

GTAA

2005 Noise Management
Report



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Glossary

Airport elevation 569 feet above sea level

ATAC Air Transport Association of Canada

CAEP Committee on Aviation Environmental Protection

CARs Canadian Aviation Regulations

Chapter 2 Noise certification class for jet aircraft built after 1977 with noisier low-bypass and early high-bypass turbofan engines

Chapter 3 Noise certification class for jet aircraft built after 1995 with newer, quieter high-bypass turbofan engines; required standard for jet aircraft operating in Canada since April 1, 2002

Chapter 4 Noise certification class for jet aircraft built after January 1, 2006, with latest, quietest engine technology

CRJ Canadair Regional Jet

dBA A-weighted decibel scale that defines sound volume within the range perceptible by the human ear

Glide slope Descent profile during final approach

GTA Greater Toronto Area

GTAA Greater Toronto Airports Authority

GTOW Gross Take-Off Weight

Hushkit Engine modification to reduce Chapter-2-certified jet aircraft noise to Chapter 3 standards

ICAO International Civil Aviation Organization

ILS Instrument Landing System

Leq Continuous equivalent sound level (average noise level)

Movement Aircraft arrival or departure

NEF Noise Exposure Forecast

NMC Noise Management Committee

Nmi Nautical mile (1.152 statute mile or 1.853 kilometres)

NMO Noise Management Office

NMT Noise Monitoring Terminal

Non-noise certificate Noise certification class for jet aircraft, such as military and historical aircraft, that use the noisiest and often the oldest engine technology

Power plant Propeller, turboprop, turbojet, or turbofan engine

Rwy Runway

Runway 05/23 11,120-foot east-west runway (heading 057 degrees & 237 degrees magnetic)

Runway 06R/24L 9,000-foot east-west runway (heading 057 degrees & 237 degrees magnetic)

Runway 06L/24R 9,697-foot east-west runway (heading 057 degrees & 237 degrees magnetic)

Runway 15R/33L 9,088-foot north-south runway (heading 147 degrees & 327 degrees magnetic)

Runway 15L/33R 11,050-foot north-south runway (heading 147 degrees & 327 degrees magnetic)

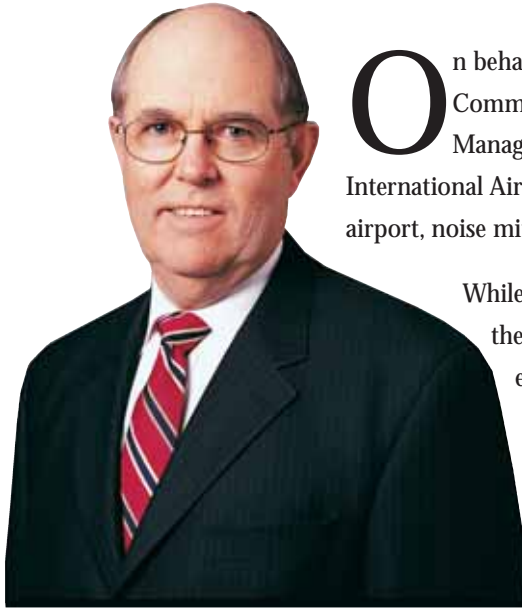
Subsonic Relating to speeds less than the speed of sound

Threshold First usable portion of a runway for landing

TNC Technical Noise Committee

Transponder Radio receiver/transmitter

Message from the Chair



On behalf of the Greater Toronto Airports Authority's (GTAA) Noise Management Committee (NMC), I am pleased to present the 2005 edition of the annual Noise Management Report. This report is intended to provide Toronto Pearson International Airport's neighbours and community partners with information on the GTAA, the airport, noise mitigation initiatives, and the activities of the NMC.

While the GTAA maintains and promotes Toronto Pearson as an economic asset for the Greater Toronto Area, it remains sensitive to the issue of aircraft noise and its effects on surrounding communities. The community-based NMC functions as a forum where airport stakeholders can openly discuss ways to limit these effects on the community. The NMC continued to meet on a regularly scheduled basis in 2005 and provided an opportunity for members of the public to attend and offer comments directly to committee members.

NMC members are effective advocates for the communities they represent and committee meetings continued to provide a constructive forum for noise mitigation issues to be brought forward and discussed. The NMC is an important mechanism for community input that helps to improve the GTAA's Noise Management Program. We look forward to working with NMC members as we continue to strive to be a good neighbour.

Lastly, I would like to extend my sincere thanks to the members of the NMC for their dedication to these important issues and for their commitment to their communities.

A handwritten signature in black ink, appearing to read "Steve Shaw".

Steve Shaw
Chair, Noise Management Committee
GTAA Vice President, Corporate Affairs

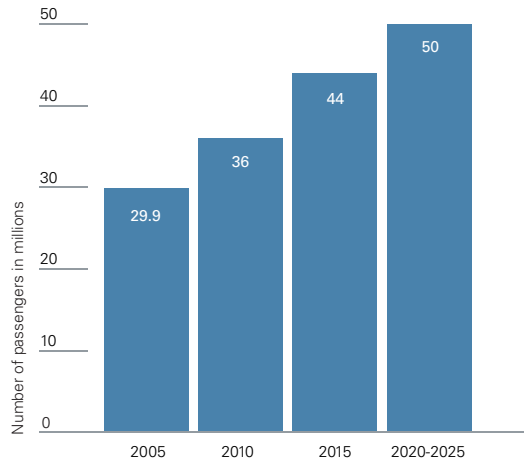


Toronto Pearson International Airport and the GTAA

On December 2, 1996, the Greater Toronto Airports Authority (GTAA) assumed responsibility for the management, operation and maintenance of Toronto Pearson International Airport. The mandate of the GTAA is to operate Toronto Pearson within a regional system of airports to enhance the economic growth and development of the Greater Toronto Area.

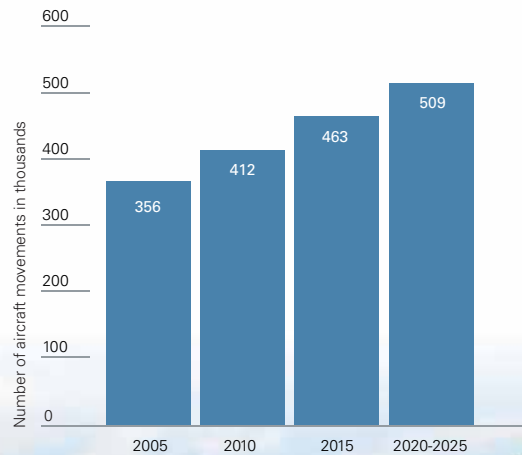
Toronto Pearson is Canada's busiest airport, welcoming 29.9 million passengers in 2005. Established in 1939, Toronto Pearson currently handles more than 1,200 arrivals and departures every day. With the air travel industry continuing to make a strong recovery, forecasts indicate that by the years 2020–25, the number of travellers passing through the airport's gates is expected to reach 50 million.

FIGURE 1
PASSENGER VOLUME
CURRENT AND PROJECTED

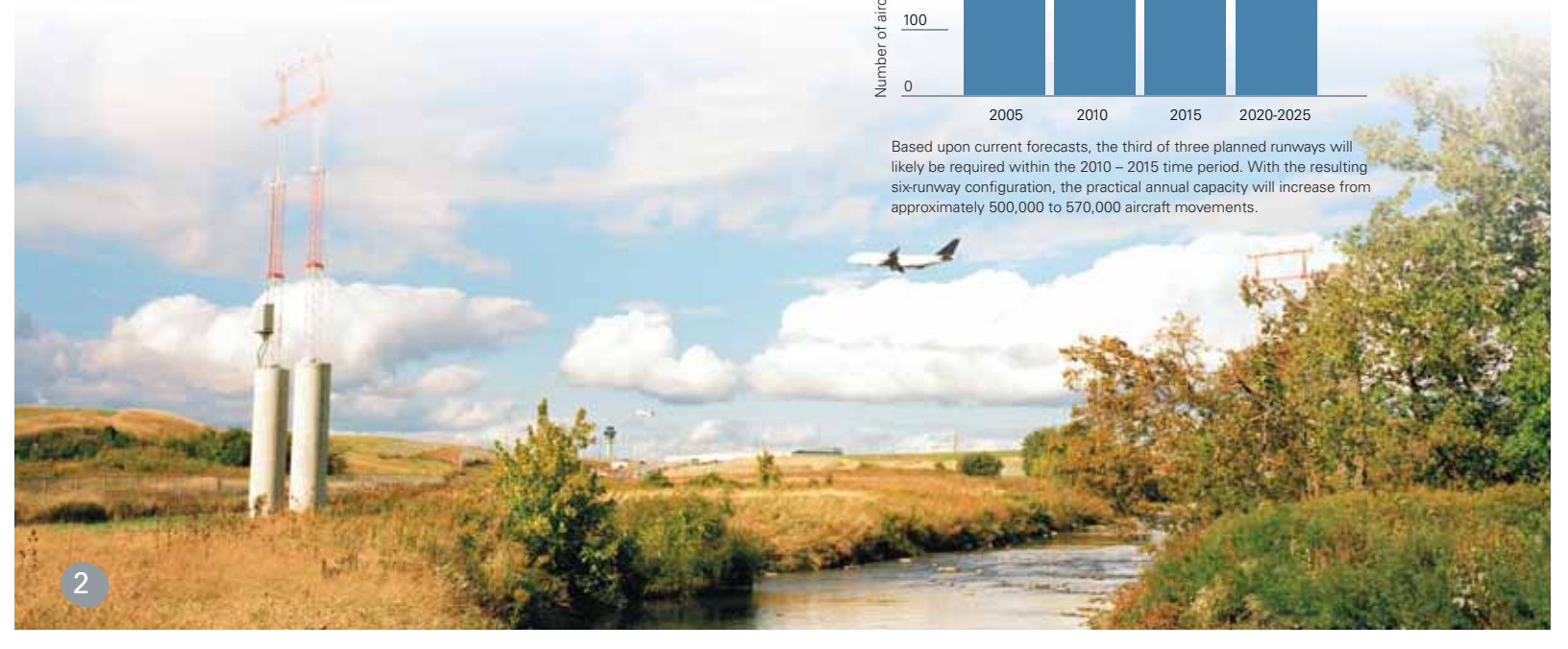


Based on a projected 3 per cent annual increase, passenger volumes are expected to reach 50 million enplaned and deplaned passengers by 2020-2025.

