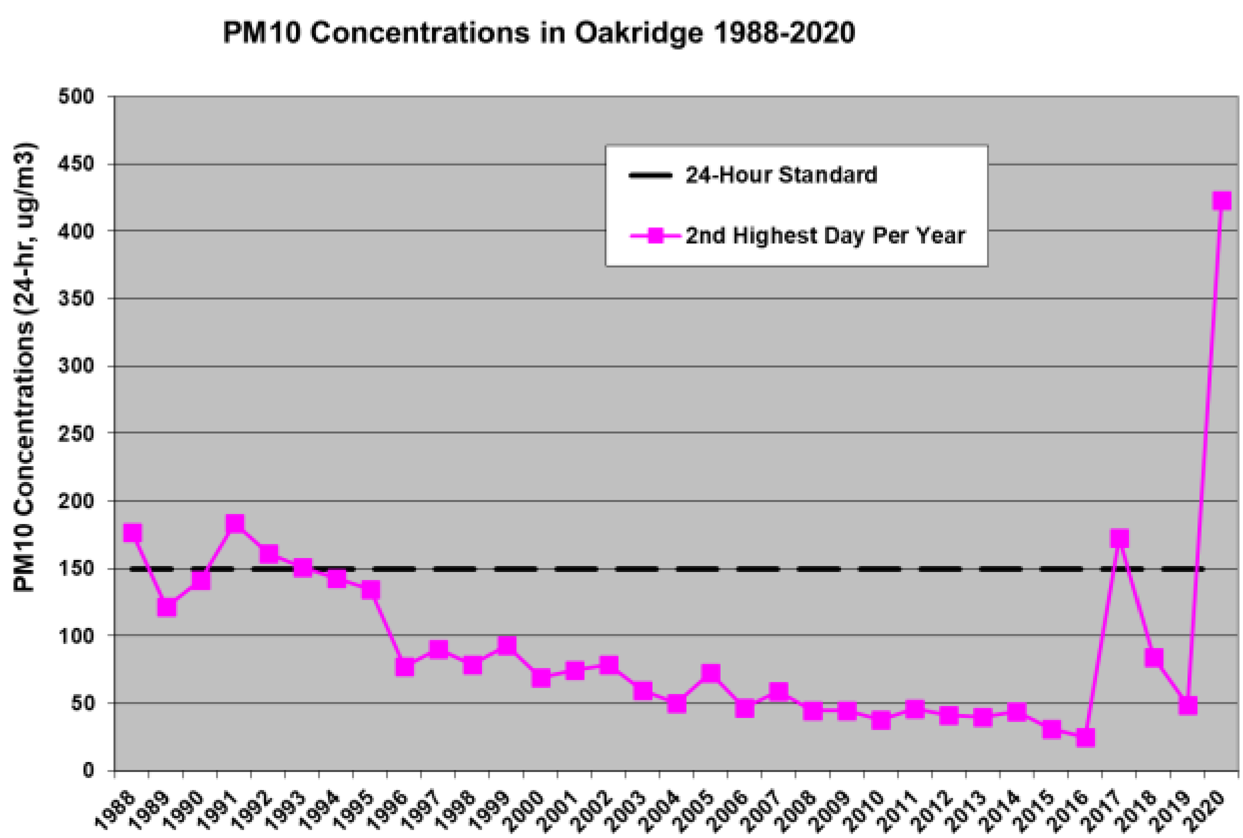


Figure 4: Oakridge PM10 Concentrations at WAC Station Location During 1988-2020.

Table 1: Oakridge PM_{10} Design Values, All Data Included, 2016-2020
(1.0 exceedance allowed over a 3-year average)

YEAR	2016	2017	2018	2019	2020
QTY.	0.0	4.3	0.0	0.0	8.1
3 YEAR AVG.	0.0	1.4	1.4	1.4	2.7

These wildfires caused significant impacts on Oakridge residents, but those violations are being addressed separately by LRAPA, ODEQ, and EPA as part of the Exceptional Events review process. The Exceptional Events guidance developed by EPA, in consultation with other agencies and the public, is intended to prevent penalizing communities for events outside their control.

Exceptional Events

Large wildfires in Oregon and nearby states in 2017, and again in 2020, resulted in many major wildfire smoke impacts in Oakridge and other Oregon communities that required documentation and submittal to EPA for review and approval as Exceptional Events. The LRAPA annual reports in 2017-2020 were expanded to include the PM_{10} data with and without the days flagged as having had major wildfire smoke impacts. Pages 25 and 26 in the LRAPA 2020 Annual Report summarize the 2011-2020 PM_{10} concentrations without and with wildfire impacts; pages 23 and 24 summarize the 2011-2020 $PM_{2.5}$ concentrations without and with wildfire impacts. Similarly, page 28 of the 2020 Oregon Annual Ambient Criteria Pollutant Air Monitoring Network Plan summarizes the 2017-2019 design values in Oakridge and other Oregon communities without and with wildfire impacts. The following figure reviews the Oakridge data excluding all flagged wildfire days. Excluding wildfire influenced data, there have been no exceedances of the PM_{10} NAAQS since 1995.

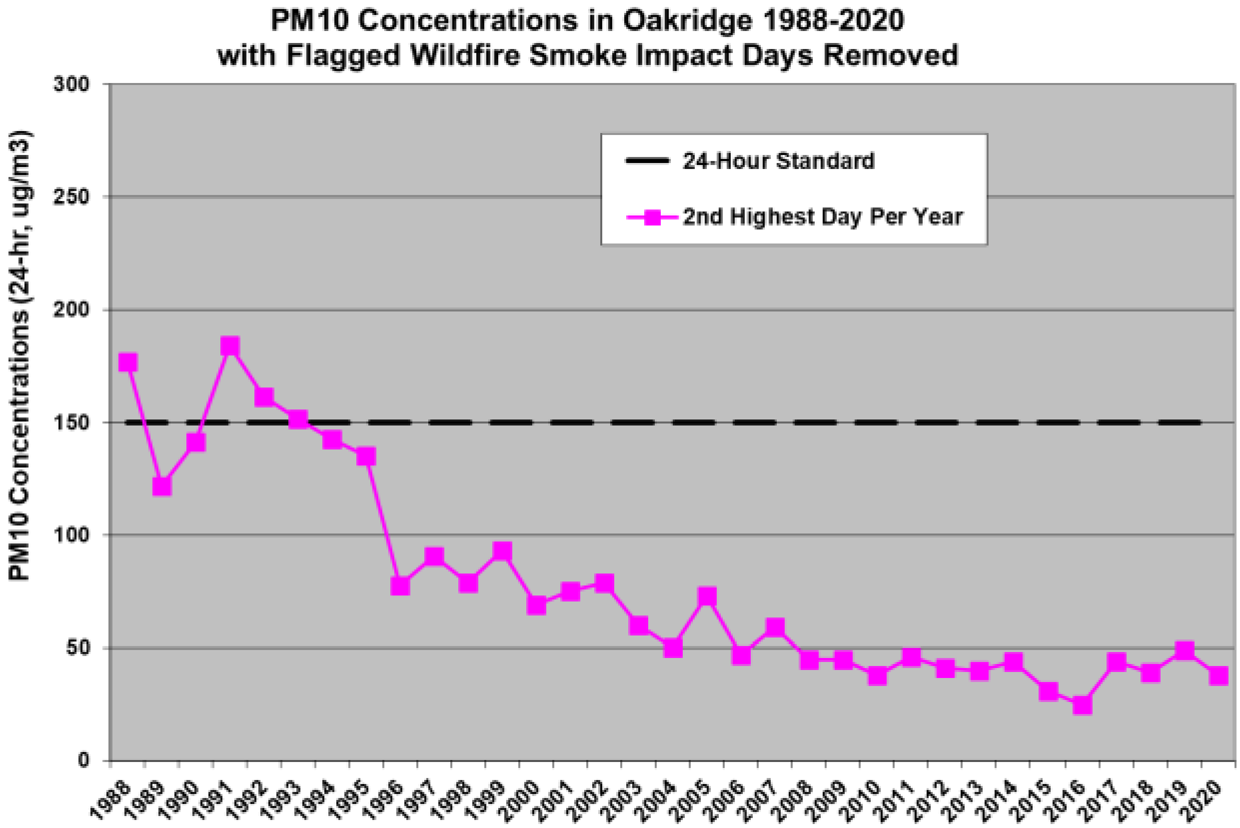


Figure 5: Oakridge PM10 Concentrations During 1988-2020 Excluding Wildfire Impact Days.

Table 2: Oakridge PM_{10} Design Values, All Flagged Wildfire Data Excluded, 2016-2020 (1.0 exceedance allowed over a 3-year average)

YEAR	2016	2017	2018	2019	2020
QTY.	0.0	0.0	0.0	0.0	0.0
3 YEAR AVG.	0.0	0.0	0.0	0.0	0.0

The Exceptional Events (EE) rule and guidance developed by EPA, in consultation with other agencies and the public, is intended to prevent penalizing communities for events outside their control. State and local air agencies may identify (or flag) days they believe have been influenced by exceptional events, such as wildfire smoke, and submit a demonstration for EPA concurrence, however, EPA can only allow exclusion of exceptional events that have "regulatory significance." This means that EPA may not be able to approve all the flagged EE days submitted by local, or state agencies.

State and local air agencies now have considerably more extensive experience with EEs during wildfires. LRAPA will refer to the following sets of air quality data for the Oakridge area for recent years:

4. Complete data including flagged wildfire impact days. This data compilation (Figure 4 and Table 1) is important to report because it reflects the air pollution impacts experienced by the community. But it could penalize the community with nonattainment restrictions for events outside their control, which the EE guidance is intended to avoid. In 2017, there were four exceedances of the 24-Hour PM_{10} standard during wildfire smoke events; even though there were no exceedances in 2015, 2016, 2018 or 2019, the four exceedances in 2017 resulted in 3-year average exceedance rates of 1.7 per year in 2015-2017, 2016-2018, and 2017-2019, greater than the 1.0 per year allowed by the 24-hour PM_{10} NAAQS. Similarly, the eight exceedances during wildfire smoke events in 2020 resulted in 3-year average exceedance rates of 2.7 per year in 2018-2020, 2019-2021, and 2020-2022, even if there are no additional wildfire impacts in 2021 or 2022.
5. Data with all flagged wildfire impact days removed. This data compilation (Figure 5 and Table 2) best illustrates the air quality improvement trends from successful implementation of the air pollution control strategies in the attainment plan. With all flagged wildfire smoke impacts removed, the exceedance rate would be 0.0 per year, in compliance with the 24-Hour PM_{10} NAAQS.
6. Data with flagged wildfire impact days removed only if they have regulatory significance. This data compilation is expected to be the basis of EPA finding a clean data determination (CDD) and EPA approval of the redesignation of the Oakridge UGB as attainment for the PM_{10} NAAQS. If EPA approves the EEs with regulatory significance in 2020, this would reduce the 3-year average exceedance rate to 0.7 per year in 2018-2020, in compliance with the 1.0 per year allowed by the 24-Hour PM_{10} NAAQS. The resultant 2018-2020 data in the EPA Air Quality System (AQS) after EPA review and approval would be between the data in Figures 4 and 5 and Tables 1 and 2, and could change in the future if EEs are experienced in 2021 or 2022 thus requiring re-evaluation of regulatory significance of the 2020 exceedances.

LRAPA and ODEQ are advancing the EE proposal for 2020 in parallel with the Oakridge PM_{10} and $PM_{2.5}$ maintenance plans and requests for redesignation to attainment.

Use of $PM_{2.5}$ Monitoring as a Surrogate for PM_{10} Monitoring in the Future

The $PM_{2.5}$ health standards adopted by EPA in 2006 as part of its periodic review and update of the NAAQS are much more protective of public health than the PM_{10} NAAQS based on the size distribution of particulate matter in the airsheds of Oregon. This is especially the case in Oakridge, which has an extremely high $PM_{2.5}$ to PM_{10} ratio, as outlined in the following summary of Oakridge PM data from 1999-2020.

The following tables and figures include the correlations and statistics for various sets of data.

Table 3: Oakridge $PM_{2.5}$ to PM_{10} Ratios and Statistics, 1999-2020

	Data Points	PM2.5 / PM10	RMSE	Stdev %	m	b	r2
All PM_{10} Data	2793	74.3%	0.804	30.97%	1.046	3.344	0.960
All PM_{10} Data, Exc. Wildfire*	2783	74.2%	0.804	31.01%	1.006	3.824	0.890
Fall/Winter PM_{10} Data	1731	86.1%	0.895	24.41%	1.065	1.574	0.950
Spring/Summer PM_{10} Data, Exc. Wildfire*	1052	54.5%	0.626	30.69%	1.213	4.653	0.669
Wildfire PM_{10} Data (Jun-Sep)	687	50.4%	0.609	34.18%	1.059	6.667	0.981

*Excludes PM10 Wildfire Data > 100 ug/m3

Table 4: Oakridge $PM_{2.5}$ to PM_{10} correlations and PM_{10} estimated test calculations

	m	b	r2	$PM_{2.5}$ trigger for $PM_{10\ est}$ 140 ug/m3	$PM_{2.5}$ trigger for $PM_{10\ est}$ 150 ug/m3
All PM_{10} Data	1.046	3.344	0.960	126	136
All PM_{10} Data, Exc. Wildfire*	1.006	3.824	0.890	131	141
Fall/Winter PM_{10} Data	1.065	1.574	0.950	126	135
Spring/Summer PM_{10} Data, Exc. Wildfire*	1.213	4.653	0.669	108	116
Wildfire PM_{10} Data (Jun-Sep)	1.059	6.667	0.981	122	131

*Excludes PM10 Wildfire Data > 100 ug/m3

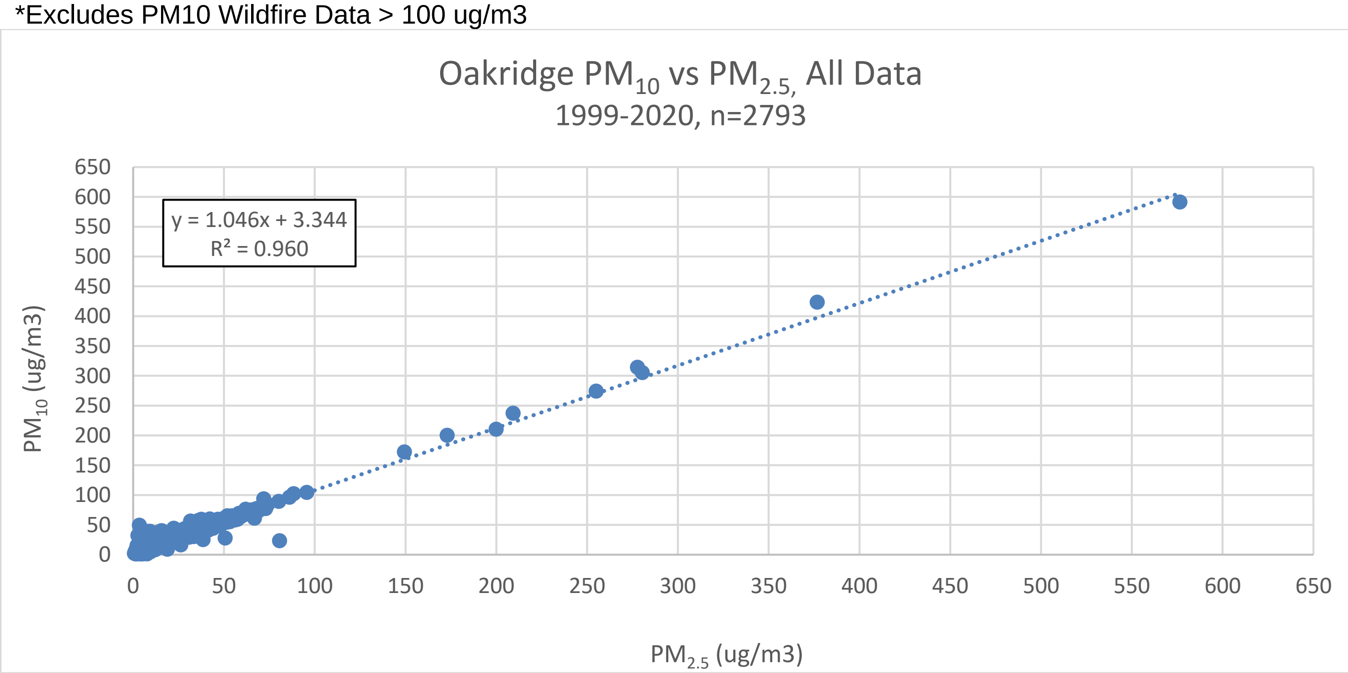
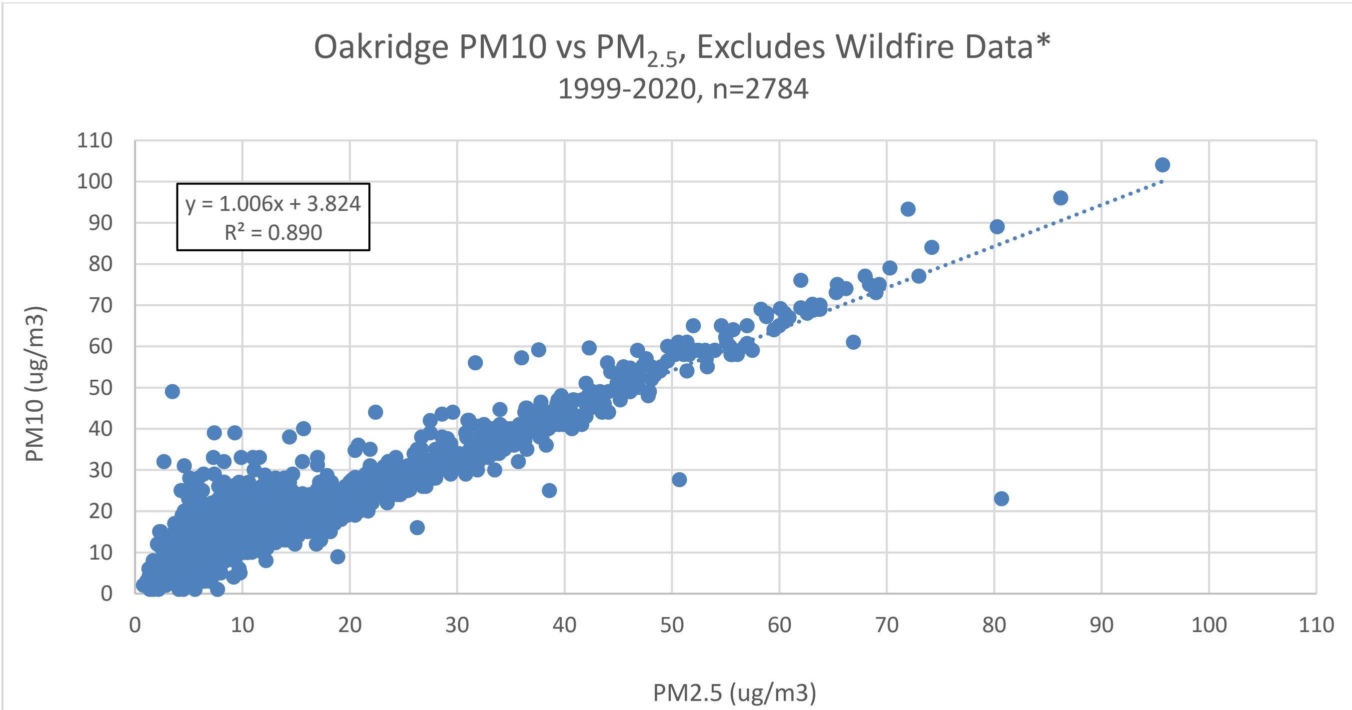


Figure 6: Oakridge PM_{10} vs $PM_{2.5}$ Correlation



*Excludes PM_{10} Wildfire Data > 100 ug/m3

Figure 7: Oakridge PM_{10} vs $PM_{2.5}$ Correlation, Excludes Wildfire Data

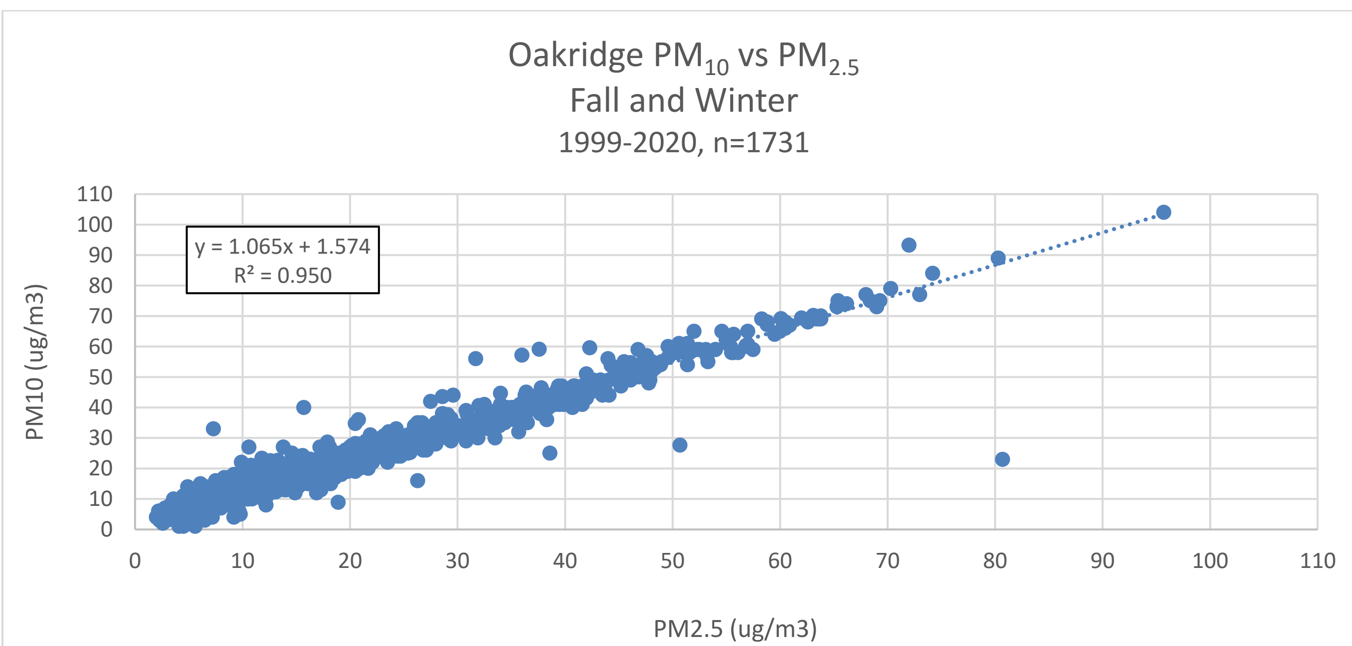
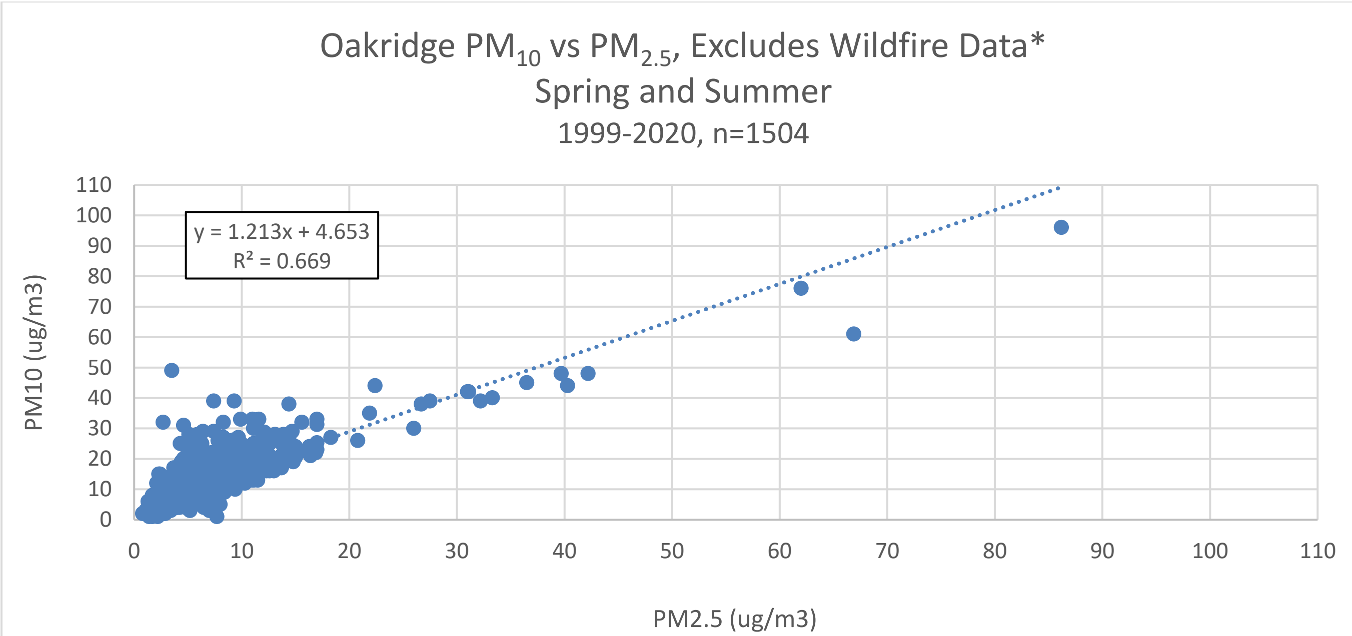


Figure 8: Oakridge PM_{10} vs $PM_{2.5}$ Correlation, Fall and Winter Data



*Excludes PM_{10} Wildfire Data > 100 ug/m3

Figure 9: Oakridge PM_{10} vs $PM_{2.5}$ Correlation, Spring and Summer Data, Excludes Wildfire Data

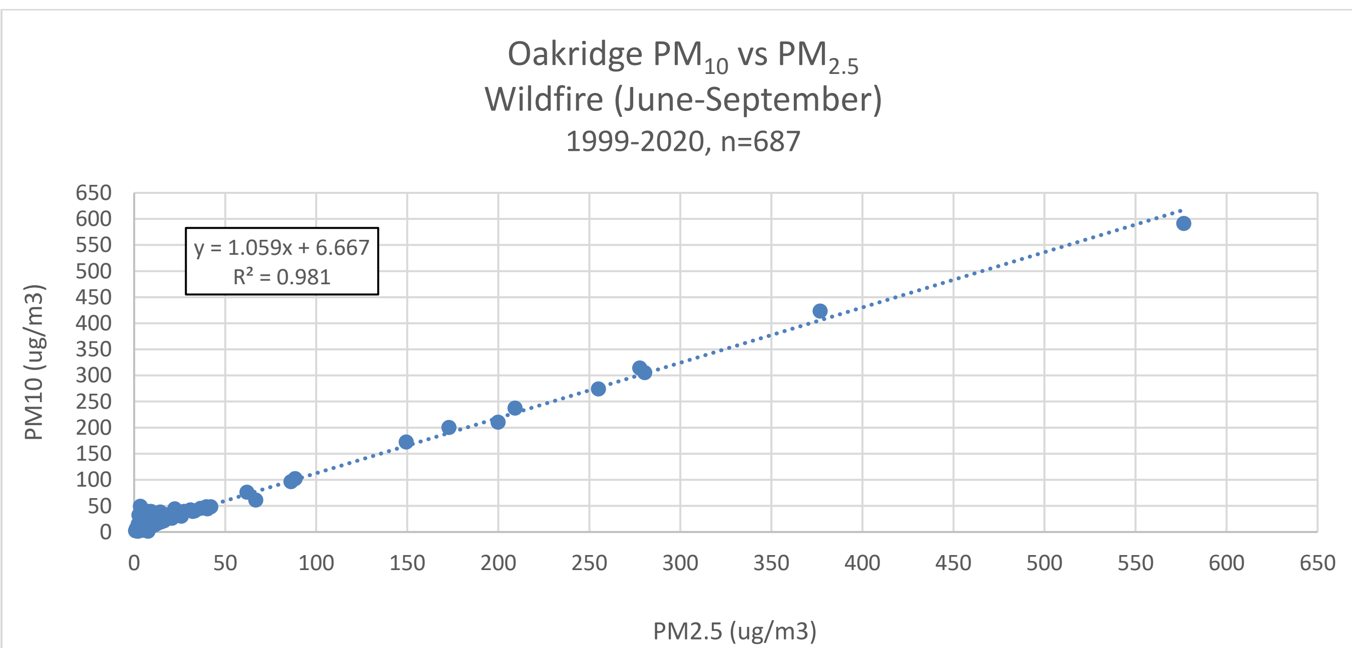


Figure 10: Oakridge PM_{10} vs $PM_{2.5}$ Correlation, Wildfire Season, June-September

Calculating Estimated PM_{10}

It is proposed that the PM_{10} concentrations be estimated using the linear regression equation developed using all the paired $PM_{2.5}$ and PM_{10} data from 1999-2020. It is similar to the data set that excludes wildfire data over 100 ug/m3 but gives a slightly more conservative trigger level for estimating PM_{10}. Figure 6 shows the linear regression and correlation coefficient used for to developing the PM_{10} estimated equation in Table 5.

Table 5: Oakridge $PM_{2.5}$ to PM_{10} equation and trigger levels

PM_{10} Estimate Linear Regression Equation	1.046 * PM2.5 + 3.344
$PM_{2.5}$ Trigger Level for Data Review	126 ug/m3
$PM_{2.5}$ Trigger Level for Exceedance	136 ug/m3

Table 6: Oakridge $PM_{2.5}$ to PM_{10} estimate calculation statistics

Median Diff.	-1.0048	ug/m3
Avg. Diff.	0.0000	ug/m3
RMSE	4.3557	ug/m3
Stdev	4.3564	ug/m3

Using the equation in Table 5, a $PM_{2.5}$ concentration of 35 ug/m3 would calculate to a PM_{10} estimated concentration of 40 ug/m3, well below the 150 ug/m3 standard. Using the same equation, the $PM_{2.5}$ level would need to reach 136 ug/m3 before the PM_{10} estimated level reached the standard of 150 ug/m3.

Contingency if the PM_{10} NAAQS is Violated in Oakridge

LRAPA proposes that if the estimated ambient PM_{10} concentrations equal or exceed 140 ug/m3 (126 ug/m3 of $PM_{2.5}$) LRAPA will review the data within six months of the triggering event and evaluate the cause of the exceedance.

If LRAPA and EPA Region 10 agree that the exceedance was caused by and exceptional event, LRAPA will not perform a formal review of the cause and will provide EPA Region 10 with evidence to support the exceptional event conclusion in the annual report.

Monitoring Contingency if the PM_{10} NAAQS is Violated in Oakridge

LRAPA will submit a report, through ODEQ, in the Annual Network Plan (ANP) showing verification of continued attainment of the PM_{10} standard using the PM_{10} estimated values to the EPA every year as part of the ANP. If the Oakridge $PM_{2.5}$ trigger levels in Table 5 for either data review or NAAQS exceedance are reached, from sources other than those determined to be an exceptional event, LRAPA will reinstall a PM_{10} monitor prior to January 1st of the following year. This would be proposed and approved in the ANP for that year.

Conclusion

PM_{10} monitoring in Oakridge can be accomplished using $PM_{2.5}$ as a surrogate. The previously referenced PM_{10} to $PM_{2.5}$ correlations and statistics support this conclusion. If the trigger level of 126 ug/m3 of $PM_{2.5}$ is reached, and caused by events other than those related to an exceptional event, LRAPA will reinstall a FRM/FEM PM_{10} monitor in Oakridge. LRAPA will use the ANP to propose any changes to PM_{10} monitoring and to make any official requests to use $PM_{2.5}$ monitoring as a surrogate for PM_{10}.

LG:MLH:mlh (09/14/2021)

Appendix II: PM_{10} Emission Inventory for 2015 Base Year

Oakridge-Westfir PM_{10} Maintenance Area Emission Inventory for 2015 Base Year

October 7, 2021

Lane Regional Air Protection Agency
1010 Main Street
Springfield, Oregon 97477

Base Year 2015 Emission Inventory

The 1990 Clean Air Act contains provisions on the required development of emission inventories for designated areas that failed or have failed in the past to meet the National Ambient Air Quality Standards (NAAQS). The Oakridge Urban Growth Boundary (UGB) is a designated NAAQS PM_{10} nonattainment area and the Oakridge-Westfir Nonattainment Area (NAA) is a designated NAAQS $PM_{2.5}$ nonattainment area. This emission inventory is provided as a part of the State of Oregon revisions to its State Implementation Plan (SIP) to formulate a strategy to maintain the NAAQS.

The PM_{10} and $PM_{2.5}$ air pollution problems in Oakridge are closely related and the PM_{10} and $PM_{2.5}$ emission inventories are more similar than different. Most of the smoke (i.e., combustion-related) components are similar for both PM_{10} and $PM_{2.5}$; the major differences are in the dust components since a higher percentage of dust falls within the PM_{10} size range compared to the $PM_{2.5}$ size range.

The Oakridge UGB was designated nonattainment for PM_{10} and classified as moderate by the U.S. Environmental Protection Agency (EPA) on January 20, 1994. LRAPA submitted a draft Oakridge PM_{10} attainment plan to EPA Region 10 for stringency review during early 1996. The Oakridge PM_{10} attainment plan was adopted by the LRAPA Board of Directors at a hearing on August 13, 1996. The Oakridge PM_{10} attainment plan was subsequently adopted by the Oregon Environmental Quality Commission (EQC) on December 9, 1996, and submitted to EPA. EPA approved the plan on March 15, 1999 (64 FR 12751). The plan relied on control strategies needed to assure attainment of the PM_{10} NAAQS. The Oakridge PM_{10} strategies were successful in achieving the PM_{10} standards on schedule. On July 26, 2001, EPA published a clean data determination (CDD) and a finding of attainment for the Oakridge PM_{10} area (66 FR 38947).

