



# City of Richmond

## Report to Committee

**To:** General Purposes Committee **Date:** December 16, 2014  
**From:** Victor Wei, P. Eng. **File:** 01-0153-04-01/2014-  
 Director, Transportation Vol 01  
**Re:** **2014 Report from City Citizen Representatives to the Vancouver International  
 Airport Aeronautical Noise Management Committee (YVR ANMC)**

### Staff Recommendation

1. That the Vancouver Airport Authority be requested to explore the feasibility of publicizing and providing training for Richmond residents in the use of WebTrak to register airport noise complaints per the recommendation of the City's citizen representatives to the YVR ANMC outlined in Attachment 1.
2. That staff be directed to provide a status update on the above recommendation as part of the annual reporting process in 2015.

Victor Wei, P. Eng.  
 Director, Transportation  
 (604-276-4131)

Att. 3

REPORT CONCURRENCE		
<b>ROUTED TO:</b>	<b>CONCURRENCE</b>	<b>CONCURRENCE OF GENERAL MANAGER</b>
Policy Planning	<input checked="" type="checkbox"/>	
<b>REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE</b>	<b>INITIALS:</b> 	<b>APPROVED BY CAO</b> 

## Staff Report

### Origin

As directed by Council, the City's two citizen appointees to the YVR ANMC provide annual updates directly to the General Purposes Committee on agenda items discussed at the YVR ANMC meetings. This report provides the 2014 update through a status report prepared by the City's appointees to the YVR ANMC (Attachment 1).

### Analysis

The YVR ANMC continues to achieve good participation from all cities and agencies and provides the opportunity for insightful discussions on a wide range of aeronautical noise-related topics as well as continued educational tours to enhance members' understanding of airport operations. The attached status report from the citizen appointees provides a comprehensive summary of the key agenda items discussed at Committee meetings held between December 2013 and October 2014; staff also provide the following supplemental comments on items not mentioned in their summary.

#### Update of 5-Year Noise Management Plan (2014-2018)

The City provided comments on the first draft of the Noise Management Plan (NMP) through a separate report presented at the November 25, 2013 Council meeting. Vancouver Airport Authority (VAA) staff then prepared a second draft of the Plan to address, where possible, comments received from all stakeholders including the City. That version was presented on December 12, 2013 to the VAA Board of Directors, who provided their final approval. The Plan was then submitted to Transport Canada where it is awaiting approval by the Minister of Transport, which is anticipated in early 2015. While the Plan has not yet been publicly released, VAA staff have advised that the City's comments were addressed as summarized in Table 1.

**Table 1: Summary of VAA Responses to City Comments on Draft NMP**

City Comment on Draft NMP	VAA Response
Indicate how the previous 2009-2013 YVR Noise Management Plan has been implemented and any outstanding initiatives	An appendix was added summarizing work on the 2009-2013 YVR Noise Management Plan.
Clarify the purpose, rationale, expected benefits, priority and timing of each proposed Plan initiative over the coming five-year period	Each initiative includes a specific objective statement that speaks to the purpose and rationale. Additional text was added that describes how VAA will meet with key stakeholders to create annual work plans to address the initiatives, and report on the results to the YVR ANMC and in the annual aeronautical noise management report.
Identify the air travel growth scenario used to prepare the proposed Plan	VAA will be reassessing traffic growth forecasts as part of the upcoming Airport Master Plan review. The findings of this work will inform the growth scenario to be used when assessing the applicability of the current 2015 long term planning Noise Exposure Forecast (NEF) Contour.

Upon receiving Ministry approval, VAA will publicly release the document and respond to all written comments provided on the first draft of the Plan.

While the Plan has not yet been formally approved, VAA initiated work in 2014 on some of the actions identified in the NMP as described below.

- *Noise Management Home Buyer & Owner Guide*: A focus area of the draft 2014-2018 NMP is enhancing community awareness of 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. Within this category, a specific initiative is the development of a brochure to help educate new homebuyers and provide existing homeowners with suggestions on how to sound insulate older homes. While the new brochure is intended for residents of all municipalities in the region impacted by aircraft noise, VAA staff consulted with the City's citizen representatives as well as City staff during the development of the brochure (see Attachment 2 for the final draft). The guide will be posted on YVR's website in early 2015 as an on-line resource for new home buyers and existing home owners.
- *Engagement with Aviation Stakeholders*: A complementary focus area is enhancing industry awareness via engagement with aviation stakeholders to improve noise management activities. To this end, VAA hosted regular meetings throughout 2014 with Transport Canada and other major airports in Canada to exchange information on noise management opportunities, discuss roles and responsibilities, and coordinate response on national issues.

Anticipated initiatives in 2015 include a review of the existing engine run-up procedures and directives with a focus on optimizing noise reduction opportunities at all non-Ground Run-up Enclosure (GRE) locations. VAA staff will work with the YVR ANMC to develop a scope of work for this project.

#### Runway End Safety Area (RESA)

In anticipation of the enactment of a Canadian standard within the next few years, VAA is proactively planning to construct RESAs for its three runways (north, south and crosswind) that will meet existing international safety recommendations. Following these best practices, the length of each RESA (300 m with widened shoulders) will exceed the anticipated Canadian standard of 150 m. Construction will occur on the south and crosswind runways first due to relatively simpler operational, environmental and financial factors. The preferred options do not impact the foreshore and maintain existing runway lengths (i.e., no extension of the takeoff and landing distances).

Modelling results by VAA indicate that there may be a negligible increase in noise levels for some areas of Burkeville, as a limited number of larger aircraft taking off to the west may begin their takeoff roll where the new pavement will be added for the RESA at the eastern end of the south runway, which would bring those aircraft approximately 200 m closer to the Burkeville area. The estimated increase in noise level is three decibels, which is imperceptible to humans, and operational procedures such as the use of reduced thrust will help mitigate noise exposure. This increased noise level would still be lower than what Burkeville residents currently experience for takeoffs to the east; these latter noise levels will not change. On-going noise impacts will be monitored via VAA's network of Noise Monitoring Terminals throughout the community.

Consultation commenced in early September 2014 and included:

- presentations to YVR's Environmental Advisory and Noise Management Committees;
- small meetings with stakeholder groups including City staff, community associations and agricultural, environmental, business, and tourism organizations/committees; and

- an open house and on-line survey for the general public.

Construction is scheduled to occur during the summer months commencing in 2015 for both ends of the crosswind runway and the west end of the south runway. The east end of the south runway will require preload from Winter 2015 to Spring 2016, with construction occurring in Summer 2016 and 2017. Planning for RESAs on the north runway is currently in the early stages and consultation with the public and stakeholders will occur when more information is available.

