



# Strategic Directions 5-Year Plan

**2022-2027**



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## ACKNOWLEDGEMENTS

This five-year Strategic Directions Plan will be a guide for the Trail Area Health & Environment Program (THEP) from 2022 to 2027. The City of Trail, on behalf of the Trail Area Health & Environment Committee (THEC), gratefully acknowledges the collaborative work over forty years that has led to this plan. For close to a year, numerous people have been involved in developing the strategic directions, and the following are acknowledged for their contributions:

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*Adopted by THEC on September 22, 2022 and updates approved February 27, 2024 as per THEP's adaptive management framework. Two updates made: 5.1 Air, Milestone 3 updated to specify Pb and SO<sub>2</sub>. 5.3 Built Environments, Milestone 2 updated percentage from 90 to 100.*

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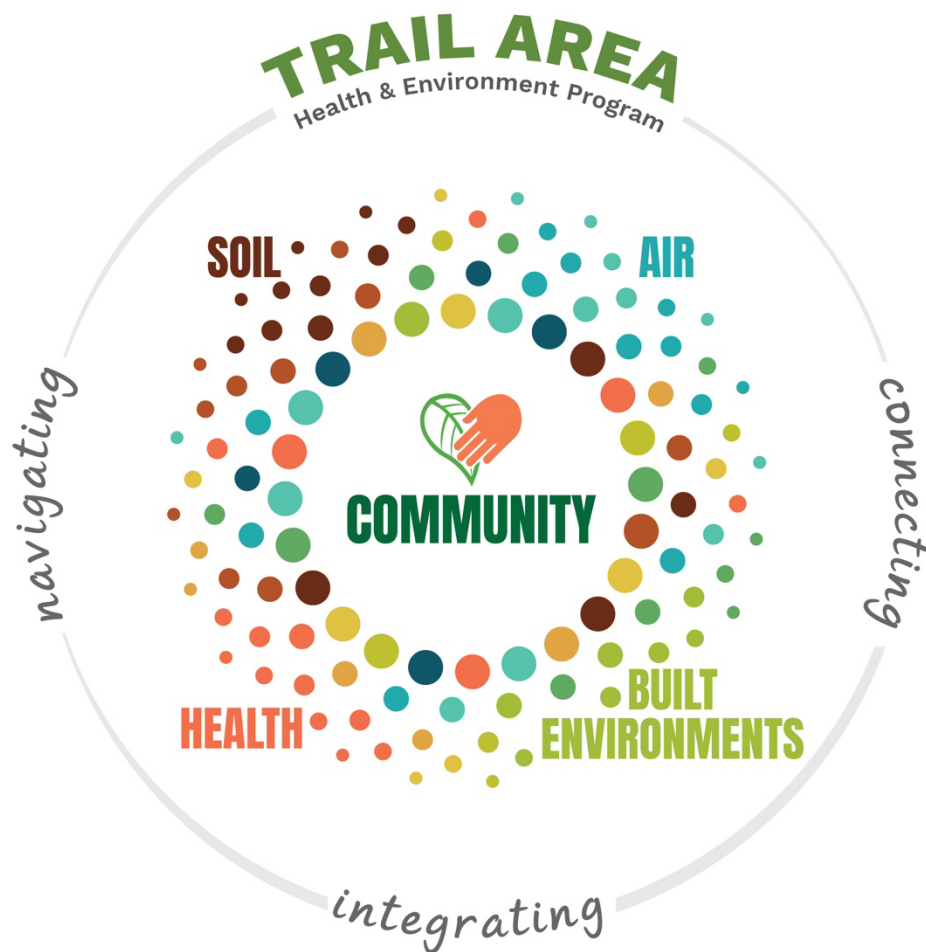
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## 1.0 INTRODUCTION

### The Program

The Trail Area Health & Environment Program (THEP, also referred to as the Program) represents a unique collaboration in support of community health and wellbeing in an area influenced by smelter air emissions for over 125 years. The comprehensive Program enables the community to understand and navigate ways to reduce exposure to lead (Pb), as well as sulphur dioxide (SO<sub>2</sub>). Program components focus on air, health, soil, built environments (e.g. homes, daycares, civic buildings, fences, sheds, etc), and community connection, while keeping the perspective of the whole in mind. The Program also addresses the inherent overlap of different exposure pathways and maximizes opportunities for improving health and the environment through an integrated approach.



In addition, a Program team delivers program components to the community and helps to increase their understanding of broad air quality, environmental, and health regulations in the local context of Trail. The team strives for continuous improvement of activities with respect to issues that are regulated by the Province of BC (e.g. source emissions), as well as issues outside of government regulation (e.g. in-home visiting and Pb safe renovation). Ongoing work of the Program includes activities contributing to THEP's purpose, sharing learning locally and beyond, and ensuring linkages with community partners.

