



STAFF REPORT ACTION REQUIRED

Health Impacts Associated with Billy Bishop Toronto City Airport Expansion

Date:	November 25, 2013
To:	Board of Health
From:	Medical Officer of Health
Wards:	All
Reference Number:	

SUMMARY

The Billy Bishop Toronto City Airport (BBTCA) is located on the Toronto Islands, close to residential areas, parks, and Toronto's downtown. A Tripartite Agreement signed by City Council, the Federal Government, and the Toronto Port Authority governs the airport's operations until its expiry in 2033 and currently prohibits jet aircraft or expansion of the airport's runways. In Spring 2013, Porter airlines requested that the Tripartite Agreement be amended to permit jets at the BBTCA.

The public and especially some in the communities near the BBTCA have expressed concern that the airport's current operations may be harmful to health and that the proposed expansion could worsen the situation.

A rapid Health Impact Assessment commissioned by Toronto Public Health at the request of the Board of Health concluded that this evolving area is home to some vulnerable populations and that many sources currently contribute to health risks in the area. The airport, even in its current form, contributes to existing air quality and noise-related health concerns. Traffic conditions, which increase the risk of injuries or fatalities and hamper access to recreational, health, and community services in the area are expected to worsen with expansion. Current and expanded operations at the BBTCA may also have negative impacts on health risk from air pollution, climate change, water quality, feelings of safety in the community, and enjoyment of parks and cultural and social events along the Waterfront.

The findings suggest that the long-term presence of the airport on the City's Central Waterfront has a more important impact on health than the proposed incremental changes to the airport's operations. The current vision in the City's Official Plan for the Central Waterfront as a densely populated, vibrant area that celebrates and provides connections

to the lakefront aligns with the characteristics of a Healthy City. Optimal protection and enhancement of the health of Central Waterfront residents and the city as a whole calls for a reduction of current and future airport impacts.

RECOMMENDATIONS

The Medical Officer of Health recommends that:

1. the Board of Health recommend that City Council plan for the most health-supporting use of the airport lands upon expiry of the current Tripartite Agreement, consistent with the vision for the Central Waterfront in the City's Official Plan;
2. the Board of Health recommend to City Council that while the Tripartite Agreement remains in effect, any change to operations and associated transportation infrastructure should ensure that existing health impacts are reduced;
3. the Board of Health recommend that City Council endorse the mitigation measures applicable to current airport operations, as set out in the report from the Deputy City Manager, Cluster B, for consideration by Executive Committee on December 5, 2013.

Financial Impact

There are no financial implications arising from the adoption of this report.

DECISION HISTORY

In April 2013, Executive Committee considered a request from Porter Airlines that the City approve an exemption from the commercial jet ban at Billy Bishop Toronto City Airport (BBTCA) and in May, City Council adopted a report from the Deputy City Manager, Cluster B, outlining a workplan to respond to the request, including hiring consultants to investigate the implications of amending the agreement (<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.EX31.27>)

In July 2013, Executive Committee considered a report on the work undertaken to date, including preliminary findings from the consultants. A further progress report was considered by Executive Committee in September 2013. (<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.EX33.18> and <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.EX34.14>).

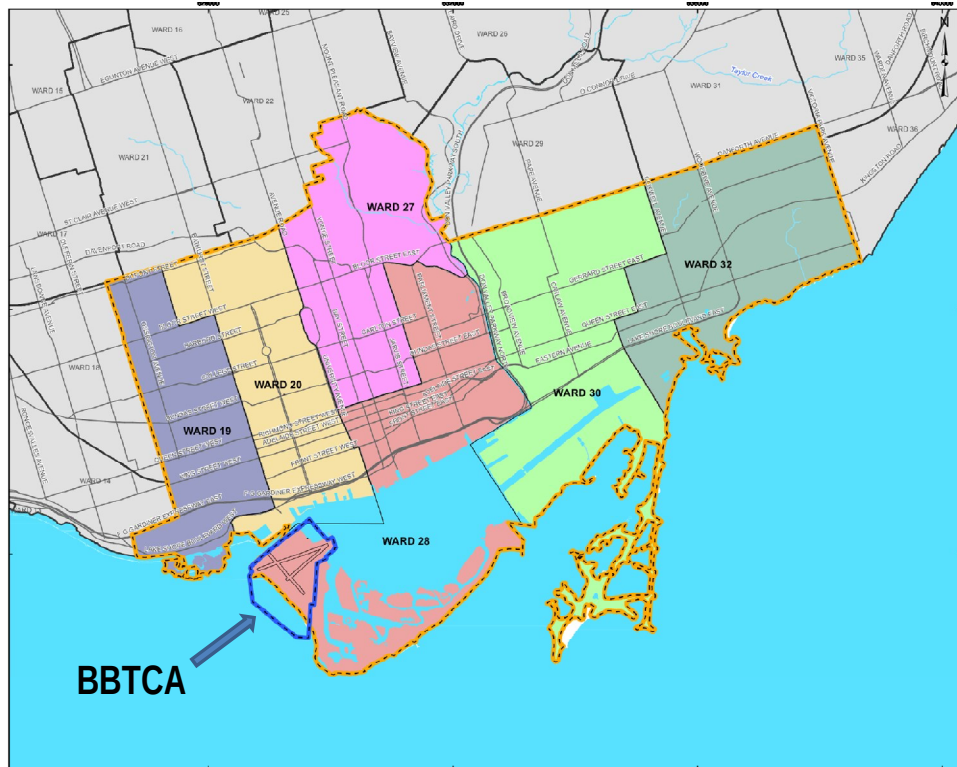
In July 2013, the Board of Health requested that the City Manager ensure that the scope of work for external consultants retained by the City and to be funded by the Toronto Port Authority to examine noise, environmental and traffic congestion impacts associated with the use of commercial jets at Billy Bishop City Centre Airport also include a requirement to conduct a Health Impact Assessment (HIA), in collaboration with the Medical Officer of Health; and that the Medical Officer of Health report back to the Board of Health on

