

Work Plan Application

Project Information	
Project Title:	Atmospheric Pollutant Active Monitoring Network
Lead Applicant, Organization, or Community:	Alberta Environment and Protected Areas
Work Plan Identifier Number: If this is an on-going project please fill the identifier number for 24/25 fiscal by adjusting the last four digits: Example: D-1-2425 would become D-1- 2425	A-LTM-S-1-2425
Project Region(s):	Oil Sands Region
Project Start Year: First year funding under the OSM program was received for this project (if applicable)	Pre-1998
Project End Year: Last year funding under the OSM program is requested Example: 2024	
Total 2024/25 Project Budget: From all sources for the 2024/25 fiscal year	\$13,088,204.00
Requested OSM Program Funding: For the 2024/25 fiscal year	\$13,501,250.29
Project Type:	Long Term Monitoring
Project Theme:	Air & Deposition
Anticipated Total Duration of Projects (Core and Focused Study (3 years))	-Select One-
Current Year (choose one):	Focused Study -Select One-
	Core Monitoring -Select One-

Contact Information

Lead Applicant/ Principal Investigator: Every work plan application requires one lead applicant. This lead is accountable for the entire work plan and all deliverables.	Greg Wentworth
Job Title:	Senior Atmospheric Scientist, Airshed Sciences
Organization:	Alberta Environment and Protected Areas
Address:	9th Floor, 9888 Jasper Ave NW Edmonton, AB T5J 5C6
Phone:	780-229-7236
Email:	greg.wentworth@gov.ab.ca

Project Summary

In the space below, please provide a summary of the proposed project that includes a brief overview of the project drivers and objectives, the proposed approach/methodology, project deliverables, and how the project will deliver to the OSM Program objectives. The summary should be written in plain language and **should not exceed 300 words**.

Ambient air quality monitored through active methods is essential to identify stressor sources, and to link stressors to potential impacts on humans and the environment. The data collected continuously by this program allows an assessment of emission sources, air quality and possible receptor responses to be undertaken for any period of interest (e.g. hourly, daily, seasonal, long-term). Assessments can be conducted on real-time or historical data collected as far back as 1998.

The overall objectives of the active air quality monitoring network in the oil sands region are:

- Provide ambient data that will allow assessment of: (i) current state of air quality, (ii) changes in measured concentrations (relative to baseline), and (iii) hot-spots and emerging issues (based on changes from baseline and/or elevated levels relative to established criteria/objectives/thresholds).
- Provide representative ambient concentrations in populated areas to inform human health risk assessments and provide the public with air quality indicators through the Air Quality Health Index (AQHI) or Fort McKay Air Quality Index (FMAQI).
- Provide ambient concentrations to help understand the impact of multiple sources on air quality in the Oil Sands region, including the ability to distinguish between oil sands specific sources of emissions from other natural and anthropogenic sources.

Specific objectives of the active monitoring network in the OSM region are provided in Section 2.0 Objectives of the Work Plan.

The Active Ambient Air Monitoring Program has four components described below:

(1) Long-term core ambient air monitoring network - includes continuous and time-integrated air monitoring. The Wood Buffalo Environmental Association (WBEA) operates 30 ambient air monitoring stations (AMSs) in the Athabasca Oil Sands Region (including the acute air monitoring station in Fort McKay - Waskōw ohci Pimâtisiwin). The Lakeland Industry and Community Association (LICA) operates 5 AMSs in the Cold Lake Oil Sands Region, and the Peace River Area Monitoring Program (PRAMP) operates 5 AMSs in the Peace River Oil Sands Region. All three airsheds collect time-integrated samples for the National Air Pollution Surveillance (NAPS) program and other parameters that cannot be collected through continuous monitoring. The long-term core air monitoring network was developed to fulfill EPEA Approval compliance monitoring requirements and satisfy community and scientific interests. Both the WBEA and PRAMP core ambient air monitoring networks have recently undergone multi-stakeholder assessments to develop a series of recommendations to rationalize/optimize the network. The results of these assessments are being used to adapt the networks.

In addition, funding for the operation of the Namur Lake AMS was approved by OSM in 2021-22. This station, implemented in 2016, is owned and operated by Fort McKay First Nation (FMFN) and is referenced in Section 5.4 of the Moose Lake Access Management Plan released by the Government of Alberta in February 2021 (<https://open.alberta.ca/publications/moose-lake-access-management-plan>).

(2) Recommendations 14/15 in the report "Recurrent Human Health Complaints Technical Information Synthesis - Fort McKay Area" (Alberta Energy Regulatory and Alberta Health, 2016) continue to be implemented. Implementation of these recommendations will improve air monitoring consistency within 30 km of Fort McKay and allow improved characterization of the air pollutants and their sources that cause air quality and odour concerns in the community. Some aspects of this monitoring are intended to be short-term or focused, as described in Section 10.0 Work Plan Approach/Methods. A request is made in this work plan to purchase, deploy, and operate a portable vertical wind/temperature profiler to better understand emissions transport and impacts in Fort McKay and surrounding areas.

(3) Odour Monitoring - The WBEA created an odour monitoring app (COMP) that allows the public to provide anonymous information on the odours they experience. The app collects information such as odour type, intensity, duration, time, and location. The collected information is compared to data at WBEA ambient air monitoring stations to determine if or how ambient air quality trends are related to odours. All submitted odour observations and annual reports can be found at www.comp.wbea.org.

(4) Transition to an Adaptive Monitoring Approach - will continue in 2024-25. This will involve a structured approach to: (a) reviewing the existing monitoring network and document the purpose or objective for each station and for each parameter monitored at each station (completed); (b) developing a shared understanding of regulatory and community expectations that will guide any OSM adaptive monitoring framework based adjustments required to the current long-term surveillance program (in progress); (c) determining which air quality parameters are applicable for the Adaptive Monitoring approach (in progress); (d) quantifying baselines for selected parameters (in progress); and (e) establishing limits of change for selected parameters (future work).

In addition, the Atmospheric Pollutant Active Monitoring Network work plan includes collaboration with two community-based (FMFN and Fort McKay Metis Nation (FMMN)) monitoring projects, one for dust and one for odour that were approved for funding and commenced in 2022-23.

Major changes relative to the 2023-24 work plan include:

- Procurement of vertical wind/temperature profiler to fulfill a Fort McKay Air Quality and Odour (FMAQO) Rec 14/15 monitoring gap that was created with the decommissioning of the ECCC Oski-ötin AMS in Fort McKay. The capital cost for the purchase of the equipment is being included in this workplan, while the additional costs of short-term deployments and operations will be included in WBEA's routine operational costs.
- On-going implementation of recommendations from the WBEA and PRAMP network assessments.

1.0 Merits of the Work Plan

All work plans under the OSM Program must serve the mandate of the program by determining (1) if changes in indicators are occurring in the oil sands region and (2) if the changes are caused by oil sands development activities and (3) the contribution in the context of cumulative effects. In the space below please provide information on the following:

- Describe the key drivers for the project identifying linkages to Adaptive Monitoring framework particularly as it relates to surveillance, confirmation and limits of change (as per OC approved Key Questions).
- Explain the knowledge gap as it relates to the Adaptive Monitoring that is being addressed along with the context and scope of the problem as well as the Source - Pathway - Receptor Conceptual Models .
- Describe how the project meets the mandate of the OSM Program or areas of limited knowledge is the work being designed to answer with consideration for the TAC specific Scope of Work Document (attached) and the Key Questions (attached)?
- Discuss results of previous monitoring/studies/development and what has been achieved to date. Please identify potential linkages to relevant sections of the State of Environment Report.

KEY DRIVERS and LINKAGES TO ADAPTIVE MONITORING FRAMEWORK:

Active air monitoring in the Athabasca oil sands region started shortly after oil sands development with the first continuous monitoring commencing in 1975. The original driver of this monitoring was regulatory approval requirements and human exposure community monitoring. Airshed organizations began monitoring air quality in the Athabasca, Cold Lake and Peace oil sands regions in 1998, 2000 and 2016, respectively. In recent years, air monitoring networks were broadened to address specific concerns ranging from emergency response to understanding the impact of oil sands development in the context of other cumulative impacts (e.g. domestic sources, wildfire smoke, climate change).

The proposed work builds on an already well-developed framework for surveillance monitoring, mechanisms for confirming change, and modelling to support understanding of airborne contaminants' transport and fate. This network collects data on ambient air pollutant concentrations that will be used to: (1) establish appropriate baseline conditions for selected parameters at relevant receptor locations, (2) assess changes from these baseline conditions and comparison to limits of change established by the OSM Program; and (3) confirmation of the nature and extent of events that may have impacts on humans and/ or the environment.

In the 2024-25 work plan, we will: (1) continue surveillance (including ambient compliance) monitoring, (2) continue developing limits of change and criteria for investigation of cause at specific receptor locations, (3) continue developing an understanding and establishment of a baseline or baselines of air quality that are appropriate for determining change, (4) improve effects-based surveillance and air quality linkages, (5) improve our understanding of regional emission sources, and (6) use an air quality model (GEM-MACH) to continue providing model outputs to meet OSMP objectives and provided information used by OSMP members (e.g., deposition maps, baseline assessment, quantifying source contributions). Please refer to the diagram called "Monitoring Activities in an EEM Framework (within existing linkages)" in Supplemental Attachment #06 for a visual explanation of how the active air monitoring network fits into the adaptive monitoring approach.

KNOWLEDGE GAP WITHIN SOURCE-PATHWAY-RECEPTOR MODEL:

The active ambient air quality monitoring network is directly included in the conceptual model and is linked to odours, contaminant exposure, abiotic chemical change and human health. The current active ambient air quality monitoring network was, and is, based on meeting both regulatory and community interests and needs. Data collected by this network is used to understand the impact of air emission sources on ambient air quality. This understanding allows the potential odour, health, and environmental impacts of the air quality parameters associated with emissions from oil sands operations and other sources (in a cumulative effects context) to be assessed. Understanding the impacts of air pollutants on the environment and humans can be assessed using the Adaptive Monitoring framework approach. A major focus of the Air and Deposition TAC will be to develop a shared understanding of the current regulatory and community expectations that will guide any required OSM adaptive monitoring framework-based adjustments to the current long-term surveillance program and to determine which elements of the

adaptive monitoring approach of the Adaptive Monitoring framework need to be incorporated into the active ambient air monitoring network.

Data collected by the active long-term air monitoring network is used to address the following knowledge gaps:

- Does air quality exceed the benchmarks such as AAAQOs, AAAQGs, LARP triggers/limits, CAAQS or Fort McKay's Permissible Air Quality Limits?
- What is the Air Quality Health Index (AQHI) in communities and in Fort McKay what is the Fort McKay Air Quality Index (FMAQI)?
- What are the long-term trends of monitored parameters in relation to human health, ecosystem, and environmental effects thresholds and to community concerns?
- What are the patterns of change of monitored parameters in communities and at key receptor locations and what is contributing to these patterns?
- What are the effects of energy resources and commercial developments on the air quality in communities?
- Are anthropogenic air emissions and/or associated atmospheric deposition related to oil sands activities affecting ecological systems in the oil sands region?
- What changes to environmental indicators are occurring in the oil sands region? Are they due to oil sands development?
- What are the background concentrations of measured ambient air parameters?
- What is the relationship between odour complaints and ambient air monitoring data?
- Do ambient air concentrations of H₂S and/or SO₂ in Fort McKay meet Trigger Levels determined by the FMAQO Advisory Committee?
- How are air emissions from industry within 30 km of Fort McKay affecting air quality and odour in the community?

