City of Kingston
216 Ontario Street
Kingston, Ontario
K7L 2Z3

www.CityofKingston.ca

where history and innovation thrive

TO: Mayor and Members of Council

FROM: Denis Leger, Commissioner, Transportation, Facilities & Emergency Management

DATE: June 23, 2016

Re: Airport Expansion Project
WSP Response to Amec Foster Wheeler (AFW) Noise Modelling Study

At the June 21, 2016 Council meeting, City Council heard delegations from members of the public on the City-commissioned reports dealing with the Airport Expansion Project: i) Screening Level Environmental Assessment, ii) Noise Exposure Technical Report and iii) the Air Quality Emissions Assessment and Forecast. That same evening, Council was presented with the Collins Bay Marina commissioned Noise Modelling Study from the consulting firm Amec Foster Wheeler.

As there may have been some resulting concerns or questions arising from presentations made by the delegations specifically in regards to the three studies presented by City consultants and with the AFW critique of WSP's Noise Study, I felt that a response from the City's consultant was required.

I asked our Airport Manager to convey my request for a WSP response to the AFW critique. I am providing the attached WSP response to matters that they felt needed to be addressed which resulted from the AFW critique of the Noise Exposure Technical Report and to a lesser extent matters that were raised by delegations.

I trust this will be of assistance.

Denis Leger

Att: WSP Response 2016

c.c. Gerard Hunt, Chief Administrative Officer
c.c. David Snow, Manager Kingston Airport
c.c. John Bolognone, City Clerk

Commissioner of Transportation, Facilities & Emergency Services
City Hall
☎ Phone: 613-546-4291 ext. 1328 Fax: 613-546-3004 dleger@cityofkingston.ca

MMM Group Limited
100 Commerce Valley Drive West
Thornhill, ON Canada L3T 0A1
t: 905.882.1100 | f: 905.882.0055

www.mmmgrouplimited.com

June 23, 2016

Mr. Denis Leger, Commissioner, Transportation, Facilities and Emergency Services
&
David Snow, Airport Manager
Kingston Airport
1114 Len Birchall Way
Kingston, ON, K7M 9A1

Dear David,

Subject: **Kingston Airport: WSP Review and Comments to Amec Foster Wheeler (AFW) Report - Technical Peer Review of WSP NEF Technical Report Dated June 6 2016, RevA**

GENERAL:

Further to our presentation to Council on June 21, 2016 and having received a copy of the report referenced above on June 22, 2016, WSP offers the following comments/observations for your consideration. In addition, we have also offered some additional responses to various comments or questions raised by some of the delegations that presented to Council on June 21, 2016.

Based on our review of the AFW report we concluded as follows:

- The WSP NEF models and those of AFW match very closely. We do not observe any significant differences in the size/shape and overall extents of the resulting NEF contours that would suggest a major concern in the modelling techniques and system used.

- The 30 NEF remains within the airport boundaries for the various scenarios AFW prepared for the years 2012 to 2026. This is same time scale WSP used and consistent with the Transport Canada definition of a Noise Exposure Forecast (NEF).

- AFW appears to have not read the WSP Appendix A Output Report properly and as such were inclined to suggest WSP did not include Local (training circuit) traffic in our models.

WSP did incorporate local traffic in all our models. Further technical clarification is provided below.

- WSP does not agree with the AFW scenarios that projected traffic to 2036 including eight (8) B737-800. This volume of B737 traffic is not reasonable nor is consistent with the business plan objectives. Furthermore, the proposed 6000 ft. runway does not support a viable air carrier business at this frequency of flights for these aircraft. Simply, these are not reasonable scenarios for this proposal.

Overall, our report and findings remain sound, are reasonable and comply with the approved Transport Canada NEF System. The expansion of the airport as proposed will have no significant impact on land use compatibility around the airport with respect to aircraft noise.