the degree to which health impacts are being addressed in the Phase 1 and Phase II studies, and when available, what the anticipated health impacts are (<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.HL23.11>).

ISSUE BACKGROUND

The Billy Bishop Toronto City Airport (BBTCA) is located on the northwestern tip of the Toronto Islands (See Figure 1). Since it opened in 1939, it has been used to varying degrees for general aviation, military flights, and commercial flights to regional destinations.

Figure 1: Location of BBTCA and nearby City of Toronto Wards



In 1983, the City of Toronto, Toronto Harbour Commission (superseded by the Toronto Port Authority) and the Federal Government signed a fifty-year "Tripartite Agreement" that governs operation of the airport. The Tripartite Agreement places restrictions on the types of aircraft that may be operated at the airport, hours of operation, noise conditions and access. It currently prohibits the use of jets and extensions to existing runways. The Tripartite Agreement expires in 2033 and does not contain any provisions for renewal.

The airport is currently used for commercial flights, privately owned airplanes, small charters, and emergency flights. Recently, the character of operations at the BBTCA has changed. In 2006, about 23,000 people travelled through BBTCA. That year, Porter airlines began operating flights using 70-seat turboprop aircraft (the Q400). Passenger volumes have grown and in 2012, 2.3 million people travelled through BBTCA. The airport is currently accessed using a ferry that operates from the foot of Bathurst St. A

pedestrian tunnel to the airport is currently under construction with completion scheduled for 2014.

Currently, the City is considering a request from Porter Airlines Inc. that the Tripartite Agreement be amended to lift the current prohibition on jet aircraft operations at the BBTCA and to authorize a runway extension of either 168 or 200 metres at each end.

In addition to the airport, the Toronto Islands include beaches, parks, residences, and an amusement park. The mainland directly to the north of the BBTCA is occupied by a public park, a combined school/community centre, and mid-rise residential buildings. The airport is also close to the downtown commercial and business districts, and to densely populated residential areas characterised by mid- and highrise buildings.

TPH's recent *Healthy Toronto by Design* report is a reminder that health issues are embedded in all policies, programs and services, and that the way cities are designed, built, and managed is fundamental to the health and well-being of its residents. In 1991, a Royal Commission on the Future of the Toronto Waterfront invoked the "Healthy City" concept in its final report, *Regeneration*, drawing on the perspective that health depends on the quality of social, physical, and economic environments, and on equal access to the health opportunities they provide. Its vision described Toronto's future Waterfront as connected to the rest of the City and characterized by integrated, well-planned functions including parkland, residential and commercial uses, and transportation.

This approach is reflected in the City's planning policies, which call for the revitalization of the area surrounding the airport, including transforming the waterfront and improving its connection to the rest of the city. Toronto's Official Plan provides for continued operation of the airport, but requires that changes to the airport's facilities have no adverse impacts on the surrounding environment. The Policy provides that if the airport ever closes, the site should be converted to a park or a mix of park and residential uses.

Studies show that airports can affect the health of people who live, work, and play nearby because of exposure to air and noise pollution associated with aircraft, ground-side operations, and traffic. However, the available research considers airports where operations and settings are distinct from BBTCA. Recommendations related to BBTCA operations are best guided by an analysis that considers local circumstances.

A recognized way to evaluate the potential health implications of a policy or decision is to conduct a Health Impact Assessment (HIA). HIA is a well-defined process that is documented by organizations such as the World Health Organization. HIAs typically look at who is most likely to be affected, explore whether the positive or negative impacts affect certain groups of people more than others, and consider all aspects of health, including physical, cultural, and social well-being.

In this case, the HIA examined potential health implications of the BBTCA's current operations and potential expansion to include jets. Toronto Public Health (TPH) developed a preliminary scope for the HIA based on available studies of health impacts

and HIAs conducted at other airports. The scope was refined based on input from stakeholders and local considerations.

COMMENTS

Toronto Public Health retained Golder Associates to conduct the HIA which examined the potential health implications of the BBTCA's current operations as well as potential expansion to include jets.

Assessment Scenarios

The scenarios examined were informed by a 2010 capacity study completed by the Toronto Port Authority that determined that the airport could accommodate a maximum of 202 commercial flights per day within the noise limits set in the Tripartite Agreement.