FULFILLMENT OF OSM PROGRAM MANDATE:

The Air TAC will continue to develop a shared understanding of objectives, tiers of monitoring activity, baselines, limiting factors, triggers, pathways and contributing factors to, as appropriate, implement elements of an adaptive monitoring framework. This will allow further assessment of the impact of air quality on environmental receptors and human health. This work is being led by a Sub-Working Group within the Air TAC; however, baseline development work has been delayed to address other OSM priorities (e.g., workshops, meeting funding conditions, transitioning to a new governance structure).

The active air monitoring network in the oil sands region has been in place for over 40 years and provides a wealth of data to assess changes in air quality indicators. The active air monitoring data provides confirmation of expected and observed influence of stressor - response pathways (Hemsley et al., 2019, Landis et al., 2019).

As discussed in the next section, many studies have been conducted to evaluate the impacts of air emissions from oil sands operations on air quality and human and environmental receptors. An Adaptive Monitoring approach will continue to be developed for specific air quality parameters, which will allow further assessment of the impact of air quality on environmental receptors and human health. Different parameters may require different baselines after which they will be assessed for potential "change" within the data availability period.

RESULTS OF PREVIOUS MONITORING STUDIES:

Emissions from oil sands operations are impacting ambient air quality. The assessment of the nature and magnitude of these changes in air quality depends on the methodology used to assess change, and the baseline from which changes are assessed. Monitoring is a direct measure of ambient air quality in the oil

sands region. Complementary tools, such as modelling, satellite data, and intensive focused studies, provide the necessary information (i.e., calculated and predictive scenarios) to address monitoring gaps and inform decision-making.

The following are some of the air quality changes and source attribution relations that have been observed in the oil sands region:

- Net SO₂ from the main sources as inferred from surface monitoring stations and satellite data shows a slight overall increasing change in SO₂ in the oil sands mining region between Fort McMurray and Fort McKay (McLinden et al., 2020).
- Sulphur concentrations in lichen, as a marker of S-in-air, shows no significant changes (Wieder et al., 2020).
- Secondary organic aerosol (SOA) as a major component of total PM_{2.5} resulting from oil sands activities has increased between an early industrial expansion period (1998-2001) and more recent times (2011-2014) (Liggio et al., 2016).
- SO₂ concentrations are low and remain stable at the Maskwa monitoring station (Cold Lake Airshed) despite new facility construction and the commissioning of oil sands expansions projects. The stable SO₂ observations are likely due to the de-grandfathering of older facilities and associated reductions in the allowable SO₂ releases from these facilities.
- Although the Reno monitoring station continues to show elevated hydrocarbon concentrations (CH₄, NMHC) relative to current measurements at the other PRAMP sites overall, there has been a decrease in the magnitude and frequency of elevated concentration hydrocarbon events.
- Edgerton et al. (2020) showed a decrease in concentrations of reactive gases from the center of surface mining oil sands production operations towards the edges of the monitoring domain by factors of 8 for SO₂, 20 for NO₂, 4 for HNO₃ and 3 for NH₃, with 18 out of 30 sites showing a ~40% SO₂ decrease since 2000 and only 2 out of 30 sites showing statistically significant temporal changes for NO₂.
- Landis et al., 2017 applied a PMF receptor model to ambient air data from AMS Fort McKay, which resolved five sources explaining 96% of PM_{2.5}, and six sources explaining 99% of PM₁₀ and based on the study results concluded that “Abatement strategies targeting the three major types of fugitive dust would likely result in significant reductions in ambient PM_{10-2.5} concentrations in the Fort McKay community”.
- Overall, ambient NO₂ increased from 2000-2008 in the Athabasca Oil Sands Region (AOSR) and plateaued with little change since. Small data sets prevented examining PM_{2.5} and NH₃ changes; however, wildfires are known as a large NH₃ source during summer months. McLinden et al. (2015) showed regional annual increases in NO₂ through to 2014 and NO_x emission data shows a general continuing increase in NO_x emissions North of Fort McMurray. It should be noted that NO₂ levels at stationary air monitoring stations will be influenced by their proximity to mining operations (e.g. levels will increase when the mine expands closer to the station and decrease when the mine expands away from the station). Therefore, general ambient NO₂ level trends may be better predicted by trends in NO_x emissions.
- Strong seasonality is also observed for PM₁₀, where ambient monitoring near community and industry operations detected high alkalinity and strong spatial gradients, with higher deposition of base cations during snow-free periods.
- Fort McKay, in cooperation with WBEA, commenced dustfall monitoring at the Fort McKay Bertha Ganter AMS in November 2022. For the November 2022 through to September 2023 period WBEA has reported exceedances of the monthly AAAQG for Dustfall for all months except January and February 2023. This highlights that coarse particulate levels, and associated deposition of these particulates, represent a dustfall issue which is consistent with the finding of Landis et al., 2017 as noted above. Since dust can have a number of environmental impacts as noted in the bullet, this new type of regional particulate monitoring is an example of adaptive monitoring.

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Air quality levels are dynamic in the oil sands region. They may change depending on several factors such as emission rates, meteorological conditions, topography, and the location of emission sources relative to the receptor (community). Alternate approaches have been used to assess the impacts of oil sands operations on nearby communities. The use of these methodologies show a "clear and generally increasing influence of industry on air quality" in the community of Fort McKay (Davidson and Spink, 2018). Based on this work, concentrations of NO₂, SO₂, THC, TRS, and PM_{2.5} between an early industrial expansion period (1998-2001) and more recent times (2011-2014) have significantly increased and that this change can be attributed to industrial development. Furthermore, pollution "episodes" continue to impact Fort McKay's community (Wren et al., 2020). Due to the dynamic nature of air pollution in the oil sands region, traditional time-series trend analysis of air quality data may not be appropriate for assessing the effectiveness of emission management programs and therefore previous trending findings need to be interpreted and used with caution.

This work plan explicitly links to Chapter 3 of the State of Environment Report (State of the Air), including ambient air measurements of NO₂, SO₂, PM_{2.5}, THC, H₂S/TRS, PACs and trace elements.

Results based on data collected by the active air monitoring network are available at:

<https://open.alberta.ca/publications/9781460140925>

<https://open.alberta.ca/publications/9781460145692>

<https://www.tandfonline.com/doi/full/10.1080/10962247.2017.1377648>

<https://wbea.org/resources/reports-publications/air-monitoring-reports/>

<https://comp.wbea.org/>

<https://wbea.org/resources/reports-publications/publications/>

<https://www.sciencedirect.com/journal/science-of-the-total-environment/special-issue/10LW6CG6CPT>

<https://wbea.org/air/air-quality-events/>

<https://lica.ca/resources/>

<https://prampairshed.ca/resources/other-resources/>

2.0 Objectives of the Work Plan

List in point form the objectives of the 2024/25 work plan below

The active air monitoring network functions to address multiple objectives, science questions and policies including:

- Environmental Protection and Enhancement Act (EPEA) approvals;
- National Air Pollution Surveillance (NAPS) system;
- Acid Deposition Management Framework (ADMF);
- 2009 Ambient Air Monitoring Strategy for Alberta;
- 2019-2024 science strategy (Knowledge for a changing environment);
- OSM Monitoring Objectives;
- Alberta's Ambient Air Quality Objectives (AAAQOs) and Guidelines (AAAQGs);
- Air Quality Health Index (AQHI);
- Fort McKay Air Quality Index (FMAQI);
- Fort McKay Response Trigger Protocol;
- Lower Athabasca Regional Plan (LARP);
- Canadian Ambient Air Quality Standards (CAAQS)
- The AER and Alberta Health Fort McKay Air Quality and Odour (FMAQO) Project; and

- Indigenous air quality concerns and monitoring requests.

Specific objectives of the 2024/25 work plan are:

- (1) To measure impacts from Oil Sands development on ambient air quality.
- (2) To provide ambient air data that citizens, industrial members, and regulatory bodies can use to make informed decisions on health, facility compliance, and environmental management policy.
- (3) To provide ambient air data for community needs, including the Air Quality Health Index (AQHI), the Fort McKay Air Quality Index (FMAQI), and measuring representative ambient concentrations in populated areas.
- (4) Implement ambient air monitoring approved by the Fort McKay Air Quality and Odour (FMAQO) Advisory Committee (specific to Recommendations 1, 14 and 15).
- (5) To measure air parameters in Fort McKay that will assist in odour identification and source characterization/attribution during air quality and odour events.
- (6) To understand the impacts of Oil Sands development on the odours experienced in communities in the AOSR.
- (7) To understand the relationship between the odours experienced by community members and the ambient air data collected at active air monitoring stations.
- (8) To measure air parameters in Fort McKay that will assist in dustfall identification and source characterization during dustfall and low visibility events.
- (9) To understand the impacts of Oil Sands development on the dustfall experienced in Fort McKay.
- (10) To understand the relationship between the dustfall experienced by community members in Fort McKay and the ambient air data collected at active air monitoring stations.
- (11) To ensure that monitoring carried out in the region is relevant to the concerns of community members.
- (12) To implement the adaptive monitoring approach, as directed by the OSM Program Oversight Committee, where appropriate in the Atmospheric Pollutant Active Monitoring Network.
- (13) Create an Indigenous-led air monitoring program in the Peace Athabasca Delta and at reserve locations in partnership with WBEA.

3.0 Scope

Evaluation of Scope Criteria (Information Box Only- No action required)

Your workplan will be evaluated against the criteria below. A successful workplan would:

- Be in scope of the OSM Program (e.g., regional boundaries, specific to oil sands development, within boundaries of the Oil Sands Environmental Monitoring Program Regulation)
- consider the TAC-specific Scope of Work document and the key questions
- integrate western science with Indigenous Community-Based Monitoring)
- address the Adaptive Monitoring particularly as it relates to surveillance, confirmation and limits of change as per approved Key Questions.
- have an experimental design that addresses the Pressure/Stressor, Pathway/Exposure, Response continuum
- produce data/knowledge aligned with OSM Program requirements and is working with Service Alberta
- uses Standard Operating Procedures/ Best Management Practices/ Standard Methods including for Indigenous Community-Based Monitoring

3.1 Theme

Please select the theme(s) your monitoring work plan relates to:

- | | | | |
|--|---|--|-----------------------------------|
| <input checked="" type="checkbox"/> Air | <input type="checkbox"/> Groundwater | <input type="checkbox"/> Surface Water | <input type="checkbox"/> Wetlands |
| <input type="checkbox"/> Terrestrial Biology | <input type="checkbox"/> Data Management Analytics & Prediction | <input type="checkbox"/> Cross Cutting | |

3.2 Core Monitoring, Focused Study or Community Based Monitoring

Please select from the dropdown menu below if the monitoring in the work plan is “core monitoring” and/or a “focused study”. Core monitoring are long term monitoring programs that have been in operation for at least 3 years, have been previously designated by the OSM program as core, and will continue to operate into the future. Focused studies are short term projects 1-2 years that address a specific emerging issue.

