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CITY OF KAMLOOPS

Airshed Management Plan (2012)





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ACKNOWLEDGEMENTS

The Airshed Management Technical Committee

The purpose of the Airshed Management Technical Committee was to provide technical input throughout the entire planning process as required, facilitate the coordination of agency and local government actions, contribute experiential knowledge gained through practices occurring in other municipalities, and review and provide input on draft documents.

- R. Adams, Ministry of Environment (MOE)
- J. Gudjonson, Thompson Rivers University (TRU)
- D. Olstad, Kamloops Fire Rescue (KFR)
- C. Swan, Ministry of Forests, Lands and Natural Resource Operations (MOF)
- B. Janning, MOF (Alternate)
- D. Wallace, Thompson-Nicola Regional District (TNRD)
- B. Zaharia, Interior Health Authority
- R. Collison, School District No. 73 (Kamloops-Thompson)
- A. MacDonald, School District No. 73 (Kamloops-Thompson) (Alternate)
- M. Diffin, Tk'emlúps te Secwépemc (TteS)
- D. Funk, TteS (Alternate)

The Airshed Management Advisory Committee

The purpose of the Airshed Management Advisory Committee was to lead the process and ensure gaps were identified and resolved quickly; consider input from and provide advice to the Technical Committee; participate in public involvement activities and ensure the goals in the plan align with the public interest; and ensure that sufficient consideration was given to the social, economic, and environmental impacts of the Airshed Management Plan (AMP).

- P. Milobar, Mayor, City of Kamloops
- T. Lange, Councillor, City of Kamloops
- M. Spina, Councillor, City of Kamloops
- A. Raine, Director, TNRD/Mayor, Sun Peaks Resort Municipality
- F. Seymour, Councillor, TteS
- K. Dangelmaier, Domtar
- D. Funk, TteS (Alternate)
- T. Helin, Public Member
- R. Pynn, Public Member

City Staff and Consultants

- R. Lambright, Planning and Development Manager
- J. Fretz, Trades and Environmental Services Manager
- L. Piroddi, Planner
- M. Solomon, Environmental Services Coordinator
- M. Luciani, Planner
- M. Luca, Office Services Supervisor - Public Works and Utilities Department (Recorder)
- J. Muir, Communication Solutions Inc.
- K. Stebbings, Communication Solutions Inc.

Funders

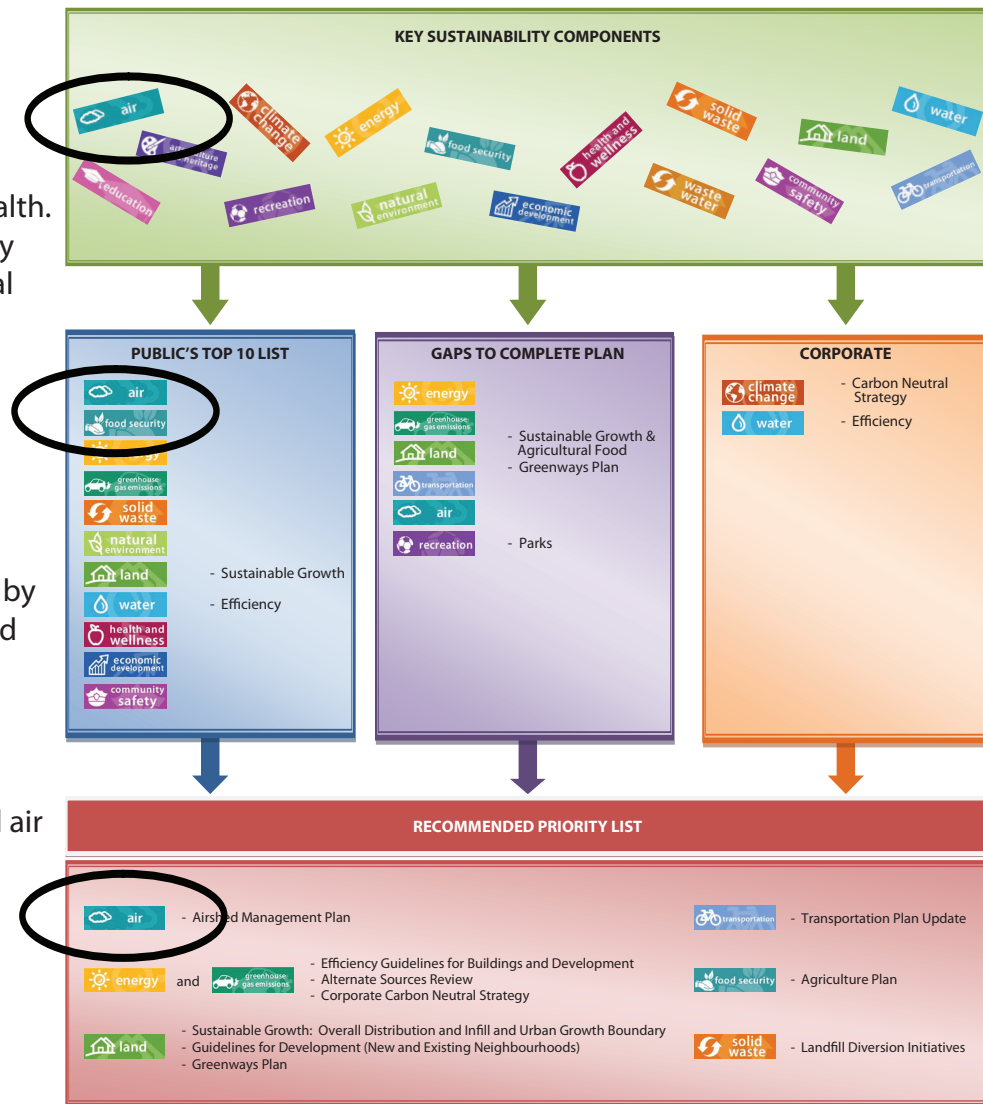
- Real Estate Foundation
- Federation of Canadian Municipalities (FCM) - Green Municipal Fund
- Union of British Columbia Municipalities (UBCM) - Gas Tax Fund



Our Commitment to Airshed Planning

Airshed planning is a key element of the Sustainable Kamloops Plan vision. As outlined in the Sustainable Kamloops Plan, ensuring good quality air in our community is essential to human and environmental health. Health concerns, including cardiovascular and respiratory conditions have been linked to degraded air quality. Vital ecological processes can also be impacted by poor air quality. Appropriately managing activities in our airshed is critical to ensuring Kamloops' good quality air is maintained. The AMP's vision is aligned with the diverse goals and objectives outlined in the Sustainable Kamloops Plan. The components of this vision include:

- Ensuring that citizens have healthy air to breathe by meeting or exceeding Canada-wide standards and provincial air quality objectives;
- Ensuring maintenance of good air quality and improvements to air quality where feasible throughout the community/region;
- Educating and informing the community on local air quality issues; and
- Leading by example by changing behaviour as needed to protect air quality.





HIGHLIGHTS

The Airshed Management Plan:

- Engages the City of Kamloops and its residents to address air quality, provides actions for maintenance of clean air and improvement where feasible, and positions the City as a leader of sustainability in the Thompson Region;
- Re-confirms our commitment to creating a model healthy city, a goal in the 2005 Kamloops Annual Report;
- Reflects the unique challenges of Kamloops, a growing community with increasing servicing needs;
- Requires the City of Kamloops to monitor successes and failures to ensure the City is meeting the expectations of the community; and
- Continues to build on the momentum created from the Sustainable Kamloops Plan.

The Process:





Public Consultation:

The Airshed Management Planning process involved an extensive public input phase to solicit input for the plan and feedback on draft documents. Some of the public input opportunities included:

- AMP Advisory and Technical Committees
- Web-based and hard copy Airshed Survey
- Web access to all presentation, workshop and open house materials
- Airshed Management road show presentations
- Action-oriented Airshed Management Workshop
- Open House to review and comment on the draft Airshed Management Plan
- Facebook and Twitter
- Designated email address and telephone number

A separate, public input report was developed based on the results of the public input opportunities and is available at www.kamloops.ca/environment/airshedmanagementplan.shtml.

Key Strategies:

A number of action-oriented strategies were identified through public consultation and technical review of the air quality issues in the Kamloops Airshed. The following strategies are discussed in detail in Section 5: Strategies and Actions.