The HIA explored health impacts associated with three scenarios:

1. Existing conditions without the BBTCA;
2. Maximum existing operations under the existing Tripartite Agreement, assuming 202 commercial turboprop flights per day and 3.8 million passengers per year. Although only 2.3 million people used BBTCA in 2012, this scenario is effectively a worst-case representation of current conditions, as there are already instances where BBTCA reaches the maximum 202 flights per day;
3. Future conditions assuming 25% of turboprop flights replaced by jets and 4.3 million passengers per year. While the number of flights cannot increase beyond 202 per day, passenger volumes can still increase because jets can carry more people than turboprops. (The CS100 can carry 100 passengers while the Q400 can carry 70). For this scenario two types of jets were considered spanning a range of air and noise emissions that might be expected from jets landing at BBTCA: the CS100 (as a best-case scenario) and a 737-700 (as a worst-case scenario).

Quantitative evaluation of each scenario was possible for air pollution and noise-related impacts because the Health Impact Assessment collected additional information about air quality and noise in the area. For other potential health impacts, available data was used to support a qualitative assessment of the potential impacts that would be expected.

Stakeholder Input

To ensure that the final scope of the BBTCA HIA reflects the range of local concerns and considerations, TPH gathered input by extracting health-related comments from the public consultations co-ordinated by the City, reviewing the findings of the online and telephone surveys co-ordinated by the City, organizing a targeted stakeholder workshop, and collecting written submissions by email. Details about the process and findings as well as a complete list of the health concerns raised can be found in the *HIA for Proposed Expansion to Billy Bishop Toronto City Airport Key Stakeholder Summary Report*, available from <http://www.toronto.ca/health/reports/>

Overwhelmingly, people believe that the airport contributes to adverse health risks under existing conditions, and that permitting jets at the airport will increase existing health impacts.

Findings

Table 1 lists the factors considered and presents a summary of the HIA's findings. The sections following the table provide additional explanation. A full technical *HIA for Proposed Expansion to Billy Bishop Toronto City Airport* report and appendices are available from <http://www.toronto.ca/health/reports/>.

Table 1: Summary of potential health impacts from BBTCA operations and potential expansion^{1,2}

Potential Health Risk	Health Impact of BBTCA relative to a baseline of "no airport"	Health Impact of permitting Jets, relative to current conditions
Environmental		
Air quality	Air pollution from BBTCA worsens existing risk of cancer, premature death, and cardiovascular and respiratory health outcomes	Increased air pollution further increases risk of premature death, and cardiovascular and respiratory health outcomes
Noise	Noise from BBTCA worsens levels which already exceed several health guidelines related to annoyance, sleep disturbance and children's learning performance Noise from run-ups is much louder than background noise levels and its abrupt nature is likely to be disruptive	Noise levels and therefore risk to health is much the same for some aircraft operations and improves for others
Traffic	Traffic conditions around the airport increase the risk of injuries or fatalities, especially for vulnerable pedestrians including children. Traffic congestion also undermines health by hampering access to recreational, health, and community services in the area.	Increase in traffic volumes further increases the risk of injuries or fatalities, especially for vulnerable pedestrians including children. Increase in traffic congestion further undermines health by hampering access to recreational, health, and community services in the area.
Climate change	BBTCA operations contribute to greenhouse gas emissions, potentially contributing to climate-related health effects	Increases greenhouse gas emissions, potentially contributing to climate-related health effects
Water quality	BBTCA introduces risk of chemical spills to water including de-icing fluids and fuels	Increases risk of chemical spills to water including de-icing fluids and fuels
Economic		
Income	Likely Increases income which can offer health benefits	Increases income which can offer health benefits

¹ The technical report also identifies health risks related to fuel transport, wildlife, odour, and light pollution. In this table, they are captured within the categories "feeling safe in the community" and "recreation".

² While the HIA considered a range of potential health concerns, TPH's ability to assess each was affected by the type and quality of data available and limited time for the assessment. The technical report provides further details about limitations and gaps in data that were not resolved in this HIA.

Employment	Likely Increases employment which can offer health benefits	Increases employment which can offer health benefits
Tourism	Likely increases number of visitors but may decrease enjoyment of the area	May increase number of visitors but decrease their enjoyment of the area
Healthcare costs	Increase in healthcare costs due to increased risk of air pollution, noise, and traffic-related related health outcomes	May increase healthcare costs related to traffic injuries, may decrease healthcare costs related to noise annoyance
Property values	May be positive or negative since property value increases are in line with the Toronto market as a whole but some stakeholders link the airport to relocations and even closure of co-op buildings	May be positive or negative since property value increases are in line with the Toronto market as a whole but some stakeholders link the airport to relocations and even closure of co-op buildings
Infrastructure	Likely increases costs of transportation infrastructure	Increases cost of transportation upgrades
<i>Social and Cultural</i>		
Feeling safe in the community	Introduces concern about accidents such as spills, explosions, and plane crashes	Introduction of jets increases concerns about traffic safety from more vehicles, higher chance of plane crashes, and higher chance of fuel spills or explosions
Recreation	Decreases opportunities for access to recreational space due to longer commute times resulting from traffic congestion and delays Decreases enjoyment of recreational space due to impact on air quality, noise, traffic, odour, and light pollution	Further decreases opportunities for access to recreational space due to longer commute times resulting from traffic congestion and delays Further decreases enjoyment of recreational space due to impact on traffic, odour, light pollution, and potential for wildlife strikes
Cultural activities	Decreases opportunities for access due to longer commute times resulting from traffic congestion and delays Decreases enjoyment of cultural activities due to impact on air quality and noise	Further decreases opportunities for access due to longer commute times resulting from traffic congestion and delays Further decreases enjoyment of cultural activities due to impact on traffic, odour, light pollution, and potential for wildlife strikes
Community services	Decreases opportunities for access due to longer commute times resulting from traffic congestion and delays	Further decreases opportunities for access due to longer commute times resulting from traffic congestion and delays
Community Character	Not known	Decreases satisfaction with the neighbourhood because expanding service does not seem to align with Toronto's Official Plan

The HIA separates the relevant health impacts into categories in order to ensure that they can be clearly understood and evaluated. However, it is important to consider that people

do not experience the impacts one at a time, but all together. In particular, the communities immediately adjacent to the airport are likely to bear many of the potential health impacts of the airport's operations.

