2014-2018 YVR NOISE MANAGEMENT PLAN

-VANCOUVER INTERNATIONAL AIRPORT-

Prepared by Vancouver Airport Authority
Environment Department
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A MESSAGE FROM THE PRESIDENT & CEO

Managing noise from aircraft operations has been a priority for the Vancouver Airport Authority since assuming responsibility of Vancouver International Airport (YVR) in 1992. Managing all our impacts, including noise, is integral to our sustainability framework, which integrates the economic, environmental, social and governance of our business. This framework is essential to our success and provides a responsible approach for our business objectives and our commitment to the local community.

To manage the effects of aircraft noise, the Airport Authority has a comprehensive Aeronautical Noise Management Program. A critical piece of the program is the 2014-2018 YVR Noise Management Plan. The Plan serves to document the program and identifies key areas of work over the next five-years. The Plan and associated initiatives were developed in close consultation with the YVR Aeronautical Noise Management Committee and input provided by the community. The initiatives contained in the Plan serve as our ongoing commitment to manage impacts from our operations.

The Airport Authority takes a leadership role in working with airlines, NAV CANADA (air traffic control), and the regulators, and the community to manage the effects of aircraft noise. Through this, the Airport Authority was able to deliver many key successes over the past five years. These include initiatives in the 2009-2013 YVR Noise Management Plan such as upgrading the Aircraft Noise & Operations Monitoring System; expanding the noise monitoring terminal network; the introducing WebTrak, an online community tool for noise and flight tracking; and opening Canada's first ground run-up enclosure.

The Airport Authority is committed to building on our past successes, and we will continue our work with the YVR Aeronautical Noise Management Committee, our aviation partners, and the community to complete the initiatives outlined in this Plan.

I would like to acknowledge the hard work and input provided by members of the YVR Aeronautical Noise Management Committee during the development of this Plan. The Committee's interest and commitment to helping the Airport Authority manage noise is unsurpassed.

Craig Richmond
President & CEO
Vancouver Airport Authority

YVR, AVIATION & THE ECONOMY

Vancouver International Airport

The Vancouver International Airport ("YVR") is located on the southwest coast of the Province of British Columbia, and is the second busiest airport in Canada. YVR is a major entry point to North America from Asia and is a hub for domestic, transborder (U.S.), and international air travel. YVR is a major employer in the region, and directly contributes to the provincial gross domestic product ("GDP"), and the operations at the airport facilitate activity in other economic sectors, which further contribute to the provincial economy.

YVR occupies approximately 1,340 hectares of federal property on Sea Island within the City of Richmond. The airport has three surface runways: the 11,500 feet south runway (08R/26L); the 9,940 feet north runway (08L/26R); and the 7,300 feet crosswind runway (12/30), along with helicopter pads and float plane docks (see Figure 1). In 2012, YVR served: 261,124 aircraft movements on its runways; an additional 35,270 movements by float plane and helicopters; a record 17.5 million passengers; and, accommodated 227,929 tonnes of cargo.

YVR accommodates a very diverse mix of aircraft, as the airport serves regional areas within British Columbia, as well as national and international destinations. Due to its strong support of regional communities, approximately 48% of aircraft operations at YVR in 2012 were with propeller aircraft. This is very unusual and unique for an international airport, which would normally see a much higher percentage of jet operations. This diversity in the fleet mix, along with the terrain and congested airspace, presents a significant challenge for managing the airspace and moving air traffic safely and efficiently.

Downtown Vancouver is approximately 12 kilometres from YVR, and the airport is in close proximity to major urban residential developments including those within the City of Richmond. This proximity adds to the challenge of operating 24-hours a day to support the provincial economic engine while minimizing disturbance from aircraft operations on its neighbours.

FIGURE 1: Vancouver International Airport

Vancouver Airport Authority

The Vancouver Airport Authority ("Airport Authority") is a community-based private not-for-profit corporation, incorporated under the Canada Not-For-Profit Corporations Act (previously Part II of the Canada Corporations Act), which manages YVR and is committed to creating an airport that British Columbia can be proud of: a premier global gateway, regional economic generator and significant community contributor.

The Airport Authority assumed management of YVR from Transport Canada in 1992 under the provisions of a long-term ground lease with the Government of Canada. The Airport Authority has no shareholders and all profits, known as excess of revenues over expenditures, are reinvested in airport development and service improvements.

The Airport Authority's purpose is to manage and operate YVR in the best interests of the region, expand the contribution that YVR makes to local economic development, and ensure the airport can respond to the demands of the community and aviation industry in a safe, efficient, and environmentally responsible manner.

The Airport Authority is governed by a Board of Directors, members of which are appointed by nominating entities, namely: The Association of Professional Engineers and Geoscientists of British Columbia; City of Richmond; City of Vancouver; Government of Canada; Metro Vancouver; The Institute of Chartered Accountants of British Columbia; The Law Society of British Columbia; and, The Vancouver Board of Trade. The Board also includes the Airport Authority's President and CEO, and additional members appointed by the Board from the community-at-large.

The Board oversees the business conduct of the Airport Authority and the activities of management. The Board's goal is to ensure that the Airport Authority fulfills its objectives on an ongoing basis and operates in a safe, efficient and reliable manner.

Vision and Business Objectives

As the closest major West Coast airport to Asia, YVR enjoys a significant competitive advantage. The Airport Authority's vision is to be a premier global gateway of choice, connecting the Asia-Pacific Region and the Americas. As a gateway of choice, YVR offers, and can continue to offer, better service in terms of destinations, frequency and airlines than the local market could otherwise support. This provides, and will continue to provide, additional opportunities for local businesses to participate in the global economy, for tourists to visit British Columbia and for residents to travel overseas.

The Airport Authority's vision is to be a premier 24-hour global gateway of choice and will be achieved by having YVR realize its full potential as a major:

- ***gateway*** taking full advantage of the airport's strategic location on Great Circle routes, and market growth opportunities in the Asia/Pacific region, the US, Europe and Latin America;
- international and domestic ***destination*** capitalizing on the tourism destination appeal of Super Natural British Columbia, and associated trade and travel opportunities; and
- ***intermodal distribution centre*** as a key component of a global logistical system for the trans-shipment of air freight by sea, truck and rail between the world's major trading blocks.

Economic Contribution of YVR to the Economy

YVR is an important economic generator for British Columbia, creating jobs, contributing government revenues and adding significantly to provincial and national GDP. The airport supports over 23,000 direct jobs, and there are over 400 businesses and organizations that operate at YVR generating millions of dollars in taxes and billions of dollars in wages and GDP through day-to-day operations and construction projects.

Key findings from the YVR 2010 Economic Impact Study[1] identified the following economic contribution of YVR to the economy:

- Employees of organizations located at YVR or with operations related to the airport earned approximately $1.0 billion in wages in 2010, with an average wage of $46,814 per year.
- The direct employment attributable to operations at YVR generates $1.9 billion in direct GDP.
- Operations at YVR generated $608 million in government revenues, paid to federal, provincial, and municipal governments as well as to TransLink (the regional transportation authority).

Future Growth and Development at YVR

Forecasts from governments, companies and agencies suggest that the global, national and local demand for air travel will grow between 2007 and 2027. To ensure it can meet future passenger and cargo needs, the Airport Authority has considered a range of possible air travel scenarios out to 2027 and developed low-, medium- and high-growth scenarios (see Table 1). As with all projections, there are risks and uncertainties associated with these forecasts and they will require frequent review, discussion and adjustment. Given the projected future growth of air traffic, and the emergence of Asian economies, it is imperative that YVR is positioned to capitalize on opportunities to support and contribute to the economy of British Columbia.

TABLE 1: 2027 FORECASTS – Low, Medium, High Growth Scenarios*

SECTOR	2005 ACTUAL	2027 (LOW)	2027 (MEDIUM)	2027 (HIGH)
Passengers (millions)	16.4	26.9	33.4	40.5
Runway (landings and takeoffs)	275,000	383,000	484,000	581,000
Cargo (tonnes)	223,700	400,000	500,000	600,000

** These forecasts were created in 2006 and will be updated as part of the upcoming update to the YVR Master Plan.*

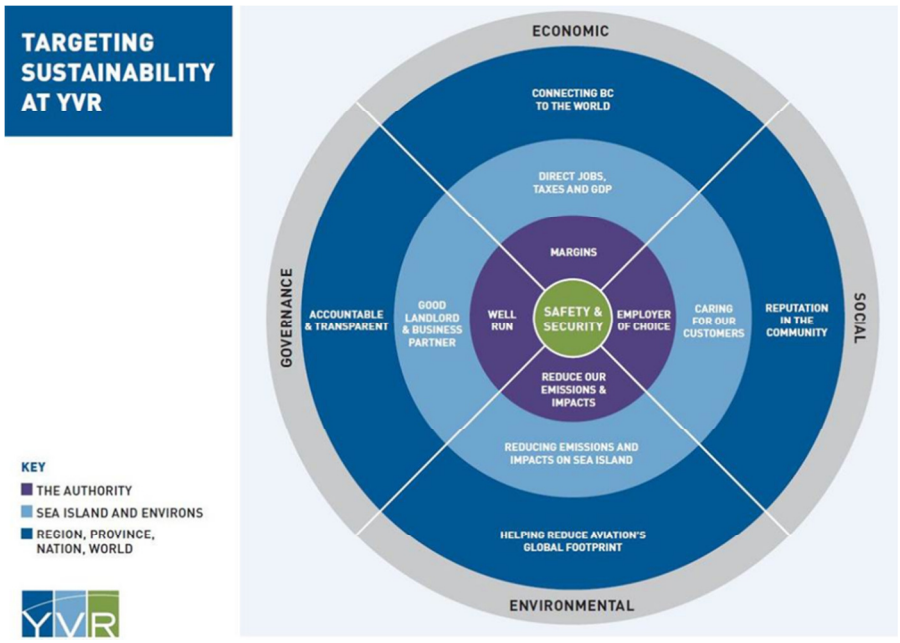
[1] *http://www.yvr.ca/Libraries/2010_Annual_Report/2011_05_12_Economic_Impact_Summary_FINAL.sflb.ashx*

ENVIRONMENTAL MANAGEMENT

Sustainability Pillars

The Airport Authority is committed to the development of a sustainable airport to support the future needs of British Columbia. To do this, the Airport Authority is committed to effective long-term planning and views good planning and sustainability as one and the same. Contributing to a sustainable and prosperous future while caring about the well-being of its surroundings, its people and its communities is fundamental to the Airport Authority's operating philosophy and central to its planning processes.

The Airport Authority's view is that there are four pillars to sustainability: economic, environmental, social and governance (see Figure 2). Noise is a social or community issue closely linked with environmental issues of emissions and climate change and is managed by the YVR Environment Department.



Sustainability Pillar	
Economic	▪ YVR is a major employment centre and economic generator. The Airport Authority's challenge is to sustain and promote economic growth while minimizing YVR's impact on its communities and the environment.
Environment	▪ The Airport Authority is committed to managing the airport in an environmentally sound manner and balancing potential environmental impacts with the need for safe and efficient air travel. ▪ To eliminate, reduce, mitigate or manage environmental impacts wherever possible, the Airport Authority has developed an Environmental Policy and implemented an Environmental Management Plan
Social	▪ British Columbians frequently travel by air because of the unique geography of our province and our immigrant heritage. Affordable and accessible air travel allows people to stay connected and pursue personal interests. ▪ As an employer, the Airport Authority is committed to providing a quality work environment and the tools and resources to support a flexible, strong and capable team. Its commitment to accessibility recognizes the importance of meaningful access regardless of age or ability. ▪ The Airport Authority is also committed to engaging stakeholders, providing transparency in open, honest and timely communications to customers, business partners, the community it serves and its employees.
Governance	▪ The Airport Authority has added governance to its sustainability framework to recognize the importance of local accountability for economic, environmental, and social issues, while meeting the business objectives of the Airport Authority and the communities it serves.

FIGURE 2: Sustainability Pillars

Environmental Management Plan and Core Programs

The Airport Authority is committed to the development of a sustainable airport for the future of British Columbia, and to operating the airport in a manner that minimizes negative impacts on the environment and the community. The Airport Authority recognizes our success as a global operator comes from our commitment to environmental excellence. To manage the Airport Authority's environmental risks, the YVR Environmental Management Plan documents the programs, plans, and initiatives in place to enhance the airport's operations and development to become more environmentally sustainable (see Table 2).

TABLE 2: Vancouver Airport Authority – Core Environmental Program Areas

Environmental Program	Description
Aeronautical Noise	The purpose of the Aeronautical Noise Management Program is to minimize disturbance to those living in communities in the vicinity of the airport while recognizing the need for continued safe and efficient airport operations.
Air Quality and Climate Change	The purpose of the Air Quality and Climate Change Program is to addresses airport and airport-related activities that could impact local, regional and global air quality through the production of pollutants, including greenhouse gases and ozone-depleting substances.
Water Quality	The purpose of the Water Quality Program is to protect the Fraser River and Strait of Georgia from airport activities by preventing the contamination of surface water runoff on Sea Island.
Natural Habitat	The purpose of the Natural Habitat Management Program is to protect environmentally sensitive features (e.g., Sea Island Conservation Area) from impacts of airport operations.
Hazardous Materials	The purpose of the Hazardous Materials Program is to reduce risk by exceeding the regulatory requirements for life cycle management, safe handling of hazardous materials, and spill preparation and prevention.
Contaminated Sites	The purpose of the Contaminated Sites Program is to enable the Airport Authority and its tenants, in conjunction with Transport Canada, to manage contaminated sites at YVR and reduce any potential risks and long-term liabilities.
Environmental Assessment & Sustainable Building Design	The purpose of the Environmental Assessment Program is to ensure environmental impacts are identified, avoided or mitigated by integrating environmental management into planning, design, construction and operation of all new projects.
Energy and Resources	The purpose of the Energy and Resources Program is to promote the importance of resource-efficient operations and identifies ways to reduce consumption of natural gas, diesel, gasoline, water and electricity at the airport.
Waste	The purpose of the Waste Management Program is to reduce waste and promote recycling by Airport Authority employees, airport tenants and passengers.