The Oakridge PM_{10} maintenance plan and request for redesignation to attainment was purposely delayed until the attainment in Oakridge of the more restrictive and protective $PM_{2.5}$ NAAQS which was achieved on December 31, 2016. EPA made a finding of $PM_{2.5}$ attainment and a clean data determination (CDD), based on 2014-2016 air monitoring data, on February 8, 2018 [83 FR 5537] effective March 12, 2018.

The 1996 Oakridge PM_{10} Attainment Plan approved by EPA in 1999 was based on a 1991 base year PM_{10} emission inventory and projected 2000 and 2003 future year PM_{10} emission inventories. The PM_{10} maintenance plan is updated for a 2015 PM_{10} base year emission inventory, and builds on the work done in recent years on the Oakridge-Westfir $PM_{2.5}$ attainment plan and maintenance plan.

The $PM_{2.5}$ emission inventories for the Oakridge area for 2008 (Base Year) and 2015 (Attainment Year) were included in the Oakridge 2016 $PM_{2.5}$ Attainment Plan ("2016 Plan"). The 2016 Plan was adopted by the LRAPA Board of Directors on November 10, 2016, approved and incorporated into the State Implementation Plan (SIP) by the Oregon Environmental Quality Commission (EQC) on January 18, 2017, and approved by EPA on February 8, 2018 [83 FR 5537] effective March 12, 2018. Residential Wood Combustion (RWC) emissions from certified and non-certified woodstoves, fireplaces and pellet stoves were identified as the major source of $PM_{2.5}$ emissions on worst winter days contributing to violation of the NAAQS for $PM_{2.5}$.

The principal components for development and documentation for the 2015-2035 Oakridge PM_{10} maintenance Plan emission inventories have been addressed in this document, which includes stationary permitted point sources, stationary area (non-permitted) sources, non-road mobile sources (railroads), on-road mobile sources, re-entrained road dust, and emissions summaries. Inventory years include the 2015 emission inventory as the new base year for the maintenance plan, and then the projected 2025-2035 emission inventories for the maintenance period. The geographic boundary for each inventory is the Oakridge-Westfir NAA, as defined by the NAA boundary in the 2016 Plan.

In this document the terms *typical season day*, and *worst-case day* emissions are used to categorize the estimated emissions for a particular time period. The typical season day emissions represent an average daily emission value occurring from November 1st through the end of February. This four-month time period is considered to be the PM season, and is when the PM standard is usually violated. The worst-case day emissions are the highest daily emissions estimated for the PM season, and represent a day during the PM season when emissions generating activity is at its highest. Typical season day and worst-case day emissions are represented in pounds per day (lbs/day).

The emission calculation protocols are included in the supporting documents for the 2016 Plan, and the prior 2012 Oakridge-Westfir $PM_{2.5}$ Attainment Plan ("2012 Plan"), and are not duplicated here. The 2008-2011-2014 National Emission Inventories (NEIs) for Lane County were used as the starting point for calculating both PM emissions and PM-precursor emissions for the Oakridge-Westfir $PM_{2.5}$ nonattainment area. The initial Oakridge-Westfir emissions were estimated by applying appropriate emission allocation factors (e.g., relative population, housing, vehicle miles of travel, land area, etc.) to the Lane County $PM_{2.5}$ and precursor emission categories. The significant (and insignificant) source categories during the winter $PM_{2.5}$ problem season were identified in Appendix D-5 of the 2012 Plan.

Secondary particulate is an overall very minor contributor to the Oakridge $PM_{2.5}$ air pollution concentrations on worst winter days as summarized in both the 2012 Plan and the 2016 Plan. Each of the precursor groups (nitrates, sulfates, ammonia, and volatile organic compounds [VOC]) was determined in the 2016 Plan to be below the EPA Region 10 insignificance threshold of 1.3 ug/m3:

- Nitrate + ammonia = 0.16 ug/m3 + 0.01 ug/m3 = 0.17 ug/m3 < 1.3 ug/m3.
- Sulfate = 0.43 ug/m3 < 1.3 ug/m3.
- VOC = 1.17 ug/m3 < 1.3 ug/m3.

Therefore, the LRAPA emission inventory analysis focused in most detail on the significant $PM_{2.5}$ particulate sources during the winter season in Oakridge-Westfir, notably residential woodburning emissions from woodstoves, fireplaces and pellet stoves.

Description of Maintenance Area

Oakridge, Oregon lies in an alluvial plain in the foothills at the southern end of the Willamette River valley. The city is in Lane County, Oregon, approximately 45 miles east-southeast of Eugene, and 28 miles west of Willamette Pass, the summit of the Cascade Mountain Range. The city limits of present-day Oakridge include the historic City of Oakridge and, directly west, the area formerly known as Willamette City. Figure A shows the location of Oakridge in Lane County.

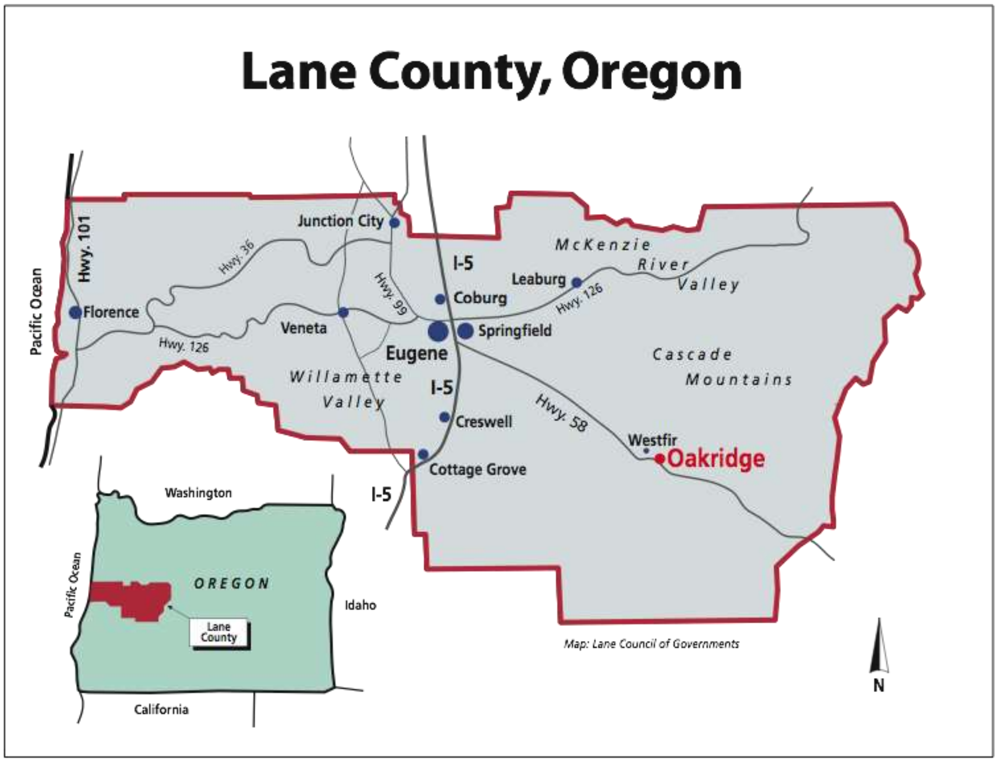


Figure A: Oakridge Location in Lane County, Oregon.

The Oakridge PM_{10} and $PM_{2.5}$ attainment plans were very similar; both identified residential wood combustion (in certified and non-certified woodstoves, fireplaces and pellet stoves) as the major emission category causing violations of the PM_{10} and $PM_{2.5}$ health standards on stagnant winter days, and outlined commitments for a number of strategies to replace non-certified woodstoves with cleaner burning units, improve firewood seasoning and woodstove operation to reduce PM emissions, and to curtail residential wood combustion during air stagnation episodes. Therefore, where possible, the Oakridge PM_{10} and $PM_{2.5}$ maintenance plans are closely synchronized, including the PM and precursor emission inventories and control strategies. However, EPA adopted different nonattainment area boundaries for PM_{10} and $PM_{2.5}$ and this affects the inventory boundaries for the PM_{10} and $PM_{2.5}$ Motor Vehicle Emissions Budgets (MVEBs) in Appendix IV. The nonattainment area boundary for PM_{10} is the Oakridge Urban Growth Boundary (UGB) shown in Figure B; and the nonattainment area boundary for $PM_{2.5}$ is a rectangular boundary surrounding the Oakridge-Westfir communities shown in Figure C.

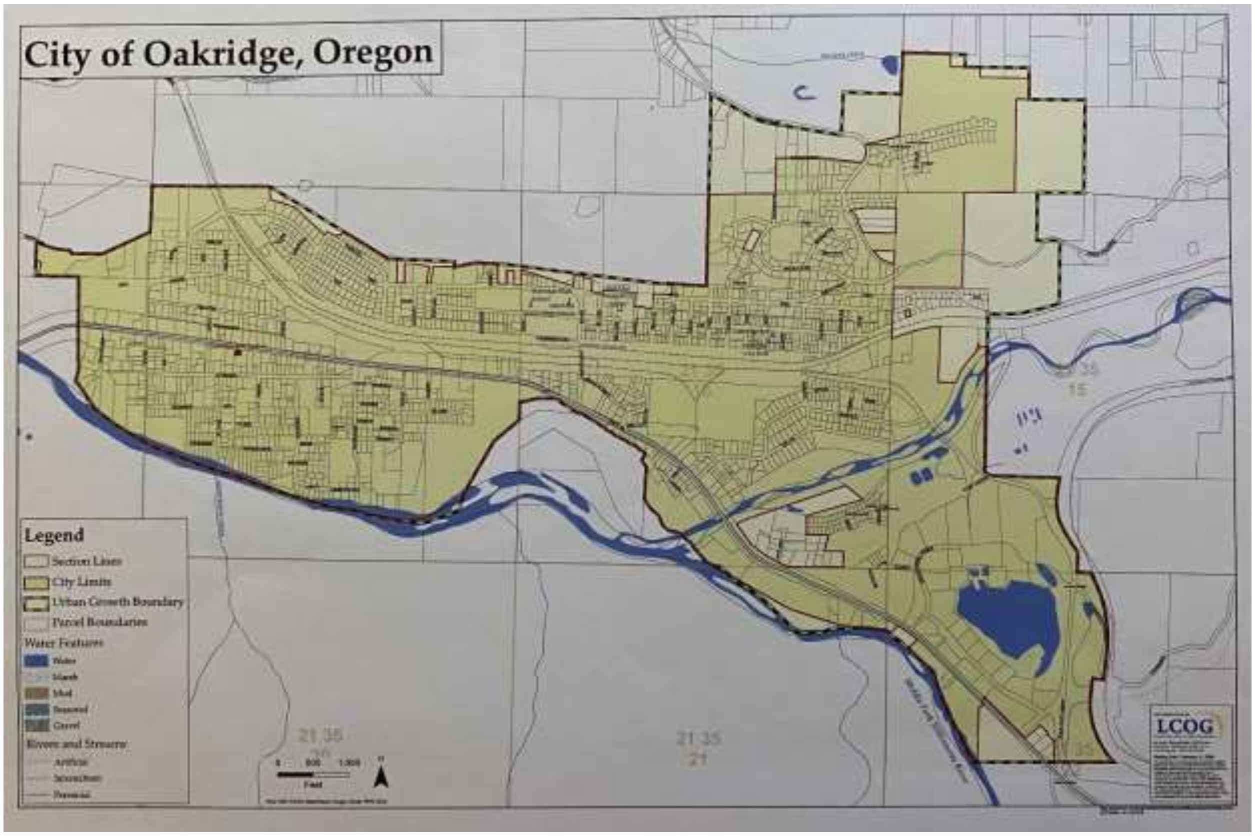


Figure B: Oakridge Urban Growth Boundary and PM_{10} Nonattainment Area Map.

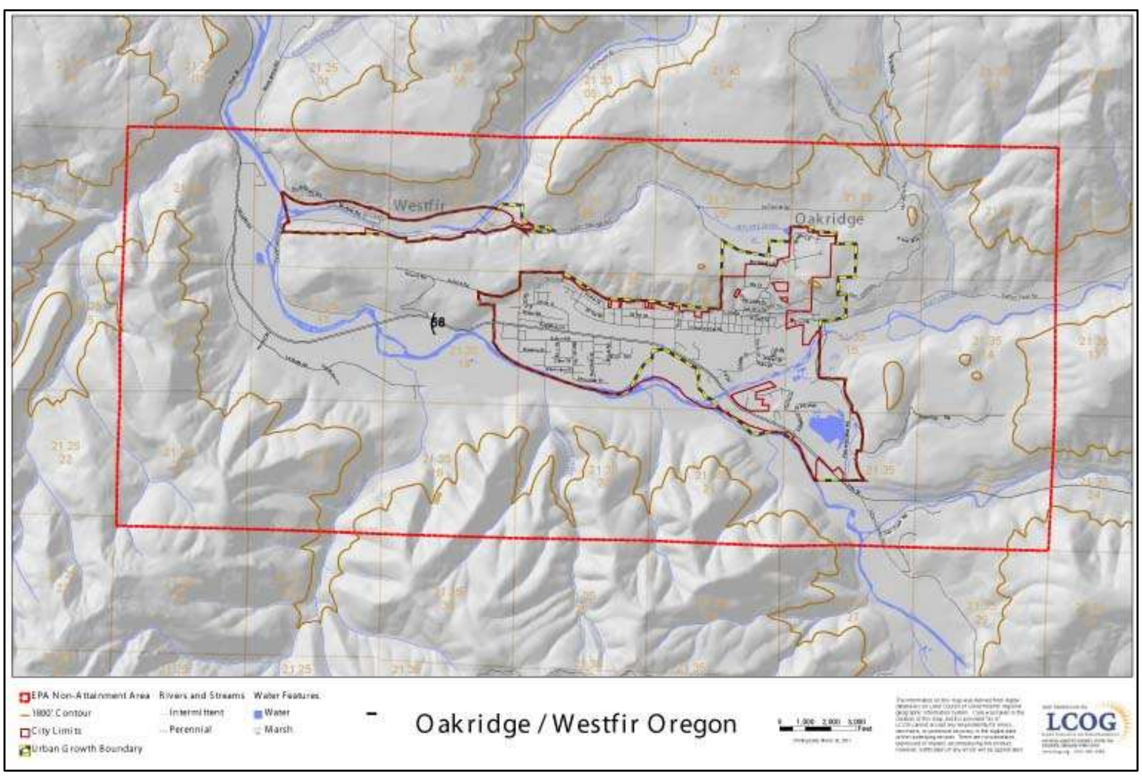


Figure C: Oakridge-Westfir $PM_{2.5}$ Nonattainment Area Map.

The overall emission inventories for PM_{10} and $PM_{2.5}$ (and the PM precursors) in the maintenance plans are based on the larger Oakridge-Westfir area in Figure C for consistency. But the EPA guidance on MVEBs very specifically indicates each MVEB (PM_{10} and $PM_{2.5}$) must be based on its respective nonattainment area boundary, so the PM_{10} and $PM_{2.5}$ are calculated specifically for their respective nonattainment area boundaries.

New Base Year Emission Inventory (2015)

The base year inventory is the PM_{10} emission inventory for the 2015 year. The 2015 base year emission inventory updates the information from the 1996 PM_{10} attainment plan and uses the same 2015 population, housing, employment, industry, railroad, and traffic data as used in the $PM_{2.5}$ maintenance plan.

Industrial Point Sources

LRAPA maintains data on industrial point source emissions in Lane County. The two existing industrial sources in the Oakridge-Westfir area are minor industrial sources of PM emissions. The facilities are a portable rock crusher and a ready-mix concrete plant owned and operated by Oakridge Sand & Gravel.

The initial 2015 attainment year emissions for these two facilities were conservatively based on the maximum allowable production rates identified in the facility permit applications and the LRAPA-issued permits. The typical season day emissions were based on the annual maximum production capacity and the worst-day emissions were based on the daily maximum production capacity. The rock crusher has a production capacity of 3,600 tons per day (potential PM_{10} emissions of 72 lb/day) and 300,000 tons per year (potential PM_{10} emissions of 6,000 lb/year). The ready-mix concrete plant has a production capacity of 480 cubic yards per day (potential PM_{10} emissions of 10 lb/day) and 30,000 cubic yards per year (potential PM_{10} emissions of 600 lb/year); the ready-mix concrete plan air discharge permit was terminated on January 24, 2014, so it did not operate in 2015 or future years.

The Oakridge Sand & Gravel ready-mix concrete plant and rock crusher did not operate in Oakridge in 2015; any rock crushing was done at the Hale Valley quarry site near Noti, Oregon, which is 50+ miles distant from Oakridge. Therefore, the actual concrete plant and rock crusher emissions in the 2015 emission inventory were zero.

Residential Wood Combustion

Residential wood combustion (RWC) is a common way to heat homes in Oregon. As outlined under the general growth projections, the Lane Council of Governments (LCOG) periodically updates and summarizes the demographic information for Oakridge, Westfir and other Lane County communities, based on American Community Survey (ACS) data from the U.S. Census Bureau. The 2018 ACS data indicates 1,791 total housing units in Oakridge, of which 1,433 are occupied, with electric heat as the primary heat source in 1,027 of the occupied housing units, wood as the primary heat source in 340 of the occupied housing units, and 66 occupied housing units using other fuel or none. Similarly, the Westfir ACS data indicates 131 total housing units, of which 121 are occupied, with electric heat as the primary heat source in 66 of the occupied housing units, wood as the primary heat source in 39 of the occupied housing units, and 16 occupied housing units using other fuel or none. Home heating sources other than electricity or wood are considered insignificant, with the number of estimated units less than the margin of error in the ACS survey; for example, the estimated number of "other fuel" in Oakridge in 2018 was 15 homes, but the margin or error was +/- 28 homes.

Natural gas is not available in Oakridge-Westfir, thus the reliance on electricity and wood for most home heating. More detailed home wood heating surveys have been done during 2009-2015 by LRAPA, DEQ and the South Willamette Forest Collaborative (SWFC) in Oakridge to provide more details on primary and secondary use of wood for home heating, average number of cords burned per year, certified and non-certified woodstoves, pellet stoves, etc. The composite result of the various surveys is that most homes in Oakridge-Westfir rely on some combination of electricity and wood (primary or secondary) for home heating.

The various surveys provided LRAPA with information on how many homes use various types of wood-heating devices, the amount of wood burned, and other information on wood-heating practices. The Oakridge wood use was updated for the 2015 base year (the new base year for the maintenance plan) as summarized in the following table. AP-42 indicates most of the RWC particulate emissions are in the submicrometer range, so the same emission factors are used for both PM_{10} and $PM_{2.5}$ emissions.

Table A: Oakridge 2015 Residential Wood Use.

Woodburning Device	2015 Wood Fuel Use (Households)	2015 Wood Fuel Use (tons/HH)	2015 Wood Fuel Use (tons/year)
Oakridge NAA			
21-04-008-100 Fireplace without Insert	123	1.6	195.6
21-04-008-320 Certified Non-Cat Wood-Stove	287	3.0	846.9
21-04-008-330 Certified Cat Wood-Stove	62	3.0	183.0
21-04-008-310 Conv Wood Stove	66	3.0	194.8
21-04-008-230 Fireplace Insert Cert Catalyst	27	3.0	79.7
21-04-008-220 Fireplace Insert Cert Non-Cat	125	3.0	368.9
21-04-008-210 Fireplace Insert Conv.	78	3.0	230.2
21-04-008-400 Exempt Pellet Stove	238	1.2	276.1
21-04-008-510 Central Furnace	0	0.0	0.0
Total	1,006		2,375

The LRAPA 2009-2010 survey report, data, and additional RWC emission calculation details are included in the 2012 Plan and 2016 Plan. The 2015 RWC emissions are calculated in the following table.

Table B: Oakridge 2015 Residential Wood Combustion (RWC) PM_{10} Emissions.

(1) Woodburning Device	(2) 2015 Wood Fuel Use (tons/yr)	(3) PM10 EF (lbs/ton)	(4) Relative HDD	(5) Activity (days/wk)	PM10 Emissions: Annual (6) Annual (tons/yr)	PM10 Emissions: PM Season (7) Typical Day (lb/day)	PM10 Emissions: PM Season (8) Worst Case Day (lb/day)	(9) Worst Case Day 25% Advisory Controlled (lbs/day)
Oakridge NAA								
21-04-008-100 Fireplace without Insert	195.6	23.6	1.10	7	2.3	38	42	32
21-04-008-320 Certified Non-Cat Wood-Stove	846.9	19.6	1.10	7	8.3	138	152	114
21-04-008-330 Certified Cat Wood-Stove	183.0	20.4	1.10	7	1.9	31	34	26
21-04-008-310 Conv Wood Stove	194.8	30.6	1.10	7	3.0	50	55	41
21-04-008-230 Fireplace Insert Cert Catalyst	79.7	20.4	1.10	7	0.8	14	15	11
21-04-008-220 Fireplace Insert Cert Non-Cat	368.9	19.6	1.10	7	3.6	60	66	50
21-04-008-210 Fireplace Insert Conv.	230.2	30.6	1.10	7	3.5	59	65	48
21-04-008-400 Exempt Pellet Stove	276.1	3.1	1.10	7	0.4	7	8	8
21-04-008-510 Central Furnace	0.0	27.6	1.10	7	0.0	0	0	0
Total	2,375				23.8	397	437	**330**

Notes:
1) Woodburning Device categories are from the 2010 Oakridge Wood Burning Survey Results and subsequent heating unit replacements verified by LRAPA.
2) Woodburning Fuel Use estimates are from the 2010 Oakridge Wood Burning Survey Results.
3) Residential Wood Combustion PM10 and PM2.5 emission factors and references:

scc	factor, lb/ton fuel burned	Reference
2104008100	23.6	1
2104008210	30.6	1
2104008220	19.6	1
2104008230	20.4	1
2104008310	30.6	1
2104008320	19.6	1
2104008330	20.4	1
2104008400	3.06	3
2104008510	27.6	3
2104008610	27.6	3
2104008700	23.6	3
2104009000	28.4	2

Reference 1: US EPA. Documentation For The 2002 Base Year National Emission Inventory For Hazardous Air Pollutants
Reference 2: Li, Victor S., and Rosenthal, Steven. "Content and emissions characteristics of Artificial Wax Firelogs." Paper presented at the 15th International Emission Inventory Conference. New Orleans, Lousiana. May 15th-18th, 2006.
Reference 3: Houck, James E., Eagle, Brian N. Control Analysis and Documentation for Residential Wood Combustion in the MANE-VU Region. Prepared for MARAMA. December 19, 2006.

4) Heating Degree Days calculated from LRAPA meteorological monitoring site at Willamette Activity Center (WAC) in Oakridge.
5) Klamath Falls and Oakridge survey results indicate activity occurs throughout the week.
6) Annual emissions [tons/year] = (2010 Survey Wood Fuel Use [tons/year] * emission factor [lbs/ton]) / 2000 [lbs/ton].
7) Typical PM_{10} Season Day Emissions [lbs/day] =
(Annual Emissions [tons/year] * 2000 [lbs/ton]) / (120 heating days per season) without a weight for day of week fuel burned.
8) Worst Case Day Emissions [lbs/day] typical season day * worst-case day multiplier (based on peak/average HDD).
(9) Advisory controlled emissions based on woodburning curtailment compliance surveys during 2007-2011 with 25% compliance with 2012 strategy.
(10) Lane Electric reported heat pump installations of: 15 in 2012, 15 in 2013, 22 in 2014, and 36 in 2015.
(11) HeatSmart reported four non-certified woodstoves were removed in Oakridge during 2010-2015, assumed replacement with certified units.

Other Area Sources

The only other area source category with potential significant emissions is outdoor burning. Outdoor burning is banned in Lane County for fire safety reasons during the June-September fire season and is banned in Oakridge for air quality reasons during November-February. There are 1,756 households in the Oakridge-Westfir nonattainment area. The LRAPA survey indicates that 28% of the households (about 492 households) burn yard debris (weighted average of 3 cubic yards per household) during the Fall and Spring months. The yard debris is a mix of leaves and brush with an estimated average density of 312.5 pounds per cubic yard using conversion factors (250-375 lb/yard) from OAR 340-097-0110. AP-42 emission factors are 17-38 lb/ton, or an average of 27.5 lb/ton; AP-42 indicates most of the particulate emissions are in the submicrometer range, so the same emission factors are used for both PM_{10} and $PM_{2.5}$ emissions. The total amount of yard debris burned is calculated to be 230.6 tons per year with PM_{10} emissions of 3.2 tons per year. Typical season days emissions are calculated to be 47.4 lb/day on the approximately 135 days per year during the Spring and Fall burning seasons. Although outdoor burning is banned during November-February, LRAPA and Oakridge occasionally receive complaints of outdoor burning on banned days, so outdoor burning emissions are conservatively calculated at 10% (4.7 lb/day) on worst-case days during November-February in the 2015 emission inventory.

Mobile and Nonroad Sources

The U.S. Environmental Protection Agency's (EPA's) MOtor Vehicle Emission Simulator (MOVES) is a state-of-the-science emission modeling system that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases, and air toxics. MOVES is used by state and local agencies to estimate nitrogen oxides (NOx), particulate matter ($PM_{2.5}$ and PM_{10}), volatile organic compounds (VOCs), carbon monoxide (CO), and other pollutants/precursors from cars, trucks, buses, and motorcycles for State Implementation Plan (SIP) purposes and conformity determinations outside of California. MOVES incorporates the latest data on vehicle populations, travel activity, and emission rates as well as updated fuel supply information at the county level, and accounts for vehicle starts and idling. MOVES is considered the most accurate tool for estimating emissions from the transportation sector for most purposes.

EPA has adopted federal requirements for progressively cleaner vehicles and cleaner fuels under the authority of the federal Clean Air Act since 1970. As a result of EPA's regulatory programs and various state regulations, motor vehicles and their fuels (both gasoline and diesel) sold today in the U.S. are far cleaner than vehicles and fuels produced in previous decades. The emission-reduction benefits of these requirements for cleaner vehicles and cleaner fuels are quantified at the county level in MOVES.

Exhaust, brake wear and tire wear emissions of PM_{10} from motor vehicles were calculated by staff of the Oregon Department of Environmental Quality (DEQ) in 2016 based on MOVES 2014a for years 2008 and 2015. Traffic growth in Vehicle-Miles-Traveled (VMT) was based on previous transportation modeling by LCOG and ODOT in the Highway 58 corridor. Road dust emissions were estimated using EPA's AP-42 formulas for both paved roads (see AP-42 Section 13.2.1 for Paved Roads and Section 13.2.2 for Unpaved Roads).

The 2015 exhaust, brake wear and tire wear emissions of PM_{10} from motor vehicles were modeled again by DEQ staff in 2018 as part of the forecasting of future years emissions (2025-2035). Federal control measures included in the MOVES2014a modeling are all federal measures that affect the fleets and fuels used in future years once implemented by EPA. Examples of federal control measures include requirements for cleaner engines and fuels. The 2015 exhaust, brake wear and tire wear emissions from motor vehicles, for PM_{10} and $PM_{2.5}$ and PM-precursors are summarized in the following table.

Table C: **Oakridge MOVES 2014a emission modeling results (lb/day) by category for 2015.**

Year	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Ammonia (NH3)	8.0	11.6	10.7	15.5	10.3	13.6	7.6	12.0	9.7	12.0
2015	Oxides of Nitrogen (NOx)	539.7	671.8	669.7	861.0	642.4	765.6	535.5	711.3	613.6	711.3
2015	Primary Exhaust PM2.5 - Total	13.8	17.6	15.2	20.3	15.1	18.5	15.1	20.2	15.8	20.2
2015	Primary PM2.5 - Brakewear Particulate	1.1	1.4	1.3	1.7	1.3	1.5	1.1	1.4	1.2	1.4
2015	Primary PM2.5 - Tirewear Particulate	0.5	0.6	0.6	0.8	0.6	0.7	0.4	0.7	0.5	0.7
2015	Primary Exhaust PM10 - Total	15.2	19.3	16.6	22.3	16.6	20.4	16.6	22.1	17.4	22.1
2015	Primary PM10 - Brakewear Particulate	8.6	11.0	10.2	13.2	9.9	12.1	8.3	11.3	9.7	11.3
2015	Primary PM10 - Tirewear Particulate	3.0	4.3	3.9	5.5	3.8	4.9	2.9	4.4	3.6	4.4
2015	Sulfur Dioxide (SO2)	2.0	2.8	2.6	3.7	2.5	3.2	2.0	2.9	2.4	2.9
2015	Volatile Organic Compounds	507.5	508.0	530.7	558.9	523.5	526.4	533.3	543.2	522.7	543.2

The 2015 modeling results were consistent with the previous work for the 2016 Plan; therefore, no adjustments were made to the motor vehicle emissions in the 2015 emission inventory. The re-entrained road dust calculations were rechecked with AP-42 protocols, updated with the latest LCOG VMT numbers, and compared for consistency with the Lane County portion of the NEIs for 2014 and 2017.

Re-entrained road dust is more significant in the PM_{10} emission inventory (compared to the $PM_{2.5}$ emission inventory) and is calculated in three categories: Paved road dust, unpaved road dust, and winter sanding (for ice and snow events). Paved road dust was calculated according to AP-42 Section 13.2.1 and previous PM_{10} emission inventories in Lane County, resulting in an emission factor of 0.00044 lb/VMT (compared to the $PM_{2.5}$ emissions factor of 0.00011 lb/VMT), and applied to the 2015 VMT provided by LCOG. Unpaved road dust was calculated according to AP-42 Section 13.2.2 and previous PM_{10} emission inventories in Lane County, resulting in an emission factor of 0.70 lb/VMT (compared to the $PM_{2.5}$ emissions factor of 0.07 lb/VMT), applied to an estimated 100 VMT per day primarily on unpaved driveways, alleyways and parking lots. Winter sanding emissions were conservatively kept at the 2.0 lb/day historical emission levels even though ODOT continues to evaluate alternative sanding materials.

Emissions from railroads were provided by Union Pacific Railroad staff using the EPA NONROAD2008a emissions protocol for the 2012 Plan. Typical Season Day and Worst Case Day PM_{10} and $PM_{2.5}$ emissions were calculated to be 6.4 lb/day and 6.0 lb/day, respectively, in 2008. The three or four key factors affecting future railroad locomotive emissions are:

- The gross ton-miles hauled by rail; this fluctuates with the economy, but is on an overall increasing trend.
- The fuel efficiency in gross ton-miles per gallon; this has increased significantly over the past decade, from perhaps 900 gross ton-miles per gallon to about 1000 gross ton-miles per gallon; future improvements will probably be smaller.
- Locomotive turnover, as Uncontrolled (pre-1973) and Tier 0 (1973-2001) locomotives are replaced by Tier 1, 2, 3 and 4 locomotives; this turnover will continue in future years until most line-haul locomotives are replaced with Tier 4 (with earlier tiers retired, or relegated to local switchyards, etc.).
- A fourth factor, affecting some parts of the country, is the decreasing amount of gross ton-miles by coal trains.

The National Emission Inventories (NEIs) for Lane County, Oregon, indicate the combined factors have resulted in a significant decrease from 2008 to 2014:

Table D: Lane County PM_{10} locomotive emissions from NEI for 2008, 2011, and 2014.

2014 Emissions Inventory - Lane County	
EI Sector	Lane County Emission (tons)
Mobile - Locomotives	19.62

2011 Emissions Inventory - Lane County	
EI Sector	Lane County Emission (tons)
Mobile - Locomotives	33.98

2008 Emissions Inventory - Lane County	
EI Sector	Lane County Emission (tons)
Mobile - Locomotives	42.63

More recent railroad emissions data from 2016-2017, and consultations with national experts at Illinois EPA and LADCO, indicate that railroad emissions continue to decrease overall; for example, the preliminary 2017 NEI emissions for Lane County are 18.56 tons. In June 2018, Matt Harrell at Illinois EPA (matthew.harrell@Illinois.gov) reviewed the FRA traffic density data used for the 2008 and 2014 v2 NEI inventories; rail traffic on the Union Pacific line that passes through Oakridge decreased 29.9% between 2007 and 2014. The latest 2016 traffic density data shows a 33.6% decrease from 2007 levels. At the same time, Union Pacific's fuel efficiency increased from 974.6 to 1006.2 gross ton-miles/gallon. Lastly, due to fleet mix turnover, Union Pacific's weighted PM emission factors decreased almost 22%. Matt Harrell concluded that maintaining railroad emissions at 2014 levels is indeed a conservative assumption, given that all three of these key factors have decreased by considerable amounts within the Oakridge area.

In the 2012 Plan and 2016 Plan, railroad emission projections for 2015 were conservatively estimated at 2008 levels. In the Oakridge PM_{10} and $PM_{2.5}$ maintenance plans, the 2015 railroad PM_{10} and $PM_{2.5}$ emissions are reduced based on the 2008-2011-2014 NEI data to 2.9 lb/day and 2.7 lb/day, respectively.

Other non-road mobile sources were categorized by LRAPA as insignificant in Oakridge-Westfir during the winter season as summarized in the 2016 Plan.

Updated 2015 Emission Inventory as the New Base Year

The 2015 PM_{10} Emission Inventory in the following table becomes the new Base Year PM_{10} Emission Inventory for the 2015-2035 Maintenance Plan.

Table E: Actual 2015 Typical Season Day and Worst-Case Day PM_{10} Emissions.

