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## NOTE DE SCÉNARIO POUR LE MINISTRE DE TRANSPORTS CANADA

### RENCONTRE AVEC L'AUTORITÉ AÉROPORTUAIRE DU GRAND TORONTO

#### DÉTAILS DE LA RÉUNION

- **DATE/HEURE** : 7 mars 2024, 16 h 00
- **PARTICIPANTS** :
  - Pablo Rodriguez, Transports Canada
  - Deborah Flint, présidente et chef de la direction, Autorité aéroportuaire du Grand Toronto

#### OBJECTIF

- Pour discuter des initiatives suivantes avec l'Administration aéroportuaire du Grand Toronto :
  - Obstructions à proximité des aéroports
  - Plan d'immobilisations transformateur/carrefour multimodal
  - L'avion russe cloué au sol (l'Antonov)

#### POINTS À INSCRIRE

##### *Obstructions à proximité des aéroports*

- Il s'agit d'une question importante. Je suis heureux de constater que l'Administration aéroportuaire du Grand Toronto a été un membre actif du groupe de travail que nous avons récemment mis sur pied pour régler les obstacles à proximité des aéroports.
- Le rythme de la construction de nouveaux immeubles de grande hauteur pour régler le problème du logement s'accélère, les gouvernements de tout le pays cherchant des solutions en réduisant les obstacles aux nouveaux aménagements.
- L'un des défis est que l'impact des développements sur les aéroports et Nav Canada est souvent négligé par les provinces et les municipalités au cours de leurs processus de planification.
- Il est essentiel que nous assurions la sécurité de l'espace aérien pour les opérations aéroportuaires tout en reconnaissant les objectifs des acteurs des secteurs public et privé qui cherchent à accroître l'offre de logements.

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- Je suis heureux d'apprendre que vous et vos collègues avez pris le temps de proposer des mesures qui pourraient être prises pour régler les problèmes. Ils seront examinés par mon ministère.
- Comme prochaine étape, Transports Canada cherchera à sensibiliser les partenaires fédéraux aux questions de sécurité cruciales et, surtout, avec d'autres ordres de gouvernement, à s'assurer que nos aéroports et Nav Canada participent adéquatement au processus de développement.
- Cette sensibilisation n'est qu'un début.
- À l'heure actuelle, les promoteurs ne sont pas tenus de tenir compte de l'exploitation des aéroports dans leurs plans d'aménagement, et les administrations municipales et provinciales n'ont pas le pouvoir d'empêcher les aménagements qui pourraient avoir une incidence sur l'aviation et l'espace aérien canadien.
- Nous examinons donc les options réglementaires qui pourraient être disponibles pour régler ce problème par l'entremise du groupe de travail.
- Je suis heureux d'avoir d'autres idées que vous pourriez avoir sur l'impact de cette question sur Pearson.

*Plan d'immobilisations transformateur/carrefour multimodal*

- J'aimerais en savoir plus sur les projets d'immobilisations que vous proposez.
- Je crois comprendre que vous redynamiez les plans d'un carrefour multimodal, est-ce que cela fait partie du Plan d'immobilisations transformatrices ou d'une initiative distincte ?
- J'encourage votre équipe à communiquer avec mes fonctionnaires pour en discuter plus en détail.
- Le plan d'immobilisations et le carrefour multimodal nécessiteront probablement une collaboration avec de multiples administrations (fédérale, provinciale, municipale).
- Nous devrions discuter, avant trop longtemps, de la meilleure façon d'amener les personnes nécessaires à la table pour nous assurer que toutes les considérations sont étoffées relativement tôt dans le processus.



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- Il y aura des questions d'autorités, d'approbations, de permis, ainsi que de coûts. Parmi beaucoup d'autres considérations.
- Quels sont les échéanciers de ces initiatives ?
- Allez-vous augmenter les frais pour couvrir les coûts ?

*RÉACTIF SEULEMENT : L'avion russe cloué au sol à Pearson (Antonov)*

État, maintenance et mouvement de l'aéronef :

- D'après ce que j'ai compris de mon ministère, Services publics et Approvisionnement Canada a travaillé avec vous pour régler certaines des questions en suspens liées à l'aéronef et que les discussions ont été bénéfiques.

RE Greater Toronto Airport Authority's ability to do something regarding the aircraft

- Avez-vous exploré cette question avec Affaires mondiales Canada ?
- Je me ferai un plaisir de sensibiliser mon collègue, le ministre des Affaires mondiales, à vos préoccupations.

**CONTEXTE / CONSIDÉRATIONS**

*Obstructions à proximité des aéroports*

- L'espacement sécuritaire des aéronefs des dangers potentiels est requis pendant toutes les phases du vol, y compris les phases critiques du départ et de l'arrivée (à l'aéroport), et où des procédures d'urgence doivent être utilisées. Les bâtiments, les structures et d'autres objets peuvent devenir des dangers pour la navigation aérienne s'ils sont construits au mauvais endroit.
- Traditionnellement, la protection du zonage des aéroports était fondée sur les surfaces dangereuses ou limites d'obstacles requises dans les règlements et les normes de l'aéroport. Toutefois, le règlement de zonage actuel des aéroports ne protège pas adéquatement les procédures de vol aux instruments, qui sont nécessaires pour assurer la sécurité des vols dans toutes les conditions météorologiques (p. ex. conditions de faible visibilité).
- La solution actuelle consistant à re-concevoir les procédures de vol pour atténuer l'impact d'un tel développement dans cet espace aérien est une solution de « pansement » et ne peut être faite indéfiniment. Il est coûteux, prend du temps et a des options limitées.



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- Nav Canada et les aéroports font face à une pression croissante et demandent à Transports Canada d'élaborer des solutions viables pour protéger cet espace aérien critique, en mettant l'accent sur des consultations obligatoires, opportunes et significatives par ceux qui développent des structures à proximité d'un aéroport ou d'un aérodrome, et un moyen de prévenir de tels dangers dans cet espace aérien, si cela est nécessaire.

## Répercussions sur les aéroports de la région du Grand Toronto

- La région et l'administration centrale de Transports Canada en Ontario ont travaillé avec l'Administration aéroportuaire du Grand Toronto et PortsToronto sur la façon dont cette question aura une incidence sur leurs activités. Cette question est encore plus compliquée en Ontario en raison des récents changements apportés aux lois provinciales sur le zonage afin de lever les restrictions de hauteur de zonage et de supprimer les exigences de consultation qui garantissaient auparavant que les aéroports étaient au courant des développements futurs qui pourraient avoir une incidence sur leurs activités.

## Situation actuelle

- Un groupe de travail, composé de Transports Canada, de NAV Canada, du Conseil des aéroports du Canada et de certains aéroports (Vancouver, Toronto, Waterloo), a été formé pour examiner le problème et élaborer des mesures d'atténuation potentielles pour y remédier, y compris des activités de mobilisation pour aider à sensibiliser d'autres ordres de gouvernement à ce problème et des solutions réglementaires potentielles pour protéger l'espace aérien autour des aéroports et des aérodromes du Canada.

*Plan d'immobilisations transformateur/carrefour multimodal*

- L'Administration aéroportuaire du Grand Toronto est en train de lancer son plan d'immobilisations transformatrices. L'échange d'information n'en est qu'à ses débuts et cette réunion représente une occasion d'en savoir plus auprès du président et chef de la direction. Les éléments de base sont compris comme suit :
  - Restaurer l'infrastructure vieillissante et améliorer l'expérience des passagers, en mettant l'accent sur l'abordabilité.
  - Protéger la connectivité aérienne mondiale directe et le statut de Toronto Pearson en tant que porte d'entrée pour le Canada.
  - Créer de la croissance économique grâce à des occasions d'affaires et d'investissement qui profiteront aux économies nationales et régionales, créant ainsi des milliers d'emplois.



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- Mettre en œuvre un environnement numérique pour prendre des décisions basées sur les données pour des opérations plus prévisibles et plus efficaces.
- Construire plus de routes directes et de connexions de transport en commun pour les employés, les passagers et le fret.
- Réduire l'impact environnemental tout en faisant progresser les objectifs climatiques et la transition énergétique du Canada.
- L'Autorité aéroportuaire du Grand Toronto a fourni à Transports Canada un pont de haut niveau concernant le plan proposé, une copie est jointe.
- L'Administration aéroportuaire du Grand Toronto a indiqué qu'elle reprenait les travaux antérieurs pour faire progresser la planification et l'aménagement d'un éventuel centre régional de transport en commun à l'aéroport Pearson. Cela semble faire partie du Plan d'immobilisations transformatrices visant à soutenir la croissance et l'expansion futures des aéroports.
- Le concept de base est une plaque tournante intégrée à l'aéroport pour : (A) améliorer les options de transport à destination ou en provenance de l'aéroport (p. ex. plusieurs nouvelles lignes de train léger sur rail ; accès direct au train GO ; service à l'aéroport Pearson au train interurbain longue distance) ; et (B) les services de maison qui sont actuellement situés dans la construction principale de l'aérogare, comme le contrôle des passagers, afin de permettre un espace supplémentaire pour les portes et les avions.
- L'Autorité aéroportuaire du Grand Toronto avait fait progresser les travaux liés à une plaque tournante multimodale entre 2016 et 2019 ; cependant, les efforts ont été interrompus avec le début de la pandémie. Auparavant, Transports Canada a collaboré avec l'aéroport et d'autres intervenants à ce projet par l'entremise d'un comité de sous-ministres et de plusieurs organismes de travail. Il s'agit d'un projet d'infrastructure novateur, mais aussi à très grande échelle (plusieurs milliards de dollars) et complexe, qui nécessitera l'alignement d'un nombre important d'acteurs, dont certains ont des intérêts divers.
- L'aéroport a récemment retenu les services d'un consultant (Planification de l'accès) et devrait publier une demande de propositions au cours du premier semestre de 2024 pour une capacité supplémentaire de planification et d'établissement de la portée. Ce plan est destiné à servir de contribution au prochain plan directeur de l'aéroport Pearson, prévu pour 2027-2028. Le projet avait été défendu par l'ancien président de l'Autorité aéroportuaire du Grand Toronto (Howard Eng). Les responsables de l'aéroport ont indiqué que la présidente actuelle (Deborah Flint) est également d'accord.

#### *L'avion russe cloué au sol (l'Antonov)*

- L'avion Antonov est cloué au sol à l'aéroport international Pearson de Toronto depuis février 2022, en raison de la fermeture de l'espace aérien du Canada aux aéronefs immatriculés en Russie par Transports Canada, à la suite de l'invasion



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illégal de l'Ukraine par la Russie.

- Le 6 avril 2023, le Canada a ajouté de nouvelles désignations à son *Règlement sur les mesures économiques spéciales visant la Russie*, y compris plusieurs cibles de sûreté liées au secteur de l'aviation de la Russie. Volga-Dnepr Group et Volga-Dnepr Airlines étaient parmi ceux désignés à cette date.
- Il est interdit aux personnes au Canada et aux Canadiens à l'étranger de faire le commerce de biens détenus, contrôlés ou détenus, directement ou indirectement, par des personnes et des entités sanctionnées.
- Le *Décret d'autorisation de permis visant les mesures économiques spéciales visant la Russie* autorise le ministre des Affaires étrangères à délivrer à toute personne au Canada ou à tout Canadien à l'étranger un permis pour l'exercice d'une activité ou d'une transaction déterminée, ou de toute catégorie d'activités ou d'opérations, qui est restreinte ou interdite en vertu du Règlement. Affaires mondiales Canada a récemment fourni à l'Autorité aéroportuaire du Grand Toronto des renseignements sur le processus de demande de permis.
- Le régime de saisie et de confiscation d'actifs liés aux sanctions, qui est entré en vigueur en juin 2022, confère au gouvernement le pouvoir de saisir, de confisquer, d'aliéner et de redistribuer des biens au Canada appartenant à des personnes et à des entités sanctionnées.
- Le Canada a saisi l'avion-cargo Antonov le 8 juin 2023, en vertu des pouvoirs de saisie et de confiscation d'actifs de *la Loi sur les mesures économiques spéciales* du Canada. Ces pouvoirs sont distincts de la directive de Transports Canada.
- L'ordonnance de saisie ne change pas la propriété de l'aéronef. Services publics et Approvisionnement Canada gère le bien depuis l'entrée en vigueur du décret de saisie.
- Transports Canada, Aviation civile, croit comprendre de Services publics et Approvisionnement Canada, qui est responsable de la gestion de l'aéronef, que :
  - Services publics et Approvisionnement Canada travaille avec Antonov (le constructeur ukrainien de l'avion) et prévoit effectuer une inspection technique complète de l'aéronef afin de déterminer son état de maintenance
  - Ils ont l'intention de donner un préavis de quatre semaines de cette inspection à l'Autorité aéroportuaire du Grand Toronto
  - Des visas sont en cours pour les techniciens ukrainiens

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- Services publics et Approvisionnement Canada collabore avec Immigration, Réfugiés et Citoyenneté Canada et Affaires mondiales Canada.
- La date d'inspection la plus probable est de la fin mars au début avril – Services publics et Approvisionnement Canada s'est engagé à tenir Transports Canada informé
- Services publics et Approvisionnement Canada a souligné l'excellente collaboration avec l'Autorité aéroportuaire du Grand Toronto sur

16 (2)

- Il est entendu que Services publics et Approvisionnement Canada se penche également sur la question des frais de stationnement impayés.