FIGURE 2
AIRCRAFT MOVEMENTS
CURRENT AND PROJECTED*



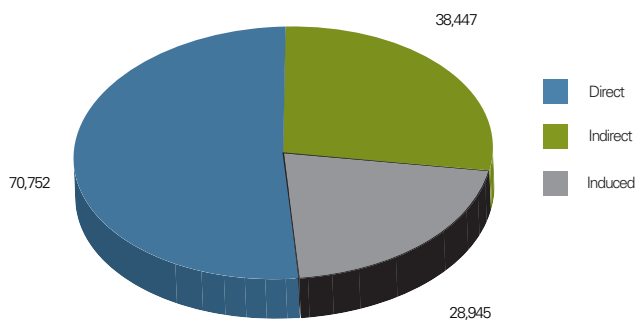
Based upon current forecasts, the third of three planned runways will likely be required within the 2010 – 2015 time period. With the resulting six-runway configuration, the practical annual capacity will increase from approximately 500,000 to 570,000 aircraft movements.



As Canada's premier gateway to North America, Toronto Pearson brings extensive economic benefits to the regions it serves, including:

- 130,000 jobs (Fig. 3)
- \$4.1 billion in wages
- \$14.7 billion in business revenue
- \$134.5 million in rent to the federal government
- \$25.7 million in payments in lieu of taxes to the cities of Toronto and Mississauga
- \$25 million (est.) in real property taxes paid by Airport tenants

FIGURE 3
EMPLOYMENT ATTRIBUTED TO
TORONTO PEARSON



In addition to the economic benefits that Toronto Pearson provides to the regions it serves, the GTAA continues to be an environmentally sensitive neighbour. To this end, the GTAA undertakes the following:

- Operates Toronto Pearson environmental programs to maintain its certification for the ISO 14001 international environmental standard. GTAA was the first airport in North America to achieve this environmental standard

- Invested in and maintains an extensive stormwater management program at Toronto Pearson
- Monitors air quality at Toronto Pearson and undertook a comprehensive Air Quality Study in 2005. The study can be viewed at www.gtaa.com
- Implemented a comprehensive environmental emergency contingency plan to ensure swift environmental emergency response
- Maintains an extensive Noise Management Program aimed at mitigating the effects of aircraft activity on local communities
- Consults and communicates with the community through regular ongoing meetings of the Consultative Committee and Noise Management Committee (NMC), an integral component of the Noise Management Program at Toronto Pearson
- Publishes this annual Noise Management Report to communicate the ongoing progress of initiatives and the latest results of the consultative process with the community.



Noise Management at Toronto Pearson

Since assuming management of Toronto Pearson, the GTAA has taken responsibility, in accordance with its Ground Lease with the federal government, for the management and mitigation of aircraft noise for aircraft operating to and from Toronto Pearson within a 10 nautical mile (18.5 km) radius of the airport.

The GTAA has a dedicated Noise Management Office that works toward noise mitigation by investigating complaints and following through with enforcement actions as necessary. The GTAA also works with the aviation community, neighbouring municipalities and local residents through the NMC to consult with these parties and to communicate its ongoing efforts to manage and mitigate aircraft noise at Toronto Pearson. In addition, the GTAA discusses noise mitigation strategies within the GTAA Technical Noise Committee and the GTAA Consultative Committee, described later.

Ongoing initiatives aimed at mitigating aircraft noise at Toronto Pearson include:

- Restricting operating hours of jet aircraft based on noise certification levels, such that quieter aircraft operate with fewer restrictions and noisier aircraft are more restricted during the night
- Managing the total number of nighttime movements to meet Transport Canada allowances
- Using departure and arrival procedures to minimize noise impacts in neighbouring communities by ensuring that pilots approach runways and depart runways on specified routes and operate their aircraft in ways to mitigate aircraft noise

- Working with surrounding municipalities to ensure that areas that are impacted by aircraft noise are zoned appropriately and that sensitive land uses, such as residential, are restricted in higher noise-impacted areas
- Working with community representatives on the NMC to maintain public dialogue about aircraft noise through regularly scheduled committee meetings, a series of noise forums and educational workshops, and ongoing communications from the GTAA available on GTAA.com, including this annual Noise Management Report.

Understanding Noise

Sound is transmitted through the air in waves, like ripples that move outward across a pond when a stone splashes in its midst. When we perceive sound, we judge it to be desirable or undesirable. Sounds deemed undesirable are often referred to as noise.

The decibel is the universally accepted measurement of sound amplitude or volume: in our example, amplitude represents the height of the ripples on the pond. Because the sounds we experience vary in volume between 1 and 100,000 units, the logarithmic scale of the decibel (dB) is used to express this range because it reduces perceivable sound volumes within a manageable scale of 20–120 dB.

In addition, the human ear has greater sensitivity to a certain range of frequencies or pitches. Thus, sounds are usually measured in A-weighted decibels (dBA), which stresses the range of sounds that register most noticeably in the human ear.

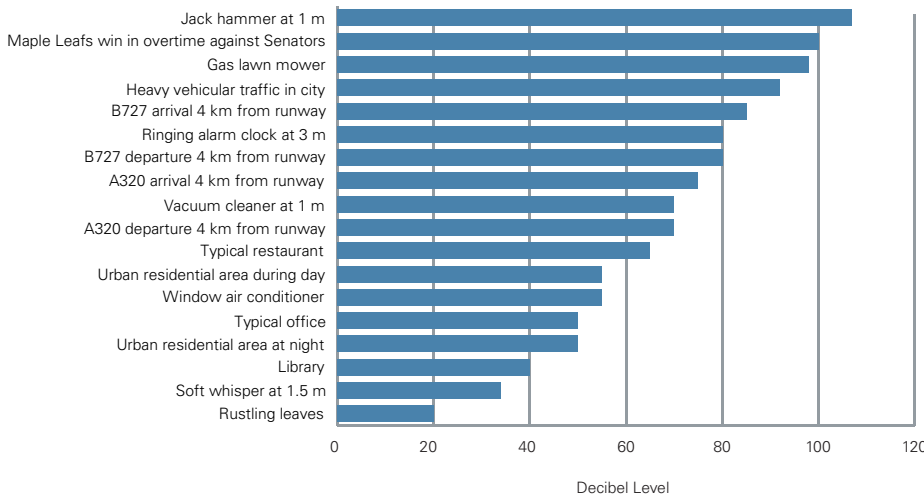
Within the logarithmic A-weighted decibel scale, a 3 dBA decrease is barely perceptible to most people, while a 5 dBA decrease is clearly perceptible. Further, a decrease of 10 dBA is perceived as being half as loud. For example, a library that generates 40 dBA of

ambient noise is considered half as loud as a typical office that generates 50 dBA of ambient noise.

Yet, noise is often considered annoying even when it occurs at much lower volumes than desirable sounds. For example, an arriving Airbus A320 flying overhead four kilometres from the runway may generate the same 70 dBA level as a vacuum cleaner one metre away, but the aircraft may seem more annoying because people expect to hear the noise of the vacuum and, therefore, are willing to accept it. In addition, quieter noises that occur frequently may be considered as annoying as infrequent louder noises.

For comparison, the following chart displays average sound levels of different events:

FIGURE 4
COMMON SOUND LEVELS



It is also important to realize that sound volume can vary by up to 5 dBA depending on humidity, temperature and wind direction. Due to these factors, the sound of the same aircraft can appear to vary at the same location on different days.

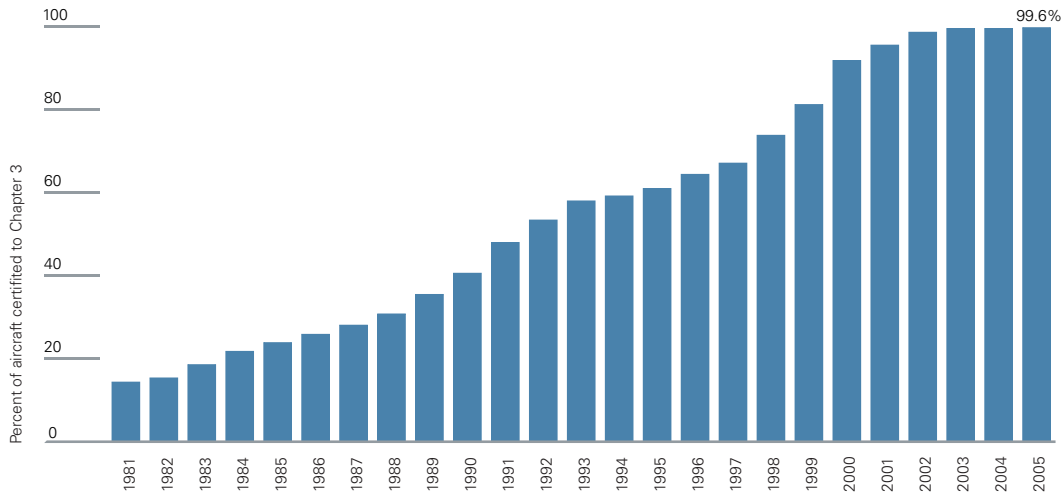
Aircraft Noise Certification Levels

Over the past 30 years, improvements in aircraft design and technology have resulted in significant reductions in aircraft noise, which is caused by engines and by the movement of air over the frame of the aircraft. To date, noise reduction initiatives have focussed primarily on reducing engine noise. However, new airframe designs appear capable of cutting aircraft noise further, at least in half, according to the British Parliamentary Office of Science and Technology.