Long Term Monitoring

Themes

Please select the theme from the options below. Select all that apply.

- | | | | |
|---|--|--|----------------------------------|
| <input checked="" type="checkbox"/> Air | <input type="checkbox"/> Groundwater | <input type="checkbox"/> Surface Water | <input type="checkbox"/> Wetland |
| <input type="checkbox"/> Terrestrial | <input type="checkbox"/> Cross-Cutting | | |

3.3.4 Air Themes

3.3.4.1 Sub Themes

Quality

3.3.4.2 Air & Deposition - Key Questions:

Explain how your air & deposition monitoring program addresses the key questions below.

Has baseline been established? Have thresholds or limits of change been identified?

There are multiple ways to define 'change', all of which require defined definitions and determinations of the 'baselines' or 'backgrounds' against which change is measured. Developing a shared understanding between all stakeholders and partners will be crucial for the success of this framework. These terms have not been explicitly defined for air monitoring by the OSM Program, but have been defined by numerous reports, journal articles, and review papers in the literature. In 2024-25, the TAC will continue its work to define 'baseline(s)' for specific air quality parameters through a TAC Sub-Working Group. Existing data will be leveraged to help define 'baseline(s)', which consider different time periods and geographical locations. It is likely that each contaminant will require distinct baselines.

Are changes occurring in air quality? If yes, is there evidence that the observed change is attributable to oil sands development? (Describe source-pathway-receptor and/or conceptual models) and what is the contribution in the context of cumulative effects?

The assessment of change depends on the statistical method used to evaluate the data, the criteria used to determine the statistical significance of any calculated change, and the data period used to assess change. Based on annual average concentration data over ten years, statistically significant improvements in ambient air quality have been measured for SO₂, H₂S/TRS and NO₂ at several air monitoring stations in the Athabasca oil sands region. However, a statistically significant increase (worsening) in SO₂ levels was measured at the Lower Camp AMS based on ten years of data. These changes imply there have already been impacts on air quality due to OS emissions. Nonetheless, air quality levels are dynamic in the oil sands region and may change depending on factors such as emission rates, meteorological conditions, topography and the location emission sources relative to the receptor(s) of interest e.g. community, sensitive ecosystem, etc.

As an example, Davidson and Spink (2018) found that concentrations of NO₂, SO₂, THC, TRS, and PM_{2.5} between an early industrial expansion period (1998-2001) and current day (2011-2014) have significantly increased in Fort McKay and that this change can be attributed to industrial development. Due to the dynamic nature of air pollution in the oil sands region, traditional monotonic time-series trend analysis of air quality data may not be appropriate for assessing temporal changes in air quality and/or the effectiveness of emission management programs.

Odours and air quality concerns are a recurrent issue in communities in the oil sands region, especially in Fort McKay. Intensive air monitoring in and near the community helps identify air pollutants that are causing air quality and odour issues and the sources responsible for these issues. Air quality trigger levels have been established for SO₂ and H₂S in Fort McKay that will be compared to, and actioned, based on data from the Waskōw ohci Pimâtisiwin station. As of September 2022, the lowest trigger level for SO₂ has been exceeded twenty-nine times since the Fort McKay Acute Response Triggers Process was established. The most recent exceedance occurred on May 15, 2023. All trigger exceedances can be viewed at <https://wbea.org/air/air-quality-events/>.

An enhanced air quality monitoring station in Fort McKay (Oske-ôtin) was established in 2013 to monitor a wide range of air pollutants in near-real-time so that a detailed diagnosis of pollutants associated with odour events and other air quality episodes could be determined. The station was decommissioned in 2022 and data analysis from this site has led to new methods for source attribution for specific air quality or odour events in Fort McKay (Wren et. al. 2020).

Are there unanticipated results in the data? If yes, is there need for investigation of cause studies?

Previous results from this work plan, some of which were unanticipated, are summarized in Section 1.0. The TAC will continue its work to develop baselines for core monitoring parameters to support defining limits of change that can be used to trigger investigation of cause studies. In the meantime, the WBEA has completed a Network Assessment (consistent with an Oversight Committee Funding Direction from May 2022). At the time of writing, the technical recommendations the working group made are undergoing community review. Some the recommendations did include Investigations of Cause/Focused studies where monitoring gaps were identified.

Are changes in air quality informing Indigenous key questions and concerns?

Based on recurrent odour and poor air quality issues and general concerns regarding air quality impacts on health, air quality monitoring is conducted in or near several Indigenous communities in the oil sands region, including Fort Chipewyan, Fort McKay, Anzac, Janvier, Conklin and Cadotte Lake. Air quality data from these monitoring stations is used to calculate the Air Quality Health Index (AQHI), which provides community members with a short-term health-based indicator of current air quality conditions with associated advice on health risk mitigation actions that can be taken. Additionally, community members in the Athabasca Oil Sands Region can submit odour concerns through the Community Odour Monitoring Program (COMP) app. The WBEA, LICA, and PRAMP currently monitor in communities that would otherwise have been excluded from provincial and federal monitoring strategies or plans, filling a monitoring gap that helps address Indigenous community concerns.

Additional air monitoring is conducted in Fort McKay as, due to its location relative to oil sands mining and upgrading operations, it is the community most impacted by oil sands emissions and there are recurrent air quality issues in the community and related health and quality of life concerns by community members. In addition to a community ambient air monitoring station, a second station located in the centre of the community (Waskōw ohci Pimâtisiwin station) provides information to the community on acute concentrations of SO₂ and H₂S for emergency response purposes.

The report “Recurrent Human Health Complaints Technical Information Synthesis - Fort McKay Area” (Alberta Energy Regulatory and Alberta Health, 2016) contains recommendations directed at addressing many of Fort McKay’s air quality and odour concerns. Pollution “episodes” that continue to impact the community of Fort McKay were evaluated by Wren et al., 2020 and Landis et al. 2017 where source attribution was undertaken. Landis et al. 2017 concluded that “Abatement strategies targeting the three major types of fugitive dust would likely result in significant reductions in ambient PM_{10-2.5} concentrations in the Fort McKay community.” which is information the community can use to understand the sources impacting one element of air quality in the community. Furthermore, regulatory agencies and industry can use this information to pursue mitigation measures to reduce impacts on surrounding communities.

The project is linked to GEM-MACH modeling activities under the Atmospheric Deposition Monitoring work plan (A-PD-6-2425), which will include an examination and further development of the model’s predictive capabilities for odour events, and a transition of GEM-MACH into a service delivery role in 2023-24 by providing outputs to fulfill OSMP objectives and data needs of OSM members.

Are data produced following OSM Program requirements and provided into the OSM Program data management system?

All data produced by the active air monitoring program are publicly available and accessible. For the 39 active air monitoring stations, data are available at:

WBEA - <https://wbea.org/data/continuous-monitoring-data/>

WBEA - <https://wbea.org/data/time-integrated-data-search/> (time-integrated data)

WBEA - <https://annualtrends.wbea.org/> (annual trends)

WBEA - <https://wbea.org/air/air-quality-events/> (air quality events)

LICA - <https://lica.ca/airshed/>
PRAMP - <https://prampairshed.ca/live-air-quality-data/>
All Airsheds - <http://airquality.alberta.ca/map> (real time data)
All Airsheds - <https://www.alberta.ca/access-air-quality-and-deposition-data.aspx> (quality assured data)

In the future, quality assured data from the new Air Data Management System will be linked to the OSM Program data portal.

Data from the COMP are available at <https://comp.wbea.org/>.

Data from the WBEA and Fort McKay dustfall monitoring programs is available at <https://wbea.org/data/time-integrated-data-search/>

Data on the past ECCC measurements at Oski-ôtin are accessible at <https://www.canada.ca/en/environment-climate-change/services/oil-sands-monitoring/monitoring-air-quality-alberta-oil-sands.html>.

Do methodologies use relevant Standard Operating Procedures/ Best Management Practices/ Standard Methods?

Quality assurance and quality control are conducted in accordance with the Air Monitoring Directive (AMD), the Air Monitoring Quality Assurance Plan and SOPs for data QA/QC developed by AEP and each airshed.

The Namur Lake AMS operated by FMFN follows the AMD to the extent possible. Because this is an off-grid AMS, year-round operation is not practical. Typically, the station is operated from March through November. The TAC will discuss the need for and value of having this station operate year-round operation and the appropriate changes and requirements to facilitate its year-round operation if this is considered desirable.

The WBEA's site documentation (Volume III of the annual data report) is publicly available, and specific SOPs and QAP are available upon request.
<https://wbea.org/annual-ambient-air-monitoring-data-reports/>

The AEP SOPs and Air Monitoring Directive are available here:
<http://environmentalmonitoring.alberta.ca/resources/standards-and-protocols>
<http://aep.alberta.ca/air/legislation/air-monitoring-directive/default.aspx>

How does the monitoring identify integration amongst projects, themes or with communities?

Supplemental Attachment #06 provides a visual description of how this work plan is integrated with other Air and Deposition work plans and with other monitoring themes.

This work plan is also integrated with a Community-Based Monitoring (CBM) work plan being submitted from the community of Fort Chipewyan. Two community members from the Athabasca Chipewyan First Nation and Mikisew Cree First Nation completed their training at the WBEA and are now providing operational support for the Fort Chipewyan AMS year-round with the support of the WBEA. Through the WBEA, they continue to learn and train on new equipment and technology in the ever-developing field of ambient air monitoring. The operational funds for the operational and maintenance of the station and the deployment and analysis of the time-integrated samples come from the WBEA's budget, while the individuals are employed by their respective communities.

This work plan is also integrated with Community-Based Monitoring (CBM) work plans being submitted by the Fort McKay First Nation (FMFN) and the Fort McKay Métis Nation (FMMN). One work plan related to dust monitoring is being led by the FMFN and the other related to odour is being led by the FMMN but both work plans are collaborative FMFN and FMMN initiatives and are therefore include the entire Fort McKay

Community. The WBEA association has a strong role in both work plans which involve community monitoring of both dust and odours and coordinating and integrating this monitoring with current WBEA monitoring and associated data management and analyses. For the community odour monitoring the odour magnitude and characteristics observations of the community monitors are compared to the continuous and/or time-integrated reduced sulphur compound and hydrocarbon data at the air monitoring stations in Fort McKay. For the dust monitoring, WBEA has implemented a Regional Dustfall Monitoring Program which includes dustfall collectors at Community air monitoring stations. Fort McKay is operating a community-specific dustfall monitoring program with dustfall collectors being placed throughout the community, on its Reserve Lands (e.g., at the Namur Lake AMS), and on its traditional territory (e.g., certain traplines and community gathering areas). The Fort McKay program also involves: elemental analysis of dustfall, continuous TSP monitoring, and time-integrated TSP monitoring with mass, ion and elemental analysis conducted on the time-integrated samples. The analyses of the collected dust data will be done by Fort McKay air quality scientists, in collaboration with the WBEA scientists, and will consider and use related air quality data currently being collected under the OSM Atmospheric Pollutant Active Monitoring Network program (e.g. continuous PM2.5 and PM10 monitors, the NAPS integrated PM mass, ion and element data, and the regional meteorological data).