## **This Document**

This strategic directions plan was developed with recognition of various concurrent processes, often with related objectives, occurring in and around Trail to improve community health and the environment in relation to the operation of the smelter. This five-year strategy leverages the unique capacity, roles, and expertise of the partners (see section 3.0) and community.

This is not a legal document. This is a guide that the partners can use to work together toward their shared ambitions. Its strength is that while people often come from different viewpoints, the partners acknowledge the cooperative spirit by which this Program has been developed. They also acknowledge the expectation that the various Program elements will be monitored and adjusted based on new knowledge, always keeping the community at the forefront of decision making. This document sets out the broad areas of work, aspirations, and milestones to achieve.

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## 2.0 BACKGROUND

Trail, British Columbia has been the site of one of the world's largest lead and zinc smelting facilities for over 125 years, with the community of Trail growing up around the smelter, creating unique challenges for people and the environment.

A University of British Columbia (UBC) study in 1989 found that children in Trail had elevated blood Pb levels as a result of air emissions from the smelter.<sup>1</sup> Parents were concerned, and the community came together to form a community-industry-government task force working in partnership to reduce children's blood Pb levels. Through extensive research and independent reviews, the Trail Lead Task Force made the groundbreaking recommendation to focus on air quality as the first major action in reducing exposure to Pb (and other smelter metals) in Trail. Work began in 1991 to reduce emissions at the source (the smelter complex), and to generate extensive community-wide support and involvement, as well as provide education. This led to a decade of success in reducing children's blood Pb levels in Trail. In 2001, the Trail Lead Task Force concluded and its work continued through the creation of THEP and the Trail Area Health & Environment Committee (THEC).

THEP has continuously strived to evolve with emerging science and understanding. Over the past decade, further reductions in fugitive emissions from the smelter complex (dust that escapes from buildings, stockpiles, roadways, and other activities on site) and public health primary prevention programs targeted at young families have resulted in the lowest levels of Pb in community air and the lowest children's blood Pb levels ever documented in Trail. The public-facing members of the Program team have become active members in the social landscape, contributing to the overall wellbeing of families and community in the Trail area.

Program partners and the community are committed to being leaders for positive change. In the 1990s, the average blood Pb level in Trail children was over 14 µg/dL, and since 2018, the average level is consistently under 3 µg/dL. Provincially, the BC Centre for Disease Control uses a blood Pb level of 5 µg/dL as a guideline to prompt follow up into Pb exposure. Still, there is more work to be done to drive down blood Pb levels of children in Trail and surrounding areas. The average blood Pb level remains higher than national levels, and there are individual children in Trail and area who exceed the BC guideline for follow-up.

In addition to Pb, SO<sub>2</sub> is emitted by Teck Trail Operations as a by-product of processing mine concentrates into metal and chemical products. In 2020, building on the momentum of new Federal and Provincial Air Quality Standards, a working group of THEC initiated public communications in the community related to SO<sub>2</sub>. This expanded the focus of the Program beyond Pb (and other smelter metals) to include SO<sub>2</sub>.

This strategic directions plan is an update to the 2014 Program document.

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<sup>1</sup> Hertzman, C *et al.*, (1990). Trail Lead Study Report. Available at: <https://thep.ca/wp-content/uploads/2020/07/1989-Trail-Lead-Study-Report.pdf>

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### 3.0 GOVERNANCE, WORKING GROUPS AND PARTNERS

THEP reports to the Trail Area Health & Environment Committee (THEC). THEC is formally established as a Select Committee of the City of Trail.<sup>2</sup> The Terms of Reference (ToR) are approved by Trail City Council and are intended to be reviewed on the same five-year schedule as updates to the strategic directions plan.

#### **THEC Mandate** (as per the Terms of Reference updated in June 2022)

To be a transparent platform for multi-stakeholder dialogue, collective decision making and community engagement with respect to the THEP.

#### **Role**

- Participate in the decision making and approve the strategic direction of the THEP.
- Monitor and advise Trail City Council on the implementation of the THEP.
- Support collaboration between Program partners in an effort for the whole to be greater than the sum of the parts.
- Help interpret and understand the complexities of the comprehensive Program, including contextualizing information to the local area.
- Establish and convene Working Groups from time to time to investigate and make recommendations on specific issues (for example Air Quality Working Group, Community Renewal Working Group).
- Facilitate public communication and oversight with respect to delivery of services and progress toward the joint goals and objectives of the THEP.
- Provide voice for the community of Trail in related processes taking place concurrently at times, and relevant to attaining the stated goals and objectives.
- Be a mechanism for Program accountability to the community, the City, as well as between the partners.

As mentioned above, THEC has established working groups, such as:

- Air Quality Working Group (AQWG). This group is comprised of THEC members and technical specialists from Teck Trail Operations, IH, and ENV. The purpose is to gain a better understanding of, and prioritize, air quality issues that impact the community from environmental and health perspectives.
- The Community Renewal Working Group. This group is led by a THEC community member and is tasked with finding ways to ensure ongoing inclusion, representation, and engagement of community in THEC/THEP activities.