ROLES & RESPONSIBILITIES IN AVIATION

International

International Civil Aviation Organization

The International Civil Aviation Organization (ICAO) is an agency of the United Nations and was created to promote the safe and standardized development of international civil aviation. ICAO sets standards and regulations necessary for aviation safety, security, efficiency and regularity, and environmental protection.

ICAO's current environmental activities, including the discussion and creation of noise and emissions standards, are mainly undertaken through the Committee on Aviation Environmental Protection (CAEP). This Committee was established by the ICAO Council in 1983, and meets approximately every three years, with each meeting producing a report with specific recommendations for the consideration of the ICAO Council.

The ICAO standards for aircraft noise are contained in *Annex 16 - Volume I Environmental Protection, Aircraft Noise*. These standards have the goal of reducing aircraft noise at the source, and aircraft are placed into different categories (known as "Chapters") depending on measured noise levels. For subsonic jet aircraft, the current categories include: Chapter 2; Chapter 3; Chapter 4 (applicable for new aircraft certified after 1 January 2006); and the proposed Chapter 14 (applicable to new types submitted to certification on or after 31 December 2017, or 31 December 2020 for aircraft < 55 tonnes). In general, a higher Chapter certification translates to newer quieter aircraft and engine technology.

In 2001, the ICAO Assembly endorsed the concept of a "Balanced Approach" to aircraft noise management. The Balanced Approach aims to identify and implement the most cost effective means to address noise problems identified around airports. These include noise reduction at source, land-use planning and management, noise abatement operational procedures and operating restrictions, with the goal of addressing the identified noise problem in the most cost effective manner. Canada, as a member state of ICAO, recognizes and supports the ICAO Balanced Approach methodology to aircraft noise management.

The Airport Authority aims to achieve the objectives of the Balanced Approach through:

- Developing policies and procedures in consultation with stakeholders
- Identifying specific noise abatement procedures for take-off and landings, preferred runway use, and aircraft type
- Responding to stakeholder questions and concerns
- Maintaining the active multi-stakeholder YVR Aeronautical Noise Management Committee
- Application of noise monitoring and flight tracking technologies
- Supporting and encouraging municipalities to undertake compatible land-use planning in high noise areas
- Participating in national discussions and supporting international efforts to develop new standards and technologies for noise mitigation

Airports Council International

Airports Council International ("ACI") is a non-profit global trade organization of the world's airports. There are currently 580 members in ACI operating 1,650 airports in 179 countries and territories. ACI primarily represents member airport's interests and to promote professional standard in airport management and operations. It aims to provide the public with a safe, secure, efficient and environmentally responsible air transport system.

ACI operates in five regions (ACI-North America, ACI-Europe, ACI-Latin America, ACI Asia-Pacific, and ACI-Africa) and has observer status with ICAO. The ACI World Environment Standing Committee takes an active role in ICAO discussions around aircraft noise and emissions standards and reduction measures.

The Airport Authority participates in ACI-North America discussions through the Canadian Airports Council (see below), which is a Canadian division of ACI-North America, to share information and align common goals for the advancement of aviation in Canada and abroad.

National

Transport Canada

While the management of many of the major airports in Canada has been transferred to local airport authorities, Transport Canada remains the regulator of all aspects of aviation. Transport Canada's role is to develop up-to-date, relevant transportation policies and legislation to promote aviation, and to maintain a high level of safety and security.

The responsibilities of Transport Canada with regards to noise include: reviewing, approving, and publishing of new proposed noise control measures at airports; conducting enforcement of suspected violations of the published Noise Abatement Procedures; and, managing noise issues outside the 10 nautical mile area around airports. Transport Canada also adopts noise and emissions standards prescribed by ICAO and has regulations requiring jet aircraft over 34,000 kg to meet or exceed Chapter 3 noise standards, with some exceptions for aircraft serving remote northern destinations.

Transport Canada also chairs the Aircraft Noise & Emissions Committee (ANEC), a multiagency committee that discusses noise issues with national implications, and participates as a member of ICAO/CAEP to represent the interests of Canada at these meetings.

Canadian Airports Council

The Canadian Airports Council ("CAC") is a division of Airports Council International - North America and is the collective voice for airports in Canada. The CAC was formed in 1992, as the devolution of airports to local airport authorities was beginning, and became the federal representative for airports on a wide range of significant issues and concerns. The CAC has 46 member organizations representing more than 120 airports in Canada.

The Airport Authority is a participating member in the CAC and regularly attends the CAC Environment Committee meetings where noise issues with national implications are often discussed.

Local

Vancouver Airport Authority

The Airport Authority assumed management of YVR from Transport Canada in 1992 and operates the airport under the provisions of a long-term ground lease with the Government of Canada. Under the provisions of the ground lease, the Airport Authority is responsible for noise management, including noise complaint and noise monitoring, for aircraft arriving and departing YVR up to 10 nautical miles from the airport. The Airport Authority is required to have a noise management plan that is approved by the Minister of Transport. Managing aircraft noise concerns from aircraft operating outside 10 nautical miles from YVR, and from aircraft travelling to and from other airports in the region are the responsibility of others.

Municipalities

In British Columbia, the responsibility for land-use planning has been delegated to local municipalities. As such, the role that municipalities play in managing the community's noise exposure is through exercising compatible land use planning policies, to ensure residential development or other sensitive land uses in high noise areas are kept to a minimum or avoided altogether.

While Transport Canada has federal guidelines (*TP1247E – Land Use in the Vicinity of Airport*) to assist in land use planning decisions with the goal of reducing the impact on residential and other noise sensitive land uses, municipalities may or may not choose to follow the guidelines.

Land use planning plays a critical role in any successful noise management strategy as gains achieved through quieter aircraft technology or airport noise control measures can be negated if incompatible, noise sensitive developments are permitted near an airport. In addition, given the close proximity of some residential development to the airport, it is often not possible to change or modify flight procedures to minimize noise over these areas without a serious compromise to aviation safety.

Prospective Residents & Residents

Aircraft noise is often cited as the concern voiced by communities and is often the primary reason for opposing airport development and improvements to air traffic management. Residents and prospective residents near airports and flight paths have the responsibility to seek an understanding of the challenges of aircraft operations and what measures can be realized to minimize aircraft noise effects on people.

Individual and community responses to aircraft noise are subjective with some residents responding with annoyance or irritation and others having little to no response. Prospective residents of areas exposed to airborne and ground based aircraft noise should make an informed decision by understanding their tolerance to aircraft noise and act accordingly. Flight paths and procedures are designed to ICAO standards, and in many cases changes cannot be accommodated to minimize noise and over flights of populated areas without impacting the safety of the aviation system. Ad hoc solutions often offered by residents such as "have the aircraft only operate over the water", "move the aircraft to fly over the mountains", or "have the aircraft fly higher" are over simplified solutions to a very technical safety-driven complex issue.

Aviation noise is a community and social impact that the aviation industry and airport assign significant resources to mitigate; however, the efforts of residents to educate themselves and understand the challenges associated with the many issues is a significant stride in managing the impacts of noise from aircraft operations.

Partners

NAV CANADA

NAV CANADA provides air traffic management and information services to all of Canada. NAV CANADA is responsible for the safe co-ordination and the efficient movement of aircraft in Canadian domestic airspace and international airspace assigned to Canadian control. NAV CANADA's mission is to provide safe, efficient and effective delivery of air navigation services and is a critical partner in the communication and coordination of aircraft noise management at YVR.

Major facilities operated by NAV CANADA in the Lower Mainland include the control towers at many of the airports (including those at YVR, Boundary Bay, Pitt Meadows, and Vancouver Coal Harbour), and the Area Control Centre located in Surrey. In addition, NAV CANADA operates and maintains navigation and approach aids and equipment, and is responsible for regular engineering flight checks for all runway landing systems to ensure equipment is operating in compliance with strict standards prescribed by Transport Canada.

Airlines & Aircraft/Engine Manufacturers

The aviation industry, including airlines and manufactures, are well aware of noise issues, and put tremendous effort to reducing these impacts. Over the years, airlines worldwide have invested significant capital to upgrade fleets to reduce both noise and emissions. Aircraft operating today are approximately 30 dB quieter, meaning a 90% reduction in noise footprint area as compared to original commercial jet aircraft. Airlines in Canada have invested billions of dollars over the years to continually modernize their fleet and are active in research and development projects to reduce noise and emissions. Airlines in Canada are known throughout the world as having one of the youngest, quietest, and cleanest fleets.

While technology and ICAO noise certification standards for jet engine design have advanced through the years, helicopter and propeller noise certification standards have not changed since 2002, with no further review by ICAO in the foreseeable future.

REGULATIONS & POLICIES GUIDING AVIATION NOISE

The Aeronautics Act

Aeronautics in Canada is federally regulated and the *Aeronautics Act* is the legislation that allows the Minister of Transport to govern and regulate all aspects of civil aviation in Canada. Transport Canada is the department within the government of Canada which is responsible for developing regulations, policies and services of transportation in Canada, and is also responsible for enforcing the *Aeronautics Act* and other legislation. One of the main effects of the *Aeronautics Act* is to enable the *Canadian Aviation Regulations*.

Canadian Aviation Regulations

The *Canadian Aviation Regulations* are a compilation of regulations designed to enhance safety and the competitiveness of the Canadian aviation industry. The Canadian *Aviation Regulations* cover a broad range of areas that Transport Canada mandated to regulate, including but not exclusive to those related to: standards for airports; aircraft noise and emissions; minimum aircraft altitudes; noise abatement and noise control procedures; and aircraft maintenance requirements.

Appendix 1 provides a brief summary of the relevant regulations and guidelines governing aeronautical noise at airports in Canada. The *Canadian Aviation Regulations* can be viewed in full on the Transport Canada's website[2].

Noise Abatement Procedures

Noise Abatement Procedures are a set of published rules outlining how aircraft are to be operated at an airport. The Noise Abatement Procedures are unique for each airport as they are meant to deal with local issues, and the procedures for YVR are published in the *Canada Air Pilot - British Columbia* edition.

Violations to the published Noise Abatement Procedures are subject to investigation by Transport Canada and are fineable offences under the *Canadian Aviation Regulation 602.105 – Noise Operating Criteria*, which prescribes that no person shall operate an aircraft at or in the vicinity of an aerodrome except in accordance with the applicable noise abatement procedures and noise control requirements specified by the Minister in the *Canada Air Pilot* or *Canada Flight Supplement*

Operators found in non-compliance with the Noise Abatement Procedures can be subject to monetary fines or other sanctions imposed by Transport Canada. The *Aeronautics Act* allows Transport Canada to delegate enforcement authority to its inspectors over regulations. As this authority has not been granted to the Airport Authority, suspected violations to procedures are documented and forwarded to Transport Canada for review and follow up.

[2] *http://www.tc.gc.ca/eng/civilaviation/regserv/cars/menu.htm*

Amending or Introducing a Noise Control Measure at an Airport

Transport Canada must review and approve any new or proposed changes to Noise Abatement Procedures at an airport. To ensure that any proposed new, or amendments to existing Noise Abatement Procedures cannot be completed in isolation, Transport Canada established a protocol[3] to ensure full consultation of all stakeholders, including communities and industry be completed. The protocol is often referred to as the "checklist process" and requires the analysis and consultation outlined in Table 3 be completed and results included with the proposal to Transport Canada.

TABLE 3: Advisory Circular (AC) No. 302-002 Implementation of New or Amended Noise Abatement Procedures

Purpose and objective:	
Advisory Circular No. 302-002 outlines the process required to implement new or amended noise abatement procedures, pursuant *to Canadian Aviation Regulation 602.105* at an airport. The process is to ensure that implementation of new or amendments to noise abatement procedures are subject to extensive analysis and consultation with all affected parties.	
Analysis	**Consultation**
The noise issue is clearly identified by the proponent. Supporting documentation shall consider (where applicable) but not limited to the following: a. Description of the problem; b. Proposed solution (including exceptions); c. Alternatives (such as alternative procedures or land uses in the community); d. Costs (such as revenue impact, direct and indirect costs to the community, airport operator and airport users); e. Noise impacts of the proposed solution; f. Effects on aircraft emissions; g. Effect on current and future airport capacity; h. Implications of not proceeding with the proposal; i. Implementation issues (e.g.; aircraft technology; availability of replacement aircraft; ground facilities); j. Impact on the Aviation System; k. Safety implications; l. Air traffic management; **m.** Fleet impact.	The proponent is required to conduct consultation on the proposal with all affected parties, which are to include the following: a. Airport management/operator; b. Noise management committee (where applicable); c. Community representatives; d. NAV CANADA; e. Air Transport Association of Canada; f. Canadian Business Aircraft Association; g. Canadian Owners and Pilots Association; h. All scheduled Operators who operate at the airport; i. Transport Canada; j. All Fixed Base operators on the airport.

If all stakeholders support the proposed procedures, Transport Canada will likely approve and publish the procedure. If the proposal does not have consensus among stakeholders, dissenting views must be documented and included with proposal sent to Transport Canada. In these cases, the final decision to approve or deny the proposal is made by the Civil Aviation Regulatory Committee.

[3] *Transport Canada Advisory Circular (AC) – Implementation of New or Amended Noise Abatement Procedures 302-002.*

North Runway Operating Restrictions

The north runway (08L/26R) was opened in November 1996. The project to construct this runway was reviewed extensively as part of the federal Environmental Assessment and Review Process (EARP). The assessment included the preparation of an Environmental Impact Statement and provided for the project to be the subject of public hearings by the EARP Panel.