1. Encourage Alternative, Sustainable Methods of Transportation and Supportive Infrastructure
2. Minimize Contaminant Emissions from Wood Burning Appliances with Proper Installation and Management
3. Ensure that Open Burning is a Last Resort Approach and is Undertaken Correctly to Minimize Contaminant Emissions
4. Limit Impact of Contaminant Emissions from Industrial, Commercial, and Institutional Sources
5. Increase Local Government Role in Air Quality Preservation and Enhancement Through Land Use Planning, By-laws, and Programs
6. Enhance Access to Air Quality Information and Increase Public Awareness
7. Support Ongoing Air Quality Research to Protect and Improve Air Quality

SECTION 1: INTRODUCTION AND BACKGROUND

With a population of 85,678¹, the City of Kamloops is the fourth largest municipality in British Columbia outside of the Lower Mainland. It encompasses almost 30,000 hectares of land and stretches approximately 25 km up the Thompson River valley across diverse landscapes. As one of the fastest-growing communities in the province, Kamloops is projected to reach 120,000 residents by 2036.² As the population increases, so will the level of activity from mobile and area sources that could negatively affect local air quality.

Air quality was the top priority for sustainability identified through extensive public consultation for the Sustainable Kamloops Plan Foundations for Sustainability, adopted in 2010.

Development of the AMP required the following steps and activities:

- Establishment of Technical and Advisory Committees to lead the AMP development process;
- Engagement of stakeholders and public consultation sessions to facilitate knowledge exchange;
- Compilation and assessment of air quality data to better understand the situation in the Kamloops airshed, including sources of emissions;
- Providing direction to manage activities relating to Kamloops air quality through regulation, education, incentives and other possible means deployed by the City, Province and industry; and
- Building community awareness of local air quality conditions and steps which can be taken individually and collectively to ensure its protection and improvement.

¹ Statistics Canada. 2012. Kamloops, British Columbia (Code 5933042) and Thompson-Nicola, British Columbia (Code 5933) (table). Census Profile. 2011 Census. Statistics Canada Catalogue no. 98-316-XWE. Ottawa. Released February 8, 2012.

www12.statcan.ca/census-recensement/2011/dp-pd/prof/index.cfm?Lang=E (accessed February 13, 2012).

² This assumes an annual growth rate of 1.25%. See the KAMPLAN (2004) and Development Cost Charge By-law Update (2010).



Historically, Kamloops has been revered for air that possesses a “clean crisp quality which gives it an invigorating, snappy effect, rather than the depressing effect so common at the coast (1906 Kamloops Sentinel).” In order to create a common vision for maintaining our current level of air quality for future generations, an AMP has been developed. An Airshed Management Advisory Plan Committee and Technical Committee comprising of members of the public, government agencies, non-government organizations and industry were created to meet this request. Committee members dedicated their valuable time and knowledge toward the development of the AMP over a period of 15 months.

A background report entitled “What is in the Air We Breathe” was developed by City staff with support from the Airshed Advisory and Technical Committees. The purpose of the report was to identify and characterize the air quality issues facing the City of Kamloops prior to development of the AMP. Components of the report included:

- Defining the topics and issues;
- Describing how they relate to air quality;
- Identifying how individuals, communities and industry contribute to ambient air quality issues;
- Reviewing the state of the air in Kamloops; and
- Defining terms related to air quality and airshed management

The background report is available at www.kamloops.ca/environment/airshedmanagementplan.shtml.

The main pollutants present in the Kamloops airshed, and thus targeted in the AMP, include particulate matter (PM₁₀ and PM_{2.5}), ground level ozone (GLO), and odorous reduced sulphur gases (ORSG). It has been scientifically proven that air pollution and emissions of PM and GLO are linked to a variety of heart and lung-related negative health outcomes, including premature death. ORSG are not scientifically proven to be a human health hazard but they are a nuisance and can impact economic development due to the odour they release.³ Other pollutants that can be of concern to the airshed should their levels increase include nitrogen dioxide (NO₂), sulphur dioxide (SO₂) and volatile organic compounds (VOCs).

³ The Clean Air Bylaws Guide, West Coast Environmental Law, 2006

Historically, Kamloops City Council has proactively initiated a number of by-laws and measures to address air quality. These measures and others initiated by the TteS and the TNRD are discussed in more detail in Section 4.

Implementation and regular review of the AMP are the next steps in the airshed management process. Some of the actions and strategies described in this document have already been implemented to some extent; however, opportunities still exist to improve upon those actions, reducing contaminant emissions further. Those actions that have not been implemented are expected to be undertaken over the next few years. With continued support from the MOE, TNRD, local government, TteS, businesses, industry and the citizens of Kamloops, and ongoing monitoring of air quality in the airshed, the common goal of a healthier Kamloops can be achieved.

WHY DEVELOP AN AIRSHED MANAGEMENT PLAN?

Managing air quality is important due to impacts on human health, the environment, and the economy.

Poor air quality has been linked to many adverse health effects such as breathing difficulties, exacerbation of allergies, aggravation of respiratory or cardiovascular conditions, and in severe cases, premature death (Brunekreef and Holgate, 2002; Government of BC, 2008). Populations vulnerable to poor air quality include children, seniors, and those with respiratory illnesses (Gage and Saha, 2006). The Provincial Health Officer's 2003 annual report on air quality and public health in BC found that poor air quality (air pollution) can lead to an estimated \$85 million increase in health care costs and as many as 250 premature deaths every year.

Environmental impacts of air pollution include effects on vegetation health and productivity, and poor visibility due to smog (Environment Canada, 2010b; Government of BC, 2008). Air pollution can also contribute to global climate change; many sources of air pollution also emit greenhouse gases and some air pollutants such as soot particles and ozone themselves affect climate. Combined, the health and environmental impacts of poor air quality can also lead to negative consequence for the economy, such as lost work time, increased health care costs, and declines in the tourism industry and agricultural sector (Environment Canada, 2010; Gage and Saha, 2006; Province of British Columbia, 2011).⁴

The AMP provides the foundation and direction needed to preserve air quality in our community through a collaborative effort among government, business, industry and residents. When the air we breathe is compromised by pollutants, there are a variety of adverse impacts. This plan outlines a number of measures to maintain our current standard of air quality and improve it where feasible.

⁴ C. Coccola, January 2012. Inventory of Air Quality By-laws in British Columbia: Vehicle Idling, Open Burning, and Wood Burning Appliances. BC Ministry of Environment.



SECTION 2: AIR QUALITY IN THE KAMLOOPS AIRSHED

The current air quality in the Kamloops airshed has been described as generally good, but with periods of deterioration usually caused by wildfires or periods of poor atmospheric dispersion. Kamloops currently meets all air quality objectives in use in British Columbia, in particular those for respirable particulate matter (PM_{2.5}) which are the most stringent of any jurisdiction in the world. The City of Kamloops is fortunate to enjoy good air quality compared to some other BC communities and other areas of the country.

Thousands of sources release air contaminants every day. Emission sources range in size from vehicle use and household wood-burning appliances, to small businesses and large-scale industrial operations. While Kamloops air quality is good, it is important to implement actions and strategies and monitor results in order to maintain clean air quality and improve air quality where feasible.

POLLUTANTS OF INTEREST IN KAMLOOPS

Pollutants identified in the AMP are those that pose the most significant effect to human health and/or are relevant to the Kamloops Airshed. These pollutants are also identified by Environment Canada as Criteria Air Contaminants (CAC). Information on CAC emissions is collected every year within the National Pollutant Release Inventory (NPRI) starting in 2002. CACs are produced from a number of sources.

The two main pollutants in the Kamloops Airshed (identified by the MOE through ongoing local monitoring of air pollutant emissions) are PM_{2.5} and GLO. These contaminants are widespread and are listed by Environment Canada as Criteria Air Contaminants or those that can have serious impacts on human health and the environment.

A third pollutant has been identified through extensive public consultation as a community concern. ORSG are nuisance pollutants and have not been proven to significantly impact human health.