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<sup>2</sup> In 2001, the Trail Lead Task Force recommended evolving into the Trail Area Health & Environment Committee (THEC), a select committee of the City of Trail, for governance, and the Program, as a mechanism to collaboratively address the purpose through activities in the community.

## Importance of Community

Community leadership and participation on THEC is fundamental to its success. Community engagement has ensured a potentially stigmatizing issue is a community success story. This is exemplified by exceptionally high participation rates in children's Pb testing clinics and other programs, owing in large part to the high degree of trust and good will generated by the Program. Community leaders keep up the conversation, provide local context, and root strategic directions in on-the-ground realities. The community voice helps to hold all partners accountable to the residents and each other.

Without the community at the table, THEC would revert to being a regulatory discussion between industry and government, excluding the people that the programs are intended to benefit. Meaningful involvement of people in decisions affecting their life/health is itself a determinant of health. Effective citizen participation requires a facilitative effort because of the complexity of the issues; however community members will voice their perspectives if they are empowered and listened to.

## The Program Partners

The Program is implemented by multiple partners, each with their own mandate. Together they work toward shared objectives and goals with respect to improvements in knowledge, awareness, and health related to Pb and SO<sub>2</sub>. The Program partners are the City of Trail, Teck Trail Operations, Interior Health (IH), and the BC Ministry of Environment and Climate Change Strategy (ENV). Program partners each have two representatives on THEC.

## Partners Committee<sup>3</sup>

The Partners Committee is composed of the entities who hold responsibility for delivering Program components, and who also sit on THEC. In addition to the roles outlined below, the partners are committed to building on the synergies of each others' activities and finding opportunities to maximize impact.

## Partner Roles:

- The City of Trail is the convenor, providing facilitation and collaboration support for the partners, the Program team, as well as THEC. In addition, the City supports community engagement and additional dust control measures throughout the Trail area. Activities are implemented via elected officials, hired consultants, and City staff.
- Teck Trail Operations manages air quality, soil, and built environment components of the Program. This includes air emissions monitoring, reporting, and improvements; soil testing and remediation; and primary prevention via in-home visits (in collaboration with IH's team), provision of lead-safe renovation information and supplies, and support for partnerships in the community. Secondary prevention is addressed through additional support for families that the IH Medical Health Officer (MHO) is following up with. Activities are implemented via Teck employees and a consulting team.

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<sup>3</sup> Historically this committee was referred to as the THEC Executive Committee.



- IH manages health components of the Program, including primary and secondary prevention activities. This includes in-home visits with a Public Health Nurse, engagement with the local community, management of blood Pb testing clinics, and providing Enhanced Support<sup>4</sup> in collaboration with partners. Activities are implemented via the Public Health Nurse with support of the MHO, the Manager of Environmental Management, and the IH THEC representative.
- ENV has regulatory oversight of Teck Trail Operations as it relates to environmental protection (i.e. discharges to the environment). ENV provides expertise and serves as a liaison to the community and other partners. This includes working with Teck to ensure data have undergone quality control measures, participating in activities of the Air Quality Working Group, and being available to engage with the community as requested. Activities are implemented via the Authorizations and Land Remediation Branch, as well as the Senior Air Quality Meteorologist.

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<sup>4</sup> Enhanced Support is additional follow-up by THEP provided to all children in the Trail area that test above 5 micrograms per decilitre through blood Pb testing.

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## 4.0 THEP PURPOSE, VISION, MISSION, AND VALUES

### Purpose

THEP's purpose is to support the community of Trail and surrounding areas to live, work, and play in an area influenced by smelter air emissions.

### Vision

A community with thriving families, environment, and economy.

### Mission

THEP aims to reduce exposure to smelter air emissions such as Pb (lead) and SO<sub>2</sub> (sulphur dioxide) by collaboratively working together to improve air quality, provide community-based education and programs to reduce children's blood Pb levels, and ultimately improve people's health.

### Values

**Health** – Program resources are targeted at reducing people's health risks and empowering families and others to support their health journey.

**Community** – Community members are integral to success, from programs on the ground to participation in decision making, and have the largest proportion of representation on THEC. Program goals and activities are reviewed by the community through regular public consultation, and the Program actively contributes to community health and wellbeing.

**Partnership** – THEP uses a partnership approach in governance and Program delivery. It has been recognized for the effectiveness of its collaborative multi-stakeholder model of industry, government, and community working together for mutual benefit.

**Science-based** – THEP designs and delivers activities based on scientific research, evidence of effectiveness, and a recognition of complex systems.

**Accountability** – THEP is accountable to the community, THEC, and other stakeholders through transparent decision making, responsive and timely programming, and proactive public communication and consultation.

**Trustworthy** – THEP is open, honest, and transparent in its actions and communication with the public, with each other as partners, and with THEC.