SELECT DELEGATION COMMENTS AND WSP RESPONSES:

The following are some of the more significant comments observed by WSP during the delegation presentations at the Council Meeting held the evening of June 21, 206. WSP has offered our assessment/comments to these observations below:

1. **Marina continues to be considered a noise sensitive land use vis a vis airport noise.**

    a. Marinas are not noise sensitive land uses as supported by Transport Canada.

    b. Transport Canada's TP1247 latest edition clearly does not consider a marina a noise sensitive land use. The table below confirms this as extracted directly from TP1247 and also presented in our technical report. Marinas are compatible at all NEF values.

Table 2B- Recreational - Outdoor

Noise Exposure Forecast Values	>40	40-35	35-30	< 30
Response Areas	1	2	3	4
Athletic Fields	NO	J	K	YES
Stadiums	NO	NO	K	YES
Theatres - Outdoor	NO	NO	NO	H
Racetracks - Horses	NO	K	K	YES
Racetracks - Autos	YES	YES	YES	YES
Fairgrounds	K	K	YES	YES
Golf Courses	YES	YES	YES	YES
Beaches and Pools	YES	YES	YES	YES
Tennis Courts	NO	K	YES	YES
Playgrounds	K	K	YES	YES
Marinas	YES	YES	YES	YES
Camping Grounds	NO	NO	NO	NO
Park and Picnic Areas	NO	K	YES	YES

c. Two examples of prominent marina locations in Canada that co-exist with major airports/air traffic include:

i. Billy Bishop City Centre Airport – Total Aircraft Movements = 120,000 +/-

ii. Vancouver Harbour Seaplane Airport – Total Aircraft Movements = 50,000 +/-

2. **The existing crane at the marina may need to be removed.**

    a. The proposed "displaced" threshold for Runway 19 will allow aircraft to safely clear the existing crane as they do today. There will be no impact on the crane and it can remain as it does today.

    b. This is another benefit of the proposed displaced threshold along with the noise mitigation of keeping aircraft at their existing approach heights for Runway 19.

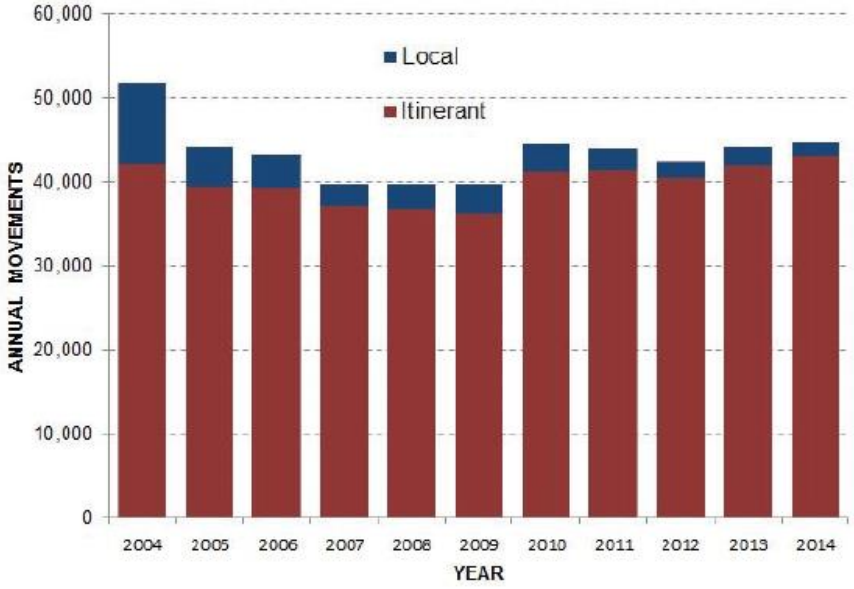
3. **How can the City tell us that they expect "Growth" with no increase in "Noise" or "Traffic"**