These pollutants and several others of interest are described in Table 1.⁵

⁵ BC Ministry of Environment 2005



Table 1 - Pollutants of Interest in Kamloops and Their Associated Impacts

POLLUTANT	DESCRIPTION AND SOURCES		HEALTH IMPACT	ENVIRONMENTAL IMPACT
Particulate Matter (PM) Dust and tiny particles of solid and liquid material.	PM ₁₀ - Particles smaller than 10 micrometers (µm) in diameter.	<ul style="list-style-type: none"> Road dust and road construction. Mixing and applying fertilizers/pesticides. Forest fires. 	Coarse particles irritate the nose and throat, but do not normally penetrate deep into the lungs.	<p>PM is the main source of haze that reduces visibility.</p> <p>It takes hours to days for PM₁₀ to settle out of the air.</p> <p>Tiny PM_{2.5} particles stay in the air much longer than PM₁₀, taking days to weeks to be removed.</p>
	PM _{2.5} - Particles smaller than 2.5 micrometers (µm) in diameter	<ul style="list-style-type: none"> Combustion (motor vehicles including trains, woodstoves and fireplaces). Industrial operations. Open burning. 	<p>Fine particles enter the lungs, making it difficult to breathe, and lead to diseases such as bronchitis. Depending on the source and chemical composition of the fine particles, effects can be severe enough to contribute to respiratory and cardiovascular disease and premature death in vulnerable individuals.</p> <p>PM_{2.5} is the worst public health problem from air pollution in BC.</p>	
Ground Level Ozone (GLO) Bluish gas with a pungent odour.	<p>Formed at ground level by chemical reactions between Volatile Organic Compounds (VOCs) and Nitrogen Dioxide (NO₂) in the presence of sunlight.</p> <p>VOCs and NO₂ are released by burning coal, gasoline, and other fuels; and naturally by plants and trees (e.g. the smell from evergreen sap/needles.)</p>		<p>Can include symptoms such as chest pain, coughing, nausea and pulmonary congestion. Impacts on individuals with pre-existing heart or respiratory conditions can be very serious.</p> <p>Exposure can contribute to asthma, reduced resistance to colds and other infections.</p>	<p>Can damage plants and trees, leading to reduced yields.</p> <p>Leads to lung and respiratory damage in animals.</p>



POLLUTANT	DESCRIPTION AND SOURCES		HEALTH IMPACT	ENVIRONMENTAL IMPACT
Odorous Reduced Sulphur Gases (ORSG)	<ul style="list-style-type: none"> Colourless gases considered to be nuisance odour pollutants. Comprised of Hydrogen Sulphide and Total Reduced Sulphur compounds. At detectable concentrations, ORSG is characterized by an offensive odour similar to rotten eggs. 	<ul style="list-style-type: none"> Pulp and paper industry. Sewage treatment plants. Oil and gas industry (from the extraction and processing of sour gas). Natural sources include bogs and marshes. 	<p>Local governments are likely to have complaints about the smell from ORSG well before the levels are high enough to have any known clinical effect, although prolonged exposure to even low levels of ORSG may produce headaches and nausea.⁶</p> <p>While extremely high levels of ORSG can be fatal, such ambient levels will occur only as a result of a major accident in certain types of oil and gas operations. ORSG is viewed as a nuisance more than a health problem.</p>	
Other Pollutants	<p>Sulphur Dioxide Nitrogen Dioxide Volatile Organic Compounds (VOC)</p> <p>Most of these come from combustion, industrial processes or the evaporation of paints and common chemical products.</p>		<p>Health impacts of these pollutants are varied.</p> <p>Note: These pollutants have never exceeded the CWS Level A Objective and tend not to be a problem in Kamloops. While we should continue to monitor them, they do not appear to be a threat to human health in Kamloops.</p>	<p>Most local impacts on the environment are relatively short-lived while others travel the world on wind currents in the upper atmosphere.</p>

⁶ The Clean Air Bylaws Guide, West Coast Environmental Law, 2006



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AIR QUALITY BASELINE DATA

Baseline data is of critical importance to the success of this plan. Since air quality in the City of Kamloops is consistently better than the Canada Wide Standards (CWS) and Provincial Objectives for air quality, the AMP aims to provide a means to maintain this clean air and strive for continuous air quality improvement where feasible (see Appendix 1 for CWS and Provincial Objectives). Tables 2 and 3 below, provided by MOE officials, identify and accurately profile air emissions in the City of Kamloops over the past few years.

Table 2 - PM_{2.5} and GLO Levels in Kamloops⁷

Year	Annual PM _{2.5} (µg/m ³)	PM _{2.5} 98th Percentile (3 Year Average) ⁸	Ozone Metric (ppb) 4th Highest Maximum Average ⁹
2000	5.6	Insufficient data ¹⁰	57
2001	5.3	14	55
2002	6.7	16	55
2003	7.9	25	58
2004	5.7	26 ¹¹	60
2005	4.7	24	59
2006	5	16	57
2007	4.9	14	55
2008	5	15	56
2009	5.7	18	57
2010	5.4	24	55
Canada Wide Standard (2000)	N/A	30µg/m ³	65 ppb
BC Ambient Air Quality Objective (2009)	8 µg/m ³	N/A	N/A

⁷ Data provided by MOE

⁸ The 98th percentile of the daily averages in a calendar year averaged over the previous 3 years.

⁹ The 4th highest maximum 8 hour average for each day in the period April 1st to September 30th.

¹⁰ PM_{2.5} Measurements began in Kamloops in the Fall of 1998. Therefore it was not until the end of the 2001 calendar year that a three year average could be calculated.

¹¹ Because three years of data are averaged, the forest fires in 2003 resulted in high values for the period 2003-2005. The fires in 2010 will have a similar effect. Even if there are no forest fires in 2012, values will appear to be high in 2011 and 2012.

Table 3 - Maximum Observed Yearly Averages for Other Contaminants in Kamloops¹²

	BROCKLEHURST						DOWNTOWN	
	Nitrogen Dioxide		Nitrogen Oxide		Sulphur Dioxide		Sulphur Dioxide	
Year	(μgm^{-3})	(μgm^{-3})	(μgm^{-3})	(μgm^{-3})	(μgm^{-3})	(μgm^{-3})	(μgm^{-3})	(μgm^{-3})
1995	90	66	269	84	40	10	35	4
1996	117	74	286	130	64	8	35	5
1997	92	66	257	117	24	4	24	5
1998	90	59	177	136	61	11	48	11
1999	84	55	213	144	83	19	40	8
2000	90	74	311	141	56	11	40	8
2001	92	59	157	67	93	10	75	17
2002	82	66	207	108	75	18	109	14
2003	80	52	299	90	88	10	45	13
2004	78	54	206	106	48	8	53	9
2005	82	58	192	85	64	13	90	10
2006	--	--	--	--	56	9	--	--
2007	80	54	153	67	77	11	--	--
2008	78	56	165	67	61	14	--	--
2009	78	--	135	--	67	--	--	--
Canada Wide Standard (2000)	1 hr	24 hr	1 hr	24 hr	1 hr	24 hr	1 hr	24 hr
BC Level A Objective (2009)	400	200	NA	NA	450	160	450	160
These contaminants, to date, have not exceeded the Canada Wide Standard Level A Objective.								

¹² Data provided by MOE



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Table 4 - Number of Hours per year When the Hourly Average for ORSG was Above the Level A Objective.

Year	BROCKLEHURST	DOWNTOWN
1977	83	no data
1978	451	no data
1979	409	no data
1980	578	no data
1981	455	no data
1982	544	no data
1983	53	30
1984	168	94
1985	138	56
1986	351	197
1987	421	17
1988	454	41
1989	344	127
1990	328	148
1991	125	96
1992	113	79
1993	170	118
1994	117	105
1995	125	61
1996	168	77
1997	172	91
1998	204	47



Year	BROCKLEHURST	DOWNTOWN
1999	230	42
2000	171	46
2001	131	no data
2002	221	136
2003	111	42
2004	70	45
2005	32	14
2006	16	no data
2007	21	no data
2008	8	no data
2009	36	no data
2010	74	no data

- Woodland Trailer Court
- McArthur Island

Note: If the average concentration of these gasses exceeds five parts per billion for one hour, this qualifies as a BC Level A Objective exceedence.