The British Aviation Environment Federation estimates that 95 per cent of aircraft in production today are capable of meeting the latest aircraft noise reduction standards of a 10 dBA cumulative reduction over existing noise levels, meaning that aircraft noise levels are reduced a total of 10 dBA when measurements at three different points, one during aircraft take off, one during fly over, and one during approach are summed. At Toronto Pearson, approximately 80 per cent of aircraft in operation currently deliver a 10 dBA cumulative reduction, the International Civil Aviation Organization (ICAO) Chapter 4 noise reduction standard.

The GTAA currently follows the aircraft noise management guidelines prescribed by Chapter 3 of the ICAO Standards and Recommended Practices—Aircraft Noise: Annex 16 to the Convention on International Civil Aviation, Volume I, which publishes standards for the global aviation industry. Chapter 3 noise reduction standards require that all subsonic jet aircraft types certificated after October 1977 meet more stringent maximum noise levels, reducing aircraft noise by 10 dBA over Chapter 2 standards. Aircraft that

FIGURE 5
TORONTO PEARSON CHAPTER 3
PERCENTAGE (ALL JET OPERATIONS)



conform to Chapter 3 noise emission standards include the Boeing 747-400, new generation B737, B757, B777 and Airbus 319, A320, A330 and A340, among others.

Noisier, older aircraft, known as Chapter 2, include Douglas DC-9, Boeing 727, older model B737, and older Learjet and Gulfstream business jets. Some of these jets were retrofitted or hushkitted to meet Chapter 3 standards. During 2005, less than three per cent of jet aircraft movements at Toronto Pearson involved these hushkitted Chapter 3 aircraft.

Jets that are non-noise certificated are the oldest and noisiest models. These include military aircraft that make fewer than 100 visits to Toronto Pearson each year.

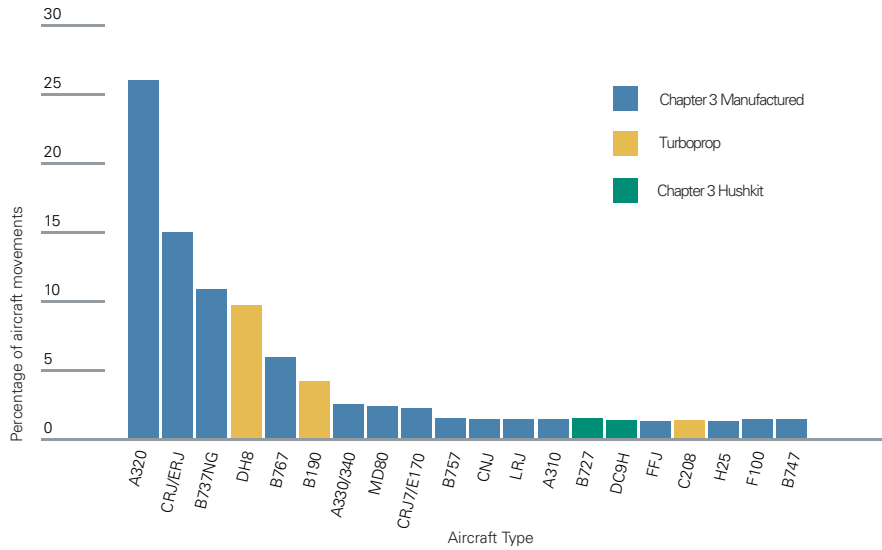
There are separate noise certification systems for small propeller aircraft and helicopters.

Since April 1, 2002, only the quieter Chapter 3 aircraft (greater than 34,000 kg) are permitted to operate at Toronto Pearson. Although the GTAA and the NMC have opposed the operation of Chapter 2 aircraft, Transport Canada retains the right to approve exemptions and permit some Chapter 2 aircraft to operate at Toronto Pearson.

What's Next?

In June 2001, on the basis of recommendations made during the fifth session of the Committee on Aviation Environmental Protection (CAEP/5), the ICAO Council adopted a new Chapter 4 noise standard that is more stringent than standards contained in Chapter 3. Since January 2006, the latest standard, a 10 dBA reduction over Chapter 3 aircraft noise standards, applies to newly manufactured aircraft and to Chapter 3 aircraft for which Chapter 4 certification is requested.

FIGURE 6
ANNUAL PERCENTAGE OF
SPECIFIC MOVEMENTS BY
AIRCRAFT TYPE



This figure shows the annual percentage of movements by aircraft type that operated at Toronto Pearson in 2005. Operations by the Airbus A320 series, the Boeing 737 new generation (NG), Canadair Regional Jet (CRJ) and Embraer Regional Jet (ERJ) totaled over 50 % of all aircraft movements. These aircraft were all manufactured to meet Chapter 3 requirements and are among the quietest aircraft that operate at the airport.

In 2005, 99.6% of all jet aircraft operations were by Chapter 3 aircraft. Jet aircraft that have been hushkitted to conform to Chapter 3 regulations, such as the Boeing 727, Boeing 737-200 and McDonnell Douglas DC-9 accounted for less than 3% of all jet operations at Toronto Pearson.

Non-jet aircraft operations were 17 % of total aircraft movements in 2005. The most popular turboprop aircraft operating at Toronto Pearson was the twin engine De Havilland Dash 8 representing 10% of all movements at the airport.



Noise Mitigation Measures

Regulations and Policies

Regulations and policies pertaining to noise management originate from various organizations, including those standards set by the ICAO, Transport Canada and the GTAA.

The federal *Aeronautics Act* and the *Canadian Aviation Regulations* (CARs) support the ICAO standards and set Canadian procedures relating to aircraft noise certification and operations. It is important to note that aviation is federally regulated, and therefore municipal bylaws, such as noise bylaws, are not applicable to aviation activity.

Specific sections governing operations of the airport include:

Aeronautics Act - Section 4.9(f) The federal government may make regulations respecting aeronautics and noise emanating from airports and aircraft.

Canadian Aviation Regulations No person shall operate an aircraft at or near an airport 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*.

These documents issued by the federal government describe the rules that pilots must follow to abide by the airport's noise management program, including the procedures and requirements relating to the following:

- Preferential runways;
- Minimum noise routes;
- Hours when aircraft operations are prohibited or restricted;



- Arrival procedures;
- Departure procedures;
- Duration of flights;
- The prohibition or restriction of training flights;
- Visual flight rules or visual approaches;
- Simulated approach procedures; and
- The minimum altitude for the operation of aircraft near the airport.

Noise Operating Restrictions

Time of Day Restrictions

The GTAA is required to develop and maintain a comprehensive aircraft Noise Management Program that includes a plan for managing the number of flights during restricted hours, between 12:30 a.m. and 6:30 a.m. To ensure that flights during the restricted period remain proportionate to overall traffic levels, Transport Canada has imposed annual limits on the total number of restricted period flights at Toronto Pearson, calculated between November and October. Operating the only airport in Canada with these restrictions, the GTAA carefully manages these flights to ensure that the limit is not exceeded.

Effective June 10, 2004, Toronto Pearson's night flight restrictions were amended to apply to all aircraft. The noisiest and older non-noise certificated jet aircraft are prohibited from operating between 8 p.m. and 8 a.m.,

while Chapter 2 and equivalent aircraft are prohibited from operating between midnight and 7 a.m. The quieter Chapter 3 and equivalent aircraft may be scheduled between 12:30 a.m. and 6:30 a.m., while a limited number of Chapter 3 aircraft may be scheduled during the evening and morning shoulder periods (12:30 a.m. to 1 a.m. and again between 6 a.m. and 6:30 a.m.).

The GTAA may grant operating extensions on the day of operation for flights delayed by weather, emergencies, security, air traffic control issues or mechanical difficulties. Chapter 3 aircraft greater than 34,000 kg Gross Take Off Weight (GTOW) may operate until 3 a.m., depending upon existing circumstances and runway availability.

Daily requests for Chapter 3 jet aircraft less than 34,000 kg GTOW and equivalent propeller aircraft may be approved to operate in the restricted hours up to a daily limit. A limited number of exemptions for

Chapter 3 aircraft are approved by Transport Canada if the GTAA can ensure that they remain within the imposed annual allowance of restricted period flights.

Noisier Chapter 2 aircraft, non-noise certified aircraft and

equivalent operations are not granted operating extensions.

Preferential Runway Assignment

Runways are labelled by the first two digits of their compass bearings. For example, a pilot approaching Toronto Pearson from the southwest and cleared to land on Runway 05 would

follow compass heading 057.

Toronto Pearson has five runways: 05–23, 06R–24L, 06L–24R, 15R–33L, and 15L–33R. Each runway has two designators as each runway can be used in either direction. The right (R) and left (L) designators identify which of a pair of runways a pilot is cleared to use.

Aircraft using these runways take off and land into the wind for safety reasons; therefore, runway use is dependent on the direction and speed of the wind. In addition, weather, runway conditions, and approach aid availability may affect NAV CANADA's determination of which runways will be used at any time.

To minimize noise, the GTAA works with NAV CANADA air traffic control to maintain strict flight procedures for arriving and departing aircraft. Subject to existing conditions, preferential runways have been allocated for use between midnight and 6:30 a.m.

The following runways are preferred for aircraft departures in the following order of priority: Runways 23, 33R and 24R. The following runways are preferred for aircraft arrivals in the following order of priority: Runways 05, 15L and 06L. Operations on other runways are limited as much as possible during this time period.

Preferential runway assignments have been in practice for many years to ensure that the fewest number of people in the surrounding communities are impacted by aircraft operating at night.

Engine Run-ups

Occasionally, airline maintenance staff are required to perform engine run-ups after engine repairs have been completed. At all times, these run-ups must be approved by the GTAA in advance and conducted at designated times and locations determined to minimize their impact on the surrounding communities.



Between midnight and 7 a.m., engine run-ups are approved only for aircraft scheduled to depart that morning at locations farthest from residential areas. Engine run-ups are prohibited for all noisier Chapter 2 aircraft between 2 a.m. and 5 a.m.

Noise Abatement Procedures

Noise abatement procedures governing flights operating at Toronto Pearson are approved by Transport Canada and are legally binding on aircraft operators.