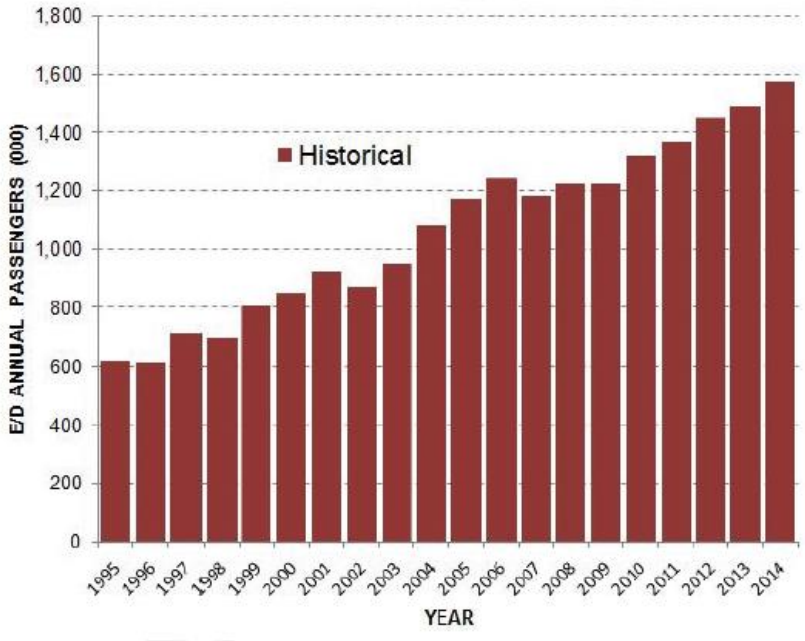
    a. The delegate needs to define "Growth". WSP assumes the delegate meant "Growth" in passengers as this is what drives the business plan.

    b. Passenger growth can be achieved with equal or lower traffic volumes by air carrier selection of aircraft size. For example, an air carrier may reduce the number of Beech 1900 flights per day and replaced these with a single or fewer flights by larger Dash 8s. In this case the traffic movements actually go down or remain flat while passenger movements can go up.

    c. Air traffic growth is not required to see growth in passenger movements.

d. Examples of this exist though out Canada and one such example is St. John's International Airport. From the historical data shown in the charts, it is shown that even with flat or less aircraft traffic, passenger volumes can actually grow considerably.





4. Land values around the airport

a. From previous experience at other airports where noise is a concern, land values have been studied.

b. For example, Oshawa Airport has high density residential developments around the airport and operates at traffic volumes higher than Kingston at about 60,000 +/- movements per year.

c. Many sections of the residential areas fall within the 30+ NEF value which is not the case in Kingston.

d. See a study below from a Trent University student on land values around the airport which demonstrates values can actually be higher.

http://www.durhamregion.com/news-story/4492531-oshawa-residents-living-with-airport-noise-are-living-well/

May 05, 2014

Oshawa residents living with airport noise are living well

Student's study suggests residents close to airport have pricier homes, more money

Ryan Pfeiffer / Metroland

OSHAWA -- Chris Hart is a fourth-year Trent University honours geography student who presented a paper on whether noise from the nearby airport impacts property values.

April 8, 2014.
Oshawa This Week
By Reka Szekely

OSHAWA -- The standard of living is high for Oshawa residents most affected by noise from the Oshawa Municipal Airport, a study by a Trent University student has found.

The honours student's study found that residents living with the most airport noise have more expensive homes than the average Oshawa resident, higher incomes, better education and are more likely to have a job.

Chris Hart is a fourth-year geography student at Trent University in Oshawa specializing in GIS, which combines computer mapping and non-geographic information. He tackled the socio-economic impact of the Oshawa airport on residents for his honours thesis.

"I've always kind of had an interest in urban planning and transportation," said Mr. Hart. "I went to some of the council meetings and open houses and some of the discussions about the runway expansion a couple of years ago."

Mr. Hart created noise contours for the airport based on flight movements and overlaid the noise contours over census blocks. He wanted to see if airport noise had a socio-economic impact.

The noise-affected area stretches north to Conlin Road, east to Wilson Road, south to King Street and west just past Thornton Road.

The results were that the socio-economic status of residents in the most intense aircraft noise zones was not only the highest among the areas impacted by airport noise, but also higher than the Oshawa-wide average.

"Aircraft noise does not appear to be having a deteriorating impact on the standard of living," said Mr. Hart.