In reviewing the project, the EARP Panel made 22 environmental recommendations, 10 of which related to noise mitigation. With regards to the operational use of the north runway, the EARP Panel recommended that[4]:

a. *the parallel runway be operated as an arrival runway, except when departures are necessary for emergencies or routine maintenance of the main runway, and in due course when routine departures become necessary because capacity limits of YVR have been reached;*
b. *only Stage 3 aircraft (see Transport Minister's response below) be permitted to operate on the parallel runway, except when Stage 2 operations are necessary for emergencies or routine maintenance of the main runway;*
c. *all operations on the parallel runway be banned from 10:00 p.m. to 7:00 a.m., except when night-time operations are necessary for emergencies or for routine maintenance of the main runway; and*
d. *landings on the parallel runway be conducted with the aircraft in the least-noisy configuration possible and with minimal use of reverse-thrust for braking, consistent with the principle that there be no compromise of air safety, and in compliance with applicable procedures of the International Civil Aviation Organization.*

The Minister of Transport approved the north runway project in June 1992, and responded to the EARP Panel's recommendations. The north runway opened in November 1996, and all 22 of the environmental commitments established by the Minister of Transport were met. With regards to the EARP Panel's recommendations on use of the north runway use, the Minister of Transport responded with the following commitments, which now form the basis on how the runway is used on a daily basis:

a. *Transport Canada is prepared to operate the new runway primarily as an arrival runway, but may need to use it for departures when traffic demand approaches capacity limits at YVR, such as during peak times.*
b. *On the ground, an aircraft's noise-emission classification (stage) can be determined, and it can therefore be assigned a runway upon leaving the terminal or hangar, without undue strain on the air traffic control (ATC) system. However, arriving aircraft cannot be assigned to a particular runway without adding to the complexity of the ATC workload, and decreasing safety. Given that noise levels created by Stage 3 aircraft are typically only a few decibels (dBA) lower on arrival than arrival noise levels of similar Stage 2 aircraft, Transport Canada is prepared to restrict departures on the new runway to Stage 3 aircraft, but not arrivals.*
c. *Transport Canada agrees with this recommendation;*
d. *Transport Canada agrees with this recommendation.*

[4] *Excerpt: Transport Canada BACKGROUNDER (public release 24-Jun-1992) EARP Panel Recommendation No. 5.*

YVR AERONAUTICAL NOISE MANAGEMENT PROGRAM

Airports bring a range of economic, social and environmental challenges. Airports are important socially and economically as they connect the community to the world by promoting business development and investment all the while providing meaningful employment to local citizens. While there are substantial economic and social benefits provided by the airport to the region, there are local impacts, including noise, on communities proximally located around YVR.

To mitigate impacts from aircraft noise, the Airport Authority has a comprehensive noise management program. The core components of the YVR Aeronautical Noise Management Program were started in the early 90's, and was built on various elements in place during the time period that Transport Canada managed the airport facilities. The program has since evolved and expanded over the years to meet the growing challenges of residential encroachment, managing community expectations, and educating the community about aircraft noise.

Program Vision & Goals

The **vision** of the YVR Aeronautical Noise Management Program is to support the business objectives of YVR by protecting 24-hour airport access.

The **goal** of the YVR Aeronautical Noise Management Program is to minimize the level of disturbance to those living in the vicinity of the airport while recognizing the need for 24-hour airport operations. From a sustainability perspective, the inherent challenge is to balance the competing demands of community expectations of enjoyable urban living and the airport services that support the economy of British Columbia.

Main Program Elements

The vision and goal of the YVR Aeronautical Noise Management Program are achieved through the following core program elements:

- Consulting with the YVR Aeronautical Noise Management Committee on all aspects of noise management activities and soliciting their input on implementing initiatives outlined in the Noise Management Plan.
- Monitoring and assessing aircraft noise levels in the community.
- Maintaining relevant operating procedures (Noise Abatement Procedures, Airside Directives & Procedures) to minimize noise from aircraft operations.
- Responding and providing information to address community questions and concerns about aircraft noise.
- Participating in and supporting international efforts to develop new standards and technologies for noise mitigation.
- Partnering and working with stakeholders.

The YVR Aeronautical Noise Management Program will evolve in order to respond to changing industry dynamics, new technologies, and feedback received from the community. The Airport Authority's approach to solutions is collaborative in nature, and proposed changes or new procedures will not be supported without first objectively assessing impacts and consulting with stakeholders. Only those changes that have broad benefit to all stakeholders will be championed.

YVR Aeronautical Noise Management Committee

The YVR Aeronautical Noise Management Committee ("ANMC") was formed in the early 1990s from various technical working groups concerned with noise management at the airport. The Airport Authority's Vice President of Community and Environmental Affairs is the chairperson for the ANMC, and membership includes community and industry stakeholders with an interest in noise management. The ANMC meets on a quarterly basis, and minutes from the meetings are posted on the YVR website.

A list of all organizations represented on the ANMC is listed in Table 4 and the respective members (as of July 2014) can be found in Appendix 2.

TABLE 4: YVR Aeronautical Noise Management Committee – Member Organizations

YVR ANMC	
Vancouver Airport Authority	
City of Richmond	NAV CANADA
City of Vancouver	Transport Canada
Corporation of Delta	Canadian Business Aircraft Association
City of Surrey	Floatplane Operators Association
National Airlines Council of Canada	Air Canada Pilots Association
Air Canada	YVR Airline Operators Committee
WestJet	Musqueam Indian Band

The **purpose** of the ANMC is to provide a balanced forum for the discussion and consideration of all aeronautical noise issues at YVR.

The **scope** of the ANMC is to discuss, analyse and provide advice on, or make recommendations about noise management to the Airport Authority. The ANMC does not have decision making authority, as the Airport Authority is responsible and accountable for operational and business decisions on all matters related to aeronautical noise.

YVR Noise Management Plan

The YVR Noise Management Plan is a requirement under the Airport Authority's ground lease, and is an integral part of advancing the goals of the YVR Aeronautical Noise Management Program. The Plan documents the existing program and identifies areas of focus and supporting initiatives over a five-year time period. The Airport Authority creates a new Plan every five-years to ensure the areas of focus remain relevant and that issues identified by the community are addressed where possible.

The identification of community issues and potential initiatives for consideration in the Plan is undertaken consultatively and considers community and industry input. Initiatives in the Plan set broad objectives and deliverables; however, actions and results are often subject to further work and assessments to ensure decisions can be made with all available input, information, and data available.

Structuring initiatives over a five-year period assists the Airport Authority in preparing annual work and business plans. Meetings are held early each year with City staff and citizen representatives on the ANMC to discuss the annual work plan. In addition, updates on progress are provided to the ANMC on a regular basis, and critical decision points will be discussed with the Committee to gather input before proceeding. A summary of progress and results of work is provided to the community through the annual noise management reports, available to the community on the YVR website.

Aircraft Noise & Operations Monitoring System

The Airport Authority has a sophisticated Aircraft Noise & Operations Monitoring System ("ANOMS") to monitor and assess noise levels in the community. This system monitors noise levels monitored at 20-fixed Noise Monitoring Terminals ("NMTs") located in the community, and has an interface to NAV CANADA's radar system to provide data for flights operating in the vicinity of the airport.

Data from ANOMS allows the Airport Authority to understand the contribution of aircraft noise in the community, identify trends, support or assess proposed changes to Noise Abatement Procedures, respond to questions or concerns about a particular operations, and check for compliance with published procedures. Results of noise monitoring are summarized and reported in the annual noise reports made available on the Airport Authority's website.

Using best practices and technology to provide the community with open and transparent information of flight tracks and noise levels, the Airport Authority employs *YVR WebTrak*[5], which displays information collected from ANOMS. WebTrak allows the community to view dynamic "real-time" (delayed by 10-minutes for security reasons) and historical flight tracks, noise levels, and register noise concerns on-line. WebTrak has proven to be an effective communication tool for the community to learn and understand how aircraft navigate over areas of the Lower Mainland.

Operating procedures

YVR Noise Abatement Procedures

The Noise Abatement Procedures for YVR are published in the *Canada Air Pilot - British Columbia*, and can be referred to as the "noise rules" for the airport. They rely on the cooperation of pilots, air traffic controllers, and favorable operating conditions such as weather, runway conditions, and air traffic patterns.

The Noise Abatement Procedures are subject to enforcement under *Canadian Aviation Regulation 602.105*, and it is the responsibility of the aircraft operator to adhere to the Noise Abatement Procedures. Suspected violations may be subject to investigation by Transport Canada, and the Airport Authority regularly conducts audits for compliance. If any operation is suspected of non-compliance, the incident will be reported to Transport Canada for their review and they can issue fines of up to $5,000 for individuals and $25,000 for corporations.

Airside Directives and Procedures

The Airport Authority maintains a number of airside directives and procedures aimed at managing operations that have a noise impact on the community. The directives and procedures provide direction and operational guidance to Airport Authority staff and tenants to ensure that airport noise mitigation strategies are applied in a consistent manner. Current directive and procedures are in place to manage activities related to night-time operations and engine maintenance engine run-ups. The directives and procedures are routinely reviewed and updated to reflect that dynamic nature of airside operations.

Responding to Questions and Concerns

Providing information and educating the community about aircraft operations and noise management is an important aspect of the YVR Aeronautical Noise Management Program. The community can contact the Airport Authority through a variety of means, including:

- Email – *noise@yvr.ca*
- The 24-hour YVR Noise Information Line (telephone 604-207-7097)
- WebTrak

[5] *http://webtrak.bksv.com/yvr*

Complaints are also relayed from other parties such as members of the YVR Aeronautical Noise Management Committee, NAV CANADA, municipal officials, government departments or airport officials. The Airport Authority treats all complaints seriously, information provided by the complainant is kept confidential, and responses are provided if possible.

Concerns and other supporting information are logged in a database, which allows the Airport Authority to identify trends and issues within the various communities. Integrating complaint information with data from ANOMS also helps to correlate specific flight operations that cause concerns.

While the Airport Authority is responsible for responding to noise complaints regarding YVR operations within 10 nautical miles from the airport, the management of complaints currently extends beyond this area and the complainant is responded to with whatever information is available.

YVR NOISE MANAGEMENT ACTION PLAN

A key component of the YVR Noise Management is the five-year action plan. The action plan outlines initiatives to be undertaken over the next five-years to address community issues and to improve the noise environment around the airport. This section summarizes the process of creating the five-year action plan associated with the 2014-2018 YVR Noise Management Plan. This process followed three- distinct stages as illustrated in Figure 3.

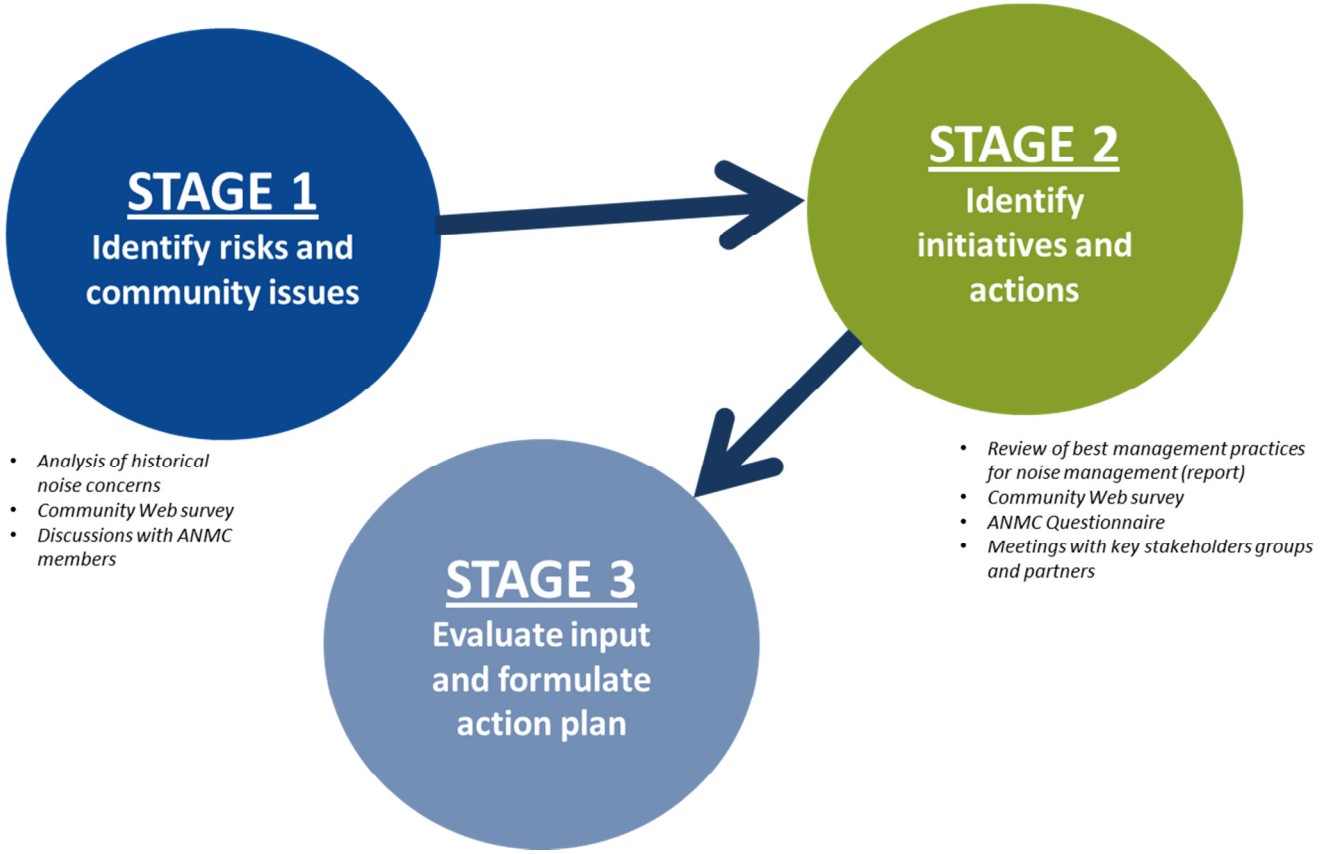


FIGURE 3: Creating the Five Year Action Plan

The Airport Authority engaged and consulted with members of the YVR Aeronautical Noise Management Committee throughout the entire process, and sought input from the broader community at specific times during the process.

