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LURA Consulting
Sent by email to gmosher@lura.ca

Re: Noise Assessment Concerns
Draft RESA EA Study Report dated May 2025
Toronto Island Airport

Dear Mr. Geoffrey Mosher,

This letter summarizes various complaints, questions, and requests stemming from a review of the draft RESA EA Study Report dated May 2025. As noise is the most important environmental issue to be assessed at the airport, this letter is focused on the noise related components.

Introduction

The sheer number of errors and omissions found in the draft RESA EA report with respect to the noise related components was truly astonishing. The report materials did not provide the necessary level of confidence that the writer of the report was informed on the urban marine noise environment of Toronto's high rise waterfront, nor informed on the technical information needed to complete a significance assessment of the projected environmental noise effects.

The report relies on some underlying consultant information which was referenced but neither included or footnoted in the draft report circulated for public comment. Given the avoidable haste of the EA Study preparation timeline, it is unknown if the technical work referenced in the report had actually been completed yet as of the June 6, 2025 draft report circulation date. An overall impression emerged that the assessment material appeared to have been mostly recycled from a previous report prepared for a different project site.

Based on the report contents, an objective professional assessment of environmental effects has not yet been completed for the RESA project. The information that is available in the draft report dated May 2025 would not permit a PEO-licensed noise engineer to prepare, or independently peer review, the noise effects and assess their significance. The assessment of noise effects cannot be treated as a mere academic or perfunctory exercise, performed by uninformed or inexperienced consulting staff.

For example, the draft EA report provided examples which showed 15dB proposed noise change effects for outside noise and for internal bedroom noise, but did not state that these examples are illustrative of 'very significant' effects. Other information provided showed the proposed construction noise change effects will vary above 20dB on an average hour basis! Such magnitudes of noise change are not normally assessed, as they lie beyond the legislative assessment threshold of 15dB. The sub-consultant also interchanged background with stationary source decibels, and then confused daytime with nighttime total noise. Yet, the draft EA report incongruously concluded that the noise effect will only be 2dB to 4dB. Did the noise sub-consultant actually confirm that this partially completed work should be circulated for public comment?

Once the draft RESA EA Study Report has been completed by a PEO licensed noise engineer and is actually ready for public input, can an updated version of the draft EA report be circulated for a 60 day review period?

Complaints, Questions, and Requests

A number of assessment gaps, technical conflicts, incomplete findings, and follow up items have been identified herein. The specific technical concerns regarding the noise assessments in the draft RESA EA Study Report are summarized under the headings below. For ease of reference, the pages in the draft report discussing noise have been extracted and compiled in attached Appendix 1.

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Appendix 1: All Noise related pages of the Draft RESA EA Study Report dated May 2025 (10 pages)

RESA EA Study Report References

Some documents referenced in the draft EA report were not provided for public review.

A recent 'Noise Impact Assessment Report' is being referenced under Section 3.2.2 on Page 50 of the report, and was supposed to be contained in Appendix G. However, the draft report circulated for public review contains an empty Appendix G, and it is unclear if this Impact Assessment report had been completed yet as of the date of circulation. This report would appear to be fundamental for anyone assessing the noise effects.

1) Can this Noise Impact Assessment report be circulated as soon as it has been completed for public review, as it may help all readers understand the contents of the Draft RESA EA Report?

2) An historical 'Noise Impact Assessment Report' dated 2017 is being referenced under Section 3.2.2.2 on Page 50. Can this report be provided ASAP for public review as it may help all readers understand the contents of the Draft RESA EA Report?

3) A Health Canada report is referred to under Section 3.2.4.2.2 on Page 58. Can this report be provided ASAP for public review as it may help all readers understand the contents of the Draft RESA EA Report?

According to Section 3.2.3 on Page 52, a Socio-Economic Assessment Report was supposed to be contained Appendix H. However, the draft report circulated for public review contains an empty Appendix H. It is unclear if this report had been completed yet.

4) Can this Socio-Economic report be circulated as soon as it has been completed for public review, as it may help all readers understand the contents of the Draft RESA EA Report?

Noise Change Assessment Thresholds

The sub-consultant was apparently not aware of the typical EA noise change significance thresholds applied in Environmental Assessments including past airport EAs.

5) Can the following noise change thresholds be stated and applied in the draft RESA EA Study Report?

- 1-3 dB change: insignificant effects projected
- 3-5 dB change: noticeable effects projected
- 5-10 dB change: significant effects projected
- 10-15 dB change: very significant effects projected
- Noise changes exceeding 15dB are beyond all EA noise assessment thresholds

When the predicted noise change will become 'significant' (ie. 5dB and above), the licensed engineer must consider mitigation. However, given the efficacies of any proposed noise mitigation measures were not provided in the draft report circulated for public review, the sub-consultant is not yet able to complete the EA significance assessment.

Section 3.2.4.2.2 on Page 58 states that noise mitigation is to be considered where the predicted change exceeds 6.5%. This statement is unclear. Does this percentage refer to a 0.3 dB change? The source for the percentage was not provided, and may have perhaps been applied by the sub-consultant on some other site involving lower decibel change magnitudes.

Section 3.2.4.2.2 of the draft report also refers to the 'Day Night Average Sound Level' (L_{dn}) noise modelling formula. This reference is confusing as this noise modelling formula is not used at airports in Canada. In any event, the formula is a 24 hour noise capacity formula, used to inform the number of approvable aircraft flybys in each hour, which will collectively be generating a continuous noise environment spanning 24 hours. It is not used to estimate the stationary sources generated at an airport, nor the routine overnight maintenance noises and construction noises. Explanation is required.

Noise Data Collection

6) Section 3.2.2.1 discussed Data Collection and refers to Figure 3-5 on Page 51. However, this figure only shows modelling Points of Reception. Can the building storeys (or elevations relative to runway end) of these Points of modelled projected noise be shown on the figure?

7) Section 3.2.2.1 currently does not discuss the actual in- field data collected, which is contributing to the incomplete status of the draft EA report. Can a separate figure be provided in the draft report showing the locations where actual in field noise measurement were collected to date and are being referenced for the draft report?

Section 3.2.2.1 noted that "noise levels at noise sensitive receptors were conservatively estimated based on historic baseline levels." It then further noted that some noise levels were based on "interpolation of values at nearby point of reception locations." These statements are unclear and appear to conflict with Section 3.2.2 which said: "The following sections summarize the existing conditions".

The term 'existing conditions' would typically refer to the total noise levels including background sound plus airport activities. The term 'baseline levels' typically refers to 'background sound levels' only, which excludes any airport related activities. The sloppy wording of Section 3.2.2.1 appears to blur the typical meanings and may be indicative of writer confusion.

Also, Section 3.2.2.1 notes that some noise levels are interpolated, which implies there are some actual in-field measurements mixed in with the modelled Points of Reception. Can explanation be provided as to why some noise levels at modelled Points of Reception were interpolated and not modelled directly, as well as information on how the noise magnitudes were being interpolated (eg. linear interpolation, spatial spreading, etc.)