In the highest noise area, located north of Rossland Road, west of Simcoe Street and east of Stevenson Road, the average home value is $257,000, while the average home in Oshawa is worth $230,000. Average home values ranged from $217,000 to $235,000 in the other noise-impacted areas.

The average family income in the highest noise area is $83,000 compared to the City-average of $71,000. The study also found that the area with the highest noise impact had the highest employment rate among the noise-affected areas and the rate is similar to the Oshawa average. The education rate in the highest noise impact area is higher than the city average.

Mr. Hart's study also found that 50 per cent of the land use in the noise-affected area near the airport is residential and the majority of the homes were built after the airport opened.

Only 18 per cent of the homes in the noise-affected area were built before 1946, meaning the majority were built after the airport opened in 1941. The largest proportion, 31 per cent, were built between 1946 and 1960, though just under 12 per cent were built more recently, between 1996 and 2006.

His study did not examine why the area closest to the airport has a higher standard of living.

"This was purely a statistical and geographic study, I wasn't looking at neighbourhood opinions and why they chose to live in that area," he said.

5. **Request for additional environmental assessment**

    a. The Screening level EA should not be confused with the full EA process. This is not an EA.

    b. An EA is not required, as the length of the proposed extension (total 319.5 m) is less than the length at which this would be considered a designated project under CEAA 2012 (1,500 m).

    c. A better term may be "Environmental Screening" only since its looking at construction related impacts and mitigations only. It is not a full EA.

    d. Any public request for full EA can be responded to on the basis that it is not required by the applicable federal law, as noted above. The City is going above and beyond to complete the screening to be prudent, to ensure compliance with other applicable environmental legislation, and with concern for the environment.

REVIEW OF AMEC FOSTER WHEELER REPORT (VERSION 0 RELEASE DATE JUNE 27, 2016)

This following summarizes WSP's observations related to the review of AFW technical report as received on June 22, 2016 following the Council presentation of June 21, 2016.

1. **Page 6 – Inference that the scope of the extension is "ambiguous"**

    a. The Business Plan Recommendation Page iii clearly states:

> *Infrastructure Improvements*
>
> The study recommends that the City of Kingston undertakes modest improvements in the airport's infrastructure including a runway extension from 1,502 m (4,929') to 1,829 m (6,000'), introduction of runway end safety areas, and air terminal update, reconfiguration and expansion.

These infrastructure investments will improve the capability of Kingston's Airport and specifically will:

- enable the airport to accommodate larger regional jet and turboprop aircraft which are increasingly replacing smaller and more costly turboprop aircraft;
- accommodate newer narrow body jets if necessary; and
- enable the air terminal building to handle newer and larger regional aircraft types.

b. The WSP NEF Technical Report clearly establishes the 6000 ft. and the smaller narrow body commercial jets as the design basis along with previously published forecasts to ensure consistency in analysis.

