

LADNER – HAWTHORNE ELEMENTARY SCHOOL

INTRODUCTION:

This report summarizes the results from the deployment of the portable noise monitor in Ladner between 6 November 2010 and 28 January 2011, a period of 84 days.

The monitoring site, located at Hawthorne Elementary School (5160 Central Ave, Delta, BC), was selected in consultation with Corporation of Delta staff. The measurements were obtained using a portable noise monitoring terminal located on the roof of the school.

The goal of the portable noise monitoring program is to obtain objective data and assess aircraft noise levels in the community. This data is used to augment measurements collected by the network of 20 fixed noise monitoring terminals located throughout the Lower Mainland and connected to the airport’s [Aircraft Noise & Operations Monitoring System](#).

TYPICAL AIRCRAFT OPERATIONS OVER THE AREA:

The flight patterns over the Metro Vancouver area are influenced by which runway is active at the airport. In turn, the active runway is determined by the wind conditions on the airfield – for safety reasons aircraft must land and take-off into the wind.

Figures 1 and 2 illustrate the Ladner monitoring location in relation to radar flight tracks during a typical four hour period (10AM-2PM) of westerly operations ([runway 26 active](#)) and easterly operations ([runway 08 active](#)) at Vancouver International Airport (YVR). The GREEN tracks represent YVR departures, the RED tracks represent YVR arrivals, and the YELLOW tracks represent aircraft operating from other airports in the region.