All airport related noises, including proposed stationary source noises, flyby noises, and the proposed RESA construction noises at both ends of runway, will travel and reverberate throughout the entire waterfront, not just between Stadium Road and Spadina Avenue as shown on Figure 3-5.

8) Can Section 3.2.2.1 and Figure 3-5 be updated to cover the modelled Points of Reception at the predictable worst case impact locations along the waterfront (east of Spadina Ave) and west of Stadium Road?

Background Sound Levels

Page 58 of the draft report notes the background noise level Leq (8) from 23:00 to 07:00 hours exceeds 45dBA overnight. The conflicts with Page 50 of the report which states existing nighttime background sound Leq for the same time period ranges from 52 to 62dBA.

9) Can this background noise conflict in the draft report be removed in order for the noise effects significance to be assessed.

Page 50 of the draft report also states that a nighttime Leq(8) of 52 to 62dBA between 23:00-07:00 hours is "typical of those found in urban communities". This statement contradicts noise measurements obtained in other parts of the city core during calm overnight hours (eg. inside Little Italy and Little Portugal). The sub-consultant appears to have confused daytime with nighttime noise levels.

The nighttime low background sound level, at the predictable worst case noise impact locations opposite the airport, in fact range from Leq(1) of 43 to 47 dBA in plane of open window, depending on the calm weather conditions that given night. This aligns with the 45dBA noted in the draft EA report on Page 58. This was also shown in past airport noise reports.

10) In order to complete the noise assessments, can the draft report show the minimum half second background decibel reading during the nighttime, and the minimum nighttime avg hour Leq(1).

Additionally, the minimum half second daytime background noise reading, and the minimum daytime avg hour Leq(1) also needs to be known for assessment.

The report does not acknowledge that the hourly background sound Leq(1) during the daytime hours in plane of shielded open window at the predictable worst case impact locations is in fact consistently **51dBA**, when excluding all airport related noises whatsoever (eg. excluding noises from any aircraft flybys, idling and taxiing aircraft, runups, aircraft HVAC related, airport ferry related, and airport parking lot noises).

Note that the number of occasions when there is absolutely no airport related noise are very few in any given quarter, and prolonged noise monitoring over numerous quarters was required to eventually obtain the lowest half second decibel of actual background sound in each hour of the 24 hour period during calm weather conditions. This is in lieu of a series of pre-determined airport blackout periods for targeted background noise monitoring of the airport operating hours (which study is beyond overdue).

Airport Operations Noise

Page vii and Page 58 state that "the maximum noise levels exceed 60dBA $L_{max,}$ under existing conditions". Note that the statement contains a paradox. Additionally, the Executive Summary Page vii noted that the 60dBA exceedances had considered "urban environment noise from sources other than airport operations".

These statements indicate the sub-consultant has confused airport operations of 60dBA with background sound levels. The noise data source for these statements has not been provided in the draft report. It is not stated if the noted 60dBA L_{max} being referred to is assumed to occur during a daytime hour or nighttime hour, and in which specific hour and for what duration.

It is clear that the noted L_{max} 60 dBA magnitude cited by the sub-consultant has not actually been correlated with aircraft operations. The report does not state that since the GRE (Ground Runup Enclosure) was constructed, the average roar from the airport grounds varies continuously from **55dBA to 73dBA** in the plane of shielded open bedroom window, when there are two to four Q400 aircraft operating on the airport grounds simultaneously. This is during calm weather conditions and while there are no aircraft in the air. The typical average total noise level generated by this scale of airport activity at a predictable worst case noise impact location opposite the airport is approximately Leq(1) of 63 dBA. (Note this pre-Covid era excessive noise magnitude is still 7dB lower than the total peak hour flights programmed in the Port Authority Master Plan.)

The sub-consultants use of the term 'airport operations' should also be clarified. It is not stated that the non-electric airport ferry operation peak noise varies 55 to 61 dBA in plane of shielded open window during decelerations and accelerations at the mainland slip, roughly 8 times in any hour between 05:00AM to 12:00AM. The report is unclear if the sub-consultant has incorrectly included for the ferry noise in the assumed L_{max} magnitude being considered for the assessments. (Note that airport staff have recently provided verbally that the non-electric ferry will now run only about 10% of the time. This would theoretically increase the sub-consultant's incorrectly prepared noise impact calculations.)

One is forced to speculate if the Leq(8) noted by the sub-consultant on Page 50, said to vary 52 to 62dBA, is with respect to the unshielded permanent noise monitor installed on the airport ferry terminal rooftop. This location is not shown on Figure 3-5 on Page 51. However, this location is neither a shielded or unshielded noise sensitive residential location, and not the focus of the RESA EA noise assessment. Explanation is needed.

From the above, the author of Page vii, Page 50, and Page 58 appears confused over the background noise levels versus airport operations noise levels, or else the sub-consultant has otherwise unwittingly re-defined the technical definition of 'background sound level' to now also include some of the regular airport stationary source noises, which generally occur between 04:30 to 23:59, before, during, and after runway operation hours.

11) Can these background noise vs airport operations noise conflicts in the draft report be removed so that the cumulative noise effects significance of the RESA project can be assessed.

Proposed Overnight Construction Noise

The Draft RESA EA Study Report material appears to pre-determine that overnight construction of RESA runway extensions is in fact possible. Yet, the phases of construction noise are not broken down in the draft report nor assessed yet. Is it not intended to complete an objective environmental assessment of the noise effects?

12) There is example provided in Section 3.2.4.2.2 on Page 58 where an outdoor noise peak L_{max} of 60dBA occurs while the overnight background noise is 45dBA. It is not stated whether the 60dBA is the peak of a prolonged continuous noise varying within 5dB of the peak. Can a statement be added that this example in the draft EA report is illustrative of a circumstance where the proposed noise effects are 'very significant'.

Table 5-15 on Page 154 shows the projected noise increase effect of construction is estimated to be **2 to 4 dB**. This was premised on the incorrectly stated background Leq(8) of 52 to 62dBA that was noted on Page 50. Accordingly, the draft EA report assumed the average one hour Leq(1) construction noise could be varying **54 to 66 dBA** at the residences, without stating this clearly. [52dBA + 2dB = 54dB] [62dBA + 4dB = 66dBA]. Technical support is needed.

Based on the available information in the draft EA report and the actual overnight background of 43 to 47dBA in plane of shielded open window, the overnight noise impact on a one hour basis is in fact projected to vary **7dBA to 23 dBA**, not merely the 2dB to 4 dB increase as stated in the draft report [54dBA - 47 dBA = 7dBA] [66dBA - 43dBA = 23dBA].