	-- lbs/per day --		Percent of Total NAA Emissions	
	Typical Season Day	Worst-Case Day	Typical Season Day	Worst-Case Day
Permitted Point Sources[(1)]				
Oakridge Sand & Gravel: Rock crushing operation	0.0	0.0	0.0%	0.0%
Oakridge Sand & Gravel: Cement plant	0.0	0.0	0.0%	0.0%
Stationary Area Sources				
Residential Wood Combustion: Fireplace[(2)]	38.5	31.7	7%	6%
Residential Wood Combustion: Non-Certified Woodstove/Insert[(2)]	108.4	89.4	18%	18%
Residential Wood Combustion: Certified Woodstove/Insert[(2)]	243.2	200.7	41%	40%
Pellet Stoves	7.3	8.0	1%	2%
All Other Stationary Area Sources	47.4	4.7	8%	1%
On-Road Sources				
On-Road: Exhaust, Brake, Tire[(3)]	30.7	37.8	5%	8%
Re-Entrained Road Dust	111.4	120.7	19%	24%
Nonroad Sources				
Union Pacific Railroad	2.9	2.9	0%	1%
	------	------		
Total, All Sources, lbs/day	**590**	**496**		

(1) Worst-case day = Permitted hourly (x24) operating capacity.
(2) Worst-case day = Peak Heating Degree Day.
(3) Updated with MOVES 2014a in May 2018.
(4) Based on curtailment effectiveness of 25% in 2015.

Updated by MLH on 07/06/2021.

The 2015 PM_{10} Emission Inventory in Table E is used as the Base Year for forecasting and calculating the future year (2025-2035) PM_{10} emission inventories in Appendix III.

Precursor Emissions (NOx, VOC, SO_2, and NH_3)

Secondary particulate is an overall very minor contributor to the Oakridge $PM_{2.5}$ air pollution concentrations on worst winter days as summarized in both the 2012 Plan and the 2016 Plan. Each of the precursor groups (nitrates, sulfates, ammonia, and volatile organic compounds [VOC]) was determined in the 2016 Plan to be below the EPA Region 10 insignificance threshold of 1.3 ug/m3:

- Nitrate + ammonia = 0.16 ug/m3 + 0.01 ug/m3 = 0.17 ug/m3 < 1.3 ug/m3.
- Sulfate = 0.43 ug/m3 < 1.3 ug/m3.
- VOC = 1.17 ug/m3 < 1.3 ug/m3.

In the initial assessment in the 2016 Plan, LRAPA staff reviewed the decreasing precursor trends in the Lane County, Oregon, portion of the National Emission Inventories (NEIs for 2008, and

2011, and 2014) for the major emission categories in Oakridge-Westfir and concluded that precursor emissions would be even less significant contributors to PM_{10} in the future. The 2017 NEI further supported this conclusion.

In response to preliminary EPA review comments, LRAPA staff performed a more definitive analysis of 2015 precursor emissions (NO_X, VOC, SO_2, and NH_3) in preparation for forecasting future year precursor emissions (2025-2035) in Appendix III. The 2015 precursor emissions are summarized in the following tables. Some precursor categories were not applicable (NA).

Table F: PM_{10} and Precursor Emissions for Typical Season Day in 2015 Base Year.

	Typical Season Day PM_{10} and Precursor Emissions (lb/day)				
Source Category	**PM_{10}**	**NO_x**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	397.3	50.4	373.0	7.7	20.7
Onroad Motor Vehicles	30.7	613.6	522.7	2.4	9.7
Re-Entrained Road Dust	111.4	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.9	0.1	5.2	0.1	0.1
Other Area Sources	47.4	5.1	134.0	3.5	9.3
Total Emissions	**590**	**669**	**1035**	**14**	**40**

Table G: PM_{10} and Precursor Emissions for Worst Case Day in 2015 Base Year.

	Worst Case Day PM_{10} and Precursor Emissions (lb/day)				
Source Category	**PM_{10}**	**NO_x**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	329.8	41.6	307.8	6.6	17.3
Onroad Motor Vehicles	37.8	711.3	543.2	2.9	12.0
Re-Entrained Road Dust	120.7	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.9	0.1	5.2	0.1	0.1
Other Area Sources	4.7	0.5	13.4	0.4	0.9
Total Emissions	**496**	**753**	**870**	**10**	**30**

Most of the 2015 precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories (i.e., 73-99%), as shown in the following two tables.

Table H: Percentage by Category of PM_{10} and Precursor Emissions for Typical Season Day in 2015.

	Typical Season Day PM_{10} and Precursor Emissions (%)				
Source Category	**PM_{10}**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	67.4%	7.5%	36.0%	56.4%	52.1%
Onroad Motor Vehicles	5.2%	91.7%	50.5%	17.4%	24.4%
Re-Entrained Road Dust	18.9%	NA	NA	NA	NA
Permitted Point Sources	0.0%	0.0%	0.0%	0.0%	NA
Railroad Locomotives	0.5%	0.0%	0.5%	0.4%	0.1%
Other Area Sources	8.0%	0.8%	12.9%	25.7%	23.4%
Total Emissions	**100%**	**100%**	**100%**	**100%**	**100%**

Table I: Percentage by Category of $PM_{2.5}$ and Precursor Emissions for Worst Case Day in 2015.

	Worst Case Day PM_{10} and Precursor Emissions (%)				
Source Category	**PM_{10}**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	66.5%	5.5%	35.4%	66.7%	57.2%
Onroad Motor Vehicles	7.6%	94.4%	62.5%	29.2%	39.6%
Re-Entrained Road Dust	24.3%	NA	NA	NA	NA
Permitted Point Sources	0.0%	0.0%	0.0%	0.0%	NA
Railroad Locomotives	0.6%	0.0%	0.6%	0.6%	0.2%
Other Area Sources	1.0%	0.1%	1.5%	3.6%	3.1%
Total Emissions	**100%**	**100%**	**100%**	**100%**	**100%**

Since most of the 2015 precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories (i.e., 73-99%), these emission categories were evaluated in more detail. The following tables summarize the PM_{10} and precursor emission calculations for Residential Wood Combustion.

Table J: PM_{10} Emissions from Residential Wood Combustion in 2015 Base Year.

(1) Woodburning Device	(2) 2015 Wood Fuel Use (tons/yr)	(3) PM10 EF (lbs/ton)	(4) Relative HDD	(5) Activity (days/wk)	PM10 Emissions: Annual (6) Annual (tons/yr)	PM10 Emissions: PM Season (7) Typical Day (lb/day)	PM10 Emissions: PM Season (8) Worst Case Day (lb/day)	(9) Worst Case Day 25% Advisory Controlled (lbs/day)
Oakridge NAA								
21-04-008-100 Fireplace without Insert	195.6	23.6	1.10	7	2.3	38	42	32
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21-04-008-310 Conv Wood Stove	194.8	30.6	1.10	7	3.0	50	55	41
21-04-008-230 Fireplace Insert Cert Catalyst	79.7	20.4	1.10	7	0.8	14	15	11
21-04-008-220 Fireplace Insert Cert Non-Cat	368.9	19.6	1.10	7	3.6	60	66	50
21-04-008-210 Fireplace Insert Conv.	230.2	30.6	1.10	7	3.5	59	65	48
21-04-008-400 Exempt Pellet Stove	276.1	3.1	1.10	7	0.4	7	8	8
21-04-008-510 Central Furnace	0.0	27.6	1.10	7	0.0	0	0	0
Total	2,375				23.8	397	437	**330**

Notes:

1) Woodburning Device categories are from the 2010 Oakridge Wood Burning Survey Results and subsequent heating unit replacements verified by LRAPA.
2) Woodburning Fuel Use estimates are from the 2010 Oakridge Wood Burning Survey Results.
3) Residential Wood Combustion PM10 and PM2.5 emission factors and references:

SCC	factor, lb/ton fuel burned	Reference
2104008100	23.6	1
2104008210	30.6	1
2104008220	19.6	1
2104008230	20.4	1
2104008310	30.6	1
2104008320	19.6	1
2104008330	20.4	1
2104008400	3.06	3
2104008510	27.6	3
2104008610	27.6	3
2104008700	23.6	3
2104009000	28.4	2

Reference 1: US EPA. Documentation For The 2002 Base Year National Emission Inventory For Hazardous Air Pollutants

Reference 2: Li, Victor S., and Rosenthal, Steven. "Content and emissions characteristics of Artificial Wax Firelogs." Paper presented at the 15th International Emission Inventory Conference. New Orleans, Lousiana. May 15th-18th, 2006.

Reference 3: Houck, James E., Eagle, Brian N. Control Analysis and Documentation for Residential Wood Combustion in the MANE-VU Region. Prepared for MARAMA. December 19, 2006.

4) Heating Degree Days calculated from LRAPA meteorological monitoring site at Willamette Activity Center (WAC) in Oakridge.
5) Klamath Falls and Oakridge survey results indicate activity occurs throughout the week.
6) Annual emissions [tons/year] = (2010 Survey Wood Fuel Use [tons/year] * emission factor [lbs/ton]) / 2000 [lbs/ton].
7) Typical PM_{10} Season Day Emissions [lbs/day] =

   (Annual Emissions [tons/year] * 2000 [lbs/ton]) / (120 heating days per season) without a weight for day of week fuel burned.
8) Worst Case Day Emissions [lbs/day] typical season day * worst-case day multiplier (based on peak/average HDD).

(9) Advisory controlled emissions based on woodburning curtailment compliance surveys during 2007-2011 with 25% compliance with 2012 strategy.
(10) Lane Electric reported heat pump installations of: 15 in 2012, 15 in 2013, 22 in 2014, and 36 in 2015.
(11) HeatSmart reported four non-certified woodstoves were removed in Oakridge during 2010-2015, assumed replacement with certified units.

Table K: NOx Emissions from Residential Wood Combustion in 2015 Base Year.

(1) Woodburning Device	(2) 2015 Wood Fuel Use (Households)	(3) NOx EF (lbs/ton)	(4) Relative HDD	(5) Activity (days/wk)	NOx Emissions Annual (6) Annual (tons/yr)	PM Season (7) Typical Day (lb/day)	PM Season (8) Worst Case Day (lb/day)	(9) Worst Case Day 25% Advisory Controlled (lbs/day)
Oakridge NAA								
21-04-008-100 Fireplace without Insert	195.6	2.6	1.10	7	0.3	4	5	3
21-04-008-320 Certified Non-Cat Wood-Stove	846.9	2.3	1.10	7	1.0	16	18	13
21-04-008-330 Certified Cat Wood-Stove	183.0	2.0	1.10	7	0.2	3	3	3
21-04-008-310 Conv Wood Stove	194.8	2.8	1.10	7	0.3	5	5	4
21-04-008-230 Fireplace Insert Cert Catalyst	79.7	2.0	1.10	7	0.1	1	1	1
21-04-008-220 Fireplace Insert Cert Non-Cat	368.9	2.3	1.10	7	0.4	7	8	6
21-04-008-210 Fireplace Insert Conv.	230.2	2.8	1.10	7	0.3	5	6	4
21-04-008-400 Exempt Pellet Stove	276.1	3.8	1.10	7	0.5	9	10	7
21-04-008-510 Central Furnace	0.0	1.8	1.10	7	0.0	0	0	0
Total	2,375				3.0	50	55	**42**

Notes:
1) Woodburning Device categories are from the 2010 Oakridge Wood Burning Survey Results and subsequent heating unit replacements verified by LRAPA.
2) Woodburning Fuel Use estimates are from the 2010 Oakridge Wood Burning Survey Results.
3) Residential Wood Combustion NOx emission factors and references:

scc	factor, lb/ton fuel burned	Reference
2104008100	2.6	1
2104008210	2.8	1
2104008220	2.3	3
2104008230	2.0	1
2104008310	2.8	1
2104008320	2.3	3
2104008330	2.0	1
2104008400	3.8	3
2104008510	1.8	3
2104008610	1.8	3
2104008700	2.6	1
2104009000	7.7	2

Reference 1: US EPA. Documentation For The 2002 Base Year National Emission Inventory For Hazardous Air Pollutants
Reference 2: Li, Victor S., and Rosenthal, Steven. "Content and emissions characteristics of Artificial Wax Firelogs." Paper presented at the 15th International Emission Inventory Conference. New Orleans, Lousiana. May 15th-18th, 2006.
Reference 3: Houck, James E., Eagle, Brian N. Control Analysis and Documentation for Residential Wood Combustion in the MANE-VU Region. Prepared for MARAMA. December 19, 2006.

4) Heating Degree Days calculated from LRAPA meteorological monitoring site at Willamette Activity Center (WAC) in Oakridge.
5) Klamath Falls and Oakridge survey results indicate activity occurs throughout the week.
6) Annual emissions [tons/year] = (2010 Survey Wood Fuel Use [tons/year] * emission factor [lbs/ton]) / 2000 [lbs/ton].
7) Typical PM_{10} Season Day Emissions [lbs/day] =

(Annual Emissions [tons/year] * 2000 [lbs/ton]) / (120 heating days per season) without a weight for day of week fuel burned.

8) Worst Case Day Emissions [lbs/day] typical season day * worst-case day multiplier (based on peak/average HDD).
(9) Advisory controlled emissions based on woodburning curtailment compliance surveys during 2007-2011 with 25% compliance with 2012 strategy.

Table L: VOC Emissions from Residential Wood Combustion in 2015 Base Year.

(1) Woodburning Device	(2) 2015 Wood Fuel Use (Households)	(3) VOC EF (lbs/ton)	(4) Relative HDD	(5) Activity (days/wk)	VOC Emissions Annual (6) Annual (tons/yr)	VOC Emissions PM Season (7) Typical Day (lb/day)	VOC Emissions PM Season (8) Worst Case Day (lb/day)	(9) Worst Case Day 25% Advisory Controlled (lbs/day)
Oakridge NAA								
21-04-008-100 Fireplace without Insert	123	18.9	1.10	7	1.2	31	34	25
21-04-008-320 Certified Non-Cat Wood-Stove	287	12.0	1.10	7	1.7	85	93	70
21-04-008-330 Certified Cat Wood-Stove	62	15.0	1.10	7	0.5	23	25	19
21-04-008-310 Conv Wood Stove	66	53.0	1.10	7	1.7	86	95	71
21-04-008-230 Fireplace Insert Cert Catalyst	27	15.0	1.10	7	0.2	10	11	8
21-04-008-220 Fireplace Insert Cert Non-Cat	125	12.0	1.10	7	0.8	37	41	30
21-04-008-210 Fireplace Insert Conv.	78	53.0	1.10	7	2.1	102	112	84
21-04-008-400 Exempt Pellet Stove	238	0.0	1.10	7	0.0	0	0	0
21-04-008-510 Central Furnace	0	11.7	1.10	7	0.0	0	0	0
Total	1,006				8.1	373	410	**308**

Notes:

1) Woodburning Device categories are from the 2010 Oakridge Wood Burning Survey Results and subsequent heating unit replacements verified by LRAPA.
2) Woodburning Fuel Use estimates are from the 2010 Oakridge Wood Burning Survey Results.
3) Residential Wood Combustion VOC emission factors and references:

scc	factor, lb/ton fuel burned	Reference
2104008100	18.9	1
2104008210	53	1
2104008220	12	3
2104008230	15	1
2104008310	53	1
2104008320	12	3
2104008330	15	1
2104008400	0.041	3
2104008510	11.7	3
2104008610	11.7	3
2104008700	18.9	1
2104009000	39.56	2

Reference 1: US EPA. Documentation For The 2002 Base Year National Emission Inventory For Hazardous Air Pollutants
Reference 2: Li, Victor S., and Rosenthal, Steven. "Content and emissions characteristics of Artificial Wax Firelogs." Paper presented at the 15th International Emission Inventory Conference. New Orleans, Lousiana. May 15th-18th, 2006.
Reference 3: Houck, James E., Eagle, Brian N. Control Analysis and Documentation for Residential Wood Combustion in the MANE-VU Region. Prepared for MARAMA. December 19, 2006.

4) Heating Degree Days calculated from LRAPA meteorological monitoring site at Willamette Activity Center (WAC) in Oakridge.
5) Klamath Falls and Oakridge survey results indicate activity occurs throughout the week.
6) Annual emissions [tons/year] = (2010 Survey Wood Fuel Use [tons/year] * emission factor [lbs/ton]) / 2000 [lbs/ton].
7) Typical PM_{10} Season Day Emissions [lbs/day] =
   (Annual Emissions [tons/year] * 2000 [lbs/ton]) / (120 heating days per season) without a weight for day of week fuel burned.
8) Worst Case Day Emissions [lbs/day] typical season day * worst-case day multiplier (based on peak/average HDD).

(9) Advisory controlled emissions based on woodburning curtailment compliance surveys during 2007-2011 with 25% compliance with 2012 strategy.
(10) Lane Electric reported heat pump installations of: 15 in 2012, 15 in 2013, 22 in 2014, and 36 in 2015.
(11) HeatSmart reported four non-certified woodstoves were removed in Oakridge during 2010-2015, assumed replacement with certified units.

Table M: SO2 Emissions from Residential Wood Combustion in 2015 Base Year.

(1) Woodburning Device	(2) 2015 Wood Fuel Use (tons/year)	(3) SO2 EF (lbs/ton)	(4) Relative HDD	(5) Activity (days/wk)	SO2 Emissions Annual (6) Annual (tons/yr)	SO2 Emissions PM Season (7) Typical Day (lb/day)	SO2 Emissions PM Season (8) Worst Case Day (lb/day)	(9) Worst Case Day 25% Advisory Controlled (lbs/day)
Oakridge NAA								
21-04-008-100 Fireplace without Insert	195.6	0.4	1.10	7	0.0	1	1	1
21-04-008-320 Certified Non-Cat Wood-Stove	846.9	0.4	1.10	7	0.2	3	3	2
21-04-008-330 Certified Cat Wood-Stove	183.0	0.4	1.10	7	0.0	1	1	1
21-04-008-310 Conv Wood Stove	194.8	0.4	1.10	7	0.0	1	1	1
21-04-008-230 Fireplace Insert Cert Catalyst	79.7	0.4	1.10	7	0.0	0	0	0
21-04-008-220 Fireplace Insert Cert Non-Cat	368.9	0.4	1.10	7	0.1	1	1	1
21-04-008-210 Fireplace Insert Conv.	230.2	0.4	1.10	7	0.0	1	1	1
21-04-008-400 Exempt Pellet Stove	276.1	0.3	1.10	7	0.0	1	1	1
21-04-008-510 Central Furnace	0.0	2.0	1.10	7	0.0	0	0	0
Total	2,375				0.5	8	9	**7**

Notes:
1) Woodburning Device categories are from the 2010 Oakridge Wood Burning Survey Results and subsequent heating unit replacements verified by LRAPA.
2) Woodburning Fuel Use estimates are from the 2010 Oakridge Wood Burning Survey Results.
3) Residential Wood Combustion SO2 emission factors and references:

scc	factor, lb/ton fuel burned	Reference
2104008100	0.4	1
2104008210	0.4	1
2104008220	0.4	3
2104008230	0.4	1
2104008310	0.4	1
2104008320	0.4	3
2104008330	0.4	1
2104008400	0.32	3
2104008510	2.03	3
2104008610	2.03	3
2104008700	0.4	1
2104009000	unknown	--

Reference 1: US EPA. Documentation For The 2002 Base Year National Emission Inventory For Hazardous Air Pollutants
Reference 2: Li, Victor S., and Rosenthal, Steven. "Content and emissions characteristics of Artificial Wax Firelogs." Paper presented at the 15th International Emission Inventory Conference. New Orleans, Lousiana. May 15th-18th, 2006.
Reference 3: Houck, James E., Eagle, Brian N. Control Analysis and Documentation for Residential Wood Combustion in the MANE-VU Region. Prepared for MARAMA. December 19, 2006.

4) Heating Degree Days calculated from LRAPA meteorological monitoring site at Willamette Activity Center (WAC) in Oakridge.
5) Klamath Falls and Oakridge survey results indicate activity occurs throughout the week.
6) Annual emissions [tons/year] = (2010 Survey Wood Fuel Use [tons/year] * emission factor [lbs/ton]) / 2000 [lbs/ton].
7) Typical PM_{10} Season Day Emissions [lbs/day] =

(Annual Emissions [tons/year] * 2000 [lbs/ton]) / (120 heating days per season) without a weight for day of week fuel burned.

8) Worst Case Day Emissions [lbs/day] typical season day * worst-case day multiplier (based on peak/average HDD).
(9) Advisory controlled emissions based on woodburning curtailment compliance surveys during 2007-2011 with 25% compliance with 2012 strategy.
(10) Lane Electric reported heat pump installations of: 15 in 2012, 15 in 2013, 22 in 2014, and 36 in 2015.
(11) HeatSmart reported four non-certified woodstoves were removed in Oakridge during 2010-2015, assumed replacement with certified units.

Table N: NH3 Emissions from Residential Wood Combustion in 2015 Base Year.

(1)	(2)	(3)	(4)	(5)	NH3 Emissions			(9)
					Annual	PM Season		Worst Case
	2015				(6)	(7)	(8)	Day 30%
	Wood Fuel	NH3				Typical	Worst Case	Advisory
Woodburning	Use	EF	Relative	Activity	Annual	Day	Day	Controlled
Device	(tons/year)	(lbs/ton)	HDD	(days/wk)	(tons/yr)	(lb/day)	(lb/day)	(lbs/day)
Oakridge NAA								
21-04-008-100 Fireplace without Insert	195.6	1.8	1.10	7	0.2	3	3	2
21-04-008-320 Certified Non-Cat Wood-Stove	846.9	0.9	1.10	7	0.4	6	7	5
21-04-008-330 Certified Cat Wood-Stove	183.0	0.9	1.10	7	0.1	1	2	1
21-04-008-310 Conv Wood Stove	194.8	1.7	1.10	7	0.2	3	3	2
21-04-008-230 Fireplace Insert Cert Catalyst	79.7	0.9	1.10	7	0.0	1	1	0
21-04-008-220 Fireplace Insert Cert Non-Cat	368.9	0.9	1.10	7	0.2	3	3	2
21-04-008-210 Fireplace Insert Conv.	230.2	1.7	1.10	7	0.2	3	4	3
21-04-008-400 Exempt Pellet Stove	276.1	0.3	1.10	7	0.0	1	1	1
21-04-008-510 Central Furnace	0.0	1.8	1.10	7	0.0	0	0	0
Total	2,375				1.2	21	23	**17**

Notes:
1) Woodburning Device categories are from the 2010 Oakridge Wood Burning Survey Results and subsequent heating unit replacements verified by LRAPA.
2) Woodburning Fuel Use estimates are from the 2010 Oakridge Wood Burning Survey Results.
3) Residential Wood Combustion NH3 emission factors and references:

scc	factor, lb/ton fuel burned	Reference
2104008100	1.8	1
2104008210	1.7	1
2104008220	0.9	3
2104008230	0.9	1
2104008310	1.7	1
2104008320	0.9	3
2104008330	0.9	1
2104008400	0.3	3
2104008510	1.8	3
2104008610	1.8	3
2104008700	1.8	1
2104009000	unknown	--

Reference 1: US EPA. Documentation For The 2002 Base Year National Emission Inventory For Hazardous Air Pollutants
Reference 2: Li, Victor S., and Rosenthal, Steven. “Content and emissions characteristics of Artificial Wax Firelogs.” Paper presented at the 15th International Emission Inventory Conference. New Orleans, Lousiana. May 15th-18th, 2006.
Reference 3: Houck, James E., Eagle, Brian N. Control Analysis and Documentation for Residential Wood Combustion in the MANE-VU Region. Prepared for MARAMA. December 19, 2006.

4) Heating Degree Days calculated from LRAPA meteorological monitoring site at Willamette Activity Center (WAC) in Oakridge.
5) Klamath Falls and Oakridge survey results indicate activity occurs throughout the week.
6) Annual emissions [tons/year] = (2010 Survey Wood Fuel Use [tons/year] * emission factor [lbs/ton]) / 2000 [lbs/ton].
7) Typical PM_{10} Season Day Emissions [lbs/day] =

(Annual Emissions [tons/year] * 2000 [lbs/ton]) / (120 heating days per season) without a weight for day of week fuel burned.

8) Worst Case Day Emissions [lbs/day] typical season day * worst-case day multiplier (based on peak/average HDD).
(9) Advisory controlled emissions based on woodburning curtailment compliance surveys during 2007-2011 with 25% compliance with 2012 strategy.
(10) Lane Electric reported heat pump installations of: 15 in 2012, 15 in 2013, 22 in 2014, and 36 in 2015.
(11) HeatSmart reported four non-certified woodstoves were removed in Oakridge during 2010-2015, assumed replacement with certified units.

The other major category of 2015 precursor emissions is On-Road Motor Vehicles. The following tables summarize the $PM_{2.5}$ and precursor emission calculations for On -Road Motor Vehicles from the MOVES modeling.

Table O: $PM_{2.5}$ and Precursor Emissions (lb/day) from On-Road Motor Vehicles in 2015 Base Year.

Year	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Ammonia (NH3)	8.0	11.6	10.7	15.5	10.3	13.6	7.6	12.0	9.7	12.0
2015	Oxides of Nitrogen (NOx)	539.7	671.8	669.7	861.0	642.4	765.6	535.5	711.3	613.6	711.3
2015	Primary Exhaust PM10 - Total	15.2	19.3	16.6	22.3	16.6	20.4	16.6	22.1	17.4	22.1
2015	Primary PM10 - Brakewear Particulate	8.6	11.0	10.2	13.2	9.9	12.1	8.3	11.3	9.7	11.3
2015	Primary PM10 - Tirewear Particulate	3.0	4.3	3.9	5.5	3.8	4.9	2.9	4.4	3.6	4.4
2015	Sulfur Dioxide (SO2)	2.0	2.8	2.6	3.7	2.5	3.2	2.0	2.9	2.4	2.9
2015	Volatile Organic Compounds	507.5	508.0	530.7	558.9	523.5	526.4	533.3	543.2	522.7	543.2
2015 Total		**1099.3**	**1248.4**	**1261.5**	**1502.9**	**1225.9**	**1366.9**	**1122.7**	**1329.4**	**1196.6**	**1329.4**

The 2015 precursor emissions related to Residential Wood Combustion and On-Road Motor Vehicles calculated in Tables J through O account for 73-99% of the precursor emissions, depending on the precursor category (NO_X, VOC, SO_2, or NH_3). The less significant source categories of precursor emissions in Tables F and G were calculated from the 2015 activity levels and appropriate emission factors from the 2014 and 2017 NEIs. As indicated in Tables F and G, some of these precursor categories were not applicable (e.g., Re-entrained Road Dust for NOx, VOC, SO2, and NH3). The PM_{10} and precursor emissions are projected for future years (2025, 2030, and 2035) in Appendix III.

Condensable and Filterable $PM_{2.5}$ Emissions

In addition to the precursor assessment, LRAPA staff also did a more detailed analysis of the condensable and filterable fractions of the $PM_{2.5}$ emission inventory. Unfortunately, the EPA guidance indicates there is not reliable condensable-filterable information available for the major $PM_{2.5}$ emission categories in Oakridge-Westfir.

For example, condensable PM emissions are not an issue associated with mobile sources. The MOVES model used for these sectors produces primary emission estimates for PM, including particle components (e.g., elemental carbon and organic carbon) and gaseous hydrocarbons (e.g., VOC, non-methane organic gases). These pollutant metrics would include both "filterable" and "condensable" PM. These are currently not separable in MOVES, and for SIP inventory purposes, they can be reported as they are output from MOVES without additional modification.

For Residential Wood Combustion, EPA-OAQPS staff confirmed that the condensable requirement for RWC is currently waived for RWC because the data is not available at present, so just the total $PM_{2.5}$ emissions should be reported.

The following summarizes the unavailability or inapplicability of condensable-filterable information for the major sources of $PM_{2.5}$ emissions in Oakridge-Westfir:

Table P: Availability and Applicability of PM_{10} Filterable & Condensable Emissions Information.

	2015 Typical Season Day PM_{10} Emissions (lb/day)			
Source Category	**Total PM_{10}**	**Filterable PM_{10}**	**Condensable PM_{10}**	**Notes**
Residential Wood Combustion	397.3	NA	NA	Not available for RWC.
Onroad Motor Vehicles	30.7	NA	NA	Addressed in MOVES.
Re-Entrained Road Dust	111.4	NA	NA	Not applicable.
Permitted Point Sources	0.0	0.0	0.0	No activity in 2015.
Railroad Locomotives	2.9	NA	NA	Not available.
Other Area Sources	47.4	NA	NA	Not available for vegetative sources.
Total PM_{10} Emissions	**590**	**NA**	**NA**	

	2015 Worst Case Day PM_{10} Emissions (lb/day)			
Source Category	**Total PM_{10}**	**Filterable PM_{10}**	**Condensable PM_{10}**	**Notes**
Residential Wood Combustion	329.8	NA	NA	Not available for RWC.
Onroad Motor Vehicles	37.8	NA	NA	Addressed in MOVES.
Re-Entrained Road Dust	120.7	NA	NA	Not applicable.
Permitted Point Sources	0.0	0.0	0.0	No activity in 2015.
Railroad Locomotives	2.9	NA	NA	Not available.
Other Area Sources	4.7	NA	NA	Not available for vegetative sources.
Total PM_{10} Emissions	**496**	**NA**	**NA**	

Confirmation of Updated 2015 $PM_{2.5}$ Emissions Inventory

In summary, the updated 2015 $PM_{2.5}$ and precursors emissions inventories are outlined previously in Tables F and G and repeated below. These inventories were used as the new 2015 Base Year for calculating future year (2025, 2030, and 2035) emission inventories for the Oakridge-Westfir PM_{10} Maintenance Plan in Appendix III.

Table F: PM_{10} and Precursor Emissions for Typical Season Day in 2015 Base Year.

	Typical Season Day PM_{10} and Precursor Emissions (lb/day)				
Source Category	**PM_{10}**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	397.3	50.4	373.0	7.7	20.7
Onroad Motor Vehicles	30.7	613.6	522.7	2.4	9.7
Re-Entrained Road Dust	111.4	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.9	0.1	5.2	0.1	0.1
Other Area Sources	47.4	5.1	134.0	3.5	9.3
Total Emissions	**590**	**669**	**1035**	**14**	**40**

Table G: PM_{10} and Precursor Emissions for Worst Case Day in 2015 Base Year.

	Worst Case Day PM_{10} and Precursor Emissions (lb/day)				
Source Category	**PM_{10}**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	329.8	41.6	307.8	6.6	17.3
Onroad Motor Vehicles	37.8	711.3	543.2	2.9	12.0
Re-Entrained Road Dust	120.7	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.9	0.1	5.2	0.1	0.1
Other Area Sources	4.7	0.5	13.4	0.4	0.9
Total Emissions	**496**	**753**	**870**	**10**	**30**

MLH:mlh (07/06/2021)

Appendix III: PM_{10} Emission Inventories for Future Years

Oakridge-Westfir PM_{10} Maintenance Area Emission Inventories for 2025, 2030 and 2035

October 7, 2021

Lane Regional Air Protection Agency
1010 Main Street
Springfield, Oregon 97477

Forecasting Future Year Emission Inventories

The 1990 Clean Air Act contains provisions on the required development of emission inventories for designated areas that failed or have failed in the past to meet the National Ambient Air Quality Standards (NAAQS). The Oakridge Urban Growth Boundary (UGB) is a designated NAAQS PM_{10} nonattainment area and the Oakridge-Westfir Nonattainment Area (NAA) is a designated NAAQS $PM_{2.5}$ nonattainment area. This emission inventory is provided as a part of the State of Oregon revisions to its State Implementation Plan (SIP) to formulate a strategy to maintain the NAAQS.

The PM_{10} and $PM_{2.5}$ air pollution problems in Oakridge are closely related and the PM_{10} and $PM_{2.5}$ emission inventories are more similar than different. Most of the smoke (i.e., combustion-related) components are similar for both PM_{10} and $PM_{2.5}$; the major differences are in the dust components since a higher percentage of dust falls within the PM_{10} size range compared to the $PM_{2.5}$ size range.

The Oakridge UGB was designated nonattainment for PM_{10} and classified as moderate by the U.S. Environmental Protection Agency (EPA) on January 20, 1994. LRAPA submitted a draft Oakridge PM_{10} attainment plan to EPA Region 10 for stringency review during early 1996. The Oakridge PM_{10} attainment plan was adopted by the LRAPA Board of Directors at a hearing on August 13, 1996. The Oakridge PM_{10} attainment plan was subsequently adopted by the Oregon Environmental Quality Commission (EQC) on December 9, 1996, and submitted to EPA. EPA approved the plan on March 15, 1999 (64 FR 12751). The plan relied on control strategies needed to assure attainment of the PM_{10} NAAQS. The Oakridge PM_{10} strategies were successful in achieving the PM_{10} standards on schedule. On July 26, 2001, EPA published a clean data determination (CDD) and a finding of attainment for the Oakridge PM_{10} area (66 FR 38947).

The Oakridge PM_{10} maintenance plan and request for redesignation to attainment was purposely delayed until the attainment in Oakridge of the more restrictive and protective $PM_{2.5}$ NAAQS which was achieved on December 31, 2016. EPA made a finding of $PM_{2.5}$ attainment and a clean data determination (CDD), based on 2014-2016 air monitoring data, on February 8, 2018 [83 FR 5537] effective March 12, 2018.

The 1996 Oakridge PM_{10} Attainment Plan approved by EPA in 1999 was based on a 1991 base year PM_{10} emission inventory and projected 2000 and 2003 future year PM_{10} emission inventories. The PM_{10} maintenance plan is updated for a 2015 PM_{10} base year emission inventory, and builds on the work done in recent years on the Oakridge-Westfir $PM_{2.5}$ attainment plan and maintenance plan.

The $PM_{2.5}$ emission inventories for the Oakridge area for 2008 (Base Year) and 2015 (Attainment Year) were included in the Oakridge 2016 $PM_{2.5}$ Attainment Plan ("2016 Plan"). The 2016 Plan was adopted by the LRAPA Board of Directors on November 10, 2016, approved and incorporated into the State Implementation Plan (SIP) by the Oregon Environmental Quality Commission (EQC) on January 18, 2017, and approved by EPA on February 18, 2018 [83 FR 5537] effective March 12, 2018. Residential Wood Combustion (RWC) emissions from certified and non-certified woodstoves, fireplaces and pellet stoves were identified as the major source of $PM_{2.5}$ emissions on worst winter days contributing to violation of the NAAQS for $PM_{2.5}$.