Departures

Pilots of jet aircraft are required to throttle back from take-off power to less noisy climb power shortly after

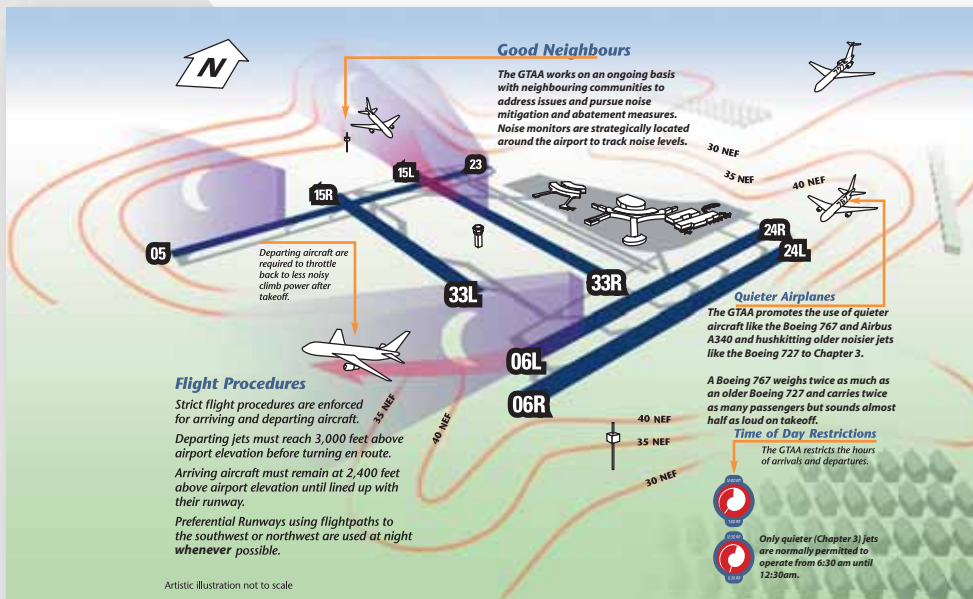
take-off and must follow specified headings or ground tracks to 3,000 feet (914 m) above airport elevation before making en-route turns. Pilots of propeller aircraft must comply with jet procedures between 11 p.m. and 7 a.m., except during climb procedures. During the day, these pilots may turn as low as 500 feet (152 m) above airport elevation to accommodate increased hourly operations.

A new procedure for smaller, quieter Chapter 3 jet aircraft was established in 2001 and formalized in 2005 after four years of trials and analysis. Using this new early turn procedure, pilots of these aircraft can turn to assigned headings at 500 feet (152 m) above airport elevation between 7 a.m. to 11 p.m. when departing on Runways 05, 06R, 06L, 23, 24R and 24L.

Arrivals

Pilots of arriving jet aircraft must remain at 2,400 feet (732 m) above airport elevation until they line up with their runways, generally 7 to 10 nautical miles (13 to 18.5 km) from the airport. They must then maintain a three-degree glide slope approach until touchdown, and minimize noisy reverse thrust after touchdown. Pilots of propeller aircraft must comply with jet arrival procedures between 11 p.m. and 7 a.m.

FIGURE 7
NOISE ABATEMENT
PROCEDURES



While the Airport and airlines act to minimize noise during departures and arrivals, sometimes they may have to deviate from noise abatement procedures when prevailing conditions, such as thunderstorms, dictate.

Land Use Planning

To ensure that compatible land uses are planned and developed near the Airport, the GTAA works closely with surrounding municipalities to ensure that areas impacted by aircraft noise are zoned appropriately and that sensitive land uses, such as residential, are restricted in higher noise-impacted areas.

Noise Exposure Forecast

Transport Canada has developed a Noise Exposure Forecast (NEF) model to calculate long-term aircraft noise exposure based on actual and forecasted flights, and the assessed level of noise annoyance in those areas. Contour lines are drawn on a map (Figure 8) connecting points of equal noise impact representing

25, 30, 35 and 40 NEF. It is important to remember that the NEF contour does not measure decibel levels for individual flights, but is a cumulative noise value of overall actual and forecasted flights, and noise annoyance. Figure 8 can also be viewed under the Noise Management section of www.gtaa.com.

Transport Canada has taken the position that areas as low as 25 NEF may be affected by aircraft noise. Areas of 30 NEF or greater are considered incompatible for sensitive land uses, such as residential development.

For new airport development in non-urban settings, Transport Canada has set 25 NEF as the standard and recommends that no new sensitive land uses be permitted within the 25 NEF.

Airport Operating Area

The GTAA has established the Toronto Pearson Airport Operating Area (AOA), which uses well-defined natural and manmade boundaries to approximate the 30 NEF contour on the ground. Surrounding municipalities have included this operating area in their Official Plans and have approved associated policies that limit incompatible land uses within these areas.

FIGURE 8
AIRPORT
OPERATING
AREA

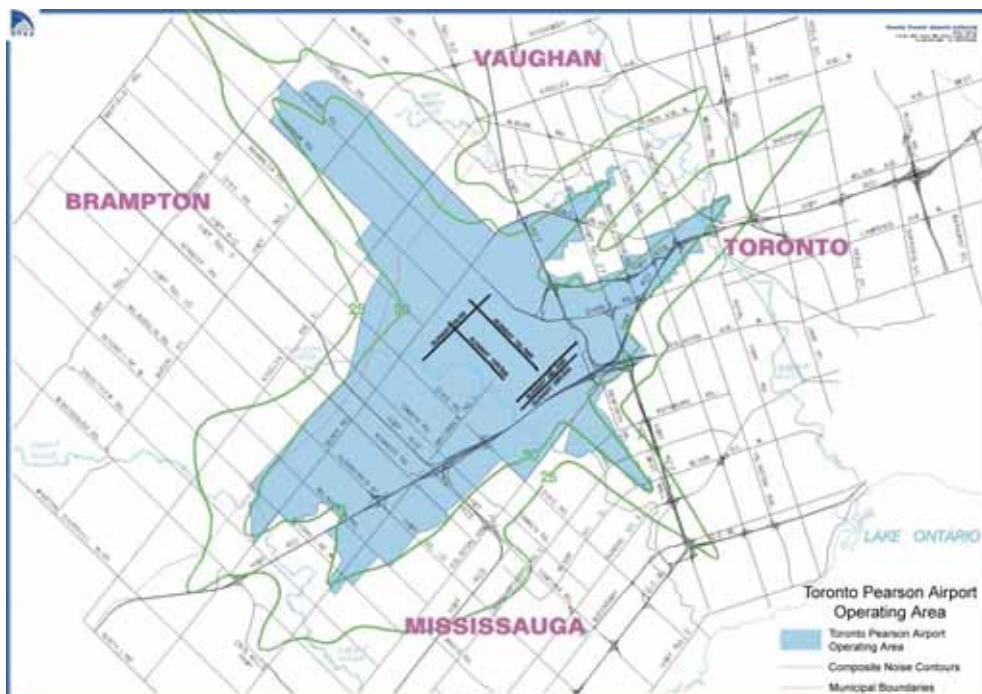
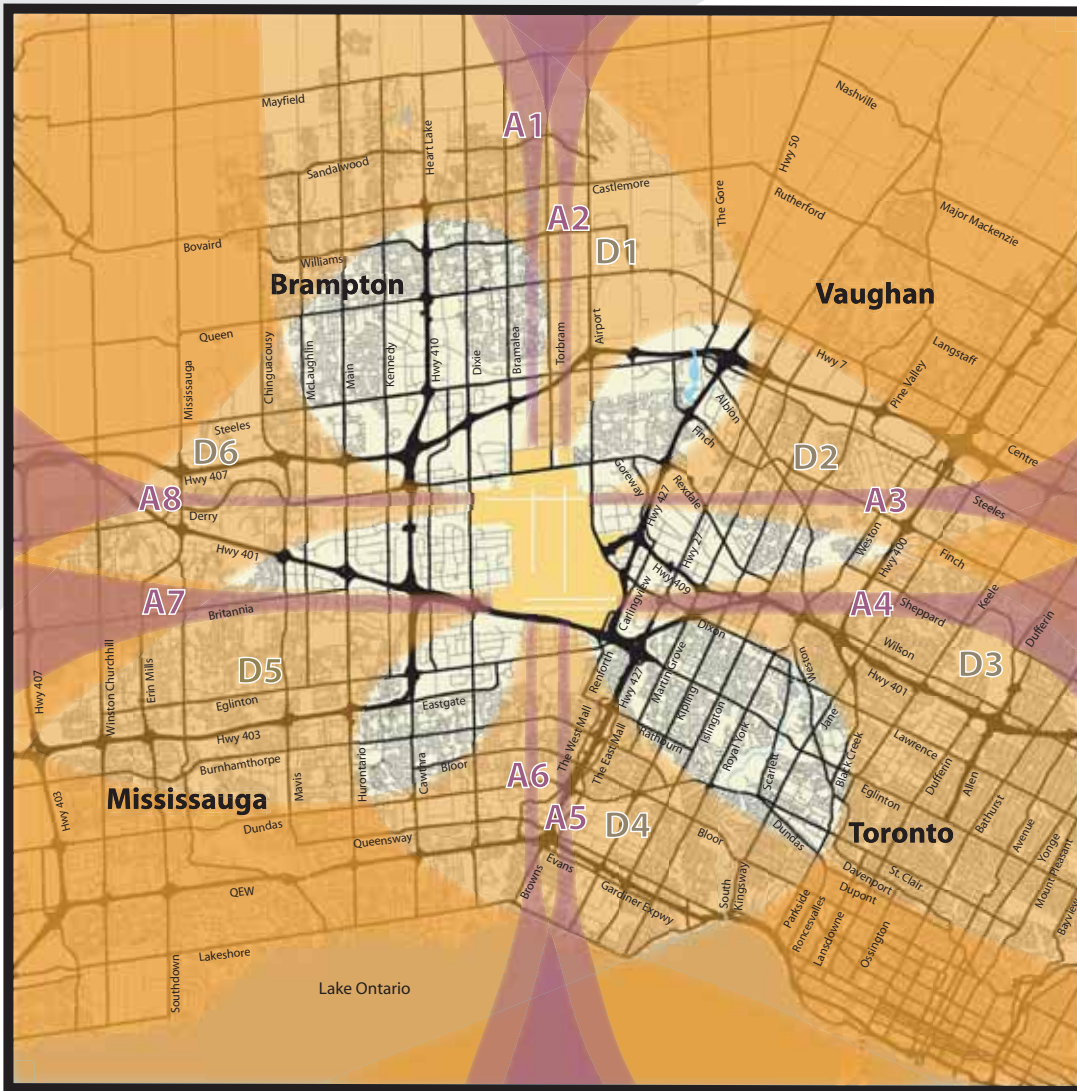