SECTION 3: OBJECTIVES AND TARGETS

The objectives of the AMP are to:

- protect, and where feasible, improve air quality in the City of Kamloops;
- continue to raise awareness and inform the public about air quality issues in the Kamloops Airshed;
- continue to support MOE in monitoring emissions of air contaminants in the Kamloops Airshed
- continue to meet and be consistently better than CWS and Provincial Objectives for air quality except in the case of episodic, natural events such as forest fires; and
- ensure there is no upward trend in any measured air contaminant parameters.

The targets for the AMP were developed by the Technical Committee in consultation with the Advisory Committee and City staff. Appendix 2 outlines the setting of targets for the Kamloops Airshed Plan. Targets are based on there being no upward trend in any measured parameter. The parameters chosen are those used in the determination of ambient air quality objectives. These parameters are used in the setting of ambient air quality objectives and there is considerable scientific research to support their use. The measurable air contaminants and parameters in question are as follows:

Table 4 - Target Air Pollutants in the Kamloops Airshed and Respective Measured Parameters

AIR POLLUTANT	PARAMETERS			
Respirable Particulate Matter PM_{2.5}	1.	Annual average		
	2.	98th percentile of daily averages		
Ground Level Ozone	1.	Annual 4th highest daily maximum 8 hour average in April to September (Canada Wide Standard definition)		
Nitrogen dioxide	1.	Hourly average		
Sulphur Dioxide	1.	Hourly average		
	2.	Ten minute average		
Odorous Reduce Sulphur Gases (reported as H₂S)	1.	Hours above 5µg/m ³	3.	Ten minute periods above 5µg/m ³
	2.	Hours above 3µg/m ³	4.	Ten minute periods above 3µg/m ³



The statistical method used to detect a trend in the above parameters is being determined by Dr. Isabella Ghement, a University of British Columbia statistician with expertise in air quality and considerable experience in supplying specialized trend analysis for ozone and PM_{2.5} in the Kelowna and Kamloops airshed. Funding for this project was provided by MOE. The project will be complete by Fall 2012.

Summaries of air quality and trend analysis will be supplied annually by MOE to the City of Kamloops in a user-friendly format.

SECTION 4: CURRENT STRATEGIES AND ACTIONS

The City of Kamloops has already enacted several by-laws and policy amendments to reduce air pollution in the local airshed. These include:

- Fire Prevention By-law, which restricts open burning;
- Noise Control By-law, which restricts commercial vehicle idling in residential areas for more than three minutes;
- Adoption of the City's Industrial Land Review 2010-2015 as part of KAMPLAN: the Official Community Plan;
- Clean Indoor Air By-law, which addresses smoking in indoor public places; and
- Prohibition of Outdoor Wood Boilers By-law, which reduces smoke emissions in the community.

In addition to these by-laws, the City has implemented several initiatives to promote air quality improvement, including:

- Clean Air Day: Demonstrates a wide variety of alternative methods of transit.
- Bike to Work Week: Promotes cycling as an active mode of transportation to reduce emissions.
- Anti-idling Program: Educates people on the environmental effects of idling.
- Installation of roundabouts: Reduces idling, engine noise, air pollution, and fuel consumption.
- Street Tree Programs: Promotes planting trees in neighbourhoods and providing incentives to do so.
- Development of new bike lanes: Supports convenience and safety of active transportation and alternative, green commuting methods.

Although steps have already been taken, the following public policies indicate that further planning must be done to improve air quality in the Kamloops airshed:

- The Sustainable Kamloops Plan
- KAMPLAN, the City's Official Community Plan
- The Provincial Environmental Management Act (EMA)



SECTION 5: STRATEGIES AND ACTIONS

While provincial industrial permitting as a way of regulating emissions in British Columbia has resulted in emission reductions from industrial sources, contributions from non-industrial, unregulated sources are growing. The Airshed Management Plan provides goals and strategies for both regulated and non-regulated sources with added focus on area and mobile sources.

Several strategies have been identified through extensive public consultation and technical review to achieve the Airshed Management Plan goals. They are identified and described in this section.

The Plan includes a number of actions for achieving the objectives identified earlier for the preservation of clean air quality and improvement of air quality where feasible. Strategies and actions were developed based on public feedback from the survey, roadshow presentations and workshop, input from technical and advisory committees and City staff and review of plans developed in other communities. While some of the actions described in the following section have already been implemented to some degree, opportunities still exist to improve upon those actions, which could reduce pollutant emissions further. The next section describes these actions, implementation timelines and the party(ies) responsible for implementing each one.

Each action has been assigned a priority level depending on the ease of which it can be implemented, its associated cost as well as the length of time required to implement the action. Priority levels are identified as:

L = Low Priority (implementation is difficult, costly and lengthy taking 10+ years)

M = Medium Priority (implementation can be done with a low level of difficulty, with some financial implications, within 10 years)

H = High Priority (implementation can be done with ease, with minimal financial implications, within 5 years)

I = Immediate Priority (action item to be included in the 2013 Budget and Corporate Strategic Plan)



The following acronyms have been used to identify the department(s) and organization(s) responsible for implementing each action:

BCS	Business and Client Services Division
BCT	BC Transit
CFTC	Community Futures Thompson Country
CSCS	Corporate Services and Community Safety Department
DES	Development and Engineering Services Department
EC	Environment Canada
FIN	Finance Department
IHA	Interior Health Authority
KFR	Kamloops Fire Rescue
MOE	Ministry of Environment
MOF	Ministry of Forests, Lands & Natural Resource Operations
PRCS	Parks, Recreation, and Cultural Services Department
PWU	Public Works and Utilities Department
SD73	School District No. 73
TNRD	Thompson-Nicola Regional District
TteS	Tk'emlúps te Secwépemc
TRU	Thompson Rivers University
VK	Venture Kamloops

While some of the actions outlined in this plan will deliver reductions in measured parameters, some of the identified actions are dependent on further research and analysis and support from external agencies and organizations.



Strategy 1: Encourage alternative, sustainable methods of transportation and supportive infrastructure.

Most of our transportation system is powered by fossil fuels. The result is that transportation is one of the largest sources of air pollutants (and greenhouse gases) in British Columbia (Refer to 'What is in the Air We Breathe' Background Report for more information). As most of these emissions happen close to where we live and work, they can have a significant impact on our health. Research has shown that reducing our dependency on the automobile can have dramatic effects to localized air quality; for example, closing down a 10-mile section of the 405 Freeway in Los Angeles for road repairs during one weekend last July, an event referred to as "Carmageddon" and repeated last September, rendered the air 83% cleaner in the immediate area and 5% cleaner throughout the entire region according to researchers at UCLA (www.newsroom.cula.edu).

Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
1. Develop a community wide Food Strategy for the City of Kamloops	Emphasize locally grown and locally processed products, opportunities for urban agriculture, etc.	PRCS DES	I
2. Continue to promote and implement sustainable transportation plans and projects.	Such as the City of Kamloops Pedestrian Master Plan, Travel Smart Plan, Transit Future Plan, Trails Master Plan and the Bicycle Master Plan. Example: pedestrian-friendly upgrades along the Lorne Street Corridor to link Riverside Park with downtown, improved bicycle routes.	DES PRCS	I



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Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
3. Implement the Corporate Energy and Emissions Management Plan as part of the Sustainable Kamloops Plan.	Eg. Reducing the City's fleet emissions and fuel usage. Continue to conduct needs-based assessments of the City Fleet to determine the number and size of City vehicles needed in relation to what we currently have.	PWU PRCS	I
4. Continue to change out old inefficient City vehicles with best in class low emission vehicles.	Underway as part of the existing Corporate Policy.	PWU	I
5. Develop transit connections to TteS lands.	Currently underway - expanded services areas.	DES TteS BCT	I
6. Evaluate and implement regulations for drive-thrus.	Identified by the Sustainable Kamloops Plan: 2010.	DES	H



Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
7. Develop an educational campaign to promote anti-idling.	<p>Idling by-laws aim to restrict unnecessary idling while allowing exceptions for necessary idling (e.g. emergency and armoured vehicles).</p> <p>Ensure the existing anti-idling policy is being observed by City employees driving City vehicles and increase by-law enforcement of the Anti-Idling Noise Control By-law in locations frequented by commercial vehicles: warehouses, loading docks, fuelling facilities etc.</p> <p>Include consistent anti-idling signage at the entrances of the City and coordinate with other agencies to do the same (IHA, TRU, School District). Create 'idle-free' zones where there is potential for higher incidences of idling.</p>	PRCS PWU DES CSCS BCA	H
8. Promote trip reduction services in businesses and residential outreach programs.	Example: educational programming that promotes the benefits of combining multiple errands in one-vehicle trips and suggesting alternatives to single occupancy vehicle transportation.	City TNRD TteS	H
9. Develop a Community Energy Plan for the City and include actions for reducing vehicle emissions community wide.	As part of the Sustainable Kamloops Plan to be completed after the Corporate Energy and Emissions Management Plan.	PRCS	H



air

Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
10. Work with BC Transit (BCT) to encourage transit use and improve customer information.	Increased service times and areas, promotion of the BCT ProPass and encourage more businesses to provide these for their employees. Evaluate need for increased service and expanded service areas. Ensure consistency with Transit Future Plan.	DES BCT TteS	H
11. Develop a Corporate Policy for staff meetings and events.	Encourage staff virtual attendance for events, seminars and meetings.	BCS TNRD TteS	H
12. Continue to promote and encourage buying locally grown products to reduce transport emissions resulting from imported foods.	E.g. educational programming and marketing campaigns to encourage buying locally/regionally grown products and "Made in Kamloops" or "Made in the Thompson Region".	PRCS DES BCS CFTC TNRD TteS	H
13. Encourage ongoing federal government actions to improve emission standards for trains	Lobby for railway anti-idling programs. City to start tracking complaints related to train emissions/idling through calls for service system.	MOE TNRD City TteS	H
14. Require facilities and infrastructure for alternative methods of transportation at all City-owned buildings and facilities.	Bicycle racks and lockers, parking and fast-charge plug-in systems for electric vehicles etc. Fraser Basin Council could be a source of funding for the latter.	PRCS DES PWU	H



Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
15. Continue to optimize the City's traffic signal network.	The City of Kamloops currently optimizes and coordinates its signal network on a regular basis. Traditionally, this task was undertaken to reduce delay for motorists; however, it also has the secondary benefit of reducing idling time, and consequently, vehicle emissions. It is recommended that the City continue to undertake this task.	DES PWU	H
16. Work with BC Hydro, Venture Kamloops and Fortis BC to encourage businesses and other interested parties to develop their own energy and emission reduction plans and provide assistance as requested.	E.g. Climate Smart Program (currently underway), vehicle emission reductions.	PRCS BCS	H
17. Consider amending the Zoning By-law to continue to encourage active transportation.	Encourage new commercial and industrial developments to include linkages to existing trails as well as lockers and other active transportation amenities in addition to bicycle stall provisions.	DES PRCS	M
18. Develop trail connections to TteS lands	Create better linkages with the rest of the City promoting active transportation (e.g. the CN foot bridge).	PRCS DES TteS	M



Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
19. Continue to develop opportunities and programs that encourage employees to cut down on personal vehicle usage.	Conduct employee transportation surveys initially to determine need and feasibility. (e.g. Employee Ride Share Program, more HOV parking, fees for staff parking).	City TNRD TteS	M
20. Review and revise parking requirements for new developments where feasible.	Consider providing incentives for parking reductions and shared parking scenarios. Include tree planting requirements per number of parking stalls.	DES	M
21. Encourage ongoing federal government actions to improve national non-road engine emission and fuel standards.	Environment Canada has developed national regulations to restrict the level of sulphur in non-road diesel fuel and establishing emission standards for some non-road sources (e.g. small and large spark-ignition engines, personal watercraft, recreational vehicles etc. The Sulphur in Diesel Fuel Regulations set maximum limits for sulphur in on-road, off-road, rail (locomotive) and marine (vessel) diesel fuels.	MOE TNRD City TteS	M
22. Encourage ongoing Provincial government actions to improve provincial standards for road engine emissions.	Consider providing incentives for parking reductions and shared parking scenarios.	DES	M
23. Support industry efforts to develop more efficient transportation systems for material/product transport.	E.g. reducing fuel consumption per unit of weight or load, proposed Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations for engines built in 2014 and beyond.	PRCS Industry	M



Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
24. Evaluate a special levy on gas purchased in Kamloops.	The Sustainable Kamloops Plan (2010) suggests considering a gas levy as an additional source of revenue for alternate transportation facilities.	CSCS PRCS	L
25. Continue agency cooperation to promote the increase of octane levels in Canadian gasoline.	Canadian levels are much lower than European levels. The lower the level, the greater the pollution from mobile sources.	TNRD City TteS	L

Strategy 2: Minimize contaminant emissions from wood burning appliances with proper installation and management.

Wood has long been used in B.C. as a heating fuel. It can be an effective and economical way to heat a home if the correct appliance is used for the function and it is operated properly. However, inefficient wood stoves and fireplaces, and improper burning, can result in excessive smoke negatively affecting a neighbourhood. The worst impacts of wood smoke can be avoided by following clean burning practices and by using clean burning wood stoves that meet the emissions standards set by the U.S. Environmental Protection Agency (EPA). This strategy is targeted at the “worst offenders” in terms of those that are creating higher emission levels through improper installation and/or management of their wood-burning appliances.

Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
1. Apply for funding to implement a Provincial Wood Stove Exchange Program. Create a local wood stove exchange incentive program in accordance with the Provincial Wood Stove Exchange program that entices people to convert to CSA/EPA certified clean burning wood stoves. Create a local webpage devoted to the wood stove exchange program (local and provincial details).	The Provincial Wood Stove Exchange is a program designed to encourage British Columbians to change out their older, smoky wood stoves for low-emission appliances including new CSA-/EPA-certified clean-burning wood stoves. Consider waiving the permit fee for original non-CSA/EPA certified woodstove exchanges Webpage accessible from the City’s “Air” webpage	DES PWU BCS PRCS	I



Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
2. Raise public awareness about: <ul style="list-style-type: none"> the importance of efficient, safe, and smoke-free wood burning as it relates to air quality and human health the need for a building permit to install a wood-burning appliance purchasing and installing a wood-burning appliance with reputable retailers/companies 	<p>Through the website, in-print documents and educational programs.</p> <p>Partner with local wood burning appliance retailers.</p> <p>For example, a building permit is required under the City's Building By-law for the installation of solid fuel burning appliances, fireplaces, and chimneys. Education through website/in-print and traveling road show.</p> <p>This could also be in the form of a "How to Burn Efficiently and Effectively" instruction sheet.</p>	KFR DES BCS TteS TNRD	I
3. Continue to promote 'burning smart' through the City's website and through educational programming.	Update information as needed on the webpage that raises awareness and educates about proper wood burning procedures for reduced smoke pollution, cost-efficiency. Develop an educational tool-kit to present throughout the community.	BCS KFR PWU PRCS	I
4. Continue to assess wood burning appliance policies and regulations to determine if amendments are required for improved air quality.		PWU DES	H



Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
5. Develop a Wood Burning Appliance By-law.	<p>A wood burning appliance by-law would prevent installation of non-EPA/CSA certified wood burning appliances. Under this by-law there should be directives related to proper burning and improper burning and wood storage. Include restrictions to using indoor wood burning appliances when air quality is poor, new developments should utilize an alternate source of heat.</p> <p>There are 2 CSA standards that apply to wood stoves</p> <ol style="list-style-type: none">1. Safety Code B365-M2. Pollution/emission Code 415 <p>The BC Building Code does not make reference to both of these codes. The City could lobby the provincial government to include a Pollution/emission Code 415 requirement in the BC Building Code. A local Wood Burning Appliance By-law should require both codes be met or the equivalent EPA standard.</p> <p>Create a definition for “non-compliant wood stove” and consider all non-compliant woodstoves be replaced by a certain year.</p>	DES KFR Local Woodstove Retailers	H
6. Evaluate the potential for implementation of a community development small grant/loan program.	For low income residents to change out their old non-compliant wood stove; often it is the required replacement of the chimney that makes the rebate program not feasible.	PRCS DES PWU	L
7. Consider developing an inspection program for existing wood-burning appliances.	To ensure compliance with the Building Code and to provide an opportunity to raise awareness about ‘burning smart’.	DES PWU KFR	L



Strategy 3: Ensure open burning is a last resort approach and is undertaken correctly to minimize contaminant emissions.