Assuming a construction noise change effect of 15dBA to 20dBA is envisioned, this would be an unbearable experience for anyone to endure overnight for an unknown duration, within the proposed 18 month construction period. This proposed noise change, being greater than 15dB, exceeds the typical legislative assessment thresholds. Based on the information currently shown in the draft EA report, the sub-consultant needs to assess the proposed overnight construction noise change effect as a 'beyond very significant' on a one hour average basis. This is notwithstanding that the sub-consultant's information assumes a continuous noise and not the more troublesome impact noises typically generated and currently under discussion.

Construction Methodology

During CLC Meeting No. 59 on September 8, 2025, it is was mentioned that potential construction methods such as sheet piling, rock splitting, etc. are currently still being discussed. These various speech and sleep disruptive construction methods were not yet estimated for in the draft RESA EA Study Report.

13) Can the construction methodology assumed for each phase of construction be provided in the draft EA report as required in order for the sub-consultant to assess the significance of noise effects?

The construction noises under discussion will not be a constant hum as currently assumed by the sub-consultant in the draft report, but will likely include a series of distinct construction noise events, ongoingly for hours, days, and weeks during the proposed 18 month construction of RESA extensions. Assuming this is the case, the distinct L_{max} dB impacts will be reverberating throughout the waterfront to increase the split-second resident noise experience (ie. direct noise from source, plus immediate reflections off harbour lake water, plus subsequent reflections off vertical structures). The reflections plus reverberations could add 5dB onto top of the instantaneous sound to be received directly from source per noise model output.

14) Can the number of hourly L_{max} impact events with reflections and reverberations be estimated and assessed relative to the prevailing overnight background sound level?

Construction Noise Effects on Residential Interior Space

Page 58 states that the assumed reduction of noise due to typical building construction is 15 dBA. An example is footnoted where an outdoor noise level of 60dBA would result in an indoor noise level of 45dBA.

This assumption is of concern as the predictable worst case impact locations do not have noise proofed walls and windows, or building HVAC systems. This 15dB noise reduction example is with respect to the materials of external walls, but not the windows. The actual noise reductions of the asbuilt windows when closed is less than the 15dBA assumed in the draft EA report. The asbuilt windows are not of 6 mm glass.

The report does not state that if the construction work is to be completed in the summer months. During summertime, many residential units must have their windows left open for internal temperature reduction and for sleeping purposes. This results in an increase in indoor ambient noise level from **37 dBA** when windows are closed, upwards toward the outdoor background sound level.

Another consideration is the small bedroom layout of some buildings opposite the airport, which are such that the headboard must be adjacent the windows facing the airport, resulting in a 0.6m (2') pillow offset from open window pane.

15) The example footnoted on Page 58 says that a 60 dBA outdoor construction noise would result in an indoor noise level of 45 dBA with windows <u>closed</u>. Can a statement be added to the Page 58 footnote, that this example is illustrative of a 'significant' **8dBA** environmental effect on residential interior noise, based on the typical EA noise change significance thresholds [45dBA – 37dBA = 8 dBA]?

Note, however, that the sub-consultant's footnoted example assumed a 60 dBA continuous noise (not the typical impact noise events which are currently under discussion), and assumed that closed windows will provide a high 15dB reduction. The draft EA report does not state that the nighttime noise effects to result from the sub-consultant's example will render some residences uninhabitable during the proposed 18 month construction period.

16) Can an assumed construction phasing and timeline be provided in the draft EA report so that an informed assessment of noise impact significance can be prepared and peer reviewed?

Construction Vibrations

17) Often, the significance of the proposed ground vibrations are also assessed by the same noise consultant. Can the draft EA report be revised to assess the significance of the projected vibrations to result from the assumed construction methodologies.

Barging

18) Can the draft report discuss if all RESA materials will be transported to both ends of runway via barge from the Eastern Gap, rather than by triaxle and flat bed trucks using the airport ferry at foot of Eireann Quay? This mode of transport for construction materials was mentioned in CLC Meeting No. 59 on Sept 8, 2025 and has been successfully used in past.

19) Can the draft EA report estimate and assess the significance of noise and/or vibrations of barging through the Western Gap, if this is envisioned?

20) Can waterborne vibrations in the residential units be reviewed if envisioned, as received in past from overnight heavily loaded ferry accelerations and decelerations in and out of mainland slip.

Cumulative Noise Effects Assessment

Section 8.3.1.1 of the draft RESA EA Study Report examined the cumulative effects of the RESA project interacting with other airport construction initiatives and temporal overlaps with other projects by other entities surrounding Toronto Island Airport.

The cumulative effects assessment does not yet quantify and discuss the cumulative noise effect which will result from the RESA alternatives once implemented, together with the current total noises, which is the main purpose of a cumulative effects assessment.

21) Can the local, provincial, federal, and international noise standards to which the noise effects are being considered be provided in the draft EA report?

22) Can the standards to be used to assess the construction vibrations and waterborne transport vibrations be provided in the draft EA report?

23) Can the typical 'Do Nothing' Alternative be added to the draft EA report in order to compare the cumulative noise effects of each Alternative (ie. by capping the number of annual emplaned and deplaned passengers at 325,000, per the Amendments to the Canadian Aviation Regulations.)?

24) The minimum noise statistics needed for a PEO licensed engineer to assess the significance of effects were not available in the draft report. For each Alternative's construction phase, can the following minimal information summary of projected noises be tabulated for nighttime and daytime? Desirably, the noise magnitudes would also be shown separately in both dBA and dBZ units.

Nighttime dB

Noise Statistic	**Proposed Construction Noise**	**Current Noise Nighttime**	**Total Cumulative** [antilog(Bel) summation]	**Max Noise Change Nighttime dB**
(1)	(2)	(3)	(4)=(2)+(3)	(5)=(4)-(3)
Min Half Second Noise (Background Noise) 0.5 sec Min One-Hour Avg Noise Leq(1) Max One-Hour Avg Noise Leq(1) <u>Distinct Noise Events</u> Max Peak of loudest distinct noise event (Lmax) Max Peak in loudest one hour (Lmax) Max number of distinct noise events per hour				

Note: all statistics to be in plane of open residential window at predictable worst case noise impact location.

Daytime dB

Noise Statistic	**Proposed Construction Noise**	**Current Noise Daytime**	**Total Cumulative** [antilog(Bel) summation]	**Max Noise Change Daytime dB**
(1)	(2)	(3)	(4)=(2)+(3)	(5)=(4)-(3)
Min Half Second Noise (Background Noise) 0.5 sec Min One-Hour Avg Noise Leq(1) Max One-Hour Avg Noise Leq(1) <u>Distinct Noise Events</u> Max Peak of loudest distinct noise event (Lmax) Max Peak in loudest one hour (Lmax) Max number of distinct noise events per hour				

Note: all statistics to be in plane of open residential window at predictable worst case noise impact location.