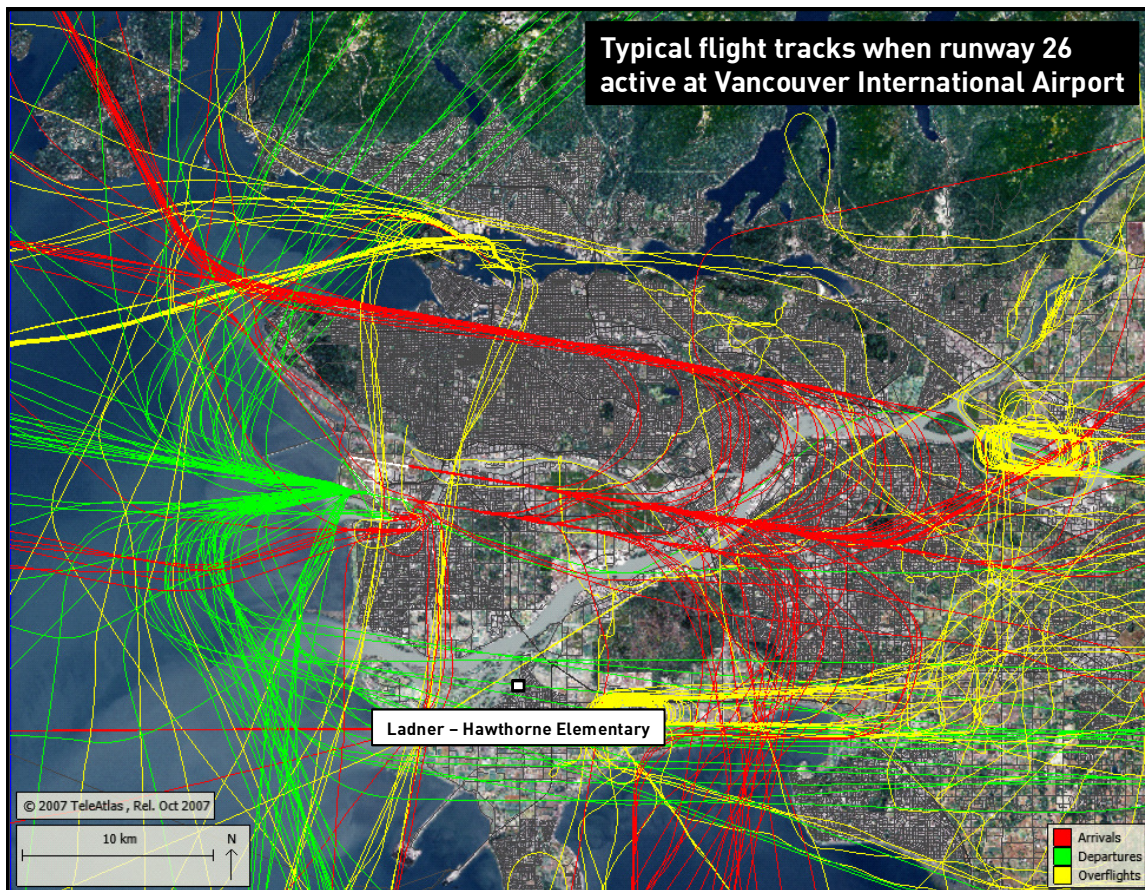


FIGURE 1

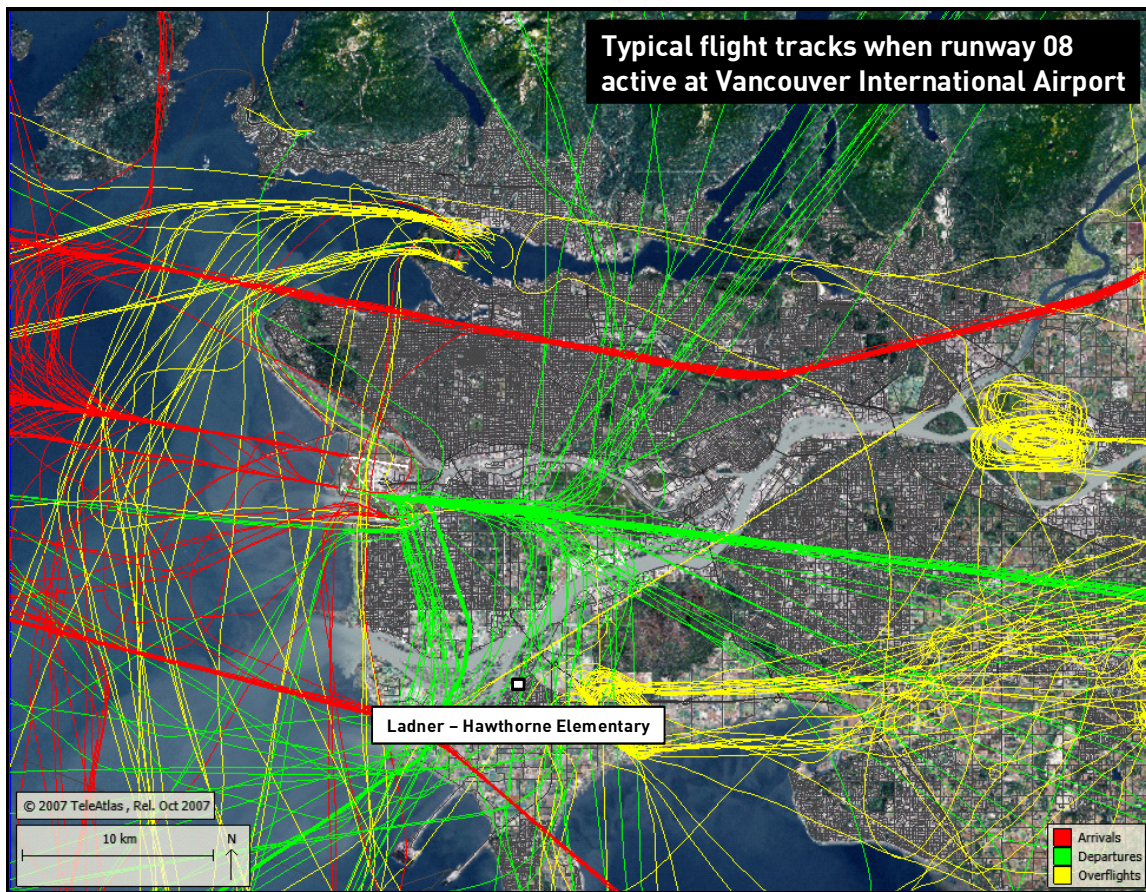


FIGURE 2

YVR AIRCRAFT OPERATIONS OVER THE MONITORING PERIOD:

During the period 6 November 2010 and 28 January 2011, there were approximately 55,300 runway operations at Vancouver International Airport (YVR). The breakdown of these operations by runway used is as follows:

Runway		Arrival	Departure	Total
Crosswind Runway	12	829	80	909
	30	6	5	11
South Runway	08R	6,930	20,555	27,485
	26L	1841	6857	8698
North Runway	08L	13911	196	14107
	26R	4078	12	4090
		27,595	27,705	55,300

Over the monitoring period, runway 08 was active for approximately 78% of the arrivals and 75% of the departures, and runway 26 was active for approximately 22% of the arrivals and 25% of the departures.

MONITORING RESULTS:

Noise Events

A noise event is captured when the sound level and duration exceed a predefined threshold. In the case of the measurements at Ladner (Hawthorne Elementary) the event threshold was set at 64 dBA during the day (7AM-10PM), and 50 dBA during the night (10PM-7AM), and the event time duration was set at 10 seconds. The sound thresholds were set according to the ambient background noise level, and the lower threshold at night accounts for the lower ambient background noise.