The principal components for development and documentation for the 2015-2035 Oakridge PM_{10} maintenance Plan emission inventories have been addressed in this document, which includes stationary permitted point sources, stationary area (non-permitted) sources, non-road mobile sources (railroads), on-road mobile sources, re-entrained road dust, and emissions summaries. Inventory years include the 2015 emission inventory as the new base year for the maintenance plan, and then the projected 2025-2035 emission inventories for the maintenance period. The geographic boundary for each inventory is the Oakridge-Westfir NAA, as defined by the NAA boundary in the 2016 Plan.

In this document the terms *typical season day*, and *worst-case day* emissions are used to categorize the estimated emissions for a particular time period. The typical season day emissions represent an average daily emission value occurring from November 1st through the end of February. This four-month time period is considered to be the PM season, and is when the PM standard is usually violated. The worst-case day emissions are the highest daily emissions estimated for the PM season, and represent a day during the PM season when emissions generating activity is at its highest. Typical season day and worst-case day emissions are represented in pounds per day (lbs/day).

The emission calculation protocols are included in the supporting documents for the 2016 Plan, and the prior 2012 Oakridge-Westfir $PM_{2.5}$ Attainment Plan ("2012 Plan"), and are not duplicated here. The 2008-2011-2014 National Emission Inventories (NEIs) for Lane County were used as the starting point for calculating both PM emissions and PM-precursor emissions for the Oakridge-Westfir $PM_{2.5}$ nonattainment area. The initial Oakridge-Westfir emissions were estimated by applying appropriate emission allocation factors (e.g., relative population, housing, vehicle miles of travel, land area, etc.) to the Lane County $PM_{2.5}$ and precursor emission categories. The significant (and insignificant) source categories during the winter $PM_{2.5}$ problem season were identified in Appendix D-5 of the 2012 Plan.

Secondary particulate is an overall very minor contributor to the Oakridge $PM_{2.5}$ air pollution concentrations on worst winter days as summarized in both the 2012 Plan and the 2016 Plan. Each of the precursor groups (nitrates, sulfates, ammonia, and volatile organic compounds [VOC]) was determined in the 2016 Plan to be below the EPA Region 10 insignificance threshold of 1.3 ug/m3:

- Nitrate + ammonia = 0.16 ug/m3 + 0.01 ug/m3 = 0.17 ug/m3 < 1.3 ug/m3.
- Sulfate = 0.43 ug/m3 < 1.3 ug/m3.
- VOC = 1.17 ug/m3 < 1.3 ug/m3.

Therefore, the LRAPA emission inventory analysis focused in most detail on the significant $PM_{2.5}$ particulate sources during the winter season in Oakridge-Westfir, notably residential woodburning emissions from woodstoves, fireplaces and pellet stoves.

Description of Maintenance Area

Oakridge, Oregon lies in an alluvial plain in the foothills at the southern end of the Willamette River valley. The city is in Lane County, Oregon, approximately 45 miles east-southeast of Eugene, and 28 miles west of Willamette Pass, the summit of the Cascade Mountain Range. The city limits of present-day Oakridge include the historic City of Oakridge and, directly west, the area formerly known as Willamette City. Figure A shows the location of Oakridge in Lane County.

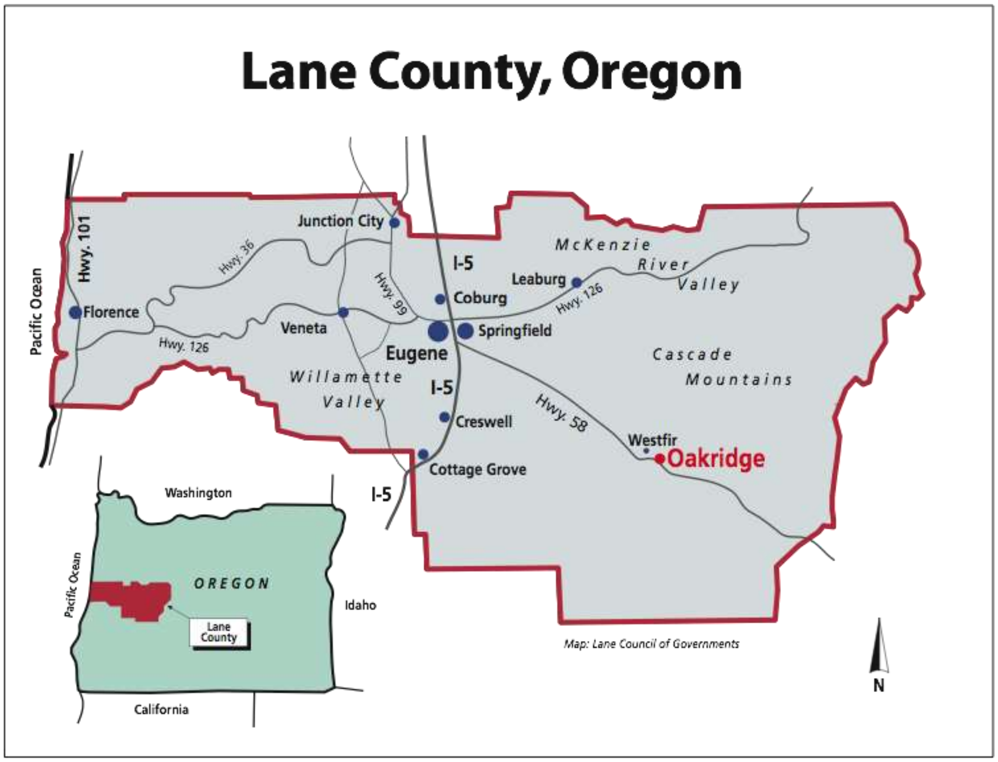

Figure A: Oakridge Location in Lane County, Oregon.

The Oakridge PM_{10} and $PM_{2.5}$ attainment plans were very similar; both identified residential wood combustion (in certified and non-certified woodstoves, fireplaces and pellet stoves) as the major emission category causing violations of the PM_{10} and $PM_{2.5}$ health standards on stagnant winter days, and outlined commitments for a number of strategies to replace non-certified woodstoves with cleaner burning units, improve firewood seasoning and woodstove operation to reduce PM emissions, and to curtail residential wood combustion during air stagnation episodes. Therefore, where possible, the Oakridge PM_{10} and $PM_{2.5}$ maintenance plans are closely synchronized, including the PM and precursor emission inventories and control strategies. However, EPA adopted different nonattainment area boundaries for PM_{10} and $PM_{2.5}$ and this affects the inventory boundaries for the PM_{10} and $PM_{2.5}$ Motor Vehicle Emissions Budgets (MVEBs) in Appendix IV. The nonattainment area boundary for PM_{10} is the Oakridge Urban Growth Boundary (UGB) shown in Figure B; and the nonattainment area boundary for $PM_{2.5}$ is a rectangular boundary surrounding the Oakridge-Westfir communities shown in Figure C.

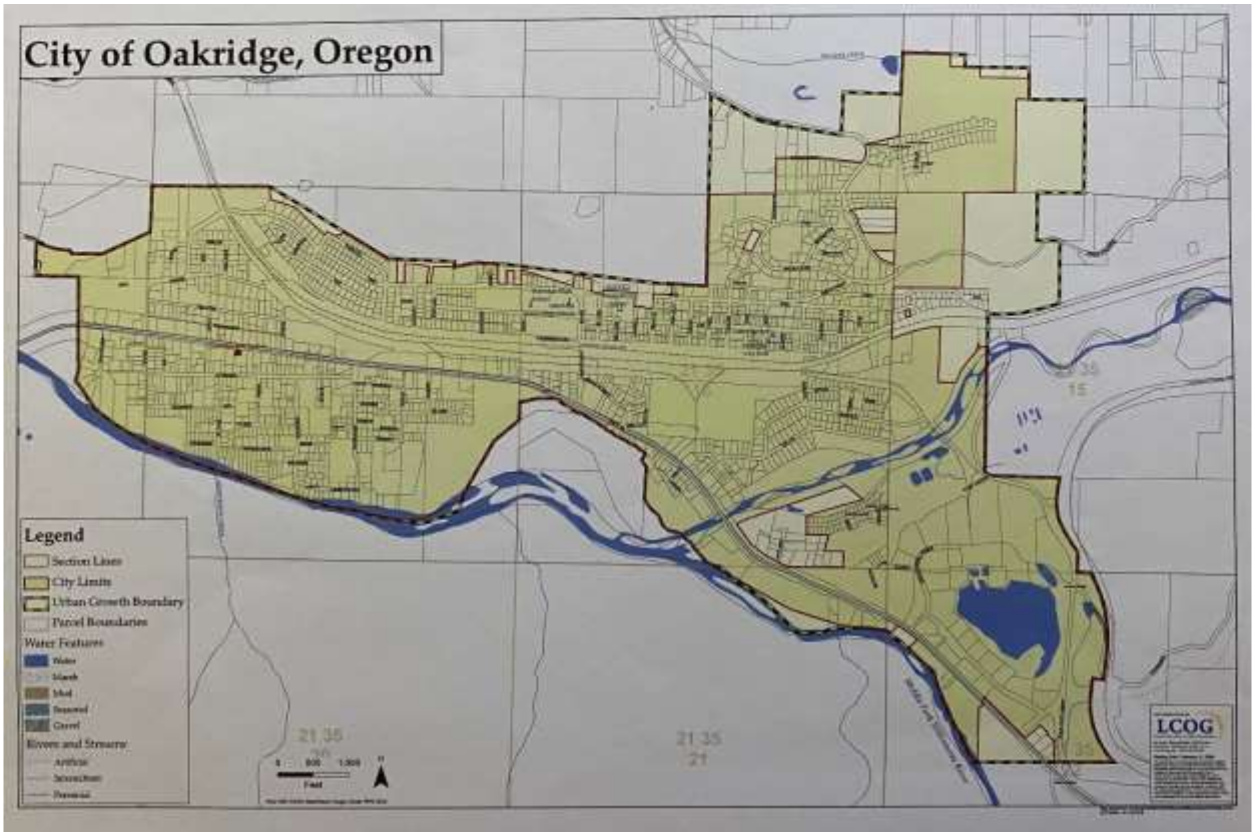

Figure B: Oakridge Urban Growth Boundary and PM_{10} Nonattainment Area Map.

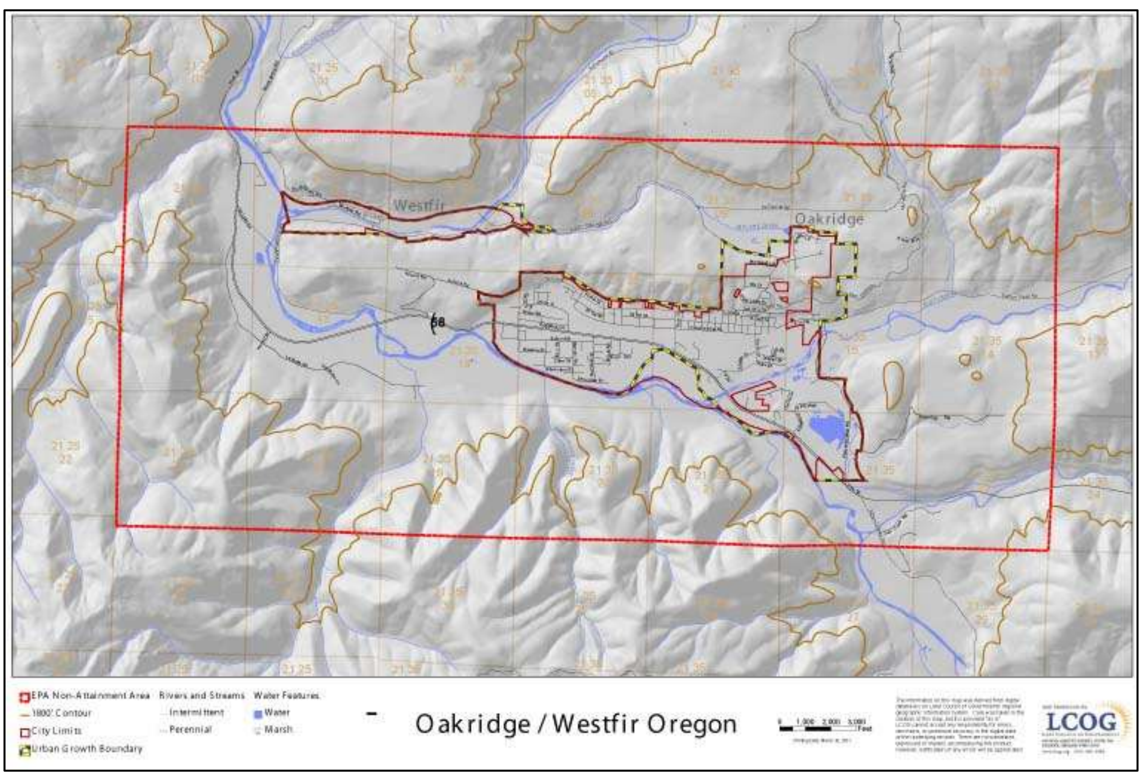

Figure C: Oakridge-Westfir $PM_{2.5}$ Nonattainment Area Map.

The overall emission inventories for PM_{10} and $PM_{2.5}$ (and the PM precursors) in the maintenance plans are based on the larger Oakridge-Westfir area in Figure C for consistency. But the EPA guidance on MVEBs very specifically indicates each MVEB (PM_{10} and $PM_{2.5}$) must be based on its respective nonattainment area boundary, so the PM_{10} and $PM_{2.5}$ are calculated specifically for their respective nonattainment area boundaries.

Base Year Emission Inventory (2015)

The base year emission inventory was used as the starting point for the maintenance demonstration. The 2015 emission inventory from Appendix II is summarized in Table A.

Table A: Actual 2015 Typical Season Day and Worst-Case Day PM_{10} Emissions.

	-- lbs/per day --		Percent of Total NAA Emissions	
	Typical Season Day	Worst-Case Day	Typical Season Day	Worst-Case Day
Permitted Point Sources[(1)]				
Oakridge Sand & Gravel: Rock crushing operation	0.0	0.0	0.0%	0.0%
Oakridge Sand & Gravel: Cement plant	0.0	0.0	0.0%	0.0%
Stationary Area Sources				
Residential Wood Combustion: Fireplace[(2)(4)]	38.5	31.7	7%	6%
Residential Wood Combustion: Non-Certified Woodstove/Insert[(2)(4)]	108.4	89.4	18%	18%
Residential Wood Combustion: Certified Woodstove/Insert[(2)(4)]	243.2	200.7	41%	40%
Pellet Stoves	7.3	8.0	1%	2%
All Other Stationary Area Sources	47.4	4.7	8%	1%
On-Road Sources				
On-Road: Exhaust, Brake, Tire[(3)]	30.7	37.8	5%	8%
Re-Entrained Road Dust	111.4	120.7	19%	24%
Nonroad Sources				
Union Pacific Railroad	2.9	2.9	0%	1%
	------	------		
Total, All Sources, lbs/day	**590**	**496**		

(1) Worst-case day = Permitted hourly (x24) operating capacity.
Updated by MLH on 07/06/2021.
(2) Worst-case day = Peak Heating Degree Day.
(3) Updated with MOVES 2014a in May 2018.
(4) Based on curtailment effectiveness of 25% in 2015.

The emissions inventory on worst winter days is of most interest since the PM_{10} concentrations measured in Oakridge occur on cold, stagnant days during the November-February wood-heating season. Residential wood-heating emissions (from certified and non-certified woodstoves, fireplaces, and pellet stoves) accounted for about 67% of the emissions on worst winter days in the 2015 Base Year, as shown in the last column of Table A.

Maintenance Years (2025, 2030, 2035) Emission Inventories

The principal components for development and documentation for the 2020 Maintenance Plan emission inventories have been addressed in this document, which includes stationary permitted point sources, stationary area (non-permitted) sources, non-road mobile sources (railroads), on-road mobile sources, and emissions summaries. Inventory years for the Maintenance Plan include the 2015 Base Year and then Future Years 2025, 2030 and 2035. The geographic boundary for each inventory continues to be the Oakridge-Westfir NAA, as defined by the NAA boundary in the 2016 Plan and illustrated previously in Figure C.

The differences between the 2015 base year emission inventory and the maintenance years (2025, 2030, and 2035) emission inventories are the combination of increases due to growth factors and decreases due to emission control strategies. For example, motor vehicle emissions continue to decrease overall due to progressively cleaner gasoline and diesel fuels and motor vehicles and the transition to more zero-emission vehicles, but part of the emissions decrease will be offset by gradual growth in traffic volumes. Industry emissions are minor so this did not have a major effect on the 2015 emissions or future emission inventories. The most significant category continues to be residential wood-heating; emissions were increased to reflect population and housing growth in future years, decreased due to non-certified woodstove replacements with cleaner burning units after 2015, and decreased due to improvements in public outreach regarding cleaner burning techniques and code enforcement programs for curtailment during stagnant air episodes.

Overall Growth Projections

Growth is expected to be low in the Oakridge-Westfir area through 2035. Population, housing, and employment forecasts are expected to increase gradually. The 2019 Population Forecasts by the Population Research Center at Portland State University[*see note below] indicate total expected population growth in the Oakridge and Westfir Urban Growth Boundaries (UGBs) during 2010-2035 of only 0.4% (less than 0.02% average per year), increasing from 3,563 (3,308+255) to 3,578 (3,312+266) population over the 2010-2035 time period.

*Note: The Oregon legislature passed a law (ORS 195.033) in 2013 by way of HB 2253 that assigned the forecast creation task to the Population Research Center at Portland State University (PSU). In 2015, the Land Conservation and Development Commission adopted rules (OAR 660-032) to implement the new law.

The staff of the Lane Council of Governments (LCOG) periodically updates and summarizes the demographic information for Oakridge, Westfir and other Lane County communities, based on American Community Survey (ACS) data from the U.S. Census Bureau. The 2018 ACS data indicates 1,791 total housing units in Oakridge, of which 1,433 are occupied, with electric heat as the primary heat source in 1,027 of the occupied housing units, wood as the primary heat source in 340 of the occupied housing units, and 66 occupied housing units using other fuel or none. Similarly, the Westfir ACS data indicates 131 total housing units, of which 121 are occupied, with electric heat as the primary heat source in 66 of the occupied housing units,

wood as the primary heat source in 39 of the occupied housing units, and 16 occupied housing units using other fuel or none.

Traffic growth in Vehicle-Miles-Traveled (VMT) is based on previous transportation modeling by LCOG, Lane County and ODOT in the Highway 58 corridor, as summarized in the following table. More detail about the VMT modeling is in the LCOG memorandum (link here) that summarizes the VMT data process LCOG completed in May of 2021 to update the VMT estimations previously used in the 2016 Updated Attainment Plan so that they are current and consistent with modeling guidance for this Maintenance Plan.

Table B: **Oakridge Projected Traffic Growth (Vehicle Miles of Travel, VMT) for 2015-2035.**

Daily and Annual VMT by Month								
	2015		2025		2030		2035	
Month	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
April	74,134	106,845	74,879	107,920	75,254	108,465	75,364	109,004
July	98,553	142,602	99,544	144,036	100,057	144,780	100,553	145,493
September	94,834	125,470	95,788	126,732	96,282	127,385	96,761	128,017
December	69,909	110,697	70,612	111,810	70,958	112,353	71,307	112,901
Total Annual	34,558,914		34,906,443		35,083,373		35,239,815	

The Future Traffic Forecasting Methodology is based on Technical Memorandum #6 (December 23, 2014) by DKS Associates for the Lane County Transportation System Plan (TSP) update: Lane County TSP_Future Forecasting Methodolgy_TM 6_Draft (12-23-14).pdf. VMT growth in various portions of Lane County was projected to range from 0.1% to 2.7% annual growth rate. The VMT growth rate in the Oakridge corridor, consistent with the low growth projections for population, housing and employment, is projected at 0.1% per year; this is the basis for the VMT projections by LCOG in Table B.

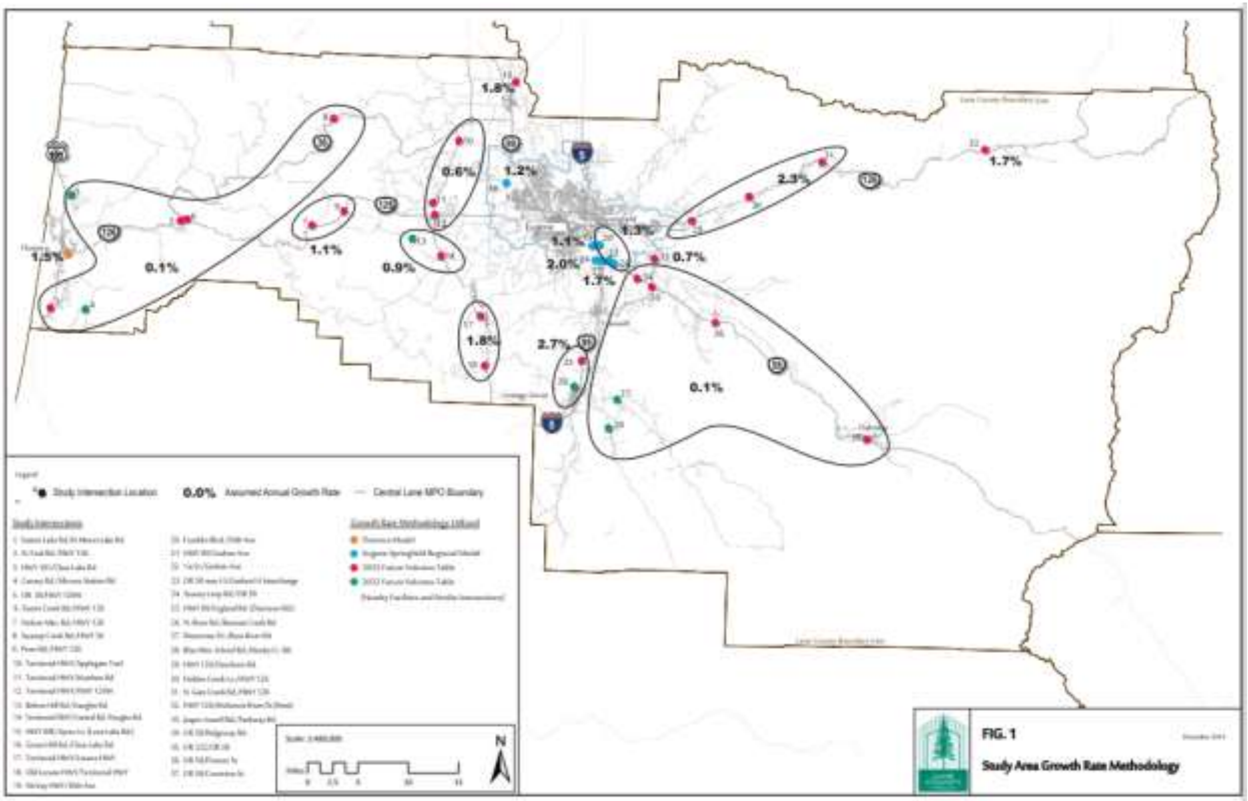

Figure D: Lane County Traffic Growth Rate Methodology.

Industrial Point Sources

LRAPA maintains data on industrial point source emissions in Lane County. The two existing industrial sources in the Oakridge-Westfir area are minor industrial sources of PM_{10} emissions. The facilities are a portable rock crusher and a ready-mix concrete plant owned and operated by Oakridge Sand & Gravel.

The initial 2015 attainment year emissions for these two facilities were conservatively based on the maximum allowable production rates identified in the facility permit applications and the LRAPA-issued permits. The typical season day emissions were based on the annual maximum production capacity and the worst-day emissions were based on the daily maximum production capacity. The rock crusher has a production capacity of 3,600 tons per day (potential PM_{10} emissions of 72 lb/day) and 300,000 tons per year (potential PM_{10} emissions of 6,000 lb/year). The ready-mix concrete plant has a production capacity of 480 cubic yards per day (potential PM_{10} emissions of 10 lb/day) and 30,000 cubic yards per year (potential PM_{10} emissions of 600 lb/year); the ready-mix concrete plan air discharge permit was terminated on January 24, 2014, so it did not operate in 2015 or future years.

The Oakridge Sand & Gravel rock crusher did not operate in Oakridge in 2015; any rock crushing was done at the Hale Valley quarry site near Noti, Oregon, which is 50+ miles distant from Oakridge. Therefore, the actual rock crusher emissions in the 2015 emission inventory were zero. The Oakridge Sand & Gravel ready-mix concrete plant permit was terminated on January

24, 2014, so the concrete plant $PM_{2.5}$ emissions will be 0.00 pounds per day in 2025, 2030 and 2035.

The Oakridge Sand & Gravel rock crusher did not operate in Oakridge in 2012-2016. The only rock crushing done in Oakridge during 2008-2017 during the November-February season-of-concern was in January- February 2011, with 272 pounds of PM_{10} emissions in January 2011 and 204 pounds of emissions in February 2011. For future (2025, 2030, 2035) typical season day, the estimated emissions are conservatively based on the January-February 2011 average of 238 pounds per month or 8.0 pounds per day. For future (2025, 2030, 2035) worst-case day, the estimated emissions are conservatively based on the January 2011 PM_{10} emissions of 272 pounds per month, or 13.7 pounds per day (at 20 production days per month).

Residential Wood Combustion

Residential wood combustion (RWC) is a common way to heat homes in Oregon. As outlined under the general growth projections, the Lane Council of Governments periodically updates and summarizes the demographic information for Oakridge, Westfir and other Lane County communities, based on American Community Survey (ACS) data from the U.S. Census Bureau. The 2018 ACS data indicates 1,791 total housing units in Oakridge, of which 1,433 are occupied, with electric heat as the primary heat source in 1,027 of the occupied housing units, wood as the primary heat source in 340 of the occupied housing units, and 66 occupied housing units using other fuel or none. Similarly, the Westfir ACS data indicates 131 total housing units, of which 121 are occupied, with electric heat as the primary heat source in 66 of the occupied housing units, wood as the primary heat source in 39 of the occupied housing units, and 16 occupied housing units using other fuel or none. Home heating sources other than electricity or wood are considered insignificant, with the number of estimated units less than the margin of error in the ACS survey; for example, the estimated number of “other fuel” in Oakridge in 2018 was 15 homes, but the margin of error was +/- 28 homes.

Natural gas is not available in Oakridge-Westfir, thus the reliance on electricity and wood for most home heating. More detailed home wood heating surveys have been done during 2009-2015 by LRAPA, DEQ and the South Willamette Forest Collaborative (SWFC) in Oakridge to provide more details on primary and secondary use of wood for home heating, average number of cords burned per year, certified and non-certified woodstoves, pellet stoves, etc. The composite result of the various surveys is that most homes in Oakridge-Westfir rely on some combination of electricity and wood (primary or secondary) for home heating.

The various surveys provided LRAPA with information on how many homes use various types of wood-heating devices, the amount of wood burned, and other information on wood-heating practices. The Oakridge wood use for the 2015 base year is summarized in the following table.

Table C: Oakridge 2015 Residential Wood Use.

Woodburning Device	2015 Wood Fuel Use (Households)	2015 Wood Fuel Use (tons/HH)	2015 Wood Fuel Use (tons/year)
Oakridge NAA			
21-04-008-100 Fireplace without Insert	123	1.6	195.6
21-04-008-320 Certified Non-Cat Wood-Stove	287	3.0	846.9
21-04-008-330 Certified Cat Wood-Stove	62	3.0	183.0
21-04-008-310 Conv Wood Stove	66	3.0	194.8
21-04-008-230 Fireplace Insert Cert Catalyst	27	3.0	79.7
21-04-008-220 Fireplace Insert Cert Non-Cat	125	3.0	368.9
21-04-008-210 Fireplace Insert Conv.	78	3.0	230.2
21-04-008-400 Exempt Pellet Stove	238	1.2	276.1
21-04-008-510 Central Furnace	0	0.0	0.0
Total	1,006		2,375

The LRAPA 2009-2010 survey report, data, and additional RWC emission calculation details are included in the 2012 Plan and 2016 Plan. The detailed 2015 RWC emission calculations are summarized in the following table.

Table D: Oakridge 2015 Residential Wood Combustion (RWC) $PM_{2.5}$ Emissions.

(1) Woodburning Device	(2) 2015 Wood Fuel Use (tons/yr)	(3) PM10 EF (lbs/ton)	(4) Relative HDD	(5) Activity (days/wk)	PM10 Emissions Annual (6) Annual (tons/yr)	PM Season (7) Typical Day (lb/day)	(8) Worst Case Day (lb/day)	(9) Worst Case Day 25% Advisory Controlled (lbs/day)
Oakridge NAA								
21-04-008-100 Fireplace without Insert	195.6	23.6	1.10	7	2.3	38	42	32
21-04-008-320 Certified Non-Cat Wood-Stove	846.9	19.6	1.10	7	8.3	138	152	114
21-04-008-330 Certified Cat Wood-Stove	183.0	20.4	1.10	7	1.9	31	34	26
21-04-008-310 Conv Wood Stove	194.8	30.6	1.10	7	3.0	50	55	41
21-04-008-230 Fireplace Insert Cert Catalyst	79.7	20.4	1.10	7	0.8	14	15	11
21-04-008-220 Fireplace Insert Cert Non-Cat	368.9	19.6	1.10	7	3.6	60	66	50
21-04-008-210 Fireplace Insert Conv.	230.2	30.6	1.10	7	3.5	59	65	48
21-04-008-400 Exempt Pellet Stove	276.1	3.1	1.10	7	0.4	7	8	8
21-04-008-510 Central Furnace	0.0	27.6	1.10	7	0.0	0	0	0
Total	2,375				23.8	397	437	**330**

Notes:

1) Woodburning Device categories are from the 2010 Oakridge Wood Burning Survey Results and subsequent heating unit replacements verified by LRAPA.
2) Woodburning Fuel Use estimates are from the 2010 Oakridge Wood Burning Survey Results.
3) Residential Wood Combustion PM10 and PM2.5 emission factors and references:

scc	factor, lb/ton fuel burned	Reference
2104008100	23.6	1
2104008210	30.6	1
2104008220	19.6	1
2104008230	20.4	1
2104008310	30.6	1
2104008320	19.6	1
2104008330	20.4	1
2104008400	3.06	3
2104008510	27.6	3
2104008610	27.6	3
2104008700	23.6	3
2104009000	28.4	2

Reference 1: US EPA. Documentation For The 2002 Base Year National Emission Inventory For Hazardous Air Pollutants
Reference 2: Li, Victor S., and Rosenthal, Steven. "Content and emissions characteristics of Artificial Wax Firelogs." Paper presented at the 15th International Emission Inventory Conference. New Orleans, Lousiana. May 15th-18th, 2006.
Reference 3: Houck, James E., Eagle, Brian N. Control Analysis and Documentation for Residential Wood Combustion in the MANE-VU Region. Prepared for MARAMA. December 19, 2006.

4) Heating Degree Days calculated from LRAPA meteorological monitoring site at Willamette Activity Center (WAC) in Oakridge.
5) Klamath Falls and Oakridge survey results indicate activity occurs throughout the week.
6) Annual emissions [tons/year] = (2010 Survey Wood Fuel Use [tons/year] * emission factor [lbs/ton]) / 2000 [lbs/ton].
7) Typical PM_{10} Season Day Emissions [lbs/day] =
   (Annual Emissions [tons/year] * 2000 [lbs/ton]) / (120 heating days per season) without a weight for day of week fuel burned.
8) Worst Case Day Emissions [lbs/day] typical season day * worst-case day multiplier (based on peak/average HDD).

(9) Advisory controlled emissions based on woodburning curtailment compliance surveys during 2007-2011 with 25% compliance with 2012 strategy.
(10) Lane Electric reported heat pump installations of: 15 in 2012, 15 in 2013, 22 in 2014, and 36 in 2015.
(11) HeatSmart reported four non-certified woodstoves were removed in Oakridge during 2010-2015, assumed replacement with certified units.

The primary focus of the 2016 Plan and this 2021 Maintenance Plan is to continue to reduce RWC emissions. The Oakridge Air Program, outlined in detail in Appendix V, continues and expands RWC strategies that have been effective over the past few decades. Much of the funding for the Oakridge Air Program is provided by an EPA Targeted Airshed Grant received by LRAPA in 2019, to be implemented during 2020-2024. The key RWC strategies include:

- Home heating upgrades: Weatherization, home repairs, ductless heat pumps, certified woodstove upgrades to 145 homes;
- Expanded code enforcement, public outreach, and educational diversion program for first-time smoke violations;
- Community firewood program to ensure seasoned firewood with a reduced rate for low-income, senior, and disabled residents;
- Community and school education with curriculum by the Middle Fork Willamette Watershed Council in coordination with the Oakridge School District; and
- Air filters to improve HVAC systems of public buildings for community smoke shelters, and portable filters distributed through local health clinics for vulnerable residents, for use during summer wildfire smoke impacts or winter air stagnation woodstove smoke events.

The core RWC strategies from the 2016 Plan continue. The city and county ordinances are included in Appendix VI, and the woodburning curtailment protocols are included in Appendix VII. The most significant of the RWC reductions from the Oakridge Air Program will be achieved during 2020-2024 and are reflected in the 2025 Oakridge-Westfir RWC Emission Inventory.

Table E: Oakridge 2025 Projected Residential Wood Combustion (RWC) PM_{10} Emissions.