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## 5.0 STRATEGIC DIRECTIONS

THEP strategic directions focus on themes the Program works on, as well as where the Program intersects, adds value, and creates meaning to achieve the vision of a community with thriving families, environment, and economy. This strategic document was developed on the heels of a global pandemic, which challenged partners to find ways to continue working together and with the community, across distance and competing demands. It acknowledges the excellence that occurred and that there is still work ahead.

### 5.1 Air

*Issue:* Trail is home to one of the world's largest Pb and zinc smelting and refining facilities. While significant operational improvements have been made to reduce emissions, Pb and SO<sub>2</sub> levels in air have the potential to impact community health. It's important to ensure air quality data in the ambient air quality monitoring network are representative of the community's air and provide high-quality, timely data to track progress, inform decision making, and contextualize Trail relative to other Canadian communities.

#### Pb in Air:

Monitoring data at the established community monitoring stations meet the most stringent standard in the world. However, children's blood Pb levels are higher than non-smelter communities, and ongoing emissions contribute to Pb in dust in the community (as measured by Pb in ambient air). Further reductions of fugitive dust may provide opportunity for reductions in blood Pb levels. Fugitive emissions may also influence soil Pb levels in the community.

#### SO<sub>2</sub> in Air:

Monitoring data at the established community monitoring stations show periodic elevated levels of SO<sub>2</sub> that exceed the recently introduced federal standard. Short-term exposure to elevated levels of SO<sub>2</sub> can constrict or tighten air passages in the lungs, leading to breathing difficulties and tightening in the chest. Young children, elderly people, and those with chronic respiratory disease are most sensitive. While sulphur capture at Teck Trail Operations meets the highest standard for smelters across Canada, and SO<sub>2</sub> emissions are lower than other Canadian smelters, dispersion of SO<sub>2</sub> emissions can be constrained due to the location of the smelter, weather, and the surrounding topography. Teck Trail Operations is working on a program to reduce SO<sub>2</sub> emissions; however improvement will take several years.

#### What needs to be done:

- Continue to implement the programs in place to identify and support the implementation of actions that improve air quality and reduce Pb in dust in the community (e.g. the fugitive dust reduction program, SO<sub>2</sub> reduction program).

- Continue collection and verification of relevant air quality data to support partners and researchers to evaluate the influence of air quality on community health.
- Undertake community education to increase knowledge around SO<sub>2</sub> levels, the potential health effects, and actions that can be taken so that people are empowered to make choices around their health.

### THEP Ambition:

Air quality measures for Pb and SO<sub>2</sub> meet the most stringent applicable criteria:

- Pb levels in air around Trail consistently meet 0.15 µg/m<sup>3</sup> on a three-month rolling average across the community; and
- SO<sub>2</sub> levels in the air around Trail meet Canadian Ambient Air Quality Standards.

### Milestones of THEP partners toward achieving the ambition:

1. By 2025, review the ambient air monitoring network in the community and, where necessary, identify recommendations for modifications to ensure air quality data are representative of the community's air.
2. Annually, demonstrate improvements in Pb in ambient air, as measured in the community.
3. Annually review and update the communications plan on community education around Pb and SO<sub>2</sub> levels in Trail, potential risks, and actions to take.

## 5.2 Soil

*Issue:* Emissions from over 125 years of metallurgical operations in Trail have resulted in elevated levels of Pb and other metals in soil in the surrounding area (EM Area).<sup>5</sup> These levels are above natural background levels and regulatory standards. Teck is the responsible party for soil impacted by historical emissions in accordance with the *Environmental Management Act* and the *Contaminated Sites Regulation*. While working towards an approved Wide Area Remediation Plan (WARP),<sup>6</sup> annual soil management plans, developed by Teck and submitted to ENV, aim to address potential health risks associated with metal contaminated soil. Examples of activities in annual soil management plans include soil testing, remediation, and management in residential yards, parks, and commercial properties. While the community is supportive of soil management, it's important people understand that there are multiple exposure pathways for Pb, and all actions to potentially reduce Pb dust in the home and community are necessary (see 5.3 and 5.6 below). In addition, to ensure sustainability of the soil work taking place, it's important to understand the potential influence of contemporary air emissions on soil as the smelter continues to operate.

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<sup>5</sup> The Environmental Management Area (EM Area) is outlined on the map in section 7.0.

<sup>6</sup> Teck is working with ENV to develop a long-term soil management plan called a Wide Area Remediation Plan (WARP).

### What needs to be done:

- Continue reducing the potential exposure to Pb and other metals in soil via soil management on a prioritized basis.
- Improve communications on the potential risk from metals in soil, who may be at risk, and the supports available to the community.
- Ensure soil is contextualized as one exposure pathway, and that people understand soil management may not be the only (or the most impactful) action to reduce Pb exposure (and lower blood Pb levels).
- Undertake research and monitoring to understand the sustainability of soil management in the community.

### THEP Ambition:

Metal contaminated soil in the Environmental Management (EM) Area is managed in a risk-based and prioritized way through an approved approach under a WARP (Wide Area Remediation Plan).