Community Profile

Some groups of people are more likely to experience illness than others, including groups with lower incomes, lower education, children and seniors, and those who are already ill. A review of data for Wards nearest the airport³ suggests that compared to the Toronto average they tend to be home to a higher percent of people living on low income. They also have a higher proportion of children who are vulnerable in terms of readiness to learn, higher injury rates especially among children, and higher rates of lung and heart disease. As well, some lands directly adjacent to the BBTCA are occupied by facilities that are primarily used by children, including the elementary school, alternative school, community centre and Little Norway Park.

For these groups, vulnerability to health outcomes may be magnified by the added environmental, economic, social, and cultural risks from the airport.

Environmental Health Impacts

Air Pollution

Air pollution is a complex mix of substances including common air contaminants that contribute to respiratory and cardiovascular health outcomes, and air toxics that may increase the risk of various outcomes including cancer and reproductive, neurological, or developmental conditions. The HIA modelled how the airport might affect air pollution and related health risk for 30 substances.

The BBTCA including related traffic contributes 10-15% of air pollution close to the airport, with the balance originating from non-airport traffic, small industrial and commercial sources, home furnaces, and air pollution from other parts of Ontario and United States. The airport-related air pollution comes mainly from the aircraft and the ferry. It is dominated by nitrogen dioxide (NO₂) and also includes particulate matter (PM), acrolein, aldehydes, and metals. Figure 2 shows the geographic pattern of elevated NO₂ levels without and with the airport, illustrating that the airport's impact on ambient levels extends across the central waterfront and islands. Darker colours reflect higher concentrations, and the effect occurs mainly to the northeast of the airport because the predominant wind direction is from the southwest.

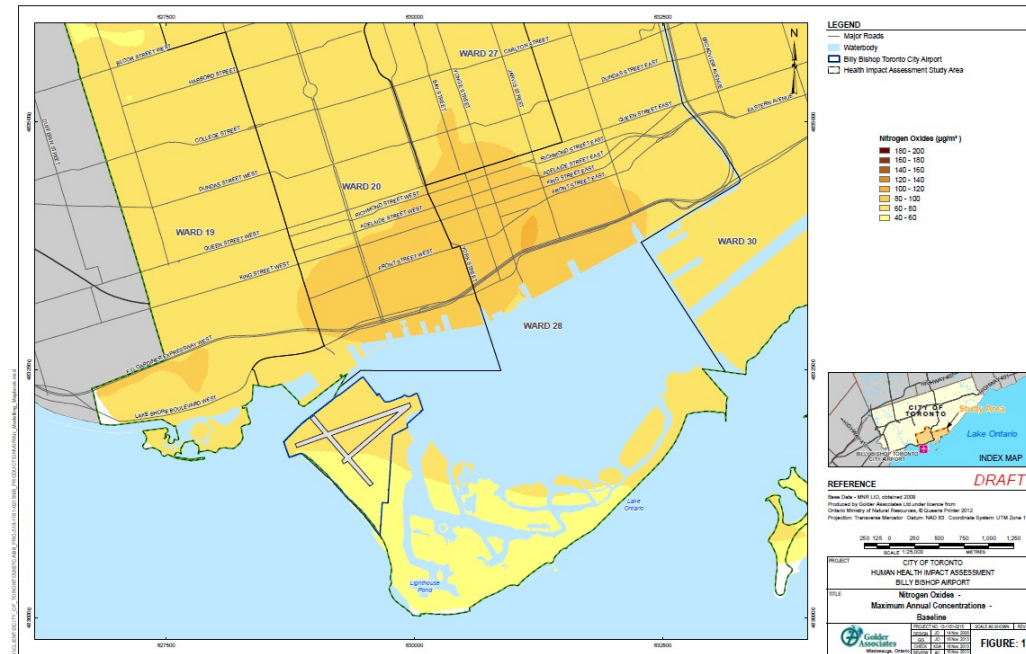
Under all scenarios, levels of four substances (polycyclic aromatic hydrocarbons, represented by benzo[a]pyrene, NO₂, particulate matter (PM₁₀), and benzene) are expected to be present at levels above provincial ambient air quality standards in some locations, some of the time.

³ Data Source: 2011 City of Toronto Ward Health Profiles for Wards 19, 20, and 28 (<http://app.toronto.ca/wards/jsp/wards.jsp>); Please see the Technical Report for further details and information.

Current levels of pollution exceed health benchmarks and contribute to the overall existing burden of respiratory, cardiovascular, and cancer-related illness in Toronto. BBTCA is one source contributing to this burden.