(1) Woodburning Device	(2) 2025 Wood Fuel Use (Households)	(2) 2025 Wood Fuel Use (tons/HH)	(2) 2025 Wood Fuel Use (tons/year)	(3) PM10 EF (lbs/ton)	(4) Average Heating Degree Days (HDD)	(4) Peak 2% Heating Degree Days (HDD)	(4) Relative HDD	(5) Activity (days/wk)	PM10 Emissions Annual (6) Annual (tons/yr)	PM10 Emissions PM Season (7) Typical Day (lb/day)	PM10 Emissions PM Season (8) Worst Case Day (lb/day)	(9) Worst Case Day 30% Advisory Controlled (lbs/day)
Oakridge NAA												
21-04-008-100 Fireplace without Insert	123	1.6	195.6	23.6	26	28	1.10	7	2.3	38	42	30
21-04-008-320 Certified Non-Cat Wood-Stove	363	2.5	907.5	19.6	26	28	1.10	7	8.9	148	163	114
21-04-008-330 Certified Cat Wood-Stove	78	2.5	195.0	20.4	26	28	1.10	7	2.0	33	36	26
21-04-008-310 Conv Wood Stove	7	3.0	21.0	30.6	26	28	1.10	7	0.3	5	6	4
21-04-008-230 Fireplace Insert Cert Catalyst	31	2.5	77.5	20.4	26	28	1.10	7	0.8	13	14	10
21-04-008-220 Fireplace Insert Cert Non-Cat	159	2.5	397.5	19.6	26	28	1.10	7	3.9	65	71	50
21-04-008-210 Fireplace Insert Conv.	8	3.0	24.0	30.6	26	28	1.10	7	0.4	6	7	5
21-04-008-400 Exempt Pellet Stove	238	1.2	276.1	3.1	26	28	1.10	7	0.4	7	8	8
21-04-008-510 Central Furnace	0	0.0	0.0	27.6	26	28	1.10	7	0.0	0	0	0
Total	1,007		2,094						19.0	316	348	**246**

Less significant RWC reductions from the Oakridge Air Program will be achieved after 2024, as reflected in the 2030 and 2035 Oakridge-Westfir RWC Emission Inventories. The Oakridge Air Program is expected to gradually increase compliance with the woodburning curtailment program from 30% to 40% between 2025 and 2035; this is a conservative projection based on the 30-50% compliance demonstrated in other Oregon and western states communities. The EPA Guidance Document for Residential Wood Combustion Emission Control Measures (EPA-450/2-89-015) outlines historical curtailment compliance rates in communities of the Pacific Northwest of 16-50% for voluntary programs and 38-90% for mandatory programs over time.

Table F: Oakridge 2030 Projected Residential Wood Combustion (RWC) PM_{10} Emissions.

(1) Woodburning Device	(2) 2030 Wood Fuel Use (Households)	(2) 2030 Wood Fuel Use (tons/HH)	(2) 2030 Wood Fuel Use (tons/year)	(3) PM10 EF (lbs/ton)	(4) Average Heating Degree Days (HDD)	(4) Peak 2% Heating Degree Days (HDD)	(4) Relative HDD	(5) Activity (days/wk)	PM10 Emissions Annual (6) Annual (tons/yr)	PM10 Emissions PM Season (7) Typical Day (lb/day)	PM10 Emissions PM Season (8) Worst Case Day (lb/day)	(9) Worst Case Day 35% Advisory Controlled (lbs/day)
Oakridge NAA												
21-04-008-100 Fireplace without Insert	123	1.6	195.6	23.6	26	28	1.10	7	2.3	38	42	28
21-04-008-320 Certified Non-Cat Wood-Stove	365	2.5	912.5	19.6	26	28	1.10	7	8.9	149	164	107
21-04-008-330 Certified Cat Wood-Stove	80	2.5	200.0	20.4	26	28	1.10	7	2.0	34	37	24
21-04-008-310 Conv Wood Stove	5	3.0	15.0	30.6	26	28	1.10	7	0.2	4	4	3
21-04-008-230 Fireplace Insert Cert Catalyst	33	2.5	82.5	20.4	26	28	1.10	7	0.8	14	15	10
21-04-008-220 Fireplace Insert Cert Non-Cat	160	2.5	400.0	19.6	26	28	1.10	7	3.9	65	72	47
21-04-008-210 Fireplace Insert Conv.	6	3.0	18.0	30.6	26	28	1.10	7	0.3	5	5	3
21-04-008-400 Exempt Pellet Stove	238	1.2	276.1	3.1	26	28	1.10	7	0.4	7	8	8
21-04-008-510 Central Furnace	0	0.0	0.0	27.6	26	28	1.10	7	0.0	0	0	0
Total	1,010		2,100						19.0	316	348	**229**

Table G: Oakridge 2035 Projected Residential Wood Combustion (RWC) PM_{10} Emissions.

(1) Woodburning Device	(2) 2035 Wood Fuel Use (Households)	(2) 2035 Wood Fuel Use (tons/HH)	(2) 2035 Wood Fuel Use (tons/year)	(3) PM10 EF (lbs/ton)	(4) Average Heating Degree Days (HDD)	(4) Peak 2% Heating Degree Days (HDD)	(4) Relative HDD	(5) Activity (days/wk)	PM10 Emissions Annual (6) Annual (tons/yr)	PM10 Emissions PM Season (7) Typical Day (lb/day)	PM10 Emissions PM Season (8) Worst Case Day (lb/day)	(9) Worst Case Day 40% Advisory Controlled (lbs/day)
Oakridge NAA												
21-04-008-100 Fireplace without Insert	123	1.6	195.6	23.6	26	28	1.10	7	2.3	38	42	25
21-04-008-320 Certified Non-Cat Wood-Stove	367	2.5	917.5	19.6	26	28	1.10	7	9.0	150	165	99
21-04-008-330 Certified Cat Wood-Stove	82	2.5	205.0	20.4	26	28	1.10	7	2.1	35	38	23
21-04-008-310 Conv Wood Stove	3	3.0	9.0	30.6	26	28	1.10	7	0.1	2	3	2
21-04-008-230 Fireplace Insert Cert Catalyst	35	2.5	87.5	20.4	26	28	1.10	7	0.9	15	16	10
21-04-008-220 Fireplace Insert Cert Non-Cat	162	2.5	405.0	19.6	26	28	1.10	7	4.0	66	73	44
21-04-008-210 Fireplace Insert Conv.	3	3.0	9.0	30.6	26	28	1.10	7	0.1	2	3	2
21-04-008-400 Exempt Pellet Stove	238	1.2	276.1	3.1	26	28	1.10	7	0.4	7	8	8
21-04-008-510 Central Furnace	0	0.0	0.0	27.6	26	28	1.10	7	0.0	0	0	0
Total	1,013		2,105						18.9	316	347	**212**

Other Area Sources

The only other area source category with potential significant emissions is outdoor burning. Outdoor burning is banned in Lane County for fire safety reasons during the June-September fire season and is banned in Oakridge for air quality reasons during November-February. There are 1,756 households in the Oakridge-Westfir nonattainment area. The LRAPA survey indicates that 28% of the households (about 492 households) burn yard debris (weighted average of 3 cubic yards per household) during the Fall and Spring months. The yard debris is a mix of leaves and brush with an estimated average density of 312.5 pounds per cubic yard using conversion factors (250-375 lb/yard) from OAR 340-097-0110. AP-42 emission factors are 17-38 lb/ton, or an average of 27.5 lb/ton; AP-42 indicates most of the particulate emissions are in the submicrometer range, so the same emission factors are used for both PM_{10} and $PM_{2.5}$ emissions. The total amount of yard debris burned is calculated to be 230.6 tons per year with PM_{10} emissions of 3.2 tons per year. Typical season days emissions are calculated to be 47.4 lb/day on the approximately 135 days per year during the Spring and Fall burning seasons. Although outdoor burning is banned during November-February, LRAPA and Oakridge occasionally receive complaints of outdoor burning on banned days, so outdoor burning emissions are conservatively calculated at 10% (4.7 lb/day) on worst-case days during November-February in the 2015-2035 emission inventories.

Mobile and Nonroad Sources

The U.S. Environmental Protection Agency's (EPA's) MOtor Vehicle Emission Simulator (MOVES) is a state-of-the-science emission modeling system that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases, and air toxics. MOVES is used by state and local agencies to estimate nitrogen oxides (NOx), particulate matter ($PM_{2.5}$ and PM_{10}), volatile organic compounds (VOCs), carbon monoxide (CO), and other pollutants/precursors from cars, trucks, buses, and motorcycles for State Implementation Plan (SIP) purposes and conformity determinations outside of California. MOVES incorporates the latest data on vehicle populations, travel activity, and emission rates as well as updated fuel supply information at the county level, and accounts for vehicle starts and idling. MOVES is considered the most accurate tool for estimating emissions from the transportation sector for most purposes.

EPA has adopted federal requirements for progressively cleaner vehicles and cleaner fuels under the authority of the federal Clean Air Act since 1970. As a result of EPA's regulatory programs and various state regulations, motor vehicles and their fuels (both gasoline and diesel) sold today in the U.S. are far cleaner than vehicles and fuels produced in previous decades. The emission-reduction benefits of these requirements for cleaner vehicles and cleaner fuels are quantified at the county level in MOVES.

Exhaust, brake wear and tire wear emissions of PM_{10} from motor vehicles were calculated by staff of the Oregon Department of Environmental Quality (DEQ) in 2016 based on MOVES 2014a for years 2008 and 2015. Road dust emissions were estimated using EPA's AP-42 formulas for both paved roads (see AP-42 Section 13.2.1 for Paved Roads and Section 13.2.2 for Unpaved Roads). Traffic growth in Vehicle-Miles-Traveled (VMT) was based on previous transportation modeling by LCOG and ODOT in the Highway 58 corridor and revised with this plan (see LCOG's explanation of VMT revisions). The 2015 exhaust, brake wear and tire wear emissions from motor vehicles were modeled again by DEQ staff in 2018 as part of the forecasting of future years emissions (2025-2035). Road dust emissions were estimated again in 2021 using EPA's AP-42 formulas for both paved roads (see AP-42 Section 13.2.1 for Paved Roads and Section 13.2.2 for Unpaved Roads) and updated VMT data for 2015 and 2020.

Federal control measures included in the MOVES2014a modeling are all federal measures that affect the fleets and fuels used in future years once implemented by EPA. Examples of federal control measures include requirements for cleaner engines and fuels. The PM_{10} MOVES 2014a emission modeling results for 2015, 2025, 2030, and 2035 are summarized in the following table. The 2030 MOVES input files (that also include the 2015 and 2025 inputs) are all available in this link. The 2035 MOVES input files are all available in this link.

Table H: **Oakridge PM_{10} MOVES 2014a emission modeling combined results (lb/day) for 2015-2035.**

Year	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015 Total	Total PM10 Exhaust, Brake, Tire	26.8	34.6	30.7	41.0	30.3	37.3	27.8	37.8	30.7	37.8
2025 Total	Total PM10 Exhaust, Brake, Tire	16.9	21.7	20.0	26.5	19.6	24.0	16.7	22.9	19.2	22.9
2030 Total	Total PM10 Exhaust, Brake, Tire	18.6	24.3	22.6	30.1	22.1	27.2	17.9	25.1	21.2	25.1
2035 Total	Total PM10 Exhaust, Brake, Tire	18.0	23.5	21.9	29.6	21.3	26.3	17.4	24.3	20.6	24.3

The more detailed categories of the $PM_{2.5}$ MOVES 2014a emission modeling results for 2015, 2025, 2030, and 2035 are in the following table.

Table I: **Oakridge PM_{10} MOVES 2014a emission modeling results (lb/day) by category for 2015-2035.**

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Primary Exhaust PM10 - Total	15.2	19.3	16.6	22.3	16.6	20.4	16.6	22.1	17.4	22.1
2015	Primary PM10 - Brakewear Particulate	8.6	11.0	10.2	13.2	9.9	12.1	8.3	11.3	9.7	11.3
2015	Primary PM10 - Tirewear Particulate	3.0	4.3	3.9	5.5	3.8	4.9	2.9	4.4	3.6	4.4
2015 Total	Total PM10 Exhaust, Brake, Tire	26.8	34.6	30.7	41.0	30.3	37.3	27.8	37.8	30.7	37.8
2025	Primary Exhaust PM10 - Total	4.0	4.9	4.4	5.8	4.4	5.3	4.3	5.5	4.5	5.5
2025	Primary PM10 - Brakewear Particulate	9.5	12.1	11.3	14.5	11.0	13.3	9.2	12.5	10.7	12.5
2025	Primary PM10 - Tirewear Particulate	3.3	4.7	4.3	6.1	4.2	5.4	3.2	4.9	4.0	4.9
2025 Total	Total PM10 Exhaust, Brake, Tire	16.9	21.7	20.0	26.5	19.6	24.0	16.7	22.9	19.2	22.9
2030	Primary Exhaust PM10 - Total	2.6	3.5	3.3	4.6	3.2	4.1	2.4	3.6	3.0	3.6
2030	Primary PM10 - Brakewear Particulate	13.3	16.9	15.7	20.4	15.4	18.7	12.9	17.5	14.9	17.5
2030	Primary PM10 - Tirewear Particulate	2.7	3.9	3.6	5.1	3.5	4.5	2.6	4.0	3.3	4.0
2030 Total	Total PM10 Exhaust, Brake, Tire	18.6	24.3	22.6	30.1	22.1	27.2	17.9	25.1	21.2	25.1
2035	Primary Exhaust PM10 - Total	1.9	2.6	2.4	3.5	2.4	3.0	1.8	2.7	2.2	2.7
2035	Primary PM10 - Brakewear Particulate	13.3	17.0	15.8	20.9	15.5	18.7	12.9	17.6	15.0	17.6
2035	Primary PM10 - Tirewear Particulate	2.8	3.9	3.6	5.2	3.5	4.5	2.7	4.0	3.3	4.0
2035 Total	Total PM10 Exhaust, Brake, Tire	18.0	23.5	21.9	29.6	21.3	26.3	17.4	24.3	20.6	24.3

The MOVES 2014a emission modeling for 2015, 2025, 2030, and 2035 also included PM_{10} precursor emission results. The precursor emissions are summarized in the following tables.

Table J: Oakridge NOx MOVES 2014a emission modeling results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Oxides of Nitrogen (NOx)	539.7	671.8	669.7	861.0	642.4	765.6	535.5	711.3	613.6	711.3
2025	Oxides of Nitrogen (NOx)	154.8	182.7	183.3	225.6	177.8	203.5	155.0	193.1	171.2	193.1
2030	Oxides of Nitrogen (NOx)	87.5	121.8	108.7	153.0	106.6	137.8	84.4	127.9	103.2	127.9
2035	Oxides of Nitrogen (NOx)	74.6	103.7	92.3	132.7	90.6	117.0	71.9	108.8	87.8	108.8

Table K: Oakridge VOC MOVES 2014a emission modeling results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Volatile Organic Compounds	507.5	508.0	530.7	558.9	523.5	526.4	533.3	543.2	522.7	543.2
2025	Volatile Organic Compounds	170.6	169.5	167.6	175.2	168.2	168.4	182.3	183.2	173.7	183.2
2030	Volatile Organic Compounds	13.2	18.3	17.8	24.9	16.8	21.6	12.6	18.8	15.7	18.8
2035	Volatile Organic Compounds	11.2	15.4	14.9	21.4	14.1	18.2	10.6	15.9	13.2	15.9

Table L: Oakridge SO_2 MOVES 2014a emission modeling results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Sulfur Dioxide (SO2)	2.0	2.8	2.6	3.7	2.5	3.2	2.0	2.9	2.4	2.9
2025	Sulfur Dioxide (SO2)	1.0	1.3	1.2	1.7	1.2	1.5	0.9	1.4	1.1	1.4
2030	Sulfur Dioxide (SO2)	0.8	1.2	1.1	1.6	1.1	1.4	0.8	1.2	1.0	1.2
2035	Sulfur Dioxide (SO2)	0.8	1.1	1.1	1.6	1.0	1.3	0.8	1.2	1.0	1.2

Table M: Oakridge NH_3 MOVES 2014a emission modeling results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Ammonia (NH3)	8.0	11.6	10.7	15.5	10.3	13.6	7.6	12.0	9.7	12.0
2025	Ammonia (NH3)	6.1	8.8	8.1	11.8	7.8	10.3	5.7	9.1	7.4	9.1
2030	Ammonia (NH3)	3.6	5.2	4.8	6.9	4.6	6.1	3.4	5.4	4.4	5.4
2035	Ammonia (NH3)	3.6	5.1	4.7	7.0	4.6	6.0	3.4	5.3	4.3	5.3

Railroad Emissions

Emissions from railroads were provided by Union Pacific Railroad staff using the EPA NONROAD2008a emissions protocol for the 2012 Plan. Typical Season Day and Worst Case Day PM_{10} and $PM_{2.5}$ emissions were calculated to be 6.4 lb/day and 6.0 lb/day, respectively, in 2008. The three or four key factors affecting future railroad locomotive emissions are:

- The gross ton-miles hauled by rail; this fluctuates with the economy, but is on an overall increasing trend.
- The fuel efficiency in gross ton-miles per gallon; this has increased significantly over the past decade, from perhaps 900 gross ton-miles per gallon to about 1000 gross ton-miles per gallon; future improvements will probably be smaller.

- Locomotive turnover, as Uncontrolled (pre-1973) and Tier 0 (1973-2001) locomotives are replaced by Tier 1, 2, 3 and 4 locomotives; this turnover will continue in future years until most line-haul locomotives are replaced with Tier 4 (with earlier tiers retired, or relegated to local switchyards, etc.).
- A fourth factor, affecting some parts of the country, is the decreasing amount of gross ton-miles by coal trains.

The National Emission Inventories (NEIs) for Lane County, Oregon, indicate the combined factors have resulted in a significant decrease from 2008 to 2014:

Table D: **Lane County PM_{10} locomotive emissions from NEI for 2008, 2011, and 2014.**

2014 Emissions Inventory - Lane County	
EI Sector	Lane County Emission (tons)
Mobile - Locomotives	19.62

2011 Emissions Inventory - Lane County	
EI Sector	Lane County Emission (tons)
Mobile - Locomotives	33.98

2008 Emissions Inventory - Lane County	
EI Sector	Lane County Emission (tons)
Mobile - Locomotives	42.63

More recent railroad emissions data from 2016-2017, and consultations with national experts at Illinois EPA and LADCO, indicate that railroad emissions continue to decrease overall; for example, the preliminary 2017 NEI emissions for Lane County are 18.56 tons. In June 2018, Matt Harrell at Illinois EPA (matthew.harrell@Illinois.gov) reviewed the FRA traffic density data used for the 2008 and 2014 v2 NEI inventories; rail traffic on the Union Pacific line that passes through Oakridge decreased 29.9% between 2007 and 2014. The latest 2016 traffic density data shows a 33.6% decrease from 2007 levels. At the same time, Union Pacific's fuel efficiency increased from 974.6 to 1006.2 gross ton-miles/gallon. Lastly, due to fleet mix turnover, Union Pacific's weighted PM emission factors decreased almost 22%. Matt Harrell concluded that maintaining railroad emissions at 2014 levels is indeed a conservative assumption, given that all three of these key factors have decreased by considerable amounts within the Oakridge area.

In the 2012 Plan and 2016 Plan, railroad emission projections for 2015 were conservatively estimated at 2008 levels. In the Oakridge PM_{10} and $PM_{2.5}$ maintenance plans, the 2015 railroad PM_{10} and $PM_{2.5}$ emissions are reduced based on the 2008-2011-2014 NEI data to 2.9 lb/day and 2.7 lb/day, respectively. Future years (2025-2035) are based on the 2014-2017 NEI data.

Other non-road mobile sources were categorized by LRAPA as insignificant in Oakridge-Westfir during the $PM_{2.5}$ winter season as summarized in the 2016 Plan.

Total $PM_{2.5}$ Emission Inventories for Future Years

The various categories of $PM_{2.5}$ emissions for 2025, 2030 and 2035 are combined in the following series of tables for comparison with the 2015 Base Year PM_{10} Emission Inventory in Table A.

Table O: Projected 2025 Typical Season Day and Worst-Case Day PM_{10} Emissions.

	-- lbs/per day --		Percent of Total NAA Emissions	
	Typical Season Day	Worst-Case Day	Typical Season Day	Worst-Case Day
Permitted Point Sources[1]				
Oakridge Sand & Gravel: Rock crushing operation	8.0	13.7	1.6%	3.3%
Oakridge Sand & Gravel: Cement plant	0.0	0.0	0.0%	0.0%
Stationary Area Sources				
Residential Wood Combustion: Fireplace[2][4]	38.5	29.6	8%	7%
Residential Wood Combustion: Non-Certified Woodstove/Insert[2][4]	11.5	8.8	2%	2%
Residential Wood Combustion: Certified Woodstove/Insert[2][4]	259.5	199.8	51%	49%
Pellet Stoves	7.3	8.0	1%	2%
All Other Stationary Area Sources	47.4	4.7	9%	1%
On-Road Sources				
On-Road: Exhaust, Brake, Tire[3]	19.2	22.9	4%	6%
Re-Entrained Road Dust	111.8	121.2	22%	29%
Nonroad Sources				
Union Pacific Railroad	2.9	2.9	1%	1%
	------	------		
Total, All Sources, lbs/day	**506**	**412**		

(1) Worst-case day = Permitted hourly (x24) operating capacity.

Updated by MLH on 07/06/2021.

(2) Worst-case day = Peak Heating Degree Day.

(3) Updated with MOVES 2014a in May 2018.

(4) Based on curtailment effectiveness of 30% in 2025.

Table P: Projected 2030 Typical Season Day and Worst-Case Day PM_{10} Emissions.

	-- lbs/per day --		Percent of Total NAA Emissions	
	Typical Season Day	Worst-Case Day	Typical Season Day	Worst-Case Day
Permitted Point Sources[1]				
Oakridge Sand & Gravel: Rock crushing operation	8.0	13.7	1.6%	3.5%
Oakridge Sand & Gravel: Cement plant	0.0	0.0	0.0%	0.0%
Stationary Area Sources				
Residential Wood Combustion: Fireplace[2][4]	38.5	27.5	8%	7%
Residential Wood Combustion: Non-Certified Woodstove/Insert[2][4]	8.4	6.0	2%	2%
Residential Wood Combustion: Certified Woodstove/Insert[2][4]	262.4	187.6	52%	47%
Pellet Stoves	7.3	8.0	1%	2%
All Other Stationary Area Sources	47.4	4.7	9%	1%
On-Road Sources				
On-Road: Exhaust, Brake, Tire[3]	21.2	25.1	4%	6%
Re-Entrained Road Dust	112.0	121.4	22%	31%
Nonroad Sources				
Union Pacific Railroad	2.9	2.9	1%	1%
	------	------		
Total, All Sources, lbs/day	**508**	**397**		

(1) Worst-case day = Permitted hourly (x24) operating capacity. *Updated by MLH on 07/06/2021.*
(2) Worst-case day = Peak Heating Degree Day.
(3) Updated with MOVES 2014a in May 2018.
(4) Based on curtailment effectiveness of 35% in 2030.

Table Q: Projected 2035 Typical Season Day and Worst-Case Day PM_{10} Emissions.

	-- lbs/per day --		Percent of Total NAA Emissions	
	Typical Season Day	Worst-Case Day	Typical Season Day	Worst-Case Day
Permitted Point Sources[1]				
Oakridge Sand & Gravel: Rock crushing operation	8.0	13.7	1.6%	3.6%
Oakridge Sand & Gravel: Cement plant	0.0	0.0	0.0%	0.0%
Stationary Area Sources				
Residential Wood Combustion: Fireplace[2][4]	38.5	25.4	8%	7%
Residential Wood Combustion: Non-Certified Woodstove/Insert[2][4]	4.6	3.0	1%	1%
Residential Wood Combustion: Certified Woodstove/Insert[2][4]	265.7	175.4	52%	46%
Pellet Stoves	7.3	8.0	1%	2%
All Other Stationary Area Sources	47.4	4.7	9%	1%
On-Road Sources				
On-Road: Exhaust, Brake, Tire[3]	20.6	24.3	4%	6%
Re-Entrained Road Dust	112.2	121.7	22%	32%
Nonroad Sources				
Union Pacific Railroad	2.9	2.9	1%	1%
	------	------		
Total, All Sources, lbs/day	**507**	**379**		

(1) Worst-case day = Permitted hourly (x24) operating capacity. *Updated by MLH on 07/06/2021.*
(2) Worst-case day = Peak Heating Degree Day.
(3) Updated with MOVES 2014a in May 2018.
(4) Based on curtailment effectiveness of 40% in 2035.

PM_{10} Emission Inventories for Future Years – Comparison to Base Year

The PM_{10} emission inventories for the 2025, 2030 and 2035 future years, Typical Season Day and Worst Case Day, are compared to the 2015 Base Year $PM_{2.5}$ Emission Inventory in the following tables and figures.

Table R: **Comparison of Base Year to Future Years Typical Season Day PM_{10} Emissions (lb/day).**

Source Category	2015	2025	2030	2035
Residential Wood Combustion	397.3	316.7	316.6	316.1
Onroad Motor Vehicles	30.7	19.2	21.2	20.6
Re-Entrained Road Dust	111.4	111.8	112.0	112.2
Permitted Point Sources	0.0	8.0	8.0	8.0
Railroad Locomotives	2.9	2.9	2.9	2.9
Other Area Sources	47.4	47.4	47.4	47.4
Total PM_{10} Emissions	**590**	**506**	**508**	**507**

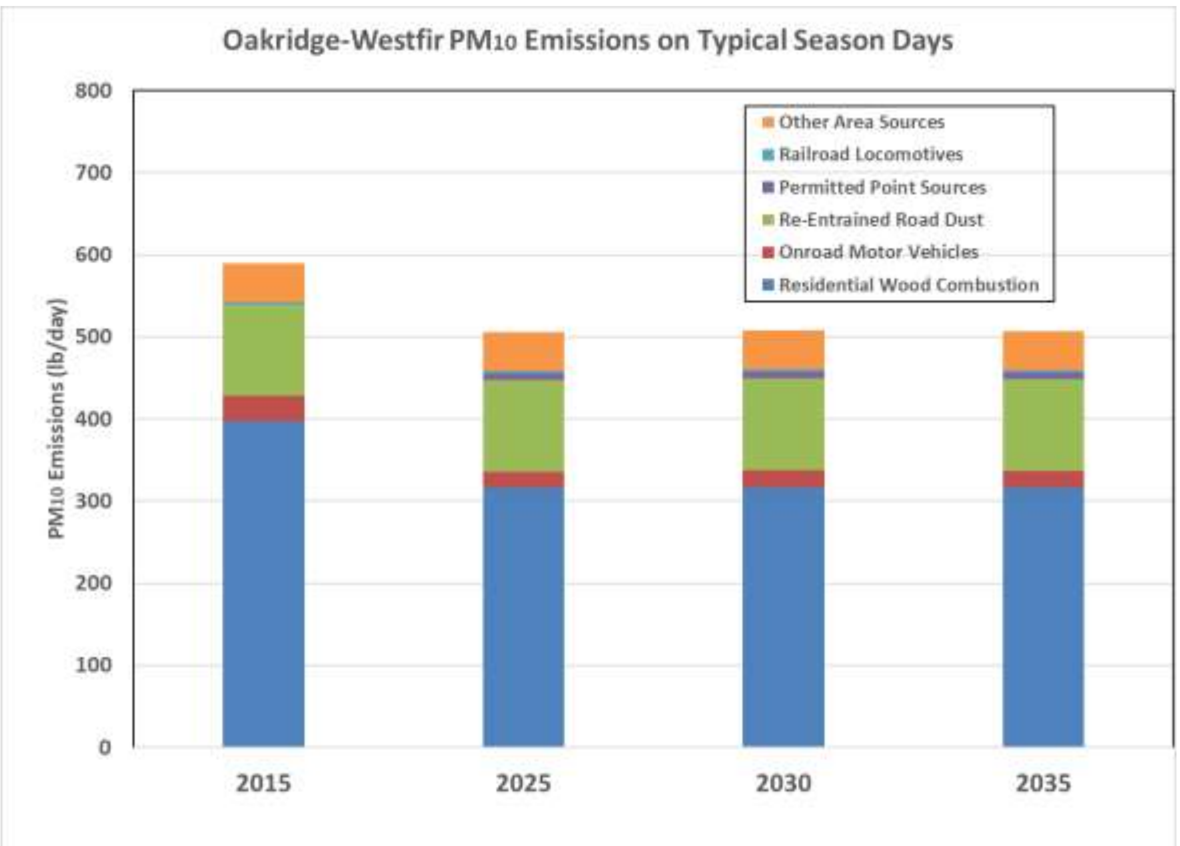

Figure E: Typical Season Day PM_{10} Emissions 2015-2035.

Table S: Comparison of Base Year to Future Years Worst Case Day PM_{10} Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	329.8	246.2	229.1	211.8
Onroad Motor Vehicles	37.8	22.9	25.1	24.3
Re-Entrained Road Dust	120.7	121.2	121.4	121.7
Permitted Point Sources	0.0	13.7	13.7	13.7
Railroad Locomotives	2.9	2.9	2.9	2.9
Other Area Sources	4.7	4.7	4.7	4.7
Total PM_{10} Emissions	**496**	**412**	**397**	**379**

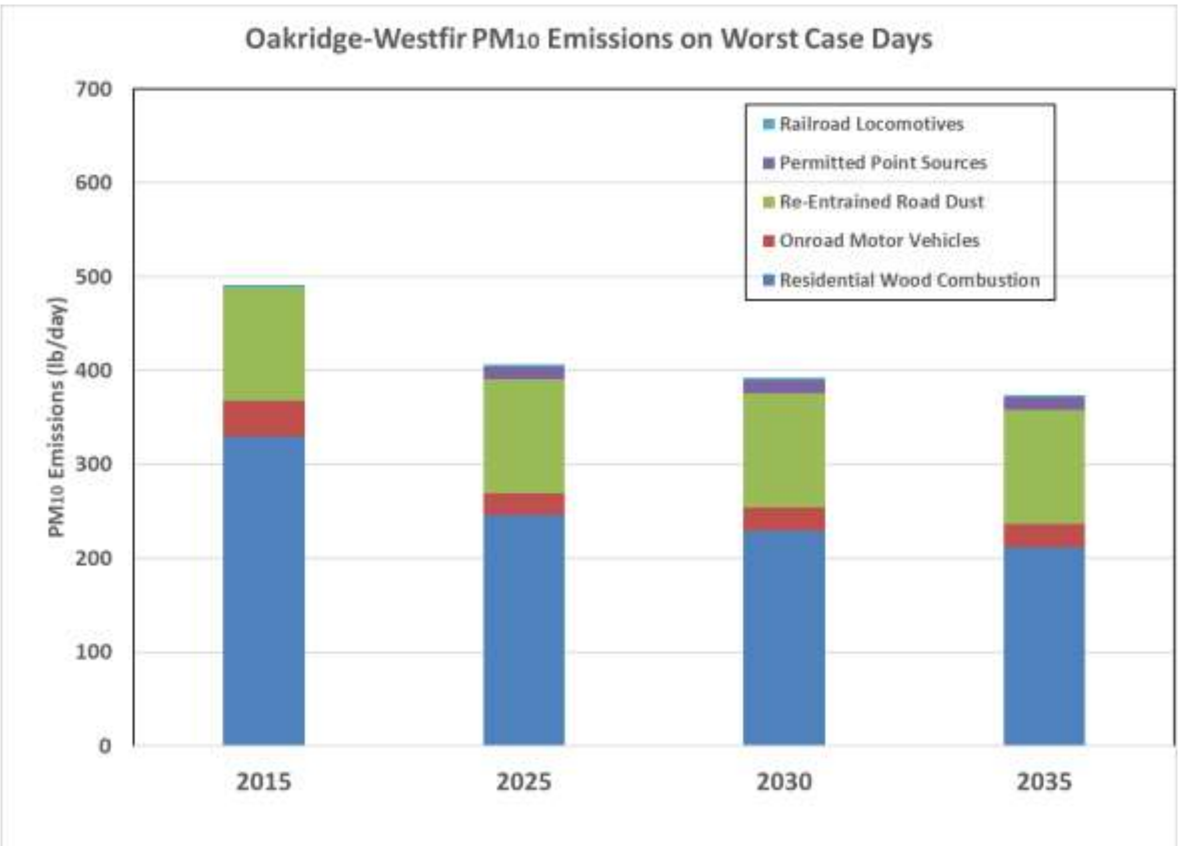

Figure F: Worst Case Day PM_{10} Emissions 2015-2035.

In summary, the future year PM_{10} emissions in 2025, 2030 and 2035 are significantly lower than the 2015 Base Year emissions. Thus, the current $PM_{2.5}$ strategies are expected to keep the Oakridge-Westfir airshed well within the PM_{10} 24-hour NAAQS through 2035.

Precursor Emission Inventories (NO_X, VOC, SO_2, and NH_3): 2015-2035

Secondary particulate is an overall very minor contributor to the Oakridge PM_{10} air pollution concentrations on worst winter days as summarized in both the 2012 Plan and the 2016 Plan. Each of the precursor groups (nitrates, sulfates, ammonia, and volatile organic compounds [VOC]) was determined in the 2016 Plan to be below the EPA Region 10 insignificance threshold of 1.3 ug/m3:

- Nitrate + ammonia = 0.16 ug/m3 + 0.01 ug/m3 = 0.17 ug/m3 < 1.3 ug/m3.
- Sulfate = 0.43 ug/m3 < 1.3 ug/m3.
- VOC = 1.17 ug/m3 < 1.3 ug/m3.

In the initial assessment in the 2016 Plan, LRAPA staff reviewed the decreasing precursor trends in the Lane County, Oregon, portion of the National Emission Inventories (NEIs for 2008, and 2011, and 2014) for the major emission categories in Oakridge-Westfir and concluded that precursor emissions would be even less significant contributors to $PM_{2.5}$ or PM_{10} in the future. The 2017 NEI further supported this conclusion.

In response to preliminary EPA review comments, LRAPA staff performed a more definitive analysis of the 2015 base year and the 2025-2035 future year precursor emissions (NO_X, VOC, SO_2, and NH_3). The 2015 precursor emissions are calculated in Appendix II and summarized in the following tables. [The tables in this precursor emissions section are by number (rather than letter) to distinguish this series from the previous $PM_{2.5}$ emissions section.] Some precursor categories were not applicable (NA).

Table 1: PM_{10} and Precursor Emissions for Typical Season Day in 2015 Base Year.