The above information was also summarized in a staff memorandum to Council dated September 30, 2014 (see Attachment 3).

**2014 Aeronautical Noise Management – Summary Report**

In 2014, YVR received a total 1,695 noise concerns from 278 individuals across Metro Vancouver, which is a 31 per cent increase in concerns but no change in the number of complainants over 2013 (see Chart 1). The increase in concerns is attributed primarily to three individuals (one each in South Surrey, South Delta and Richmond) who together submitted 66 per cent of all noise concerns in 2014 (i.e., 1,122 concerns).

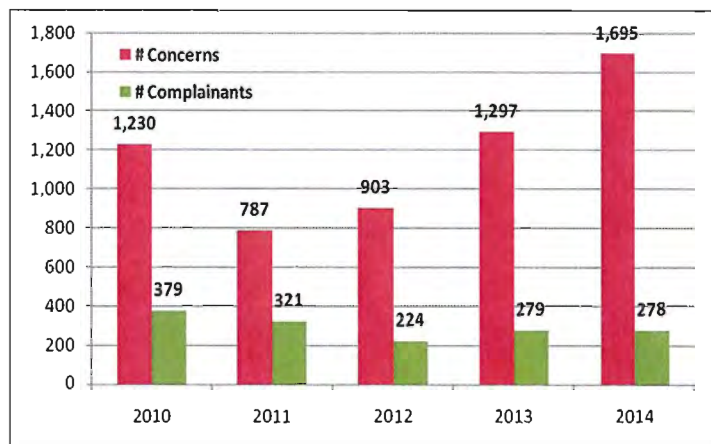


Chart 1: Total Number of Region-wide Noise Concerns and Complainants

The individual in Richmond resides adjacent to the float plane route and registered 130 concerns in 2014 (42 per cent of all Richmond-related concerns), which is a decrease from the 225 concerns registered by the same individual in 2013 (see Chart 2). While the total number of Richmond-related concerns fell from 376 in 2013 to 306 in 2014 (19 per cent decrease), the number of complainants residing in Richmond increased marginally from 87 in 2013 to 92 in 2014 (six per cent increase).

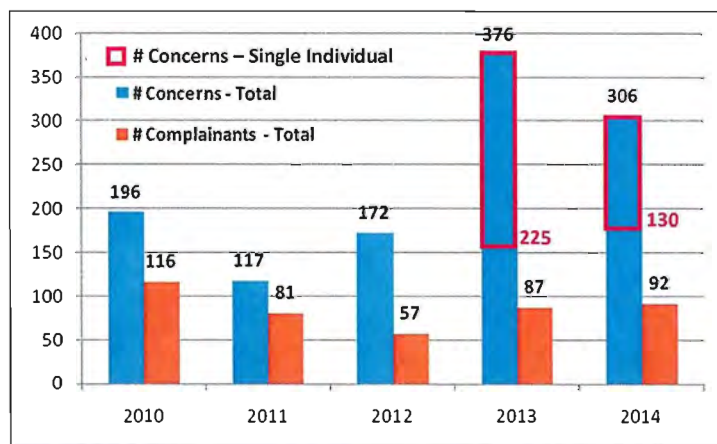


Chart 2: Total Number of Richmond-Related Noise Concerns and Complainants

When the concerns from the single individual are excluded for 2013 and 2014, the remaining number of Richmond-related concerns registered in 2014 is 176, which is a 17 per cent increase from the balance of 151 concerns received in 2013 and in line with the general trend over the past several years. Note that the status report from the City’s appointees to the YVR ANMC summarizes noise concerns received for the first three quarters of 2014 (i.e., January through September).

Based on data up to the end of 2013, there is growing use of WebTrak to register concerns (e.g., in 2013, 63 per cent of concerns were received via WebTrak versus an average of 44 per cent over the 2010-2012 period). WebTrak is a web-based tool on YVR's website that allows the public to view 'real-time' and historical flight and noise data, and allows citizens to register concerns about particular aircraft or aviation in their community. The increase in concerns registered via this medium suggests that residents are becoming more aware of the tool.

Of those concerns received from Richmond residents, the operational concerns identified include float plane operations as noted above followed by take-offs and engine run-ups. The number of concerns related to run-ups has decreased in correlation with the opening of the GRE.

#### Outcome of 2013 Recommendations of the City Appointees to the YVR ANMC

The citizen representatives recommended that the City consider partnering with the VAA on its *Fly Quiet Awards* to show the City's appreciation of the aviation community's commitment to being good neighbours. These awards are presented at the annual YVR Chief Pilot's Meeting to the airlines that are not in violation of noise abatement procedures, have the lowest average noise level and fly regularly at YVR. The awards now feature the City's heron logo so that airline operators are aware that the City recognizes and appreciates their efforts to minimize aeronautical noise impacts on the surrounding community.

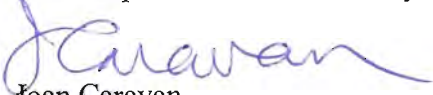
#### **Financial Impact**

None.

#### **Conclusion**

The City's citizen representatives to the YVR ANMC continue to uphold Richmond's profile at the Committee and both contribute positively to discussions. Staff support the recommendation identified in the status report (i.e., publicize and provide training for residents in the use of WebTrak to register airport noise complaints) and recommend that its feasibility be explored with the Vancouver Airport Authority. Staff would provide an update on the status of the initiative as part of the annual report back in 2015.

The YVR ANMC remains a valuable forum for addressing aeronautical noise impacts on Richmond. The provision of input regarding action items to support VAA's new *2014-2018 Noise Management Plan* will be an opportunity for the City and the City's representatives to the YVR ANMC to ensure that the initiatives are consistent with a goal of minimizing aeronautical noise impacts to the community and enhancing residents' quality of life.



Joan Caravan  
Transportation Planner  
(604-276-4035)

- Att. 1: 2014 Status Report: YVR Aeronautical Noise Management Committee
- 2: Noise Management Home Buyer & Owner Guide
- 3: Memorandum to Council re YVR RESAs

**Date:** November 17, 2014

**To:** City of Richmond General Purposes Committee

**From:** Margot Spronk, City of Richmond Citizen YVR ANMC Representative  
Donald Flintoff, City of Richmond Citizen YVR ANMC Representative

## **2014 Status Report: YVR Aeronautical Noise Management Committee**

### **City Appointees**

The 2013/14 term is the third Airport Noise Management Committee (ANMC) appointment for Margot Spronk. Margot was previously NAV CANADA's General Manager for the Vancouver Flight Information Region, and worked as an air traffic controller at the Vancouver Area Control Centre. Margot lives in Steveston.