### Milestones of THEP partners toward achieving the ambition:

1. Annually, ensure the soil management prioritization framework meets the needs of changing priorities and emerging issues.
2. Annually, support prioritized soil management on residential properties by identifying priority properties and offering soil management work.
3. By 2024, develop a long-term monitoring program to:
  - a. evaluate soil metal levels over time, including the influence of contemporary emissions; and
  - b. consolidate performance verification activities for remediated sites.
4. By 2025, identify opportunities for, and provide outreach to, property developers to increase their knowledge and understanding on soil management considerations in the EM Area.
5. By 2025, identify, evaluate, and recommend solutions for soil management including soil relocation, reuse, and disposal strategies for the EM Area that support a long-term sustainable approach to soil management.
6. By 2025, support the community to have an increased awareness and understanding around metal contaminated soil, potential risks, soil management programs, and priorities.
7. Integrate THEP-supported soil management activities into the development of a future WARP for the EM Area.

## 5.3 Built Environments

*Issue:* Pb in indoor dust is a significant pathway for children’s Pb exposure, and continues to be an important focus of THEP’s in-home visits to families with children under 36 months old. There are many sources of Pb in homes in the Trail area, including smelter emissions and other non-smelter related sources. Many buildings (homes and other structures) in the Trail area were built prior to the regulation of Pb in paint and plumbing materials and have a greater likelihood of containing Pb-based paint or Pb in plumbing. Also, older homes can contain historical Pb dust from an era when smelter emissions were higher. Chipping and peeling paint creates Pb dust, which can be accessed and ingested by small children, and paint and dust stirred up during renovation activities may expose residents to Pb dust. Furthermore, as air quality improves, soil management activities reach more properties, and the Program expands to communities more distant to the smelter, the relative influence of Pb exposure from sources in the built environment may be more significant.

### What needs to be done:

- Continue to work with families through in-home visits<sup>7</sup> to provide:
  - education about various potential sources of Pb; and
  - supports that help to reduce potential Pb exposure in the built environment.
- Gain an understanding of the relative influence of non-smelter sources of Pb in the built environment.
- Educate renovators (Do-It-Yourself (DIY) and contractors) to identify Pb risks during renovation projects and protect themselves, their families, and others in the household.

### THEP ambition:

Current and future residents and caregivers in the Trail area are knowledgeable, supported, and empowered to ensure their built environments are lead-safe.

### Milestones of THEP partners toward achieving the ambition:

1. Biannually review and update the communications plan on community education about Pb sources in the built environment.
2. Annually, ensure 100% of the known eligible homes / daycares are offered an in-home visit by the community program representative focused on a healthy home.
3. Biennially, demonstrate that at least 80% of in-home visit recipients surveyed feel they were empowered to take action in their home or daycare environment.
4. By 2025, review data collected through existing THEP activities to evaluate the prevalence of Pb-based paint in the Trail area and make recommendations, as required,

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<sup>7</sup> Eligible families receive an in-home visit from the community program representative focused on a healthy home environment and an in-home visit from the Public Health Nurse focused on a healthy family.

to update THEP guidance for residents on managing Pb based paint and dust in the home.

5. By 2026, demonstrate an increase in THEP's online lead-safe renovation support and education usage.

## 5.4 Health

*Issue:* There is considerable research that shows a link between blood Pb levels and health effects. Children are known to be particularly vulnerable to the effects of Pb. Since 1991, Trail has been hosting and encouraging participation in the annual voluntary children's blood Pb clinics, and notably the average blood Pb level in children has been going down. A Health Canada (2013)<sup>8</sup> literature review identified that a range of 1 to 2 µg/dL of Pb in blood may be associated with a one point reduction in children's IQ. Effects have not been clinically diagnosed in individual children, but rather were identified through studies of populations (large groups) of children.<sup>9</sup> Many other factors, beyond Pb exposure, contribute to IQ differences,<sup>10</sup> which could potentially be influenced in a positive way through improvements in early childhood education supports. In addition, pregnant women who are exposed to Pb can also pass it on to their baby.

Further, as described in section 5.1 on air, based on recent monitoring in Trail, SO<sub>2</sub> levels exceed the benchmarks for ambient air quality set for 2020. Short-term exposures to elevated SO<sub>2</sub> levels can cause the air passages in the lungs to constrict or tighten, leading to breathing difficulties and tightening in the chest. Symptoms may worsen during vigorous exercise or hard physical labour. Those most sensitive to the effects of elevated SO<sub>2</sub> include young children, elderly people, and persons with chronic respiratory disease, especially persons with asthma. In 2020, reducing potential health effects from SO<sub>2</sub> was identified as a priority area for work by the Program.

### What needs to be done:

- Continue to identify future and new parents and provide one-to-one education and supports on healthy child development to positively influence children's future outcomes.
- Identify children with elevated blood Pb levels via the voluntary blood Pb clinics and support them.
- Evaluate the influence of the Program in reducing community Pb exposure through population-level blood Pb data.