Figure 2: Annual average concentrations of NO₂ around BBTCA under two scenarios: A) no airport; B) maximum existing conditions

A – no airport



B – maximum existing conditions

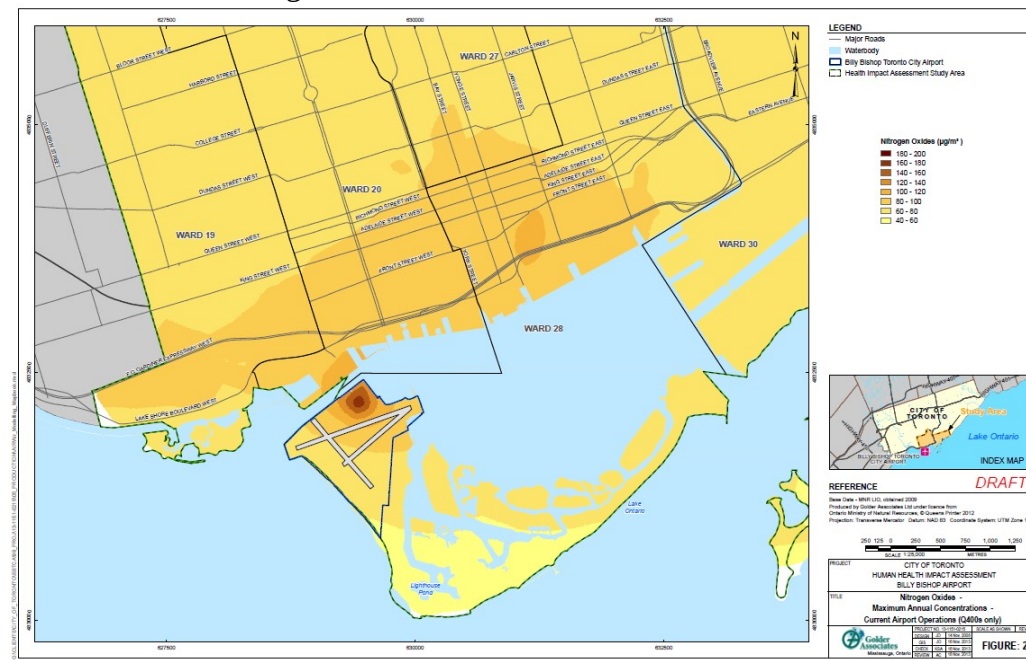
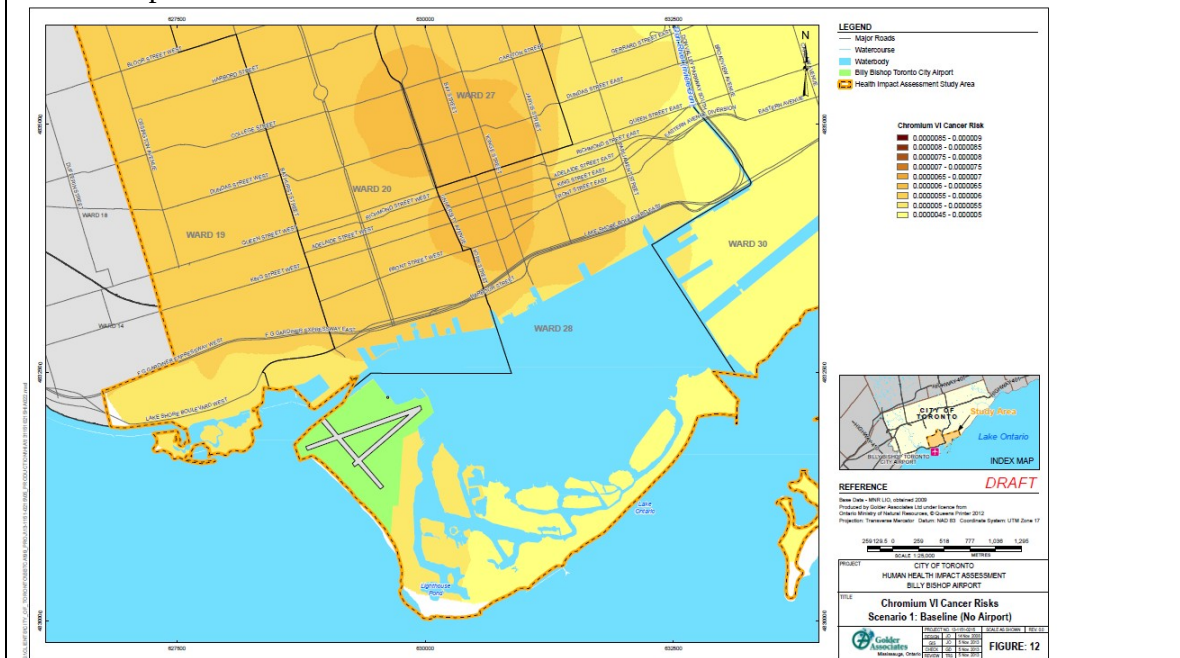
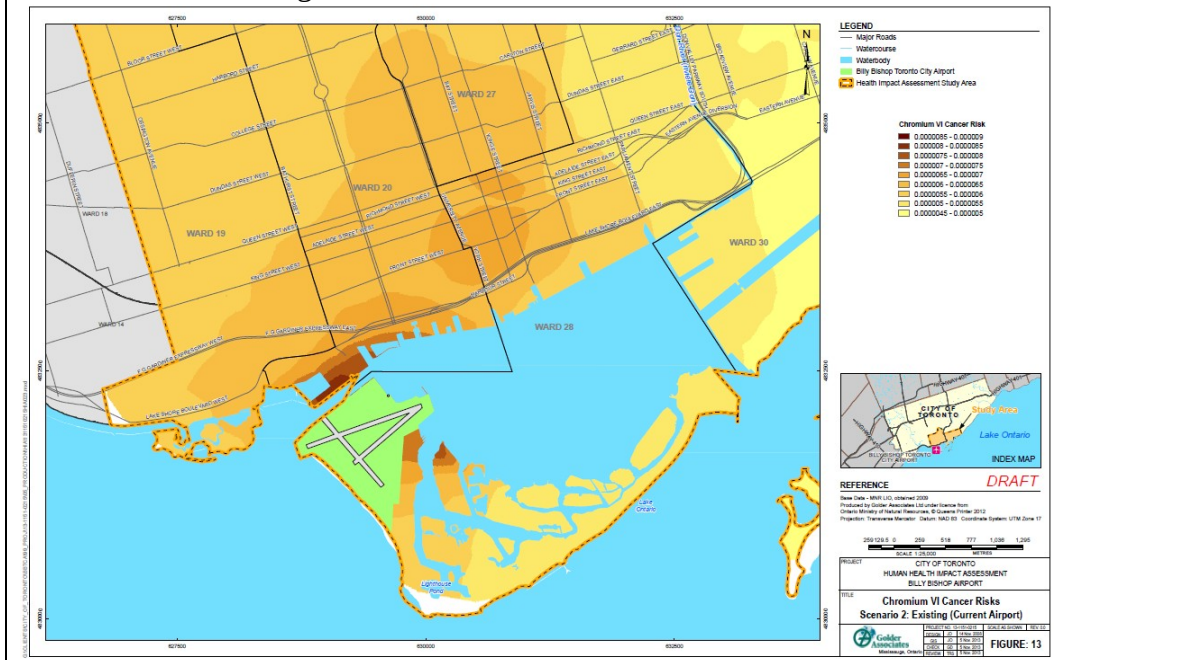