Donald Flintoff was appointed to the VANMC in January 2013 for a two-year term. Donald brings his experience as a consulting engineer to the table. Currently Donald is the Senior Electrical Engineer for the British Columbia Utilities Commission, has lived in Richmond since 1975, and currently lives in the Thompson area since 1988.

### **Past Year at the YVR Aeronautical Noise Management Committee**

Since our last report, the ANMC met 3 times: December 4, 2013, April 30, 2014 and October 15, 2014.

### **Highlights**

#### **Floatplane Operations**

Don Flintoff raised concerns about YVR floatplane operations at the ANMC meeting in April 2014. He had four questions that were answered by YVR at the October ANMC meeting.

- Q: Could the flight path be changed to minimize noise?  
A: No changes can be accommodated due to proximity of flight paths for the south runway
- Q: Could altitudes be increased to 1500' or above?  
A: No, due to conflicts with aircraft operating on south runway
- Q: Could further noise impact studies be conducted?  
A: The Airport Authority is open to additional monitoring in the area. Monitoring aids in understanding the contribution of aircraft noise, but does not drive compliance, enforcement or changes to routes or procedures.
- Q: Could Wide Area Augmentation System (WAAS) be implemented to eliminate low flying in bad weather?  
A: State of the art radar surveillance is employed at YVR. Floatplanes operate under VFR (Visual Flight Rules) which require aircraft to navigate and avoid obstacles and other aircraft visually and with reference to the ground. As weather degrades, the only option is to fly lower.

The Airport Authority has also provided a letter documenting their responses to the City.

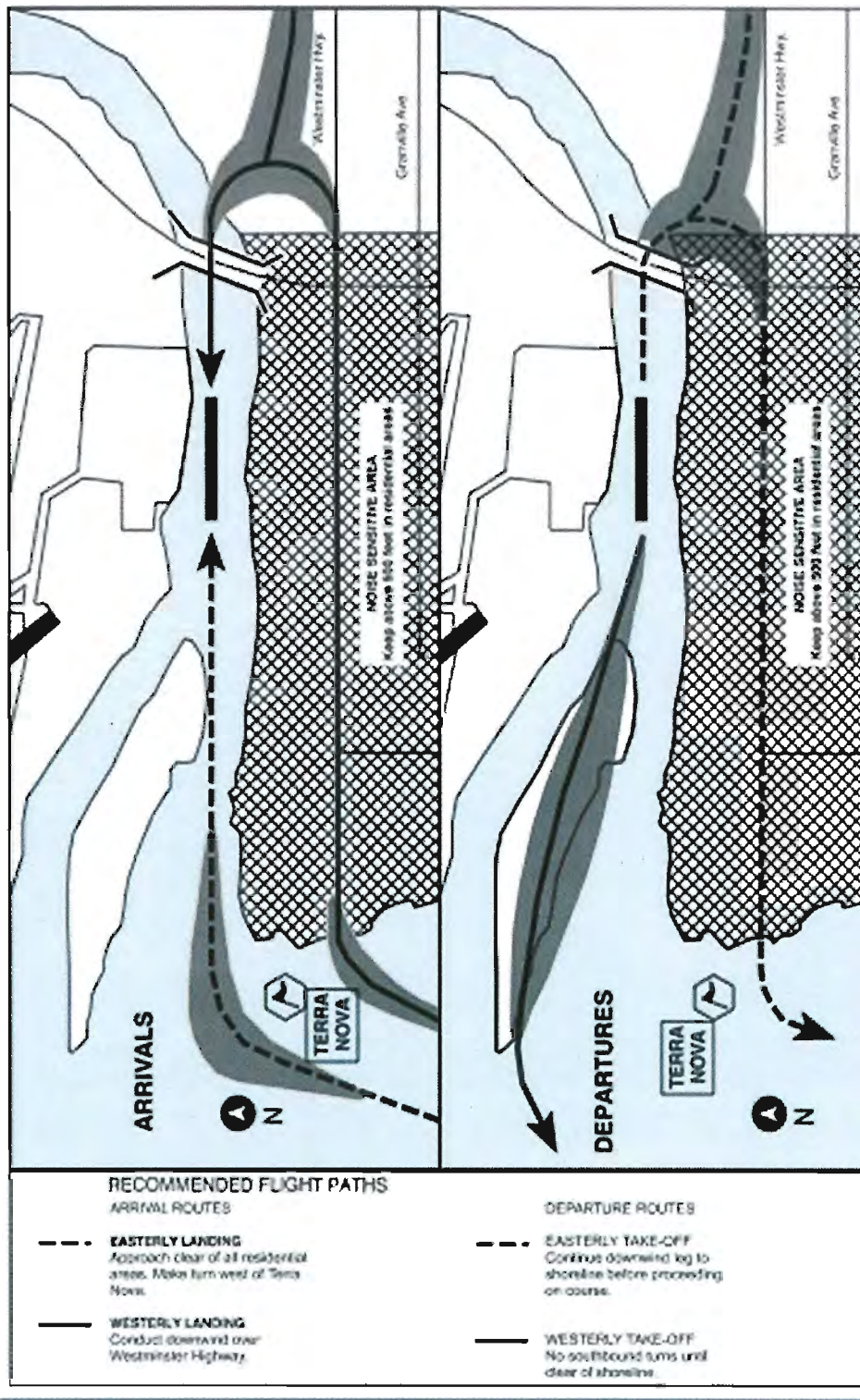
Excerpts from the current Water Aerodrome Supplement related to float plane operations at YVR are shown below.