Data generated by this work plan are used to support atmospheric deposition calculations, conduct model validation exercises, and provide data relative to established regulatory benchmarks. The deposition calculations and model validation are done through the Integrated Atmospheric Deposition Monitoring work plan (A-PD-6-2425).

With consideration for adaptive monitoring, where does the proposed monitoring fit on the conceptual model for the theme area relative to the conceptual model for the OSM Program?

The active ambient air quality monitoring network is directly included in the conceptual model and is linked to odours, contaminant exposure, abiotic chemical change and human health. Data collected by this network is used to understand the impact of air emission sources on ambient air quality. This understanding allows the potential odour, health, environmental impacts of the air quality parameters associated with emissions from oil sands operations and other sources (in a cumulative effects context) to be assessed. The data is used to support atmospheric deposition calculations and provide data relative to established regulatory benchmarks. Please refer to Supplemental Attachment #06 for a visual description of how this work plan fits into the conceptual model.

How will this work advance understanding transition towards adaptive monitoring?

Work proposed for 2024-25 intends to apply the Adaptive Monitoring framework to the active air monitoring network where appropriate. The first step will be to develop a shared understanding of regulatory and community expectations which in turn will guide any OSM adaptive monitoring framework adjustments required to the current long-term surveillance program.

This will involve developing a clear understanding of: (1) regulatory and community expectations for monitoring which will be used to determine if and where adjustment of the current long-term surveillance program based on the OSM adaptive monitoring framework are needed or appropriate (in progress); (2) the purposes for monitoring at each monitoring station (complete); (3) air quality parameters (and locations) where the adaptive monitoring approach is adequate (in progress); and (4) a method for quantifying baselines and developing limits of change that will inform future monitoring activities (in progress). A TAC sub-working group has been formed to lead the baselines work.

The Air and Deposition TAC recognizes that implementing the Adaptive Monitoring Approach will be a process and will require collaboration with other OSM TACs. Please see Supplemental Attachment #06 for a visual representation of how active air monitoring fits within the Adaptive Monitoring framework.

Is the work plan contributing to Programmatic State of Environment Reporting? If yes, please identify potential linkages to relevant sections of the State of Environment Report.

Yes, monitoring from previous iterations of this work plan are being used in the Programmatic State of Environment reporting. Project team members from this work plan contributed data, analyses, figures, and text to the OSM SoE report, and will continue to do as required.

4.0 Mitigation

Evaluation of Mitigation Criteria (Information Box Only- No action required)

Your workplan will be evaluated against the criteria below. A successful workplan would potentially inform:

- efficacy of an existing regulation or policy
- an EPEA approval condition
- a regional framework (i.e., LARP)
- an emerging issue

Explain how your monitoring program informs management, policy and regulatory compliance. As relevant consider adaptive monitoring and the approved Key Questions in your response.

The pollutant monitoring program functions to address multiple objectives and scientific questions as identified in the EPEA approvals, NAPS, ADMF, 2009 Alberta Monitoring Strategy, 2019-2024 Alberta Science Strategy, OSM Monitoring Objectives, FMAQO Project, AAAQO, AAAQG, AQHI, FMRKT, FMAQI, LARP, and CAAQS.

Many of the active monitoring stations that are part of the long-term core air monitoring network (operated by WBEA, LICA and PRAMP) are required by an EPEA approval condition. Approvals may include the requirement for a specific monitoring activity (specific station and parameters) or the requirement for an industrial operator to participate in an Airshed organization. In many cases, the industry meets their EPEA approval requirements through the monitoring and reporting conducted by the Airshed organizations. Airshed organizations will report non-compliance of approval conditions related to ambient air monitoring to the regulator on behalf of the industry. Consistent exceedances of AAAQOs can lead to regulatory action. In some cases, existing monitoring stations and the parameters being monitored at these stations are the result of commitments made by an operator to an Indigenous community as part of project mitigation.

The Namur Lake AMS is required to assess air quality pollutant levels in the Moose (Namur) Lake area relative to the Moose Lake Ambient Air Quality Targets as identified in the Moose Lake Access Management Plan (MLAMP). Fort McKay has also established Moose Lake ambient air quality targets for air quality on the Moose Lake Reserves (Gardiner Lake Reserve #174A and Namur Lake Reserve #174B) which are more stringent than the MLAMP Ambient Air Quality Targets. The station is therefore also required to assess air quality pollutant levels on the Moose Lake Reserves relative to these community-based air quality targets. The MLAMP specifically requests that financial support through the OSM Program be provided to operate this station and this funding was provided starting in the 2021/22 fiscal year.

Data collected at the active air monitoring stations are included in the annual reporting against limits/triggers for air quality under LARP and CAAQS. If air quality levels are above the benchmarks outlined by LARP or CAAQS, then management actions may need to be developed. The nature of the management action will depend on the trigger level exceeded.

The PRAMP air monitoring network was originally established to address the AER report "Decision 2014 ABAER 005: Report of Recommendations on Odours and Emissions in the Peace River Area (March 31, 2014)" available through the Peace River Performance Dashboard at <https://www.aer.ca/protecting-what-matters/reporting-on-our-progress/taking-action-in-peace-river/peace-river-performance-dashboard>. This report was generated based on public concerns associated with oil sands development in the Peace River region.

Ambient air data supports several population centre (community) monitoring needs, including the Air Quality Health Index (AQHI), and measuring representative ambient concentrations in populated areas.

Odours and air quality are important issues in the oil sands region, and much of the monitoring and evaluation in this work plan is focused on addressing these issues (FMAQO Advisory Committee). Specifically, monitoring is needed to improve the consistency of air and meteorological monitoring within 30 km of Fort McKay to assist the regulator, industry, community and the OSM Program in identifying

priority air quality management issues and the emission sources that need to be the focus for additional management to improve air quality in Fort McKay. Funds requested in 2024-25 for a vertical wind/temperature profiler will partially address this FMAQO recommendation. The WBEA Community Odour Monitoring Program is available throughout the AOSR and allows community members to be engaged in identifying odour events.

The relevance of the active air monitoring network and its connection to other monitoring themes and tools for investigation of cause are visually portrayed in Supplemental Attachment #06.

5.0 Indigenous Issues

Evaluation of Indigenous Issues Criteria (Information Box Only- No action required)

Your workplan will be evaluated against the criteria below. A successful workplan would potentially:

- Investigate Indigenous communities key questions and concerns
- Includes culturally relevant receptor(s) and indicator(s)
- Include or be driven by Indigenous communities (participatory or collaborative)
- Develop capacity in Indigenous communities
- Include a Council Resolution or Letter of Support from one or more Indigenous communities
- Describe how ethics protocols and best practices regarding involvement of Indigenous peoples will be adhered to
- Provide information on how Indigenous Knowledge will be collected, interpreted, validated, and used in a way that meets community Indigenous Knowledge protocols

Explain how your monitoring activities are inclusive and respond to Indigenous key questions and concerns and inform the ability to understand impacts on concerns and inform Section 35 Rights

Active (continuous and time-integrated) monitoring occurs in most Indigenous communities in the oil sands region (including Fort Chipewyan, Fort McKay, Anzac, Janvier, Conklin and Cadotte Lake). Information from this monitoring provides communities with ambient air monitoring concentrations and the AQHI in real time. Because of Fort McKay's location relative to mining and upgrading operations, and concerns repeated by community members regarding air quality and odour, more comprehensive air monitoring and reporting are conducted. Most First Nation and Métis organizations belong to Airshed organizations in the oil sands region. In addition, the Namur Lake AMS operated by Fort McKay First Nation was included as part of the OSM Program starting in 2021-22.

The WBEA's long-term environmental monitoring program was initiated due to concerns expressed by local Indigenous community members about the potential impacts of industrial development on ambient air quality. Indigenous community members continue to be key participants in the technical and general membership that oversees this surveillance program.

The Atmospheric Pollutant Active Monitoring Network program co-operates with, supports, and, as requested, participates in ICBM monitoring programs (e.g., the FMFN dust monitoring work plan and the FMMN odour monitoring program).

Does this project include an Integrated Community Based Monitoring Component?

No

If YES, please complete the [ICBM Abbreviated Work Plan Forms](#) and submit using the link below

[ICBM WORK PLAN SUBMISSION LINK](#)

5.1 Alignment with Interim Ethical Guidelines for ICBM in the OSM Program

Are there any community specific protocols that will be followed?

N/A

Does the work plan involve methods for Indigenous participants to share information or knowledge (e.g. interview, focus group, survey/structured interview), or any other Indigenous participation? If yes, describe how risks and harms will be assessed, and the consent process that will be used.

No

Do the activities include any other collecting/sharing, interpreting, or applying Indigenous knowledge? Please describe how these activities will be conducted in alignment with the Interim Ethical Guidelines, and any community-based protocols and/or guidelines that may also apply.

No

Indicate how Indigenous communities / Indigenous knowledge holders will be involved to ensure appropriate analysis, interpretation and application of data and knowledge.

N/A

How are Indigenous communities involved in identifying or confirming the appropriateness of approach, methods, and/or indicators?

N/A

How does this work plan directly benefit Indigenous communities? How does it support building capacity in Indigenous communities?

N/A

How is the information from this work plan going to be reported back to Indigenous communities in a way that is accessible, transparent and easy to understand?

N/A

6.0 Measuring Change

Evaluation of Measuring Change Criteria (Information Box Only- No action required)

Your workplan will be evaluated against the criteria below. A successful workplan would potentially:

- assess changes in environmental conditions compared to baseline (e.g., validation of EIA predictions)
- report uncertainty in estimates and monitoring is of sufficient power to detect change due to oil sands development on reasonable temporal or spatial scales
- include indicators along the spectrum of response (e.g., individual, population, community)
- focus on areas of highest risk (where change is detected, where change is greater than expected, where development is expected to expand collection of baseline).
- measure change along a stressor gradient or a stressor/reference comparison

Explain how your monitoring identifies environmental changes and how can be assessed against a baseline condition. As relevant, consider adaptive monitoring, the TAC specific Scope of Work document and the Key Questions in your response.

A major outcome of long-term ambient air quality monitoring is to, over time, measure trends and changes in air quality at specific and strategic locations so that the impacts of oil sands activities and other non-oil sands activities on human and environmental indicators can be determined. Long-term, continuous air monitoring at consistent monitoring locations in the oil sands regions allows such assessments.