RESA 3 Noise Barriers

The increased noise to be received at residences from new taxiways for some EA alternatives eg. RESA 3 have not been discussed in the draft report, except for some incomplete cursory comments in Table 6-16 on page 155 which suggest a nominal noise reduction. More technical information is required, as the waterfront residential properties in towers lie beyond the noise shadow of proposed RESA 3 noise walls.

To also note the construction of the existing noise wall along Western Gap did not result in any change or reduction in noise readings at residences in towers, contrary to the noise model renderings presented to the public by the Port Authority's consultant prior to the construction of the existing noise wall.

Section 5.1.4 briefly describes the RESA 3 Noise Barriers. It is noted that: "The final limits and heights of these noise barriers are subject to ongoing preliminary and final design activities."

25) Can the preliminary noise barrier noise design analyses as of the draft EA report dated May 2025 be provided? This would have also been needed by the noise sub-consultant to assess mitigation scenarios and complete the assessment of the noise change significance in the draft EA report.

Reversibility of Noise Effects

Section 8.3.1.1 states that there is an "inherent reversibility of the noise effects." The term 'reversibility' has to do with reinstating a pre-existing project condition. This sub-consultant statement is absurd when one contemplates answers to the following questions.

- How are the decibels removed from the ear canal after entering it?
- How can the resident's bodily organs reverse their experience of prolonged infrasound noise effects?
- How does a resident go back in time to work those shift hours missed due to sleep deprivation?
- How can a resident reverse the increment in interest accumulating on their line of credit due to the loss of ability to earn income due to the noise effects?
- When watching a paid live stream program, how does a resident hear the segments that were masked by the noise effects?
- etc.

The dismissive attitude of the EA sub-consultant indicates they were unaware of a legal obligation to protect public health, safety, and well-being when completing the EA noise effects components, as required of a PEO licensed noise engineer.

In any event, the compensation value of the environmental noise capacity exceedance is not reversible and in fact accumulates on a dollar per 'decibel-second' noise energy basis [antilog(Bel) x second].

Temporary Resident Displacement

Based on the information in draft EA report, some residents will be severely affected and forced to vacate their homes during the proposed overnight construction activities still being discussed. The 15 dBA to 20 dBA construction noise effect being contemplated in the draft EA report to occur during the overnight hours would render some housing uninhabitable for periods of time during the proposed 18 month construction duration, especially where windows must otherwise remain open overnight for residences without HVAC systems.

26) Can details be provided on the interim overnight sleeping arrangements that are envisioned to mitigate the overnight effects of the RESA project (eg. the terms of a stipend for the out of neighbourhood hotel costs and other related nuisance expenses, for those waterfront residents affected at the predictable worst case noise impact locations)?

Construction Cost Effects

In Fall 2024, the Toronto Port Authority pursued a fourth Amendment to the Tripartite Agreement governing the airport with the City of Toronto and Minister of Transport, which Amendment was eventually executed on Jan 28, 2025 without public meeting. Sections D and 1(b) of the amendment noted that the term of the agreement had to be extended from July 1, 2033 to Dec 31, 2045 (12.5 years) in order to finance the RESA construction cost. Clearly, the cost recovery of the RESA project construction had been unofficially assessed prior to commencing the draft EA report as being a 'very significant' effect, in order to pre-emptively warrant the re-negotiation of the Tripartite Agreement prior to the preparation of the draft EA report. This typical component of economic cost criteria was not covered in the draft EA report.

It is assumed that the Port Authority's need to extend the term of the Tripartite Agreement was a result of a direction from Transport Canada and City of Toronto to lower the number of slot-regulated commercial flights of Q400 aircraft, from 202 slots per day, approved in 2010, to notably less than half this number (based on projected flyby noises alone), due to slot capacity re-calculation corrections. Such lowering would have significantly reduced the projected airport revenues and affect the engineering economics cost recovery component of the RESA project to be assessed. However, this has not been provided in the draft EA report nor discussed publicly.

27) Can the draft RESA EA report be revised to discuss the construction costs and cost recovery for each of the Alternatives, including the engineering economics analyses that informed the 12.5 year extended cost recovery timeline, as was re-negotiated for the Tripartite Agreement Amendment?

28) Can the projected increments of additional annual passengers exceeding 325,000 to benefit from the RESA project, with the lowered number of commercial slots in each year from 2027 to 2045, be provided.

Commercial Slot Number Estimates (Year 2010)

Flight Capacity based on Noise Capacity

In accordance with national noise standard for all Canadian airports, all residential properties in the waterfront were zoned, planned, designed, and constructed to receive a maximum of 25 NEF decibels per hour of aircraft flyby noise. This was in accordance with the Official Noise Map as established for every Canadian airport, which dictates land zoning based on the ultimate flyby noise capacity set by the NEF value. At any airport, a proposed aircraft flight mix, and the maximum number of flights of each aircraft type in the mix, are to be established such that they do not exceed the 25 NEF flyby noise capacity limit at any residentially zoned property. This involves an iterative environmental noise analyses process which includes electronic modelling of flybys using Transport Canada NEF software, which software can help to reduce the extent of manual calculations otherwise needed for a licensed noise engineer to professionally seal their flight capacity calculation results.

Flyby Noise Capacity Exceedance

In 2010, the Toronto Port Authority retained a noise consultant to prepare a 'Slot Capacity' report premised on using the Q400 (Bombardier DASH 8-400) aircraft at Toronto Island Airport. The report recommended a slot regulated Q400 operation of 202 slots/day. The City of Toronto subsequently retained a different noise consultant to peer review the slot report and identified no concerns with the proposed slot number. Both consultants prepared their estimates using the oldest functioning version of Transport Canada's NEF software available, to apply the historical aircraft noise data that was available at the time for a similar model of aircraft. This slot capacity report is still being relied upon currently.

It has since been confirmed that the Port Authority consultant had committed professional misconduct. The City's peer review consultant who separately calculated the same slot number in 2010 was also practicing engineering without a PEO license, contrary to the Professional Engineers Act of Ontario.

At that time and probably still today, both consultants were not able to answer fundamental engineering questions related to the numerical constants of 16.67 and 88 in the NEF modelling formula, shortly after each presented on separate occasions, the proposed 202 slot/ day Q400 operation that they had separately calculated. Each directed the questioner to seek answers from Transport Canada and asked if responses can be conveyed back. Neither consultant was aware of the ground noise attenuation algorithm embedded within the NEF software. The algorithm lowers the estimated noise to be received from each flyby at lower aircraft sightline viewing angles. The algorithm is inapplicable to both reflective water surfaces and the high rise residential apartment properties in vicinity of the airport.