Noise events can be either aircraft or non-aircraft related. Noise events caused by aircraft are correlated to the associated flight operation using the radar data supplied by air traffic control (NAV CANADA). This allows the contribution of aircraft noise to be determined in relation to other community noise sources.

During the 84-day monitoring period, a total of 3,484 noise events were measured at the site. Of these 3,484 noise events, 430 (12%) were related to aircraft and the remainder were associated with other community noise sources. A summary of the 3,484 noise events is provided in the table below.

Number of Noise Events	3,484	Community Events	3,054		
		Aircraft Events	430	YVR aircraft	372
				Non-YVR aircraft	58

Figure 3 categorizes the 3,484 noise events according to the maximum sound level (Lmax) measured during the event and illustrates a comparison of typical indoor and outdoor sound levels, for example a sound level of 70 dBA is equivalent to a vacuum cleaner at 10 feet.

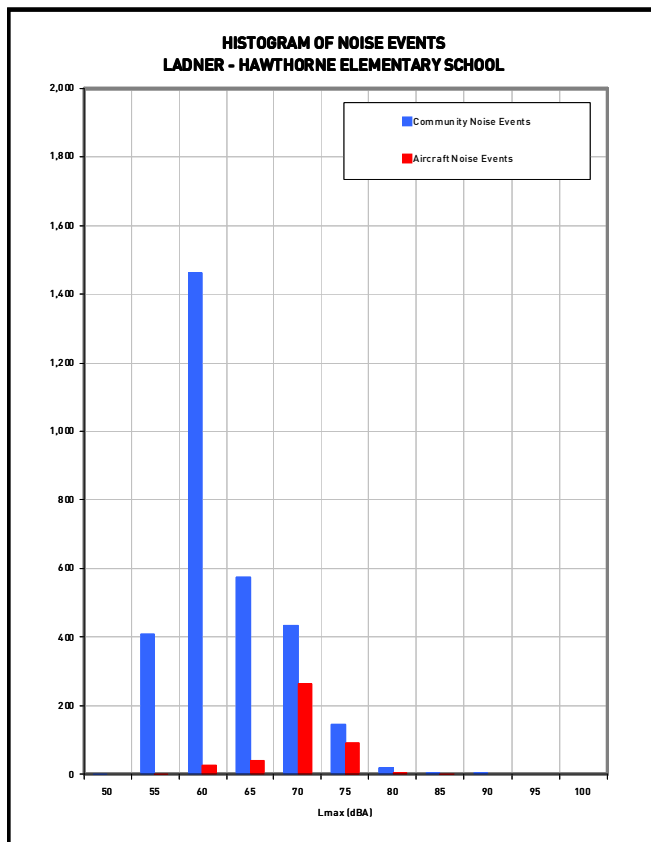


FIGURE 3



Source: URS Corporation, 2008

Leq and Aircraft DNL

The total equivalent continuous sound pressure level (Leq) at the site during the monitoring period was determined to be 52.0 dBA. The Leq related specifically to the 430 aircraft events was determined to be 36.6 dBA; therefore, aircraft did not contribute significantly to the noise environment at this site over the monitoring period.

The measured aircraft related day-night average sound level (DNL) at this site was determined to be 39.8 dBA. This is significantly lower than the DNL level of 65 dBA that the US Federal Aviation Administration has defined as the threshold of significant aviation noise exposure.

DEFINITIONS:

Maximum Sound Level (Lmax)

The Lmax is maximum sound level measured during a noise event.

Equivalent Continuous Sound Pressure Level (Leq)

The Leq is widely used as an index for noise and is defined as the steady-state sound level that has the same energy as the fluctuating community noise over a given time interval.

Aircraft Day-Night Average Sound Level (DNL)

The aircraft DNL is a daily average noise metric in which events occurring at night (between 10PM and 7AM) are penalized by 10 dBA. This night-time weighting treats one nighttime noise event as equivalent to 10 day-time events of the same magnitude, and is intended to account for the greater community annoyance with night-time noise.

The US Federal Aviation Agency has guidelines for compatible land uses and environmental sound levels based on the DNL metric. These guidelines are found in the Airport Noise Compatibility Program, found in Part 150 of the Federal Aviation Regulations. The FAA has identified a DNL of 65 dBA as the threshold level of aviation noise which is deemed as significant.