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**Biographie :****Deborah Flint, présidente et chef de la direction de la GTAA**

Deborah Flint s'est jointe à l'Autorité aéroportuaire du Grand Toronto en tant que présidente et chef de la direction en février 2020, après plus de 4 ans en tant que PDG de Los Angeles World Airports et 24 ans à des postes de direction dans l'industrie de l'aviation.

À Los Angeles World Airports, Deborah a lancé la modernisation de ses terminaux de 14 milliards de dollars, l'amélioration des pistes et un programme de transport en commun complet qui comprend des améliorations routières et une installation de transport intermodal.

En tant que leader reconnue au sein de la communauté de l'aviation internationale et américaine, Deborah est membre du conseil d'administration international du Conseil des aéroports, nommée au comité consultatif sur les drones du DOT des États-Unis et présidente du comité de surveillance du programme de recherche coopérative sur les aéroports du Transportation Research Board.

Au-delà de l'industrie aéroportuaire, elle a siégé au conseil d'administration de la Banque fédérale de réserve et est administratrice de la Honeywell Corporation.





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**SCENARIO NOTE FOR THE MINISTER OF TRANSPORT CANADA****MEETING WITH GREATER TORONTO AIRPORTS AUTHORITY****MEETING DETAILS**

- **DATE/TIME:** March 7, 2024, 4:00 p.m.
- **PARTICIPANTS:**
  - Pablo Rodriguez, Transport Canada
  - Deborah Flint, President and Chief Executive Officer, Greater Toronto Airports Authority

**OBJECTIVE**

- To discuss the following initiatives with the Greater Toronto Airports Authority:
  - Obstructions in the Vicinity of Airports
  - Transformative Capital Plan/multimodal hub
  - The Grounded Russian Aircraft (the Antonov)

**POINTS TO REGISTER***Obstructions in the Vicinity of Airports*

- This is an important issue. I'm happy to see that the Greater Toronto Airport Authority has been an active member of the working group we recently established to address obstructions in the vicinity of airports.
- The pace of new construction of high-rise developments to address the housing issue is accelerating, with governments across the country looking for solutions by reducing barriers to new developments.
- One challenge is that the impact of developments on airports and Nav Canada is often overlooked by provinces and municipalities during their planning processes.
- It is essential that we ensure the safety of airspace for airport operations while acknowledging the aims of public and private sector players seeking to increase the supply of housing.
- I am glad to hear that you and your colleagues have taken the time to propose actions that could be taken to address the issues. They will be reviewed by my Department.



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- As a next step, Transport Canada will be looking to build awareness of the critical safety issues across federal partners, and crucially, with other levels of government, to ensure our airports and Nav Canada are properly engaged throughout the development process.
- This outreach is only the beginning.
- At present, developers are not required to factor airport operations into their development plans and municipal and provincial governments lack the authority to prevent development that may impact aviation and Canadian airspace.
- So we're looking at what regulatory options may be available to address this issue through the working group.
- I welcome any additional insight you may have on how this issue is impacting Pearson.

*Transformative Capital Plan/Multimodal Hub*

- I am interested in learning more about your proposed capital projects.
- I understand you are reinvigorating plans for a multimodal hub, is that part of the Transformative Capital Plan, or a separate initiative?
- ~~I would encourage your team to reach out to my officials to discuss in greater detail.~~
- Both the Capital Plan and multimodal hub are likely to require engagement with multiple jurisdictions (federal, provincial, municipal), so we should ensure that we discuss how best to bring the necessary folks to the table to ensure that all considerations are fleshed out relatively early in the process.
- I would encourage your team to reach out to my officials shortly, to discuss in greater detail, as there will be questions of authorities, approvals, permits, as well as costs. Amongst many other considerations.
- .
- .
- ~~We should discuss, before too long, how best to bring the necessary folks to the table to ensure all considerations are fleshed out relatively early in the process.~~

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- ~~There will be questions of authorities, approvals, permits, as well as costs. Amongst many other considerations.~~
- I'd like to hear more from you on:
  - Timelines for these initiatives;
  - The capacity of the airport with your expansion plans, and whether you feel that you can meet the demand for travel of a growing population; and
  - ~~What are the timelines for these initiatives?~~
  - Will you be ~~Whether you plan to~~ increase fees to cover the costs?

*RESPONSIVE ONLY: The Grounded Russian Aircraft at Pearson (the Antonov)*

RE condition/maintenance/movement of the aircraft:

- I understand from my Department that Public Services and Procurement Canada has been working with you to address some of the outstanding issues related to the aircraft and that the discussions have been beneficial.

RE Greater Toronto Airport Authority's ability to do something regarding the aircraft

- ~~Have you explored this with Global Affairs Canada?~~ My department is working with Global Affairs Canada on this matter.
- I understand that there may be concerns around parking fees, and my officials are committed to looking into this issue.
- ~~I would be happy to make my colleague the Minister of Global Affairs aware of your concerns.~~

**BACKGROUND / CONSIDERATIONS**

*Obstructions in the Vicinity of Airports*

- The safe separation of aircraft from potential hazards is required during all phases of flight, including the critical phases of departure and arrival (at airport), and where emergency procedures must be used. Buildings, structures and other objects can become hazards to air navigation if constructed in the wrong place.

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- Traditionally, airport zoning protection has been based on the hazard, or obstacle limitation surfaces required in the airport regulations and standards. However, the existing airport zoning regulations do not adequately protect instrument flight procedures, which are needed to ensure safe flights during all weather conditions (e.g., low visibility conditions). This can result in limited available approaches to the airport for aircrafts, as large building reduce the options due to limited visuals, wind conditions, etc.
- This can result in constrained growth for airport operations, impact safety and security, limit the growth of passengers and the types of aircrafts that are able to safely land.
- The current solution of re-designing the flight procedures to mitigate the impact of such development in this airspace is a “band-aid” solution and cannot be done indefinitely. It is expensive, time-consuming and has finite options.
- Nav Canada and airports are facing increasing pressure and are asking Transport Canada to develop viable solutions to protect this critical airspace, with an emphasis on mandatory, timely, and meaningful consultations by those developing structures within close proximity to an airport or aerodrome, and a means to prevent such hazards being placed within this airspace, should it be required.

**Implications for Greater Toronto Area Airports**

- Transport Canada's Ontario region and headquarters have been working with both Greater Toronto Airport Authority and PortsToronto on how this issue will impact their operations. This issue is further complicated in Ontario due to recent changes provincial zoning laws to lift zoning height restrictions and to remove consultation requirements that previously ensured airports were aware of future developments that could impact their operations.

**Current Status**

- A working group, comprised of Transport Canada, NAV Canada, Canadian Airports Council and specific airports (Vancouver, Toronto, Waterloo), has been formed to examine the issue and develop potential mitigation measures to address it, including engagement activities to help build awareness of this issue with other levels of government and potential regulatory solutions to protect airspace around Canada's airports and aerodromes.

***Transformative Capital Plan/Multimodal Hub***

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- Greater Toronto Airport Authority is in the process of launching their Transformative Capital Plan. Information sharing is at an early stage and this meeting represents an opportunity to find out more from the President and CEO. Core elements are understood to be:
  - Restoring aging infrastructure and enhancing the passenger experience, with a focus on affordability.
  - Protecting direct global air connectivity and Toronto Pearson's status as a gateway for Canada.
  - Creating economic growth through business and investment opportunities that will benefit national and regional economies, creating thousands of jobs.
  - Implementing a digital environment to make data-driven decisions for more predictable and efficient operations.
  - Building more direct roadways and transit connections for employees, passengers, and cargo.
  - Reducing environmental impact while advancing Canada's climate goals and energy transition.
- The Greater Toronto Airports Authority provided Transport Canada with a high-level deck regarding the proposed plan, a copy is attached.
- The Greater Toronto Airports Authority has signaled that it is resuming previous work to advance planning and development for a potential Regional Transit Centre at Pearson Airport. This appears to be part of the Transformative Capital Plan to support future airport growth and expansion.
- The core concept is an integrated hub at the airport to: (A) improve transportation options to/from the airport (e.g. multiple new light rail transit lines; direct GO Train access; service at Pearson to long distance intercity rail); and (B) house services that are currently located in the main terminal build such as passenger screening, to enable additional space for gates and airplanes.
- The Greater Toronto Airports Authority had advanced work related to a multimodal hub between 2016-2019; however, efforts were paused with the onset of the pandemic. Previously, Transport Canada engaged with the airport and other stakeholders on this project through a Deputy Minister-level committee and several working-level fora. This is an innovative yet also extremely large scale (multi-billion \$) and complex infrastructure project that will require aligning a significant number of players, some with diverse interests.
- The airport recently engaged a consultant (Access Planning) and is expected to issue a Request for Proposals in the first half of 2024 for additional planning and scoping capacity. This is intended to serve as input to the next Pearson Airport Master Plan, due in 2027/2028. The project had been championed activity by the former Greater Toronto Airports Authority president (Howard Eng). Airport officials have indicated that the current President (Deborah Flint) is also supportive.





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*The Grounded Russian Aircraft (the Antonov)*

- The Antonov aircraft has been grounded at Pearson International Airport in Toronto since February 2022, pursuant to the closure of Canada's airspace to Russian registered aircraft by Transport Canada, following Russia's illegal invasion of Ukraine.
- On April 6, 2023, Canada added new designations to its *Special Economic Measures (Russia) Regulations*, including several security targets linked to Russia's aviation sector. Volga-Dnepr Group and Volga-Dnepr Airlines were among those designated on this date.
- Persons in Canada and Canadians abroad are prohibited from dealing in assets owned, controlled, or held- directly or indirectly- by sanctioned individuals and entities.
- The *Special Economic Measures (Russia) Permit Authorization Order* authorizes the Minister of Foreign Affairs to issue to any person in Canada or any Canadian outside Canada a permit to carry out a specified activity or transaction, or any class of activity or transaction, that is restricted or prohibited pursuant to the Regulations. Global Affairs Canada recently provided Greater Toronto Airports Authority with information on the process for requesting a permit.
- The sanctions-related asset seizure and forfeiture regime, which entered into force in June 2022, provides the authorities for the government to seize, forfeit, dispose, and redistribute assets in Canada belonging to sanctioned individuals and entities.
- Canada seized the Antonov cargo plane on June 8, 2023, under Canada's *Special Economic Measures Act* asset seizure and forfeiture authorities. These authorities are separate and distinct from the Transport Canada directive.
- The seizure order does not change the ownership of the aircraft. Public Services and Procurement Canada has been managing the asset since the seizure order entered into force.
- Transport Canada Civil Aviation understands from Public Services and Procurement Canada, who is responsible for the management of the aircraft, that:
  - Public Services and Procurement Canada is working with Antonov (the Ukrainian manufacturer of the aircraft) and re planning to conduct a full tech inspection of the aircraft to determine its maintenance status



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- They intend to provide four weeks' notice of this inspection to Greater Toronto Airports Authority
  - Visas are in progress for the Ukrainian technicians
  - Public Services and Procurement Canada is working with Immigration, Refugees, and Citizenship Canada and Global Affairs Canada.
  - Most likely inspection date is late March to early April– Public Services and Procurement Canada has committed to keep Transport Canada informed
  - Public Services and Procurement Canada has highlighted excellent cooperation with the Greater Toronto Airports Authority on 16 (2)
- 16 (2)
- It is understood that Public Services and Procurement Canada is also looking into the question of unpaid parking fees.