Open burning is the combustion of materials in the open air. Open burning can occur in a few different forms, but the activities most regulated by local governments include recreational burning, residential or backyard burning, and burning for land clearing purposes. Smoke generated by improper open burning can have significant impacts on air quality, with associated health and environmental concerns. Factors that affect the degree of pollution associated with burning include: the type and quality of the material being burned, the meteorological conditions at the time of burning, and the location of the burn in relation to sensitive receptors. Effective smoke management involves an understanding of both proper burning techniques and the conditions that impact transport and dispersion of emissions. While the MOF regulates open burning for large scale burning activities under the Open Burning Smoke Control Regulation, local governments issue permits and can raise awareness about the long-term effects of air emissions on human health and the environment.

Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
1. Continue to implement the Community Wildfire Protection Plan in accordance with Provincial Regulations	Appropriate forest fuel management will be required for continued wildfire risk management. This will include biomass reduction through mechanical means and prescribed fire. Alternatives will always be sought, but the appropriate use of prescribed fire is often the ecologically and operationally appropriate management tool on many sites. www.kamloops.ca/firerescue/pdfs/cwpp.pdf	PRCS KFR MOF	I
2. Continue to enforce the Prohibition of Outdoor Wood-Fired Boilers By-law.	The installation and/or operation of an outdoor wood-fired boiler in the City of Kamloops is prohibited. This refers to an outdoor wood burning appliance or solid fuel burning appliance which is used for the space heating of buildings, the heating of water, or other such purpose and which is located in a separate building or on the exterior of the building.	CSCS DES PWU	I



Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
3. Continue liaising with MOF, Forest Licensees and MOE to control smoke from forest harvest debris burning and prescribed burning.		TNRD PRCS KFR	I
4. Review, update, and continue to enforce the Fire Prevention By-law.	<p>Implementation of higher fees for Open Burn Permits in the Fire Prevention By-law.</p> <p>Section 406 of the Fire Prevention By-law - An Open Air Burning Permit is not required under current municipal regulations for 'necessary burning by any government authority'.</p> <p>Review the concept of 'necessary burning' and revise to require a permit that lays out the requirements for the burn.</p> <p>Prevention of burning yard waste etc.</p>	KFR PRCS	I
5. Educate/promote composting and recycling as an alternative to burning waste.	<p>In-print/website and traveling road-show.</p> <p>It has been identified by several City departments that a more focused effort on this type of education is needed</p>	TNRD PWU TteS PRCS BCS KFR	H



Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
6. Require public and private land owners that carry out large-scale open/prescribed burning to do so only in accordance with the MOF's Go No Go burn program and development of a 'burn and smoke management plan.'	<p>Should be developed by an appropriately qualified person. Burning should only be conducted under the supervision of an appropriately qualified person and with the on-site resources as indicated in the approved prescribed fire plan.</p> <p>Develop guidelines and procedures for open burns that have been permitted. (Best Management Practices).</p> <p>Provide information on how those with burn permits can meet local government goals for improving air quality for protection of human health and manage burning or alternative means of treating wood waste in a manner that is consistent with the Environmental Management Act.</p> <p>The overall goal of smoke management plans is to reduce health risks by minimizing human exposure to smoke from wood burning. Human exposure to wood smoke is minimized by:</p> <ul style="list-style-type: none"> • Reducing emissions of smoke from wood burning; • Ensuring that emissions of smoke from wood burning occur in times and places where dispersion is good so that high concentrations of smoke are not transported to populated areas; • Warning citizens of high levels of smoke and other pollution, and advising appropriate actions to minimize exposure; and • Following guidelines/Best Management Practices already in place and/or upgrading those guidelines when necessary. <p>Educate open burning permit holders in Kamloops about preferred practices to limit smoke from open burning.</p>	TNRD PRCS KFR	M
7. Investigate a City-wide curbside organics collection program.	<p>As an alternative to open burning.</p> <p>Promote the use of the existing yard waste drop-off depots.</p>	PWU	M



Strategy 4: Limit impact of contaminant emissions from industrial, commercial, and institutional sources.

In the long term, the City of Kamloops should encourage industries that may impact air quality to locate in areas of the airshed and neighbouring airsheds that have the least impact on residential neighbourhoods. The redevelopment of the old oil refinery site in the Iron Mask East Industrial Area and the expansion of industrial development in the Iron Mask West and Domtar Industrial Areas should be pursued to provide a means of achieving this goal.

Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
1. Encourage MOE to investigate the creation of an electronic Complaint Management System to track odour complaints from industrial, commercial and institutional sources throughout the City.	Continuously monitor incidences of public irritation from Odorous Reduced Sulphur Gases and other nuisance odours as they relate to air quality and facilitate air quality research to achieve air quality goals. Residents would be able to log on to the system and complete a short survey relative to the odour event they are experiencing. This system would be used to monitor odour in order to better gauge the impact of odour on the community (follow-ups with MOE certified inspector as odour perception can be highly subjective based on one's level of sensitivity).	PWU MOE TteS TNRD	I



Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
2. Review existing Industrial Land Use policies and revise as necessary to ensure future industries are located where air quality can be maintained.	<p>Ensure future industrial and commercial development that may have an impact on air quality is located in areas of the airshed that lessen impacts to residential neighbourhoods, neighbouring communities and other sensitive areas (e.g. school and hospital zones) where possible.</p> <p>Better buffering in place for existing and proposed operations that may have an impact on air quality, to respect neighbouring land uses.</p>	DES	I
3. Continue coordination between local, regional and provincial governments for future industrial operations.		PWU MOE TteS TNRD	H
4. Develop a standardized calls for service program to better track and analyze all issues related to air quality in the City.	Currently, only some departments have a system in place to track trends in terms of calls for service coming into the City. Each department has a different logging system. A standardized system would allow more accurate tracking and review of City issues for airshed planning (i.e. odour, smoke).	FIN All other City departments	H



air

Strategy 5: Increase local government role in air quality preservation and enhancement through land use planning, by-laws, and programs.

It is important that the City of Kamloops lead by example. The effective application of land use planning powers can reduce causes of air pollution and minimize the human health impacts. Unlike most of the federal and provincial powers over air quality - which focus on how much pollution is appropriate - the land use powers of local government can be used to determine where the development of an industrial operation can occur. Municipalities can create by-laws to regulate certain activities causing emissions within their boundaries (Provincial Health Officer, 2004).

Given the link between air quality and urban form, an effective way to bring together the various elements that affect travel behaviour, land-use and activity patterns is to undertake regional planning focused on air quality improvements.

Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
1. Continue to encourage infill development through the Zoning By-law and Official Community Plan policies.	E.g. the City Centre Plan encourages creating 'streets for people' with a goal of getting people out of their cars. One of the specific actions identified as part of the City Centre Plan is a 'streetcar' or 'shuttle bus' to increase accessibility of the waterfront to downtown workers and tourists. www.city.kamloops.bc.ca/communityplanning/pdfs/plans/05-CityCentrePlan.pdf	DES	I
2. Continue to evaluate City growth patterns in relation to industrial lands to ensure compatibility of land use.	Siting residential developments away from industrial areas, or appropriate buffering, will reduce the impact of industrial emissions on neighbourhoods.	DES	H



Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
3. Promote and continue to implement the Sustainable Kamloops Plan: Foundations for Sustainability.	The Sustainable Kamloops Plan was adopted by Council in 2010 and is the framework for a socially, financially and environmentally equitable community. www.city.kamloops.bc.ca/sustainable/index.shtml	City	H
4. Incorporate the AMP's goals into the City's long-range plans and policies and tools.	E.g. the Official Community Plan, Neighbourhood Plans, the Zoning By-law, the Fire Prevention By-law, the Corporate Energy Plan, TravelSmart, and other transportation policies www.kamloops.ca/development/index.shtml	City	H
5. Develop a Riparian/ Greenways Plan for the City.	Include provisions for better interconnectivity of bicycle and walking trails within the City, tree retention and planting as well as options for riverfront preservation and dust prevention.	DES PRCS	H
6. Review and amend the Traffic By-law on littering.	To ensure transport of any material does not cause fugitive dust release, e.g. covered or watered down loads, enclosed trailers, etc.	DES PRCS PWU	H
7. Have more community clean-up days.	To combat roadside dirt/dust.	PRCS BCS	H
8. Investigate municipal and provincial legislation to regulate smoking in all defined outdoor public spaces.		CSCS	H



air

Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
9. Evaluate the current street sweeping/cleaning program for effectiveness.	To determine if the City's roadside dirt/dust sweeping/cleaning program is sufficient or needs attention.	PWU	H
10. Review and update the City's Landscape Guidelines, continue to promote natural yard practices, and increase tree coverage.	<p>Promotion of lawn care without pesticides, small engines etc. Include provisions for 'alternative lawns' (alleviating need to cut grass through gardens or rocks or combination thereof). Review for increased landscaping requirements for industrial operations, buffer zones near major roadways. www.kamloops.ca/development/pdfs/LandscapeGuide.pdf</p> <p>Evaluate potential for increased landscaping requirements for commercial, residential, and industrial operations e.g. better buffering, more tree coverage.</p> <p>Support natural yard care practices through community outreach/awareness programs. www.city.kamloops.bc.ca/ipm/healthy-lawnsoverview.shtml</p> <p>Review the Tree Protection By-law and strengthen, if feasible, to preserve tree coverage.</p>	PRCS DES	M
11. Review the Pesticide Use Control By-law and update as needed.	Potential amendments/revisions/additions for air quality preservation and improvement (where feasible) (especially in relation to small scale cumulative uses as well as golf courses and agricultural land practices).	PRCS	M



Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
12. Evaluate the potential for development and implementation of Corporate and Community Erosion and Sedimentation Control Plans.	<p>Could be a stand-alone policy or implemented as part of the Earth Works By-law.</p> <p>For residential, commercial, institutional and industrial developments and operations to reduce dust generated from these activities during and after construction.</p>	DES PRCS PWU	M



air

Strategy 6: Enhance access to air quality information and increase public awareness.

Education and awareness are important components of air emissions reduction. Not only is an informed public more likely to make personal choices and behavioural changes that benefit the airshed (i.e. Reducing vehicle idling time or composting rather than burning yard waste), but they are also likely to bring social pressure to bear on neighbours not to pollute, and to support a council which takes a leadership role in fighting air pollution.

Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
1. Continue to provide seminars and information with the goal of reducing vehicle emissions.	E.g. Clean Air Day events, increased awareness and education about personal vehicle maintenance.	PRCS BCS TNRD TteS	I
2. Continue to work with MOE to provide air quality monitoring information to the general public.	Improve communication of air quality information, and promote actions for local governments, businesses and residents. Continue to update the City's Air Quality webpage with updated information and issues.	PWU MOE TNRD TteS PRCS	H
3. Continue to involve the public in air quality planning processes and plan implementation.	Refer to Section 6 of this Airshed Management Plan for more details.	City TNRD TteS	H



Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
4. Continue to provide air quality programs to residents and students within the City of Kamloops and continue to incorporate air quality education into existing presentations for local schools.	<ul style="list-style-type: none"> • Open burning • Wood burning appliances • Anti-idling • Active/alternative transportation • Pesticide use • Consider developing a clean-air toolkit for school-aged children 	PRCS PWU BCS TNRD TteS KFR SD73	H
5. Promote the Air Quality Health Index.	<p>The Air Quality Health Index (AQHI) is a public information tool that helps Canadians protect their health on a daily basis from the negative effects of air pollution.</p> <p>www.airhealthbc.ca/index.htm</p>	PWU BCS TNRD TteS IHA PRCS	M



air

Strategy 7: Support ongoing air quality research to protect and improve air quality.

The challenge in monitoring policy objectives is in knowing what is most appropriate to monitor, and how to use that data strategically once it is acquired. An increased effort to conduct air quality research will help determine the continued validity of the plan and the chosen targets and allow for revisions to the Plan as needed, based on empirical emissions data specific to the Kamloops Airshed.

Recommended Actions			
Action	Description	Responsible Party Lead/Support	Priority (L, M, H, I)
1. Continue to work with Environment Canada and MOE to conduct and enhance detailed emission inventories in concert with other jurisdictions in Canada.	Inventories should include point, mobile and area sources of emissions within the Kamloops Airshed. Inventories will support future Planning for air quality.	MOE PWU	H
2. Work with Environment Canada and MOE to conduct emissions forecasting for all sources of emissions to enhance understanding of emission areas that might require further controls (e.g. based on projected population increases).	Forecasting for point, mobile and area sources in the Kamloops Airshed to best plan for future Airshed Plan strategies and actions.	MOE PWU	H
3. Work with Environment Canada and MOE to identify key contributors to smoke and dust.	These are called 'source apportionment studies of particulate matter' and are carried out to determine if better controls are required to maintain or improve air quality in an area.	MOE PWU	H



SECTION 6: IMPLEMENTATION AND REPORTING

Oversight and implementation of the AMP will be led by the City of Kamloops.

The Plan will be revisited periodically to determine if the goals and targets are being met and to revise the Plan if required. Annual air quality reports based on the Plan's targets will be compiled based on data from Ministry of Environment monitoring stations and posted on the City's website. These reports will be compiled as part of the annual update for the Sustainable Kamloops Plan. The goals of the Plan will require continuous review and refining as air quality data is constantly received from the air quality monitoring stations in Brocklehurst and the City Centre. A five-year review, at a minimum, is recommended to review the goals, objectives and targets, actions and overall content of the plan and ensure its continued relevancy. This review also provides an opportunity to make modifications to the Plan in light of emerging issues. The first review of the Plan will take place in 2018.



CONCLUSION

The City of Kamloops Airshed Management Plan reflects a clear acceptance that there is no single action or approach that will enable the community to maintain or improve existing air quality objectives and targets. This plan reflects the fact that air quality preservation and emissions management cannot happen in isolation. It requires a collective effort from government, the business community, industry and residents in an integrated and explicit fashion to enable action and reap the benefits.

With the implementation of this Plan, the City will report regularly on its progress in taking action and its achievements in meeting the established targets and actions. As the City progresses, this Plan will be regularly updated and improved as the City achieves positive results and assess the benefits of its actions.

In conclusion, the AMP represents a key and integrated component of the implementation of the Sustainable Kamloops Plan and enhancing community sustainability. To succeed, this Plan requires individual commitment as well as corporate and public sector responsible behaviour; all residents must remain vigilant and determined to make Kamloops a healthier, more livable community. This requires teamwork and long-term responsibility.



Appendix 1: Canada-wide Standards and Provincial Objectives for Air Quality

Air Quality Objectives and Standards ($\mu\text{g}/\text{m}^3$)
www.bcairquality.ca/reports/pdfs/aqotable.pdf

Contaminant	Averaging Period	Canada Maximum desirable	Canada Maximum acceptable	Canada Maximum tolerable	BC Level A	BC Level B	BC Level C
Nitrogen dioxide	1 hr		400	1000			
	24 hr		200	300			
	Annual arithmetic mean	60	100				
Ozone	1 hr	100	160	300			
	24 hr	30	60				
	Annual arithmetic mean		30				
PM ₁₀	24 hr						
Sulphur dioxide	1 hr	450	900		450	900	900-1300
	3 hr				375	665	
	24 hr	150	300	800	160	260	360
	Annual arithmetic mean	30	60		25	50	80
Total Reduced Sulphur (ORSG)	1 hr				7	28	
	24 hr				3	6	

Canada-wide Standards Established in 2000

PM _{2.5}	24 hour		30 $\mu\text{g}/\text{m}^3$ *	
Ozone	8-hour daily max.		65 ppb **	

*based on annual 98th percentile value, averaged over 3 consecutive years; **based on 4th highest annual value, averaged over 3 consecutive years

Ambient Air Quality Objectives Established in 2009

PM _{2.5}	24 hour Annual arithmetic mean Annual arithmetic mean	Air Quality Objective: 25 $\mu\text{g}/\text{m}^3$ * Air Quality Objective: 8 $\mu\text{g}/\text{m}^3$ Planning Goal: 6 $\mu\text{g}/\text{m}^3$		
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*based on annual 98th percentile value

Appendix 2: Setting Targets for the Airshed Management Plan

Ambient Targets for the Kamloops Airshed Plan

Ralph Adams
British Columbia Ministry of Environment
Kamloops

November 30, 2011

In the context of air quality objectives or targets, a useful way to define the objective of an airshed plan is, to protect, and where feasible, improve air quality. The current air quality in the Kamloops airshed can best be described as; generally good, but with periods of deterioration usually caused by wildfires or periods of poor atmospheric dispersion. Kamloops currently meets all air quality objectives in use in British Columbia, in particular those for respirable particulate matter ($PM_{2.5}$) which are the most stringent of any jurisdiction in the world.