FIGURE 9
2005 JET FLIGHT PATH
MOVEMENTS CHART



**Jet Flight Path
Movements Chart**

In an effort to better communicate with local residents and provide new tools that describe aircraft activity near Toronto Pearson, the GTAA has developed a Jet Flight Path Movements Chart to illustrate the general flight patterns of the majority of Toronto Pearson's jet aircraft operations. While this chart does not indicate the level of noise generated by aircraft activity in an area nor the level of community annoyance, it does provide valuable information when used in conjunction with other traditional aircraft noise maps and resources. This new chart is based on a program successfully employed at Sydney Airport in Australia and on input from the NMC.

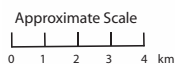
Flight Zone Names	Daily Average Movements	Percentage of All Movements	Daily Range of Movements	Days With No Movements	Associated Runway (s)
A1	4	0.5%	0-177	317	15R
A2	38	4.1%	0-443	150	15L
A3	81	8.9%	0-274	107	23
A4	146	15.9%	0-459	82	24L & 24R
A5	4	0.4%	0-256	297	33R
A6	18	2.0%	0-373	293	33L
A7	84	9.2%	0-382	111	06L & 06R
A8	81	8.9%	0-391	130	05
D1	70	7.7%	0-476	40	33L & 33R
D2	36	3.9%	0-220	171	05
D3	113	12.4%	0-461	136	06L & 06R
D4	5	0.5%	0-254	230	15L & 15R
D5	124	13.5%	0-424	70	24L & 24R
D6	111	12.1%	0-417	80	23
Arrivals (A1-A8)	457	49.9%			
Departures (D1-D6)	459	50.1%			
Total Jet Movements	915	100.0%			

Legend

- Pearson International Airport
- Arrival Flight Zone
- Departure Flight Zone
- Body of Water
- Areas with Less Frequent Jet Over Flights
- Overlapping Arrival Flight Zones
- Overlapping Departure Flight Zones

Notes:

- 1) The flight zones illustrated are intended to reflect the general flight path patterns of the majority of Pearson's jet aircraft operations. Some jet operations do occur outside these zones.
- 2) The information presented excludes non-jet aircraft (piston and turboprop) using Pearson, and any over flights unrelated to Pearson (en route aircraft flying through the area) to maximize the clarity of the presentation and to focus on the types of operations with the most significant noise impact.
- 3) The arrival flight zones reflect primarily the final approach phase of the arrival, excluding any earlier phases that may pass through the airport vicinity prior to joining the final approach path.
- 4) The departure flight zones do not reflect the flight paths of the smaller, quieter jet aircraft that are permitted to conduct early departure turns (similar to non-jet aircraft), although these operations are included in the table above.
- 5) Although the yellow map areas, 'Areas with Less Frequent Jet Over Flights' are not within arrival or departure flight zones, they are not completely free of over flights. These areas may be over flown by jet aircraft operating outside of the general jet flight zones (see Note 1), non-jet and over flights not associated with Pearson (see Note 2), arrivals prior to joining the final approach path (see Note 3), and early turn jet departures (see Note 4).
- 6) The information reflects traffic levels and flight zones for the year 2005 only. It does not project future airport operations. Overall traffic volumes can be expected to increase as demand for air travel services increases in the future.
- 7) This map only presents the general location and number of jet aircraft operations at Pearson and is provided for general information purposes only. It does not quantify the noise impacts associated with those operations. The noise associated with operations within any of the flight zones may be heard outside of the zone itself. This information does not replace the Noise Exposure Forecast system used for land use planning purposes.
- 8) Runway 05-23 was closed for maintenance at times during the 2005 construction season resulting in lower annual utilization of its associated flight zones (A3, A8, D2 & D6), particularly D6 which was used 10-40% less in 2005 compared to other recent years.



Noise Management Committee

The Noise Management Committee (NMC) is a public forum for community representatives, airport stakeholders, and the GTAA to discuss noise-related issues. The NMC meets publicly on a regular basis, with meeting minutes posted online, distributed to interested parties, and referred to the GTAA Board of Directors for review. A detailed edition of the terms of reference can be viewed at www.gtaa.com.

Terms of Reference

The NMC provides a consultative/communicative forum for community stakeholders to meet with GTAA management and other aviation community representatives to discuss issues relating to the mitigation of aircraft noise in the surrounding communities. The NMC serves as an advisory body for the GTAA President and Chief Executive Officer, and includes representatives of the three surrounding municipalities.

Committee members discuss concerns openly in a public forum for the GTAA to consider. The GTAA may then take actions that it deems appropriate to address those concerns.

Mandate

The NMC mandate is set out in the Ground Lease (section 8.12.02) as follows:

“The Tenant shall ensure that mitigation of noise emanating from aircraft in the

takeoff, ascent, descent, approach and terminal phases of flight is a part of the mandate of a noise management committee, which the Tenant shall establish and which shall include at a minimum: the Tenant, the Minister or his designate, aviation industry representatives and appropriate provincial and municipal government representatives.”

Scope

The NMC advises the GTAA on matters related to, but not limited to the following:

- Aircraft operation procedures impacting aircraft noise in the Airport Operating Area
- The examination of alternatives for noise mitigation
- The enforcement of aircraft noise violations
- Municipal land use within the Airport Operating Area.

The NMC reports and makes recommendations to the GTAA President and Chief Executive Officer, who may refer recommendations to the appropriate committee of the GTAA Board of Directors, the GTAA Consultative Committee, the Technical Noise Committee or other bodies as appropriate for consideration.

Committee members have the opportunity to vote on recommendations and are regularly given feedback on the outcome of their recommendations. Meeting minutes showing the conclusion and resolution of issues are published in a timely fashion.

Communication and Education of Stakeholders

The NMC acts in an advisory capacity to the GTAA on all issues relating to Toronto Pearson's Noise Management Policy with a view to improving the GTAA's Noise Management Program and promoting the objectives of the Authority regarding all aspects of noise management. The NMC provides a forum for the discussion of noise-related matters and decides on

the best methods for distributing information to stakeholders and to stakeholder groups on an issue-by-issue basis.

Committee members that represent community stakeholders shall actively seek the opinions of their constituents on noise-related matters and shall represent their concerns in the committee forum. Similarly, committee members shall communicate the results of committee discussions to their constituent bodies.

Linkages

Linkage to the GTAA Consultative Committee, Toronto Pearson's main consultative communication forum, will be provided through common membership, such that one member from the GTAA and one member from the community shall jointly serve on both committees and, thus, act as liaisons between the committees. The GTAA will continue to perform this liaison function through the committees' chair. The NMC will also link to the Technical Noise Committee (TNC) to provide communication on the operational aspects of noise

monitoring, enforcement, and mitigation. This linkage will be provided through GTAA staff, including the General Manager, Airside operations (TNC Chair).



Membership

The NMC is comprised of resident and elected representatives from the cities of Brampton, Mississauga, and Toronto. The committee is also supported by technical members from the GTAA, NAV CANADA, Transport Canada, and the airline industry.

Voting Members

Chairperson: GTAA President and Chief Executive Officer or designate

Steve Shaw, Vice President, Corporate Affairs, and Consultative Committee representative



City of Brampton: 1 elected representative, 1 resident and 1 additional representative appointed at the discretion of city council (3)

John Sproveri, City of Brampton councillor
Jim Medeiros, City of Brampton resident
Brad Green, City of Brampton resident



City of Mississauga: 2 elected representatives, 2 residents and 1 additional representative appointed at the discretion of city council (5)

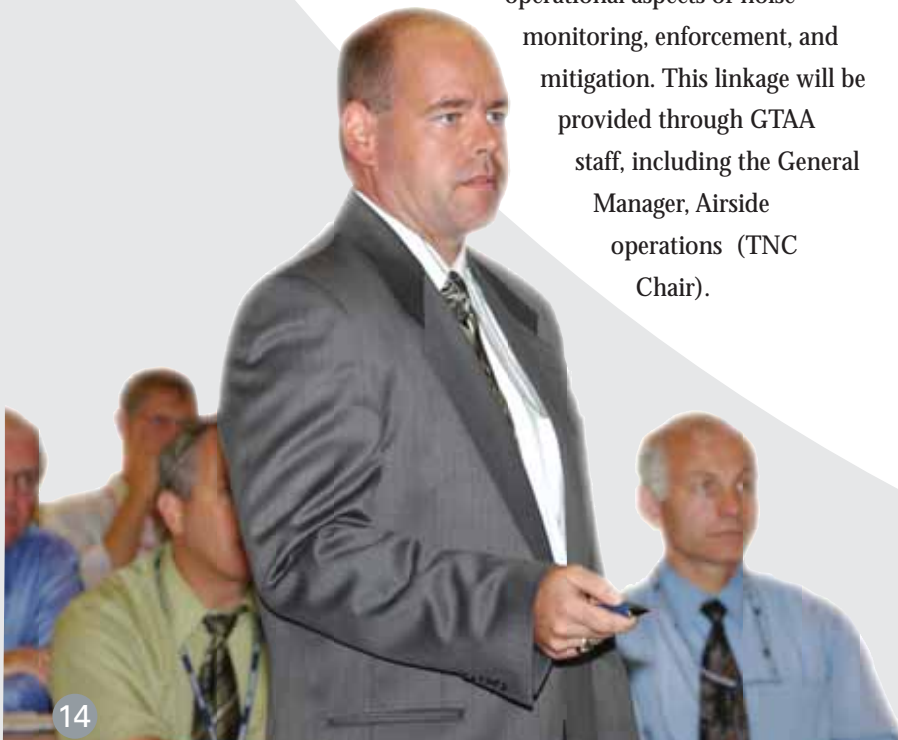
Maja Prentice, City of Mississauga councillor
Pat Saito, City of Mississauga councillor
Tina Rizzuto-Willan, City of Mississauga resident
Gordon Stewart, City of Mississauga resident
VACANT, City of Mississauga discretionary appointment



City of Toronto: 1 elected representative, 1 resident and 1 additional representative appointed at the discretion of city council (3)

Rob Ford, City of Toronto councillor
Suzan Hall, City of Toronto councillor
VACANT, City of Toronto resident

Municipalities are permitted to appoint alternate representatives, who are encouraged to attend meetings regularly. Alternates can vote in the absence of regular members.