**Biography:****Deborah Flint, GTAA President and CEO**

Deborah Flint joined the Greater Toronto Airports Authority as President and Chief Executive Officer in February 2020, following more than 4 years as CEO of Los Angeles World Airports and 24 years serving in executive roles in the aviation industry.

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At Los Angeles World Airports, Deborah initiated the \$14-billion modernization of its terminals, runway improvements, and a comprehensive transit program that includes roadway improvements and an intermodal transportation facility.

As a recognized leader within the international and U.S. aviation community, Deborah serves as a member of the Airports Council International board, appointee to the U.S. DOT Drone Advisory Committee, and Chair of the Oversight Committee of the Transportation Research Board's Airport Cooperative Research Program.

Beyond the airport industry, she has served on the Board of the Federal Reserve Bank and is a Director of the Honeywell Corporation.

**From:** Sawyer, Auramarina (TC/TC)  
**Sent:** Wed, 19 Mar 2025 12:50:29 +0000  
**To:** Dubé, Maxime (TC/TC)  
**Cc:** TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC  
**Subject:** Urgent Scenario Note: Pearson Airport Backgrounder (13651)  
**Attachments:** SN - Minister Freeland meeting with GTAA Deborah Flint.docx  
**Categories:** Scenario Notes

Good morning, Max: I have reviewed the SN and updated/formatted/updated acronyms.

The approval info is at the bottom of the SN.

With gratitude,

Auramarina

**SCENARIO NOTE TO THE MINISTER OF TRANSPORT****MEETING BETWEEN MINISTER OF TRANSPORT AND PRESIDENT AND CHIEF  
EXECUTIVE OFFICER OF THE GREATER TORONTO AIRPORTS AUTHORITY****MEETING DETAILS**

- **DATE/TIME:** TBD
- **PARTICIPANTS:**
  - Deborah Flint, President and Chief Executive Officer, Greater Toronto Airports Authority (GTAA)

**SUMMARY**

- This meeting provides an opportunity for the GTAA to outline their ongoing priorities, including their Long-term Investment in Facilities and Terminals (LIFT) Program; and other initiatives for which they are seeking policy changes including: airport rent, data sharing among key air industry stakeholders, Airport Zoning Regulations, border and security screening modernization, and arrivals duty free.

**POINTS TO REGISTER***General*

- The Delta Endeavor Air crash was a terrible incident, but I am thankful there were no fatalities, in part due to GTAA's quick emergency response. Thank you for your continued cooperation with the Transportation Safety Board as they continue their investigation.
- I recognize that the current trade war with the U.S. creates uncertainty for the air sector; I would welcome any insights you can share on the anticipated financial and operational impacts you foresee resulting from measures being implemented.

*Pearson's LIFT Program*

- I understand it's an exciting time at Toronto Pearson now that the GTAA has launched the LIFT Program, and you are actively engaged with Transport Canada (TC) officials as the program unfolds. I am keen to hear of the reactions you've received from stakeholders and community groups on this ambitious project.
- What challenges do you expect in moving ahead with this program?
- How does the GTAA intend to minimize impact to travellers during implementation?

**IF PRESSED:***Construction Insurance Issue*

- My officials have informed me that your team has expressed concerns about the market availability of certain limits of construction insurance that is required under the Ground Lease.
- It is my understanding that the GTAA has committed to providing additional details and data to support its assertion.
- My team will be pleased to urgently review and assess the GTAA's request upon receipt of the outstanding information.

*Airport Rent:*

- As outlined in the recent policy statement on airport investment, the Government's priority at this time is to explore negotiating extensions to ground leases to provide more certainty to investors, facilitate more development, and incentivize investment on airport lands, including from Canadian pension funds.
- Any changes to airport rent, such as the cap you have requested, fall under the purview of the Minister of Finance.

*Airport Zoning Regulations:*

- I am aware of your concerns about very tall buildings affecting flight paths and the significant impact this could have on your operations.
- I understand that Departmental officials have been working with you and the Canadian Airports Council to reach a way forward to address the situation, and that work is continuing.
- When there are competing interests, it is necessary to present the detailed economic impact of inaction, otherwise it becomes difficult to engage all levels of government to protect airspace around airports by limiting taller buildings during a housing crisis.

*Data Sharing between airlines and airports:*

- I am happy to hear that the Data Working Group Pilot Project is progressing so well and that it is already reaping operational benefits.
- The industry is closest to operations and are best positioned to lead on initiatives that support efficiency and smooth functioning of the ecosystem.
- While it's my understanding that WestJet and Transat have been engaged to be incorporated into the initiative, my officials can certainly liaise with international organizations like IATA when the group is ready to include foreign carriers.

*Modernizing Borders and Security Screening:*

- TC is working with Government partners, including the Canada Border Services Agency and Immigration, Refugees and Citizenship Canada as well as the Canadian Air Transport Security Authority to explore avenues to improve efficiencies and the

overall passenger experience, including through the Air Right Touch initiative and the deployment of advanced screening technology at airports.

*Arrivals Duty Free:*

- I understand the business case for this proposal, and encourage you to engage with my colleague, the Honourable François-Philippe Champagne, Minister of Finance.

*Antonov An-124 Cargo Plane*

- Before the aircraft can be flown again, it will need to undergo inspection and necessary maintenance to ensure it conforms to its type design and is safe for flight. This situation presents a complex set of legal, regulatory, and legislative considerations—such as liability and ownership—that require coordination between Transport Canada and the broader Government of Canada.



## **BACKGROUND / CONSIDERATIONS**

### *General*

- The GTAA is a private, not-for-profit, non-share capital National Airports System (NAS) Airport Authority that operates Toronto Pearson International Airport (Toronto Pearson), Canada's busiest airport.
- In 2023, Toronto Pearson handled 29% of Canada's passengers (43.6 million (M) passengers), and 28.1% of total cargo.
- Pearson passenger traffic is 37% domestic, 27% transborder, and 37% international.

### *Pearson's LIFT Program*

- In April 2024, the GTAA launched its LIFT Program, a multi-billion-dollar 20 (1) (b) **commercially confidential – please protect** capital redevelopment plan that will be implemented over the next decade, which consists of three programs that are designed to structurally address acute long-term passenger capacity constraints with demand forecasted to increase to 65M passengers by the 2030s:
  - **Accelerator Program:** Upgrading critical operational assets, including airfield, greenhouse gas emissions reduction projects, priority end-of-lifecycle projects, high-speed taxiways to enhance operational efficiency, runway restoration, electrical systems modernization, expand cargo capacity, and interim facilities.
  - **Gateway Program:** Expanding Terminal 1 (T1) to deliver an additional 15M passengers annually. GTAA will pursue a pier scheme configuration that will include mostly transborder and international gate capacity.
  - **T1/T3 Revitalization Program:** Renewing T1/T3 assets to restore facilities and enhance the passenger experience, drive better commercial opportunities, implement sustainable design features, and support greater implementation and optimization.
- The GTAA is pursuing a progressive design-build project delivery model. This model allows the design to progress alongside project phasing and logistics work. GTAA and the builder can work to minimize the impact on operations, maintain schedules and construction integrity.
- The GTAA's intention is to finance the construction through bond markets.

### *Construction Insurance Issue*

- The Ground Lease requires the GTAA to purchase All Risks Builders Risk Insurance in an amount not less than the full cost to reproduce any building being constructed. While this clause has been in place since 2004 and has not represented an obstacle to major construction at every National Airports System airport, in late February 2025, the GTAA contacted Transport Canada (TC) and indicated that the insurance market would not be able/willing to insure replacement value for a project of this scale 20 (1) (b)
- In response, TC officials sought additional details and clarification (e.g., whether insurance markets have been sounded, what coverage is currently available and at what cost and what alternatives are available).

- On March 12, 2025, the GTAA confirmed that it had not conducted any market sounding in advance of approaching TC and was relying on the opinion of its insurance broker, Marsh Canada. The GTAA committed to urgently addressing the questions posed by TC officials, however, TC has not yet received any additional documentation or correspondence from GTAA.
- Upon receipt of the requested information from the GTAA, TC officials will assess the issue and identify potential solutions (as required).

#### *Recent requests from GTAA*

- Airport Rent:** Requested to [20 (1) (b)]  
Savings would be reinvested into new infrastructure programs and would reduce upward pressure on fees and charges. GTAA claims [20 (1) (b)]  
[20 (1) (b)]  
Requires approval from Finance Canada.
- Airport Zoning Regulations:** Given the growing need for vertical high-density residential and commercial buildings, several airports, including GTAA, are advocating for the regulations designed in the 1970s to be updated in a timely manner to prevent land in the vicinity of an airport from being used in a manner that is incompatible with the safe operation of an airport.
- Data sharing between airlines and airports:** An industry-led data sharing pilot project has been implemented between Toronto Pearson, Montreal-Trudeau, Vancouver Airport, and Air Canada to improve planning and efficiencies in management of daily operations. GTAA advocates for Transport Canada to compel other airlines to share data.
- Borders and security screening:** Advocating for initiatives to enhance the passenger experience, including digital solutions like biometric passport entry.
- Arrivals Duty Free:** Advocating for Canada to also allow duty-free upon arrival. GTAA estimates this will create [20 (1) (b)] jobs with an estimated [20 (1) (b)] in wages and [20 (1) (b)] in payroll taxes in the first 12 months and will generate [20 (1) (b)] in non-aeronautical revenue. Requires tax policy change from Finance Canada.

#### *Delta Endeavor Air crash*

- On 17 February 2025, a CRJ-900 aircraft, manufactured by Bombardier, operated by Delta Endeavor Air, was conducting a flight from Minneapolis–Saint Paul to Toronto Pearson.
- Upon landing, the aircraft impacted the runway, and following the initial impact, parts of the aircraft separated, notably a wing and the tail section, and a fire ensued. The fuselage came to rest slightly off the right side of the runway upside down facing the other direction.
- Once the aircraft came to rest, the occupants began to evacuate. The passengers and cabin crew evacuated out the right forward door and one of the two right emergency exit windows. The cockpit door was unusable, so the flight crew exited out of the emergency hatch in the cockpit ceiling. Twenty-one passengers and crew were injured during the accident, many of whom were hospitalized.
  - Preliminary interviews have been conducted and will continue as needed.

- The cockpit voice recorder, the flight data recorder, and other electronic components containing non-volatile memory have been recovered and sent to the Transportation Safety Board (TSB) Engineering Laboratory in Ottawa, Ontario. The data has been downloaded and is being analyzed.
- The aircraft wreckage has been removed from the scene and moved to a hangar located at Toronto Pearson where it will be further examined. Investigators have examined the runway and released the site back to the GTAA for site clean-up and return to operations.
- The field phase of the investigation is ongoing. Transportation Safety Board investigators are assisted by representatives from the U.S. National Transportation Safety Board, the Federal Aviation Administration, the GTAA, NAV CANADA, the operator, and the manufacturers of the aircraft and engines. Transport Canada also deployed a Minister's Observer.
- For reference, the Minister's Observer's role is to liaise with the TSB during an investigation of an aviation occurrence. The TSB will always conduct investigations pursuant to the International Civil Aviation Organization Annex 13. The TSB's mandate is focused on determining the causes of transportation accidents and making safety recommendations to prevent future occurrences. The Minister's Observer liaises with the TSB to assist the investigation while safeguarding the TSB's independence in the investigation.
- The TSB preliminary report is expected within 30 days of the accident, as per international guidelines. Although the timing for its release has not yet been confirmed, the TSB is expecting to release the preliminary factual report on or around March 20.