Measuring change in air quality parameters needs to consider the dynamic nature of air quality in the oil sands region. While conventional statistical methods for assessing air quality trends, have application in certain circumstances, alternative methods that consider all the temporal and spatial variability in oil sands emissions, need to be used to adequately measure short- and long-term change and the factors contributing to any measured changes. (see response to question 1. under 3.4.4.2 above).

The Air and Deposition TAC has formed a Sub-Working Group to quantify baselines for selected air parameters and develop or adopt methodologies to determine both short and long-term deviations from the established baselines. This will allow future comparisons to limits of change.

7.0 Accounting for Scale

Evaluation of Accounting for Scale Criteria (Information Box Only- No action required)

Your workplan will be evaluated against the criteria below. A successful workplan would potentially be:

- appropriate to the key question and indicator of interest
- relevant to sub-regional and regional questions
- relevant to organism, population and/or community levels of biological organization
- where modelled results are validated with monitored data
- where monitoring informs on environmental processes that occur at a regional scale. e.g. Characterizing individual sources to gain a regional estimate of acid deposition and understand signal from individual contributing sources.

Explain how your monitoring tracks regional and sub-regional state of the environment, including cumulative effects. As relevant, consider adaptive monitoring, the TAC specific Scope of Work document and the Key Questions in your response.

Active air monitoring is concentrated in the minable oil sands region (north of Fort McMurray), where the largest pollutant emissions are, and has expanded to the south of Fort McMurray where the number and/or sized of Steam-Assisted Gravity Drainage (SAGD) facilities have been increasing. Data from the active monitoring network are being used to support evaluation of the GEM-MACH model (part of project A-PD-6-2425 - Integrated Atmospheric Deposition Monitoring). Starting in Q2 2023-24, GEM-MACH has transitioned primarily to a service delivery role to provide model outputs that help achieve OSMP objectives and fulfill information needs of OSMP members. GEM-MACH simulations include regional to sub-regional sources for the OS and other pollutants; the relative impact of these towards odour events will be examined in collaboration with A-PD-6-2425. Active monitoring also takes place in communities and in the vicinity of industrial sources allowing for sub-regional assessment for the state of the environment. The existing monitoring network has limitations in terms of accounting for regional changes outside of the minable oil sands region because of the vast expanse and the cost/practicality of active monitoring. However, once evaluated with active monitoring data, air modelling information and satellite data can be

used to fill existing gaps in the regional monitoring network. A numerical forecast model, fully evaluated against long-term surface monitoring data, is highly useful for supporting cumulative effects assessments.

8.0 Transparency

Evaluation of Transparency Criteria (Information Box Only- No action required)

Your workplan will be evaluated against the criteria below. A successful workplan would potentially include:

- a plan for dissemination of monitoring data, including appropriate timing, format, and aligns with OSM program data management plan
- demonstrated transparency in past performance
- identified an annual progress report as a deliverable
- reporting of monitoring results occurs at timing and format that is appropriate for recipient audience.

Explain how your monitoring generates data and reporting that is accessible, credible and useful. As relevant, consider adaptive monitoring, the TAC specific Scope of Work document and the Key Questions in your response.

There is a vast amount of active air quality information available from airshed organization websites and provincial reports. Near real-time and quality assured data are available from airshed and AEP websites indicated below:

WBEA - <https://wbea.org/data/continuous-monitoring-data/> (continuous data)

WBEA - <https://wbea.org/data/time-integrated-data-search//> (time-integrated data)

WBEA - <https://annualtrends.wbea.org/> (annual trends)

WBEA - <https://wbea.org/air/air-quality-events/> (air quality events)

LICA - <https://lica.ca/airshed/>

PRAMP - <https://prampairshed.ca/live-air-quality-data/>

All Airsheds - <http://airquality.alberta.ca/map> (real time data)

All Airsheds - <https://www.alberta.ca/access-air-quality-and-deposition-data.aspx> (quality assured data)

COMP data - <https://comp.wbea.org/>

Oski-ôtin data - <https://www.canada.ca/en/environment-climate-change/services/oil-sands-monitoring/monitoring-air-quality-alberta-oil-sands.html>

EPA and Airshed organizations are working with OSM to assure that data are also available from the active monitoring network on the OSM portal current in development.

Multiple data summaries and reporting products for communicating information from the active monitoring network have been produced by EPA and airsheds. Some examples include:

- A COMP web site that reports odour observations through a map driven interface in real time, as well as an annual report that compares ‘Odour Event Days’ to the data collected at ambient air monitoring stations;
- Community AQHI displays (e.g. AQHI lanterns, WBEA screens that display hourly AQHI data for the RMWB region, as well as local air monitoring data)
- Map driven websites showing air quality results
- The AQE (Air Quality Events) app developed by the WBEA informing subscribers of exceedances of the AAQO/Gs and the Fort McKay Response Triggers in real time.
- The COMP app developed by the WBEA to allow community members to submit odour observations
- The WBEA trends website which shows the annual mean concentrations of the different parameters at the different stations throughout the WBEA network
- Community presentations
- Reports against triggers, limits and standards defined by frameworks including the Lower Athabasca Regional Plan and the Canadian Ambient Air Quality Standards

9.0 Efficiency

Evaluation of Efficiency Criteria (Information Box Only- No action required)

Your workplan will be evaluated against the criteria below. A successful workplan would include:

- appropriately addressed a risk-informed allocation of resources
- identified the role and justification for each staff member on the proposed work plan
- identified in-kind and leveraged resources (e.g., resources and approaches are appropriately shared with other OSM projects where possible)
- established partnerships (value-added) and demonstrated examples of coordinated efficiencies (e.g., field, analytical)
- identified co-location of monitoring effort
- demonstrated monitoring activities and information collected are not duplicative
- considered sampling/measurement/methods compatibility to other data sources (e.g., AER)

Explain how your monitoring is integrated with other OSM projects and incorporates community-based participation and/or engagement in proposed monitoring activities. As relevant, consider adaptive monitoring, the TAC specific Scope of Work document and the Key Questions in your response.

The primary allocation of resources for this work plan is the on-going operation of 39 active air monitoring stations in the oil sands region. The cost of purchasing, implementing, operating, and maintaining active monitoring stations is significant and, in many cases, more expensive in the oil sands region because of challenges with power and road access. The air monitoring stations have multiple monitoring objectives and support the implementation of many air quality related management frameworks (LARP, AAAQOs/AAAQGs, CAAQS, ADMF, and FMKRT).

The WBEA Network is currently undergoing a Network Assessment, consistent with the OC Funding Decision received in May 2022. The Network Assessment will generate recommendations through a multi-stakeholder working group which strives for consensus. These recommendations are focused on adapting the network to ensure monitoring objectives are achieved in an efficient and effective manner. At the time of writing, the technical recommendations that the working group made are undergoing community review. Some the recommendations include Investigations of Cause/Focused studies where monitoring gaps were identified. Once the recommendations have received necessary approvals, they will move on to a planning and implementation phase, overseen by the WBEA Ambient Air Technical Committee (AATC).

The WBEA has also launched an in-house laboratory, referred to as the Analytical Services Group (ASG). The WBEA started the lab to reduce the reliance on US labs, keep funding and data within Canada, and be better able to control costs. As a result, the WBEA has managed to keep costs, for analyses conducted by ASG, at 2021 prices, during this period of drastic price increases.

PRAMP completed a Network Assessment in December 2022, and was developed through multistakeholder engagement and discussed/supported at the Air and Deposition TAC. PRAMP is using results from the Network Assessment to adapt the ambient air monitoring network in the Peace OSR. These updates are reflected in the work plan and budget.

Airshed organizations are looking at opportunities to partner with communities to operate air monitoring stations to help build relationships and capacity.

The WBEA is a multi-stakeholder organization that has community-participation on its Governance Committee, General Members board, and all its Technical Committees. The Technical Committees develop and approve the WBEA annual work plans, which are then provided to OSM, so the communities have a voice at multiple tables. The LICA and PRAMP Committee have similar multi-stakeholder structures and processes.

The Community Odour Monitoring Program (COMP) is dependent on citizen/community member participation. The app allows citizens throughout the Regional Municipality of Wood Buffalo to submit information about the odours they experience. Since the release of the COMP app in September 2017, to the day this work plan was written, there have been 1499 odour observations submitted through the app. The odour observations include submissions from the communities of Fort Chipewyan, Fort McKay, Fort McMurray, Anzac, and Conklin, as well as odour observations in industrial areas and on highways

throughout the region. The WBEA takes this information and releases an annual report that summarizes the observations and compares days with observations in a community to the data from the local air monitoring station.

The WBEA has also incorporated community-based participation in the operation and maintenance of Fort Chipewyan station by training community members to perform monthly calibrations and instrument repairs (Air Quality Monitoring in the Peace Athabasca Delta).

The WBEA and LICA are supporting the OSM groundwater team by collecting and deploying precipitation samples at Bertha Ganter-Fort McKay AMS and Maskwa AMS, respectively.

This work plan is also integrated with the Integrated Atmospheric Deposition Monitoring (A-PD-6-2425) work plan by providing data to calculate deposition and conduct model validation exercises, respectively.

10.0 Work Plan Approach/Methods

List the Key Project Phases and Provide Bullets for Each Major Task under Each Project Phase

Note: these phases occur concurrently

PHASE 1: Operation of existing ambient air monitoring stations in the WBEA, LICA, and PRAMP airsheds

a) WBEA:

- Operate 30 ambient air monitoring stations including the acute air monitoring station (Waskōw ohci Pimâtisiwin AMS) in Fort McKay. These stations may fulfill EPEA Approval compliance monitoring requirements, and/or satisfy community and scientific interests.
- Time-integrated sampling: PM2.5 metals and ions, PM2.5 EC/OC, PM10 metals and ions, PAHs, precipitation, VOC, TSP, dustfall, triggered RSC tubes, triggered VOC canisters
 - o The WBEA is supporting the OSM groundwater team by collecting and deploying monthly (summer) and weekly (winter) precipitation samples at Bertha Ganter-Fort McKay AMS.
 - o The WBEA is supporting the Fort McKay dustfall project by: collecting the dustfall samples at AMS1; operating the continuous and time-integrated TSP; analyzing and or coordination the analysis of dustfall and time-integrated TSP samples;
- Continue to operate the WBEA Air Quality Events app to streamline notification of events (AAAQOs, AAAQGs, Fort McKay response triggers - app was implemented in 2020-21);
- Conduct the following non-routine activities:
 - o Continue with the Continuous Hydrocarbon Instrument Evaluation study
 - o Continue with the Continuous Particulate Instrument Evaluation study
 - o Continue with the Regional Dustfall Monitoring study
 - o Continue with the Ambient Air Monitoring Network Assessment;
- Operations and maintenance and of the VOC and RSC gas chromatograph analyzers at Bertha Ganter-Fort McKay AMS (Rec 14/15)
- Purchase, deployment, and operation of a vertical wind and temperature profiler in and around Fort McKay (Rec 14/15)

b) LICA:

- Operate three permanent and one portable continuous and semi-continuous (or triggered semi-continuous) stations in the Cold Lake oil sands
- Operate portable monitoring station in the Town of Lac La Biche.

c) PRAMP:

- Operate five continuous and three triggered semi-continuous monitoring stations in the Peace River oil sands
- Operate portable monitoring station in the Town of Grimshaw and a second location to be determined late in 2023.

d) Fort McKay First Nation (FMFN) Namur Lake AMS:

The Namur Lake AMS was commissioned in late 2016 by the Fort McKay First Nation (FMFN) to help obtain baseline air quality information in the Moose Lake area where the FMFN has two Reserves. Since the spring of 2017 the station has operated continuously except during the colder winter months. Shutting the station down in the cold weather period has been necessary in order to:

- avoid significant generator operational time and thus minimize fuel consumption and associated generator emissions in this clean area, and
- ensure that should the generator fail to start in the coldest part of the year, that the lead-acid battery system (worth \$35,000) does not become damaged due to the freezing of battery electrolyte.