Stage 1 – Identifying Current Community Issues

Analysis of Historical Noise Concerns

Concerns received by the Airport Authority are logged in a database along with other supporting information. Over 6,000 records, received between 2008 and 2012, were analyzed to identify trends for each of the various communities. The results of this analysis was shared with members of the YVR ANMC to help the City staff and citizen representatives better understand the issue of concern within their respective communities.

Community Web Survey

To augment information gathered through the analysis of historical noise complaints, a community web survey was hosted between 8 March and 9 April 2013. The survey sought broad community input on a range of environmental issues addressed by programs under the YVR Environmental Management Plan, including aircraft noise.

The main objective of the survey was to: (1) gain an understanding of current community perceptions on environmental issues and management; and, (2) solicit ideas on how the Airport Authority could enhance its environmental performance and programs.

With respect to the issue of aircraft noise, the survey asked respondents "*What specific concerns do you have with regards to aircraft noise and what should Vancouver Airport Authority do to better address these issues?*". A summary of the survey can be found in Appendix 3.

Stage 2 – Identifying and Canvassing for Potential Initiatives

Review of Best Management Practices for Noise Management (report)

To help generate ideas for potential initiatives or actions to address the community issues identified in Stage 1 of the process, the Airport Authority commissioned a study to review best and unique practices for noise management in use at other international airports.

The scope of work for the study included: identifying industry best practices related to aircraft noise management; reviewing policy and technology enhancements affecting noise around airports; and reviewing the trade-offs between emissions and noise while not compromising safety.

This work was completed by Airbiz, who gathered information from interviews with key individuals at airports in Australia and New Zealand, as well as from materials available in the public domain.

The results of the study was presented and discussed with the YVR ANMC, and full copy of the report was posted on the YVR website[6]. A high level summary of the report can be found in Appendix 4.

Community Web Survey

The community web survey administered during Stage 1 of the process provided an opportunity for respondents to submit suggestions for initiatives and actions to address the issues they raised.

YVR Aeronautical Noise Management Committee Questionnaire

As ANMC members are individuals with a greater understanding of noise issues, a detailed questionnaire was provided to them to gather input on proposed initiatives and actions. The questionnaire was designed to help members articulate clearly the issue to be addressed, identify objectives, and success measures.

Meeting with Key Stakeholder Groups and Partners

During the course of developing the Plan, the Airport Authority met with key stakeholders to keep groups informed of progress, gather input, and provide an opportunity of two-way dialogue and exchange of ideas. Some of the key meetings are presented in Table 5.

[6] http://www.yvr.ca/Libraries/ENV_Docs/Noise_Management_Review_of_Best_Practices.sflb.ashx

TABLE 5: Key meetings for the development of the 2014-2018 Noise Management Plan

Date	Organization / Activity	Summary
12 Dec 2012	YVR ANMC – 2012 4th Quarter Meeting	Presented and discussed the process to create the 2014-2018 YVR Noise Management Plan.
4 Jan 2013	Floatplane Operators Association	Reviewed work program to create the Plan and solicited ideas for proposed initiatives.
14 Jan 2013	Corporation of Delta (YVR ANMC staff and citizen representatives)	Reviewed work program to create the Plan and solicited ideas for proposed initiatives.
15 Jan 2013	City of Richmond (YVR ANMC staff and citizen representatives)	Reviewed work program to create the Plan and solicited ideas for proposed initiatives.
17 Jan 2013	City of Surrey (YVR ANMC staff and citizen representatives)	Reviewed work program to create the Plan and solicited ideas for proposed initiatives.
18 Jan 2013	City of Vancouver (YVR ANMC staff and citizen representatives)	Reviewed work program to create the Plan and solicited ideas for proposed initiatives.
29 Jan 2013	Canadian Business Aircraft Association	Reviewed work program to create the Plan and solicited ideas for proposed initiatives.
24 Apr 2013	YVR ANMC – 2013 1st Quarter Meeting	Presented results of 2008-2012 complaint analysis, community web survey results, noise management best practices study results.
26 Jun 2013	City of Richmond (YVR ANMC staff and citizen representatives)	Discussed City of Richmond's proposed initiatives.
8 Jul 2013	NAV CANADA	Discussed input and comments received to date as well as proposed initiatives for consideration in the Plan.
9 Jul 2013	City of Richmond (staff)	Discussed proposed joint initiatives between the City of Richmond and the Airport Authority for consideration in the Plan.
10 Jul 2013	Transport Canada	Discussed input and comments received to date as well as proposed initiatives for consideration in the Plan.
11 Jul 2013	WestJet	Reviewed work program to create the Plan and solicited ideas for proposed initiatives.

Stage 3 – Evaluating Input and Formulate Action Plan

All submissions and input received during Stage 2, together with the Airport Authority's responses, can be found in Appendix 5. Input received for proposed initiatives and actions were wide ranging. Each submission was evaluated against their feasibility and impacts to airport and aircraft operations. For those submissions that were directed at responsibilities of other aviation business partners (either Transport Canada or NAV CANADA), the response was discussed with the respective organization so that a coordinated and informed response could be provided.

While the Airport Authority is committed to reducing noise on the community where possible, it is equally committed to allowing operators to meet the community's demand for air services – this means ensuring 24-hour access to the airport, and allowing supporting aviation activities (e.g. engine maintenance) to occur. The Airport Authority responses to submissions generally fall into one of the following three categories:

a) Supported and will be incorporated into the Five-Year Action Plan.
b) Not supported as proposed, but the goal and objective of the submission will be worked towards in the Five-Year Action Plan.
c) Not supported.

The submissions categorized as "not supported" are contrary to the business objectives of the Airport Authority, and are deemed to not be in the best interest of the broader community. Some of the submissions related directly to flight paths and procedures. While they may be feasible in isolation, when taken in context of a complex airspace system many cannot

be implemented and are not supported. Suggested changes to air routes and procedures often: impact other aircraft operating in the area; negate any safe separation requirements built into the system; or, move air routes over other residential and noise sensitive areas.

FIVE-YEAR ACTION PLAN

Based on the evaluation of the submissions and input received, Table 6 summarizes the ten areas of focus and their supporting initiatives and tasks have been identified for the 2014-2018 YVR Noise Management Plan. While each area of focus has its own individual objective, the overarching objective for the Airport Authority is to build a strong understanding of noise management issues by working collaboratively with stakeholders, providing up-to-date and easy to understand information on noise management activities and airport operations to the community, and strengthening core aspects of the YVR Aeronautical Noise Management Program.

The initiatives are meant to be high level as specific outcomes and deliverables will result from close work and consultations with affected stakeholders. In addition, direction of particular initiatives may need supporting studies to be completed before a decision can be made on how best to proceed.

Every year, the Airport Authority will meet with key stakeholders to create annual work plans to address the initiatives. The YVR ANMC will continue to play an integral role in working to complete the proposed initiatives, and regular progress updates will be provided to this group. The YVR ANMC will also be consulted at key decisions points during projects to gather their input before decisions are made.

Results of work will be summarized in annual noise management reports. Individuals interested in reading about past accomplishments against initiatives contained in the 2009-2013 YVR Noise Management Plan can view annual reports posted on the YVR website, or reference Appendix 6 for a short summary.

TABLE 6: Initiatives and Actions 2014-2018

No.	Issue	Objective		Initiative/Action
1	Land use planning	**Build on existing collaborative partnership and work with local municipalities on land use planning to minimize the level of aircraft noise, nuisances and disturbances for those living in the vicinity of the airport.**	1.1	***Review the 2015 YVR Noise Exposure Forecast Contours*** The 2015 Noise Exposure Forecast planning contours, created in 1994, were meant to provide guidance to municipalities on land use planning efforts. To account for future growth in air traffic and changes in aircraft fleet mix, the Airport Authority will review the existing 2015 Noise Exposure Forecast contour to assess future noise exposure and provide information to municipalities to help with long term land use planning decisions. Following this review, relevant noise mitigation measures and documents (e.g., brochures, policies, bylaws covenants, noise mitigation standards) will be updated as required.
		Maintain and enhance safe aircraft operations, while minimizing aircraft noise exposure, and consider desires to maximize building heights.	1.2	***Review of existing YVR Aeronautical Zoning Regulations*** The heights of buildings and obstacles in close vicinity to the airport are governed by the YVR Aeronautical Zoning Regulations, which set maximum building heights to ensure safe aircraft operations. The Airport Authority will conduct a review of the Zoning Regulations to seek protection for runway options identified in the YVR Master Plan, and to protect existing runways given increased zoning requirements. As part of this review, the Airport Authority will also consult with the City of Richmond and other stakeholders to explore maximizing City Centre viability by possible increases in building height around City Hall to improve sustainability, social, economic and environmental benefit.
2	Awareness - Community	**Better inform the public about aircraft operations, flight paths, and noise management measures to enable a greater understanding of the implications of aircraft noise and airport operations, and to match public expectations with experience.**	2.1	Improve online media tools to enhance communication with the public of noise management information and program efforts.
			2.2	Explore and implement better methods of communicating with the public regarding aircraft noise and over-flight impacts, such as respite charts, N70 (number of events over 70 dBA) Contours, and flight path density maps.
			2.3	Track, report, and profile progress and trends towards the use of quieter aircraft at YVR and provide this information in the annual noise report.
			2.4	Provide better information to the public on airport operations and aircraft noise management efforts to help educate new homebuyers and provide existing homeowners with suggestions on how to sound insulate older homes.
3	Awareness – Industry	**Engage with aviation stakeholders to improve noise management activities and discussions about aircraft noise management.**	3.1	Develop a training module on noise management for flight schools to raise awareness of noise issues within the aviation community.
			3.2	Host regular meetings with Transport Canada to discuss roles and responsibilities, and exchange information on noise management opportunities.
			3.3	Host regular meetings with NAV CANADA to dialogue and exchange information on noise management opportunities.
			3.4	Host regular meetings with other major airports in Canada to dialogue and exchange information on noise management opportunities, and to coordinate responses and positions to national issues.
			3.5	Review the YVR Fly Quiet Award and explore possible opportunities for further recognition and engagement of the aviation community.

No.	Issue	Objective	Initiative/Action	
4	**Night-time Operation**	**Monitor and report on the number of night operations.**	**4.1**	Ongoing review of approval guidelines for night-time operations.
			4.2	Report annually on the number of night operations by aircraft noise certification.
			4.3	Review and create a summary report on the nature of marginally compliant Chapter 3 aircraft operations at YVR.
5	**YVR ANMC**	**Ensure that the YVR ANMC remains relevant and functional.**	**5.1**	Update the Terms of Reference for the YVR ANMC and review membership, expectations, scope, objectives, etc.
6	**Run-ups**	**Further manage noise from engine run-ups.**	**6.1**	Review existing engine run-ups procedures and directives with a focus on optimizing noise reduction opportunities at all non-GRE run-up locations.
7	**Performance Based Navigation (PBN) Procedures**	**Better understand the potential impacts associated with PBN procedures, and ensure that noise, emissions and capacity impacts of PBN are considered during implementation.**	**7.1**	Support and participate in national discussions on PBN arrival and departure procedures through the Canadian Airports Council, and in conjunction with the Transport Canada PBN Working Group (soon to become the Canadian Performance Based Aviation Action Team).
			7.2	Provide assistance with the evaluation of noise associated with PBN procedures, and assist with the review of altitudes when turns can be commenced, degree of turns, aircraft destination, RNAV departure routes or vectors, aircraft altitude over residential communities, etc.
			7.3	Undertake a study to determine and better understand potential flight routings associated with PBN arrival and departure procedures.
			7.4	Ensure community is advised before any changes to flight paths are implemented.
8	**YVR Float Plane Operations**	**Further manage noise impacts from YVR float plane operations.**	**8.1**	Continue ongoing dialogue and work with YVR float plane operators to assess ways to further manage noise.
			8.2	Review current float plane operating procedures and routes and identify opportunities if any to mitigate noise.
9	**Noise Abatement Procedures**	**Ensure procedures to manage noise remain relevant and current.**	**9.1**	Undertake annual review of published Noise Abatement Procedures for YVR with the aim of ensuring clarity and continual improvement.
			9.2	Undertake a gap analysis of the YVR Aeronautical Noise Management Program by comparing to other airports of similar size to identify opportunities for improvement in core program elements.
10	**Managing Runway Demand**	**Ensure runway system at YVR is used effectively to reduce delays while managing noise impacts on the community.**	**10.1**	Quantify current level of delays at YVR and associated costs.
			10.2	Assess airside capacity and determine optimal use of runway system.

ENVIRONMENT – YVR Noise Management

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Environmental Analyst

Version 1.00

APPENDIX 1

Relevant Aviation Regulations & Guidelines Related to Noise Management

Descriptions following descriptions are summaries only. Readers interested in the full descriptions should refer to the relevant Canadian Aviation Regulation (CAR). Where applicable, the CAR numbers are referenced.

Noise Abatement Procedures (NAP)

Primarily intended for jet aircraft, the NAP specifies departure/arrival procedures, preferential runway determination, altitude restrictions, and night restrictions. Procedures in the NAP are enforceable by Transport Canada. [CAR 602.105]

Noise Abatement Departure Procedures (NADP)

For jet take-offs, the '1' or '2' procedures specify reduced engine power for noise mitigation at prescribed altitudes, consistent with flight safety requirements. The NADP1 procedure results in lower noise close to the airport, while NADP2 procedure results in lower noise farther from the airport [CAR 602.105].