Figure 3: Lifetime risk of cancer attributable to Chromium VI around BBTCA under two scenarios: A) no airport; B) maximum existing conditions

A – no airport



B – maximum existing conditions



Of the carcinogens considered in the HIA, nine are likely emitted by the BBTCA. Combined, emissions of these pollutants from BBTCA are predicted to increase the lifetime cancer risk at locations near the airport. Figure 3 illustrates the change in lifetime cancer risk arising from the chromium VI, which is the most important contributor to

predicted cancer risk related to BBTCA operations. In this Figure, darker colours indicate higher risk. As with NO₂, the effects can be observed across the downtown.

The common air contaminants include carbon monoxide, sulphur dioxide, PM_{2.5}, and nitrogen oxides. Emissions of these that are attributable to BBTCA contribute to a slight increase in risk of premature death. The HIA used premature death as an indicator of the most severe health outcome that can arise from exposure to the common air contaminants. Common air contaminants are also known to contribute to risk of heart and lung diseases. While these less severe health outcomes were not evaluated in the HIA, they are expected to be more common.

Levels of other non-carcinogenic air pollutants (those classed as air toxics) occur below levels of concern to health even when the combined exposure is taken into account.

The scenarios for expanded service including jets were associated with minor changes in air pollution concentrations which resulted in negligible changes for cancer-related health risk and increases the risk of premature mortality from the common air contaminants in areas closest to the airport.

Noise

Sound is generally reported on the logarithmic decibels (dB) scale. Using a combination of modelling and monitoring, this HIA assessed noise at nine locations commonly associated with noise complaints (See Table 2 for list) and at several elevations, in order to capture the potential impacts on condominiums.

The HIA evaluated a series of health effects related to noise including children's learning performance, annoyance, sleep disturbance, and cardiovascular health outcomes.

Children's learning development was assessed based on noise levels measured at two area schools. The HIA concluded that at the Waterfront City school, the airport further adds to noise levels that are already above a World Health Organization (WHO) guideline for annoyance. While levels at the Island school are below the WHO annoyance guideline for all scenarios, the airport adds more to the total noise exposure there deteriorating the learning environment at the Island school.

Prolonged feelings of annoyance are expected to undermine quality of life. Percent Highly Annoyed (%HA) reflects the percentage of the population that is highly annoyed by a specific noise. Health Canada considers changes in %HA greater than 6.5% to be significant. While the average change in %HA from baseline (no airport) to existing conditions is 5.6%, in some places, %HA increased by up to 12%. This suggests that airport-related noise is a real concern in some parts of the community.

The airport may be a minor contributor to sleep disturbance in some locations. According to the HIA's findings, noise levels are already above the WHO night noise guideline for all locations and scenarios except at Ward's island in the no airport scenario. Airport operations appear to increase the values slightly depending on the location. The airport is

not expected to contribute to risk of heart disease in the neighbourhood, mainly because noise thresholds for heart disease are rarely exceeded in the area.