#### *Antonov An-124 Cargo Plane*

- On February 27, 2022, Transport Canada issued a Notice to Airmen (NOTAM) prohibiting Russian-owned, chartered, or operated aircraft from entering, exiting, or overflying Canadian territorial airspace. This action was part of Canada's response to Russia's invasion of Ukraine.
- As a result of this NOTAM, a Russian-operated Antonov An-124 cargo plane that landed at Toronto Pearson International Airport on the same day was grounded and prohibited from departing, as doing so would have violated the NOTAM. The aircraft has remained at Toronto Pearson since, accumulating significant parking fees.
- In April 2023, Canada announced its intention to seize the aircraft as part of sanctions against Russia. In June 2023, the Canadian government issued a formal order to confiscate it, marking the first application of new asset seizure laws targeting Russian assets.
- The aircraft's owner, Volga-Dnepr Airlines, initiated arbitration proceedings against Canada in August 2024, seeking at least \$100 million in damages, alleging that the seizure amounted to expropriation. Legal proceedings between Volga-Dnepr Airlines and the Canadian government are ongoing, and the aircraft's ultimate fate remains undetermined. Transport Canada has agreed to cost-share the legal expenses for these proceedings. A Memorandum of Understanding, including a fee schedule, is currently being negotiated with Global Affairs Canada.

- Before the aircraft can be flown again, it will need to undergo inspection and necessary maintenance to ensure it conforms to its type design and is safe for flight. This situation presents a complex set of legal, regulatory, and legislative considerations—such as liability and ownership—that require coordination between Transport Canada and the broader Government of Canada.

**ANNEX –Toronto Pearson International Airport Funding***National Trade Corridors Fund*

- The NTCF is funding one project at Toronto Pearson International Airport:
  - The National Trade Corridors Fund is investing up to \$93.8M at Toronto Pearson International Airport to improve cargo capacity.
  - The project proposed is to build two new facilities: the South Cargo Transfer Development Facility (YYZ South) and the North Cargo Apron Development (YYZ North). YYZ South will increase capacity for incoming cargo, and YYZ North will build additional infrastructure for more cargo aircraft parking spaces, which will also increase cargo capacity. The project is currently in its design phase. The project completion date is not yet confirmed.

*Airport Critical Infrastructure Program*

- The Airport Critical Infrastructure Program (ACIP), launched in May 2021, provided over \$570 million in funding over five years to airports for eligible infrastructure projects related to safety, security, connectivity to mass transit systems, or testing and screening related to COVID-19 and its variants.
- The Government of Canada provided support to Greater Toronto Airport Authority (GTAA) for the projects indicated in the table below under the Airport Critical Infrastructure Program.
- The program is fully committed and not accepting further proposals.

| Project                                                                                                                 | Stream                                     | Total Cost | Approved             | Status    |
|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|------------|----------------------|-----------|
| International-To-Domestic Transfer Passenger Testing Infrastructure – Terminal 1, Toronto Pearson International Airport | Biosecurity                                | 20 (1) (b) | \$460,000            | Completed |
| Airside Upgrades and Pavement Restoration                                                                               | Safety                                     |            | \$81,250,000         | Ongoing   |
| Technology Transformation Project                                                                                       | Operational efficiency to enhance security |            | \$35,513,500         | Ongoing   |
| Airport Segment of the Eglinton Light Rail Transit                                                                      | Mass Transit                               |            | \$22,800,000         | Ongoing   |
| <b>TOTAL</b>                                                                                                            |                                            |            | <b>\$140,023,500</b> |           |



## **ANNEX – Information on Security Initiatives at Pearson**

### **One Stop Security (OSS)**

#### **Key Messages - OSS**

- Transport Canada appreciates Pearson's excellent collaboration in working together to ensure continuity of Canada's One-Stop Security program, such that passengers can continue to transit onward to their final destination without the need to be re-screened.

#### ***If pressed on physical segregation***

- My officials assure me that your concerns have been registered in relation to any potential for full physical segregation of OSS passengers.
- We continue to communicate to our international partners that segregation of OSS passengers is not realistic at this time in Canada. While there is no firm guarantee, the implementation of Transport Canada's new OSS policy is our opportunity to demonstrate that all parties are serious about complying with alternative measures with a view to avoiding full physical segregation.

#### **Background - OSS**

- One-Stop Security allows passengers arriving from certain countries with equivalent aviation security systems to connect to their next flight without leaving the sterile area for rescreening. One-Stop Security in Canada dates back to 2016 and is currently implemented at six Canadian Class 1 aerodromes [Vancouver, Edmonton, Calgary, **Toronto**, Montreal, and Halifax]. Until recently (see below), OSS program compliance was largely voluntary.
- Canada's One-Stop Security Program includes arrangements with the United States, European Union, United Kingdom, Australia, and New Zealand and include provisions for participants to undertake site visits to assess operations.
- A 2023 site visit by the European Commission identified opportunities for Canada to improve and to better align with ICAO OSS standards. Recent changes (December 2024) to Transport Canada security measures and supporting program policies are part of the department's corrective action plan to address these findings. Notable program enhancements include:
  - Creating a more robust oversight framework by requiring aerodrome operators to obtain and maintain a written authorization from the Minister to facilitate the One-Stop Security Program.
  - The implementation of a background check requirement for temporary pass holders in the sterile area of an airport.
  - Bolstering security search/sweep protocols in the sterile area together with other existing measures (e.g. closed caption TV) – these measures are permitted as an alternative to full physical segregation of OSS passengers.
- Aerodrome operators, including Pearson, have been highly engaged in the recent OSS program enhancements. The program continues to be beneficial to their operations by facilitating the efficient movement of passengers. Through



the Canadian Airports Council, Toronto-Pearson and other OSS airports have been vocal about avoiding full physical segregation as this is seen as cost prohibitive.

## **Non-Passenger Screening (NPS)**

### **Key Messages - NPS**

- Transport Canada is committed to enhancing Canada's Non-Passenger Screening (NPS) program to better align Canadian requirements with International Civil Aviation Organization (ICAO) standards. This is with a view to increasing security and maintaining global confidence in Canada's aviation security program.
- As a starting point, on May 31, 2025, the program will expand to *all* airports that operate international flights and introduce a risk-based approach to NPS that is tied to aviation security threat levels. This will move us beyond the current model where NPS screening ratios are generally static and currently only implemented at Canada's largest airports, including Toronto-Pearson.
- Looking beyond May of this year, Transport Canada is committed to working with industry partners to shape the parameters of a future phase that will bring Canada's NPS program more squarely in line with ICAO requirements to screen 100% of non-passengers.
- Recognizing that there are important financial and operational considerations to balance alongside international obligations, my officials will look to engage you on these future/Phase 2 program design elements this Spring.

### ***If pressed on NPS funding***

- Transport Canada officials will engage industry in the coming months with the objective of identifying the most efficient and cost-effective path forward, while considering Canada's unique aerodrome network and acknowledging that no funding is expected to be available.

### **Background - NPS**

- Canada, like other countries, is required to meet international standards set by ICAO, including as they relate to non-passenger (e.g. crew, airport staff) screening. Serious non-compliance, identified through the ICAO audit process as a "Significant Security Concern," can result in negative impacts, such as reduced global confidence in Canada's aviation security program, and the potential for other countries to impose increased restrictions on flights departing or transiting through Canadian airports.
- In place since 2016, Canada's current NPS program is designed to mitigate insider threats via a multi-layered, risk-based approach.
- Transport Canada is enhancing its NPS program in two phases to better align with ICAO's requirements in this area.
- Phase 1, effective May 31, 2025, Canada's screening authority (CATSA) will be required to:

- Randomly select non-passengers for screening at *all* airports that service international flights (currently only Canada's largest international airports have NPS).
- Select up to 100% of non-passengers and their carry-ons based on the prevailing aviation security threat level.
- Vehicle screening requirements remain unchanged (vehicle screening currently only occurs at largest airports).
- Phase 2, implementation date TBD, however security measures should be signed (though not necessarily in force) as early as Spring 2026 to get ahead of an ICAO audit expected later in 2026
  - Once implemented, CATSA will be required to screen 100% of non-passengers and their carry-ons as the baseline, and
  - Screen up to 100% of vehicles based on the prevailing AVSEC Level.
- Transport Canada has been communicating with industry for a number of years about the NPS program enhancements needed to meet ICAO rules.
- Industry has been vocal about the operational and financial impacts of NPS enhancements and can be expected to press for federal funding; none is available at this time.

Prepared by: Katie Novak, Air Policy (Jennifer Little, DG)

Consulted with: S&S (CivAv & AvSec), Programs

Approved by: Craig Hutton, a/ADM Policy

**From:** Sawyer, Auramarina (TC/TC)  
**Sent:** Fri, 14 Feb 2025 15:12:14 +0000  
**To:** Dubé, Maxime (TC/TC)  
**Cc:** TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC  
**Subject:** FW: MinoQ: Airplane Noise  
**Categories:** MinOQ /MPQ/Medicals

Hi Max: We received the below MPQ about airplane noise.

I was able to find this response in OneNote from a meeting that Isa attended back in November. Would this be a suitable response, or would you prefer that I task out to S&S?

---

Airport Noise

Monday, November 04, 2024

8:28 AM

Airport Noise – what's our jurisdiction here and process to address community concerns

- While Transport Canada regulates aviation (for example noise levels of aircraft, pursuant to Annex 15 of the International Civil Aviation Organization), airport operators are also critical in managing local noise issues.
- TC provides a regulatory framework to support airports in implementing noise abatement procedures and specific operating restrictions tailored to their location.
- Noise abatement procedures are published in the Canada Flight Supplement and are enforceable by TC. They might include preferred runways, departing procedures, certain aircraft restrictions and curfews at certain times of day or on weekends.
- Specific concerns about aircraft noise are typically directed to the management of the airport where the noise resulting from aircraft landing or taking off is occurring.
  - Noise issues are best handled at this level. Local representatives and airport-based staff have intimate knowledge of regional matters and are better able to address local concerns.
  - When airport operators and users disagree, TC has internal procedures to escalate the issue within Civil Aviation in collaboration with the Department of Justice. A Committee then assesses options and may elect to publish restrictions in the Canada Flight Supplement, return the issue to local stakeholders for further consultations or decide that no further action is warranted.
  - The following Website describes the current framework: [Managing noise from aircraft](#).

Managing noise from aircraft

Managing noise from aircraft in communities near airports

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Gracias!!!

Auramarina Sawyer

**A/Coordination and Special Projects Officer**, Departmental Liaison Team  
**Policy & Issues Management Directorate**

Office of the Deputy Minister  
Transport Canada, Government of Canada  
[auramarina.sawyer@tc.gc.ca](mailto:auramarina.sawyer@tc.gc.ca) | Cell: 613-294-8115

**Agente de coordination et des projets spéciaux p.i.**, Équipe de liaison départementale  
**Groupe des politiques et de la gestion des enjeux**, Cabinet du sous-ministre

Transports Canada, Gouvernement du Canada  
[auramarina.sawyer@tc.gc.ca](mailto:auramarina.sawyer@tc.gc.ca) | Tél. cell. : 613-294-8115



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**From:** Simba, Chris (TC/TC) <[chris.simba@tc.gc.ca](mailto:chris.simba@tc.gc.ca)>  
**Sent:** Thursday, February 13, 2025 9:13 PM  
**To:** TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC <[XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca](mailto:XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca)>  
**Subject:** MinoQ: Airplane Noise

Hello team,

Do we have any lines that address complaints on airplane noise?

Thanks.