Minimum Aircraft Altitudes

This regulation prescribes 1,000 feet as the minimum altitude that an aircraft may fly over a built-up area (500 feet over water), unless the aircraft is conducting a take-off, approach or landing (other exemptions may also apply). [CAR 602.14-602.16]

Airworthiness Standards (Chapter 516) - Aircraft Noise

This standard prescribes the noise certification requirement for civil aircraft in Canada at the time of manufacture. This standard has adopted the noise classification prescribed by the International Civil Aviation Organization (ICAO) in Annex 16, and identifies civil subsonic jet aircraft as either Chapter 2 (old technology, noisier), Chapter 3 (new technology, quieter), or Chapter 4 (newest technology). [CAR 511.01]

TP1247E – Land Use in the Vicinity of Airports

This Transport Canada publication provides guidance on compatible land use planning around airports based on the Noise Exposure Forecast (NEF) metric and contours. Transport Canada discourages residential developments in areas exposed to NEF 30 or greater. In British Columbia, the responsibility rests with the municipalities to incorporate these guidelines into their planning practices.

Canada Flight Supplement & Water Aerodrome Supplement

The procedures and instructions contained in these publications are used a reference for operating safely at aerodromes in Canada. These documents provide information on aerodrome/runway facilities, navigation aids, operating procedures, and hours of operation. There are specific procedures for each aerodrome in Canada.

Noise Mitigation Procedures: Aircraft Engine Run-ups

Distributed as an YVR Airport Operations Directive, these procedures serve to minimize noise from engine run-ups while ensuring run-ups are performed in a safe manner.

APPENDIX 2

YVR Noise Management Committee Membership (as of December 2013)

CHAIR PERSON:

Anne Murray
Vice-President Community & Environmental Affairs, Airport Authority

SECRETARIAT:

Jody Armstrong
Administrative Assistant, Airport Authority

MEMBERS:

Rick Hedley Citizen Representative, Corporation of Delta	**Tim Fraser** WestJet
Margot Spronk Citizen Representative, Richmond	**Mark MacEachern** WestJet
Don Flintoff Citizen Representative, Richmond	**Terry Hiebert** Floatplane Operators Association
Jonathan Parker Citizen Representative, Vancouver	**Scott MacPherson** Canadian Business Aviation Association
Meg Brown Citizen Representative, Vancouver	**Marlene Keefe** Air Canada Pilots Association
Ron Sorenson Citizen Representative, Surrey	**John Nehara** Transport Canada
Victor Wei City of Richmond, staff representative	**Brent Bell** NAV CANADA
Lil Ronalds City of Vancouver, staff representative	**Leona Sparrow** Musqueam Indian Band
Michael Gomm Corporation of Delta, staff representative	**Brett Patterson** Director Airside Operations, Airport Authority
Craig MacFarlane City of Surrey, staff representative	**Shaye Folk-Blagbrough** Environmental Analyst, Airport Authority
Ahmad Zakaria Airline Operators Committee (Lufthansa)	**Mark Cheng** Supervisor Noise & Air Quality, Airport Authority
Don McLeay National Airlines Council of Canada	

APPENDIX 3

Summary of Community Web Survey

The Airport Authority commissioned Vision Critical to conduct an online community survey to solicit feedback from the community on environmental and noise management trends at YVR. The objective of the survey was to assist with the understanding current community issues, identify potential solutions to issues, and to augment data from a detailed analysis of historical noise complaints.

Survey Methodology

The survey was administered between the dates of 8 March and 9 April 2013 via an online link on the YVR website. Promotion of the survey occurred through a number of means (traditional and social media), as well as through members of the YVR Aeronautical Noise Management Committee and the YVR Environmental Advisory Committee.

A total of 88 individuals responded to the survey via the online link. In addition, a total of 305 Lower Mainland residents registered with Vision Critical' s Forum Panel were selected participate in the survey. People registered in the Forum Panel consist of individuals who have expressed interest in participating in surveys, but do not have an inherent bias on the survey topic. As such, results from this sample group are representative of the general population.

General Summary of Results

Some general observations of the responses include:

- Managing spills of hazardous materials is the most important environmental topic.
- The Forum Panel group noted less concern with minimizing aircraft noise than the individuals that responded to the survey via the online link. *This is consistent with results from the Airport Authority's annual community survey, where 85% of the respondents state they are not annoyed by aircraft noise (2012 results).*
- The Forum Panel group placed a higher importance on reducing air emissions, effects of climate change and waste including recycling than the 88 individuals that responded to the survey via the online link.
- The Forum Group thought more highly of the Airport Authority's environmental programs than the individuals that responded to the survey via the online link.

When asked what should be done to address concerns about aircraft noise, responses fell into the following board categories:

- Reducing the number of flights
- Having aircraft fly at higher altitudes
- Changing the take-off and landing flight patterns
- Designing quieter engines
- Controlling and reducing over-flights of populated residential areas
- Creating stricter regulations or bylaws for managing noise

The verbatim responses received from the survey respondents, and the Airport Authority responses to these, can be found in Appendix 5.

APPENDIX 4

Summary of Best Management Practices Report

In early 2013, the Airport Authority commissioned AIRBIZ to undertake a study to identify "best" and unique noise management practices at other international airports to support the business and strategic objectives of YVR. A "best" practice was defined as one that would either: enhance the noise environment around the airport; build stronger community ties; or enable open and transparent dialogue with the community about noise exposure and how management solutions are assessed. The objective of the study was to help identify potential initiatives for evaluation and consideration in the 2014-2018 YVR Noise Management Plan.

The study included a review of policy changes or technology enhancements relevant to aircraft noise, and reviewing the trade-offs between emissions and noise abatement. Information for the study was gathered through interviews with key individuals at airports in Australia and New Zealand, as well as from information available in the public domain. This report supplements information compiled for a similar study completed by the Airport Authority in 2008, which focused mainly on airports in North America.

The review completed by AIRBIZ was robust and resulted in highlighting a number of unique noise management practices, and a high-level assessment of their potential effectiveness at YVR, including associated qualitative costs to stakeholders and implementation considerations. Below is a short summary of the findings from the study. A full version of the report[1] can be accessed on the YVR website.

Practice	Summary Description
Restrictions on marginally compliant Chapter 3 aircraft	This practice is airport specific and is generally not state sponsored, and involves restricting marginally compliant Chapter 3 aircraft from operating at the airport. In many cases, these restrictions apply only to new services and existing operations are permitted. If considered for YVR, this practice would require completion of the Transport Canada process for adding a new noise control procedure and would likely face significant opposition from industry due to the resulting cost and operational constraints. These restrictions would also likely lead airlines to consider alternative airport, resulting in loss of economic benefit to the local community.
Advertisement of feet upgrades	This practice involves communicating the ongoing efforts by airlines to replace older aircraft with more modern and typically quieter aircraft. This is a proactive way to communicate actual noise reductions, and advertising through existing communication methods should incur little cost. Explaining nature and benefits of noisier operations may also provide better community understanding of the operations.

[1] *http://www.yvr.ca/Libraries/ENV_Docs/Noise_Management_Review_of_Best_Practices.sflb.ashx*

Practice	Summary Description
Balanced Approach to Required Navigation Performance (RNP) Operations	The objective of this practice is to ensure noise exposure is considered as part of the development and approval of RNP procedures. RNP procedures can reduce track miles, fuel consumption and emission through more efficient use of airspace. These procedures could lead to noise reductions or redistribution through the use of continuous descent approaches or by concentrating aircraft over-flights over areas located under existing or new flight paths. These procedures could also be used to define "low noise impact" corridors over communities; however, this would often lead to increased track miles and fuel burn and would need to be assessed against goals for emission reductions. As the development and implementation of these procedures in Canada is discussed, Transport Canada should be encouraged to set national policy on how RNP procedures are evaluated, including noise impacts, during development and implementation. At an airport like YVR, RNP procedures are challenging to implement because of the diverse fleet mix and terrain. In addition, not all aircraft are equipped with RNP equipment as this technology is expensive and requires specialized training for pilots.
Experience Centre	This practice involves having a permanent exhibit or mobile display to showcase the airport and help residents learn about airport operates and to enquire about noise impacts. This would be a component of a much broader community outreach strategy, and has limited effectiveness on its own. Depending on the exhibit, the capital and operating costs will vary.
Multilingual Communication Strategy	This practice involves ensuring communication materials are available for all native languages of communities affected by noise to provide an opportunity for enhanced dialogue. This communication strategy is more effective in communities where English is not broadly spoken, and an assessment of the predominant ethnic communities affected by aircraft noise would be required. Costs include translation of materials and translator support for meetings.
Alternative Noise Metrics	This practice involves using non-traditional aircraft noise metrics, other than the Noise Exposure Forecast (NEF) contours, to communicate noise impact to the community. The NEF contours are meant to assist with land use planning, and they are a poor tool to use for communicating noise exposure and impact. The airport should identify non-traditional metrics that best respond with the community, such as "Events Above" charts from actual or modeled data, or average number of over-flights. Cost to create charts and maps will vary depending on the quality of the desired output sought and information available.
Noise Mitigation Design Competition	This practice involves the airport hosting an open design competition to help identify a solution to a particular problem by seeking input from the community and specialists. The success of the design completion involves the selection of a suitable issue, and the success will vary depending on the complexity of the issue. Costs to administer the competition would vary based on extent and scope.
Adventure Airport	This practice involves the development of a physical venue aimed at providing a fun and entertaining experience to the visitor while giving a broad overview of the complexity of airport operations.
Existing Home Noise Insulation Brochure	The objective of this practice is to provide educational information about aircraft noise and operations, and provide advice on options to sound insulate older homes located in high noise areas. While the City of Richmond has policies and bylaws in place to ensure new residential housing are properly sound insulated and buyers are informed of aircraft activity, creating a noise information brochure to target residents in older dwellings not covered by the bylaws or polices may be of benefit.

Practice	Summary Description
Noise-based Landing Charges	This practice involves incorporating a noise surcharge on aircraft landing fees. The intent would be to charge a higher fee for noisier aircraft, or provide a rebate for the operation of a quieter aircraft. The International Civil Aviation Organization (ICAO) permits the use of such charges if it is applied fairly, does not increase revenues for the airport, and part of the cost recovery exercise involves mitigating impacts associated with aircraft noise (such as an acoustic treatment program or Community Trust Fund – both explained further below).
Community Trust Fund	From funds raised through a proposed noise-based landing charges scheme, development of a community Trust Fund aimed at reinvesting in the communities affected adversely by noise. This practice would serve to enhance the airport's presence in the community, notably through sponsorships. A Trust Fund could provide transparent management of funds associated with mitigating impact of noise, and would need a Terms of Reference and Board of Trustees to provide oversight.
Acoustic Treatment Program	From funds raised through the proposed noise-based landing charges scheme and in partnership with the City, development of an acoustic treatment program for existing houses located in noise affected areas. This practice would target existing buildings, residential or sensitive applications for treatment beyond building code requirements. The effectiveness would vary based on baseline condition of buildings and on scope and scale of program. Funding an acoustic treatment program would be a challenge by using landing fees alone, and other funding sources would be required. Significant Airport Authority and City resources would be required to administer and coordinate a program.
Real Estate Disclosure	The objective of this practice is to provide transparent information on noise and flight paths to real estate buyers. The airport could seek partnership with real estate associations to ensure access to key tools. Disclosure of information would create an awareness of noise impacts and help the buyer make an informed decision.
Total Noise Volume	This practice is often used in Europe as a compliance measure; however, it could be adopted at YVR as a means of reporting. The program requires development of a transparent total noise load metric and can be used to provide a single number to assess how the noise environment is changing over time.

APPENDIX 5

Vancouver Airport Authority Responses to Input on Proposed Initiatives

PROPOSALS (verbatim)							Airport Authority Response to Proposed Objective and Task
Category	**Source**	**Issue**	**Objective**	**Task**	**Challenges/Trade-offs**	**Success measures**	
FLIGHT PATHS & PROCEDURES	ANMC Member	Frequency of flights.	Respite from noise during any one hour period.	YVR should review the arrival/departure schedules to determine if respite is possible.	Ability to effect schedule adjustments.	Reduction in complaints from the frequency of flights/hour.	**The Airport Authority will not implement a program to adjust flight schedules. Airlines must have flexibility to schedule their flights to meet the demands of the travelling community, and to meet the challenges of operating through different time zones, system scheduling requirements, crew and aircraft requirements, and managing flight connections.**
	ANMC Member	Departing aircraft.	Noise reduction.	Apply noise control techniques on departures over Richmond.	Compliance will be difficult.	Reduction in number of complaints.	**The Airport Authority agrees with the Objective and the proposed Task will be assessed under Initiatives #7 and #9 (Table 6).**
	ANMC Member	Aircraft on approach.	Noise reduction.	Follow approach flight path at low thrust settings to reduce ground noise to 65 dBA.	Ability to reduce thrust to control noise levels.	Reduction in number of complaints.	**The Airport Authority agrees with the Objective of seeking ways to reduce noise on approach and this will be assessed under Initiatives #7 and #9 (Table 6); however, the Airport Authority will not implement the proposal of imposing noise limits on the ground. Aircraft operating in Canada met ICAO noise certification requirements, and this includes meeting noise limits set for approach, take-off, and sideline.**
	ANMC Member	Aircraft Routings	Noise reduction	Flight corridors should be high enough to reduce ground noise to 65 dBA.	Approaches and takeoffs techniques will have to be examined to determine the options available, if any.	Reduction in number of complaints.	**The Airport Authority agrees with the Objective of seeking ways to reduce noise from flight operations and this will be assessed under Initiatives #7 and #9 (Table 6); however, the Airport Authority will not implement the proposed Task of raising aircraft altitudes to reduce noise on the ground.** **Raising aircraft altitudes is not an option as aircraft operate at prescribed altitudes in order to provide required separation from other aircraft and to move air traffic in a safe and efficient manner. In addition, small increases in altitude often do not translate to a significant decrease in noise levels on the ground.**
	ANMC Member	Aircraft Routings	Noise reduction	Partner with Airline operators that fly into YVR to encourage NAV CANADA to move to optimized, departure and descent profiles using PBN and eliminating—where possible—levelling off during climbs and descents. Seek stakeholder status and early involvement for YVR's Noise & Environment group.	Re-organization of airspace is a complex, expensive task requiring extensive stakeholder involvement. Also, while overall noise may be reduced, some communities that do not currently experience aircraft noise may come to do so.	Reduction in number of complaints.	**The Airport Authority agrees with the Objective of seeking ways to reduce noise from flight operations and the Task will be assessed under Initiative #7 and #9 (Table 6).**
	ANMC Member	Aircraft Departures off 26L & R are turning south then heading east and passing over South Surrey Peninsula generating aircraft noise complaints.	Establish a SID that ensures such departures stay well south and off the south Surrey Peninsula before turning east. This SID should address all night time departures and where practicable be applied to as many evening and daytime hour flights as possible Not just the hours of 24:00 – 06:00.	There is a current initiative that is in process. We would like that process to be expedited and be expanded to address extended hours such that residents can have more than just the 6 hours of relief as currently envisioned in the SID.	Fuel burn and greenhouse gasses vs. noise disturbance to surrounding communities.	Reduced or elimination of noise complaints from South Surrey residents with regards to night time departures.	**The Airport Authority agrees with the Objective of seeking ways to reduce noise from flight operations and the Task will be assessed under Initiatives #7 and #9 (Table 6).**