These considerations mean that station operation generally commences in February or March of each year, and ceases in October or November. Since the station is off-grid, it is almost completely operated on energy from 36 solar panels during the operational part of the year with operation during nighttime and cloudy weather periods possible because of the station's large battery power storage system. During its operational period the standby generator is seldom required.

Further investigation is being done to assess options to allow for more reliable winter operations of the Namur Lake AMS. The Namur Lake AMS uses an Airpointer® to monitor NO, NO_x, NO₂, SO₂, H₂S, PM_{2.5} (nephelometer), O₃, temperature, wind speed, wind direction, relative humidity, and precipitation (rain/hail only). The Airpointer® system is excellent for remote off-grid operations as it includes significant diagnostics abilities to allow for planned maintenance, and also offers low power consumption for a continuous air monitoring unit. It also allows for analyzers to be swapped out over time depending on the need for various parameters to be monitored. The station uses a cellular modem and booster to ensure reliable two-way communications and control of both the Airpointer® and the Schneider power management and monitoring system, including the ability to remotely start/stop the back-up generator, and modify system settings as required.

Wood (formerly Amec Foster Wheeler) was selected to assist FMFN design, build, install, and commission the Namur Lake AMS, and have been managing the calibrations and data QA/QC, as well as monthly reporting the station was commissioned. In 2023 Digital Air Consulting Ltd. Took over the operation of the Namur Lake AMS. The Namur Lake AMS represents, as far as FMFN is aware, the world's first successful implementation of an off-grid, continuous air monitoring station.

OSM funding for the operation of the Namur Lake AMS was approved in 2021-22 and continued funding will be requested for subsequent years consistent with the Moose Lake Access Management Plan (MLAMP). FMFN's initial investment in design, construction, installation, and commissioning of the Namur Lake AMS constitutes an approximately \$700,000 investment. The location of the Namur Lake AMS is considered a sentinel site for FMFN to understand current and possible air quality impacts in the Moose Lake area associated with oil sands developments.

PHASE 2: Continue implementation of recommendations related to ambient air monitoring from the Fort McKay Air Quality and Odour Advisory Committee

a) Ongoing operation of semi-continuous GCs for sulphur compounds and VOCs in Fort McKay. This will include on-going improvement of the monitoring methodology, data analysis and provision of the quality-controlled data to stakeholders.

b) Continue triggered sampling of VOCs and sulphur compounds at Fort McKay. AEP, Fort McKay, and the WBEA will work together to establish trigger levels, sampling time and volume for the pilot study. It is expected that the pilot study will be for one year (2022-2023). A recommendation on incorporating triggered sampling for VOCs and sulphur compounds into the long-term active air monitoring network will be provided after completion of the one-year pilot (focused) study. That report will be completed in early 2024, after this workplan has been submitted. Therefore placeholder funds have been included in the budget for 24/25.

c) Purchase, deploy, and maintain a vertical wind/temperature profiler to better understand pollutant transport and identify emission sources causing air quality impacts in and around Fort McKay. The Rec 14/15 sub-committee has researched and recommended the best available method for conducting this monitoring.

PHASE 3: Strengthen Community Reporting of Odours

- a) Continue the Community Odour Monitoring Program (COMP) in the AOSR
- b) Create awareness of the COMP and app for community members
- c) If desired by the OSM program, expand COMP app to the Cold Lake and Peace River oil sands regions.

PHASE 4: Develop Adaptive Monitoring Approach for Active Ambient Air Monitoring Network

- a) The first step in applying an adaptive monitoring approach will be to articulate the specific monitoring objectives for each parameter (by station) monitored in the active air monitoring network. The output will be a matrix of stations, parameters and objectives identified for each parameter. This information has been provided by the Airshed Organizations.
- b) Develop a document that classifies each active air monitoring station/parameter funded by the OSM Program (e.g. regulatory monitoring, community monitoring etc.). This has been completed as per the 2023 Funding Condition, and was submitted to the SIKIC on June 30, 2023.
- c) Develop a shared understanding of regulatory and community expectations for monitoring that will guide the adjustment of the current long-term surveillance program to fit the OSM adaptive monitoring framework (in progress);
- d) Develop a structured approach to apply adaptive monitoring to the active air monitoring network where appropriate. This will involve:
 - o Determining air quality parameters appropriate for the application of the EEM framework (in progress);
 - o Quantifying baselines for selected parameters (in progress); and
 - o Establishing limits of change for selected parameters (future work).
- e) In subsequent years, air monitoring data will be assessed against the limits of change to determine if air quality has changed, whether this change is due to oil sands operations and if the change is of concern. This work is being led by a TAC Sub-Working Group.

Collaboration with FMFN and FMMN on the dust and odour monitoring CBM projects.

The WBEA will continue to collaborate with the FMFN and FMMN to ensure that: (1) the dust monitoring in the community (led by FMFN); and (2) the odour monitoring in the community (led by FMMN) are coordinated with, and supported by, WBEA's odour and dust monitoring programs.

Describe how changes in environmental Condition will be assessed

Incorporating, as appropriate, the Adaptive Monitoring approach adopted by the OSM Program in 2021-22 for the active air monitoring network. This adaptive monitoring approach, applying the principles of the Adaptive Monitoring Framework, will allow future air quality data assessments against limits of change established by the OSM Program. It is recognized that the Air and Deposition TAC will need to work with other TACs that measure effects-based indicators to determine the relation between air quality and environmental and human impacts based on the Adaptive Monitoring framework.

Some methods that can be used to assess changes in environmental condition include but are not limited to: (1) comparing concentrations of key parameters with AAAQOs, AAAQGs, LARP triggers and limits, CAAQS thresholds, Fort McKay air quality thresholds and other relevant benchmarks; (2) identifying temporal and spatial changes in ambient air quality; (3) based on (1) and (2) determining if there are emerging issues that required further investigation; and (4) informing the public on ambient air quality through indicators such as the AQHI and FMAQI.

Environmental change can also be assessed by: (i) determining the presence/absence of odours reported through the COMP app; and (ii) comparing these data to VOC and RSC species measured by semi-continuous GCs during odour and non-odour periods. Methodologies tested in this study can be used to assess

environmental change if applied in long-term monitoring programs.

Are there Benchmarks Being Used to Assess Changes in Environmental Condition? If So, Please Describe, If Not, State "NONE"

Specific benchmarks include AAAQOs, AAAQGs, thresholds defined by the Lower Athabasca Regional Plan (LARP), thresholds defined by the Canadian Ambient Air Quality Standards (CAAQS), AQHI, FMAQI, ADMF (critical loads), Fort McKay's Ambient Air Quality Permissible Levels, Moose Lake Ambient Air Quality Targets and other benchmarks.

At the Waskōw ohci Pimâtisiwin air monitoring station, trigger levels have been established for H2S and SO2. The instruments at this station are able to record elevated H2S and SO2 concentrations. If additional air quality parameters are added to the emergency response station, trigger levels will need to be determined before implementing the monitoring equipment (Interim H2S/TRS/SO2 Fort McKay Acute Emergency Response Process Alberta Health, 2019).

Additional limits of change will be developed for selected air quality parameters using the Adaptive Monitoring approach.

(e.g., objectives, tiers, triggers, limits, reference conditions, thresholds, etc.)

Provide a Brief Description of the Western Science or Community-Based Monitoring Indigenous Community-Based Monitoring Methods by Project Phase

PHASE 1: Operation of existing ambient air monitoring stations in the WBEA, LICA, and PRAMP airsheds

The methods used to monitor continuous air quality within the three oil sands deposits are consistent with the Air Monitoring Directive (Alberta Environment and Parks, 2016). The instrumentation is standard and used across the country, and globally, in routine air monitoring. The monitoring protocols are well documented and available to the public. The monitoring methods used to measure particulate matter, volatile organic compounds and polycyclic aromatic hydrocarbons using semi-continuous or time-integrated techniques also must follow the Air Monitoring Directive requirements. The SO2 and H2S monitors in the acute air monitoring in Fort McKay (Waskōw ohci Pimâtisiwin) are calibrated at a higher range so that elevated concentrations of these pollutants can be quantified and compared to the acute air quality levels established for the community.

The Namur Lake AMS doesn't meet certain AMD and certain framework data completeness requirements. Working with the TAC, opportunities will be assessed for improving off-grid technology (batteries, solar panels or generator systems) that will allow year-round operation and cost efficiency.

PHASE 2: Continue implementation of recommendations related to ambient air monitoring from the Fort McKay Air Quality and Odour Advisory Committee

The WBEA will lead the implementation of monitoring in Fort McKay with support from EPA. Status of implementation will be communicated to the OSM Science Secretariat through quarterly reporting and to the Fort McKay Air Quality Odour and Advisory Committee (and associated subcommittees).

PHASE 3: Strengthen Community Reporting of Odours

The COMP program consists of a mobile application available for both Android and iOS devices, allowing members of all communities of the RMWB to submit information about the odours they experience throughout the region. Data from the program is reviewed against ambient air quality parameters collected in the oil sands region to better understand the relationship between odours and ambient air quality. If requested, WBEA will work with EPA, AER, LICA and PRAMP to determine if there are opportunities to expand the COMP program to the Cold Lake and Peace River oil sands regions. As part of

the Fort McKay odour project, the WBEA has been requested to support an effort to further promote the use of the COMP app in Fort McKay.

List the Key Indicators Measured, If Not Applicable, State N/A

The long-term air monitoring program's key indicators include major pollutants (PM_{2.5}, O₃, NO₂, SO₂) required for land-use plan and CAAQS reporting. Additionally, major air pollutants are used to calculate the AQHI and report it in real-time as an indicator of health risk to ambient air quality.

Other air pollutants are also monitored at provincial monitoring sites and may be used as indicators of air quality (e.g., hydrocarbons and sulphur compounds). H₂S and SO₂ are key indicators at the Waskōw ohci Pimâtisiwin station.