Cordialement,

**Chris K. Simba**

[chris.simba@tc.gc.ca](mailto:chris.simba@tc.gc.ca) | Cell: (819) 639-4719

---

**From:** Larouche, Adam (Valdez, Rechie - MP) <[adam.larouche.463@parl.gc.ca](mailto:adam.larouche.463@parl.gc.ca)>

**Sent:** Friday, February 7, 2025 11:45:19 AM

**To:** Jackson, Sarah (TC/TC) <[sarah.jackson@tc.gc.ca](mailto:sarah.jackson@tc.gc.ca)>

**Subject:** [External/Externe]: Airplane Noise

Hi Sarah,

I hope the week is treating you well. We have a group of constituents who are very angry re airplane noise. They live under a flight path that is experiencing increased traffic. Can you send me lines on this?

Sincerely,

Adam Larouche  
Office Manager  
Office of the Hon. Rechie Valdez  
Member Parliament  
Mississauga – Streetsville  
(905) 812-1811



**From:** Holmes, Jennifer (TC/TC)  
**Sent:** Thu, 13 Mar 2025 17:59:57 +0000  
**To:** Denis, Lisa (TC/TC); Bergeron, Michelle (TC/TC); TC.F ONT PX RDGO / BDGR PX F.TC; TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC  
**Cc:** SS Information / Information SS  
**Subject:** RE: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hi Lisa, could you please re-assign this one to the region? Thanks!

---

**From:** Bergeron, Michelle (TC/TC) <michelle.bergeron@tc.gc.ca>  
**Sent:** Thursday, March 13, 2025 10:42 AM  
**To:** TC.F ONT PX RDGO / BDGR PX F.TC <ONTPXRDGO-BDGRPX@tc.gc.ca>  
**Cc:** SS Information / Information SS <TC.SSInfo-InfoSS.TC@tc.gc.ca>  
**Subject:** FW: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hello! Would this be your lead?

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**From:** Denis, Lisa (TC/TC) <lisa.denis@tc.gc.ca>  
**Sent:** Tuesday, March 11, 2025 5:04 PM  
**To:** TC.F NCR AA ADMO / BSMA RCN F.TC <AAADMO-BSMA@tc.gc.ca>  
**Cc:** TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC <XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca>  
**Subject:** MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Good afternoon S&S colleagues,

We received an MPQ pertaining to the lack of transparency and claimed corruption at the Greater Toronto Airport Authority (GTAA).

Context:

- Many constituents are expressing their frustration regarding the issues with Airport noise.



- MinO has provided this response:

*" Here's our website on noise.*

*<https://www.torontopearson.com/en/community/noise-management>. Toronto Pearson has a Noise Management Office dedicated to working with residents to address concerns and provide insights into airport operations. The team is committed to keeping our community informed and engaged.*

*There are several ways residents can connect with Pearson's Noise Management Office:*

- **Phone:** Call 416-247-7682 to ask questions or share concerns.
- **Online Flight Tracking Tool ([WebTrak](#)):** Track flights in real-time and see noise levels in your area.
- **[Insightful Online Portal](#):** Access information about noise management and learn more about aircraft operations through this easy-to-use online resource.
- **[Noise Complaint Form](#):** Submit up to 50 noise complaints at once via the online form.
- **[Checking In](#):** Stay up to date on airport operations and community updates.
- Attend our **Pearson Public Meeting** on Noise Management

*These resources help residents stay informed and connected. Pearson is always happy to engage with its community to address any concerns.*

*In addition to our Noise Management Team, we actively engage with the community in many ways to keep our neighbours informed and involved. We sponsor community events, partner with schools for career talks, partner with elected officials to host open houses and give back to the community through employee volunteering and charitable giving. This summer alone, we participated in over 75 community events, reaching more than 10,000 residents.*

*Through these efforts, we regularly share updates on our operations, our role as an economic anchor providing local jobs and supporting development, and how to connect with our team.*

*Specifically on the flights between 2am and 6am that you mentioned they have stated:*

*However, we severely limit the number of flights in and out of Pearson through the **Night Flight Restriction Program**, which limits the number of movements (arrivals and departures) during the restricted hours (12:30 AM to 06:29 AM). Transport Canada helped create this program to limit nighttime noise and balance growing regional demand. This is referred to as the "night flight budget." Toronto Pearson is the only airport in Canada to have a budget system.*

*The vast majority of flight movements between the hours you specified (02:00 to 06:00) are arriving flights. Night flights are needed to accommodate travel distance, scheduling requirements and product delivery timelines, and accommodate late-arriving or departing flights delayed due to factors such as weather, mechanical or security issues; as well as other operationally necessary night flights. Medevac flights and military and police operations are counted towards the night flight budget.*

*We also operate the **Nighttime Preferential Runway system** - between midnight and 6:30 am, we prioritize the use of runways to minimize the number of residents overflown. “*

- MinO has been informed that these problems are persisting, and that the MP's Office has received a large amount of correspondence on this issue.

Question:

- Could the department kindly provide information in regard to transparency requirements and anything that would counteract corruption claims?

**Due Date: March 21, 2025**

Would it be possible to please provide some information that we can pass along to MinO in which they can relay to the MP office?

Merci,

Lisa Denis

The following request has been assigned to you for appropriate action in Tasking Database. To access it, click on the « GOTO » link.

La demande suivante vous a été transférée pour exécution dans la base de données des tâches. Pour y accéder, cliquez sur le lien « GOTO ».

=====

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Tasking # / No de tâche: TASK-013637

Request Type / Type de demande: MPQ

Topic / Sujet: RESPONSE ON PEARSON NIGHT FLIGHTS

Assigned To / Assigné à: AA

Submit By / Date de soumission: 3/21/2025

Request / Demande: PLEASE FIND ALL CONTEXT IN TASKING EMAIL / VEUILLEZ TROUVER TOUT LE CONTEXTE DANS LE COURRIEL

=====

=====

<http://ccmenterprise.tc.gc.ca:80/Enterprise/Services/Authorization/Login?rootid=30633806&segmentid=2989866>

**From:** Kucirek, Daniel (TC/TC)  
**Sent:** Tue, 11 Mar 2025 20:24:13 +0000  
**To:** TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC  
**Cc:** Jackson, Sarah (TC/TC); Christie, James (TC/TC); Munro, Emmaleigh (TC/TC)  
**Subject:** FW: [External/Externe]: RE: Response on Pearson Night Flights

Good afternoon Issues Team,

We received this MPQ from MP Sgro's office regarding a lack of transparency and claimed corruption at the GTAA. I know they are completely arm's length but is there anything we can say in response toward transparency requirements they do have, and anything that would counteract corruption claims?

Thanks,

**Daniel Kucirek (He/Him)**

Regional Advisor - Ontario | Conseiller Régional - Ontario  
 Office of the Minister of Transport | Cabinet du Ministre des Transports  
 416-948-8556

---

**From:** Sgro, Judy - M.P. <judy.sgro@parl.gc.ca>  
**Sent:** Monday, March 10, 2025 12:23 PM  
**To:** Kucirek, Daniel (TC/TC) <daniel.kucirek@tc.gc.ca>  
**Cc:** Sgro, Judy A. - Personal [19 (1)]@parl.gc.ca>  
**Subject:** [External/Externe]: RE: Response on Pearson Night Flights

Good morning Daniel,

Thank you for your attention to this matter, our office truly appreciates it.

As you have mentioned, the information from GTAA are details previously shared with our office and our constituents.

Please see below one of the more recent communications between our office and a constituent. I will forward you separately additional correspondence from another constituent as well.

Best,  
 Abigail Aquino-Annobil

**From:** [19 (1)]  
**Sent:** Friday, March 7, 2025 9:41:24 AM  
**To:** Sgro, Judy - M.P. <judy.sgro@parl.gc.ca>  
**Subject:** Re: Request for Assistance in Addressing GTAA Complaint Reporting Discrepancies

Ms, Judy Sgro,

Thank you for your response. While we appreciate that you have forwarded our concerns to the GTAA, this is a **federal issue** that demands direct government intervention, not merely a referral to the very entity we are holding accountable.

Our investigations have uncovered serious concerns, including a lack of transparency and potential corruption. Yet, rather than addressing these findings, your response suggests a willingness to look the other way. **Is corruption something you and your government are willing to accept?**

We expect more than just referrals—we expect action. **What concrete steps will you take to escalate this matter?** Will you press for an independent investigation? Will you push for parliamentary oversight? Or will this issue continue to be ignored?

We look forward to your response and a clear commitment to addressing these concerns at the federal level.

Sincerely,

19 (1)

On Wednesday, March 5, 2025 at 01:23:02 p.m. EST, Sgro, Judy - M.P. <[judy.sgro@parl.gc.ca](mailto:judy.sgro@parl.gc.ca)> wrote:

Dear 19 (1)

Thank you for your follow-up and for expressing the community's ongoing concerns regarding the transparency and accountability issues with GTAA. The health impacts of aircraft noise is a serious issue.

I have forwarded your concerns directly to the GTAA, and ask that they respond directly to you. I understand the frustration regarding the lack of progress, and I hope for a more meaningful and timely response.

Regarding the open house, I have inquired about any developments on this front and will let you know when I hear back.

I have copied the Hon. Anita Anand, Minister of Transportation, on this email and request her assistance in addressing this important issue.

Thank you again for your continued engagement on this important issue.

Best regards,

Hon, Judy A. Sgro

Member of Parliament

Humber River-Black Creek

**Hill Office**

1180 Valour Building

Ottawa, Ontario, K1A 0A6

Ottawa Office: 613-992-7774

Ottawa Office Fax: 613-947-8319

**Constituent Office**

2201 Finch Ave West Suite 25

Toronto, Ontario, M9M 2Y9

Constituent Office: 416-744-1882

Constituent Office Fax: 416-952-1696

**From:** 19 (1)

**Sent:** March 4, 2025 11:35 AM

**To:** ZZG-Community Engagement <[communityengagement@gtaa.com](mailto:communityengagement@gtaa.com)>; Anand, Anita - M.P. <[Anita.Anand@parl.gc.ca](mailto:Anita.Anand@parl.gc.ca)>; Meneses, Albert (Sgro, Judy A. - MP)

19 (1) @parl.gc.ca>

**Subject:** Re: Request for Assistance in Addressing GTAA Complaint Reporting Discrepancies

Ms.Judy Sgro,

I am following up on my previous email regarding the ongoing concerns about transparency and accountability from GTAA. As of now, we have not received a meaningful response addressing the specific issues raised.

While we appreciate your stated intention to contact GTAA, the community remains frustrated by the ongoing delays and lack of concrete action. We need to know what steps have been taken beyond simply reaching out. Have you received any substantive response from GTAA? If so, please share their justification for the continued lack of transparency. If not, what actions will you take to escalate this matter?

Additionally, we understand there has been discussion about an open house for the community. Can you provide any updates on this, including potential timing and format?

At this stage, reassurances are not enough—we need decisive action. Please provide an update on the progress made and the immediate next steps you will take to ensure this matter is properly addressed.

We look forward to your prompt response.



Sincerely,

19 (1)

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**From:** Kucirek, Daniel (TC/TC) <daniel.kucirek@tc.gc.ca>  
**Sent:** March 10, 2025 11:39 AM  
**To:** Sgro, Judy A. - Personal 19 (1) @parl.gc.ca>  
**Cc:** Sgro, Judy - M.P. <judy.sgro@parl.gc.ca>  
**Subject:** RE: Response on Pearson Night Flights

Good morning MP Sgro,

I heard that these problems are persisting, and you have received a large amount of correspondence on this issue.

Can you provide me with a couple of the emails so I can see what is missing from the response we got from Pearson below?

Thanks,

**Daniel Kucirek (He/Him)**  
Regional Advisor - Ontario | Conseiller Régional - Ontario  
Office of the Minister of Transport | Cabinet du Ministre des Transports  
416-948-8556

---

**From:** Kucirek, Daniel (TC/TC)  
**Sent:** Thursday, October 31, 2024 3:29 PM  
**To:** Judy Sgro Personal 19 (1) @parl.gc.ca>  
**Cc:** Judy Sgro Office <judy.sgro@parl.gc.ca>  
**Subject:** Response on Pearson Night Flights

Good afternoon MP Sgro,

It was good speaking with you last Friday, we reached out to GTAA regarding the issues with Airport noise that you brought up in our conversation and here is what we got back:

Here's our website on noise. <https://www.torontopearson.com/en/community/noise-management>.