Non-Voting Community Members

David Waters, City of Brampton staff representative
 John Calvert, City of Mississauga staff representative
 VACANT, City of Toronto staff representative
 VACANT, Province of Ontario staff representative

Non-Voting GTAA Members

As required

Non-Voting Technical Members

Dave Mastel, NAV CANADA representative
 Dave Bayliss, Transport Canada regional staff representative
 Andy Vasarins, Air Transport Association of Canada representative
 Brian Harkness, Air Canada pilot

Attendance

Meetings are held on a bi-monthly basis in the GTAA Administration Building, 3111 Convair Drive, Toronto AMF. The Committee meets the second Wednesday of alternating months at 4 p.m. Should there be a need to re-schedule, the meeting will take place on the following Wednesday.

Regular attendance is expected of members. If a member misses more than two consecutive regularly scheduled meetings, the appointing community is advised.

Procedures

An agenda is delivered one week in advance of published meeting dates. Items for discussion should be submitted to the Chairperson two weeks prior to meeting.

Quorum consists of six voting members, including the chairperson. In the event a quorum is not attained, the meeting will proceed on an informal basis. Meetings are open to the public and media.

**Secretariat Services**

The GTAA Corporate Affairs department provides secretariat services. The GTAA provides a budget for the administrative support of this committee.

Public Consultation and Education

2005 Schedule

January 12—NMC Meeting

March 30—Public Workshop (Managing the Skies at Toronto Pearson)

April 13—NMC Meeting

April 27—Public Forum (GTAA Noise Management Program Open House)

June 8—NMC Meeting

September 14—NMC Meeting

November 9—NMC Meeting

Working with the Community

In an effort to educate and consult with local residents, the GTAA hosted a public workshop and a public forum in 2005. These sessions, in addition to the regularly scheduled NMC meetings, allowed the GTAA and area residents to exchange information related to the Noise Management Program.

On March 30, 2005, the GTAA hosted a workshop, entitled *Managing the Skies* at Toronto Pearson, which served to educate residents on environmental aspects of Toronto Pearson operations. Participant input from the workshop was forwarded to the NMC for review and was analyzed by the GTAA in order to improve the effectiveness of the Noise Management Program.

On April 27, 2005, the GTAA hosted a public forum where local residents visited the GTAA to learn more about aircraft noise issues. This open house session also provided a forum for community members to express comments and concerns to representatives of the GTAA, NAV CANADA, Transport Canada and the airline industry. The public forum also featured information detailing the potential effects of the 2005 construction schedule on aircraft activity.

The GTAA is committed to public consultation and looks forward to continuing to work with neighbouring residents to improve the Noise Management Program at Toronto Pearson.

Annual Noise Management Report

This annual Noise Management Report summarizes the aircraft noise mitigation efforts of the GTAA and the NMC. This report continues to be an effective tool to educate and communicate with the surrounding communities. The report is available online at www.GTAA.com and is distributed to interested residents and all local elected officials.

Technical Noise Committee

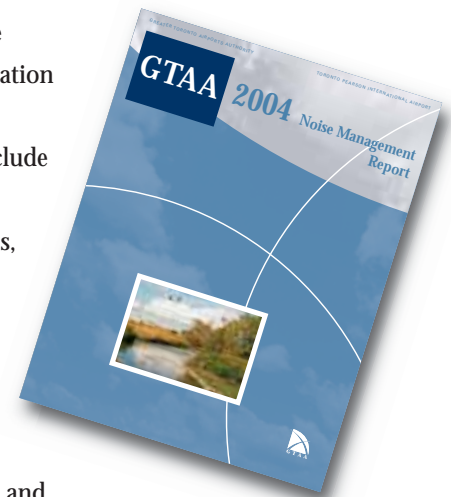
Another important component of the Noise Management Program at Toronto Pearson is the Technical Noise Committee (TNC). The TNC meets on a regular basis to assess the effectiveness of existing noise abatement procedures and to discuss the technical merits of proposed noise mitigation initiatives that are generated by individual members, the NMC, and public input from workshops or forums.

The committee consists of many airport and aviation stakeholders, including representatives from the GTAA, Transport Canada, NAV CANADA, and the airlines. The TNC is a valuable round-table forum where industry specialists consider new technologies and proposals that could be used to augment the airport's noise mitigation program. Specific discussion topics include aircraft and airport operating procedures, Toronto Pearson's night flight restriction program, aircraft noise monitoring systems, and noise mitigation enforcement processes.

On an ongoing basis, the TNC investigates and debates proposed initiatives and reports findings to the GTAA and the NMC.

GTAA Consultative Committee

The GTAA also holds regularly scheduled Consultative Committee meetings that provide an important forum for airport stakeholders to discuss issues affecting Toronto Pearson and its surrounding communities and businesses. Aircraft noise issues and noise



mitigation initiatives may be discussed by this committee, which is given regular updates on the work of the NMC.

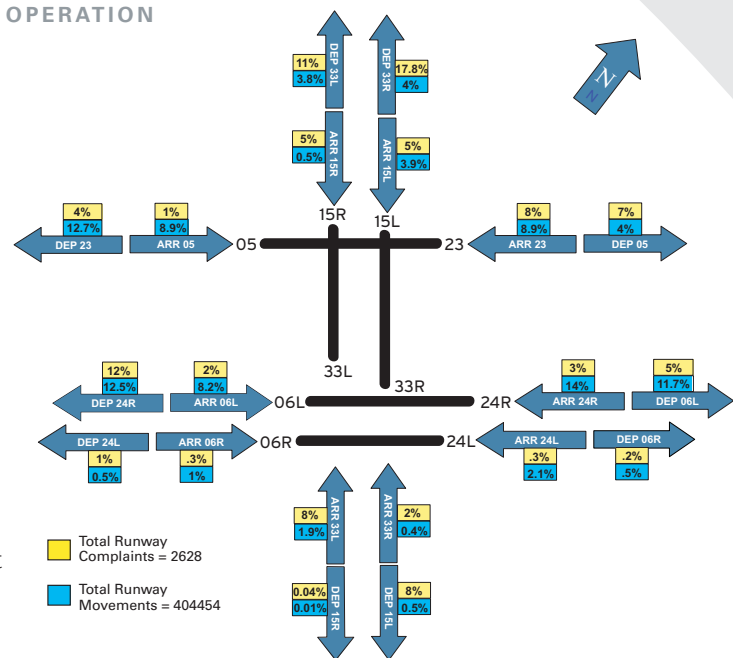
Membership on this committee consists of city councillors, regional staff, board of trade representatives, and local residents. Resource members from the GTAA, the airline industry, Transport Canada, NAV CANADA, and city staff also attend meetings.

Staff of the NMO also respond to NMC inquiries, provide information and analysis as required, research noise mitigation initiatives, and provide technical expertise for committee meetings and committee members. This ongoing collaboration between the NMO and the NMC is a key element of the Noise Management Program at Toronto Pearson.

Noise Management Office

The GTAA Noise Management Office (NMO) monitors airport operations in relation to the Noise Management Program using the Airport Noise Monitoring and Flight Tracking System and its community-based Noise Monitoring Terminals, described below. In addition, NMO staff register aircraft noise complaints using a database system that categorizes noise complaints and automatically correlates these complaints with flight tracking data and complainant data. Staff then investigate complaints, report their findings, and respond to complainants.

FIGURE 10
COMPARISON OF NOISE COMPLAINTS BY RUNWAY OPERATION



**FIGURE 11
COMPARISON OF AIRCRAFT MOVEMENTS
AND COMPLAINTS BY RUNWAY OPERATION**

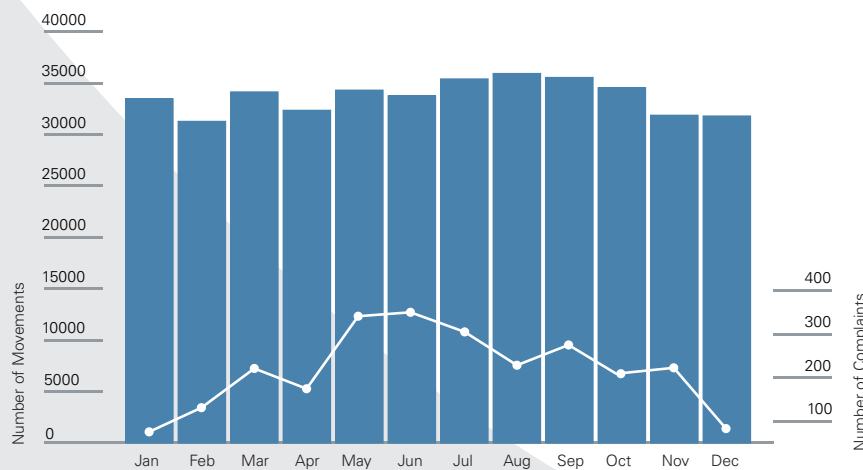
ARRIVALS			DEPARTURES		
Runway	Movements	Complaints	Runway	Movements	Complaints
Arrive 23	35948	203	Depart 05	16144	197
Arrive 24R	56539	75	Depart 06L	47296	134
Arrive 24L	8378	7	Depart 06R	2224	6
Arrive 33R	1673	60	Depart 15L	1894	209
Arrive 33L	7808	205	Depart 15R	33	1
Arrive 06R	4079	9	Depart 24L	1863	20
Arrive 06L	33046	63	Depart 24R	50481	319
Arrive 05	36075	33	Depart 23	51331	97
Arrive 15R	2159	128	Depart 33L	15431	284
Arrive 15L	15937	129	Depart 33R	16115	449
Total Arr	201642	912	Total Dep	202812	1716
Total All Runways				404454	2628
Non Runway Complaints*					36
Total Complaints					2664

Figures 11 and 12 illustrate a comparison of aircraft movements by runway to the number of complaints. In 2005 there were a total of 404,454 aircraft movements (arrivals and departures) at Toronto Pearson, while 2,664 complaints were registered with the GTAAs Noise Management Office.