PROPOSALS (verbatim)							Airport Authority Response to Proposed Objective and Task
Category	**Source**	**Issue**	**Objective**	**Task**	**Challenges/Trade-offs**	**Success measures**	
	ANMC Member	Noise Complaints regarding aircraft using visual approach to runway 26L and passing over the South Surrey Peninsula.	Reduce aircraft noise over the south Surrey peninsula by having aircraft remain on the established flight path.	Review the Air Traffic Control procedures for arriving aircraft on runway 26L and modify as required to discourage ATC clearance for visual approach to runway 26L. Encourage approvals to only situations of traffic or air traffic safety.	Aircraft cleared for visual approach to runway 26L cut across the South Surrey Peninsula rather than following the established Flight path over the water and up the center of Mud Bay. The granting of clearance for visual approach results in an intense noise impact on residents of the South Surrey Peninsula and Crescent Beach. There seems to be some difference of opinion as to why such visual approaches happen. While Nav Canada represents that visual approaches are initiated by the pilots, on speaking to pilots they tell us that they rarely if ever initiate a visual approach on this route, rather these visual approach clearances occurred at the request of the Nav Canada Controller.	Reduced or elimination of noise complaints from South Surrey residents with regards to daytime arrivals on runway 26L.	**The Airport Authority agrees with the Objective of seeking ways to reduce noise from flight operations and this will be assessed under Initiatives #7 and #9 (Table 6); however, the Airport Authority will not seek to action the proposed Task of encouraging approvals of visual approaches to only specific situations.** **The proposed task is well outside the role of the Airport Authority. The responsibility to move and direct air traffic rests with NAV CANADA, who conducts their operation in accordance and compliance with rules and regulations prescribed by Transport Canada in alignment with international standards. While NAV CANADA will continue with their efforts to reduce over-flights of the South Surrey area, no further work or efforts on this issue is forthcoming.** **Note: a review of arrival operations on runway 26 by aircraft arriving from the south indicates a very low number of over-flights of the South Surrey peninsula, as the majority of flights operate over Mud Bay.**
	Community Survey	Various		▪ Ensure flight paths are away from populated areas as much as practicable. ▪ Aircraft should not fly over North Delta but should follow the Fraser River or make their turn towards Mud Bay following Hwy 99. North Delta has an elevated geography and Aircraft are often too low as they cross the escarpment. Furthermore, the small Dash Turbo Props apply their airbrakes and/or feather their props to reduce speed and they do this over residential communities. This causes increased noise levels. Strict Flight path adherence for all aircraft should be expected by YVR. ▪ Minimize approaches over residential areas. ▪ Use an alternate approach!!!!!!!! This is from a resident trying to live a peaceful life in Ladner/Tsawwassen area. ▪ Take off over water as much as possible. ▪ Avoid changing flight paths to go over residential areas, and keep higher altitudes when they must. ▪ Stop flying over Crescent Beach. ▪ Stop flights over residential areas. ▪ Stop flights over White Rock.			**The Airport Authority agrees with the Objective of seeking ways to reduce noise from flight operations and this will be assessed under Initiatives #7 and #9 (Table 6); however, no action to move current flight paths away from populated areas will be undertaken by the Airport Authority or relevant organizations.** **Flight paths and procedures are designed with safety as the highest priority with due consideration to minimizing over-flights of populated areas where possible. All parts of the Lower Mainland are exposed to some level of aircraft over-flights, and it is not possible to move flight paths to avoid residential areas as this would create a significant impact to aviation safety. In addition, this would simply relocate noise to another community, and it is not the policy of the Airport Authority to reduce noise in one community at the expense of another community.**
				▪ Maximize take-offs to the west (over the ocean). ▪ Choose routes in/out over the ocean.			**Procedures to encourage take-offs to the west and to keep traffic over the water at night are already in place. The Preferential Runway Section of the YVR Noise Abatement Procedures prescribes take-offs to the west during the day and two-way flow (both arrivals and take-offs over the water) at night whenever possible. Operating a two-way flow pattern is a complex endeavor and is subject to many variables including favorable wind conditions (tailwind less than 5 knots), traffic volume, and air traffic control workload.**
				▪ Restrict floatplane operations and flight paths and elevations.			**Changing the procedures and altitudes of float planes using the Middle Arm of the Fraser River is not possible. The current float plane procedures and prescribed operating altitudes are established to reduce potential conflicts with aircraft and helicopters operating from the south runway and helipads.**
				▪ Small plane traffic noise through the middle of Richmond. Re-route to other airports or change flight path.			**The Airport Authority will not seek to restrict propeller aircraft operations at night. As a major hub for regional flights, YVR must accommodate small propeller aircraft to effectively support the various communities within the Province of BC and to support the local economy.**
				▪ Continuous Descent Arrival is a cockpit based flight technique that involves the continuous, gradual descent of aircraft on a constant slope at idle or at minimal low power settings.			**The Airport Authority agrees with the Objective of seeking ways to reduce noise from flight operations and this will be assessed under Initiatives #7 and #9 (Table 6); however, implementing continuous descent approaches do pose challenges for YVR because of its diverse fleet mix (e.g., small propeller and large jets) and airspace constraints.**

PROPOSALS (verbatim)							Airport Authority Response to Proposed Objective and Task
Category	**Source**	**Issue**	**Objective**	**Task**	**Challenges/Trade-offs**	**Success measures**	
FLOAT PLANES	ANMC Member	Float Plane Operations.	When taking off to the east or landing from the east, a change to the arrival and departure routes, an increase in the elevation of the routes to between 1500 and 2500 ft over Richmond, and the altitude before a turn can occur.	The proposed initiatives are to increase restrict use of the airspace over West Richmond below 1,500 ft., to have this initiative become an enforceable procedure under the CARs, and to restrict arrival and departure time, and to restrict engine start-up time for taxi. **Engine start-up time for taxi prior to departure.** Similar to the FMP for Coal Harbour, weekday flight departures will not occur before 7:00 am on weekdays, and before 8:00 am on weekends and statutory holidays. Engine start-up time for taxi will not occur until 15 minutes prior to departure time. Flight arrivals will not occur before 7:00 am on weekdays and 8:00 am on the weekends and statutory holidays. **Westminster Hwy Inbound and Granville Ave Outbound Flight Paths:** The details of the proposed initiatives are: 1. Restrict use of the airspace over West Richmond below 1,500 ft (Westminster Hwy. Corridor). The 1500 ft. ASL also improves visibility of Middle Arm boating traffic as view angle increases from 10 degrees to about 30 degrees this is to accommodate the 45m high buildings near the dike. The extra altitude may also be sufficient to compensate for the current and future high-rise development along the Middle Arm. 2. Require aircraft to remain at an altitude of not below 1,500 ft until final descent for landing from the east. 3. Float planes arriving from the west for landing westbound on the Middle Arm of the Fraser River as follows: a. Ascend to 1,500 ft. at the Radar deflectors and maintain an altitude of at least 1,500 ft along the inbound Westminster Hwy corridor. b. Follow Westminster Hwy. until east of Gilbert before turning north along Gilbert. c. Restrict left turns until over Dinsmore Bridge then descend to at least 1,000 ft. before commencing final approach. 4. For VFR aircraft, including float planes and helicopters, departing eastbound from Runway 08L or 08R, from helipads, or from the Middle Arm of the Fraser River eastbound heading west: a. Restrict right turns until at 1,000 ft. over Dinsmore Bridge then turn south along Gilbert (Gilbert Corridor). b. Ascend to 2,500 ft. south along Gilbert. c. Turn right at 2,500 ft. at Granville Ave., follow the outbound Granville Ave corridor, and maintain an altitude of at least 2,500 ft while following Granville Ave (Granville Corridor) west until past the Radar deflectors.	The challenge will be acceptance by the floatplane operators and compliance going forward as they are not required to comply. Considering the proposed development near the Oval and the Thompson corridor the opposition will only increase with time. Doing nothing would not be a prudent choice.	The success of the initiatives would be measured by the Lynas Lane noise monitor remaining below Leq=60 dBA for float planes taking off or landing from the east. A reduced number of complaints from the Thompson Area.	**The Airport Authority agrees with the Objective of seeking ways to reduce noise from YVR float plane operations and this will be assessed under Initiative #8 (Table 6).** **While the specific Tasks identified will be assessed, any proposed change to procedures or altitudes that pose a safety issue or relocate noise to other parts of the communi ty will not be implemented.**
	ANMC Member	Float Plane Operations.	Understand the float plane noise profile in Richmond.	Conduct an analysis on the current noise profile, without regard to the feasibility, legality or practicality of solutions.	Temporary positioning of NMTs to specifically capture floatplane noise in the neighbourhoods, and visual observations by volunteers/students on site for a selection of representative days	Gathering of data is key to developing innovative solutions.	**The Airport Authority agrees with the Objective of seeking ways to reduce noise from YVR float plane operations and this will be assessed under Initiative #8 (Table 6).**

PROPOSALS (verbatim)							Airport Authority Response to Proposed Objective and Task
Category	**Source**	**Issue**	**Objective**	**Task**	**Challenges/Trade-offs**	**Success measures**	
RUN-UPS	ANMC Member	Engine Maintenance Run-ups outside the GRE resulting Leq's greater than 55 dBA. This assumes the GRE is reducing the Leq to below 55dBA for the Thompson community.	Restriction on engine maintenance run-ups or test purposes outside the GRE at night because the ambient, or background noise, is lower than during the day and therefore more of an annoyance.	1. Restriction on engine maintenance run-ups outside the GRE between the hours of 10:00 p.m. to 6:00 a.m. on weekdays and 10:00 p.m. to 8:00 a.m. on weekends. 2. An idle check of a single engine not to exceed five minutes in duration may be conducted in the specific airline lease hold area. If more than one engine is to be checked, each engine must be checked separately and the cumulative duration of the idle checks cannot exceed five minutes. 3. If absolutely necessary, run-ups may be conducted during these hours with the airport's approval and may not exceed two minutes in duration. 4. Installation of a ground run-up monitoring system to remotely monitor aircraft run up activity via motion detection cameras and noise monitoring stations 24 hours a day. 5. Violations to these time restrictions will result in the following tariffs being applied to the aircraft operator: a. First offense – Letter of Admonishment & $100 (to cover the cost of the letter) b. Second offense in a calendar year - $2,000 c. Third offense within a calendar year from the first offense - $5,000 d. Maximum fine within a calendar year from first offense - $20,000	The issue of compliance versus the impact on the Thompson community will be the issue will be the trade-off.	The violation tariffs collected should be zero dollars and the complaints from the Richmond communities should be significantly reduced.	**The Airport Authority agrees with the Objective of seeking ways to reduce noise from run-up operations and this will be assessed under Initiative #6 (Table 6); however, the proposed Task of restricting run-ups by time of day, duration, and monetary fines will not be implemented.** **The Airport Authority is committed to allowing run-ups to occur, including at night, as this permits operators to meet the demands for their air services. Efforts to manage run-up noise will continue through the use of airside directives and procedures, and non-compliance with these procedures can result in an investigation and monetary fines assessed by Transport Canada.**
	General Community	Various		▪ Build more Ground Run-up Enclosures. ▪ No pre-flight run-ups before 0600. ▪ Add noise barriers. ▪ Prohibit engine run-ups between 10 PM and 8 AM.			**The Airport Authority agrees with the Objective of seeking ways to reduce noise from run-up operations and this will be assessed under Initiative #6 (Table 6); however, the proposed Tasks of building more Ground Run-up Enclosures or restricting run-ups will not be implemented.**
COMMUNICATION, EDUCATION &AWARENESS	ANMC Member	Increase awareness of noise mitigation in the community	Enhance the aviation community's understanding of noise in the community and reward operators	Add a category for fleet renewal to the Fly Quiet Awards. Include engine & propeller replacement and other technological innovations that reduce aircraft noise.		Higher profile, use in operators' promotional materials.	**The Airport Authority agrees with the Objective and proposed Task, and these will be assessed under Initiative #3 (Table 6).**
	ANMC Member	Aircraft noise	Encourage operators and pilots to think of noise on adjacent communities when designing procedures and conducting operations over populated areas.	Raise the profile of the Fly Quiet Awards to make winning meaningful for operators. Include significant participation and acknowledgement from the communities that sit on the VNMC.		Higher News Profile, use in operators' promotional materials.	**The Airport Authority agrees with the Objective and proposed Task, and these will be assessed under Initiative #3 (Table 6).**
	ANMC Member	Aircraft noise	Enhance the aviation community's understanding of noise in the community and reward operators	Add a category for Float Plane operators to the Fly Quiet Awards. Include engine & propeller replacement and other technological innovations that reduce aircraft noise.		Higher profile, use in operators' promotional materials.	**The Airport Authority agrees with the Objective and proposed Task, and these will be assessed under Initiative #3 (Table 6).**
	ANMC Member	ILS Check Education & Notification.	Enhance community understanding of ILS flight checks and ensure community is aware of when these checks are to occur.				**The Airport Authority agrees with the Objective and proposed Task, and these will be assessed under Initiative #2 (Table 6).**
	ANMC Member	Reverse thrust (jets and props).	Reduce noise.	1. Continuing education program with the airlines on scheduled basis. 2. Annual audit of Jeppesen and airline company's YVR arrival procedures to ensure that their aircrews are aware of the minimum thrust requirement. 3. Record keeping of the North Runway noise monitor stats.			**The Airport Authority agrees with the Objective and proposed Task, and these will be assessed under Initiatives #3 and #9 (Table 6).**