Toronto Pearson has a Noise Management Office dedicated to working with residents to address concerns and provide insights into airport operations. The team is committed to keeping our community informed and engaged.

There are several ways residents can connect with Pearson's Noise Management Office:

- **Phone:** Call 416-247-7682 to ask questions or share concerns.
- **Online Flight Tracking Tool ([WebTrak](#)):** Track flights in real-time and see noise levels in your area.
- **[Insightful Online Portal](#):** Access information about noise management and learn more about aircraft operations through this easy-to-use online resource.
- **[Noise Complaint Form](#):** Submit up to 50 noise complaints at once via the online form.
- **[Checking In](#):** Stay up to date on airport operations and community updates.
- Attend our **Pearson Public Meeting** on Noise Management

These resources help residents stay informed and connected. Pearson is always happy to engage with its community to address any concerns.

In addition to our Noise Management Team, we actively engage with the community in many ways to keep our neighbours informed and involved. We sponsor community events, partner with schools for career talks, partner with elected officials to host open houses and give back to the community through employee volunteering and charitable giving. This summer alone, we participated in over 75 community events, reaching more than 10,000 residents.

Through these efforts, we regularly share updates on our operations, our role as an economic anchor providing local jobs and supporting development, and how to connect with our team.

Specifically on the flights between 2am and 6am that you mentioned they have stated:

However, we severely limit the number of flights in and out of Pearson through the **Night Flight Restriction Program**, which limits the number of movements (arrivals and departures) during the restricted hours (12:30 AM to 06:29 AM). Transport Canada helped create this program to limit nighttime noise and balance growing regional demand. This is referred to as the “night flight budget.” Toronto Pearson is the only airport in Canada to have a budget system.

The vast majority of flight movements between the hours you specified (02:00 to 06:00) are arriving flights. Night flights are needed to accommodate travel distance, scheduling requirements and product delivery timelines, and accommodate late-arriving or departing flights delayed due to factors such as weather, mechanical or security issues; as well as other operationally necessary night flights. Medevac flights and military and police operations are counted towards the night flight budget.

We also operate the **Nighttime Preferential Runway system** - between midnight and 6:30 am, we prioritize the use of runways to minimize the number of residents overflown.

I know you may have seen some of this material before, but we wanted to make sure you have the full picture we are getting from the GTAA. We are happy to follow up with them on any specific questions you have after receiving this, so please don't hesitate to ask any questions that come to mind.

Best,

**Daniel Kucirek (He/Him)**

Regional Advisor - Ontario | Conseiller Régional - Ontario

Office of the Minister of Transport | Cabinet du Ministre des Transports

416-948-8556

**From:** 19 (1)  
**To:** [ONT Civil Aviation Issues / Enjeux Aviation Civile ONT \(TC/TC\)](#)  
**Subject:** [External/Externe]: Community Health Impacts Related to Pearson Aircraft Noise  
**Date:** Thursday, January 08, 2026 8:22:37 PM  
**Attachments:** Noise Pollution letter to transport canada and health canada.pdf

---

Hi,

Please find enclosed a letter regarding community health impacts related to Pearson aircraft noise.

I've been in touch with Pearson and their response did not adequately address my concerns and I have not heard back from them since sending a follow up letter with questions about their response.

I can forward my original letter and their response. I'll first await your reply to make sure I'm in touch with the correct person.

*Lots of Love*

19 (1)

*I hold in my heart the blessing that...*

*You are safe and well and that*

*You are loved, honoured, cherished, respected and seen by all, most of all yourself.*

Dear Sir or Madam,

I am writing to formally submit this letter to both **Health Canada** and **Transport Canada** regarding the **public health implications of aircraft noise exposure**, with particular emphasis on **nighttime and early-morning flight operations at Toronto Pearson International Airport (YYZ)**.

This submission is made in the interest of protecting community health and ensuring that aviation policy, operational oversight, and public-health guidance are aligned with the **current state of scientific evidence**.

## **1. Purpose of This Submission**

Residents living under Pearson's flight paths continue to experience frequent aircraft noise during overnight and early-morning hours, particularly between approximately **5:00 a.m. and 6:30 a.m.** Despite existing night-flight programs, community experience suggests that **noise exposure remains concentrated during biologically sensitive sleep periods**.

The purpose of this submission is to request:

1. **Formal recognition of aircraft noise as a public-health risk**, not merely a community annoyance
2. **Clarification of Health Canada's current position** on nighttime aircraft noise and sleep disruption
3. **Review of Transport Canada's oversight framework** for night-flight limits and their temporal distribution
4. **Consideration of whether current noise-management practices adequately reflect medical and epidemiological evidence**

## 2. Scientific Evidence: Aircraft Noise and Health

A substantial and growing body of peer-reviewed research demonstrates that aircraft noise — particularly **at night** — has measurable and clinically relevant health effects, including:

- **Sleep disturbance and fragmentation**, even when individuals do not consciously awaken
- **Activation of stress pathways** (e.g., cortisol release, sympathetic nervous system activation)
- **Increased risk of hypertension, ischemic heart disease, stroke, and metabolic disorders**
- **Increased cardiovascular mortality associated with nighttime aircraft noise exposure**

Notably:

- Research published in the *European Heart Journal* demonstrates an **increased risk of cardiovascular mortality within hours of nighttime aircraft noise exposure**, underscoring that noise is not merely a chronic risk factor but can act as an **acute physiological stressor**.
- Studies conducted near major international airports in Europe and North America show that **nighttime noise has disproportionately greater health effects than daytime noise**, because it interferes with sleep architecture and cardiovascular recovery.
- Evidence indicates that **the number and timing of noise events** (i.e., repeated overflights clustered during early-morning hours) may be **more harmful than average noise levels alone**, a factor not adequately captured by annual flight caps or averaged noise metrics.

The World Health Organization (WHO) Environmental Noise Guidelines explicitly recognize aircraft noise as a **risk factor for cardiovascular disease, sleep disturbance, and reduced quality of life**, recommending lower exposure thresholds during nighttime hours.

### **3. Concern Regarding Night Flight Limits and Temporal Clustering**

While Toronto Pearson operates under a **Night Flight Restriction Program with an annual cap**, an annual limit **does not address how flights are distributed** across:

- Months of the year
- Nights of the week
- Critical early-morning hours (e.g., 5:00–6:30 a.m.)

Community experience suggests that **night flights may be clustered**, particularly in early-morning hours when sleep disruption has the greatest health impact. Scientific literature indicates that **repeated noise events during late-stage sleep may produce cumulative physiological stress**, even if total annual flight numbers remain within regulatory limits.

From a public-health perspective, this raises important questions:

- Are current night-flight policies adequately protecting sleep health?
- Does regulatory compliance based on annual totals sufficiently mitigate health risk?
- Should temporal distribution and clustering be formally incorporated into noise-management oversight?

### **4. Requests to Health Canada**

I respectfully request that Health Canada:

1. **Clarify its current guidance** on nighttime aircraft noise and health, including how sleep disturbance and cardiovascular risk are assessed
2. **Publicly acknowledge the existing evidence** linking aircraft noise to adverse health outcomes
3. **Advise Transport Canada and airport authorities** on health-protective thresholds and operational practices, particularly during biologically sensitive hours



4. Consider whether **updated guidance or risk communication** to affected communities is warranted

## **5. Requests to Transport Canada**

I respectfully request that Transport Canada:

1. **Review the adequacy of night-flight restriction frameworks**, including how limits are defined and enforced
2. Assess whether **flight clustering within the permitted night window** undermines the health-protective intent of current policies
3. Consider whether **hour-by-hour or event-based metrics** should supplement annual caps
4. Ensure that public-health evidence is meaningfully integrated into aviation noise oversight

## **6. Closing**

Aircraft noise is not solely an operational or community-relations issue; it is a **documented environmental health exposure**. Effective mitigation requires coordination between aviation authorities and public-health institutions, informed by the best available science.

I appreciate your attention to this submission and respectfully request confirmation of its receipt, along with information on any next steps or opportunities for public engagement on this issue.

Thank you for your consideration.

Sincerely,

**From:** 19 (1)  
**To:** ONT Civil Aviation Issues / Enjeux Aviation Civile ONT (TC/TC)  
**Subject:** [External/Externe]: Midnight airplane noise torture  
**Date:** Wednesday, May 07, 2025 4:06:56 PM

---

Hello ,My Name is 19 (1) and my address is 19 (1) Brampton Ontario 19 (1)  
 19 (1)

I appreciate your email response dated may1,2025 to my complaint .Unfortunately I am not getting any response, to my multiple on line complaints ,from GTAA.Their standard answer-on the phone is that they have no plans to change the discriminating ,outdated and flawed policy of preferred overnight flights routes.

Last night I went to bed at 11 pm and was woken up at 12.48 am by the loud noise of a plane flying over my house and then the planes kept coming till 2.30 am . I sat in my bed frustrated and angry.

19 (1) This needs to fixed and I deserve to have a basic human right to be able to sleep in my own bedroom.  
 Please fix your policy so that I can live safely and 19 (1)  
 Hoping for a quick resolution .  
 Regards

19 (1)

**From:** Crossan, Irelande  
**To:** 19 (1)  
**Cc:** TC:TC@tc.gc.ca; Enjeux Aviation Civile ONT (TC/TC)  
**Subject:** [External/Externe]: RE: Midnight torture  
**Date:** Wednesday, July 02, 2025 1:43:15 PM  
**Attachments:** image001.png  
 image002.png  
 image003.png  
 image004.png  
 image005.png

Dear 19 (1)

Thank you for your email and for sharing your concerns regarding nighttime aircraft noise and its impacts on your health, wellbeing, and daily life. We recognize the seriousness of the issues you've raised and the personal toll that nighttime overflights can have on residents in your area.

With respect to your request to halt nighttime operations between 11:00 p.m. and 5:00 a.m., we regret to inform you that this is not operationally feasible. Toronto Pearson is Canada's busiest airport and must remain open 24 hours a day to accommodate a range of flight activities, including long-haul international arrivals, cargo operations, and weather-related diversions. The routing of these flights is managed through procedures designed to minimize noise impacts as much as possible while maintaining safe operations.

We also acknowledge your suggestion regarding the long-term impact of these flight paths on children and families in the area. While health studies are outside NAV CANADA's mandate, we are committed to working with our partners, including the Greater Toronto Airports Authority (GTAA), to ensure that community feedback continues to inform the review of noise mitigation programs and flight procedures.

Continued dialogue with communities like yours is essential in helping us assess the effectiveness of existing procedures and identify opportunities for improvement.

Thank you again for your message. Please feel free to reach out if you have further questions or wish to provide additional details.

Kind regards,

**Irelande Crossan**

Specialist, Stakeholder and Community Engagement | Spécialiste, Engagement des parties prenantes et des communautés

**NAV CANADA**  
 19 (1)@navcanada.ca  
 151 Slater St., Ottawa, ON K1P 5H3  
[www.navcanada.ca](http://www.navcanada.ca)



**From:** 19 (1)  
**Sent:** June 16, 2025 6:24 PM  
**To:** Crossan, Irelande 19 (1)@navcanada.ca  
**Cc:** TC:TC@tc.gc.ca; Enjeux Aviation Civile ONT (TC/TC)  
**Subject:** [EXT] Midnight torture

Hi Ms Crossan,

Thank you for your response to my previous email. I appreciate you acknowledging the serious detrimental effects of midnight plane noise on our health, finances and quality of life. I have been living at 19 (1) since 19 (1) and this torture has progressively gotten worse to the point that it is becoming unbearable. We don't know how and when can be sleep peacefully in our own bedroom between the hours of 11pm to 5am.

I understand the demands of today's air travel and all the related factors but targeting us in the middle of the night for a long term abuse is not acceptable. The night time preferred runway program based upon an outdated and flawed policy is specifically designed to ensure that we are subjected to this torture on a long term basis.