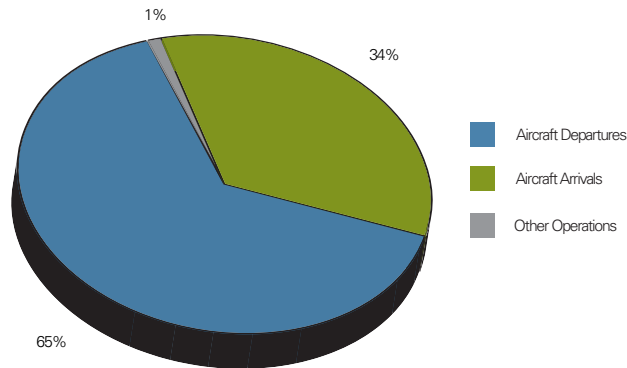
2,628 of these complaints were registered against a particular runway operation. The remaining 36 complaints were registered against: missed approaches; ILS inspections; maintenance runups and helicopter operations.

Complaints in the table relate to source of operation, not by geographic location (e.g., 33R rollback complaints are from south of the airport.)

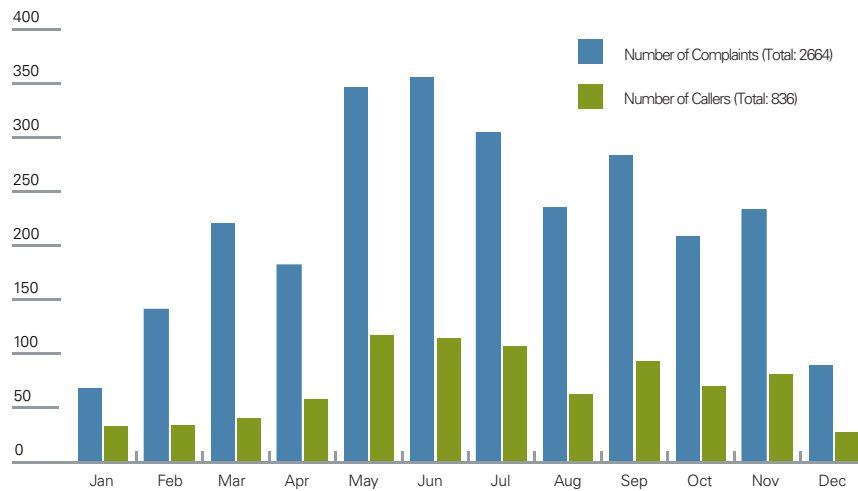
**FIGURE 12
MONTHLY COMPARISON OF RUNWAY
MOVEMENTS AND NOISE COMPLAINTS**



**FIGURE 13
NOISE COMPLAINTS
BY OPERATION**



**FIGURE 14
MONTHLY COMPARISON OF NOISE
COMPLAINTS AND CALLERS**



**FIGURE 15
COMPARISON OF NOISE
COMPLAINTS BY MUNICIPALITY**

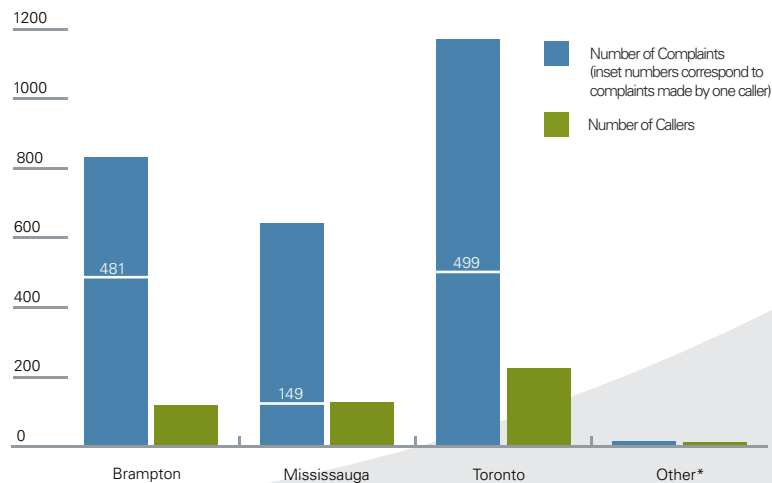


FIGURE 16
TOP FIVE CALLERS VS.
ALL OTHER CALLERS

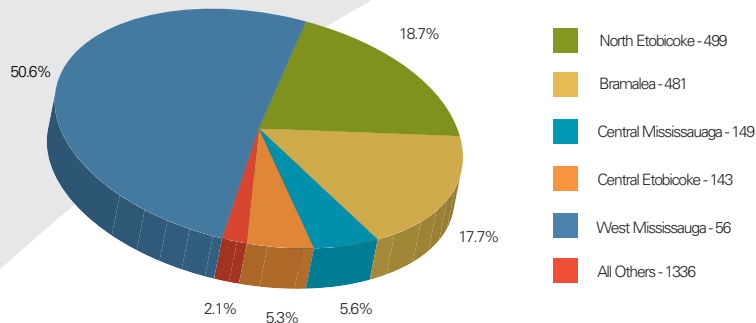
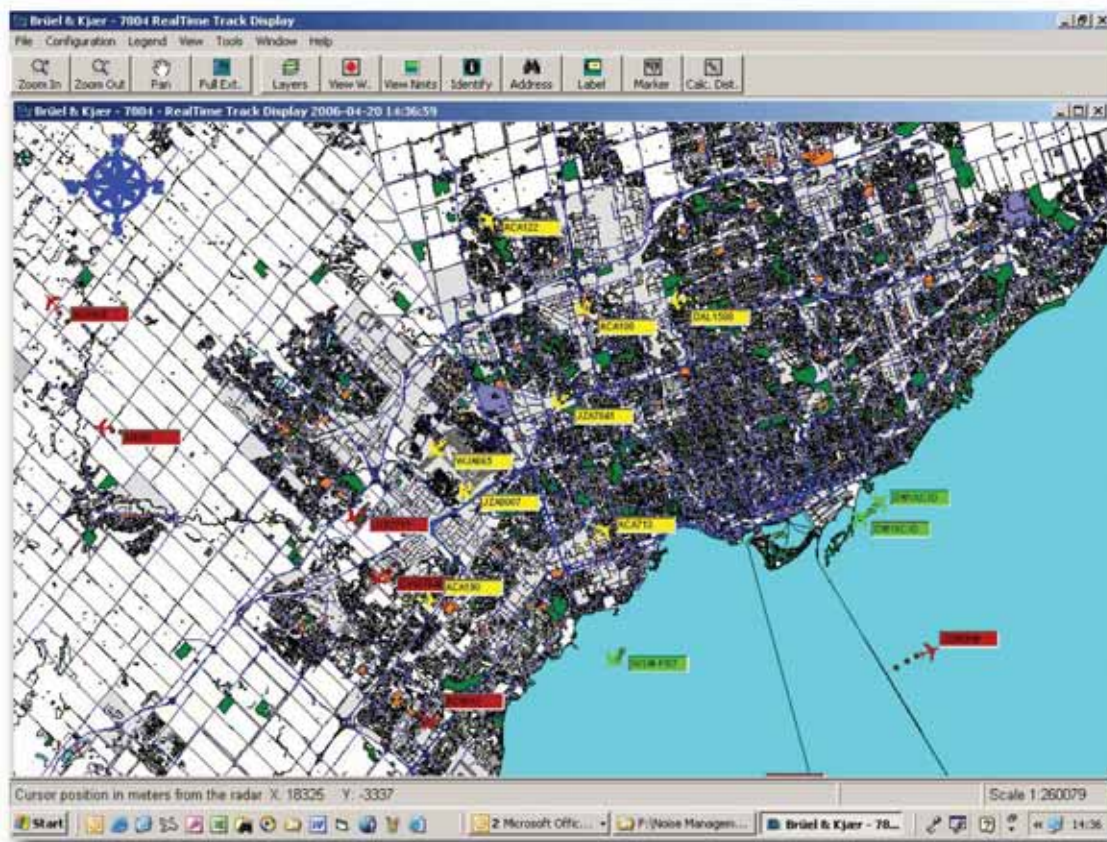


FIGURE 17
REALTIME NOISE
MONITORING DISPLAY



Airport Noise Monitoring and Flight Tracking

The GTAA utilizes a sophisticated Airport Noise Monitoring and Flight Tracking System that combines radar flight tracking data from NAV CANADA with mapping data from a Geographic Information System (GIS). This data is then correlated with noise readings collected at the Noise Monitoring Terminals (NMTs) in the surrounding communities. The figure above is a

screen shot of the system's real-time display mode that provides the GTAA with the following information respectively in descending order: aircraft identification; current altitude above sea level; aircraft type; ground speed; transponder code; origin; and destination. Aircraft arriving at Toronto Pearson are shown in yellow, while departing aircraft are shown in red.