PROPOSALS (verbatim)							Airport Authority Response to Proposed Objective and Task
Category	**Source**	**Issue**	**Objective**	**Task**	**Challenges/Trade-offs**	**Success measures**	
	ANMC Member	Provide comprehensive information about current and future flight paths into and out of the YVR airport. i.e. Introduction/use of RNAV, RNP and PBN at YVR.	Ensure any development/use of these technologies/techniques takes into consideration a balanced approach between noise emissions and green house gas emissions and that all surrounding communities are consulted with and kept informed well in advance of any changes.	Develop and implement a communication and consultation plan that will ensure all surrounding and outlying communities are involved and kept apprised of any such changes/developments and likely impacts well in advance of implementation.	I expect that under current legislation such technologies could be introduced and changes to aircraft routes made without any required consultation, environmental studies etc.	New technologies are introduced with cooperation and in a balanced approach that does not allow cost savings or green house gas emission reductions at the cost of noise emissions to communities currently either not or only minimally impacted by such noise. People should be able to readily see how when and where such changes will occur such that they can select homes away from the noise and be assured the noise will not be moved onto them at a later date.	**The Airport Authority agrees with the Objective and proposed Task, and these will be assessed under Initiatives #3 and #7 (Table 6). The Airport Authority will continue dialogue with NAV CANADA to ensure effective and timely communication about any potential changes to flight paths.**
	ANMC Member	Establish a baseline for measuring YVR Noise initiatives with other Airports.	Establish a baseline record for YVR like those in the AirBiz Noise Management Review of Best Practices.	1. Create and publish a baseline record for all noise management items that states all the noise management policies, procedures, rules, and regulations etc. that are currently in place and those which have been considered and rejected for adoption/implementation for noise management at YVR. These should also include those also in place at Nav Canada and Transport Canada governing YVR operations etc. 2. Perform a gap analysis comparing YVR to other airports we have information on.	None	A documented record of where YVR stands at this point in time with regards to other airports. Any tasks and initiatives from this point forward would be able to be compared to this document and progress measured.	**The Airport Authority agrees with the Objective and proposed Tasks, and these will be assessed under Initiative #9 (Table 6).**
	ANMC Member	Education and Awareness.	Develop an YVR noise policy with each city or community currently represented on the ANMC that clearly states what the Cities or community wants from the airport.	Create a policy that clearly defines what the Cities or communities want from the airport and include things such as: a. Support of the 24 hour unrestricted operation of the airport or support of restricted night time operations. b. Support of the current imposed north runway restriction or easing of the restriction even when traffic is below capacity. c. That emission reduction from aircraft is more important than noise reduction or that noise reduction is more important than emission and cost reductions for the operators. d. The economic viability of the airport and the carriers are important to them or noise reduction is most important at any cost.			**The Airport Authority agrees with the Objective and proposed Tasks, and these will be assessed under Initiative #5 (Table 6).**

PROPOSALS (verbatim)							Airport Authority Response to Proposed Objective and Task
Category	**Source**	**Issue**	**Objective**	**Task**	**Challenges/Trade-offs**	**Success measures**	
	General Community			▪ Do your best to ensure that prospective homeowners in the area are aware of the noise level they are agreeing to live with. ▪ Work with the city to advise which new communities being built will be affected by aircraft noise and advise buyers of the potential noise hazard before they buy. ▪ Establish noise attenuation ordinances for residences and businesses at reasonable noise contour DNL levels and notifications to home buyers moving into areas for which the authority receives complaints.			▪ **To be assessed under Initiative #1 (Table 6)**
				▪ Have some sort of complaint program in place where a person can expect to have their concerns addressed in a timely manner. ▪ The concerns of residents outside the 10nm need to be considered. An answer that noise complaints do not break any regulations does not alleviate noise concerns.			▪ **No major change to the current Airport Authority complaint management protocol is forthcoming. Concerns are investigated and the Airport Authority will respond to provide relevant information available. Complaints about noise and annoyance do not constitute a regulatory infraction.**
				▪ Consult with potentially affected communities PRIOR to changing flight paths. Consider noise impact on communities outside the 10 nm limit. Forward complaints from outside the 10 nm limit that were registered on WebTrak to Transport Canada for their consideration. ▪ Flight paths should not be changed without public input.			▪ **To be assessed under Initiatives #3 and #7 (Table 6).**
				▪ The VAA is not transparent when it comes to managing aircraft noise. The noise management meetings are held behind closed doors, minutes are not publicly available and, overall, shuts people out who raise noise concerns, even if positive options are given. A better way would be to open the process to people who are willing to provide constructive alternatives to 'business as usual' mantra, especially for people affected by night time flights.			▪ **Minutes from the YVR Aeronautical Noise Management Committee meetings are posted on www.yvr.ca.** ▪ **While there are procedures to mitigate noise at night, YVR is a 24-hour airport to serve the needs and demands of the community.**
NORTH RUNWAY OPERATIONS	ANMC Member	Use of the north runway for departures to reduce delay.		1. Compare the delay threshold (peak period) of 4 minutes as the trigger point for use of the north runway for departures, to other major airports. 2. Hold departing aircraft at the gate or to a push back hold area to the rear of the gate until the immediate departure congestion diminishes. 3. First divert light and turbo prop aircraft to the North Runway for departures during peak periods before directing the heavier jets. 4. Implement a slot control program that takes into account departing airline schedules with the object of avoiding peak period congestion.			**The Airport Authority agrees with the Objective and will assess the proposed Tasks under Initiative #10 (Table 6).**
	ANMC Member	The restricted use of runway 08L - 26R for take-off when traffic demand is below capacity limits.	The objective is to quantify the environmental costs associated with the current 08L – 26R restriction.	Quantify the addition environmental costs associated with restricting aircraft take-offs on 08L – 26R when traffic demand is below capacity limits. The costs would include emissions resulting from increased fuel burn. This will include looking at taxi times, ground holds, any increase in track distance depending upon direction of flight, etc.	There would be no trade-off associated with quantification of the costs. A challenge would be to ensure accurate data is obtained.	A tabulation of the environmental costs, the publication of the results both by YVR and by NACC as part of Canada's Action Plan to Reduce Greenhouse Gas Emissions from Aviation.	**The Airport Authority agrees with the Objective and will assess the proposed Tasks under Initiative #10 (Table 6).**

PROPOSALS (verbatim)							Airport Authority Response to Proposed Objective and Task
Category	**Source**	**Issue**	**Objective**	**Task**	**Challenges/Trade-offs**	**Success measures**	
	General Community			▪ Ensure North Runway only used for arrivals and strictly monitor use of reverse thrust. ▪ North runway operations should take the Bridgeport neighbourhood into consideration before take-offs are authorized in non-emergency situations simply to minimize Eastward flight fuel economy.			**The Airport Authority continues to operate the north runway in accordance with Minister of Transports operating commitments.**
MARGINALLY COMPLIANT CHAPTER 3 AIRCRAFT	ANMC Member	Noise complaints regarding Marginally compliant Chapter 3 Aircraft.	Prevent any increase in the use/operation of marginally compliant chapter 3 aircraft into and out of Vancouver Airport.	1. Revise approval etc. procedures, rules/regulations to Restrict carriers/operators from operating new and /or additional services with marginally compliant chapter 3 aircraft. 2. Look at applying Chapter 3 aircraft restrictions based on engine bypass ratio.	Operators could take their business elsewhere if other airports/facilities are conducive and not restrictive.	Operators continue to use YVR and the use of marginally compliant chapter 3 aircraft is reduced or eliminated.	**The Airport Authority will not seek to introduce restrictions or controls on marginally compliant Chapter 3 jet operations. These aircraft are permitted to operate in Canada and they meet national noise and certification requirements. Any proposal to restrict these operations would be subject to process outlined in the Transport Canada Advisory Circular (AC) No. 302-002, which includes consultations, options assessment, and a comprehensive cost/benefit analysis. Such a proposal would not likely be supported by industry and would be seen by Transport Canada as being discriminatory in nature.**
	ANMC Member			▪ Eliminate older aircraft technology. ▪ Stricter regulations to keep noisier aircraft away.			
	ANMC Member	Marginally Compliant Chapter 3 jet aircraft.	Minimize noise from operation of marginally compliant Chapter 3 aircraft.	Do not permit the departure of marginally compliant Chapter 3 aircraft, on any runway, between the hours of 10PM and 6AM.			
NIGHT TIME OPERATIONS	ANMC Member	With night operations increasing at YVR introduce a Total Noise Volume (an upper limit) on noise during night operations.	As Night operations at Vancouver airport are increasing the number of noise disturbances at night increases. Restricting night operations could have a negative effect on YVR revenue. However by establishing a Total Noise Volume limit and noise quotas by operator could be an encouragement for operators to use quieter aircraft for the night operations.	Analyze feasibility of implementing a night Total Noise Volume limit and noise quota system.	Operators could take their business elsewhere if other airports/facilities are conducive and not restrictive.	Operators continue to use YVR and the night noise levels/disturbances to surrounding communities is not increased.	**The Airport Authority will not seek to introduce a 'cap' or 'limit' on night operations, as restricting night-time operations in contrary to the airport's business objective of supporting the community by being a gateway airport.** **Night-time aircraft operations currently constitute a very small percentage (less than 3%) of total annual operations at YVR; however, these operations are critical to supporting the air service demands of the community.**
	ANMC Member	Night-time noise impacts.	Reduce noise at night.	1. Summertime nighttime closure of the South Runway should be closely scrutinized, possibly to include very short openings to permit pure jet aircraft departures on 8R and 26L. The pure jet departures schedules could compressed together in order to avail themselves to the short openings. 2. The whole subject of nighttime flight departures on all runways should be reviewed on an ongoing basis with the view to appraising the value of those nighttime departing pure jet airlines to the wider community.			**A program to modify airline schedules during periods of runway maintenance will not be explored. Airline schedules are based on many factors include time zones, connecting flights, crew availability, etc.** **YVR is a 24-hour facility and will continue to support the demand of the community for air services and to support the local and regional economy.**
	General Community			▪ Eliminate airport noise after 11PM. Too many flights at night. Minimize/eliminate this activity. ▪ Restrict landing and take-offs during the night hours. ▪ Airport needs to be respectful of neighbours' concerns. Solutions may include scheduling more flights during daytime. ▪ Stop late night departures. ▪ Limiting flights at night and over-flights would definitely be a start. ▪ STOP letting fed ex or Purolator take off at 0300. Not sure how they can continuously break noise bylaws. ▪ Flying 747s low over Boundary Bay in the middle of the night is not right. ▪ Stop flying at night over residential areas. Re-route these aircraft. ▪ Late night noise after 11pm needs reduction strategy.			**YVR is a 24-hour facility. While there are a number of procedures in place to reduce noise at night, the Airport Authority will not seek to introduce additional procedures to restrict night-time operations as these operations are critical to supporting the community.**

PROPOSALS (verbatim)							Airport Authority Response to Proposed Objective and Task
Category	**Source**	**Issue**	**Objective**	**Task**	**Challenges/Trade-offs**	**Success measures**	
COMPLAINT RESPONSE	ANMC Member	Provide an improved, easier and integrated means of noise complaint reporting, analysis and response. Currently complaints can be by phone, e-mail, mail, WebTrak or CAIRS and to any one or more of Transport Canada, Nav Canada and or YVR Airport. It would appear there is no complete picture of the entire noise complaints within and beyond the 10 NM of YVR.	Apply process improvement/reengineering techniques to the noise management process, procedures and data collection to provide an integrated all inclusive approach to noise complaint reporting, analysis and response for the greater Vancouver Area.	Review and document existing procedures. Identify gaps, overlaps and areas for simplification and improvement. Establish and publish comprehensive and integrated process, procedures and data collection including noise Such an initiative would require the cooperation and participation of YVR Airport, Transport Canada and Nav Canada. Providing the complete picture may require one participant compile data and produce reports etc. that is outside the scope of their responsibility. Issue escalation.	Such an initiative would require the cooperation and participation of YVR Airport, Transport Canada and Nav Canada. Providing the complete picture may require one participant compile data and produce reports etc. that is outside the scope of their responsibility.	A simplified process for reporting noise Complaints and an all-inclusive Quarterly/annual report of same.	**The Airport Authority agrees with the Objective of providing a high level of response and information to residents concerned about aircraft noise and will assess the proposed Tasks under Initiative # 3 (Table 6).** **However, complaints or reports of suspected regulatory infractions that require Transport Canada's attention must be registered through the Civil Aviation Issues Reporting System (CAIRS). This system is used to track issues on a national basis and there are no plans to merge the complaint handling system used by YVR with CAIRS.**
PERFORMANCE BASED NAVIGATION	ANMC Member	Aircraft noise	Reduced aircraft noise during departure and arrival phases of flight	Partner with Airline operators that fly into YVR to encourage NAV CANADA to move to optimized, departure and descent profiles using PBN and eliminating—where possible—leveling off during climbs and descents. Seek stakeholder status and early involvement for YVR's Noise & Environment group.	Re-organization of airspace is a complex, expensive task requiring extensive stakeholder involvement. Also, while overall noise may be reduced, some communities that do not currently experience aircraft noise may come to do so	Reduction in overall aircraft noise and numbers of complaints.	**The Airport Authority agrees with the Objective of seeking ways to reduce noise from flight operations and the Task will assessed under Initiatives #7 and #9 (Table 6).**
	ANMC Member	Aircraft noise from departures off runways 08L, 08R, 26R and 26L.	The objective is to lower emissions and noise through development and implementation of more efficient PBN-based departures at YVR for the four runways.	The development and implementation of PBN-based departures at YVR's four runways. This will include the review and evaluation of altitudes when turns can be commenced, degree of turns, aircraft destination, RNAV departure routes or vectors, aircraft altitude over residential communities, etc.	The major challenge is to have Nav Canada implement revised PBN-based flight departures for each runway. There may be a trade-off associated with lower emissions, resulting from fuel savings, and public reaction to seeing aircraft over areas where there may not have been aircraft before.	The publication and use of the PBN-based departures from the four runways.	**The Airport Authority agrees with the Objective of seeking ways to reduce noise from flight operations and the Task will assessed under Initiatives #7 and #9 (Table 6).**
	ANMC Member	Aircraft approach noise for runways 08L, 08R, 26R and 26L.	The objective is to lower emissions and noise through constant angle descent approaches with engine power at idle or near idle using the precise, repeatable and predictable curved paths of RNP AR procedures.	The development and implementation of RNP based approaches at YVR for the four runways.	The major challenge is to have Nav Canada implement RNP-AR flight procedures for each runway and obtain Transport Canada approval. There are no trade-offs as this is a "win-win" situation, low approach noise and lower emissions.	The publication and use of the RNP based approaches for the four runways.	**The Airport Authority agrees with the Objective of seeking ways to reduce noise from flight operations and the Task will assessed under Initiatives #7 and #9 (Table 6).**