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<sup>8</sup> Health Canada, (2013). Final Human Health State of the Science Report on Lead. February 2013. Her Majesty the Queen in Right of Canada, represented by the Minister of Health, 2013.

<sup>9</sup> Ross Wilson & G. Mark Richardson, (2013). "Lead (Pb) is Now a Non-Threshold Substance: How Does this Affect Soil Quality Guidelines?" *Human and Ecological Risk Assessment: An International Journal*, 19:5, 1152-1171.

<sup>10</sup> The magnitude of the potential effect reflects the values reported in the literature. They should not be interpreted as definitive, but rather as an approximate indication of the relative importance of these factors.

- Ensure messaging on reducing exposure to Pb, as well opportunities for improving child outcomes, reaches baby groups, daycares, and family service providers.
- Ensure multiple channels for communicating how to manage potential effects from elevated levels of SO<sub>2</sub> are used.

#### THEP ambition:

THEP is a community leader and champion for health and early childhood development.

#### Milestones THEP partners will contribute toward achieving the ambition:

1. Annually, ensure at least 90% of the known families will receive a primary prevention in-home visit by the Public Health Nurse focused on Pb and SO<sub>2</sub> before each child's first birthday.
2. Annually, conduct outreach and support participation in IH's blood Pb testing clinics to maintain high participation rates.
3. Biennially, ensure that the in-home visiting team (Public Health Nurse and community program representative) continues to be known as a trusted source of knowledge on Pb and SO<sub>2</sub> in the community.

## 5.5 Community Connectedness & Leadership

*Issue:* There are many supports available to residents and investors in Trail to navigate the influence of proximity to an operating smelter. Understanding where to go for information and providing one 'window' to learn about the issues, ask questions or find support is important, but could be better known outside of existing networks. Community partnerships, along with the proactive and transparent nature of the Program, are critical to maintaining THEP's relationships and high participation rates in programs by families during the child-rearing years. Referrals and community connections are necessary for trust building, ensuring messaging gets to those who need it, and maintaining THEP's positive reputation in the community. While much was published throughout the 1990s and early 2000s on the work undertaken in Trail to understand Pb exposure in the community, there has been not been any updated or published research in the past twenty years. Being accessible to others outside of Trail to share knowledge and learning is important to the global community of cities and towns with operating lead smelters and mines facing similar challenges.

#### What needs to be done:

- Increase THEP's visibility and accessibility in the community beyond its core client base.
- Continually review and update the communications plan to identify traditional, as well as harder to reach, audiences such as indigenous groups, seniors, contractors, schools, and others.
- Ensure Program representatives are:



- sources of support in a variety of family-specific networks;
- sources of education for the development community; and
- present throughout the community as a positive addition to living in Trail and surrounding areas.
- Strengthen online visibility so THEP is recognized as a source of knowledge and experience locally and globally .

### THEP ambition:

THEP is known locally (and beyond) as a trusted partner in the community wellbeing of Trail and area.

### Milestones of THEP partners toward achieving the ambition:

1. Annually, keep abreast of the work of, and actively contribute to, other organizations whose work supports THEP goals.
2. Annually, identify and participate in at least five events/year to raise THEP's profile, improve connectedness, and demonstrate leadership.
3. By 2025, document the story of THEP's evolution and achievements for the public and science community (2001-2021).
4. By 2025, establish a community of practice / learning network to support knowledge sharing and learning between global actors facing similar challenges to THEP partners (e.g. potential members include BCCDC, Port Pirie, Broken Hill, Mount Isa, along with THEP).

## 5.6 Integration, Understanding and Creating Value Together

*Issue:* The complex challenges THEP addresses cannot be solved by one organization or government alone. The diversity of people and organizations engaged in THEP bring a range of perspectives, expertise, and history. This can be a huge benefit to gaining a shared understanding of the complex landscape everyone is working in. THEP was recognized in 2011 with a Premier's Award for Collaboration, acknowledging the successful collaborative approach. However, with geographical distance, diversity in subject matter expertise, along with turnover of the partner staff, Program team staff, and committee members, at times there are different understandings of the issues, missed synergies, and potentially reduced value for the community. Furthermore, as Pb in community air (measured by the air quality monitoring network) and health (measured by blood Pb levels) improves, understanding the pathways for Pb exposure in children becomes more challenging to decipher. It's important to understand dominant exposure pathways so that resources and programming are designed for maximum impact.

### What needs to be done:

- Commit to fostering a culture of knowledge sharing and learning with the partners, including regular communication and documentation.

- Improve onboarding of new staff and committee members to increase morale and the ability to contribute to Program ambitions.
- Ensure opportunities to build everyone’s understanding of the complex system the Program operates in (including all potential pathways for Pb exposure).
- Ensure activities suggested and/or taking place are appropriate to the local context and risks are identified and managed.

### THEP ambition:

A greater understanding by all partners of the relative influence of smelter emissions on children’s blood Pb levels in the Trail Area is achieved.