Nighttime flight restrictions don't seem to apply to us and small percentage of mid night flights are diverted to the flawed night time preferred runway over our area. Last night I was woken up at 1:51 am by the loud noise of the plane and followed by another plane shortly afterwards and couldn't sleep till 4am. I had to 19 (1) so as to get my sleep and went to work in the afternoon. I have attached the copies my complaint to GTAA sent last night.

I am wondering about the impact of this torture on the wellbeing of all the children living in this area who are silently suffering from this mental abuse. I think it's time to do a study on the long term effects of this flawed policy. Please stop this torture between the hours of 11 pm to 5am at least.

Kind regards

19 (1)

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Page 49 /  
2990

2:13

We Have Received Your Complaint(s)

Thank you. We have received your complaint(s).

Complaint(s) received

19 (1)

19 (1)

By submitting this form, I am confirming that I am the person named in the complaint.

complaint-ca.emsbk.com

2:12

From the list, what is the top reason for making this complaint? If you wish to add more reasons, please include in this details section.

Quality of Life

Please give details

\* Only times entered in the 'Disturbance time' section will be registered.

It is 2.05 am and I was woken up by the loud noise of a plane going over my house at 1.51 am. Tried to sleep but another plane followed. This midnight torture targeting us must stop.

I'm not a robot

reCAPTCHA

Submit Noise Complaint

Clear

By submitting this form, I am confirming that I am the person named in the complaint.

complaint-ca.emsbk.com

2:12



Disturbance date (required)

06-16-2025

## Disturbance time (required)

To submit a complaint for additional times on the s day, please click on the Add Time button.

1:51 AM

 Add Time

## Event type (required)

From the list, what is the top reason for making this complaint? If you wish to add more reasons, please include in this details section.

Quality of Life



Please give details

\* Only times entered in the 'Disturbance time' section will be registered.

complaint-ca.emsbk.com — Private



Done

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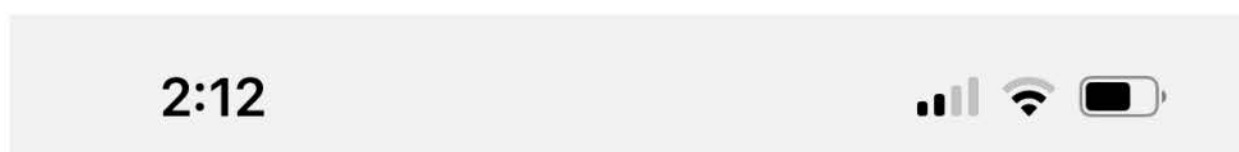
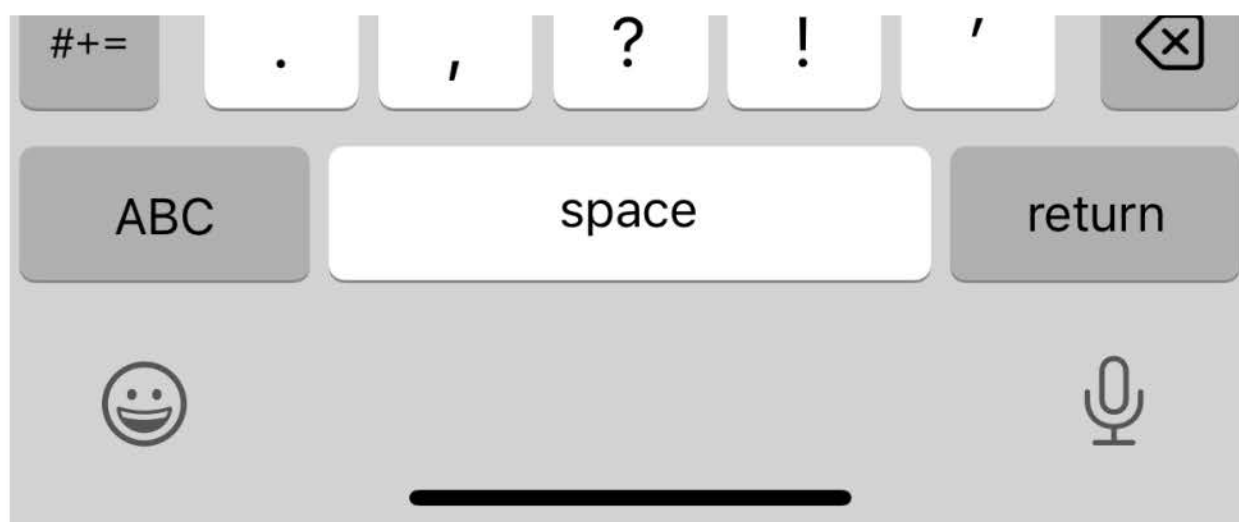
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First name (required)



Last name (required)

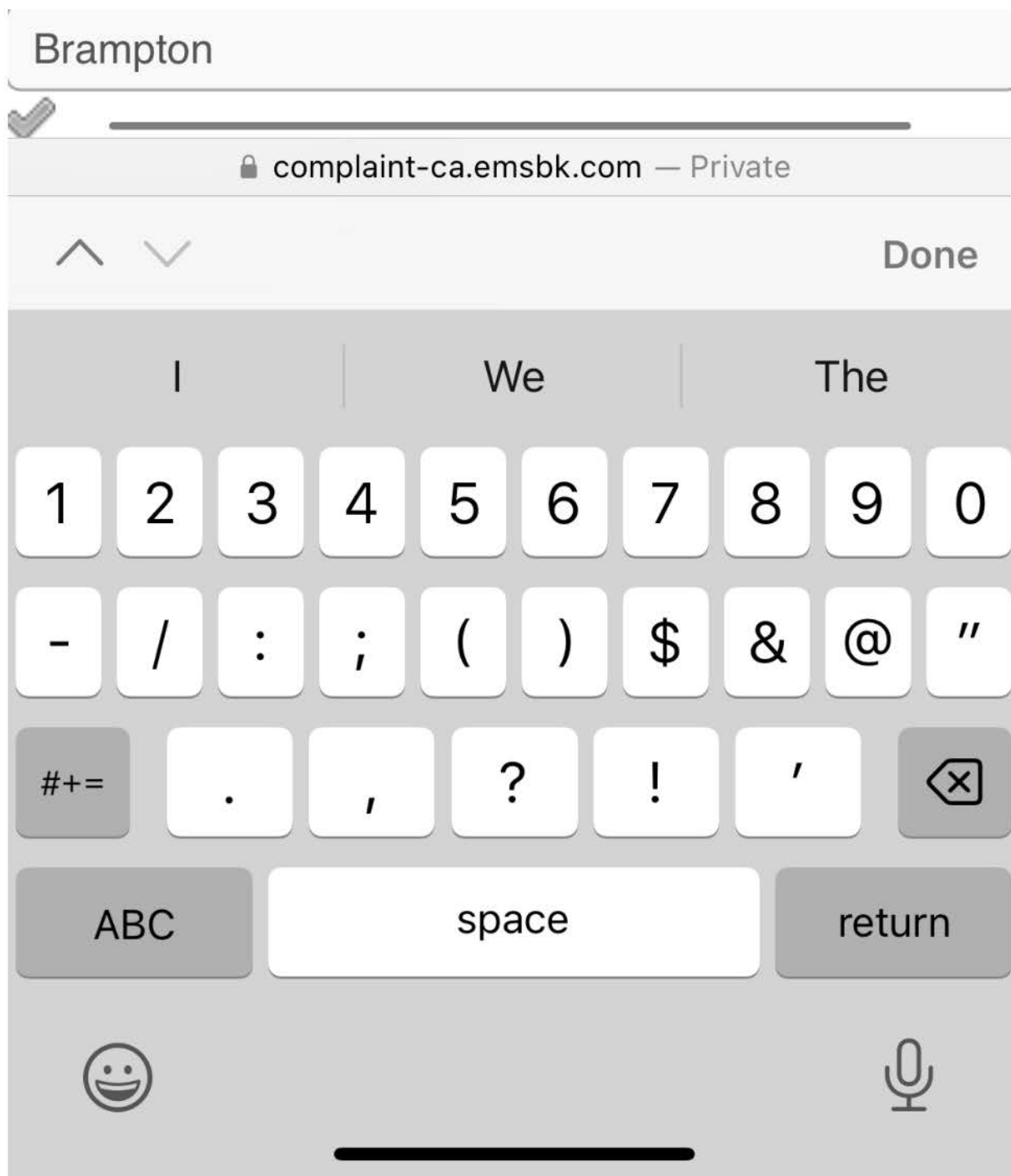


Address (required)



City (required)





Sent from my iPhone

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**From:** 19 (1)  
**To:** [ONT Civil Aviation Issues / Enjeux Aviation Civile ONT \(TC/TC\)](#)  
**Subject:** [External/Externe]: Re: Thank you for contacting Transport Canada, Civil Aviation  
**Date:** Monday, May 26, 2025 3:01:42 AM

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Hello transport Canada,

It is 2.36 am as I am writing this email and I was woken up by the loud noise of airplanes earlier( complain filed with Gtta), flying over my house and still struggling to sleep and dreading the thought of working in the morning. I appreciate you acknowledging that airplanes noise is a complex issue but your preferred overnight flights route policy is completely destroying my life physically, mentally, mentally, emotionally and financially. I understand that you have shifted the day to day operations to GTAA but they operate under your guidance and set policies. I beg you to let me sleep in my own bedroom between 11pm to 5 am .Please protect my basic human rights ( human right championed by your government) and to let me sleep in my house between the hours of 11pm to 5 am.Please stop this torture.

Regards

19 (1)

Sent from my iPhone

On May 21, 2025, at 4:50 PM, ONT Civil Aviation Issues / Enjeux Aviation Civile ONT (TC/TC) <[TC.ONTCivAvIssues-EnjeuxAvCivONT.TC@tc.gc.ca](mailto:TC.ONTCivAvIssues-EnjeuxAvCivONT.TC@tc.gc.ca)> wrote:

UNCLASSIFIED / NON CLASSIFIÉ

Good day, 19 (1)

Thank you for reaching out to Transport Canada (TC).

I would like to take this opportunity to clarify TC's mandate and our role concerning your concerns.

TC is responsible for the safety of Canada's civil aviation system. As the national safety regulator, our authority is exercised through the *Aeronautics Act* and the Canadian Aviation Regulations (CARs), which include specific requirements for minimum altitudes and safe operating practices.

While we acknowledge the impact of aircraft noise on communities, TC does not oversee the daily operations or noise management practices of individual

airports. These responsibilities fall under the jurisdiction of the airport authority—in this case, the Greater Toronto Airports Authority (GTAA). The GTAA manages local noise abatement procedures, including the Night Flight Program, and is best positioned to address concerns related to aircraft noise and flight paths.

For issues regarding flight paths, we recommend contacting NAV CANADA, which is responsible for air traffic control and routing decisions. Any further questions regarding flight paths around Toronto should be directed to NAV CANADA at [service@navcanada.ca](mailto:service@navcanada.ca).

If you believe an aircraft is being operated unsafely or is violating the CARs, we encourage you to document as many details as possible and report the incident through our [Civil Aviation Communications Centre Contact Form](#).

Regards,

#### **Issues Management**

Civil Aviation, Ontario Region  
Transport Canada / Government of Canada  
[TC.ONTCivAvlIssues-EnjeuxAvCivONT.TC@tc.gc.ca](mailto:TC.ONTCivAvlIssues-EnjeuxAvCivONT.TC@tc.gc.ca)

#### **Gestion d'enjeux**

Aviation civile, Région de l'Ontario  
Transports Canada / Gouvernement du Canada  
[TC.ONTCivAvlIssues-EnjeuxAvCivONT.TC@tc.gc.ca](mailto:TC.ONTCivAvlIssues-EnjeuxAvCivONT.TC@tc.gc.ca)

**From:** 19 (1)  
**To:** 19 (1) Aviation Issues / Enjeux Aviation Civile QNT (TC/TC)  
**Subject:** [External/Externe]: Service@naccanada.ca  
**Date:** Monday, July 14, 2025 5:07:31 PM  
**Attachments:** IMG\_4773.PNG  
IMG\_4774.PNG  
IMG\_4775.PNG  
IMG\_4776.PNG  
IMG\_4777.PNG  
IMG\_4779.PNG  
IMG\_4785.PNG  
IMG\_4786.PNG

Hi Guys,

Just got up after sleeping most of the day after the last night noise torture. Your targeted and discriminatory policy of dumping all your mid night flights over our area are ensuring that we continue to suffer from sleep deprivation and mental torture. I had to 19 (1) for today. I will soon start 19 (1) for the days like today if you guys don't change this outdated discriminatory policy. Attached are the copies of my real time complaints to G1AA.