	Typical Season Day PM_{10} and Precursor Emissions (lb/day)				
Source Category	**PM_{10}**	**NO_x**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	397.3	50.4	373.0	7.7	20.7
Onroad Motor Vehicles	30.7	613.6	522.7	2.4	9.7
Re-Entrained Road Dust	111.4	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.9	0.1	5.2	0.1	0.1
Other Area Sources	47.4	5.1	134.0	3.5	9.3
Total Emissions	**590**	**669**	**1035**	**14**	**40**

Table 2: PM_{10} and Precursor Emissions for Worst Case Day in 2015 Base Year.

	Worst Case Day PM10 and Precursor Emissions (lb/day)				
Source Category	**PM_{10}**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	329.8	41.6	307.8	6.6	17.3
Onroad Motor Vehicles	37.8	711.3	543.2	2.9	12.0
Re-Entrained Road Dust	120.7	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0	NA
Railroad Locomotives	2.9	0.1	5.2	0.1	0.1
Other Area Sources	4.7	0.5	13.4	0.4	0.9
Total Emissions	**496**	**753**	**870**	**10**	**30**

Most of the 2015 precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories (i.e., 73-99%), as shown in the following two tables.

Table 3: Percentage by Category of PM_{10} and Precursor Emissions for Typical Season Day in 2015.

	Typical Season Day PM10 and Precursor Emissions (%)				
Source Category	**PM_{10}**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	67.4%	7.5%	36.0%	56.4%	52.1%
Onroad Motor Vehicles	5.2%	91.7%	50.5%	17.4%	24.4%
Re-Entrained Road Dust	18.9%	NA	NA	NA	NA
Permitted Point Sources	0.0%	0.0%	0.0%	0.0%	NA
Railroad Locomotives	0.5%	0.0%	0.5%	0.4%	0.1%
Other Area Sources	8.0%	0.8%	12.9%	25.7%	23.4%
Total Emissions	**100%**	**100%**	**100%**	**100%**	**100%**

Table 4: Percentage by Category of PM_{10} and Precursor Emissions for Worst Case Day in 2015.

	Worst Case Day PM10 and Precursor Emissions (%)				
Source Category	**PM_{10}**	**NOx**	**VOC**	**SO_2**	**NH_3**
Residential Wood Combustion	66.5%	5.5%	35.4%	66.7%	57.2%
Onroad Motor Vehicles	7.6%	94.4%	62.5%	29.2%	39.6%
Re-Entrained Road Dust	24.3%	NA	NA	NA	NA
Permitted Point Sources	0.0%	0.0%	0.0%	0.0%	NA
Railroad Locomotives	0.6%	0.0%	0.6%	0.6%	0.2%
Other Area Sources	1.0%	0.1%	1.5%	3.6%	3.1%
Total Emissions	**100%**	**100%**	**100%**	**100%**	**100%**

Since most of the 2015 precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories (i.e., 73-99%), these emission categories were evaluated in more detail for all years (2015, 2025, 2030, and 2035). The On-Road Motor

Vehicle precursor emissions were included previously in the MOVES emission modeling results (Tables J, K, L, and M). The detailed spreadsheets for Residential Wood Combustion are provided in a supplementary Excel attachment and include separate spreadsheets for each future year (2025, 2030, and 2035) and each precursor category (NO_X, VOC, SO_2, and NH_3) in the same format as included in Appendix II for the 2015 base year, but using the activity levels and other parameters from Tables E, F, and G above. The following tables summarize the base year and future years precursor spreadsheet calculations. Odd-numbered tables compare typical season day precursor emissions; even-numbered tables compare worst case day precursor emissions.

Table 5: Comparison of Base Year to Future Years Typical Season Day NOx Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	50.4	43.4	43.4	43.4
Onroad Motor Vehicles	613.6	171.2	103.2	87.8
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	5.1	5.1	5.1
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	5.1	5.1	5.1	5.1
Total NOx Emissions	**669**	**225**	**157**	**142**

Table 6: Comparison of Base Year to Future Years Worst Case Day NOx Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	41.6	33.4	34.4	32.5
Onroad Motor Vehicles	711.3	193.1	127.9	108.8
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	8.7	8.7	8.7
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	0.5	0.5	0.5	0.5
Total NOx Emissions	**753**	**236**	**172**	**150**

Table 7: Comparison of Base Year to Future Years Typical Season Day VOC Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	373.0	215.3	212.0	207.7
Onroad Motor Vehicles	522.7	173.7	15.7	13.2
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	0.4	0.4	0.4
Railroad Locomotives	5.2	5.1	5.1	5.1
Other Area Sources	134.0	134.0	134.0	134.0
Total VOC Emissions	**1035**	**529**	**367**	**360**

Table 8: **Comparison of Base Year to Future Years Worst Case Day VOC Emissions (lb/day).**

Source Category	2015	2025	2030	2035
Residential Wood Combustion	307.8	165.9	151.7	137.1
Onroad Motor Vehicles	543.2	183.2	18.8	15.9
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	0.8	0.8	0.8
Railroad Locomotives	5.2	5.1	5.1	5.1
Other Area Sources	13.4	13.4	13.4	13.4
Total VOC Emissions	**870**	**368**	**190**	**172**

Table 9: Comparison of Base Year to Future Years Typical Season Day SO_2 Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	7.7	6.8	6.8	6.8
Onroad Motor Vehicles	2.4	1.1	1.0	1.0
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	3.5	3.5	3.5	3.5
Total SO_2 Emissions	**13.7**	**11.5**	**11.4**	**11.4**

Table 10: **Comparison of Base Year to Future Years Worst Case Day SO_2 Emissions (lb/day).**

Source Category	2015	2025	2030	2035
Residential Wood Combustion	6.6	5.5	5.2	4.8
Onroad Motor Vehicles	2.9	1.4	1.2	1.2
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	0.0	0.0	0.0	0.0
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	0.4	0.4	0.4	0.4
Total SO_2 Emissions	**9.9**	**7.3**	**6.8**	**6.4**

Table 11: Comparison of Base Year to Future Years Typical Season Day NH3 Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	20.7	16.1	16.1	16.0
Onroad Motor Vehicles	9.7	7.4	4.4	4.3
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	NA	NA	NA	NA
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	9.3	9.3	9.3	9.3
Total NH3 Emissions	**39.8**	**32.8**	**29.8**	**29.6**

Table 12: **Comparison of Base Year to Future Years Worst Case Day NH3 Emissions (lb/day).**

Source Category	2015	2025	2030	2035
Residential Wood Combustion	17.3	12.6	11.7	10.9
Onroad Motor Vehicles	12.0	9.1	5.4	5.3
Re-Entrained Road Dust	NA	NA	NA	NA
Permitted Point Sources	NA	NA	NA	NA
Railroad Locomotives	0.1	0.1	0.1	0.1
Other Area Sources	0.9	0.9	0.9	0.9
Total NH3 Emissions	**30.3**	**22.7**	**18.1**	**17.1**

In summary, all the precursor emission categories (NO_X, VOC, SO_2, and NH_3) decrease during the 2015-2035 period. This is as expected since most of the precursor emissions are related to the Residential Wood Combustion or the On-Road Motor Vehicle emission categories (i.e., 73-99% in 2015) reviewed in Appendix II, and the precursor emissions are reduced by the same control strategies that reduce Residential Wood Combustion PM_{10} and $PM_{2.5}$ emissions (e.g., progressively cleaner burning home heating units) and On-Road Motor Vehicle PM_{10} and $PM_{2.5}$ emissions (e.g., progressively cleaner vehicles and fuels).

Condensable and Filterable PM_{10} Emissions

In addition to the precursor assessment, LRAPA staff also did a more detailed analysis of the condensable and filterable fractions of the $PM_{2.5}$ emission inventory. Unfortunately, as reviewed in Appendix II, the EPA guidance indicates there is not reliable condensable-filterable information available for the major PM_{10} emission categories in Oakridge-Westfir.

For example, condensable PM emissions are not an issue associated with mobile sources. The MOVES model used for these sectors produces primary emission estimates for PM, including particle components (e.g., elemental carbon and organic carbon) and gaseous hydrocarbons (e.g., VOC, non-methane organic gases). These pollutant metrics would include both “filterable” and "condensable" PM. These are currently not separable in MOVES, and for SIP inventory purposes, they can be reported as they are output from MOVES without additional modification.

For Residential Wood Combustion, EPA-OAQPS staff confirmed that the condensable requirement for RWC is currently waived for RWC because the data is not available at present, so just the total PM_{10} and $PM_{2.5}$ emissions should be reported.

The following table (repeated from Appendix II) summarizes the unavailability or inapplicability of condensable-filterable information for the major sources of PM_{10} emissions in Oakridge-Westfir:

Table 13: Availability and Applicability of PM_{10} Filterable & Condensable Emissions Information.

	2015 Typical Season Day PM_{10} Emissions (lb/day)			
Source Category	**Total PM_{10}**	**Filterable PM_{10}**	**Condensable PM_{10}**	**Notes**
Residential Wood Combustion	397.3	NA	NA	Not available for RWC.
Onroad Motor Vehicles	30.7	NA	NA	Addressed in MOVES.
Re-Entrained Road Dust	111.4	NA	NA	Not applicable.
Permitted Point Sources	0.0	0.0	0.0	No activity in 2015.
Railroad Locomotives	2.9	NA	NA	Not available.
Other Area Sources	47.4	NA	NA	Not available for vegetative sources.
Total PM_{10} Emissions	**590**	**NA**	**NA**	

	2015 Worst Case Day PM_{10} Emissions (lb/day)			
Source Category	**Total PM_{10}**	**Filterable PM_{10}**	**Condensable PM_{10}**	**Notes**
Residential Wood Combustion	329.8	NA	NA	Not available for RWC.
Onroad Motor Vehicles	37.8	NA	NA	Addressed in MOVES.
Re-Entrained Road Dust	120.7	NA	NA	Not applicable.
Permitted Point Sources	0.0	0.0	0.0	No activity in 2015.
Railroad Locomotives	2.9	NA	NA	Not available.
Other Area Sources	4.7	NA	NA	Not available for vegetative sources.
Total PM_{10} Emissions	**496**	**NA**	**NA**	

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Appendix IV: PM_{10} Motor Vehicle Emission Inventories for Future Years and Motor Vehicle Emissions Budget (MVEB)

October 7, 2021

Lane Regional Air Protection Agency
1010 Main Street
Springfield, Oregon 97477

Forecasting Future Year Motor Vehicle Emission Inventories

Background

The Oakridge Urban Growth Boundary (UGB) was designated nonattainment for PM_{10} and classified as moderate by EPA on January 20, 1994. LRAPA submitted a draft Oakridge PM_{10} attainment plan to EPA Region 10 for stringency review during early 1996. The Oakridge PM_{10} attainment plan was adopted by the LRAPA Board of Directors at a hearing on August 13, 1996. The Oakridge PM_{10} attainment plan was subsequently adopted by the Oregon Environmental Quality Commission (EQC) on December 9, 1996, and submitted to EPA. EPA approved the plan on March 15, 1999 (64 FR 12751). The plan relied on control strategies needed to assure attainment of the PM_{10} National Ambient Air Quality Standards (NAAQS).

The Oakridge PM_{10} strategies were successful in achieving the PM_{10} standards on schedule. On July 26, 2001, EPA published a clean data determination (CDD) and a finding of attainment for the Oakridge PM_{10} area (66 FR 38947).

The Oakridge PM_{10} maintenance plan and request for redesignation to attainment was purposely delayed until the attainment in Oakridge of the more restrictive and protective $PM_{2.5}$ NAAQS which was achieved on December 31, 2016. EPA made a finding of $PM_{2.5}$ attainment and a clean data determination (CDD), based on 2014-2016 air monitoring data, on February 8, 2018 [83 FR 5537] effective March 12, 2018.

Oakridge, Oregon lies in an alluvial plain in the foothills at the southern end of the Willamette River valley. The city is in Lane County, Oregon, approximately 45 miles east-southeast of Eugene, and 28 miles west of Willamette Pass, the summit of the Cascade Mountain Range. The city limits of present-day Oakridge include the historic City of Oakridge and, directly west, the area formerly known as Willamette City. Figure A shows the location of Oakridge in Lane County.

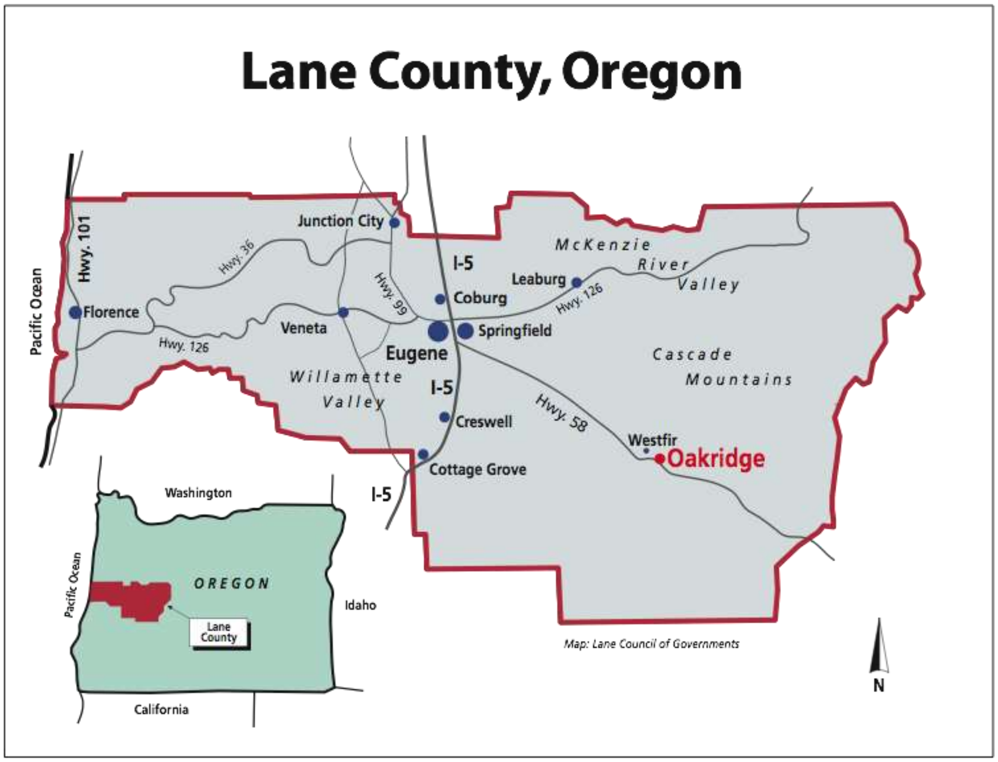

Figure A: Oakridge Location in Lane County, Oregon.

The Oakridge PM_{10} and $PM_{2.5}$ attainment plans were very similar; both identified residential wood combustion (in certified and non-certified woodstoves, fireplaces and pellet stoves) as the major emission category causing violations of the PM_{10} and $PM_{2.5}$ health standards on stagnant winter days, and outlined commitments for a number of strategies to replace non-certified woodstoves with cleaner burning units, improve firewood seasoning and woodstove operation to reduce $PM_{2.5}$ emissions, and to curtail residential wood combustion during air stagnation episodes. Therefore, where possible, the Oakridge PM_{10} and $PM_{2.5}$ maintenance plans are closely synchronized, including the PM and precursor emission inventories and control strategies. However, EPA adopted different nonattainment area boundaries for PM_{10} and $PM_{2.5}$ and this affects the inventory boundaries for the PM_{10} and $PM_{2.5}$ Motor Vehicle Emissions Budgets (MVEBs). The nonattainment area boundary for PM_{10} is the Oakridge Urban Growth Boundary (UGB) shown in Figure B; and the nonattainment area boundary for $PM_{2.5}$ is a rectangular boundary surrounding the Oakridge-Westfir communities shown in Figure C.

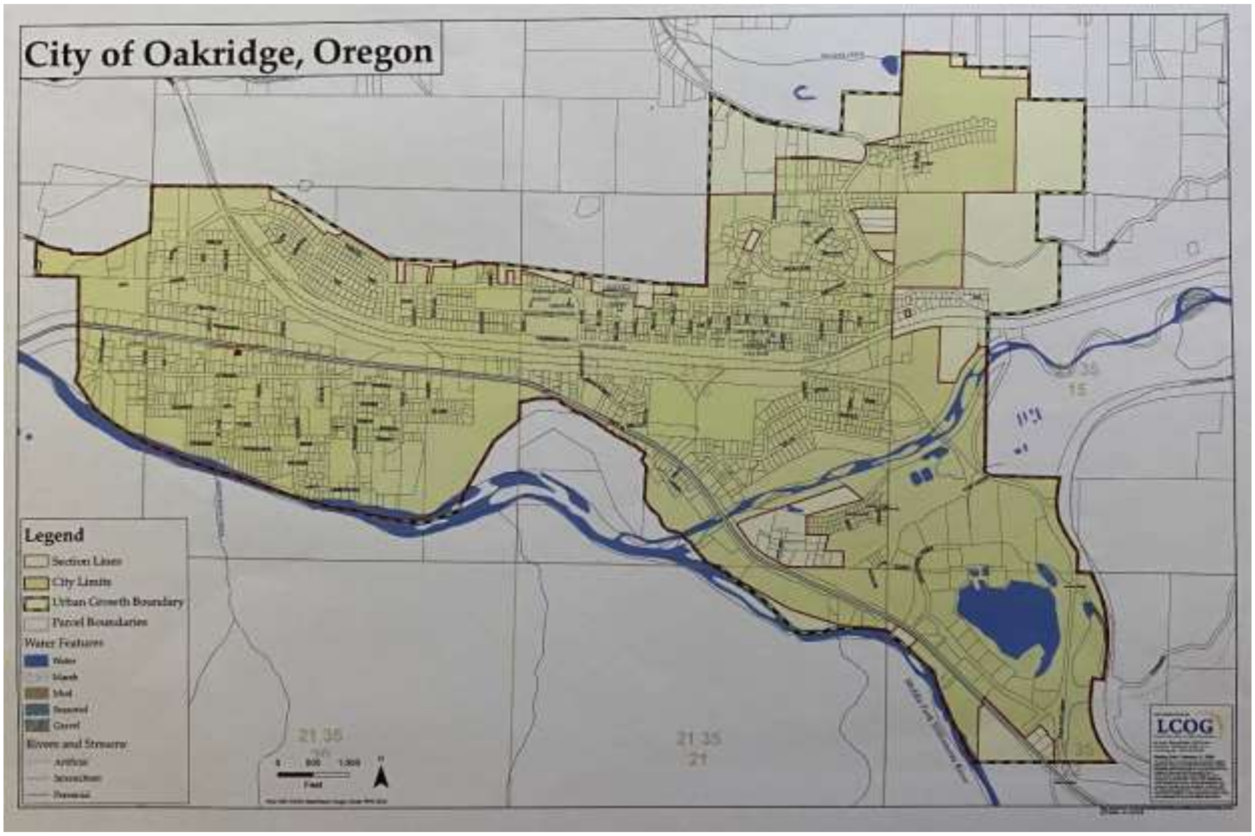

Figure B: Oakridge Urban Growth Boundary and PM_{10} Nonattainment Area Map.

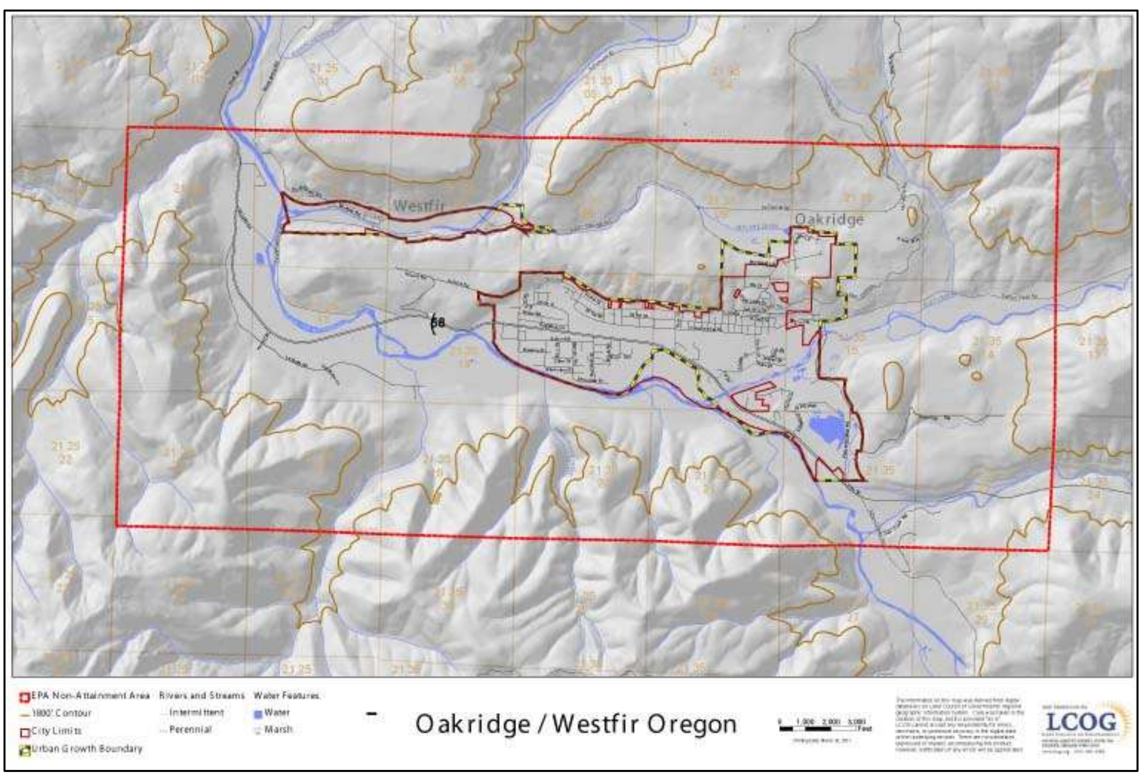

Figure C: Oakridge-Westfir $PM_{2.5}$ Nonattainment Area Map.

The overall emission inventories for PM_{10} and $PM_{2.5}$ (and the PM precursors) in the maintenance plans are based on the larger Oakridge-Westfir area in Figure C for consistency. But the EPA guidance on MVEBs very specifically indicates each MVEB (PM_{10} and $PM_{2.5}$) must be based on its respective nonattainment area boundary, so the PM_{10} and $PM_{2.5}$ are calculated specifically for their respective nonattainment area boundaries.

Growth Projections

Growth is expected to be low in the Oakridge-Westfir area through 2035. Population, housing, and employment forecasts are expected to increase gradually. The 2019 Population Forecasts by the Population Research Center at Portland State University*see note below indicate total expected population growth in the Oakridge and Westfir Urban Growth Boundaries (UGBs) during 2010-2035 of only 0.4% (less than 0.02% average per year), increasing from 3,563 (3,308+255) to 3,578 (3,312+266) population over the 2010-2035 time period.

*Note: The Oregon legislature passed a law (ORS 195.033) in 2013 by way of HB 2253 that assigned the forecast creation task to the Population Research Center at Portland State University (PSU). In 2015, the Land Conservation and Development Commission adopted rules (OAR 660-032) to implement the new law.

The staff of the Lane Council of Governments (LCOG) periodically updates and summarizes the demographic information for Oakridge, Westfir and other Lane County communities, based on American Community Survey (ACS) data from the U.S. Census Bureau.

The emission calculation protocols are included in the supporting documents for the 2016 Plan, and the prior 2012 Oakridge-Westfir $PM_{2.5}$ Attainment Plan ("2012 Plan"). The 2008-2011-2014 National Emission Inventories (NEIs) for Lane County were used as the starting point for calculating both PM_{10} and $PM_{2.5}$ emissions and PM precursor emissions for the Oakridge-Westfir $PM_{2.5}$ nonattainment area. The initial Oakridge-Westfir emissions were estimated by applying appropriate emission allocation factors (e.g., relative population, housing, vehicle miles of travel, land area, etc.) to the Lane County PM and precursor emission categories. The significant (and insignificant) source categories during the winter PM problem season were identified in Appendix D-5 of the 2012 Plan.

The comparison of the 2008-2011-2014 NEIs indicates that the anthropogenic precursor emissions are decreasing significantly over time. Based on the 2008-2014 trends, LRAPA expects the 2015-2035 precursor emissions to be even lower than the 2014 precursor emissions. Secondary particulate is an overall very minor contributor to the Oakridge $PM_{2.5}$ air pollution concentrations on worst winter days as summarized in both the 2012 Plan and the 2016 Plan. For example, as outlined in Table 6 of the 2016 Plan, sulfates contribute only 1.1% and nitrates contribute only 0.4% on the top 25% high $PM_{2.5}$ concentration days. Rather, the major $PM_{2.5}$ contributor is organic carbon (88%), primarily from residential wood combustion.

Table A: Contribution by speciated components, based on results of SANDWICH analysis for the top 25% high concentration winter (October-March) days (Table 6 from 2016 Plan).

Parameter	Sulfate	Nitrate	OC	EC	Water	NH3	OPP
Percent	1.1	0.4	88.4	7.6	1.4	0.03	1.1
ug/m3	0.43	0.16	34.46	2.95	0.54	0.01	0.44

Each of the precursor groups in Table 6 was determined to be below the EPA Region 10 insignificance threshold of 1.3 ug/m3:

- Nitrate + ammonia = 0.16 ug/m3 + 0.01 ug/m3 = 0.17 ug/m3 < 1.3 ug/m3.
- Sulfate = 0.43 ug/m3 < 1.3 ug/m3.
- VOC = 1.17 ug/m3 < 1.3 ug/m3.

Traffic growth in Vehicle-Miles-Traveled (VMT) is based on previous transportation modeling by LCOG and ODOT in the Highway 58 corridor, as summarized in the following table. More detail about the VMT modeling is in the LCOG memorandum (link here) that summarizes the VMT data process LCOG completed in May of 2021 to update the VMT estimations previously used in so that they are current and consistent with modeling guidance for this Maintenance Plan.

Table B: **Oakridge Projected Traffic Growth (Annual and Daily VMT) for 2015-2035.**

	2015		2025		2030		2035	
Month	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
April	74,134	106,845	74,879	107,920	75,254	108,465	75,364	109,004
July	98,553	142,602	99,544	144,036	100,057	144,780	100,553	145,493
September	94,834	125,470	95,788	126,732	96,282	127,385	96,761	128,017
December	69,909	110,697	70,612	111,810	70,958	112,353	71,307	112,901
Total Annual	34,558,914		34,906,443		35,083,373		35,239,815	

The Future Traffic Forecasting Methodology is based on Technical Memorandum #6 (December 23, 2014) by DKS Associates for the Lane County Transportation System Plan (TSP) update: Lane County TSP_Future Forecasting Methodolgy_TM 6_Draft (12-23-14).pdf. VMT growth in various portions of Lane County was projected to range from 0.1% to 2.7% annual growth rate. The VMT growth rate in the Oakridge corridor, consistent with the low growth projections for population, housing and employment, is projected at 0.1% per year; this is the basis for the VMT projections by LCOG in Table B.

The Table B VMT projections are for the larger Oakridge-Westfir area in Figure C. LCOG also updated the VMT projections for the smaller Oakridge UGB in Figure B; those VMT projections are discussed in a later section on the specific MVEB calculations for the PM_{10} nonattainment area.

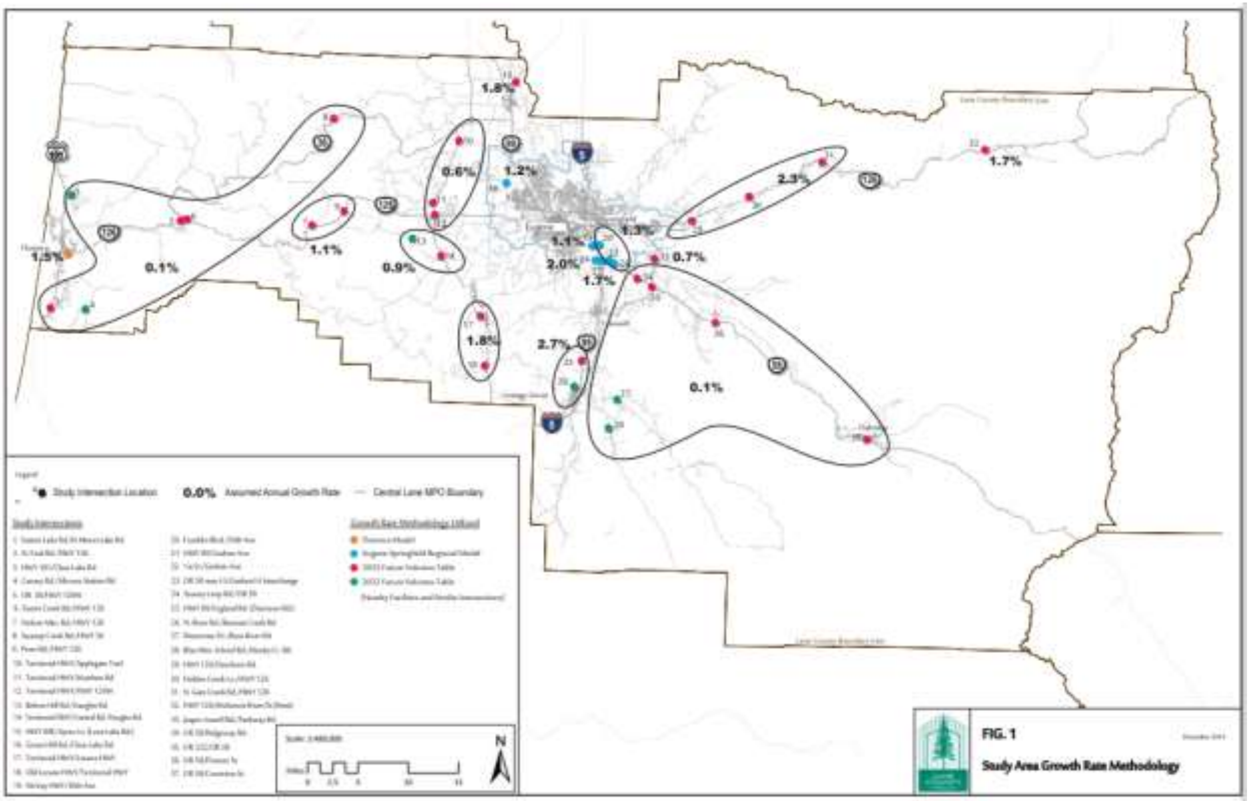

Figure D: Lane County Traffic Growth Rate Methodology.

Mobile Sources

The U.S. Environmental Protection Agency's (EPA's) MOtor Vehicle Emission Simulator (MOVES) is a state-of-the-science emission modeling system that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases, and air toxics. MOVES is used by state and local agencies to estimate nitrogen oxides (NOx), particulate matter ($PM_{2.5}$ and PM_{10}), volatile organic compounds (VOCs), carbon monoxide (CO), and other pollutants/precursors from cars, trucks, buses, and motorcycles for State Implementation Plan (SIP) purposes and conformity determinations outside of California. MOVES incorporates the latest data on vehicle populations, travel activity, and emission rates as well as updated fuel supply information at the county level, and accounts for vehicle starts and idling. MOVES is considered the most accurate tool for estimating emissions from the transportation sector for most purposes.

EPA has adopted federal requirements for progressively cleaner vehicles and cleaner fuels under the authority of the federal Clean Air Act since 1970. As a result of EPA's regulatory programs and various state regulations, motor vehicles and their fuels (both gasoline and diesel) sold today in the U.S. are far cleaner than vehicles and fuels produced in previous decades. The emission-reduction benefits of these requirements for cleaner vehicles and cleaner fuels are quantified at the county level in MOVES.

Exhaust, brake wear and tire wear emissions of PM_{10} from motor vehicles were calculated by staff of the Oregon Department of Environmental Quality (DEQ) in 2016 based on MOVES 2014a for years 2008 and 2015. Road dust emissions were estimated using EPA's AP-42 formulas for both paved roads (see AP-42 Section 13.2.1 for Paved Roads and Section 13.2.2 for Unpaved Roads).

Traffic growth in Vehicle-Miles-Traveled (VMT) was based on previous transportation modeling by LCOG and ODOT in the Highway 58 corridor and revised with this plan (see LCOG's explanation of VMT revisions). The 2015 exhaust, brake wear and tire wear emissions from motor vehicles were modeled again by DEQ staff in 2018 as part of the forecasting of future years emissions (2025-2035). Road dust emissions were estimated again in 2021 using EPA's AP-42 formulas for both paved roads (see AP-42 Section 13.2.1 for Paved Roads and Section 13.2.2 for Unpaved Roads) and updated VMT data for 2015 and 2020.

Federal control measures included in the MOVES2014a modeling are all federal measures that affect the fleets and fuels used in future years once implemented by EPA. Examples of federal control measures include requirements for cleaner engines and fuels.

The PM_{10} and $PM_{2.5}$ MOVES 2014a emission modeling results for 2015, 2025, 2030, and 2035 are summarized in the two following tables. The 2030 MOVES input files (that also include the 2015 and 2025 inputs) are all available in this link. The 2035 MOVES input files are all available in this link.

Table C: Oakridge PM_{10} MOVES 2014a emission modeling combined results (lb/day) for 2015-2035.

Year	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015 Total	Total PM10 Exhaust, Brake, Tire	26.8	34.6	30.7	41.0	30.3	37.3	27.8	37.8	30.7	37.8
2025 Total	Total PM10 Exhaust, Brake, Tire	16.9	21.7	20.0	26.5	19.6	24.0	16.7	22.9	19.2	22.9
2030 Total	Total PM10 Exhaust, Brake, Tire	18.6	24.3	22.6	30.1	22.1	27.2	17.9	25.1	21.2	25.1
2035 Total	Total PM10 Exhaust, Brake, Tire	18.0	23.5	21.9	29.6	21.3	26.3	17.4	24.3	20.6	24.3

Table D: Oakridge $PM_{2.5}$ MOVES 2014a emission modeling combined results (lb/day) for 2015-2035.