As a result, both consultants had simply used the NEF software to unwittingly fill up the 24 hour noise capacity model with unweighted Q400 flights, after weighting only the small projected number of mostly quieter night flights. The total slots thus afforded over the entirety of the 24 hour noise capacity period resulting from this incorrect calculation (including the nighttime period when the airport is closed) were then recommended to be programmed for the 16.25 airport runway open hours of 06:45 to 23:00, without constraint. The daytime flyby noise to be received by waterfront residents had been systemically under-estimated, thus failing the legal requirement that such professional engineering estimates need to be fair and reasonable under the Acts. The errors in commercial slot calculation methodology, and the recommendations, resulted in a proposed Q400 operation that the consultants ought to have known would exceed the 25 NEFdB/hour flyby capacity standard at the residences, which operation has since been implemented.

Stationary Source Noise Capacity Exceedance

The stationary source noises from the airport site itself thus also increased as a consequence of the excessive number of daytime flybys incorrectly scheduled, to result in a predictable exceedance of the provincial noise standard applicable to all airports and the surrounding approved housing. However, both consultants failed to recommend that the projected increase in total cumulative stationary source noises to result from their increased proposed flyby numbers must also be monitored and constrained. This is despite having depicted in the report multiple proposed aircraft idling on the taxiways directly across the water from pre-existing residential towers sited 350m to 700m away. Unsustainable investments at the airport were subsequently made based on the under-estimations of airport noise and resulting noise capacity exceedances.

29) Can the revised flight capacity scenario, including the lower number of Q400 slots and the revised flyby noise projections meeting residential standard, be provided for review asap and appended to the draft EA report?

30) Can the flight capacity information package that was made available to and referenced by each of the City of Toronto and Minister of Transport, as of the Jan 28, 2025 execution date of the Tripartite Agreement Amendment, be provided? This will help understand the RESA cost recovery effects which were mitigated pre-emptively by way of Tripartite Agreement term extension.

Slots Over-Estimated per Transport Canada (Year 2022)

A public meeting was held on Jan 13, 2022 in response to concerns raised by the waterfront communities regarding the number of slot-regulated commercial aircraft approved to date, and the lack of consulting industry knowledge on NEF administration requirements. In response, the most senior staff at Transport Canada (Environmental Protection and Standards Division) responsible for airport noise and TP1247 attended the Noise Management Sub-Committee Meeting No. 16 on May 5, 2022.

During this short sub-committee meeting, Transport Canada provided an informative presentation prepared in response to the community concerns raised on Jan 13, 2022, and provided helpful responses to some immediate questions. Prior to the meeting being abruptly ended by the Port Authority, Transport Canada staff had agreed that some of the airport noise under-estimation concerns, which artificially inflated the calculated flight numbers, were legitimate. Specifically, the 202 slot/day flight capacity needed to be lowered on account of the systemic flyby noise under-estimations related to: the inapplicable ground noise attenuation algorithm, the noise reflections of aircraft over water, and the proximity of high rise residential properties to the ascending and descending aircraft. (Regrettably, these Transport Canada staff comments were 12 years late.)

Through discussion, it also emerged that the responsible Transport Canada staff were not completely familiar with some of the fundamental engineering principles of the (Noise Exposure Forecast) NEF modelling constants, but vowed to investigate and understand the NEF modelling formula once and for all, the administration of which they were industry regulator. The knowledge needed is fundamental to understanding the modelling requirements and the software output. See annotated Minutes of Noise Management Sub-Committee Meeting No.16 attached to the cover memo dated Nov 6, 2023. A follow up meeting with staff was agreed to upon meeting conclusion.

A follow up meeting with Transport Canada regarding the response gaps and corrections to the various flight capacity calculation errors and omissions has not been set up yet by the Port Authority. Given the need to amend the Tripartite Agreement in Fall 2024 on account of the term extension for RESA cost recovery, it is presumed that a new noise compliant flight capacity scenario (which unavoidably will lower previous airport revenue projections), has since been prepared. Please provide this information.

Unlicensed Practitioners

After the May 5, 2022 meeting, it was observed that none of the individuals on the Transport Canada team that attended were licensed engineers. Accordingly, the responsible staff are not legally allowed under the Professional Engineers Act of Ontario, to practice engineering, which includes providing any advice, approvals, or assurances to the City of Toronto, Ports Toronto, or to the private industry consultants, regarding the administration of the NEF process and application of the underlying engineering principles, as they had been doing.

Also amongst those attending with the Transport Canada team was an unlicensed private consultant who had prepared some of the annual noise contour reports since 2008, which reports contained lengthy disclaimers, and which Transport Canada was routinely providing to the City two years after the fact.

Based on the preceding available information, from an engineering noise perspective, the incorrectly calculated 202 slot-regulated commercial flight capacity per day at the Toronto Island Airport was unlawfully recommended, and then subsequently also unlawfully approved.

TP1247

Subsequent to the meeting May 5, 2022, a document entitled *TP1247 'Aviation: Land Use in the Vicinity of Aerodromes'* was reviewed as suggested by Transport Canada. Numerous errors and omissions were found therein, starting with a surprisingly incorrect description of EPNLdB on the initial pages (the summations of EPNL being the critical inputs into the NEF modelling formula). Other important concerns with this document have since been compiled in the Noise Management Sub-Committee memo entitled: 'TP1247 Deficiencies' dated Nov 20, 2023. A follow up meeting with Transport Canada regarding TP1247 concerns has not yet been set up by the Port Authority.

NEF User's Manual

In lieu of providing an NEF Practitioner's Guide as agreed to in the May 5, 2022 meeting, Transport Canada sent on Oct 4, 2022, an *NEF Software User Manual* dated June 1990, with a note that the relevant contents were incorporated into help menus of the current NEF software. It appears there is currently no 'NEF Practitioner's Guide' or similar document to guide engineers through the NEF administration and certification process. This remains a problem for the industry and the public as it increases the risk of incorrectly estimated flyby scenarios, noise capacity exceedances, and professional misconduct.

The above notwithstanding, the User's Manual showed that individual NEF values are being calculated for each flyby and then summed in the software without constraint. This summation methodology does not align with the engineering principles embedded within the 24 hour NEF noise capacity modelling formula, and has resulted in offsetting of EPNL decibel summations by unguided practitioners using the software, not only between the 15 daytime hours and 9 nighttime hours, but also between the individual hours of the 24 hours.

The unconstrained summation methodology has resulted in too many flights being programmed in some hours and the exceedances of the 25 NEFdB/hr zoning standard at residences. Other important conflicts and concerns were observed in the User's Manual as well and also need to be discussed urgently. There has been no follow up discussion yet with Transport Canada on these flight capacity calculation matters, some of which overlap with the May 2022 meeting response gaps.

31) To ensure collective understanding regarding the revised flight capacity, can separate meetings be set up with Transport Canada's PEO licensed noise engineer and the Noise Management Sub-Committee to get a status update on the May 2022 meeting response gaps (prioritized list to be prepared), as well as the concerns identified with TP1247?

The 'Do Nothing' Alternative

32) Can the draft EA report add the typical 'Do Nothing' Alternative so that the cost effects of each Alternative can be compared (ie. by capping the number of annual emplaned and deplaned passengers at 325,000, per the Amendment to the Canadian Aviation Regulations)? Is it correct that there is no additional cost incurred with selecting the Do Nothing Alternative?