From Recommendation #14/15 - 13 parameters in the Air Quality Focal Parameter List including acetaldehyde, carbon disulphide, carbonyl sulphide, methanol, naphthalene, ozone, sulphur dioxide, nitrogen dioxide, hydrogen sulphide, total reduced sulphur, benzene, mixed (m,p) xylenes, toluene and additional 3 parameters (non-methane hydrocarbon (NMHC), acrolein, and benzo[a]pyrene are also key indicators.

Odour occurrences logged by the COMP system is a key indicator.

11.0 Knowledge Translation

In the space below, please provide the following:

- Describe the plan for knowledge transfer and distribution of learnings from the project. This could include workshops, publications, best practice documentation, marketing plan, etc.
- Demonstrate that the knowledge transfer plan is appropriate for the intended end-users.

Knowledge transfer and distribution will be assured through several mechanisms. These will include communication by Airshed organizations (WBEA, LICA and PRAMP) to stakeholders and partners on the on-going active monitoring program's status, and communication of knowledge generated by the monitoring programs. Airsheds have developed products (apps and websites) specifically focused on transferring network learnings and understandings to the public in an understandable manner. Some of these include social media, advertising campaigns, and the creation of community-specific annual air quality factsheets. Specific examples of these products are:

- Monthly and annual continuous data reports (<https://wbea.org/monthly-continuous-data-and-calibration-reports/>) (<https://wbea.org/annual-ambient-air-monitoring-data-reports/>)
- Trends report microsite that provide data graphics of annual data trends (<https://annualtrends.wbea.org/>)
- The community annual report that shares monitoring results with a general audience (<https://wbea.org/2022-annual-report/>)
- The AQE App that provides users with a searchable database of all ambient air exceedances and notifications of new exceedances in real time.
- Quarterly newsletters that provide information about recent monitoring results and updates regarding air monitoring operations (deployment of new stations or monitoring technology).
- Novel approaches to data visualization provided in PRAMP's monthly dashboard reports and LICA's 'Air Quality DNA Data Visualization intended to help the public understand air quality in an approachable and engaging way.
- Air quality displays in community centers and public spaces throughout the oil sands regions. These installations often include unique AQHI lanterns or 'live' AQHI displays and posters with information to promote clean air.
- Region-tailored classroom programs for school-age children about local air quality, including hand-held air quality measurement devices.

The COMP website was released in 2019 and provides users with the ability to view all submitted odour observations and provides information about air quality and odours. Every year, an annual report is released that provides analysis of the odour observations and air quality at the times observations were submitted. The website and the reports can be found at comp.wbea.org.

The airsheds also collect data used to calculate the AQHI used on multiple platforms (EPA websites, weather website & apps, airshed websites) to inform citizens about local air quality and make informed decisions about their health.

12.0 External Partners

List by project or project phase each component that will be delivered by an external party (including analytical laboratories) and name the party. Describe and name the associate work plan/grant/contract for these services. * state none if not required

PHASE 1 will be delivered by Airshed organizations (WBEA, LICA, and PRAMP) and Fort McKay First Nation.
PHASE 2 will be delivered by WBEA with significant involvement from Fort McKay First Nation, Fort McKay Métis, EPA and ECCC.
PHASE 3 will be delivered by WBEA with involvement and the FMMN, and ECCC is responsible for the modelling portion.

PHASE 4 will be delivered by the Air and Deposition TAC.

*To ensure complete work plan proposal submission, all grants and contracts listed in this section should also be captured in Grants & Contracts.

13.0 Data Sharing and Data Management

For 2024-25 the following approach will be taken by the OSM Program related to data sharing.

For all work plans of a **western science** nature funded under the OSM Program, data sharing is a condition of funding and must align with the principle of “**Open by Default**”. In this case, all data is to be shared with the OSM Program as directed by the OSM Program Data Management work plan.

For all work plans involving **Indigenous Knowledge** as defined below and funded under the OSM Program, data sharing is a condition of funding and the Indigenous Knowledge components of the work plan must align with the principle of “**Protected by Default**”. In this case, all data as defined as Indigenous Knowledge, are to be retained by the Indigenous community to which the Indigenous Knowledge is held.

Indigenous Knowledge is defined as:

“The knowledge held by First Nations, Inuit and Métis peoples, the Aboriginal peoples of Canada. Traditional knowledge is specific to place, usually transmitted orally, and rooted in the experience of multiple generations. It is determined by an Aboriginal community's land, environment, region, culture and language. Traditional knowledge is usually described by Aboriginal peoples as holistic, involving body, mind, feelings and spirit. Knowledge may be expressed in symbols, arts, ceremonial and everyday practices, narratives and, especially, in relationships. The word tradition is not necessarily synonymous with old. Traditional knowledge is held collectively by all members of a community, although some members may have particular responsibility for its transmission. It includes preserved knowledge created by, and received from, past generations and innovations and new knowledge transmitted to subsequent generations. In international or scholarly discourse, the terms traditional knowledge and Indigenous knowledge are sometimes used interchangeably.”

This definition was taken from the Canadian Government's Tri-council Policy Statement for Ethical Research involving Humans (Chapter 9, pg. 113) and is an interim definition specific to the Oil Sands Monitoring Program.

13.1 Has there, or will there be, a Data Sharing agreement established through this Project? *

Yes

13.2 Type of Quantitative Data Variables:

Both

13.3 Frequency of Collection:

Real Time

13.4 Estimated Data Collection Start Date:

1-Apr-2024

13.5 Estimated Data Collection End Date:

31-Mar-2025

13.6 Estimated Timeline For Upload Start Date:

1-Jun-2024

13.7 Estimated Timeline For Upload End Date:

30-Sep-2025

13.8 Will the data include traditional knowledge as defined by and provided by an Indigenous representative, Community or Organization?

No

Table 13.9 Please describe below the Location of Data and Data Type:

Add a Data Source by clicking on the add row on the bottom right side of table

Name of Dataset	Location of Dataset (E.g.:Path, Website, Database, etc.)	Data File Formats (E.g.: csv, txt, API, accdb, xlsx, etc.)	Security Classification
WBEA continuous and time-integrated monitoring data, air quality events, annual trends	https://wbea.org/data/continuous-monitoring-data/ https://wbea.org/data/time-integrated-data-search/ https://wbea.org/air/air-quality-events/ https://annualtrends.wbea.org/	.csv	Open by Default
LICA continuous and time-integrated monitoring data	https://www.alberta.ca/access-air-quality-and-deposition-data.aspx	.csv	Open by Default
PRAMP continuous and time-integrated monitoring data	https://www.alberta.ca/access-air-quality-and-deposition-data.aspx	.csv	Open by Default
FMFN Namur Lake continuous monitoring data	TBD	.csv	Open by Default
Oski-ôtin research station data (for previous years)	https://www.canada.ca/en/environment-climate-change/services/oil-sands-monitoring/monitoring-air-quality-alberta-oil-sands.html	.csv	Open by Default
Community Odour Monitoring Program (COMP) Data	https://comp.wbea.org/	.csv	Open by Default

14.0 2024/25 Deliverables

Add an additional deliverable by clicking on the add row on the bottom right side of table

Type of Deliverable	Delivery Date	Description
Technical Report	Q1	WBEA - Monthly data reports for continuous and integrated data LICA - Monthly data reports for continuous and integrated data PRAMP - Monthly dashboard reports summarizing monitoring results

Type of Deliverable	Delivery Date	Description
Technical Report	Q2	WBEA - WBEA Ambient Annual Report 2023 - Volume 1 Continuous Data; Volume 2 Integrated Data; Volume 3 Site Documentation WBEA - Monthly data reports for continuous and integrated data LICA- 2023 LICA Annual Report LICA - Monthly data reports for continuous and integrated data PRAMP - Annual Technical Review for 2023 PRAMP - Monthly data reports and dashboard reports summarizing monitoring results
Technical Report	Q3	WBEA - Monthly data reports for continuous and integrated data LICA - Monthly data reports for continuous and integrated data PRAMP - Monthly dashboard reports summarizing monitoring results
Technical Report	Q4	WBEA - Monthly data reports for continuous and integrated data LICA - Monthly data reports for continuous and integrated data PRAMP - Monthly dashboard reports summarizing monitoring results
Technical Report	Q4	2024 Community Odour Monitoring Program Annual Report
OSM Program Annual Progress Report (required)	Q4	Annual Progress Report
Key Engagement/Participation Meeting	Q4	OSM Briefing on adaptive monitoring approach for the active monitoring network
Technical Report	Q4	Annual air quality report for Namur Lake AMS
Key Engagement/Participation Meeting	Q1	TAC Meetings
Key Engagement/Participation Meeting	Q2	TAC Meetings
Key Engagement/Participation Meeting	Q3	TAC Meetings
Key Engagement/Participation Meeting	Q4	TAC Meetings

15.0 Project Team & Partners

In the space below please provide information on the following:

- Describe key members of the project team, including roles, responsibilities and expertise relevant to the proposed project.
- Describe the competency of this team to complete the project.
- Identify any personnel or expertise gaps for successful completion of the project relative to the OSM Program mandate and discuss how these gaps will be addressed.
- Describe the project management approach and the management structure.

Key members of the project team include:

- Greg Wentworth (Project Lead) - provide co-ordination between team members and the OSM Program, as well as facilitate alignment and integration within the OSM Program
- Sanjay Prasad (Component Lead) - complete deliverables linked to the WBEA
- Michael Bisaga (Component Lead) - complete deliverables linked to LICA and PRAMP
- Carrie Taylor (Government TAC Co-Chair) - provide TAC support and oversight
- Courtney Brown (Industry TAC Co-Chair) - provide TAC support and oversight
- David Spink (Indigenous TAC Co-Chair) - provide TAC support and oversight

This team consists of experts that bring forward substantial knowledge and experience in air monitoring and research. There are no major gaps in personnel or expertise, although subject matter experts will be brought in on an as needs basis for specific issues. The Project Lead is mostly a co-ordinator role, and leads the development of the work plan as well as deliverables associated with improving integration and implementing the adaptive monitoring approach.

16.0 Project Human Resources & Financing

Section 16.1 Human Resource Estimates

Building off of the competencies listed in the previous section, please complete the table below. Add additional rows as necessary. This table must include **ALL staff involved** in the project, their role and the % of that staff's time allocated to this work plan. The AEPA calculated amount is based on an estimate of \$120,000/year for FTEs. This number cannot be changed. The OSM program recognizes that this is an estimate.

Table 16.1.1 AEPA

Add an additional AEPA Staff member by clicking on the add row below the table. The total FTE (Full Time Equivalent) is Auto Summed (in Table 16.2.1) and converted to a dollar amount.

Name (Last, First)	Role	%Time Allocated to Project
Senior Atmospheric Scientist	Project Lead, and Rec 14/15 FMAQO Chair	45
Air Monitoring Scientist	Ambient Air Monitoring Technical and Odour Monitoring Program Support	5
Atmospheric Scientist	Alternate Project Lead and Support for Adaptive Monitoring Development	10

Table 16.1.2 ECCC

Add an additional ECCC Staff member by clicking on the add row below the table. The total FTE (Full Time Equivalent) is Auto Summed (in Table 16.2.2) and converted to a dollar amount.