Aircraft run-ups may be a particular problem. Aircraft run-ups are a series of checks that may need to be performed prior to take-off, or for maintenance reasons, and require increasing the engine's power. While there are no appropriate health benchmarks available to evaluate the impact of run-ups on health, the HIA concluded that noise levels currently span a range of 64 – 86 dBA. Under a future scenario with jets, this could decrease to 45-72 dBA (See Table 2). The impacts at 70 metres elevation suggest that that residents in area condominium towers may also be affected.

Table 2: Noise levels at locations near BBTCA during run-ups under two scenarios: current represented by Q400 (turboprops) and Future, represented by CS100 (new jets)

Location	Engine Run-ups (dBA)					
	Q400	CS100	Q400	CS100	Q400	CS100
	2 m Elevation		15 m Elevation		70 m Elevation	
Stadium Road	82	67	86	72	85	72
Toronto Music Garden	72	55	74	59	81	66
Harbour Square	75	62	75	62	73	60
Ward's Island	67	53	69	54	68	53
Harbour Side Co-op Homes	64	45	85	71	83	69
Windward Co-op Homes	77	63	75	61	84	70
Little Norway Park	76	62	84	70	83	69
The Waterfront School / City School	75	61	83	69	82	68
The Island Public School	77	68	77	67	75	66

According to the Canadian Centre for Occupational Health and Safety, these levels are similar to noise created by a nearby car or truck passing at 50-60 km/hour. Because run-ups are short-duration but loud, they may be more likely to startle or disturb people.

For all health outcomes considered, the scenario with jets results in either unchanged or improved noise environments, because the CS100 is expected to be quieter overall than the Q400 turboprop.

Traffic

A traffic analysis completed by BA Group for the BBTCA neighbourhood concluded that existing operations are constrained, and are generally considered unacceptable by the public and by key stakeholders in the area. The airport draws additional vehicles to an area where conditions already increase risk of injuries especially for vulnerable pedestrians including seniors, people with disabilities, and children who use the nearby school, community centre, daycare, and park. It may also limit healthy physical activity, as people are generally uncomfortable walking and cycling under such conditions. As well, all the vehicles that serve the airport including personal vehicles, taxis, and fuel trucks contribute to air pollution and noise in the area. Traffic congestion also undermines health by hampering access to local recreational, cultural, health, and community services and events.

The proposed expansion would be expected to magnify the negative impacts on each of these factors, because permitting jets would increase the number of people accessing the airport. BA Group's analysis showed that even if the proportion of people arriving by personal vehicle or taxi could be significantly reduced, the overall increase in passengers arriving means that traffic levels will at best remain unchanged from the current situation.

According to BA Group's analysis, if hourly volumes continue to rise, significant infrastructure improvements are needed to facilitate the increased traffic activity. The changes required to cope with these potential increases in peak traffic volumes are likely to negatively affect health because they may affect the streetscape, pedestrian and cycling environments, accessibility of the Waterfront, and overall character of the neighbourhood.

Water

Many stakeholders are concerned that operations at BBTCA could affect drinking water quality or recreational water quality as a result of impacts on Lake Ontario. People raised concerns that use of de-icing chemicals and fuel spills could introduce new pollution to the Lake, and that the runway extension could hamper flows that dilute current pollution in the inner harbour.

While the use of jets may increase runoff load from maintenance and cleaning, the Toronto Port Authority indicates that potential impacts of both current and proposed future operations should be minimized through their ethylene glycol containment system which collects and stores chemicals including ethylene glycol for transfer to the City's sanitary sewer. The City then treats the water and must comply with the provincial *Environmental Protection Act* which prohibits release of chemicals including ethylene glycol into the lake. Toronto Public Health is not aware of any monitoring conducted in the stormwater runoff from the airport in the Lake near the airport to confirm that the ethylene glycol containment system is functioning effectively.

Jet fuel dumps are low probability events and their impact on local water quality and therefore health would depend on where the dump occurred and how much fuel was released. In the long-term, the concentrations would dilute to levels that would not be associated with a measurable health impact.

Climate Change

Climate change is expected to contribute to a range of health impacts globally. In Toronto this may include more illness and death from extreme heat, poor air quality, and vector-borne disease; more injury and illness arising from flooding of homes and businesses; impacts on mental health; and indirect impacts arising from weather-related loss of core services such as electricity, transportation, and communication.

Air travel is associated with climate change, and compared to trains and buses, planes use more fuel and emit more greenhouse gases per passenger for a given distance travelled. The BBTCA already contributes to greenhouse gas emissions from groundside operations, aircraft, and the vehicle traffic it attracts. Even though jets emit fewer

greenhouse gases per km than turboprops, the introduction of jets would likely increase the airport's contribution to climate change overall because of the longer distances being covered. The extent to which the BBTCA would add to greenhouse gases that would otherwise originate from Pearson is unclear.

Economic Health Impacts

Having access to financial resources supports good health in individuals and populations. TPH's *Unequal City* report previously demonstrated the relationship between income and health in Toronto. There is also evidence that greater inequity within communities is linked with worse health for the community overall.

An economic analysis conducted by HLT Advisor for the BBTCA review outlined that expansion of BBTCA to include jets would have positive impacts on both employment and income, by creating jobs and increasing labour income. Health benefits would be expected for those people whose income or employment status improved as a result.