CANADA WATER AERODROME SUPPLEMENT

Effective 0901Z 7 March 2013 to 0901Z 3 April 2014

AERODROME/FACILITY DIRECTORY B237

VANCOUVER INTL CAM9 VFR TERMINAL PROCEDURES CHART



## CANADA WATER AERODROME SUPPLEMENT

Effective 0901Z 7 March 2013 to 0901Z 3 April 2014

AERODROME/FACILITY DIRECTORY B239

## VANCOUVER INTL BC (Cont'd)

CAM9

<b>PRO</b>	<p><b>AIRSPACE:</b> See VTA chart for VFR rtes &amp; pro. Class "C" Airspace &amp; CZ: Transponder rqrd.</p> <p><b>ARR/DEP:</b> See Vancouver Intl CAM9 VTPC. Downwind flt alt not below 500' ASL over populated area to the S. Westbound dep keep clear of S shore noise sensitive area. Dep rstd til 0630 hr lcl O/T PPR from YVR Ops 604-207-7022. At low tide use river slightly N of centre of river.</p> <p><b>NOISE ABATEMENT:</b> Consistent with safe acft ops, the following are recommended operational proc:  <ol style="list-style-type: none"> <li>1. Tkof Westbound and ldg Eastbound are preferred when wind and water conds permit.</li> <li>2. Use low RPM reduced noise tkof when able.</li> <li>3. Avoid dep rte that fly over the City of Richmond, whenever possible.</li> <li>4. Avoid using "reverse thrust" after ldg to slow the acft.</li> <li>5. Maintain 500 ASL when flying the Westminster Hwy downwind rte.</li> <li>6. Join the downwind circuit for the Westbound ldg after passing the TERRA NOVA checkpoint unless directed by ATC.</li> </ol> </p> <p><b>ATS REQUIREMENTS:</b> All VFR acft arriving, departing or transiting the Vancouver or Victoria Tower Class C or D airspace require a transponder code.  - All acft departing Vancouver or Victoria Intl (including Water Aerodrome) call Vancouver ACC at 888-987-2633 (866-WXBRIEF) for code assignment at least 30 minutes prior to flight or file a VFR Flight Plan/ Flight Itinerary.  - All acft arriving Vancouver, Victoria Intl (including Water Aerodrome) or transiting Vancouver or Victoria Control Zones obtain a code from one of the following ATS units; Vancouver Harbour, Nanaimo, Victoria Harbour, Boundary Bay, Langley, Abbotsford or Pitt Meadows, or call Vancouver ACC at 888-987-2633 (866-WXBRIEF)  - All acft arriving Victoria Intl from a non NAV CANADA site call Vancouver ACC at 888-987-2633 (866-WXBRIEF) at for code assignment at least 30 minutes prior to flight or file a VFR Flight Plan/ Flight Itinerary.</p>
<b>CAUTION</b>	Low lvl overflights of heli arr/dep adj land A/D. Rough water associated with strong E or W winds (1-3' swells). Debris in river. Rowers E of No. 2 Rd Bridge. Twr cranes S side of Fraser River adj Olympic Oval.

**Change in Board Chair**

Marion Town, YVR's new Director of Environment assumed chair responsibilities for the ANMC in the spring of 2014. In a recent executive level reorganization within the Airport Authority, the YVR Environment Department (and the noise management group) now report to Michael O'Brien, Corporate Secretary & VP Strategic Planning & Legal Services. Anne Murray, previous chair of the ANMC, is now VP of Communications & Marketing.

**2014 – 2018 Noise Management Plan**

This year should have marked the first year of the 2014-2018 YVR Noise Management Plan, which is still with Transport Canada awaiting approval. A major reason for the delay is a review of the requirement for Ministry approval of Airport Noise Management Plans.



### **RESA (Runway End Safety Area)**

RESA is an area at the end of the runway that is designed to provide an area free of objects to reduce the severity of damage to an aircraft when for example, it over runs the runway on landing. It can also facilitate the movement of emergency vehicles. Pending Transport Canada regulations will require RESA for all runways in Canada.

The Airport Authority has finalized its plans for RESAs on the South and Crosswind Runways. The project will take three years to complete. During construction, residents of Richmond and Vancouver may see some change in airport noise. Once completed, the effect on noise is expected to be negligible. There may be a small increase in single event noise levels for some areas of Burkeville. This increase may not be enough to be clearly audible to residents given the existing high noise levels in the area, but moving the start of take-off roll closer to residents, especially those at the south-west corner of Burkeville, may lead to a perceived increase in noise levels.

A community information session was held at the River Rock Casino in Richmond on September 30, 2014. Approximately 25 individuals attended the session.

Work to assess the options for RESA on the North Runway will begin in 2016.

### **Airspace Change Communications and Consultation Protocol**

A working group of various airports was organized under the Canadian Airports Council to work collaboratively with NAV CANADA and airlines on a protocol to outline when and how communications and consultation will occur during airspace or procedural changes. A final draft was sent to the Minister for review in October 2014. Approval is anticipated late 2014/early 2015. Once approved, details of the protocol will be released and shared with the Committee.

This initiative is most welcome, as it will standardize and formalize communication between all stakeholders, including communities, when airspace or procedural changes to air routes are planned.

### **Sound Insulation Brochure**

The Airport Authority has started a project to develop a Sound Insulation Brochure. The objectives of this project are to provide information on:

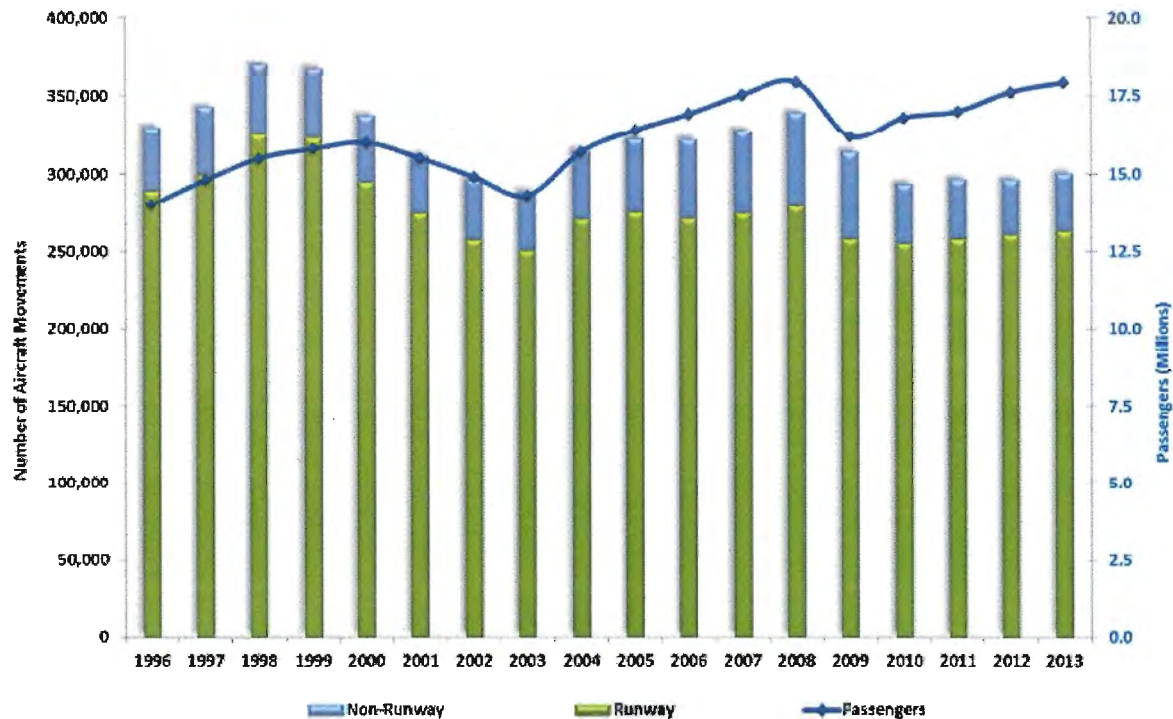
- noise exposure in areas of the City for potential home buyer;
- ways to sound insulate homes of owners of older dwellings located in high noise areas.