### Milestones of THEP partners toward achieving the ambition:

1. Annually, at the community program level, ensure that team members with varied expertise will continue to actively to seek opportunities for collaboration across subject matter (air, soil, health, and built environment).
2. Annually, have the THEP partners gather, reflect, document, and share publicly the lessons learned generated by the partners and Program team, with a focus on seeing the bigger picture.
3. By 2025, create and integrate into operations an onboarding process to welcome new Program staff and committee members.
4. By 2025, develop an accepted adaptive management framework to review and learn continuously from Program work.
5. Ongoing, advocate for participation of partners in studies that help better understand the health and environment of Trail (e.g. UBC teeth study, Trail Health Review Committee, etc.)

## 6.0 MONITORING

For each strategic area, measurable indicators of success will be developed.

## 7.0 FIGURES

Figure 1. Trend of Blood Pb Geomean by Area 1991-2021

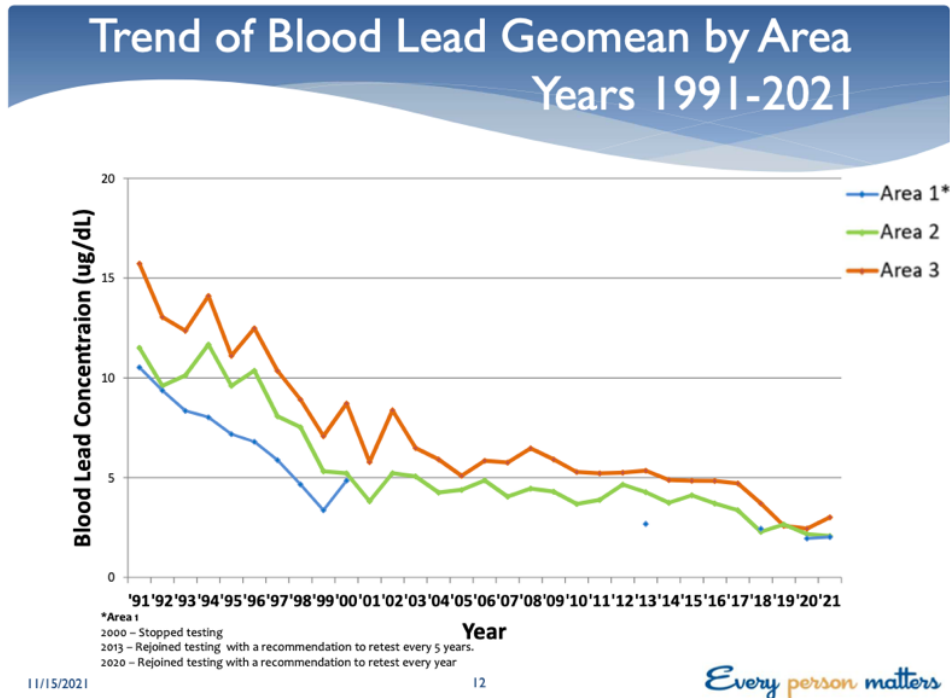
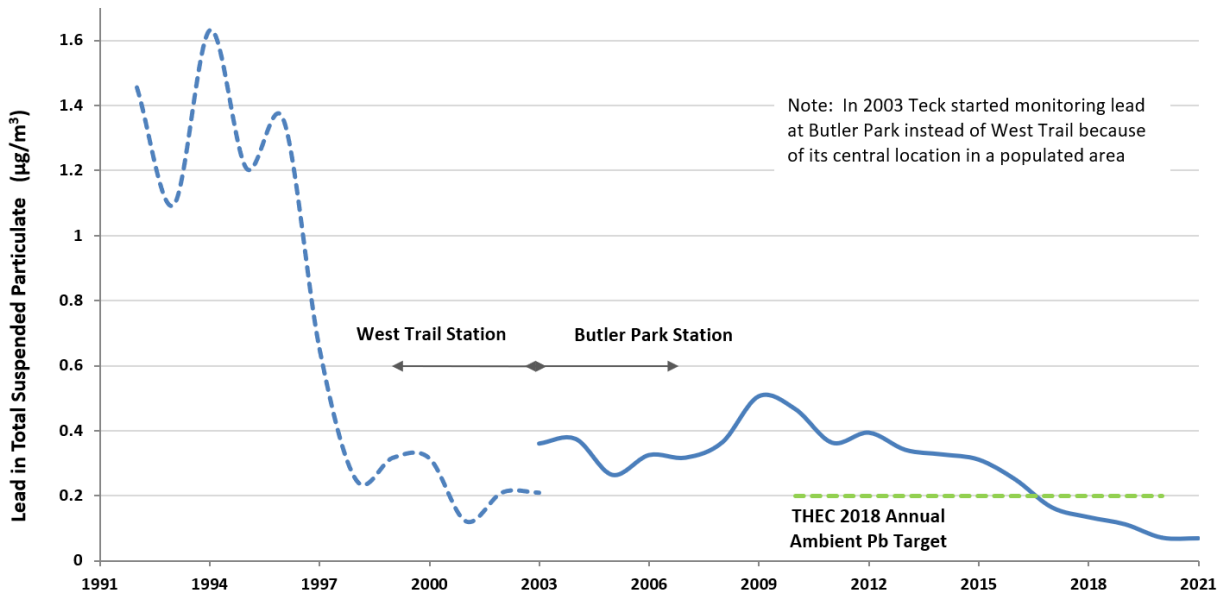