However, the analysis focussed on the economic implications of increased passenger activity and considered only the interests of airport/airline stakeholders and users. Stakeholders are concerned that the airport's current operations and proposed expansion may also have negative impacts including the costs of infrastructure needed to modify traffic demands under current and future scenarios, costs of infrastructure upgrades to some buildings in the area to reduce exposure to air pollution and noise, healthcare costs and lost work productivity days resulting from airport-related impacts, and negative impacts on tourism. The opportunity cost of having the airport located on valuable Toronto waterfront lands is not known.

As well, while the expansion of service at BBTCA has economic benefits, these benefits may not accrue to the populations which experience associated health risks.

Social and Cultural Health Impacts

Feeling Safe in the Community

For people who live near the airport, the expansion may raise safety concerns. Many people identified that jets may be at increased risk of bird strikes compared with turboprops, raising fears of plane crashes. People are concerned about the potential risks associated with storing and transporting fuel close to homes and schools, and worry that these risks will increase as more fuel is needed for the larger planes. Finally, people identified that the impacts of any emergency in the area may be elevated because of the proximity of the airport to high density residential buildings, and that response for islanders could be hampered because there is no fixed link to the island.

Aviation safety is federally regulated and addresses a wide variety of factors that directly influence the safe operation of aircraft and airports. While aviation accidents are typically rare, the probability of emergency scenarios involving plane crashes or fuel-related accidents at BBCTA under either current or expanded service scenarios has not been evaluated.

The City of Toronto has an all-hazards emergency plan in place, with specific operational support functions to deal with situations such as mass casualties, mass fatalities, and evacuations. In the event of a significant emergency, the province of Ontario, through the Emergency Management Branch of the Ministry of Health and Long-Term Care, may offer additional support to ensure that the health sector is sufficiently resourced in its response. While the city's plan is designed to be flexible enough adapt to a broad spectrum of disasters, it also specifically identifies fuel emergencies and aircraft accidents among the hazards relevant to Toronto. Significant changes to operations at the BBCTA could lead the City's Emergency Management Working Group to consider whether changes to the City's Emergency plan or mitigation measures are warranted.

Access to Recreation, Cultural Activities, and Community Services

Parks, gardens and other public green spaces play an important role in the health of Toronto city and its residents. The Central Waterfront includes swimming beaches, multi-use trails, boardwalks, gardens, picnic areas, public boat launches, and wetlands. Common activities include sailing, kayaking, windsurfing, walking, cycling, skating, musical events, and formal and informal social gatherings. Such activities promote physical, social, and mental health. Because residential development is strong throughout Toronto, more people are expected to use Toronto's entire network of existing parkland. The unique opportunities and character of the Waterfront suggest that it is a particular draw for tourists as well as residents from across the City. This includes people who want some connection with the lake, its natural landscape, and the recreational opportunities it offers, but cannot afford to access lakes and green spaces outside the city.

According to Toronto's parks plan, the availability of parkland in the Downtown and Central Waterfront is low relative to other areas of the city, and more people will be living and working along the Waterfront in coming years as a result of planned development. As well, limited land availability and high land prices make it challenging to increase public parkland for this rapidly growing population.

The City's parks plan outlines a need for strong parks planning and management to ensure that residents in high density areas across the city will continue to have access to parkland that meets their needs. BBCTA's current operations may diminish the calibre of area parks. Traffic congestion in the area makes it difficult to access the Waterfront and creates risks of injuries to pedestrians and cyclists using the trails near the BBCTA. The noise and air pollution including odours may reduce enjoyment of the parklands and nearby recreational activities.

Traffic congestion may also limit access to local cultural activities and community services and in some cases, the noise and air pollution including odours may diminish the quality of cultural or social experiences.

Participating in cultural activities is associated with good health and satisfaction with life, and low anxiety and depression. Toronto's Waterfront includes a variety of important cultural sites such as the Music Garden, Fort York, Ontario Place, and the Canadian

National Exhibition. Access to community services such as hospitals, senior's centres, community centres and community groups supports good social, mental, and physical health and community well-being by providing resources, supports and social connections.

Community character, community plan

In the long-term, the BBTCA operations may limit full use and enjoyment of the Central Waterfront and may not reflect the Healthy City visions for revitalization that are set out by the Royal Commission's final report and in the Official Plan.

CONCLUSIONS

The HIA indicates that people living in the neighbourhoods on the central waterfront are exposed to health risks from airport-related air pollution, noise, and traffic. In addition, the neighbourhoods adjacent to the BBTCA include higher proportions of some populations that may be especially vulnerable to the airport's health impacts. The findings of the HIA suggest that the long-term presence of the airport on the City's Central Waterfront is more important in determining the health of the people who live and spend time there, than incremental changes to the airport's operations.

To support the health of the people who live, work, and play nearby, current impacts should be reduced. There are a number of mitigation options that could be considered by the Toronto Port Authority which would reduce health risks associated with current operation of the airport. These are set out in a report from the Deputy City Manager, Cluster B, to be considered by Executive Committee on December 5, 2013.

The current vision in the City's Official Plan for the Central Waterfront as a densely populated, vibrant area that celebrates and provides connections to the lakefront aligns with the characteristics of a Healthy City. Optimal protection and enhancement of the health of Central Waterfront residents calls for a reduction of current airport impacts.

CONTACT

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