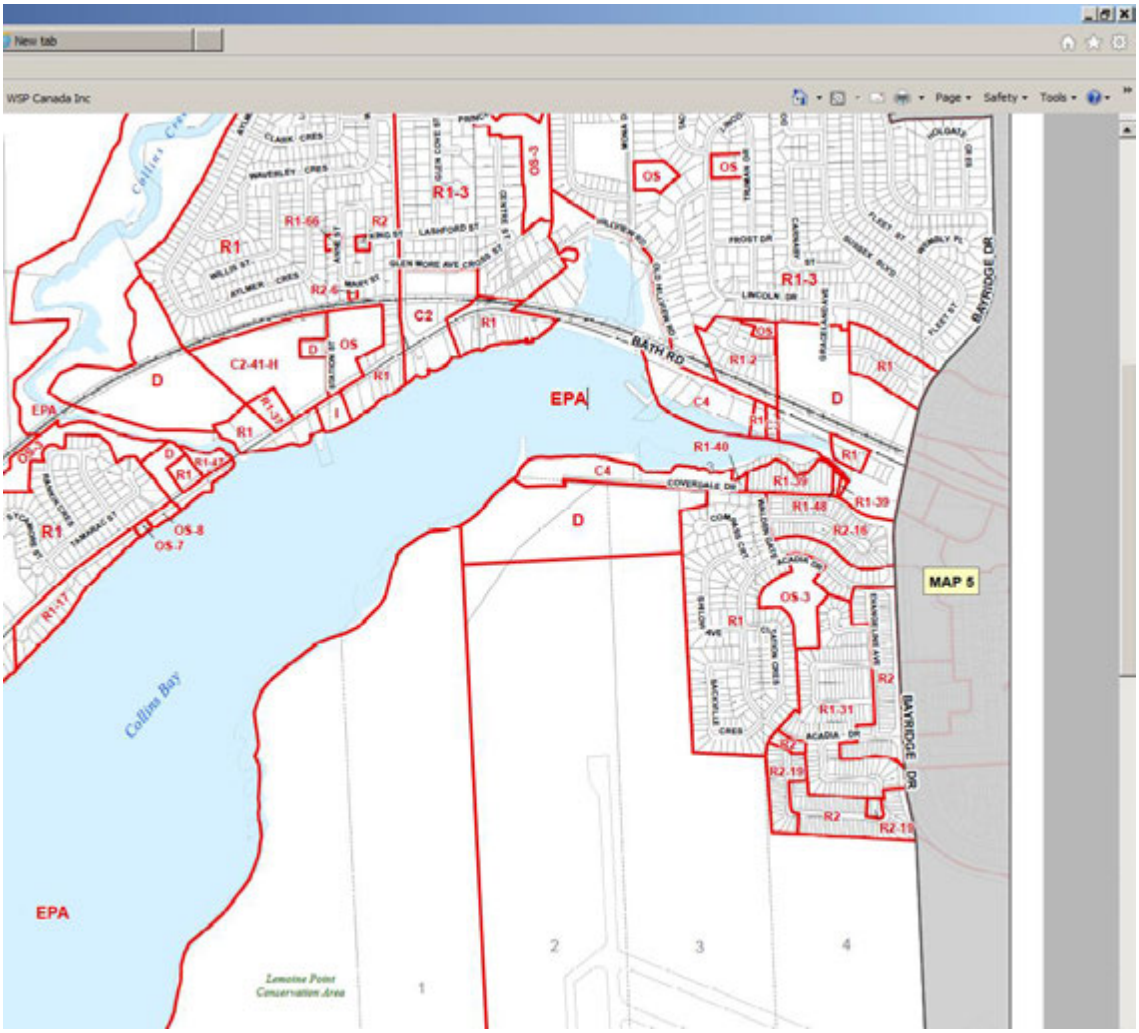
c. The WSP NEF model incorporated Code C turbo prop aircraft and Code C narrow body regional jets including the Embraer 190 type consistent with the Business Plan recommendations.

2. **Page 8 - Marina Zoning – City Zoning Bylaws**

a. The marina north of the airport is zoned ***C4 – Marine Commercial***

b. The report suggests it should be treated as a "Residential" use. Residential in this case is "accessory" is not the primary use of the lands. As such it should be treated as C4 as published in the Zoning Bylaw which is consistent with its primary use as a marina.

c. Marinas per Transport Canada recommendations are not considered noise sensitive uses.



Note: Zoning Bylaw Shows Marina as C4 Designation

3. **Page 9, Section 3.2 Approach and Selection of Metrics**

   a. WSP has had first-hand experience related to the use of alternative noise metrics in Canada through numerous assignments reviewed by Transport Canada and the Ontario Municipal Board (OMB) and other planning authorities.

   b. While we agree with AFW that other metrics are used throughout the world and in many cases help to better communicate noise impacts to the general public, these metrics are not accepted by Transport Canada and land use planning authorities in Canada.

c. Only the Transport Canada official NEF noise metric can be used for these evaluations. WSP has applied the NEF system appropriately in the assessment of noise impacts for this project.