Figure 2. Annual average for Pb in community air from 1991-2021

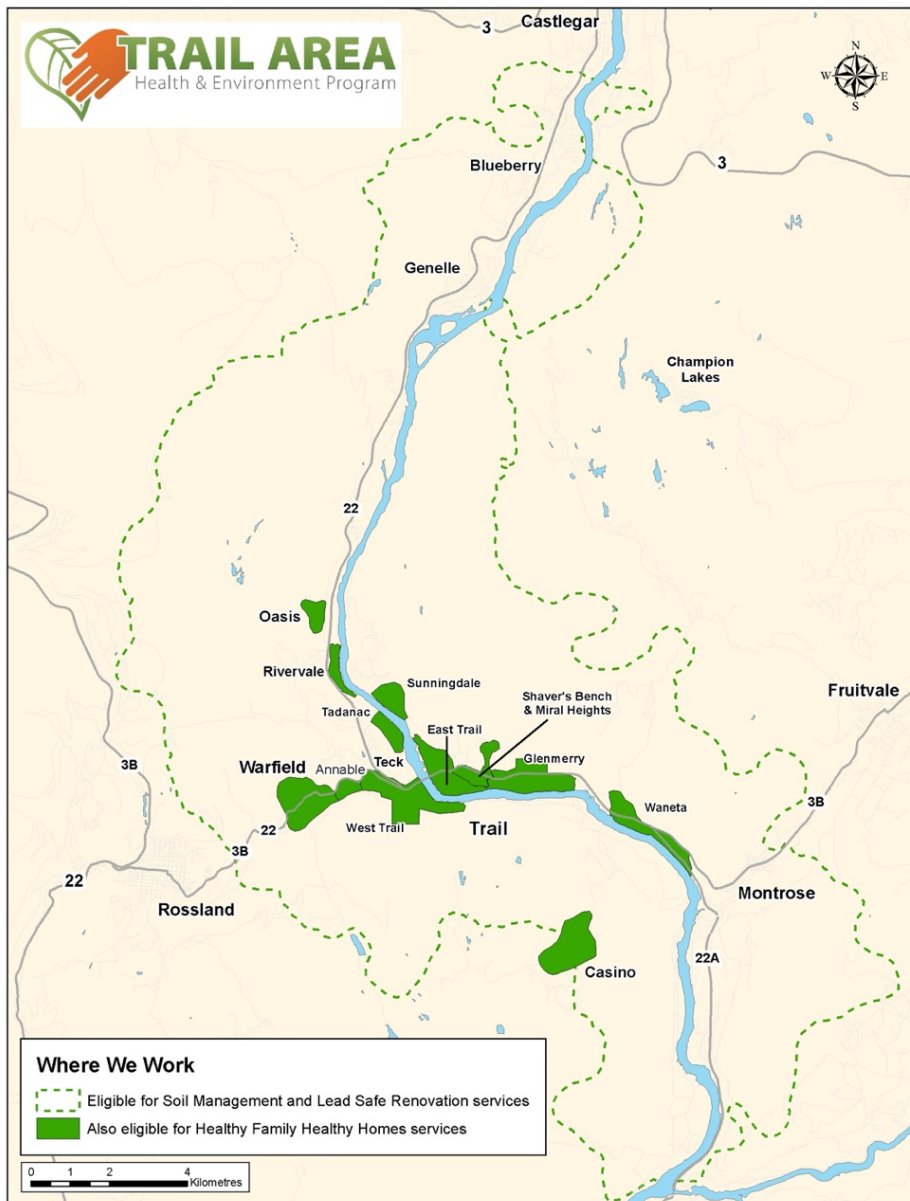


### Figure 3. Sulphur Dioxide (SO<sub>2</sub>) in community air

Actual ambient SO<sub>2</sub> concentrations in Trail fluctuate throughout the day, month and year. Although levels fluctuate, monitoring data from recent years exceed the benchmarks for ambient air quality set by the Provincial and Federal governments that came into effect in 2020. Find current and historical data online at:

<http://www.env.gov.bc.ca/epd/bcairquality/readings/find-stations-map-SO2.html>

### Figure 4. Program Area



THEP community programs serve Trail and surrounding areas in priority order. The focus and priority support is for communities closest to the smelter including Trail, Casino, Oasis, Rivervale, Waneta, and Warfield. Some programs are also available throughout the Lower Columbia Area and on the map within the green dashed line.