33) Can information be provided in the draft EA report showing that there were in fact 325,000 emplaned and deplaned passengers in last two years at the airport, including how this data is collected and verified?

RESA EA Noise Sub-Consultant

From the above and preceding, it appears the draft EA noise sub-consultant was unaware of their legal obligation to protect public health, safety, and well being while assessing the significance of noise effects. Through its dismissive and cavalier attitude in reviewing the noise effects in the draft EA report, as discussed in the preceding sections above, it was definitely not keeping the public interest paramount at all times as would a PEO license holder. Accordingly, it was concluded that the noise components of the draft RESA EA Study Report were not prepared and reviewed by a PEO licensed noise engineer, as legally required by the Professional Engineers Act of Ontario. An informed noise engineer licensed with Professional Engineers Ontario (PEO) will now need to be retained in order to review, revise, certify and professionally seal where required, the noise effects significance assessments under the Draft RESA EA Study Report.

34) The noise sub-consultant responsible for preparing the noise components in the Draft RESA EA Study Report is not known or stated in the draft report. For clarity, can the list of all sub-consultant companies and names of project leads involved with draft RESA EA Study Report be provided, and also listed in the draft RESA EA report, desirably along with their field of responsibility?

This RESA project would have a very significantly affect Toronto's waterfront. Based on the material contained in the draft EA report dated May 2025, the RESA construction cannot be greenlighted.

35) Can a Noise Management Sub-Committee meeting with the PEO licensed noise engineer working on the RESA EA Study be set up? We would like to better understand the both the origins and motivations of some of the technical assertions contained in the draft RESA EA Study Report flagged herein, and to confirm intentions to resolve the errors and omissions concerning the noise effects.

EA Noise Sub-Consultant Selection

Burnside Engineering and Environmental Consulting has been retained by the Port Authority for over 4 years to work on the ongoing 'Ground Source Noise Study', together with its sub-consultant, Akoustik Engineering Limited. It is steadily gaining knowledge of the urban marine noise environment surrounding Toronto Island Airport, and of the impact of airport operations on the residential community environment.

While reviewing the Draft RESA EA document dated May 2025, it was quickly observed that some of the material contained in the draft RESA EA Study Report was not as informed nor as articulate as the work of Burnside and Akoustik. Some technical elements of the draft RESA EA report also contradicted past statements by the 'Ground Source Noise Study' project leads of both Burnside and Akoustik, as well as the

past statements made by a senior MECP noise engineer who had previously presented to the airport Noise Management Sub-committee.

During the Community Liaison Committee (CLC) Meeting No. 59 which took place on Sept 8, 2025, the Port Authority confirmed that the noise components of the EA document had not been prepared with Burnside Consulting. It is unknown why the Port Authority had replaced its currently still active and long retained noise consultants, with an uninformed sub-consultant, to prepare the noise components on the draft EA report.

Yours Truly,

Hal Beck, P.Eng.
YQNA representative on airport standing committees since 2008

c. Heather Dennis, Project Administrator, Toronto Port Authority
Noise Management Sub- Committee, Billy Bishop Toronto City Airport
Jay Paleja, Waterfront Secretariat, City of Toronto
York Quay Neighbourhood Association Airport Committee

Appendix 1

A compilation of all pages discussing noise, as extracted from the Draft RESA Study Report dated May 2025.
(10 pages)

Environmental Assessment Study Report – DRAFT

Runway End Safety Area, Billy Bishop Toronto City Airport

PortsToronto

60733457

May 2025

Delivering a better world

Offshore conditions consisted of lakebed elevations ranging from 63.6 metres to 71.8 metres, with water depths of 2.9 metres to 11.1 metres. Fill materials, including sand, silty sand, gravelly silty sand, and clayey silt, were present at the lakebed, extending to depths of 8.7 metres to 13.8 metres. Underlying the fill, native materials such as sand, silty sand, and sandy silt were encountered, varying in thickness and condition, while below these strata, bedrock of the Georgian Bay Formation was contacted.

The sediment analysis results in the Project Study Area showed that sediment quality generally met sediment standards, except at the east end of the Project Study Area. Specific issues were found with metals and mercury at BH24-OFF-08, BH24-OFF-09, BH24-OFF-10, and BH24-OFF-11; Polycyclic Aromatic Hydrocarbons at BH24-OFF-08; and dioxins and furans at BH24-OFF-06, BH24-OFF-08, BH24-OFF-09, BH24-OFF-10, and BH24-OFF-11. Additionally, sediment exceeded Industrial/Commercial/Community Excess Soil Quality Standards at BH24-OFF-08, BH24-OFF-09, BH24-OFF-10, and BH24-OFF-11.

Socio-Economic Environment

Air Quality

The air quality study area contains fourteen sensitive receptors (residential dwellings) and three critical receptors (retirement homes, hospitals, childcare centres, and/or schools). Analysis of the ambient air quality revealed that most contaminant levels remained below the provincial Ambient Air Quality Criteria and federal Canadian Ambient Air Quality Standards except for nitrogen dioxide concentrations, which exceeded the federal Canadian Ambient Air Quality Standards in the existing background levels.

Noise

The primary source of noise from ground operations at the airport is from the aircraft run up area located on the eastern edge of the airport dock wall south of the Stolport hanger and east of gates 10 & 11. Additionally, sound sources associated with Billy Bishop Toronto City Airport include airborne aircraft, aircraft on the ground, (i.e., taxiing, idling, engine run up, engine-braking upon landing), airport ground support equipment, and the Marilyn Bell Ferry, while sources of ambient noise within or adjacent to the noise study area include nearby road traffic and light rail transit. A noise wall currently exists at the west end of Runway 08/26 along the north edge of Taxiway A.

Social Environment

The following socio-economic values exist within the socio-economic study area:

- Residential Uses: The socio-economic study area is characterized by a high population density, which has been steadily increasing and includes a mix of residential and commercial (office) properties.
- Recreational Uses: The socio-economic study area contains parks, natural areas, beaches, trails and sport facilities.
- Public Facilities, Services and Institutional Uses: There are a wide variety of public facilities, services and institutions in the socio-economic study area. Billy Bishop Toronto City Airport is a public facility itself, providing recreational, commercial, and emergency air services to the residents of the Greater Toronto Area, while providing service across the Province of Ontario and to regional centres to parts of Northeastern Canada and the United States.
- Economy and Tourism Uses: Billy Bishop Toronto City Airport has indicated its role in contribution to the growth and prosperity of the City of Toronto and the regional economy. New investment in tourism uses of the area is planned and is anticipated to result in increased tourism use of the Toronto waterfront.
- Non-Use Values: Include maintaining options for future generations to develop and use the waterfront, preserving aspects of the natural environment for future use and enjoyment and representing or contributing to the “brand” of Toronto as a major “waterfront” city.