Consultants will be hired for the development, design and production of this brochure. Committee members will be asked for review and comment at the next ANMC meeting.

### **Vancouver Airport Statistical Trends**

Vancouver International Airport was named best airport in North America for the fifth year in a row by Skytrax. Runway operations were up 1.3% in 2013, showing traffic has fully rebounded from the 2008/2009 recession. Passenger numbers were up over 2.1%, almost doubling the runway operations increase, showing a continuing shift towards larger aircraft and higher load factors. Larger newer aircraft with higher load factors have a beneficial effect on the overall noise profile of the airport.

Figure 1: YVR Annual Aircraft Movements &amp; Passenger Statistics, 1996-2013



### Noise Characteristics of New Aircraft Design (Courtesy NACC)

- Current aircraft are 30 dB quieter, or a 90% reduction in noise footprint area, compared to original commercial jets.
- Since the 1960s, the aviation industry has cut fuel burn and CO<sub>2</sub> emissions by 70%, NO<sub>x</sub> emissions by 90% and noise by 90%.
- Already one of youngest, quietest and most efficient fleets in the world, airlines in Canada are investing more than \$20 billion over the next thirteen years in newer, more modern and quieter aircraft.
- These new aircraft are not only quieter than the aircraft they are replacing, but they are also larger and carry more passengers.
- New aircraft will be equipped for RNP procedures, meaning that more efficient routes and altitudes can be instituted. However, changing air-routes and the extreme accuracy of RNP flight may cause neighbourhoods to experience noise they hadn't before, even though the overall noise profile is reduced.

### Richmond-Specific Noise Trends

- 10 Noise Monitoring Terminals (NMTs) are located throughout Richmond. These are:

NMT	Name	Location
1	Unidentified	Privacy Issues
2	Airside Burkeville	Templeton St., Richmond
3	Lynas Lane Park	Lynas Lane & Walton Rd., Richmond
4	Tomsett Elementary	Odlin Rd. and No. 4 Rd., Richmond
5	Bath Slough	Bath Rd. & Bath Slough, Richmond
6	Outer Marker	Westminster Hwy & No. 7 Rd., Richmond
11	Bridgeport	No. 4 Rd. & Finlayson Dr., Richmond
12	West Sea Island	Airside YVR, Richmond
13	North Sea Island	Ferguson Rd., Richmond
17	Maple Lane Elementary	Alouette Dr. & Tweedsmuir Ave., Richmond

- As of the end of the third quarter of 2014, 257 noise complaints were made by 66 Richmond residents, a 28% decrease over the same period in 2013. 102 concerns were registered by one Richmond resident, mostly regarding floatplane operations.
- 147 of the 351 complaints concerned floatplane operations
- This is the second year in a row where floatplane operations have been the primary source of noise complaints for Richmond.

#### **Areas for Concentration in 2014-2015**

We will continue to monitor and contribute to the following initiatives:

- Development of a training module for flying training schools to raise awareness of noise within the pilot community.
- Comment and review the Sound Insulation Brochure
- Continue to monitor progress on Noise Task Force Recommendations.
- Provide input to Vancouver Airport Authority and City on aircraft noise mitigation.

#### **Recommendations to the General Purposes Committee**

The Vancouver Airport Authority should publicize and provide training for Richmond residents in the use of WebTrak to register airport noise complaints. Also, as WebTrak is an English only program, the Vancouver Airport Authority, concerning the demographics of the surrounding community, should provide help menus in the other prominent languages spoken in Richmond. Although this may initially increase the complaints, the accuracy of the data should also increase.

#### **Closing**

We are appreciative of the opportunity to work with the City and the Vancouver Airport Authority on the environmental noise portfolio, and look forward to helping make a difference in how airport noise is felt and perceived in Richmond as we complete our 2013/2014 term.

Sincerely,

Margot Spronk  
Donald Flintoff

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NOISE MANAGEMENT

# HOME BUYER & OWNER GUIDE



## ➤ Introduction

Vancouver International Airport ("YVR") is the second busiest airport in Canada and is open 24-hours a day to support the travel and business demands of the local region and Province. In 2013, YVR accommodated over 17.9 million passengers, and over 300,000 arrivals and take-offs. These numbers are forecasted to grow in the future to meet the community demand for increased air services.

YVR is located on Sea Island, within the City of Richmond, and is in close proximity to major urban residential developments. While YVR undertakes significant effort to mitigate noise from aircraft operations, it is practically impossible to eliminate aircraft noise exposure on residents located in high noise areas under the flight paths.

Purchasing a home is often the largest financial decision a person will make in their life. This material is aimed to help residents identify aircraft noise considerations when looking to buy a new home, and to provide existing owners with information on how to better sound insulate their home.

In 2013, YVR accommodated over

↓

17.9 million  
passengers

↓

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arrivals and take-offs

Looking for more detailed information?

Visit us online for our more in-depth technical guide

↓

NoiseManagementTechnicalGuide.pdf



## ➤ New Home Buyers

### Airport Operations & Flight Paths – 101

YVR has three runways: the south runway, the north runway, and the crosswind runway. The south runway and the north runway are used most, and the use of the crosswind runway is limited to use during high crosswind conditions, which happens very infrequently.

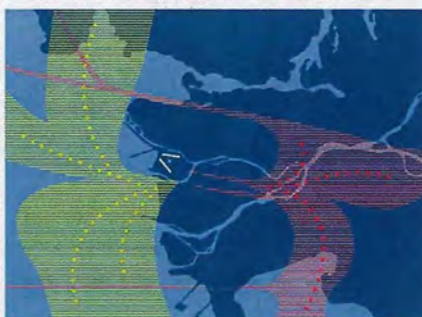
For safety reasons, landings and take-offs must occur into the wind. As such, the traffic patterns over the Lower Mainland will change based on the surface wind conditions at the airport. When the winds are from the west, take-offs will occur over the Strait of Georgia and arrivals will occur over the City. When the winds are from the east, take-offs will occur over the City and arrivals will occur over the Strait of Georgia.

#### GENERALIZED RUNWAY TRAFFIC PATTERNS ASSOCIATED WITH WIND DIRECTION

RUNWAY 08 / WINDS FROM THE EAST



RUNWAY 26 / WINDS FROM THE WEST



■ - ARRIVALS ■ - DEPARTURES

This figure is meant to illustrate how wind direction affects the direction of flights. It should not be used to assess over-flights of an area.