Three options for setting air quality targets for the Kamloops Airshed Plan have been proposed: use existing air quality objectives, develop targets based on current levels measured in the Kamloops airshed, or the use of trends. Given that the Kamloops airshed already meets current air quality objectives, the first option would not meet the objective of protecting air quality as air quality could deteriorate and the airshed still meet the objectives. Levels currently measured in the airshed would serve to protect air quality, but are difficult to set due to the large variability from year to year, for instance, choosing the lowest value recorded for a particular parameter and statistic over the last years would probably lead to that target being exceeded in the period following, if a value was chosen that was high enough to avoid an exceedance of the target due to inter-annual variability, the target would suffer from the same problem as above, that a deterioration could occur without the target being exceeded. Setting a target that there never be an upward trend in any parameter avoids many of these problems and has the additional advantage that it is easy to explain, and avoids much of the confusion that arises due to the units used in ambient air quality statistics. Most people have a clear understanding of what an upward trend is, but not what $8 \mu\text{g}/\text{m}^3$ or 7 ppb indicate.

If the target used for the airshed plan is that no upward trend shall occur, the definition of trend must be decided on. Because



of inter-annual variability and constant upgrading of instrumentation, it is not sufficient to rely on a simple statistic such as the slope parameter of a linear regression, or time tested technique of resting your temple on the desk and eyeballing the graphed data. Both of these techniques will work if the trend is large, or has been present for a long period; however, when there is large variation from year to year and trends caused from instrumentation changes, these simple techniques would not be able to detect a trend quickly. Obviously, in an airshed plan it is important to detect any trend as early as possible. The statistical method used to detect a trend will depend on the parameter in question and the instruments used to measure it. Appropriate statistical methods to detect trends in the following parameters will be determined by an independent statistician. The parameters chosen are those used in the determination of ambient air quality objectives. These parameters are used in the setting of ambient air quality objectives and there is considerable scientific research to support their use. The following table shows these parameters for the air contaminants currently measured in the Kamloops airshed, reduced sulphur gasses that cause odours will be covered below.

AIR CONTAMINANT	PARAMETERS
Respirable particulate matter PM_{2.5}	<ol style="list-style-type: none"> 1. Annual average 2. 98th percentile of daily averages
Ozone	<ol style="list-style-type: none"> 1. Annual 4th highest daily maximum 8 hr average in April to September (CWS definition)
Nitrogen dioxide	<ol style="list-style-type: none"> 1. Hourly average
Sulphur dioxide	<ol style="list-style-type: none"> 1. Hourly average 2. 10 minute average

Nitrogen oxide (NO) has not been included in the air contaminants even though it is currently measured in the Kamloops airshed. NO is produced by a number of sources, the most important in the Kamloops airshed being combustion of all kinds, once released into the atmosphere most is converted to Nitrogen dioxide (NO₂). NO is an indicator of proximity to combustion sources and is an important parameter when investigating ozone, but NO₂ is usually the oxide of nitrogen for which objectives are set and health studies undertaken. The Air Quality Health Index recently developed by Health Canada and measured in Kamloops is based on ozone, PM_{2.5} and NO₂.

The statistical method used to determine a trend in these parameters will be chosen by a statistician with expertise in air quality.

Funding for this work will be supplied by Ministry of Environment.¹³

Summaries of air quality and trend analysis would be supplied annually by Ministry of Environment to the Kamloops Air Quality advisory committee, or whichever committee oversees the implementation of the Kamloops Airshed Plan. The annual cycle of data quality assurance and control for the Ministry of Environment network is usually completed for each calendar year in the following spring. The summaries and trend analysis would therefore be available in early summer of each year.

Targets for air contaminants are useless unless action is taken if they are not met. Two points should be kept in mind when deciding the sequence of actions to be taken: first, unless there is a sudden and large change in emissions or weather (dispersion) it will take a number of years to determine that a significant trend is occurring, we will be aware that a trend appears to be developing several years before there are sufficient data for the statistical test used to determine a trend to supply unequivocal evidence of a trend. Secondly, not all trends will be amenable to mitigation. Trends due to climate change or external factors, such as a global rise in ozone levels due to industrial emissions in China and India will not be affected by actions in the Kamloops airshed. If a trend is detected, the Ministry of Environment will prepare a report to the implementation committee investigating the causes for the trend and suggesting possible mitigation measures.

Odorous reduced sulphur gasses (ORSG) are important in the Kamloops airshed as they are responsible for the odours associated with the pulp mill and sewerage treatment plant. The current method reporting ORSG odour is the number of hours each year in which the Canadian Level A (maximum desirable) concentration of 5 µg/m³ is exceeded. The averaging period used is one hour. No objective has been set in BC or Canada as to how many hours may exceed that level. The number of hours exceeding the Level A concentration is a method of reporting odour due to ORSG rather than an objective.

¹³ Dr. Isabella Gherment at UBC has considerable expertise in this area and has supplied specialized trend analysis for ozone and PM_{2.5} in the Kelowna and Kamloops airsheds.



It would be possible to use a trend in hours of Level A exceedances as the target for ORSG gasses in the airshed plan. However, there is evidence that the number of hours of Level A exceedances may not accurately reflect the apprehension of odour intensity by the residents of the Kamloops airshed. In the summer of 2011, there was a dramatic increase in the frequency of odour complaints to the Ministry of Environment and the Domtar pulp mill. All the complaints were investigated. In a number of cases, Ministry and Domtar staff were able to reach the location of the complaint quickly enough to experience the same concentration as resulted in the complaint, in addition there were a number of complaints where ministry staff were able to determine that the concentrations measured one of the two ORSG monitoring sites were similar to those that resulted in the odour complaint. In all the complaints investigated, the concentration was insufficient to be recorded as a Level A exceedance, that is, a concentration of greater than $5 \mu\text{g}/\text{m}^3$ for one hour. Complaints of nauseating odour were received when the ambient concentrations of ORSG gasses were 3 to $5 \mu\text{g}/\text{m}^3$ for periods well below an hour. The conclusion of the investigation was that the increase in complaints was due to the unseasonably cool and unsettled weather in Kamloops in the summer of 2011. The weather patterns resulted in an increase in the number of instances during which the high stack plume was carried downwards and to the west or north resulting in brief odour episodes. The complaints returned to normal frequency when the weather returned to a more normal pattern in August. However, the investigation showed clearly that some residents of Kamloops now characterize odour as objectionable well below the Level A threshold of $5 \mu\text{g}/\text{m}^3$ and when odour episodes lasted much less than an hour.

As an interim target the trend following parameters could be used:

AIR CONTAMINANT	PARAMETERS
Odorous Reduce Sulphur Gases (reported as H_2S)	<ol style="list-style-type: none"> 1. Hours above $5 \mu\text{g}/\text{m}^3$ 2. Hours above $3 \mu\text{g}/\text{m}^3$ 3. Ten minute periods above $5 \mu\text{g}/\text{m}^3$ 4. Ten minute periods above $3 \mu\text{g}/\text{m}^3$



Statistical methods to determine annual trends in these parameters could be used to report on odour trends. It should be noted that the detection limit of the sensors currently used to measure ORSG concentration are approximately $2 \mu\text{g}/\text{m}^3$, the levels at which some residents of Kamloops find odours objectionable are near the limits of detection.

As part of the airshed plan implementation, a study would be undertaken by the Ministry of Environment in partnership with the City of Kamloops, the Domtar mill and other stakeholders, to determine the frequency, origin and feasible mitigation measures. A key component of this study would be the development of a web-based application where members of the public could report time and duration of odours, as well as their note (type of odour such as hot brakes, rotting meat, rotten eggs, sewer etc.) and intensity. The site would collect invaluable data that could be used to investigate the sources of odour (such as the high stack, effluent ponds, valley sources at the mill, the city sewerage treatment plant, and many small dispersed sources that give rise to odour complaints), and the meteorological conditions under which they occur, the application could also be used to report odour events and other information to the public.

The study will also guide the development of better statistical methods and parameters to use in the reporting and determination of trends in odour episodes in the Kamloops airshed.