4. Page 12-13 AFR Comments Related to "Local movements may not have been considered"

a. This section in the AFR report references the Appendix A output tables in the WSP report and uses these as a basis to suggest the WSP models did not include local movements.

b. First, Appendix A in the WSP report is a direct output generated by the NEFCAL program.

c. Second, Appendix A outputs use the term "EVENTS" and not "MOVEMENTS". An EVENT is not the same as a MOVEMENT. A landing or takeoff or a circuit is considered an EVENT. A circuit (local) EVENT is comprised of TWO (2) MOVEMENTS. As such the numbers in the outputs are not total MOVEMENTS. Circuits (local) movements must be multiplied by 2 to obtain total MOVEMENTS.

d. WSP has reconfirmed that all our models have appropriately applied the local movements in our 2012 and 2026 scenarios.

5. Page 13 AFR Suggestion that WSP incorrectly models Local and Itinerant movements separately

a. WSP refers to LOCAL and ITINERANT as being modelled separately to ensure the reader is aware that they are treated differently. This is primarily related to how these two different traffic types peak differently and are made up of different aircraft mixes.

b. In legacy Transport Canada modelling software, local models were run separately from itinerant and then added together to obtain a total composite contour. The new NEFCAL software now allows only one file to be generate but still permits local traffic to be modelled with different characteristics.

c. WSP reconfirms that both local and itinerant movements have been included in all models presented in our report.

6. Page 14 ARW Commentary on Inputs

a. Concerns expressed about the “opaqueness” of our inputs

i. The report has been transparent on the basis that the values used are from previously presented public tables.

ii. These values have been previously tested and adopted by the City through consultations with the Consultant.

iii. The PPD and the associated “peaking factors” of 2.05 and 5x were reconfirmed through WSP’s QA process when completing this technical report

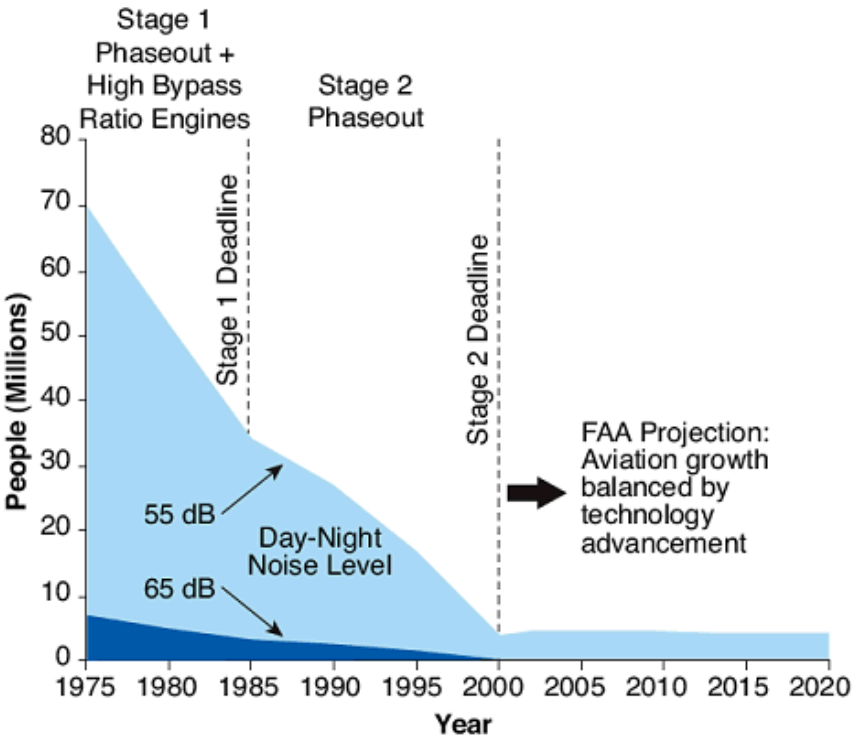
iv. The peaking factors were also compared to other similar NEF studies completed by WSP for similar airports and found to be very reasonable.