If you have questions about aircraft over-flights of an area you are interested in, please contact us – we are happy to discuss and provide you with custom information specific to the area.

At most airports, including YVR, aircraft often do not follow fixed flight paths. While there is consistency for some aircraft flight tracks, there is also a substantial degree of variation because the air traffic control environment is very dynamic. In many cases, air traffic controllers issue commands to move aircraft around the sky both horizontally and vertically, to ensure adequate separation is provided between aircraft. In other cases, the pilot is responsible for their own navigation using visual reference to the ground. In all cases, managing and moving aircraft in the complex airspace over the Lower Mainland is a significant challenge, and it is not possible to route aircraft away from populated areas.

In addition to aircraft operating from the runways, YVR is also home to a very busy float plane base on the Middle Arm of the Fraser River and helicopters based on the south side of the airport. The flight paths for these aircraft are often less fixed than aircraft using the surface runways and they operate at very low altitudes over communities close to the airport.

#### Home Buying Considerations – Exposure to Aircraft Noise

If you are wondering about aircraft noise when buying a home in a particular area, please consider the following:

- Noise levels in the community will vary on a daily basis, and will depend on a number of factors that influence sound propagation. These factors include: which runways are used; wind direction; air temperature; humidity; cloud cover; and temperature inversions.
- YVR is a 24-hour facility. While trying to take advantage of the Strait of Georgia by having both arrival and take-offs occur over the water during the night-time hours when traffic levels permit, in some cases, aircraft will need to land or take-off over the City due to the wind conditions.
- While all parts of the Lower Mainland are exposed to some level of aircraft over-flights, certain areas will experience a greater number of operations than others. If you are interested in learning about aircraft operations over a specific area, you can contact us and we would be pleased to provide information on the nature and level of aircraft activity.
- You can use our online flight tracking system [[provide link to YVR WebTrak](#)] to obtain a general understanding of air traffic over a particular area.
- Figure out where the home is located in relation to the extended centerline of the runways. In general, when close to the airport, these areas will be exposed to a greater number of over-flights than other areas.
- Aircraft maintenance and engine testing activities are required to keep aircraft air worthy, and these activities are often done at night. Homes located adjacent to the airport will be exposed to noise from these activities. Noise from landed aircraft using thrust reverse to assist braking may also be heard in residential areas adjacent to the airport.

## ➤ Sound Insulating Your Home

Aircraft noise can enter your home through numerous different paths. The significance of an individual path depends on the material, and its sound transmission loss characteristics, and the size of the exposed area. In general, the following graphic shows some of the main paths by which aircraft noise may enter a home.

The following information is intended to provide high level and general guidance only. Home owners should consult with professional contractors and consultants before undertaking work to discuss their specific needs and requirements. Additional and expanded information can be found in this guide.

### Factors to consider when upgrading home sound insulation

As it is often difficult to rank which path is most significant, homeowners often have a challenging decision on where to spend available funds to achieve the greatest overall benefit. Some questions to consider when making this decision include:

#### WHICH INDIVIDUAL ROOMS ARE THE MOST NOISE SENSITIVE?

Most municipalities require that new homes be designed to achieve lowest interior noise levels in bedrooms, with slightly higher levels permitted in living, dining, recreation rooms and dens. Noise levels in kitchens, bathrooms and hallways can be slightly higher still.

#### WHAT IS THE COST-BENEFIT OF ALTERNATIVE NOISE CONTROL MEASURES?

Replacing a large picture window in a living room could be very expensive and if the room is used infrequently, it may be better to replace smaller windows in one or more bedrooms for a similar cost, in an effort to reduce sleep disturbance.

Adding or improving weather-stripping to an exterior door is relatively inexpensive but replacing the door or adding a storm door may only be worthwhile if the door opens directly into a family room as opposed to a hallway.

Insulating an attic could provide a modest reduction in aircraft noise to all rooms in the home for a relatively low cost.

#### WHAT IS THE ORIENTATION OF THE HOUSE RELATIVE TO THE AIRCRAFT FLIGHT PATH?

Homes located almost directly beneath a flight path will have roughly equal noise exposure on all sides, whereas homes that are well off to the side of a flight path or off to the side of the airport will have greater exposure on the near side than on the far side. In this case, priority should be given to the more exposed facades and roof of the house than to the facade that is somewhat shielded from aircraft noise.



### 1 Open Chimney / Open Ventilator

- Entry of aircraft noise into homes via fireplace chimneys can be reduced somewhat by closing the flue, but a more convenient approach is to install airtight glass doors at the fireplace opening.
- Attic vents may or may not be a significant concern depending upon many factors including the type, size and location of the vents, the amount of insulation in the attic and the type of ceiling beneath the attic.
- Large gable vents in attic walls can significantly degrade overall sound insulation, and built in-place baffles could be used on the inside of gable vents to reduce this noise intrusion.
- Range hood vents may provide a significant path for aircraft noise to enter kitchens particularly if the duct work to the exterior is short and without any bends. Duct work for range exhausts cannot be acoustically lined or silencers added due to the presence of grease in the exhaust air. The best option from a noise control perspective would be to install a ductless (recirculating) range hood which filters out grease and odours without ducting exhaust air to the exterior.
- Noise entry via bathroom exhaust vents could be reduced by locating the exterior outlets on the underside of soffits and/or by installing sheet metal duct work with internal acoustic lining.

### 2 Roof

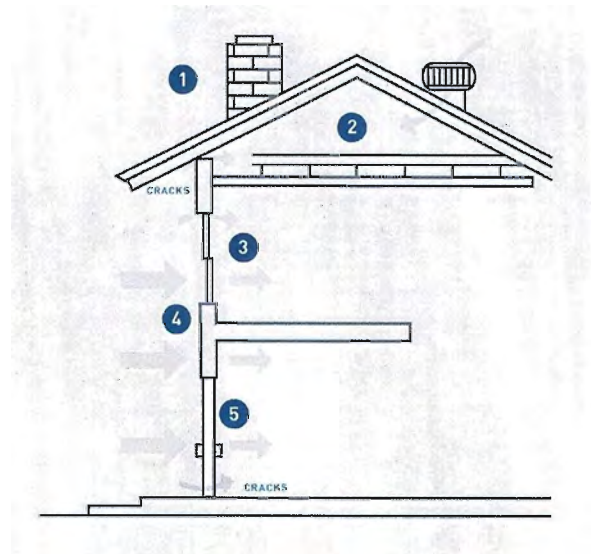
- Provide relatively thick insulation (e.g. R40 which is 240 mm thick) over the entire attic space.
- Roofs that are flat, or post and beam construction (where there is no attic space), could be a very significant path for aircraft noise to enter the home.