Public Health

As mentioned above, nitrogen dioxide was the only contaminant found to exceed the federal Canadian Ambient Air Quality Standards in the existing ambient air levels within the air quality study area. Further, noise levels exceeding 45 dBA L_{eq} (average sound level) and 60 dBA L_{max} (maximum sound level) may disturb sleep. The average nighttime sound levels in the noise study area exceed 45 dBA L_{eq} and maximum noise levels exceed 60 dBA L_{max}, under existing conditions, considering urban environment noise from sources other than airport operations.

Marine Navigation

The marine navigation study area is commonly used by various types of vessels, including recreational motorboats, sailing vessels, paddleboats, passenger ferries and tour boats. Additionally, several yacht clubs and marinas on the Toronto Islands offer private shuttle services. Physical shoreline characteristics range from concrete, timber or steel vertical seawalls to beaches, marshes and stone revetment slopes.

3.2.2 Noise

The following sections summarize the existing noise conditions. For more detailed information, please refer to Noise Impact Assessment Report (**Appendix G**).

3.2.2.1 Data Collection

Noise levels for the nearby noise-sensitive receptors were conservatively estimated based on the historic baseline levels. This noise assessment considered road and light rail transit sources – either by direct application, at similar point of reception locations, or interpolation of values at nearby point of reception locations. Refer to **Figure 3-5** below, and Table 1 in the Noise Impact Assessment Report (**Appendix G**) for the location of point of reception.

3.2.2.2 Description of Existing Environmental Conditions

The primary source of noise from ground operations at the airport is from the aircraft run up area located on the eastern edge of the airport dock wall south of the Stolport hangar and east of gates 10 & 11. RWDI previously completed a Noise Assessment Report for Billy Bishop Toronto City Airport (AECOM 2017), outlining that the primary source of noise from ground operations at the airport is the aircraft ground run up maintenance testing area, which is located in the south field next to the fuel farm, however this assessment was prior to construction of the ground run up enclosure. Additionally, sound sources associated with Billy Bishop Toronto City Airport include airborne aircraft, aircraft on the ground (i.e., taxiing, idling, engine run up, engine-braking upon landing), airport ground support equipment, and the Marilyn Bell Ferry (AECOM 2017). Sources of ambient noise within or adjacent to the noise study area include nearby road traffic and light rail transit (AECOM 2017). Pertinent to ground-based noise levels, a noise wall currently exists at the west end of Runway 08/26. The estimated existing nighttime background sound levels used for assessing construction noise impacts range from 52 to 62 dBA $L_{eq,23:00\text{-}07:00}$ (equivalent average sound levels between 11:00 pm and 7:00 am) at the nearest noise sensitive point of reception. These levels are typical of those found in urban communities.

Figure 3-5: Points of Reception – Noise

LEGEND
- Airport Boundary
- Buildings
- Point of Reception

Data Sources:
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PortsToronto RESA Environmental Assessment Study Report

Points of Reception - Noise

0 150 300 600 M

NAD 1983 UTM Zone 17N

Oct, 2024	1:8,000
P:60733457	Rev:00

Figure 3-5

AECOM

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98th percentile 1-hour NO_2 concentrations reached 108.5 µg/m³, which is 130% above the Ambient Air Quality Standard limit of 83.2 µg/m³.

3.2.4.2.2 Noise

Various measures are used to understand how noise impacts human health. For example, outdoor noise levels of 45 dBA L_{eq} (average sound level) and 60 dBA L_{max} (maximum sound level) may disturb sleep, assuming a 15 dB reduction for indoor noise[5].

Health Canada recommends using the percentage of a population highly annoyed as a key indicator of noise-induced health effects from long-term construction or operational noise exposure. The percentage of highly annoyed population is calculated using the day-night average sound level (L_{dn}), which adds a 10 dB penalty to nighttime noise. Noise mitigation is recommended to be considered where a predicted change exceeds 6.5%.

The average nighttime (23:00 to 07:00) sound levels exceed 45 dBA L_{eq} and maximum noise levels exceed 60 dBA L_{max}, under existing conditions.

3.2.5 Marine Navigation

The following sections summarize the existing marine navigation conditions. For more detailed information, please refer to Marine Navigation Effects Assessment Report (**Appendix I**).

3.2.5.1 Data Collection

A desktop review was conducted using existing data from WSP (2015), AECOM (2017), and other relevant secondary resources to identify the current conditions.

3.2.5.2 Description of Existing Environmental Conditions

The existing conditions include the type of vessels that typically are in the marine navigation study area, the shoreline characteristics, waves, currents, sedimentation trends that affect marine navigation, and boat user visibility.

3.2.5.2.1 Type of Vessels and Shoreline Characteristics

The type of vessels that typically frequent the marine navigation study area are recreational vessels including motorboats, sailing vessels and paddleboaters. Passenger ferries and tour boats also frequent the area at the Hanlan's Point Beach ferry.

5. 15 dB reduction is an assumption based on typical building construction. For example, if the outdoor noise is 60 dBA, the indoor noise would be approximately 45 dBA (60 dBA - 15 = 45 dBA).

- **Anticipated Noise Levels**
  - RESA 3 is the most preferred alternative during operation as it results in reduced noise levels from taxiway operations due to a new noise wall on the east end and extension of the existing noise wall on the west end. This alternative is expected to result in significant noise reductions (greater than 5 dB) at several sensitive receptors. The overall net effect is anticipated to range from negligible to positive.
  - RESA 2 is less preferred during operation as it results in marginal changes in noise levels from taxiway operations. With slight reductions in noise levels at several sensitive receptors, RESA 2 is anticipated to have a negligible to marginal net effect.
  - RESA 1 is least preferred during operation as its operational characteristics and noise levels during operations will not be changing (no advantages). This alternative has no net effect.
  - Construction of alternatives result in similar noise emissions. While RESA 1 has the least construction noise disturbances due to its shortest construction duration (18 months), RESA 3 overall is the most preferred alternative for noise due to its highest reductions in noise level from taxiway operation during long-term operation.
- **Use and Enjoyment of Residential Properties**
  - None of the RESA alternatives change airport operations in terms of number of flights, frequency, times of operation, types of aircraft, and therefore no additional corresponding negative impacts (e.g., noise and air quality) are anticipated. The alternatives are ranked by potential benefits they deliver for residents for use and enjoy their properties.
  - RESA 3 is the most preferred for reducing noise from taxiway operations (for some receptors) and air emissions, resulting in a net positive effect that benefits residents closest to the airport.
  - RESA 2 is moderately preferred for reducing air emissions compared to RESA 1, resulting in a net positive effect.
  - RESA 1 is less preferred as it does not provide any reduction in noise or air emissions, and has no net effect.
- **Recreational Uses**
  - All RESA alternatives have some net negative impact due to lake infill, so ranking is based strictly on the amount of lake infill required, although infill remains within the Marine Exclusion Zone in all three alternatives.