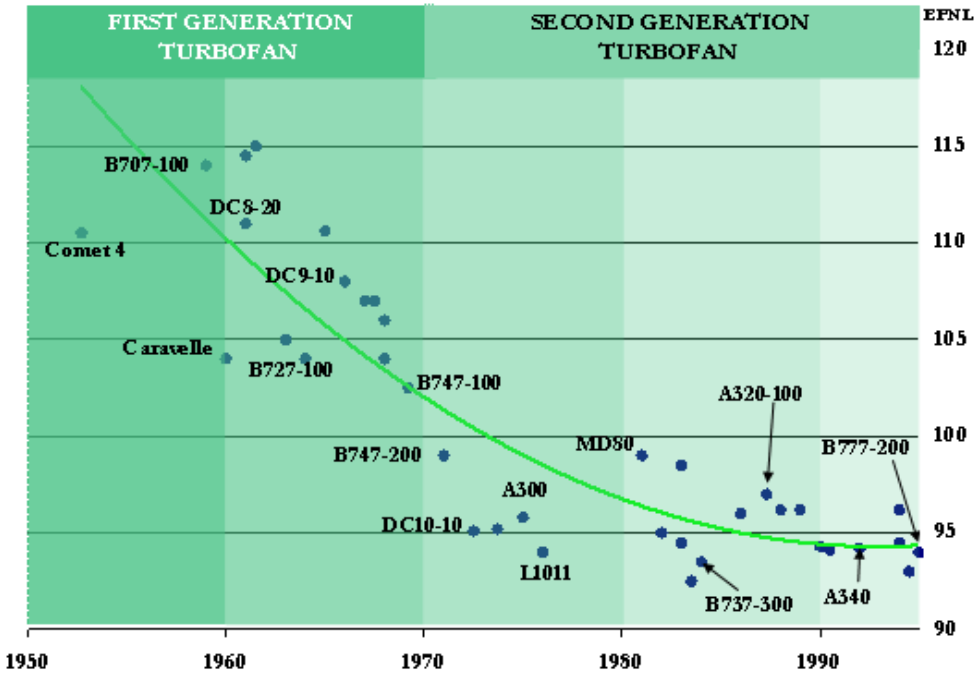
v. The forecasts were modified as explained in the report based on changes in the economic environment at the airport between 2012 and the present. There has been a consistent decline in the total annual movements at Kingston within this period. This has been documented in the report.

vi. The 10 year forecast period of the NEF report was aligned with Transport Canada’s definition of ***Noise Exposure Forecasts***. This definition meets the scope/timelines of the project:

> *Noise Exposure Forecasts (NEFs)*
>
> *Traffic volume and aircraft type and mix used in calculating the noise contours are normally forecast for a period of between **five to ten years** into the future. Runway geometry must be the current layout, except that new and approved projects involving changes in the runways may be included, when the completion date of the project lies within the forecast period.*

vii. Furthermore, given the historical trends in changes in aircraft engine technology projecting noise beyond 10 years would likely not capture further improvements to noise reduction technology. As such 10 years was considered appropriate. See below a historical timeline of noise reduction over time in aircraft technology:


Stage 1
Phaseout +
High Bypass
Ratio Engines
Stage 2
Phaseout
Stage 1 Deadline
Stage 2 Deadline
People (Millions)
80
70
60
50
40
30
20
10
0
55 dB
65 dB
Day-Night
Noise Level
FAA Projection:
Aviation growth
balanced by
technology
advancement
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
Year


FIRST GENERATION
TURBOFAN
SECOND GENERATION
TURBOFAN
EPNL
120
115
110
105
100
95
90
B707-100
DC8-20
Comet 4
DC9-10
Caravelle
B727-100
B747-100
A320-100
MD80
B777-200
B747-200
A300
DC10-10
L1011
B737-300
A340
1950
1960
1970
1980
1990

7. Page 25 – Aircraft Event Modelling

a. As previously noted, Transport Canada does not accept other noise metrics nor do municipal planning authorities when it comes to airport noise in Canada. The NEF is the official noise metric in Canada.

b. This section does however re-confirm WSP's "noise mitigation by design" proposals that the use of the displacement at the north end will keep aircraft flying over the marina at the same height as they do today. Without the displacement noise levels over the Marina would increase. Also, their analysis reconfirms the extension to the south will mitigate noise to the north over the marina as we have shown.