### 3 Windows / Sky Lights

- The most important parameters that govern the acoustic rating of windows includes the thickness of the individual panes of glass, the depth of the airspace in double glazed units, and the type of glass.
- In general, increasing the thickness of glass and increasing depth of airspace will help reduce sound through this path.
- In order to substantially increase the acoustic rating for a window, it is generally necessary to provide an exterior or interior storm window and/or reduce the size of the window.
- The use of laminated glass is most beneficial in controlling high frequency sound so it offers only marginal improvement for controlling aircraft noise, which tends to be mostly low to mid frequency in nature.

### 4 Walls

- Exterior walls are unlikely to be a significant sound transmission path relative to windows and doors if the exterior siding is relatively heavy (e.g. stucco, fibre-cement, brick or brick veneer) and if the wall is well insulated with fibreglass, mineral wool or loose fill cellulose insulation.
- Exterior walls with lightweight aluminum or vinyl siding and/or closed-cell rigid insulation are more likely to provide significant transmission paths into the house.



- Upgrading existing walls is not easy and very expensive since it generally requires application of heavier siding or modifications to the interior side of the wall.
- Upgrading the exterior siding has the advantage that it will benefit all rooms in the house but upgrading the interior side of the wall may be more cost-effective if only a few rooms (e.g. bedrooms) require improvement.

### 5 Doors

- Lightweight or poorly aligned exterior doors should be replaced with pre-hung, solid core wood doors equipped with effective weather-stripping, particularly if the door opens directly into a frequently utilized space such as a family room.
- Although steel doors can provide as much sound insulation as solid core wood doors, some steel doors intended for residential use are relatively light weight with inadequately insulated cores and it may be difficult to judge their acoustic effectiveness unless the supplier can provide the acoustic rating.
- If an existing solid core wood door is well aligned in its frame, then it should be possible to upgrade the weather-stripping without replacing the door.
- For sound attenuation, compression seals are better than sweep seals and sponge neoprene or neoprene "bubble" seals are better than felt or other porous materials.
- Any openings in the door, such as mail slots or pet doors should be avoided.
- If there is glazing in, beside or above the door, it will likely be a more significant sound transmission path than the door itself unless the glazing is upgraded.



## 7 Methods for Acoustic Rating of Sound Insulation

The ability of a material to reduce noise is commonly rated in terms of its Sound Transmission Class ("STC"). An open window would have an STC rating of 0 whereas closed windows could have STC ratings in the 25 to 40 range. The STC was originally developed to assess the attenuation of speech through interior walls so it places most importance on speech frequencies.

Exterior noise from transportation sources contain lower frequency sound than speech so a different rating system, called the Outdoor-Indoor Transmission Class ("OITC"), was developed for rating exterior assemblies such as windows. However, while some window manufacturers publish both STC and OITC data, OITC ratings are rarely provided for exterior doors or other building components.

The overall attenuation of aircraft noise from outside to inside a particular room will depend both upon the OITC rating of each building component and the area of each. However, if interior noise is being controlled primarily by one component, for example, a window, then improving the window will provide a directly corresponding reduction in interior noise level.





City of  
Richmond

**Memorandum**  
Planning and Development Department  
Transportation

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**To:** Mayor and Councillors  
**From:** Victor Wei, P. Eng.  
Director, Transportation  
Terry Crowe  
Manager, Policy Planning  
**Date:** September 30, 2014  
**File:** 01-0153-01/2014-Vol 01  
**Re:** **Update: YVR Runway End Safety Areas (RESAs)**

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The purpose of this memorandum is to provide an update regarding YVR's upcoming Runway End Safety Area (RESA) initiative.

On September 23, 2014, YVR staff and consultants met with cross-divisional City staff to provide information and an update regarding YVR's planned Runway End Safety Area (RESA) construction project. Departments attending included: Transportation, Policy Planning, Emergency Programs, Engineering, and Sustainability. The RESA project is one of YVR's initiatives outlined in its 20-year Master Plan (*YVR: Your Airport 2027*), which was approved by Transport Canada in 2008.

RESA is a pending requirement from Transport Canada that would require an additional area at each end of a runway to enhance aircraft and passenger safety. These areas would reduce the severity of damage to an aircraft should one overrun or undershoot during landing thereby increasing passenger safety, as well as providing an area for better access for emergency response vehicles. There is no change to the operational length of the runway. In anticipation of the enactment of the Canadian standard within the next few years, YVR is proactively planning to construct RESAs for its three runways (north, south and crosswind) that will meet existing international safety recommendations. Following these best practices, the length of each RESA (300 m with widened shoulders) will exceed the anticipated Canadian standard of 150 m.

Option analysis for the south and crosswind runways began in 2011; construction will occur on these runways first due to relatively simpler operational, environmental and financial factors. Potential options were evaluated based on the following criteria: water and land impacts, land use, cost, construction, operational efficiency, and noise. The preferred options do not impact the foreshore, maintain existing runway lengths (i.e., there is no extension of the takeoff and landing distances) and have low noise impacts both during and after construction (see Attachment 1).

Modelling results by YVR indicate that there may be a negligible increase in noise levels for some areas of Burkeville, as a limited number of larger aircraft taking off to the west may begin their takeoff roll where the new pavement will be added for the RESA at the eastern end of the south runway, which would bring those aircraft approximately 200 m closer to the Burkeville area. The estimated increase in noise level is three decibels, which is imperceptible to humans, and operational procedures such as the use of reduced thrust will help mitigate noise exposure. This increased noise level would still be lower than what Burkeville residents currently experience for takeoffs to the east; these latter noise levels will

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not change. On-going noise impacts will be monitored via YVR's network of Noise Monitoring Terminals throughout the community.


The preferred options being presented for consultation with stakeholder and the general public have already been presented to YVR's Environmental Advisory and Noise Management Committees and have been endorsed by YVR's Board of Directors. Stakeholder consultation commenced in early September 2014. Table 1 summarizes the schedule and identifies the participation or invitation of any City-related committees and organizations. A public information session will be held on September 30, 2014, from 4:00 pm to 8:00 pm, at the River Rock Resort & Hotel, Whistler "C" Ballroom (3<sup>rd</sup> Floor, East Tower, hotel side), 8811 River Road, Richmond, which staff will attend. Notices of this meeting have been placed in the Vancouver Sun, as well as local newspapers. Information is also posted on YVR's website (<http://www.yvr.ca/en/business-at-yvr/construction/projects.aspx>) including a Discussion Guide and on-line survey, which closes on October 31, 2014. A consultation summary report will be prepared and posted on YVR's website. YVR staff have offered to appear before Council to discuss the results of the survey findings. Staff will co-ordinate this meeting at a mutually convenient time.