5.1.3 Taxiway and Visual Approach Slope Guidance System Modifications

RESA 3 includes taxiway modifications along both the east and west ends of the airport. At the east end, the landmass expansion associated with RESA 3 offers an opportunity to relocate Taxiway D further away from the runway by 23 metres to a meet a standard separation distance of 93 metres from Runway 08/26 and aligned with the existing apron taxiway; improving from the current, non-standard Taxiway D offset that imposes restrictions and unusual aircraft taxi procedures and turns. Relocating Taxiway D will address congestion, delays, and emissions caused by current taxiing procedures, improve safety and familiarity for flight crews, while also enabling the ability to mitigate flood risks through design of a new breakwater and grading revisions.

At the west end, a realignment of Taxiway B will provide a full parallel (straight) taxi route to Runway 08/26 threshold, eliminating Taxiway A and many unnecessary aircraft turns. This change will reduce the taxi distance by about 75 metres, ultimately enhancing airfield efficiency and safety.

5.1.4 Noise Barriers

RESA 3 accommodates an extension of the existing noise wall (6 to 8 metres tall) installed at the western end of Runway 08/26, in addition to the introduction of a new noise wall at the east end of the runway. The landmass extension associated with RESA 3 allows these noise walls to be installed clear of runway and taxiway protection areas, while attenuating ground-based noise from aircraft on taxiways B and D. The final limits and heights of these noise barriers are subject to ongoing preliminary and final design activities.

5.1.5 Airside Operational Improvements

The proposed components of RESA 3 provide various improvements to airside operations, as outlined below.

5.1.5.1 Relocation of Navigational Aid (Localizer 26)

Localizer 26 is a navigational aid currently situated in the path of the proposed realignment of Taxiway B, adjacent to the west end of Runway 08/26. RESA 3 provides an opportunity to relocate the localizer 26 antenna onto the extended runway centreline within the proposed western RESA landmass. The localizer 26 antenna is currently 2.2 metres in height, with a similar height being considered for the relocated antenna. Based on a preliminary airspace analysis, the relocation of localizer 26 will not impact existing runway operations and will preserve the existing approach minimum descent

6.2.2 Noise

6.2.2.1 Net Effects Analysis - Construction

Table 6-15 outlines the potential effects, proposed mitigation measures, and net effects of RESA 1, RESA 2, and RESA 3, during construction.

6.2.2.2 Net Effects Analysis - Operation

Table 6-16 outlines the potential effects, proposed mitigation measures, and net effects of RESA 1, RESA 2, and RESA 3, during operation.

Table 6-15: Net Effects Analysis of RESA 1, RESA 2 and RESA 3 for Noise- Construction

Factor	Criteria	Potential Effects	Mitigation Measures	Net Effects
■ **Changes in Noise Levels from Construction.**	■ Overall anticipated noise levels from construction.	**RESA 1** ■ Construction noise impacts at all points of receptions are predicted to be negligible. **RESA 2, RESA 3** ■ Construction sound levels are predicted to exceed the existing nighttime average background at the location of two points of reception (4 and 5) during Stage 3 construction (onshore work only). ■ The difference in average night- time sound levels is predicted to be potentially perceptible (between 2-4 dB increase), and have marginal impact at point of reception 4 (6 sub-receptors). ■ The difference in sound level is predicted to be imperceptible (1 dB increase) and have negligible impact on point of reception 5 (5 sub-receptors). ■ Construction noise impacts at other receptor locations are predicted to be negligible. **RESA 1, RESA 2, RESA 3** ■ The daytime sound levels are assumed to be the same during the construction period as existing levels. ■ Despite the low predicted noise impacts, construction activities may be audible and potentially disturbing to some points of reception at limited times during construction.	**RESA 1, RESA 2, RESA 3** ■ Develop Construction Noise Management Plan for the Project to include efforts to minimize community impacts by employing 'best practices for noise and sound induced vibration mitigation'. ■ Maintain equipment in an operating condition that prevents unnecessary noise, including but not limited to, effective muffler systems, properly secured components and lubrication of moving parts. ■ Restrict idling of equipment to the minimum necessary to perform the specific work. ■ Ensure vehicles employed continuously on site for extended period of time (two days or more) are fitted with broad-band sound back-up alarms, rather than tonal alarms. ■ Avoid unnecessary revving of engines and switch off equipment when not required (do not idle). ■ Minimize drop heights of materials. ■ Use construction equipment compliant with noise level specifications in Ministry of the Environment, Conservation and Parks publications NPC-115 and NPC-118.	**RESA 1** ■ Negligible Negative Net Effect. **RESA 2, RESA 3** ■ Marginal Net Negative Effect. ■ Mitigation measures may reduce the extent of noise impacts on marginally affected points of receptions.

Table 6-16: Net Effects Analysis of RESA 1, RESA 2 and RESA 3 for Noise- Operation

Factor	Criteria	Potential Effects	Mitigation Measures	Net Effects
■ **Changes in Noise Levels from Operations (Taxiway Modifications and Noise Walls).**	■ Ground operation noise levels.	**RESA 1** ■ No increase in noise levels as there are no changes to ground operations. **RESA 2** ■ With taxiway modifications, taxiway noise levels are predicted to range from negligible increase (0 to 1 dB increase) to marginal reduction (1 to 5 dB decrease), depending on source taxiway and receptor height, at points of reception 2-8. ■ Taxiway noise levels are predicted to range from negligible increase (0 to 1 dB increase) to negligible reduction (0 to 1 dB decrease) at the other points of reception. **RESA 3** ■ With taxiway modifications and noise walls in RESA 3, taxiway noise levels are predicted to range from negligible increase (0 to 1 dB increase) to significant reduction (more than 5 dB decrease), depending on source taxiway and receptor height, at points of reception 2-6, 10, and 19. ■ Taxiway noise levels are predicted to range from negligible reduction (0 to 1 dB decrease) to marginal reduction (greater than 1 dB decrease but less than 5 dB decrease) at the other points of reception. ■ Refer to **Appendix G**, Noise Assessment Study Report, Table 8 for detailed information on changes in taxiway operations noise levels at various points of receptions.	**RESA 1, RESA 2, RESA 3** ■ No mitigation measures required.	**RESA 1** ■ No Net Effect. ■ No changes to ground operations. **RESA 2** ■ Negligible Net Effect. ■ Marginal noise level reductions from taxiway operations at several points of reception. **RESA 3** ■ Negligible to Positive Net Effect. ■ Significant noise level reductions from taxiway operations at several points of reception.
	■ Air operation noise levels.	**RESA 1, RESA 2, RESA 3** ■ No impacts to any noise-sensitive locations.	**RESA 1, RESA 2, RESA 3** ■ No mitigation measures required.	**RESA 1, RESA 2, RESA 3** ■ No Net Effect.