c. WSP wishes to point out why single event noise models also do not properly represent the impacts of noise. AFW note that the Cessna 172 single engine piston aircraft are the lowest level noise events. Whilst this may be true, annoyance is not only generated by the noise level itself, but also the number of times the event occurs and at what time of day since at night-time noise is much more annoying. One such, an aircraft movement mid-afternoon may go unnoticed by the public. However, with heavy training activities, continuous movements over the entire day can become annoying on the basis that it is so repetitive. That is why the NEF system is used which captures not only the noise levels but their frequency and at what time of day the events occur.

8. Page 5.1 Modelling Results

a. Scenarios BL2012 ad FC2026

i. WSP reconfirms that our models were inclusive of the displaced threshold for the 2026 model.

ii. WSP wishes to point out that the 25 NEF contour is very sensitive and will move much more significantly than higher NEF values. A very small change in the approach slope or slight changes in aircraft movements can affect the location of the 25 NEF. For example, some NEF modellers will use a 5 degree approach slope for local traffic versus a standard 3 degree approach. Local traffic is made up of primarily private pilots who will approach at much higher angles than commercial pilots. By raising the approach angle from 3 degrees to 5 degrees would affect the location of the 25 NEF.

iii. The changes observed by AFW are very small and not significant.

b. Scenario BL2012M and FC2026M

i. WSP reconfirms that our models were inclusive of the displaced threshold and local movements. AFW implies that this is not the case in their modified models.

ii. While their contours have gotten "fatter" the conclusions derived in the WSP report have not changed. We recognized changes in the noise environment but that they remain insignificant in terms of compatible land uses around the airport in particular the marina.

c. Scenarios FC2036M and A-C

i. WSP does not agree that modelling 20 year projections is appropriate. It is not consistent with the Transport Canada definition of Noise Exposure Forecasts as noted earlier.

ii. However, even under these conditions the 30 NEF still remains on the airport property.

iii. These models result in the same conclusions as WSP's report that changes will occur but they are not significant and all surrounding land uses remain compatible.

iv. The inclusion of eight (8) B737's per day is a major deviation from the Business Plan recommendations and WSP does not believe this scenario is reasonable. Some key points to note include:

a. 8 movements per day as modelled by AFW would mean a regular daily schedule of 4 arrivals and 4 departures for 365 days of the year. At an average passenger load of 170 (90% load factor) this represents a total projected passenger load of close to 500,000 passengers just for this airline. This scenario was never contemplated in the Business Plan. The scenario is not a reasonable "sensitivity" test for the noise forecasts at Kingston. The 2026 Business Plan passenger forecast was 155,380 and for 2035 was 250,000.

b. If AFW would have considered the Business Plan anticipated ***seasonal charter opportunities*** in the winter in Kingston this would have been more appropriate. In that case one could expect one flight a week for a 2-3 month period in the winter. Modeling this in

the NEF system would result in not 8 movements a day, rather something closer to less than 0.5 movements a day just be virtue of how the model works. This would result in significantly smaller contours and also a more compatible noise event in the winter versus summer months related to the marina.

c. Furthermore, the runway length of 6000 ft. would not support a viable commercial operation by B737-800's or the like at this frequency at Kingston.

d. WSP believes that these scenarios is not reasonable and does not reflect that objectives of the project.

d. Scenarios FC2026M, A- C and FC2036M, A-C

i. Result in the same conclusions as WSP's report that changes will occur, they are not significant and land uses remain compatible.

9. Page 6.1 – Mitigations

i. AFW are referred to Takeoff/Landing calculations as presented in the Business Plan Section 6.2.2.

ii. The Business Plan considered the proposed displacement in the analysis of aircraft types and destinations.

WSP | MMM GROUP LIMITED

Ian Waymann, P.Eng.
Senior Project Manager
Aviation

Bernhard Schropp, P.Eng.
Senior Aviation Consultant, Director
Aviation Eastern Canada.