YearId	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015 Total	PM2.5 Exhaust, Brake, Tire	15.4	19.6	17.0	22.8	16.9	20.8	16.6	22.2	17.6	22.2
2025 Total	PM2.5 Exhaust, Brake, Tire	5.3	6.7	6.1	8.0	6.0	7.3	5.6	7.3	6.1	7.3
2030 Total	PM2.5 Exhaust, Brake, Tire	4.4	5.9	5.5	7.5	5.4	6.7	4.2	6.1	5.1	6.1
2035 Total	PM2.5 Exhaust, Brake, Tire	3.8	5.1	4.8	6.6	4.6	5.8	3.7	5.3	4.4	5.3

The major differences between the PM_{10} and $PM_{2.5}$ emissions are in the brake wear and tire wear categories; the exhaust PM_{10} and $PM_{2.5}$ emissions are more similar. This is illustrated in the more detailed categories of the PM_{10} and $PM_{2.5}$ MOVES 2014a emission modeling results for 2015, 2025, 2030, and 2035 in the following two tables.

Table E: Oakridge PM_{10} MOVES 2014a emission modeling results (lb/day) by category for 2015-2035.

										Typical	Worst
		April	April	July	July	September	September	December	December	Season	Case
YearId	Pollutant_Name	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Day	Day
2015	Primary Exhaust PM10 - Total	15.2	19.3	16.6	22.3	16.6	20.4	16.6	22.1	17.4	22.1
2015	Primary PM10 - Brakewear Particulate	8.6	11.0	10.2	13.2	9.9	12.1	8.3	11.3	9.7	11.3
2015	Primary PM10 - Tirewear Particulate	3.0	4.3	3.9	5.5	3.8	4.9	2.9	4.4	3.6	4.4
2015 Total	**Total PM10 Exhaust, Brake, Tire**	**26.8**	**34.6**	**30.7**	**41.0**	**30.3**	**37.3**	**27.8**	**37.8**	**30.7**	**37.8**
2025	Primary Exhaust PM10 - Total	4.0	4.9	4.4	5.8	4.4	5.3	4.3	5.5	4.5	5.5
2025	Primary PM10 - Brakewear Particulate	9.5	12.1	11.3	14.5	11.0	13.3	9.2	12.5	10.7	12.5
2025	Primary PM10 - Tirewear Particulate	3.3	4.7	4.3	6.1	4.2	5.4	3.2	4.9	4.0	4.9
2025 Total	**Total PM10 Exhaust, Brake, Tire**	**16.9**	**21.7**	**20.0**	**26.5**	**19.6**	**24.0**	**16.7**	**22.9**	**19.2**	**22.9**
2030	Primary Exhaust PM10 - Total	2.6	3.5	3.3	4.6	3.2	4.1	2.4	3.6	3.0	3.6
2030	Primary PM10 - Brakewear Particulate	13.3	16.9	15.7	20.4	15.4	18.7	12.9	17.5	14.9	17.5
2030	Primary PM10 - Tirewear Particulate	2.7	3.9	3.6	5.1	3.5	4.5	2.6	4.0	3.3	4.0
2030 Total	**Total PM10 Exhaust, Brake, Tire**	**18.6**	**24.3**	**22.6**	**30.1**	**22.1**	**27.2**	**17.9**	**25.1**	**21.2**	**25.1**
2035	Primary Exhaust PM10 - Total	1.9	2.6	2.4	3.5	2.4	3.0	1.8	2.7	2.2	2.7
2035	Primary PM10 - Brakewear Particulate	13.3	17.0	15.8	20.9	15.5	18.7	12.9	17.6	15.0	17.6
2035	Primary PM10 - Tirewear Particulate	2.8	3.9	3.6	5.2	3.5	4.5	2.7	4.0	3.3	4.0
2035 Total	**Total PM10 Exhaust, Brake, Tire**	**18.0**	**23.5**	**21.9**	**29.6**	**21.3**	**26.3**	**17.4**	**24.3**	**20.6**	**24.3**

Table F: Oakridge $PM_{2.5}$ MOVES 2014a emission modeling results (lb/day) by category for 2015-2035.

										Typical	Worst
		April	April	July	July	September	September	December	December	Season	Case
YearId	Pollutant_Name	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Day	Day
2015	Primary Exhaust PM2.5 - Total	13.8	17.6	15.2	20.3	15.1	18.5	15.1	20.2	15.8	20.2
2015	Primary PM2.5 - Brakewear Particulate	1.1	1.4	1.3	1.7	1.3	1.5	1.1	1.4	1.2	1.4
2015	Primary PM2.5 - Tirewear Particulate	0.5	0.6	0.6	0.8	0.6	0.7	0.4	0.7	0.5	0.7
2015 Total		**15.4**	**19.6**	**17.0**	**22.8**	**16.9**	**20.8**	**16.6**	**22.2**	**17.6**	**22.2**
2025	Primary Exhaust PM2.5 - Total	3.6	4.5	4.0	5.3	4.0	4.8	3.9	5.0	4.1	5.0
2025	Primary PM2.5 - Brakewear Particulate	1.2	1.5	1.4	1.8	1.4	1.7	1.2	1.6	1.3	1.6
2025	Primary PM2.5 - Tirewear Particulate	0.5	0.7	0.7	0.9	0.6	0.8	0.5	0.7	0.6	0.7
2025 Total		**5.3**	**6.7**	**6.1**	**8.0**	**6.0**	**7.3**	**5.6**	**7.3**	**6.1**	**7.3**
2030	Primary Exhaust PM2.5 - Total	2.3	3.2	3.0	4.2	2.9	3.7	2.2	3.3	2.7	3.3
2030	Primary PM2.5 - Brakewear Particulate	1.7	2.1	2.0	2.6	1.9	2.4	1.6	2.2	1.9	2.2
2030	Primary PM2.5 - Tirewear Particulate	0.4	0.6	0.5	0.8	0.5	0.7	0.4	0.6	0.5	0.6
2030 Total		**4.4**	**5.9**	**5.5**	**7.5**	**5.4**	**6.7**	**4.2**	**6.1**	**5.1**	**6.1**
2035	Primary Exhaust PM2.5 - Total	1.7	2.4	2.2	3.2	2.2	2.8	1.6	2.5	2.0	2.5
2035	Primary PM2.5 - Brakewear Particulate	1.7	2.1	2.0	2.6	2.0	2.4	1.6	2.2	1.9	2.2
2035	Primary PM2.5 - Tirewear Particulate	0.4	0.6	0.5	0.8	0.5	0.7	0.4	0.6	0.5	0.6
2035 Total		**3.8**	**5.1**	**4.8**	**6.6**	**4.6**	**5.8**	**3.7**	**5.3**	**4.4**	**5.3**

The MOVES 2014a emission modeling for 2015, 2025, 2030, and 2035 also included precursor emission results. The precursor emissions are summarized in the following tables.

Table G: Oakridge NOx MOVES 2014a emission modeling results (lb/day) for 2015-2035.

										Typical	Worst
		April	April	July	July	September	September	December	December	Season	Case
YearId	Pollutant_Name	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Day	Day
2015	Oxides of Nitrogen (NOx)	539.7	671.8	669.7	861.0	642.4	765.6	535.5	711.3	613.6	711.3
2025	Oxides of Nitrogen (NOx)	154.8	182.7	183.3	225.6	177.8	203.5	155.0	193.1	171.2	193.1
2030	Oxides of Nitrogen (NOx)	87.5	121.8	108.7	153.0	106.6	137.8	84.4	127.9	103.2	127.9
2035	Oxides of Nitrogen (NOx)	74.6	103.7	92.3	132.7	90.6	117.0	71.9	108.8	87.8	108.8

Table H: Oakridge VOC MOVES 2014a emission modeling results (lb/day) for 2015-2035.

										Typical	Worst
		April	April	July	July	September	September	December	December	Season	Case
YearId	Pollutant_Name	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Day	Day
2015	Volatile Organic Compounds	507.5	508.0	530.7	558.9	523.5	526.4	533.3	543.2	522.7	543.2
2025	Volatile Organic Compounds	170.6	169.5	167.6	175.2	168.2	168.4	182.3	183.2	173.7	183.2
2030	Volatile Organic Compounds	13.2	18.3	17.8	24.9	16.8	21.6	12.6	18.8	15.7	18.8
2035	Volatile Organic Compounds	11.2	15.4	14.9	21.4	14.1	18.2	10.6	15.9	13.2	15.9

Table I: Oakridge SO_2 MOVES 2014a emission modeling results (lb/day) for 2015-2035.

										Typical	Worst
		April	April	July	July	September	September	December	December	Season	Case
YearId	Pollutant_Name	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Day	Day
2015	Sulfur Dioxide (SO2)	2.0	2.8	2.6	3.7	2.5	3.2	2.0	2.9	2.4	2.9
2025	Sulfur Dioxide (SO2)	1.0	1.3	1.2	1.7	1.2	1.5	0.9	1.4	1.1	1.4
2030	Sulfur Dioxide (SO2)	0.8	1.2	1.1	1.6	1.1	1.4	0.8	1.2	1.0	1.2
2035	Sulfur Dioxide (SO2)	0.8	1.1	1.1	1.6	1.0	1.3	0.8	1.2	1.0	1.2

Table J: Oakridge NH_3 MOVES 2014a emission modeling results (lb/day) for 2015-2035.

										Typical	Worst
		April	April	July	July	September	September	December	December	Season	Case
YearId	Pollutant_Name	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Day	Day
2015	Ammonia (NH3)	8.0	11.6	10.7	15.5	10.3	13.6	7.6	12.0	9.7	12.0
2025	Ammonia (NH3)	6.1	8.8	8.1	11.8	7.8	10.3	5.7	9.1	7.4	9.1
2030	Ammonia (NH3)	3.6	5.2	4.8	6.9	4.6	6.1	3.4	5.4	4.4	5.4
2035	Ammonia (NH3)	3.6	5.1	4.7	7.0	4.6	6.0	3.4	5.3	4.3	5.3

Motor Vehicle Emissions Budget (MVEB)

The Oakridge worst-case day PM_{10} emission inventory is based on winter weekend days during December. As discussed earlier, the MVEB for PM_{10} must be based on the PM_{10} nonattainment area which is the Oakridge UGB in Figure B. The following figure illustrates the traffic count nodes and road segments used to calculate VMT specific to the PM_{10} and $PM_{2.5}$ nonattainment boundaries, respectively, in Figures B and C.

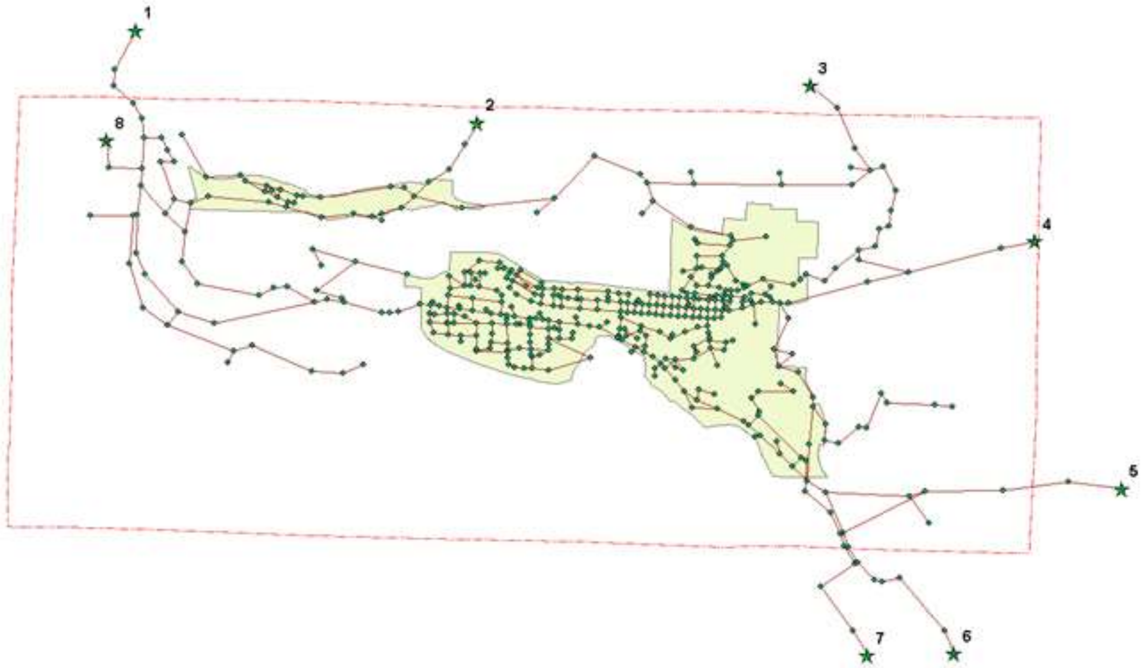

Figure E: Comparison of traffic count nodes and road segments for the two NAAs.

The VMT projections by LCOG for the Oakridge UGB (i.e., PM_{10} nonattainment area boundary in Figure B) are summarized in the following table.

Table K: **Oakridge Projected VMT Traffic Growth for 2015-2035 in Oakridge UGB.**

Month	2015		2025		2030		2035	
	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
April	35,215	50,235	35,569	50,740	35,753	51,001	35,929	51,250
July	43,275	61,936	43,710	62,559	43,925	62,866	44,145	63,180
September	42,042	55,138	42,464	55,692	42,672	55,966	42,882	56,242
December	33,834	52,970	34,175	53,502	34,338	53,747	34,512	54,018
Total Annual	15,761,044		15,919,488		15,997,800		16,077,360	

The PM_{10} emissions in Table C and Table E are adjusted for the lower VMT in the Oakridge UGB in the following two tables.

Table L: **Oakridge PM_{10} MOVES 2014a UGB-adjusted results (lb/day) for 2015-2035.**

Year	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015 Total	Total PM10 Exhaust, Brake, Tire	12.2	15.8	14.0	18.7	13.8	17.0	12.7	17.2	14.0	17.2
2025 Total	Total PM10 Exhaust, Brake, Tire	7.7	9.9	9.1	12.1	8.9	10.9	7.6	10.4	8.8	10.4
2030 Total	Total PM10 Exhaust, Brake, Tire	8.5	11.1	10.3	13.7	10.1	12.4	8.2	11.5	9.7	11.5
2035 Total	Total PM10 Exhaust, Brake, Tire	8.2	10.7	10.0	13.5	9.7	12.0	7.9	11.1	9.4	11.1

Table M: Oakridge PM_{10} MOVES 2014a UGB-adjusted results (lb/day) by category for 2015-2035.

Year	Pollutant_Name	April Weekday	April Weekend	July Weekday	July Weekend	September Weekday	September Weekend	December Weekday	December Weekend	Typical Season Day	Worst Case Day
2015	Primary Exhaust PM10 - Total	6.9	8.8	7.6	10.2	7.6	9.3	7.6	10.1	7.9	10.1
2015	Primary PM10 - Brakewear Particulate	3.9	5.0	4.6	6.0	4.5	5.5	3.8	5.1	4.4	5.1
2015	Primary PM10 - Tirewear Particulate	1.4	2.0	1.8	2.5	1.7	2.2	1.3	2.0	1.6	2.0
2015 Total	**Total PM10 Exhaust, Brake, Tire**	**12.2**	**15.8**	**14.0**	**18.7**	**13.8**	**17.0**	**12.7**	**17.2**	**14.0**	**17.2**
2025	Primary Exhaust PM10 - Total	1.8	2.2	2.0	2.6	2.0	2.4	2.0	2.5	2.1	2.5
2025	Primary PM10 - Brakewear Particulate	4.3	5.5	5.1	6.6	5.0	6.1	4.2	5.7	4.9	5.7
2025	Primary PM10 - Tirewear Particulate	1.5	2.1	2.0	2.8	1.9	2.5	1.5	2.2	1.8	2.2
2025 Total	**Total PM10 Exhaust, Brake, Tire**	**7.7**	**9.9**	**9.1**	**12.1**	**8.9**	**10.9**	**7.6**	**10.4**	**8.8**	**10.4**
2030	Primary Exhaust PM10 - Total	1.2	1.6	1.5	2.1	1.4	1.9	1.1	1.7	1.4	1.7
2030	Primary PM10 - Brakewear Particulate	6.0	7.7	7.2	9.3	7.0	8.5	5.9	8.0	6.8	8.0
2030	Primary PM10 - Tirewear Particulate	1.2	1.8	1.6	2.3	1.6	2.0	1.2	1.8	1.5	1.8
2030 Total	**Total PM10 Exhaust, Brake, Tire**	**8.5**	**11.1**	**10.3**	**13.7**	**10.1**	**12.4**	**8.2**	**11.5**	**9.7**	**11.5**
2035	Primary Exhaust PM10 - Total	0.9	1.2	1.1	1.6	1.1	1.4	0.8	1.2	1.0	1.2
2035	Primary PM10 - Brakewear Particulate	6.1	7.8	7.2	9.5	7.1	8.6	5.9	8.0	6.9	8.0
2035	Primary PM10 - Tirewear Particulate	1.3	1.8	1.6	2.4	1.6	2.0	1.2	1.8	1.5	1.8
2035 Total	**Total PM10 Exhaust, Brake, Tire**	**8.2**	**10.7**	**10.0**	**13.5**	**9.7**	**12.0**	**7.9**	**11.1**	**9.4**	**11.1**

Table N: Oakridge PM_{10} Re-Entrained Road Dust (lb/day) for 2015-2035.

Re-entrained Road Dust PM10 (lb/day)							
2015		2025		2030		2035	
Typical Day	Worst Case	Typical Day	Worst Case	Typical Day	Worst Case	Typical Day	Worst Case
111. 4	120. 7	111. 8	121. 2	112. 0	121. 4	112. 2	121. 7

The MVEB reflects the total on-road 2015 PM_{10} emissions and projected PM_{10} emissions for 2025, 2030 and 2035 plus a portion of the available safety margin. A conservative margin of safety was added to the MVEB to accommodate uncertainty.

A safety margin is the amount by which the total projected PM_{10} emissions from all sources are less than the total emissions for the 2015 base year, the level required to demonstrate continued maintenance of the standard. A small portion of the inventory safety margin was allotted to the on-road motor vehicle emissions inventory projections to accommodate the wide array of assumptions that are factored into the calculation process. Since assumptions and models change over time, it is necessary to have a margin of safety that will accommodate technical uncertainties due to model updates and inputs into the EPA MOVES model and travel forecasting models, as well as potential changes to regional transportation plans.

As outlined in Figure D, the VMT growth rates in various parts of Lane County are projected at 0.1% to 2.7% per year through 2036. The growth rate for the Oakridge-Westfir-Hwy58 corridor is currently projected to be at the low end of this range, 0.1% per year. If the actual 2015-2035 VMT growth rate was to be closer to the median (1.3% per year) in Figure D, this would significantly increase motor vehicle emissions in 2025-2035. This median Lane County VMT growth projection was used to adjust the 2025-2035 MVEB and use a small portion of the inventory safety margin for this purpose.

The Worst Case Day PM_{10} emissions in Tables L and N were increased by the difference between the projected VMT growth rate in the Oakridge area (0.1% per year) and the median Lane County VMT growth rate (1.3% per year), or a difference of 1.2% per year. The Worst Case

Day PM_{10} emissions were increased for 2025 were increased by a factor of 1.12 (i.e., additional annual growth rate of 1.2% for ten years), 2030 emissions by a factor of 1.18, and 2035 emissions by a factor of 1.24.

The respective MVEB growth rate factors for PM10 using 2015 base year and the 1.2% VMT growth rate were calculated as follows:

- 2025 Growth Rate Factor = 1.0 + (1.2% per year x 10 years) = 1.12
- 2030 Growth Rate Factor = 1.0 + (1.2% per year x 15 years) = 1.18
- 2035 Growth Rate Factor = 1.0 + (1.2% per year x 20 years) = 1.24

The MVEB Growth Rates for PM10 are calculated as follows using the respective VMT Growth Rate Factors and Oakridge PM10 MOVES 2014a UGB-adjusted results in Tables L & M were calculated as follows:

- 2025 MVEB = [2025 MOVES 2014a UGB-adjusted result (10.4 lb/day) + 2025 Re-entrained Road Dust (121.2 lb/day)] x 2025 Growth Rate Factor (1.12) = 147.4 lb/day
- 2030 MVEB = [2030 MOVES 2014a UGB-adjusted result (11.5 lb/day) + 2030 Re-entrained Road Dust (121.4 lb/day)] x 2030 Growth Rate Factor (1.18) = 156.8 lb/day
- 2035 MVEB = [MOVES 2014a UGB-adjusted result (11.1 lb/day) + 2035 Re-entrained Road Dust (121.7 lb/day)] x 2035 Growth Rate Factor (1.24) = 164.7 lb/day

The resultant MVEBs for PM_{10} emissions in future years within the Oakridge UGB are outlined in the following table.

Table O: **Oakridge PM_{10} UGB-Adjusted Motor Vehicle Emissions Budget (lb/day) for 2015-2035.**

Year	**Pollutant_Name**	**Worst Case Day (lb/day)**
2015 Total	**Total PM10 Exhaust, Brake, Tire, Re-Entrained Road Dust**	**138.9**
2025 Total	**Total PM10 Exhaust, Brake, Tire, Re-Entrained Road Dust**	**147.4**
2030 Total	**Total PM10 Exhaust, Brake, Tire, Re-Entrained Road Dust**	**156.8**
2035 Total	**Total PM10 Exhaust, Brake, Tire, Re-Entrained Road Dust**	**164.7**

Even with the safety margin applied to the MVEB in future years, the budgets still demonstrate maintenance of the NAAQS. Since 2015 is the new base year, and attainment with the standard was achieved for 2014-2016, total emissions in future years need to be below the 2015 base year to maintain compliance with the NAAQS.

Applying the same safety margins to the onroad motor vehicle source category in the larger Oakridge-Westfir area (i.e., not the smaller, UGB-adjusted area), emissions in future years are still lower than the 2015 base year. As shown in the table below (Table S from Appendix III), even with the safety margins applied, the area will still meet the NAAQs since the MVEB increases including the safety margins will be well below the 2015 base year.

Table P: Comparison of Base Year to Future Years Worst Case Day PM_{10} Emissions (lb/day).

Source Category	2015	2025	2030	2035
Residential Wood Combustion	329.8	246.2	229.1	211.8
Onroad Motor Vehicles	37.8	22.9	25.1	24.3
Re-Entrained Road Dust	120.7	121.2	121.4	121.7
Permitted Point Sources	0.0	13.7	13.7	13.7
Railroad Locomotives	2.9	2.9	2.9	2.9
Other Area Sources	4.7	4.7	4.7	4.7
Total PM_{10} Emissions	**496**	**412**	**397**	**379**

Using 2030 as an example from the table above, increasing the contribution of PM10 from Onroad Motor Vehicles from 25.1 lb/day and Re-Entrained Road Dust from 121.4 lb/day (i.e., without 1.18 safety margin applied) to 29.6 lb/day for Onroad Motor Vehicles (i.e., an increase of 4.5 lb/day with the 1.18 safety margin applied) and to 143.3 lb/day for Re-Entrained Road Dust (i.e., an increase of 21.8 lb/day with the 1.18 safety margin applied), results in total PM10 emissions of 424 lb/day which is less than the 496 lb/day in the 2015 base year.

Interagency Consultation

Consultation about the MVEB is required by Oregon (OAR 340-252-0060) and EPA (40 CFR 93.118(e)(4)(ii)) rules. This consultation is required to occur among federal, State, and local agencies and before the maintenance plan is submitted to EPA. LRAPA participates in the Oregon Interagency Consultation (IAC) group and provided a summary of the MVEB and the safety margin concept proposal at the July 28, 2021 meeting. The entire draft plan and appendices for both PM10 and PM2.5 were sent to the IAC, including EPA Region 10, on July 29, 2021 for their review.

On July 30, 2021 EPA provided comments from their second early engagement review to LRAPA. All of the EPA comments and suggested changes were investigated, considered and included in the plans and appendices.

VMT and Re-Entrained Road Dust in the MVEB

VMT: In reviewing and responding to comments after the public comment period ended, it was discovered that the VMT used in the MOVES2014a modeling in 2018 was different and lower for 2015 and 2020 than the newer VMT provided to LRAPA by LCOG (Lane Council of Governments) in May of 2021. Table Q below compares the differences between the two sets of VMT data:

Table Q: Comparison of VMT used in 2018 MOVES2014a Modeling and VMT Provided in 2021

Year	2018 MOVES input VMT	2021 VMT	% Increase	Ratio
2015	30,168,182	34,558,914	14.55	1.1455
2025	33,153,338	34,906,443	5.29	1.0529
2030	35,083,532	35,083,373	0.00	1.0000
2035	35,257,520	35,239,815	-0.05	0.9995

The Re-Entrained Road Dust category is dependent on the VMT, but it is calculated based on AP-42 formulas and this plan includes the new VMT provided by LCOG in 2021 already.

However, since the 2018 MOVES2014a model outputs for the Onroad Motor Vehicles category used in this maintenance plan are based on lower VMT in 2015 and 2020, LRAPA is demonstrating that the increases from using the 2021 VMT would not increase the MVEB in Table O.

Re-Entrained Road Dust in the MVEB: It was discovered after LRAPA Board adoption and prior to proposed adoption by the EQC on November 18, 2021 that EPA regulations require the MVEB to include PM_{10} from Re-Entrained Road Dust. LRAPA revised the MVEB on November 5, 2021 to include Re-Entrained Road Dust.

Applying the VMT ratios from Table Q to the MOVES 2014a UGB-adjusted results for each future year, and including the addition of PM_{10} from Re-Entrained Road Dust shows that the increases to the MVEB will not cause the area to exceed the NAAQs since the total projected emissions are still well below the 2015 base year.

- 2025 MVEB Demonstration = [2025 MOVES 2014a UGB-adjusted result (10.4 lb/day) + 2025 Re-entrained Road Dust (121.2 lb/day)] x 1.0529 = 139.4 lb/day which is less than the 147.4 lb/day in the MVEB

- 2030 MVEB Demonstration = [2030 MOVES 2014a UGB-adjusted result (11.5 lb/day) + 2030 Re-entrained Road Dust (121.4 lb/day)]x 1.00 = 132.9 lb/day which is less than the 156.8 lb/day in the MVEB
- 2035 MVEB Demonstration = [2035 MOVES 2014a UGB-adjusted result (11.1 lb/day) + 2035 Re-entrained Road Dust (121.7 lb/day)]x 0.9995 = 132.7 lb/day which is less than the 164.7 lb/day in the MVEB

MLH/MKH:mlh (11/10/2021)

Appendix V: Oakridge Air Targeted Airshed Grant Overview

Overview

Challenge and progress: For the last three decades, the health of residents in Oakridge in rural Oregon, has been compromised due to poor air quality from high concentrations of PM_{10} and $PM_{2.5}$ during the winter months and from wildfire smoke as climate change progresses. Local climate and topography (the city sits in a bowl of ridgelines) make the Oakridge area prone to wintertime temperature inversions, low wind speeds and poor atmospheric dispersion which exacerbates the concentrations of smoke from uncertified woodstoves and improper burning techniques (more than 80% of $PM_{2.5}$ is attributed to woodsmoke in winter). The City of Oakridge's airshed is moving into attainment and has made considerable progress since 2007, where the 24-hour PM2.5 measurement was 47 micrograms per cubic meter (µg/m3). This progress is due to community stakeholders working programmatically and individually to improve air quality.

Program intent, goals and approach: The Oakridge Air program will advance efforts to permanently reduce particulate matter. The project will span five years between 2019 and 2024 to establish the infrastructure and programs that can sustain those reductions for the next generation of Oakridge residents. It is the expressed goal of this project to decrease and sustain the 24-hour $PM_{2.5}$ concentration to below 30 µg/m3. Specifically, project stakeholders are eager to move toward "finishing the job." Historically, the stakeholders have disproportionately contributed resources to this effort (versus other communities they are supposed to serve) and have exhausted their ability to contribute dollars. However, stakeholders are resolute in their continued contribution to seeing this air quality issue resolved. This program will prioritize efforts to target low-income populations and those that suffer from environmental injustice.

Permanent	Operational - Ongoing	Episodic
Ductless Heat Pumps (DHP)	Community firewood program	Curtailment
Certified woodstove replacements	Education - small, hot, low/no damper fires	Air filters - schools and residences
Weatherization	Opacity	

Oakridge Air strategies: The Oakridge Air efforts are divided into seven specific strategies:

- Home Heating Upgrades
- Community Firewood Program
- Community and School Education
- Cleaner Indoor Air
- Code Enforcement
- Air Quality Monitoring
- Coordination

Oakridge Air

	1. Home Heating Upgrades	2. Community Firewood Program	3. Local Code Enforcement	4. School Education	5. Cleaner Indoor Air	6. Air Quality Monitoring	7. Coordination and Project Management
Summary elements	Provide more than 145 homes with: • Weatherization and home repairs • Ductless or ducted heat pumps • Certified woodstoves	• Provide 200 cords annually of clean, seasoned dry wood to the community • Reach senior, disabled, and low-income residents • Provide clean burning education	• Hire/employ a designated code enforcement officer • Provide compliance and enforcement program with education focused diversion program • Report code enforcement results	• Develop lessons and class activities for local schools	• HVAC system retrofits for public buildings to act as cleaner air spaces for students and public • Air purifier distribution to vulnerable residents	• Increase PM2.5 monitoring to daily • EPA approved PM monitor • Install and monitor low-cost air sensors to measure PM levels • Data analysis comparing health to smoke PM data	• Program management, coordination and collaboration for all project tasks • Develop community education materials and outreach via multiple approaches and platforms • Inter-agency coordination
Project managers	Rick Zylstra, Upgrades Coordinator, South Willamette Solutions	Inbound LLC, City of Oakridge, Southern Willamette Forest Collaborative	Oakridge Police Department, LRAPA	Middle Fork Willamette Watershed Council (MFWWC), Good Company	Oakridge School District, Orchid Health, Nova, City of Oakridge, Good Company	Lane Regional Air Protection Agency	Good Company
Project costs Total $4,938,190	Total: $3,009,000 (60% of total) *Weatherization / home repair: $1,232,500* *Ductless heat pumps: $652,500* *Certified wood/pellet stoves: $580,000;* *Upgrades Coordinator: $326,500*	Total: $300,500 (6% of total) *Processing equipment $121,000* *Site improvements $35,000* *Transportation of source stock $69,500* *Purchase of wood: $20,000* *Wood delivery: $30,000* *Administration $25,000*	Total: $355,000 (over 5 years) (7% of total)	Total: 115,200 (2% of total)	Total: $239,900 (5% of total) *Air purifiers: $169,900* *School HVAC upgrades: $70,000*	Total: $393,590 (8% of total) *Staff time: $248,251;* *Conference travel $4,188;* *Sampling filters $12,612; EPA approved FRM Continuous PM Monitor: $21,200* *Low cost PM sensors: $5,000 ;* Indirect $35,311 Fringe: $67,028	Total: $525,000 (over 5 years) (10% of total)

1. Home Heating Upgrades – 60% of total

Project Description and Outcomes:

- Provide weatherization upgrades and repairs to 145 or more homes to reduce the need for more wood heat.
- Install non-wood heating options such as ducted or ductless heat pumps to 145 or more homes to provide local emission-free heat.
- Replace 145 or more uncertified woodstoves with certified woodstoves or certified pellet stoves for resiliency to a community that frequently experiences power outages and has no access to natural gas.

Approach:

- *Upgrades coordinator:* Rick Zylstra, upgrades coordinator, working on behalf of South Willamette Solutions and contractor coordinator to LRAPA, connects qualified Oakridge residents to the program and evaluate their qualification status for the program. The RUC will be responsible for liaising between residents, hired contractors, Good Company and LRAPA.
- *Prioritization of residences:* Residents will be evaluated for qualifications for this program. A decision scoring sheet was developed to assist the Oakridge Air program to prioritize residences. Prioritization factors include: proximity to heaviest polluted areas, sole source wood heat/uncertified woodstoves, and income.
- *Audit and quality control inspections:* Once accepted, an energy audit will be completed to determine the need and scale of the upgrades and replacements. Reports will be produced per household on available and selected upgrades. Quality control inspections will be held after all upgrades by qualified inspectors.
- *Pilot phase:* The initial work in 2020-2021 is to develop a pilot that can serve to ensure the best functionality and process to meet the bar for residents, contractors, partners and funders.

Additional Details:

- *Serving mobile/manufactured homes:* Stick-built homes will be prioritized but this program does not exclude mobile homes. Due to the low stock of affordable housing in Oakridge, mobile homes are sometimes the only available residential option for low-income residents.
- *Removal of uncertified woodstoves:* As part of the residential upgrades, all homes in the program will be required to remove all uncertified woodstoves. Replacements can be a heat pump and/or a certified woodstove or certified pellet stove. Proof of destruction will be provided with removed uncertified woodstoves.
- *Carbon monoxide detector:* All homes with solid fuel burning devices will also be provided a mandatory Carbon Monoxide (CO) detector to be installed in their homes.

2. Community Firewood Program – 6% of total

Project Description and Outcomes: The expansion of the Community Firewood Program (CFP) will increase accessibility to clean, seasoned dry firewood for residents to burn instead of wet, green wood. The CFP will bolster a partnership between the Southern Willamette Forest Collaborative (SWFC), Inbound LLC, and the City of Oakridge. The CFP will provide more dry, seasoned firewood to members in the Oakridge community that choose to burn wood but cannot afford or have regular access to dry, seasoned firewood. Burning dry wood is the easiest solution for community members to burn clean. In a location like Oakridge, where electric outages are common and alternative heat sources not very accessible or possible, wood burning becomes a necessity. Without the ability to burn dry, seasoned wood, many people turn to burning whatever they have available – wet or green wood or even garbage, if situations get desperate. The CFP provides cords of well-seasoned, dry wood at greatly reduced rates for community members who meet low income or accessibility requirements.