Community Noise Monitoring Terminals

The GTAA uses NMTs within the Noise Management Program to quantify aircraft noise throughout the Airport Operating Area. Using specialized software, NMO staff collect and analyze noise levels generated by aircraft operating in and out of Toronto Pearson. A total of 21 NMTs are currently in operation. The NMT data is used by NMO staff when investigating resident complaints.

The GTAA has committed to the NMC that it will strategically place NMTs in each of the surrounding municipalities to improve the monitoring of aircraft noise and increase the effectiveness of aircraft noise analysis. The most recently added NMT locations were recommended by the NMC and the location of every NMT was selected to establish a comprehensive NMT footprint across the communities surrounding Toronto Pearson. Over the years, the number of NMTs in neighbourhoods around Toronto Pearson has continued to increase.

FIGURE 18
NMT LOCATION MAP



Existing Locations

- 1 West Humber
- 2 Humberlea
- 3 St. Eugene's
- 4 Markland
- 5 Garnetwood
- 6 401/403
- 7 James S. Bell
- 9 Meadowvale
- 10 Bren Road
- 11 Bramalea South
- 12 Grenoble
- 13 Goreway
- 14 Marvin Heights
- 20 South Fletchers
- 21 Peel Village
- 22 Springdale
- 25 St. Elizabeth Seton
- 26 Champlain Trail
- 27 Tomken Twin
- 30 Richview
- 31 Blackfriar

Planned Locations

Mississauga

- 8 Derry East (re-installation)
- 18 Britannia

Toronto

- 32 Humberwood

FIGURE 19
NMT LEQ DATA

NMT	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Toronto													
1	West Humber	58.5	59.0	59.1	58.9	-	-	58.8	-	-	59.0	59.3	58.5
2	Humberlea	-	-	-	58.2	59.2	58.6	58.0	62.3	58.9	58.5	59.8	-
3	St. Eugene's	56.9	56.1	56.4	56.6	55.2	58.3	53.2	-	56.1	55.5	58.4	55.7
4	Markland	54.9	55.3	54.6	56.0	56.2	55.5	57.8	-	56.8	-	-	-
7	James S. Bell	54.3	54.2	54.3	55.5	55.1	56.8	59.2	-	-	-	56.5	54.5
30	Richview	-	-	-	-	-	-	-	-	-	-	-	-
31	Blackfriar	-	64.5	64.5	64.3	63.7	63.0	62.4	63.5	64.0	64.7	64.3	63.5
Mississauga													
5	Garnetwood	53.7	54.2	54.1	56.9	55.4	54.1	53.8	53.7	-	-	-	-
6	Hwy 401 & Hwy 403	60.0	60.6	61.4	64.2	64.1	64.2	61.8	-	-	-	60.7	59.6
8	Derry East	-	-	-	-	-	-	-	-	-	-	-	-
9	Meadowvale	57.5	57.3	57.9	57.1	53.6	55.3	-	-	58.7	58.9	57.5	57.4
10	Bren Road	56.7	56.2	56.0	58.6	60.4	59.6	58.9	-	59.4	58.8	58.7	56.3
14	Marvin Heights	56.6	57.0	56.2	-	58.0	56.4	-	56.3	57.0	-	-	56.7
25	St. Elizabeth Seton	58.5	58.5	58.3	59.8	59.7	59.7	58.5	58.4	58.6	-	-	-
26	Champlain Trail	-	57.5	-	-	-	-	-	60.7	-	-	-	61.1
27	Tomken Twin	59.2	-	58.1	60.3	-	57.7	56.8	57.0	59.3	-	-	59.4
Brampton													
11	Bramalea South	60.2	59.8	57.7	58.8	-	57.9	58.7	-	58.6	59.1	59.0	67.0
12	Grenoble	53.0	53.1	53.5	55.6	55.0	54.6	55.3	54.3	57.3	54.0	57.9	53.7
13	Goreway	53.2	54.2	53.9	57.1	-	-	55.5	57.0	-	-	-	-
20	South Fletchers	62.1	62.5	62.3	62.5	61.8	61.7	61.7	-	61.9	-	63.2	62.4
21	Peel Village	-	55.0	55.1	57.3	55.7	-	53.7	55.1	57.8	-	-	91.2
22	Springdale	-	-	-	-	-	-	-	-	-	-	-	-

Notes

1. NMT #7 out of service August - October 2005 due to school roof renovation.
2. NMT #8 out of service due to new building on the property.
3. NMT #22 - New location installed July 2005.
4. Noise level data provided for NMTs that were active over 75% of the time. Software and hardware problems with new NMTs (#21, 22, 25, 26, 27, 30 & 31) resulted in limited data.

Figure 19 shows the measured monthly average noise levels at each Noise Monitoring Terminal. Noise data presented includes the contribution of all noise sources, and not simply aircraft generated. The varying locations of the NMTs in the community contribute to the variation in noise levels, where some NMTs may be closer than others to regular arrival and departure flight paths (see Fig. 4).

Registering Complaints

To register an aircraft noise complaint within 10 nautical miles (18.5 km) of Toronto Pearson, contact the NMO at (416) 247-7682. Noise complaints can also be registered through the GTAA web site at www.GTAA.com.

For complaints concerning en route aircraft or those beyond 10 nautical miles (18.5 km) of the airport, call Transport Canada at (416) 952-0335.

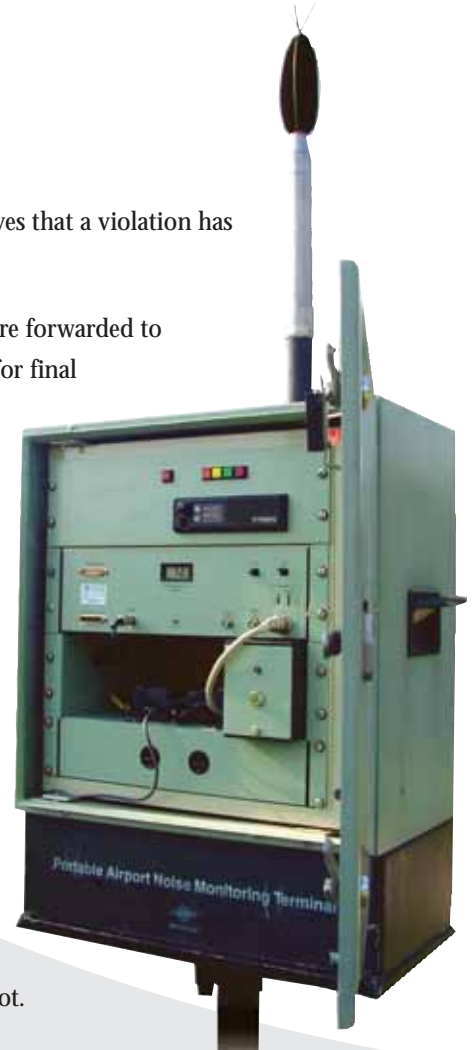
Investigations and Enforcement

The GTAA investigates potential violations of noise abatement procedures, restricted hours operations and maintenance engine run-ups. Investigations conducted by the GTAA result from both registered public complaints and ongoing tracking and monitoring carried out by the GTAA.

If GTAA staff believes that a violation has occurred, the

details of the case are forwarded to Transport Canada for final disposition, as it

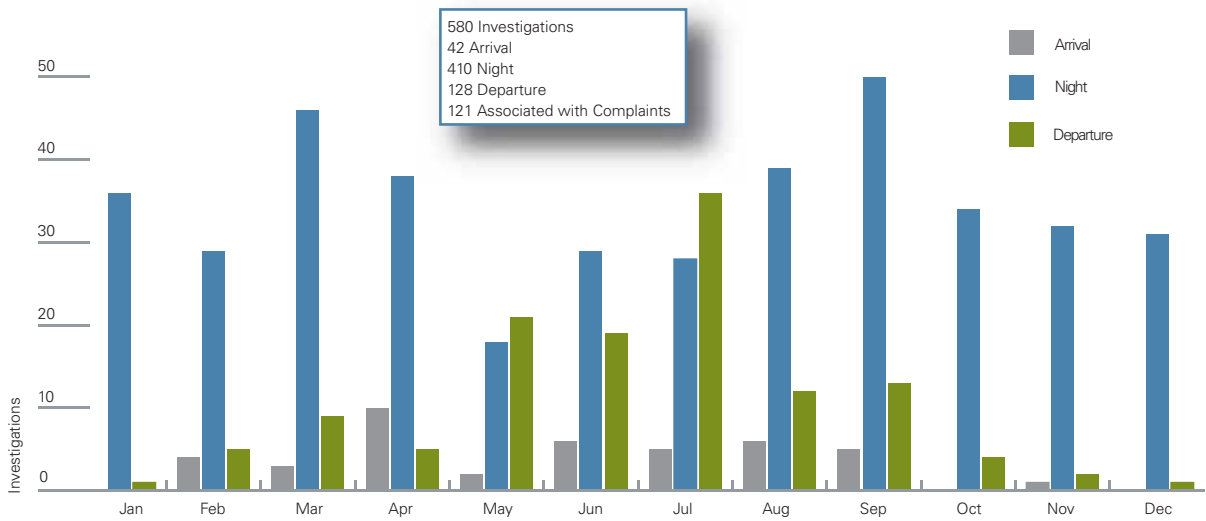
has the sole authority for determining financial penalties. For any violation, Transport Canada can assess a maximum fine of \$25,000 against a company and \$5,000 against a pilot.



In addition, at the urging and in support of the NMC, Transport Canada publishes the names of corporations violating the Aeronautics Act and the Canadian Aviation Regulations, including noise violations, on its web site:

<http://www.tc.gc.ca/civilaviation/regserv/enforcement/publications/corporate/summary.htm>

**FIGURE 20
NOISE ABATEMENT
INVESTIGATIONS**



Toronto Pearson International Airport



Greater Toronto Airports Authority

Toronto Pearson International Airport

P.O. Box 6031

Toronto AMF, ON, L5P 1B2

www.gtaa.com

President and Chief Executive Officer

John Kaldeway