Name (Last, First)	Role	%Time Allocated to Project

The tables below are the financial tables for Alberta Environment & Protected Areas (AEPA) and Environment & Climate Change Canada. All work plans under the OSM Program require either a government lead or a government coordinator.

Section 16.2 Financing

The OSM Program recognizes that many of these submissions are a result of joint effort and monitoring initiatives. A detailed "PROJECT FINANCE BREAKDOWN" must be provided using the Project Finance Breakdown Template provided, accessible [here](#). Please note that completion of this Project Finance Breakdown Template is mandatory and must be submitted along with each workplan.

PROJECT FINANCE BREAKDOWN TEMPLATE

Table 16.2.1 Funding Requested BY ALBERTA ENVIRONMENT & PROTECTED AREAS

Organization - Alberta Environment & Protected Areas ONLY	Total % time allocated to project for AEPA staff	Total Funding Requested from OSM
Salaries and Benefits (Calculated from Table 16.1.1 above)	60	\$72,000.00
Operations and Maintenance		
Consumable materials and supplies		
Conferences and meetings travel		
Project-related travel		\$5,000.00
Engagement		
Reporting		
Overhead		
Total All Grants (Calculated from Table 16.4 below)		\$0.00
Total All Contracts (Calculated from Table 16.5 below)		\$13,011,203.29
Sub-Total (Calculated)		\$13,088,203.29
Capital*		
AEPA TOTAL (Calculated)		\$13,088,203.29

* The Government of Alberta Financial Policies (*Policy # A600*) requires that all **capital asset** purchases comply with governmental and departmental legislation, policies, procedures, directives and guidelines. **Capital assets** (*Financial Policy # A100*, Government of Alberta, January 2014) are tangible assets that: have economic life greater than one year; are acquired, constructed, or developed for use on a continuing basis; are not held for sale in ordinary course of operations; are recorded and tracked centrally; have a cost greater than \$5,000.

Some **examples of capital asset equipment include**: laboratory equipment, appliances, boats, motors, field equipment, ATV's/snowmobiles, stationary equipment (pier/sign/weather), fire/safety equipment, pumps/tanks, heavy equipment, irrigation systems, furniture, trailers, vehicles, etc. (*Financial Policy # A100*, Government of Alberta, January 2014).

Table 16.2.2 Funding Requested BY ENVIRONMENT & CLIMATE CHANGE CANADA

Organization - Environment & Climate Change Canada ONLY	Total % time allocated to project for ECCC staff	Total Funding Requested from OSM
Salaries and Benefits FTE (Please manually provide the number in the space below)		
Operations and Maintenance		
Consumable materials and supplies		
Conferences and meetings travel		
Project-related travel		
Engagement		
Reporting		
Overhead		
ECCC TOTAL (Calculated)		\$0.00

* ECCC cannot request capital under the OSM program. Any capital requirements to support long-term monitoring under the OSM program should be procured by Alberta and captured in that budget table.

Table 16.3

Complete ONE table per Grant recipient.

Add a Recipient by clicking on add table below the table. The total of all Grants is Auto Summed in Table 16.2.1

GRANT RECIPIENT - ONLY: Name	
GRANT RECIPIENT - ONLY: Organization	
Category	
Salaries and Benefits FTE	Total Funding Requested from OSM
Operations and Maintenance	
Consumable materials and supplies	
Conferences and meetings travel	
Project-related travel	
Engagement	
Reporting	
Overhead	
GRANT TOTAL (Calculated)	\$0.00

Table 16.4

Complete ONE table per Contract recipient.

Add a Recipient by clicking on add row below the table.. This section is only to be completed should the applicant intend to contract components or stages of the project out to external organizations. The total of all Contracts is Auto Summed in Table 16.2.1

CONTRACT RECIPIENT - ONLY: Name	Sanjay Prasad
CONTRACT RECIPIENT - ONLY: Organization	Wood Buffalo Environmental Association
Category	Total Funding Requested from OSM
Salaries and Benefits	\$2,462,741.00
Operations and Maintenance	
Consumable materials and supplies	\$4,963,977.00
Conferences and meetings travel	\$50,000.00
Project-related travel	
Engagement	\$83,685.00
Reporting	\$823,260.00
Overhead	\$1,997,062.00
CONTRACT TOTAL (Calculated)	\$10,380,725.00
CONTRACT RECIPIENT - ONLY: Name	Michael Bisaga
CONTRACT RECIPIENT - ONLY: Organization	Lakeland Industry and Community Association
Category	Total Funding Requested from OSM
Salaries and Benefits	\$177,945.69
Operations and Maintenance	
Consumable materials and supplies	\$481,191.11
Conferences and meetings travel	\$8,709.52
Project-related travel	\$13,760.06
Engagement	
Reporting	\$153,304.56
Overhead	\$35,737.40
CONTRACT TOTAL (Calculated)	\$870,648.34
CONTRACT RECIPIENT - ONLY: Name	Michael Bisaga

CONTRACT RECIPIENT - ONLY: Organization	Peace River Area Monitoring Program
Category	Total Funding Requested from OSM
Salaries and Benefits	\$196,684.50
Operations and Maintenance	
Consumable materials and supplies	\$473,430.25
Conferences and meetings travel	\$5,460.00
Project-related travel	\$38,220.00
Engagement	
Reporting	\$150,529.00
Overhead	\$32,806.20
CONTRACT TOTAL (Calculated)	\$897,129.95
CONTRACT RECIPIENT - ONLY: Name	Ryan Abel
CONTRACT RECIPIENT - ONLY: Organization	Fort McKay First Nation
Category	Total Funding Requested from OSM
Salaries and Benefits	
Operations and Maintenance	
Consumable materials and supplies	\$20,000.00
Conferences and meetings travel	
Project-related travel	\$130,000.00
Engagement	
Reporting	\$75,000.00
Overhead	
CONTRACT TOTAL (Calculated)	\$225,000.00
CONTRACT RECIPIENT - ONLY: Name	Sanjay Prasad
CONTRACT RECIPIENT - ONLY: Organization	Wood Buffalo Environmental Association
Category	Total Funding Requested from OSM
Salaries and Benefits	
Operations and Maintenance	

Consumable materials and supplies	\$637,700.00
Conferences and meetings travel	
Project-related travel	
Engagement	
Reporting	
Overhead	
CONTRACT TOTAL (Calculated)	\$637,700.00

Table 16.5 GRAND TOTAL Project Funding Requested from OSM Program

The table below is auto calculated, please do not try to manually manipulate these contents.

Category	Total Funding Requested from OSM
Salaries and Benefits Sums totals for salaries and benefits from AEPA and ECCC ONLY	\$72,000.00
Operations and Maintenance	
Consumable materials and supplies Sums totals for AEPA and ECCC ONLY	\$0.00
Conferences and meetings travel Sums totals for AEPA and ECCC ONLY	\$0.00
Project-related travel Sums totals for AEPA and ECCC ONLY	\$5,000.00
Engagement Sums totals for AEPA and ECCC ONLY	\$0.00
Reporting Sums totals for AEPA and ECCC ONLY	\$0.00
Overhead Sums totals for AEPA and ECCC ONLY	\$0.00
Total All Grants (from table 16.2.1 above) Sums totals for AEPA Tables ONLY	\$0.00
Total All Contracts (from table 16.2.1 above) Sums totals for AEPA Tables ONLY	\$13,011,203.29
SUB-TOTAL (Calculated)	\$13,088,203.29
Capital* Sums total for AEPA	
GRAND PROJECT TOTAL	\$13,088,203.29

Some **examples of capital asset equipment include:** laboratory equipment, appliances, boats, motors, field equipment, ATV's/snowmobiles, stationary equipment (pier/sign/weather), fire/safety equipment, pumps/tanks, heavy equipment, irrigation systems, furniture, trailers, vehicles, etc. (*Financial Policy # A100, Government of Alberta, January 2014*).

17.0 FINANCIAL MANAGEMENT

The OSM Program reserves the right to reallocate project funding during the current fiscal year on the basis of project performance and financial overspend or underspend.

Please check this box to acknowledge you have read and understand

In the space below please describe the following:

- Discuss how potential cost overruns and cost underruns will be managed.
- If this is a continuing project from last year, identify if this project was overspent or underspent in the previous year and explain why.
- Describe what risks and/or barriers may affect this project.

Potential risks and barriers include delays in the contract approval process, travel restrictions for government personnel, and delays in hiring new personnel (if applicable) may also impact the budget requested for this work plan.

The proposed budget for this work plan is \$13,501,250. This is 7% (\$912,329) higher than the 2023-24 funded budget (\$12,587,921). These budget changes are documented for each organization below:

Reasons for budget changes are:

- (1) Acquisition of a vertical temperature/wind profiler to fulfill an FMAQO Rec 14/15 monitoring need.
- (2) 3% increase to WBEA budget compared to 23/24, mainly due to general cost increases associated with inflation.
- (3) Increased network operation costs for LICA and PRAMP due to inflation rates.

Attachments:

- Supplemental Attachment #01 - Budget spreadsheet
- Supplemental Attachment #02 - WBEA Detailed budget including cost difference from 2023/24
- Supplemental Attachment #03 - LICA Detailed budget
- Supplemental Attachment #04 - PRAMP Detailed budget
- Supplemental Attachment #05 - Oil Sands Monitoring Program - Field Sampling Schedule
- Supplemental Attachment #06 - Adaptive Monitoring Framework schematic

18.0 Alternate Sources of Project Financing - In-Kind Contributions

Table 18.1 In-Kind Contributions

Add an In Kind Contribution by clicking on the table and then clicking on the add row on the bottom right side of table.

Description	Source	Equivalent Amount (\$CAD)
TOTAL	\$0.00	

19.0 Consent & Declaration of Completion

Should your application be successful, The OSM Program reserves the right to publish this work plan application. Please check the box below to acknowledge you have read and understand:

I acknowledge and understand.

Lead Applicant Name

Greg Wentworth

Title/Organization

Senior Atmospheric Scientist, Alberta Environment and Protected Areas

Signature

Greg. Wentworth  Digitally signed by Greg. Wentworth
Date: 2023.11.01 15:32:22 -0600

Government Lead / Government Coordinator Name (if different from lead applicant)

Title/Organization

Signature

Please save your form and refer to the instructions page for submission link.

Governance Review & Decision Process

this phase follows submission and triggers the Governance Review

TAC Review (Date):

ICBMAC Review (Date):

SIKIC Review (Date):

OC Review (Date):

Final Recommendations:

Decision Pool:

Notes:

Post Decision: Submission Work Plan Revisions Follow-up Process

This phase will only be implemented if the final recommendation requires revisions and follow-up from governance

ICBMAC Review (Date):

SIKIC Review (Date):

OC Review (Date):

Comments:

Decision Pool:

Notes & Additional Actions for Successful Work Plan Implementation:

Signature