Table 1: Schedule of RESA Public Consultation Activities		
Date	Group	Attended/Invited
September 9	Agricultural-Goods Movement	<ul style="list-style-type: none"> <li>Richmond Agricultural Advisory Committee: staff liaison attended</li> <li>Richmond Farmers' Institute: invited</li> </ul>
September 18	Environmental Organizations	<ul style="list-style-type: none"> <li>Garden City Conservation Society: member attended</li> <li>Richmond Advisory Committee on the Environment: 2 members attended</li> </ul>
September 23	City of Richmond	<ul style="list-style-type: none"> <li>Staff from Transportation, Policy Planning, Emergency Programs, Engineering, and Sustainability</li> </ul>
September 25	Community Organizations	<ul style="list-style-type: none"> <li>East Richmond Community Association</li> <li>Hamilton Community Association</li> <li>Sea Island Community Association</li> <li>Steveston Community Society</li> <li>Thompson Community Association</li> <li>West Richmond Community Association</li> <li>South Arm Community Association</li> <li>City Centre Community Association</li> </ul>
September 30	Business-Tourism-Recreation	<ul style="list-style-type: none"> <li>Tourism Richmond</li> <li>Richmond Economic Advisory Committee</li> <li>Richmond Nature Park</li> <li>Richmond Chamber of Commerce</li> <li>Steveston 20/20</li> <li>Steveston Merchants Association</li> </ul>
September 30	General Public	<ul style="list-style-type: none"> <li>General public</li> <li>Staff will attend</li> </ul>

Construction is scheduled to occur during the summer months commencing in 2015 for both ends of the crosswind runway and the west end of the south runway. The east end of the south runway will require preload from Winter 2015 to Spring 2016, with construction occurring in Summer 2016 and 2017. Staff will continue to work with YVR to manage the construction impacts on the surrounding community.

Planning for RESAs on the north runway is currently in the early stages and consultation with the public and stakeholders will occur when more information is available.

Please contact either of us, if you have any questions or would like further information.



Victor Wei, P. Eng.  
Director, Transportation



Terry Crowe, RPP, MCIP  
Manager, Policy Planning

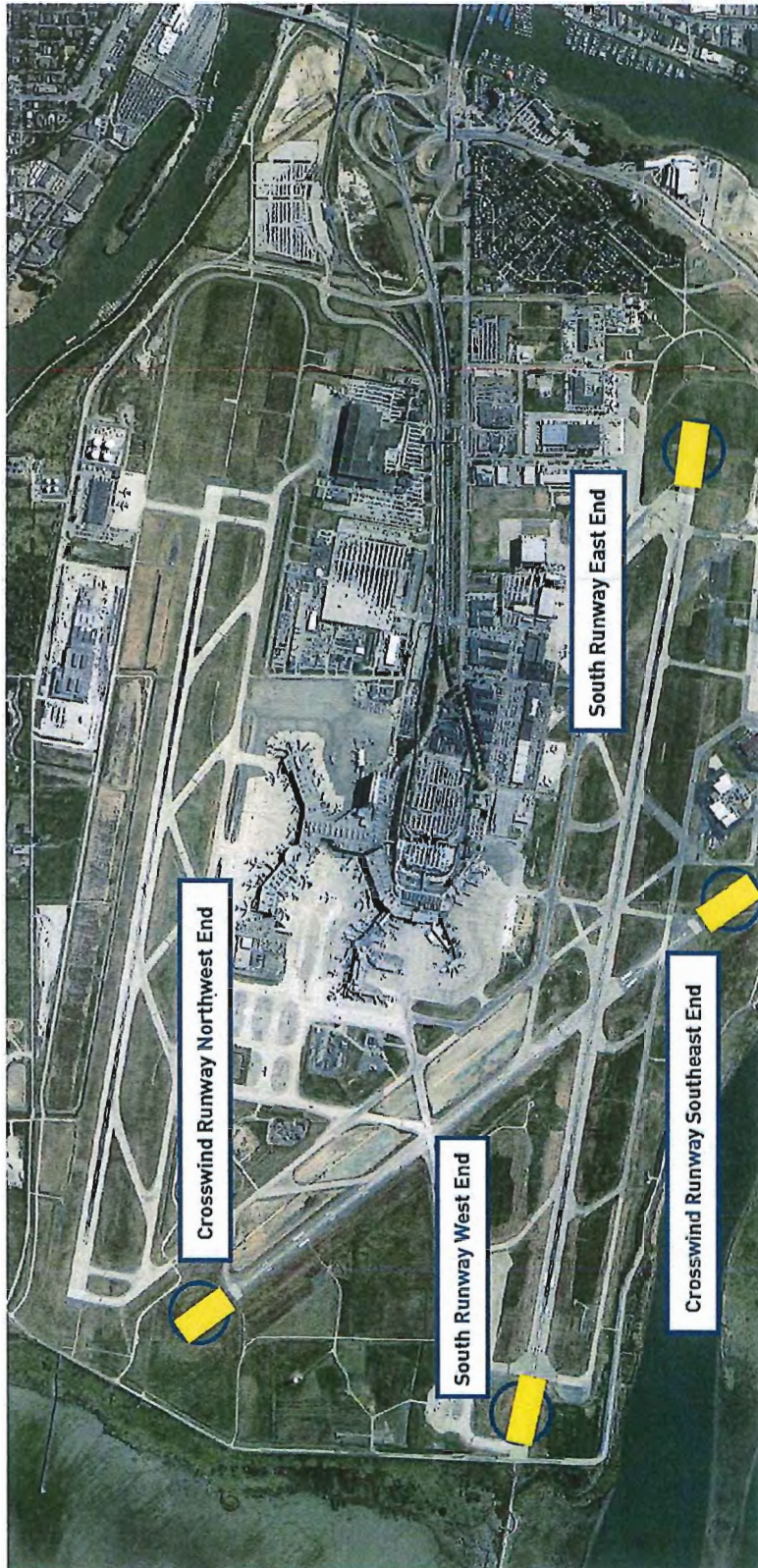
September 30, 2014




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Att. 1

VW:dc

pc:    - SMT  
          - Brendan McEwen, Manager, Sustainability  
          - John Irving, Director, Engineering  
          - Lloyd Bie, Manager, Engineering Planning  
          - Tim Wilkinson, Deputy Fire Chief  
          - Deborah Procter, Manager, Emergency Programs  
          - Ted Townsend, Senior Manager, Corporate Communications



-  RESA = 300 m in length by 120 m in width
-  South Runway = 3,500 m in length
-  Crosswind Runway = 2,200 m in length