Approach:

- *Relocation of the processing facility and facility upgrades:* In 2020, the CFP relocated the processing facility from the City's old public works building to the Oakridge Industrial Park. The City has made retrofits to the industrial park facility including retrofits like improving the building drainage with new gutters, electrical upgrades, and securing the site with fencing ($35,000).
- *Firewood sourcing and transportation:* This aspect allocates resources for source wood purchase to guarantee enough stock for firewood production and processing. The CFP bids on decks of wood from logging activities by the US Forest Service or private landowners and the Oregon Department of Forestry. The wood is then hauled, processed, and seasoned properly before being sold.
- *Firewood processing equipment:* The CFP purchased yard equipment for the processing and transportation of wood including a new Tajfun log processor and log loader, used Catepillar 279D skidsteer with new 78" HD grapple, used Champ forklift, and new 2020 Lamar dump trailer.
- *Firewood delivery:* Delivery costs have been met with resistance from the community, especially for lower-income residents who already face challenges with the higher costs of heating during the winter. Subsidize deliveries for seniors, disabled, and low-income residents.
- *Administrative functions*: South Willamette Solutions is the primary manager (with support from Good Company) to track labor, site process efficiency and implement best practices.

3. Local Code Enforcement – 7% of total

Project Description and Outcomes: The City of Oakridge's police department is authorized to regulate the city code determining the home wood heating rules in Oakridge. The City's code enforcement officer is a sub-awarded position with the City of Oakridge, and responsible for the compliance on home wood heating advisory rules. They would also expand the education and diversion program for violators. The code enforcement officer will have the proper training including EPA Method 9 to enforce the local smoke opacity limit code, daily home wood heating advisories, and respond to complaints from residents. The officer will also be a key player in the education and on-the-ground outreach point of contact with the community around proper burning methods and alternative heating sources. Violators, especially first-time violators, may be subject to a fine or a larger educational approach-including a diversion program created by the Oakridge Police Department, LRAPA and Good Company. Repeat offenders may be subject to larger fines and less leniency.

Approach:

- Strengthening local code enforcement with designated code enforcement officer with frequent EPA method 9 opacity trainings and clean burning requirements.

- Enhanced compliance and diversion program: the Oakridge municipal court manages a diversion program for first-time offenders, offering an educational course instead of a fine.
- Reporting of code enforcement activities to show number of contacts, enforcement actions and results.

4. School Education – 2% of total

Project Description and Outcomes: Oakridge Air works with the Middle Fork Willamette Watershed Council (MFWWC), to focus on K-12 education in Oakridge, and integrate air quality and science/STEM learning. The mission of the Middle Fork Willamette Watershed Council is to work with communities for a healthy Middle Fork Willamette Watershed through environmental education and habitat restoration. MFWWC has served the Oakridge community with their Watershed Education Program for over 10 years. MFWWC's established contacts and connections pair well with the clean air message and PM2.5 reduction this Oakridge Air is looking to achieve.

Approach:

- MFWWC will collaborate with Oakridge School District teachers and administrators to develop a series of air quality classes that aligns with Next Generation Science Standards (NGSS). The program will utilize best practices for science education and pull from the array of air quality curriculum currently available, to create a locally-relevant original program that is useful to teachers and engaging for students.
- MFWWC will consult with teachers (establish grades to focus on based on teacher capacity, curriculum integration), discuss feasibility for implementation, review established curriculum - pilot with a few select teachers, explore ways to integrate with K-12 standards.
- MFWWC will coordinate with teachers and administrators to schedule a presentation at the all-school assembly and classroom visits. Following the presentation, the council will teach a 1-hour classroom lesson in each 4th, 5th, and 6th grade classroom (6 total classes). MFWWC will deliver an air quality curriculum for all Oakridge students including hands-on classroom lessons tied to NGSS and take-home materials for students to share with parents (two classes per grade level per year for estimated 52 lessons per year taught for complete K-12 program).

5. Cleaner Indoor Air – 5% of total

Project Description and Outcomes: This program aspect moves to install air filtration for residences and public spaces to reduce the impact of $PM_{2.5}$ on residents' health. In times of poor air quality, whether it is from woodsmoke from home heating or from wildfire, the population currently cannot escape the air without leaving their community. While other efforts will decrease wintertime $PM_{2.5}$ from home-heating, only indoor air filtration can effectively counteract the impacts from $PM_{2.5}$ year-round, especially with the increase in dry-season wildfires and during extremely cold days during the winter where electric heat struggles to properly warm the home. This effort targets specific public access places where vulnerable populations may be more adversely impacted by smoke such as schools and community buildings (library, City hall, police department). The goal is to have enough air purifiers to provide most homes in Oakridge with needed refuge from inescapable smoke during wildfires or winter woodsmoke events.

Approach:

- *School and cleaner air spaces:* Retrofit HVAC system at elementary and high school to MERV 13 air filtration for regular, ongoing air filtration for students but also to use as cleaner air spaces.
- *Standalone air purifiers and replacement filters for vulnerable populations:* The remaining budget is reserved for residents and public spaces. These purifiers are purchased in bulk and distributed based on medical need –

cardiac and respiratory issues – using a prioritization method identifying vulnerable populations where residents with pre-existing health conditions, residence location (proximity to highest concentration of smoke), and income. Residents will sign contracts stating that the filters will not be sold or taken if the home is sold within the grant period.

6. Air Quality Monitoring – 8% of total

Project Description and Outcomes:

- Increase current PM2.5 monitoring frequency from 1 in 3 days to daily on the existing $PM_{2.5}$ FRM monitor.
- Collocate a continuous EPA approved FEM PM2.5 monitor for hourly data collection at the existing location of the FRM $PM_{2.5}$ monitor. The FEM $PM_{2.5}$ monitor wasl installed during the first year of the program.
- Install 20 PurpleAir (PA) PM monitors inside and outside to determine the $PM_{2.5}$ Reduction of the indoor air filters, referenced in Section 5 above. The PA PM monitors will be located at a variety of sites, including schools, the library, and select private residences. One PA PM sensor will be located inside and another PA PM sensor outside 10 different locations, totaling 20 monitors. The air quality data from inside versus outside sensor will then be compared to determine the effective reduction of $PM_{2.5}$ the air filters provide. Initial indoor baseline $PM_{2.5}$ levels for each site will be determined during the upcoming home wood heating season. Sites where the PA monitors are located will not have air filters installed for the 2019 home wood heating season. This will give a baseline for comparison in future years when the air filters have been installed. A simple QAPP will be developed to ensure the validity of the PA monitor data and its use.
- Use public schools, and local health officials and clinics, to anonymously track health data in relation to air emissions data.
- Attended the EPA's Hearth, Patio and BBQ 2020 Expo/Training in March of 2020 with two LRAPA staff to train/expand understanding of air quality monitoring and wood smoke mitigation.

7. Coordination and Project Management – 10% of total

Project Description and Outcomes: Good Company serves as the program manager for Oakridge Air, a contract coordinator to LRAPA. At a highest level, Good Company serves to maintain inter-agency coordination, ensure schedules and timelines for critical paths or dependencies are being met and coordinate across strategic programs. Good Company assists South Willamette Solutions homes heating upgrade team in coordination with LRAPA. Additionally, Good Company coordinates meetings with local and regional partners. Good Company will also serve as the main project manager and oversee the delivery of individual tasks for the community firewood program, local code enforcement and cleaner indoor air program elements. Good Company coordinates monthly and quarterly meetings with the core and general woodsmoke mitigation groups. Additionally, Good Company oversees program tracking and provides updates on a monthly/quarterly basis to LRAPA, Oakridge City Council and the LRAPA Board of Directors. Apart from these main strategic roles, Good Company provides expertise and manage the community and school education components of the project such as assist in Oakridge becoming a Firewise community.

Approach:

- Lead inter-agency coordination between the City of Oakridge, Lane Regional Air Protection Agency, Oregon Department of Environmental Quality, US EPA, US Forest Service, Lane Electric Co-Op, Homes for Good housing authority, and other local non-profit and business partners. Host monthly meetings with stakeholders with reporting and updates.
- Coordinate with and oversee the Residential Upgrade Coordinator (RUC) position and residential heating upgrades.

- Lead for expanding the firewood program in coordination with Southern Willamette Forest Collaborative (SWFC). Organizing the sale and education of clean fuel for wood burning.
- Lead on the local code enforcement strengthening and diversion program creation with City of Oakridge Police Department. Create educational course instead of fines for diversion program.
- Community and school education about wood burning advisories, wood burning techniques and alternative heating. School education paired with the Middle Fork Willamette Watershed Council.
- Lead on the air filter project with City of Oakridge and Oakridge School District.
- Provide monthly and quarterly report updates to the LRAPA Board of Directors, Oakridge City Council and other stakeholders. Send reports to LRAPA.
- Develop an electronic version of a "How-to-Guidebook" for replication of projects in other $PM_{2.5}$ non-attainment communities.

Justin Overdevest, Good Company (01/28/2021)

Appendix VI: Oakridge and Lane County Air Pollution Control Ordinances

The Oakridge City Air Pollution Control Ordinances were revised to be more protective as the national air quality health standards were expanded from PM_{10} to $PM_{2.5}$, the $PM_{2.5}$ standards were tightened in 2006, and the 2012 and 2016 $PM_{2.5}$ Attainment Plans were adopted. The history is summarized here:

Time Period In Effect	Oakridge Ordinance	Ordinance Date	Emission Inventories
2007-2012	#889	04-Oct-07	2008-2012
2012-2015	#903	15-Nov-12	2013-2015
2015-2016	#914	15-Oct-15	2016
2016-2035	#920	20-Oct-16	2017-2035

In addition, the Lane County Code 9.120-9.150 was revised on February 19, 2017 to require essentially the same opacity limits and episodic curtailment requirements (as Oakridge City Ordinance No. 920) in the unincorporated Urban Growth Boundary (UGB) around the city limits of the City of Oakridge.

The current City of Oakridge Ordinance No. 920 and Lane County Code 9.120-150 are included in this Appendix VI.

Merlyn Hough (February 15, 2021)

Ordinance No.920

AN ORDINANCE AMENDING SECTION 7 OF ORDINANCE 914 AND ADOPTING NEW STANDARDS FOR THE OAKRIDGE AIR POLLUTION CONTROL PROGRAM

WHEREAS, The health, safety and welfare of the citizens of the City of Oakridge are adversely affected by the degradation of air quality and violations of federal ambient air quality standards, as measured by the Lane Regional Air Protection Agency (LRAPA), occur periodically in the City of Oakridge; and

WHEREAS, Wood and other solid fuel combustion for space heating produces particulate matter and other emissions which are physically harmful and aesthetically unpleasant, and which contribute to the degradation of air quality andthe violation of federal ambient air quality standards; and

WHEREAS, The periodic restriction of the use of solid fuel burning devices will improveair quality and LRAPA has the expertise to determine when such air quality is at such a level that such restriction is necessary to preserve the health, safety and welfare of the citizens of the City of Oakridge; and

WHEREAS, The Federal Government has recently lowered the thresholds under which conditions are defined; and

WHEREAS, The City of Oakridge wishes to develop the following rules and regulations in an effort to comply with LRAPA regulations and to protect its citizens from harmful air particulates.

NOW, THEREFORE THE CITY OF OAKRIDGE ORDAINS AS FOLLOWS:

Section One. Definitions.

For the purpose of this section the following definitions apply:

(1) "City Administrator" means City Administrator or designee, including, if the City Administrator so designates, LRAPA.

(2) "EPA method" means 40 CFR Part 60, Subpart AAA, Sections 60.531, 60.534 and 60.535.

(3) "Fireplace" means a solid fuel burning device with an air/fuel ratio of greater that thirty which is a permanent structural feature of a building. A fireplace is made up of a concealed masonry or metal flue, and a masonry or metal firebox enclosed in decorative masonry or other building materials. (Cannot operate on Red or Yellow Advisory days effective 10-01-2017 if attainment is not met).

(4) "Green Advisory" means a 24 hour period beginning at 4:00 p.m. when PM 10 levels are forecast by LRAPA to be less than 100 micrograms per cubic meter and PM 2.5 levels are forecast to be less than 20 micrograms per cubic meter.

(5) "LRAPA" means Lane Regional Air Protection Agency, a regional air quality control authority established under the provisions of, and with authority and powers derived from, Oregon Revised Statutes 468A.100 et seq.

(6) "Opacity" means the degree to which an emission reduces transmission of light or obscures the view of an object in the background.

(7) "Oregon method" means Oregon Department of Environmental Quality "Standard Method for Measuring the Emissions and Efficiencies of Woodstoves", Sections 1 through 8 and O.A.R. Chapter 340. Division 21 Sections 100, 130, 140, 145, 160, 161,163,164,165.

(8) "Pellet stove" means an enclosed solid fuel burning device designed and operated to burn manufactured solid fuel and having an air-to-fuel ratio greater than 35-to1 as determined by the federal test method described in 40 CFR Part 60.534.

(9) "Person" means any individual, partnership, corporation, association, governmental subdivision or public or private organization of any charter.

(10) "Person in Charge of Property" means an agent, occupant, lessee, tenant, contract purchase, or other person having possession or control of property.

(11) "PM 2.5" means solid or liquid particulate matter (excluding uncombined water) with an aerodynamic diameter less than or equal to 2.5 micrometers.

(12) "PM 10" means solid or liquid particulate matter (excluding uncombined water) with an aerodynamic diameter less than or equal to 10 micrometers.

(13) "Red Advisory" means a 24 hour period beginning at 4:00 p.m. when PM 1O levels are forecast by LRAPA to be greater than or equal to 125 micrograms per cubic meter,or when PM 2.5 levels are forecast by LRAPA to be greater than or equal to 25 micrograms per cubic meter, within the Oakridge Area General Plan Urban Growth Boundary.(22 Micrograms effective 10-01-2017 if attainment not met).

(14) "Seasoned wood" means wood of any species that has been sufficiently dried so as to contain twenty percent or less moisture by weight.

(15) "Sole source of heat" means one or more solid fuel burning devices that:

(a) Constitutes the only source of heat in a private residence for purpose of space heating, or

(b) Constitutes the main source of heat in a private residence where the residence is equipped with a heating system that is only minimally sufficient to keep the plumbing from freezing.

(16) "Solid fuel burning device" means any device designed or operated to burn solid fuel for the heating of the interior of a building, including, but not limited to, solid fuel burning stove, fireplaces or wood stoves of any nature, combinations fuel furnaces or boilers used for space heating which can burn solid fuel, and solid fuel burning cooking stoves. "Solid fuel burning device" does not include natural gas fired artificial fireplaces.

(17) "Visible Emissions" means the reduction in transmission of light or the obscuring of the view of an object in the background caused by the air pollutants emitted by the heating device. This does not include the visual distortion caused by the heated air emitted by the heating device.

(18) "Yellow Advisory" means a 24 hour period beginning at 4:00 p.m. when PM 10 levels are forecast by LRAPA to be greater than or equal to 100 micrograms per cubic meter but less than 125 micrograms per cubic meter, or when PM 2.5 levels are forecast to be greater than or equal to 20 micrograms per cubic meter but less than 25 micrograms per cubic meter.

(19) Wood heating advisory season can commence as early as October 1 and end as late as May 31st, as set by the City of Oakridge City Council and LRAPA Board.

Section Two. Solid Fuel Burning Devices - Prohibitions.

(1) No person in charge of property during a Red Advisory shall operate or allow to be operated a solid fuel burning device which emits visible emissions into the air outside of the building housing the device, unless the person has been granted an exemption to use the device by the City Administrator.

(2) Within the City, no person in charge of property shall at any time allow to be initiated or maintained in a solid fuel burning device the burning of any fuel other than seasoned wood; prohibited materials include plastics, wire insulation, petroleum by-products, petroleum-treated materials, rubber products, animal remains or animal or vegetable matter resulting from the handling, preparation, cooking or service of food, wood with a moisture content greater than twenty percent moisture by weight, or any other material which normally emits dense smoke, noxious odors, or hazardous air contaminants.

(3) No person in charge of property shall operate or allow to be operated a solid-fuel

burning device which discharges emissions that are of an opacity greater than 20%. This provision does not apply to the emissions during the building of a new fire, for aperiod or periods aggregating no more than ten minutes in any 4-hour period.

Section Three. Solid Fuel Burning Devices Upon Sale of the Property.

(1) After June 30, 2003, all un-certified solid fuel burning devices contained on Property to be sold or rented must be removed from the property or rendered permanently inoperable unless otherwise exempted by this ordinance or the person in charge of the property is granted an exemption by the City Administrator.

(2) The following solid fuel burning devices may remain on a property to be sold:

(a) Woodstoves if the emissions do not exceed:

(i) 6.0 grams per hour weighted average when tested in conformance with the Oregon Method; or

(ii) 5.5 grams per hour weighted average when tested in conformance with the EPA method.

(b) Commercially manufactured pellet stoves that have not been tested, but were installed prior to June 30, 2003.

(c) Fireplaces operated in accordance with Section Two of this ordinance.

(d) Wood-fired, forced-air combustion furnaces that primarily heat living space, through indirect heat transfer using forced-air duct work or pressurized water systems.

(3) Within the City, it is unlawful for any person to complete, or allow the completion of the sale, transfer or conveyance of any real property unless a Certificate of Compliance is filed with the City Recorder's Office.

(4) Once a certificate of Compliance has been filed for a property, another certificate is not needed if the number and type of stoves on the real property matches what is on file at the City. The City shall list properties with Certificates of Compliance on the internet. A copy of the list must be available at the City for inspection.

(5) The Certificate of Compliance must state that either:

(a) there are no solid fuel burning devices on the property; or

(b) any solid fuel burning devices on the property meet the requirements of this section.

(6) The Certificate of Compliance must be in a format specified by the City and must be signed by the seller (s), and, if any sold fuel burning devices will remain on the property, a certified City inspector.

(7) The Certificate of Compliance does not constitute a warranty or guarantee by the City or its agents that the Solid Fuel Burning Device on the property meets any other standards of operation, efficiency or safety, except the emission standards contained in this Ordinance.

Section Four. Solid Fuel Burning Devices Prohibited.

After December 31, 2008, a person or persons may not install or use any solid fuel burning device in any structure within the City except for certified wood stoves, certified pellet stoves with emissions that do not exceed 1.0 gram per hour, weighted average when tested in conformance with the EPA Method, or a fireplace which is not a sole source of heat, operated in accordance with Section Two of this Ordinance.

Section Five. Solid Fuel Burning Devices - Exemptions.

Not withstanding the prohibitions set forth in this Ordinance, a person in charge of property may retain in their home or operate a solid fuel burning device during a Green, Yellow or Red Advisory, if that person has previously obtained one of the following exemptions from the City Administrator:

(a) Sole source of heat exemption. Persons in charge of property who signs a sworn statement that their solid fuel burning device is the sole source of heat for their residence are eligible for a sole source of heat exemption. The City may inspect to verify this fact, and to insure that the solid fuel burning device is certified, in its discretion. This exemption shall expire on July 1 of each year and must be renewed annually thereafter.

(b) Economic need exemption. Persons in charge of property who demonstrate an economic need to burn solid fuel for space-heating purposes by qualifying for energy assistance according to economic guidelines established by the U.S. Office of Management and Budget under the low income energy assistance program, as administered in Oakridge by the CDC, are eligible for an economic need permit. The City may insure that the solid fuel burning device is certified at its discretion. This exemption shall expire on July 1 of each year and must be renewed annually thereafter.

Section Six. Enforcement.

(a) In addition to, and not in lieu of any other enforcement mechanism authorized by the Oakridge City Code, upon a determination that a person has violated this Ordinance, the City Administrator or his/her designee may impose upon the violator and any other person in charge of the property, an administrative penalty not greater than $500.00.

(b) Each day's violation of a provision of this Ordinance constitutes a separate offense punishable by the penalty set forth above.

(c) The City Administrator or his/her designee is also hereby authorized to designate LRAPA to enforce and administer the provisions of this code, including LRAPA's use of administrative and hearing procedures adopted by LRAPA in its duly promulgated regulations.

Section Seven. Contingency Measures

Reserved.

Note: Oakridge does not meet federal health-based standards for fine particulate (PM2.s) and was designated a non-attainment area by the Environmental Protection Agency (EPA) on October 8, 2009. An attainment plan was developed for Oakridge in 2012 containing contingency measures that would be implemented if Oakridge did not meet the PM2.s standard by the EPA Clean Air Act 2014 deadline. Oakridge did not meet the PM 2.5 standard by the EPA Clean Air Act 2014 deadline and the contingencymeasures in the 2012 plan are incorporated into earlier sections of this ordinance.

A supplemental plan with additional strategies and contingency measures was developed during 2016. If the EPA makes a finding that the Oakridge nonattainmentarea failed to attain the 2006 24-hour PM 2.5 standard by the applicable attainmentdate, the following requirements will automatically go into effect for the October 1st, 2017 Wood Heating Season.

(1) The Red Advisory criteria in Section One (13) is reduced to forecasted PM 2.5 levels of 22 Micrograms per cubic meter; and

(2) Fireplace use Section One (3) is prohibited during both Yellow Advisory and Red Advisory periods.

The reading of this ordinance is by title only approved on the 20th day of October, 2016.

Approved and signed by the Mayor on the 20th day of October, 2016.

City of Oakridge

James B. Coey, Mayor

Attested:

Susan LaDuke, City Recorder

Ayes: 6
Nays: 0

RESTRICTION ON USE OF SOLID FUEL SPACE HEATING DEVICES

9.120 Purpose and Findings.

(1) The health, safety and welfare of the citizens of Lane County are adversely affected by the degradation of air quality. Violations of federal ambient air quality standards, as measured by the Lane Regional Air Protection Agency (LRAPA), occur periodically in Lane County.

(2) Wood and other solid fuel combustion for space heating produces particulate matter and other emissions which are physically harmful and aesthetically unpleasant, and which contribute to the degradation of air quality and the violation of federal ambient air quality standards.

(3) Periodic restriction of the use of solid fuel space heating devices will improve air quality. LRAPA has the expertise to determine when such air quality is at such a level that such restriction is necessary to preserve the health, safety and welfare of the citizens of Lane County.

(4) It is the intent of Lane County that the penalty section of this ordinance not take effect until November 1, 1991. *(Revised by Ordinance No. 9-90, Effective 1.18.91; 1-10, 6.11.10)*

9.125 Definitions.

As used herein, the following words and phrases have the meanings ascribed:

Green Advisory for Eugene-Springfield Area. A 24-hour period beginning at 4:00 p.m. when PM10 levels are forecast by LRAPA to be less than 100 micrograms per cubic meter and PM2.5 levelsare forecast to be less than 25 micrograms per cubic meter, within the Eugene/Springfield Metropolitan Area General Plan Urban Growth Boundary.

Green Advisory for Oakridge Area. A 24-hour period beginning at 4:00 p.m. when PM10 levels are forecast by LRAPA to be less than 100 micrograms per cubic meter and PM2.5 levels are forecast to be less than 20 micrograms per cubic meter, within the Oakridge Urban Growth Boundary.

Lane Regional Air Protection Agency. A regional air quality control authority established under the provisions of and with the authority and powers derived from ORS 468.500 et seq. (renumbered 468A.100 through 468A.180 in 1991)

Opacity. The degree to which an emission reduces transmission of light or obscures the view of an object in the background.

Pellet Stove. An enclosed solid fuel space heating device designed and operated to burn manufactured solid fuel and having an air-to-fuel ratio greater than 35-to-1 as determined by the federal test method described in 40 CFR Part 60.534

Person. Any individual, partnership, corporation, association, governmental subdivision or public or private organization of any character.

Person in Charge of Property. An owner, agent, occupant, lessee, tenant, contract purchaser, or other person having possession or control of property.

PM2.5. Solid or liquid particulate matter (excluding uncombined water) with an aerodynamic diameter less than or equal to 2.5 micrometers.

PM10. Solid or liquid particulate matter (excluding uncombined water) with an aerodynamic diameter less than or equal to 10 micrometers.

Sole Source of Heat. A solid fuel space heating device which constitutes the only source of heating in a private residence. A solid fuel space heating device shall not be considered to be the sole source of heat if the private residence is equipped with any permanently-installed furnace or heating system utilizing oil, natural gas, electricity or propane.

Solid Fuel Space Heating Device. Any device designed or operated to burn solid fuel for the heating of the interior of a building, including, but not limited to, solid fuel burning stoves, fireplaces or wood stoves of any nature, combination fuel furnaces or boilers used for space heating which can burn solid fuel, and solid fuel burning cooking stoves. "Solid fuel space heating device" does not include natural gas-fired artificial fireplaces.

Red Advisory:

Eugene-Springfield Area. A 24-hour period beginning at 4:00 p.m. when PM10 levels are forecast by LRAPA to be greater than or equal to 125 micrograms per cubic meter, or when PM2.5 levels are forecast by LRAPA to be greater than or equal to 30 micrograms per cubic meter within theEugene/Springfield Metropolitan Area General Plan Urban Growth Boundary.
Oakridge Area. A 24-hour period beginning at 4:00 p.m. when PM10 levels are forecast byLRAPA to be greater than or equal to 125 micrograms per cubic meter, or when PM2.5 levels are forecastby LRAPA to be greater than or equal to 25 micrograms per cubic meter within the Oakridge Urban Growth Boundary.
Visible Emissions. The reduction in transmission light or the obscuring of the view of an object in the background caused by the air pollutants emitted by the heating device. This does not include the visual distortion caused by the heated air emitted by the heating device.
Yellow Advisory:
Eugene-Springfield Area. A 24-hour period beginning at 4:00 p.m. when PM10 levels are forecast by LRAPA to be greater than or equal to 100 micrograms per cubic meter but less than 125 micrograms per cubic meter, or when PM2.5 levels are forecast to be greater than or equal to 20 micrograms per cubic meter but less than 25 micrograms per cubic meter, within the Eugene/Springfield Metropolitan Area General Plan Urban Growth Boundary.
Oakridge Area. A 24-hour period beginning at 4:00 p.m. when PM10 levels are forecast byLRAPA to be greater than or equal to 100 micrograms per cubic meter but less than 125 micrograms per cubic meter, or when PM2.5 levels are forecast to be greater than or equal to 25 micrograms per cubic meter but less than 30 micrograms per cubic meter, within the Oakridge Urban Growth Boundary. *(Revised by Ordinance No. 9-90, Effective 1.18.91; 1-00, 4.12.00; 13-03, 10.23.03; 1-10, 6.11.10; 16-10, 2.9.17)*

9.130 Area of Applicability.
These Lane Code sections 9.120 through 9.150 apply to the unincorporated areas within the Eugene, Springfield, and Oakridge Urban Growth Boundaries.*(Revised by Ordinance No. 9-90, Effective 1.18.91; 13-03, 10.23.03; 16-10, 2.9.17)*

9.135 Prohibitions.

(1) Red Advisory. A person in charge of property violates this section 9.135(1) if the person during a Red Advisory operates or allows to be operated a solid fuel space heating device which emits visible emissions into the air outside of the building housing the device unless the person in charge of the property has been granted an exemption to use the device by LRAPA.

(2) Visible Emissions Limitations for Eugene-Springfield Area. A person in charge of property violates this section 9.135(2) if the person operates or allows to be operated a solid fuel space heating device which discharges emissions that are of an opacity greater than forty (40) percent. This provision does not apply to the emissions during the building of a new fire, for a period or periods aggregating no more than ten (10) minutes in any four (4) hour period.

(3) Visible Emissions Limitations for Oakridge Area. A person in charge of property violates this section 9.135(3) if the person operates or allows to be operated a solid fuel space heating device which discharges emissions that are of an opacity greater than twenty (20) percent. This provision does not apply to the emissions during the building of a new fire, for a period or periods aggregating no more than ten (10) minutes in any four (4) hour period.

(4) Prohibited Materials. A person in charge of property violates this section 9.135(4) if the person at any time allows to be initiated or maintained in a solid fuel space heating device the burning of any plastics, wire insulation, petroleum by-products (with the exception of natural-gas-fueled log lighters), petroleum treated materials, rubber products, animal remains, or animal or vegetable matter resulting from the handling, preparation, cooking, or service of food, or of any other material which normally emits dense smoke, noxious odors, or hazardous air contaminants. *(Revised by Ordinance No. 9-90, Effective 1.18.91; 1-00, 4.12.00; 13-03, 10.23.03; 16-10, 2.9.17)*

9.140 Exemption for Economic Need.
Exemption from LC 9.135 above for Red Advisories may be obtained from LRAPA for economic need. Persons in charge of property who satisfy criteria established under the Low Income Energy Assistance Program as administered by the Lane County Housing Authority and as established by the United States Department of Energy are exempt from LC 9.135 above for Red Advisories. Individual exemptions shall expire on July 1 of each year and must be renewed annually. *(Revised by Ordinance No. 9-90, Effective 1.18.91; 1-00, 4.12.00; 16-10, 2.9.17)*

9.145 Enforcement.
The Board of County Commissioners designates LRAPA and delegates to LRAPA authority to enforce the prohibitions contained herein. The investigation, initiations of proceedings, adjudication of a failure to comply and appeal of such are regulated by the adopted administrative and hearing procedures of LRAPA set forth in its Rules and Regulations.
The County retains the right to investigate and enforce the terms of this ordinance. Existing citation, complaint, violation, or failure to comply procedures applicable to the County may be utilized to prosecute such failures to comply. *(Revised by Ordinance No. 9-90, Effective 1.18.91; 1-00, 4.12.00; 16-10, 2.9.17)*

9.150 Penalties.
A person who violates any provision of LC 9.135 above is subject to administrative enforcement pursuant to LC Chapter 5, including a monetary penalty of a minimum of $50 to a maximum of $500 for each day in which such failure to comply occurs. This remedy is cumulative and is in addition to any and all other remedies available to Lane County. *(Revised by Ordinance No. 9-90, Effective 1.18.91; 1-00, 4.12.00; 16-10, 2.9.17)*

Appendix VII: Oakridge Home Wood Heating Curtailment Protocol

Guidelines for the Oakridge Home Wood Heating Advisories

Home Wood Heating (HWH) advisories are issued in Oakridge from October 1st through May 31st of each HWH season. The most critical months of the HWH season being November through February. The description below follows the current Oakridge City Ordinance, No. 920, adopted October 20, 2016.

The Oakridge City Ordinances were revised to be more protective as the national air quality health standards were expanded from PM_{10} to $PM_{2.5}$, the $PM_{2.5}$ standards were tightened in 2006, and the 2012 and 2016 $PM_{2.5}$ Attainment Plans were adopted. The history is summarized here:

Time Period In Effect	Oakridge Ordinance	Ordinance Date	Emission Inventories
2007-2012	#889	04-Oct-07	2008-2012
2012-2015	#903	15-Nov-12	2013-2015
2015-2016	#914	15-Oct-15	2016
2016-2035	#920	20-Oct-16	2017-2035

In addition, the Lane County Code 9.120-9.150 was revised on February 19, 2017 to require essentially the same requirements (as Oakridge City Ordinance No. 920) in the Urban Growth Boundary around the City of Oakridge.

A HWH advisory is issued each day for each 24-hour period during the HWH season. The 24-hour period begins at 16:00 hours and ends at 15:59 hours, local time, the following day. The HWH advisory is publicized on the LRAPA website and via a recorded message on a dedicated HWH advisory phone line.

For Yellow Advisories LRAPA may decide to use official press releases and social media to further publicize the advisory. For Red Advisories LRAPA issues a press release and uses social media for publicity. During a Red Advisory LRAPA may also choose to employ an automated calling system that plays a pre-recorded message letting Oakridge residents know of the upcoming Red Advisory and its restrictions.

- A "Green Advisory" is issued when predicted PM levels for the upcoming 24-hour period, beginning at 16:00 hours meet the following criteria. PM_{10} levels are forecast by LRAPA to be < 100 ug/m3 and $PM_{2.5}$ levels are forecast to be < 20 ug/m3.

- A "Yellow Advisory" is issued when predicted PM levels for the upcoming 24-hour period, beginning at 16:00 hours meet the following criteria. PM_{10} levels are forecast by LRAPA to be ≥ 100 ug/m3 but < 125 ug/m3, or when $PM_{2.5}$ levels are forecast to be ≥ 20 ug/m3 but < 25 ug/m3.

- A "Red Advisory" is issued when predicted PM levels for the upcoming 24-hour period, beginning at 16:00 hours meet the following criteria. PM_{10} levels are forecast by LRAPA to be ≥ 125 ug/m3, or when $PM_{2.5}$ levels are forecast by LRAPA to be ≥ 25 ug/m3.

During a Red Advisory, visible emissions are prohibited from any solid fuel burning device, unless the person has been granted an exemption to use the device by the City of Oakridge Administrator.

Regardless of whether the HWH advisory is Green, Yellow, or Red, no person is allowed to operate a solid fuel burning device which discharges emissions that are of an opacity greater than 20%, even with the above exemption. This provision does not apply to the emissions during the building of a new fire, for a period or periods aggregating no more than ten minutes in any 4-hour period.

The below table shows how the advisory trigger levels have changed over time.

	2007-2011	2007-2011	2012-2014	2012-2014	2015-Current	2015-Current
HWH Advisory	PM_{10} ug/m3	$PM_{2.5}$ ug/m3	PM_{10} ug/m3	$PM_{2.5}$ ug/m3	PM_{10} ug/m3	$PM_{2.5}$ ug/m3
Green	< 100	< 25	< 100	< 20	< 100	< 20
Yellow	≥ 100, < 125	≥ 25, < 30	≥ 100, < 125	≥ 20, < 25	≥ 100, < 125	≥ 20, < 25
Red, Stage I	≥ 125, < 150	≥ 30, < 35	≥ 125, < 150	≥ 25, < 30	≥ 125*	≥ 25*
Red, Stage II	> 150	≥ 35	> 150	≥ 30		

* in 2015 the two-stage red advisory was replaced with a single red advisory

Lance Giles and Merlyn Hough (February 15, 2021)