PROPOSALS (verbatim)							Airport Authority Response to Proposed Objective and Task
Category	**Source**	**Issue**	**Objective**	**Task**	**Challenges/Trade-offs**	**Success measures**	
GENERAL COMMENTS	Community Survey			▪ Support for finding noise reduction technology. ▪ My only concern that whatever is done that consideration is always given to how it's going to impact those living under the noise. ▪ The noise really bugs me. ▪ I have been to Richmond and the aircraft are very loud. The only thing YVR is concerned about is getting the aircraft in as soon as possible no matter how loud the planes are to the surrounding communities. ▪ I do not have any. The airport is where it is. Communities surrounding the airport for the most part came after the airport was built. The airport is an important part of our community and will be there for a long time. It is something we have to live with. ▪ I live 10 minutes away from the airport and I can still hear the airplanes taking off and landing. ▪ Improvements in this area would be nice but other efficiencies as in fuel consumption and safety have a far greater impact. As to the community, increased traffic at YVR does have an impact. Initially, residents bought with the knowledge you were neighbours, on the other side though, it is a good corporate citizen that does not take advantage and gives back in some way. ▪ Aircraft noise that occurs frequently can disrupt people's peace of mind. However, I want the Vancouver Airport Authority to find a solution to address this issue OTHER than reducing the number of aircraft flying through Vancouver airspace. ▪ I think if there are plans to do something that creates noise where it did not exist before, people affected should be compensated if there is no way to counteract the problem for them. ▪ The noise disturbs animals as much as, or more than it does humans. This should be taken into consideration when planning take-off and landing patterns. ▪ Aircraft movements should not be too restricted as this would increase costs too much. ▪ Nothing. The airlines are operating the quietest aircraft now. They should tell the committees to stop whining and suck it up! ▪ I like the current approach configuration over Mud Bay, but too any planes break the rules as the fines are not enough. ▪ Nav Canada's top priority is to serve the airline industry. They set air routes without proper consultation with the public. The Vancouver Airport Authority should seek more power to control what Nav Canada does. ▪ I do live within ear shot of the airport and I don't think that there is much that can be done to keep the noise down. Get used to it or move. ▪ Stop the constant, long term, summer runway improvements... let us sleep. ▪ If you are truly a community airport, think about your neighbours before you increase flights just to increase revenue... not every new flight has to come to North America through Vancouver. ▪ False Creek has an increasing number of low flights and safety is a concern. ▪ There is an absence of an NMT in False Creek. ▪ Talk to False Creek community about aircraft noise. ▪ WebTrak does not address cumulative exposure.			**These are mostly general statements and views, no response can be provided by the Airport Authority.**

APPENDIX 6

Summary of Accomplishments 2009-2013 YVR Noise Management Plan

The 2009-2013 YVR Noise Management Plan identified 16 initiatives aimed at advancing noise management efforts at YVR. The Airport Authority completed many of these initiatives in collaboration with the YVR Aeronautical Noise Management Committee (ANMC) and other key stakeholders. Detailed work progress on initiatives is summarized in annual noise reports found on the YVR website (www.yvr.ca), and the summary presented in this appendix is meant only to provide a high level overview and highlights of work.

No.	Initiative	Initiative		Summary and highlights of completed actions
1	Night-time Operations	1.1	Review current guidelines for granting approval for operations for jet aircraft between the hours of mid-night and 0700 local.	▪ The Airport Authority completed a detailed study of the current nature of night-time operations, and a review of its guidelines for approving operations at night. Based on this work, the current guideline for approving night-time flights will remain the same – flights carrying passenger and cargo to and from YVR are approved, and ferry (repositioning) and technical (refueling) flights will generally be denied. This will ensure that night-time operations at YVR will continue to provide broad economic value to the community. ▪ Consultations were completed with the ANMC, airlines, and industry stakeholders on proposed amendments to the YVR Noise Abatement Procedures. The proposed amendments would clarify existing procedures and align the YVR Noise Abatement Procedures with internal airport directives and procedures. The proposed amendments were submitted to Transport Canada in fall 2013 for their review.
		1.2	Prepare a study assessing the impacts of extending the current prior approval requirement for jet operations between the hours of mid-night to 0700 local to all aircraft.	▪ A detailed study assessing the number of aircraft, type of aircraft and the frequency of night-time operations at YVR was completed. Based on results of this study, the plan to seek including propeller aircraft in the prior approval requirement process was not acted on due to the limited number of propeller aircraft operating at night, the nature of the operations, and the low number of complaints associated with night-time propeller operations.
		1.3	Explore the feasibility of developing a night-time Standard Instrument Departure (SID) procedure for aircraft on westerly routes departing runway 08.	▪ A request was submitted to NAV CANADA to develop night-time SIDs to minimize over-flights of populated areas. These procedures are currently under consideration by NAV CANAD and development will occur as resources become available.
2	Capacity and Delay Reduction	2.1	Support and work with NAV CANADA during the implementation of Area Navigation (RNAV) and Required Navigation Performance (RNP) procedures in an effort to minimize over-flights of populated areas where possible.	▪ This initiative was deferred to the 2014-2019 YVR Noise Management Plan.
		2.2	Support Transport Canada in their project to replace the current Vertical Noise Abatement Procedures with Noise Abatement Departure Procedures.	▪ This work was completed, and the Noise Abatement Departure Procedures (NADP) replaced the Vertical Noise Abatement Procedures (VNAP) in May 2011.

No.	Initiative	Initiative		Summary and highlights of completed actions
		2.3	Explore the use of de-rated thrust take-off procedures.	▪ This work was completed, and reduced thrust take-off procedures are used almost exclusively by all major airlines as this has associated benefits reducing engine wear and fuel burn in addition to reducing noise.
3	Demand Management	3.1	Develop scope of work and undertake an airside capacity study to assess various demand management strategies to conserve YVR's airside capacity.	▪ This initiative was deferred to the 2014-2019 YVR Noise Management Plan.
4	Run-ups	4.1	Assess engineering noise control measures for propeller engine run-ups and build a dedicated run-up facility of propeller aircraft if feasible.	▪ A study of run-up operations and means to further mitigate noise from this activity was completed. Based on the results of this study, the Airport Authority decided to construct a dedicated ground run-up enclosure (GRE) for propeller aircraft maintained on the south side of the airport. Construction began in 2011, and the facility was opened in January 2012.
		4.4	Assess further restriction on run-up activities - hours / duration.	▪ Completed. A number of options to further minimize noise from engine run-ups were identified and evaluated as part of work on initiative 4.1, including the construction of a GRE. Run-ups are currently controlled using airside directives and procedures, and no additional restrictions will be implemented as these have a significant impact on the ability of operators to maintain their aircraft and meet the demands of operational service.
5	ILS Flight Inspections	5.1	Develop education and awareness web material explaining the ILS system and required flight inspections.	▪ Completed. Background information on ILS flight checks and notification of upcoming testing to advise the community about this unusual activity is provided on the YVR website.
6	Float Plane Overflights	6.1	Develop education and awareness web material explaining over-flight routes and encourage Transport Canada to address these non-YVR operations.	▪ Completed. Background information on air routings and airspace is provided on the YVR website, and Transport Canada has established protocols for receiving community concerns through the Civil Aviation Issues Reporting System (CAIRS).
7	Float Plane Operations	7.1	Enhance education and awareness of community issues through regular meetings with the float plane operators.	▪ The Airport Authority hosted regular meetings with the YVR float plane operators to discuss community noise issues. ▪ Operational best practices for YVR river operations were identified and communications materials developed in consultation with the operators. ▪ The ANMC membership was expanded to include a member from the Floatplane Operators Association.
		7.2	Create "preferred" arrival and departure routes for the Fraser River, monitor use, and report to operators.	▪ Preferential arrival and departures routes for the Fraser River were identified with input from operators. The preferred routes are not mandatory; however, more than 90% of operations follow the routes based on a review of peak operations during the summer.
		7.3	Review and assess voluntary restrictions on float plane operations, (e.g., 2 vs. 3-bladed propeller, time of day).	▪ Introducing a restriction on 2-bladed aircraft was not acted on as the number of these operations at YVR is very low, and the industry trend is to replace 2-bladed propellers with 3-bladed propellers due to more efficient engine operation. ▪ Restricting the hours of operation for YVR float plane operations was not acted on as less 1% of the operations occur before 7:00AM. These early morning operations are typically departures by aircraft repositioning to Vancouver Harbour after overnighting at YVR for maintenance.

No.	Initiative	Initiative		Summary and highlights of completed actions
8	Education and Awareness-Industry	8.1	Develop a training module on noise management for flight schools to raise the awareness of noise issues within the pilot community.	This initiative was deferred to the 2014-2019 YVR Noise Management Plan.
9	Land Use Planning	9.1	Develop material for the web that provides clear concise information for areas affected by aircraft noise. Link this to municipal websites.	This initiative was deferred to the 2014-2019 YVR Noise Management Plan.
		9.2	Support and encourage municipalities to prohibit new residential development in high noise areas. Encourage municipalities to implement covenants, notification, and insulation standards should they permit developments in high noise areas.	Ongoing. The Airport Authority regularly reviews development proposals and provides comments to discourage sensitive developments in high noise areas. The City of Richmond continues to apply requirements of sound insulation, covenants, and notifications on developments in high noise areas as part of their Aircraft Noise Sensitive Development Policy.
10	Noise Abatement Procedures	10.1	Undertake annual review of published procedures with the aim of continual improvement.	Annual reviews of the published Noise Abatement Procedures were completed.
11	Noise Monitoring Terminal Network	11.1	Undertake a regular review of the Noise Monitoring Terminal network to determine if additional terminals are required.	A review of the noise monitoring terminal (NMT) network was completed in 2012 by Landrum & Brown. Recommendations include insuring appropriate microphone heights at six of the NMT locations, as well as to evaluate relocating two NMTs due to redundancy with other sites.
12	Portable Noise Monitoring	12.1	Perform routine monitoring using the portable Noise Monitoring Terminal and report publically on the monitoring results.	The portable NMT was deployed five times between 2009 and 2013. Locations included Delta, South Surrey, Vancouver and North Surrey. Reports from monitoring are posted on the YVR website.
13	Airport Noise and Operations Monitoring System	13.1	Explore the use of WebTrak and other web-based tools to enhance information exchange with the community.	WebTrak, a community based flight tracking and noise monitoring system, was introduced in 2009 and has been an effective tool for open and transparent sharing of information.
14	Communication	14.1	Review the Terms of Reference for the YVR Aeronautical Noise Management Committee	A review of ANMC functions was completed in 2012 to ensure that discussions remain relevant.
		14.2	Increase use of the web to provide information and updates on noise management activities.	YVR website is now used to post information related to notifications of planned irregular operations such as runway closures, use of the north runway for departures during peak times, flight inspections, and public information sessions. Minutes from ANMC meetings can also be found on the YVR website.
		14.3	Prepare and publish regular web-based noise monitoring reports.	Annual noise management reports are prepared posted on the YVR website.
		14.4	Develop and trial a community liaison program.	A community Noise Information Seminar Program was developed with input from members of the ANMC. These seminars were offered starting in 2010 and provide an opportunity for the community to learn about noise management activities at YVR. Registration information on the seminars is posted on the YVR website.

No.	Initiative	Initiative		Summary and highlights of completed actions
15	Aircraft Technology	15.1	Provide input through national (Aircraft Noise & Emissions Committee) and international (Airports Council International) groups to promote increased noise certification standards and lobby for phase out of older noisier Chapter III aircraft.	The Airport Authority worked with the Canadian Airports Council and other member airports to develop a position supporting the review of phasing out marginally compliant Chapter III aircraft from operations in Canada. This position was outlined in a letter provided to Transport Canada in advance of the CAEP/9 meeting.
16	Roles and Responsibilities	16.1	Meet with NAV CANADA, Transport Canada, and local Cities to develop detailed work plans to implement initiatives identified in the Noise Management Plan.	Completed and ongoing. Meetings are held with key stakeholders at the beginning of each year to discuss and coordinate noise management activities.
		16.2	Clarify roles and responsibilities between Airport Authority, Transport Canada, and NAV CANADA regarding noise management activities.	Completed and ongoing. Meeting and discussions were held with Transport Canada and NAV CANADA to coordinate noise management activities.