Regards,

19 (1)

2:07

Service your complaint via your online account or our online contact details one time before the system automatically remembers your details for the next time you log in.

Please note, the system will **not** have access to your email account, the password you can setup should be unique to this form.

Hide personal details.

**Your Contact Details:**

Provide your contact details.

Please note, we need your specific address to be able to investigate the impact of the airport operations in your area. If that information is not provided, we are not able to accurately analyze your complaint and therefore it will not be registered.

First name (required)  
19 (1)

Last name (required)  
19

Address (required)  
19 (1)

complaint-ca.emsbk.com

2:07

Last name (required)  
19 (1)

Address (required)  
19 (1)

City (required)

Brampton



Postal Code (required)

19 (1)



Contact Method (at least one required)

(so we can contact you if required)

Home phone

19 (1)



Work phone

Cell phone (required)

19 (1)



Email (required)

19 (1)



Would you like us to contact you? (required)

Yes



Preferred contact method (required)

Cell phone



Remember my details on this computer (not recommended if on a public or shared computer)

complaint-ca.emsbk.com — Private

2:07

Would you like us to contact you? (required)

Preferred contact method (required)

☒ Remember my details on this computer (not recommended if on a public or shared computer)

**Disturbance Details:**

Tell us about the disturbance(s) prompting your complaint.

Please note, we need the specific date and time to be able to investigate the aircraft operations causing the disturbance. If that information is not provided, we are not able to accurately analyze your complaint and therefore it will not be registered.

To submit more than one complaint within the same minute, the disturbance times must include different 'seconds' so the software can recognize them as unique complaints. The seconds do not need to be accurate – they are merely for the purpose of separating complaints within the same minute from one another. Otherwise, editing the 'seconds' is not necessary.

Our **complaint process** requires complaints against an operation in any given month to be submitted by the 5th day of the following month.

Disturbance date (required)

Disturbance time (required)  
 To submit a complaint for additional times on the same day, please click on the Add Time button.

complaint-ca.emsbk.com — Private

2:07

seconds' is not necessary.

Our **complaint process** requires complaints against an operation in any given month to be submitted by the 5th day of the following month.

Disturbance date (required)

Disturbance time (required)  
 To submit a complaint for additional times on the same day, please click on the Add Time button.

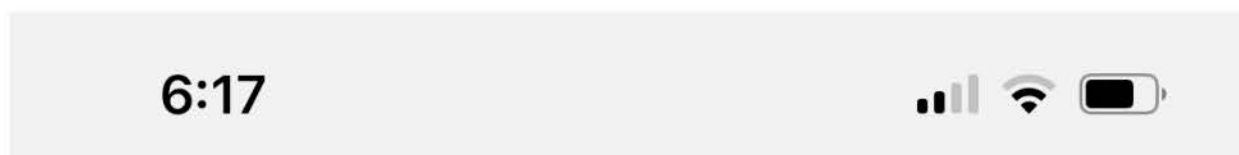
Event type (required)  
 From the list, what is the top reason for making this complaint? If you wish to add more reasons, please include in this details section.

Please give details  
 \* Only times entered in the 'Disturbance time' section will be registered.

I was woken up by the loud noise of the plane at 12:30 pm and have been kept awake by the constant flow of planes since then ensuring that I cannot sleep it is 2:05 am now This inhumane treatment must be stopped.

☒ I'm not a robot 

complaint-ca.emsbk.com — Private



## Event type (required)

From the list, what is the top reason for making this complaint? If you wish to add more reasons, please include in this details section.

Quality of Life



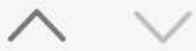
## Please give details

\* Only times entered in the 'Disturbance time' section will be registered.

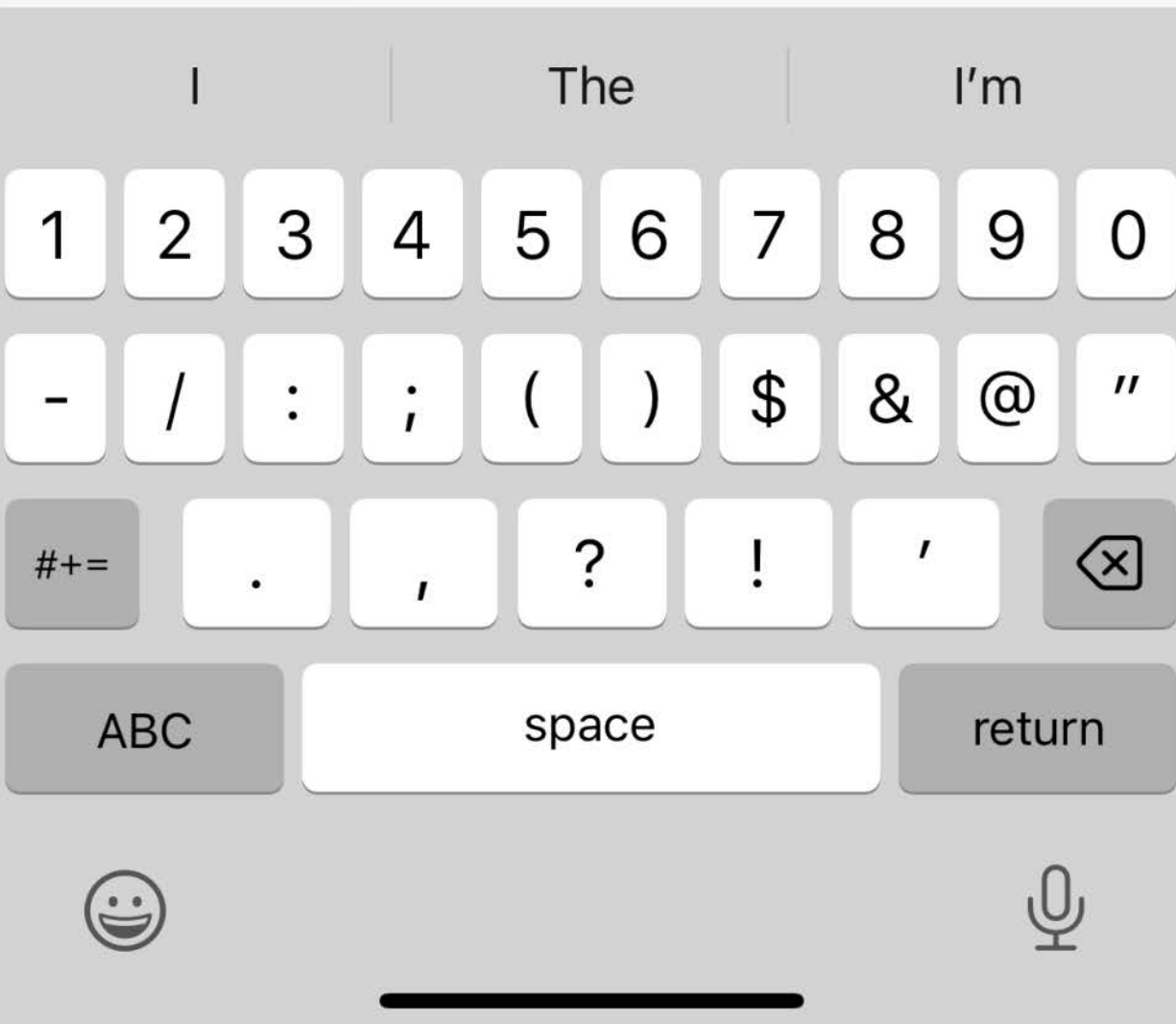
After being kept awake since midnight, by the loud noise of planes, I finally went to sleep only to be woken up again at 5.30. This targeted discriminatory torture of us must be stopped.. I

would have to  for today.

complaint-ca.emsbk.com — Private



Done





6:18

Strampton

Postal Code (required)  
19 (1)

Contact Method (at least one required)  
(so we can contact you if required)

Home phone

Work phone

Cell phone  
19 (1)

Email (required)

Would you like us to contact you? (required)  
Yes

Preferred contact method (required)  
Choose one...

☒ Remember my details on this computer (not recommended if on a public or shared computer)

**Disturbance Details:**

Tell us about the disturbance(s) prompting your complaint.

Please note, we need the specific date and time to be able to investigate the aircraft operations causing the disturbance. If that information is not provided, we are not able to accurately analyze your complaint and therefore it will not be registered.

complaint-ca.emsbk.com

6:18

To submit more than one complaint within the same minute, the disturbance times must include different 'seconds' so the software can recognize them as unique complaints. The seconds do not need to be accurate - they are merely for the purpose of separating complaints within the same minute from one another. Otherwise, editing the 'seconds' is not necessary.

Our **complaint process** requires complaints against an operation in any given month to be submitted by the 5th day of the following month.

Disturbance date (required)  
01-14-2025

Disturbance time (required)  
To submit a complaint for additional times on the same day, please click on the Add Time button.  
5:29 AM Add Time

Event type (required)  
From the list, what is the top reason for making this complaint? If you wish to add more reasons, please include in this details section.  
Quality of Life

Please give details  
\* Only times entered in the 'Disturbance time' section will be registered.

After being kept awake since midnight, by the loud noise of planes, I finally went to sleep only to be woken up again at 5:30. This targeted discriminatory noise of us must be stopped. I would have 19 (1) today.

complaint-ca.emsbk.com - Private

Sent from my iPhone

# Noise Management Action Plan Update



*For You. The World.*



**Toronto Pearson**

International Airport | Aéroport International



## Noise Management Action Plan Update – April 29, 2015

# Objectives

1. Noise Management Action Plan Review
2. 2014 Initiatives
3. 2015 Initiatives
4. Next Steps & CENAC Feedback



# Noise Management Action Plan Overview

# Noise Management Action Plan Review

- In January 2013, a **Noise Management Action Plan** was introduced to organize and guide noise management efforts between 2013 and 2017.
- Initiatives for the Plan were identified mainly through:
  - Feedback from residents and elected officials
  - Issues arising at CENAC meetings
  - Trends and issues identified by the Noise Management team
  - Industry Best Practices

# Noise Management Action Plan Review

## Categories:

- Land Use Planning
- Ground Operations
- Flight Procedures
- Monitoring and Flight Tracking
- Community Outreach and Education



# 2014 Initiatives



# 2014 Initiatives – Monitoring & Flight Tracking

| Action Plan Initiative                                 | Description                                                                                                                    |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Monitoring and Flight Tracking</b>                  |                                                                                                                                |
| Standardization of Enforcement and Auditing Procedures | <ul style="list-style-type: none"> <li>Based on capabilities of new Noise system, establish new auditing procedures</li> </ul> |

- Review of the existing Enforcement and Auditing processes

**Outcome** - introduced automated detection process to identify possible violations of flight procedures:

- The Noise system was set up to automatically review all arrivals and departures for compliance to the Noise Abatement procedures
  - Flags potential violators for further analysis by Enforcement Specialist
- As of July 1, 2014, process implemented to assess 100% of flights for compliance

# 2014 Initiatives – Monitoring & Flight Tracking

| Action Plan Initiative                             | Description                                                                             |
|----------------------------------------------------|-----------------------------------------------------------------------------------------|
| <b>Monitoring and Flight Tracking</b>              |                                                                                         |
| 10 Nautical Mile (NM) Complaint Restriction Review | <ul style="list-style-type: none"> <li>Review of 10 NM complaint restriction</li> </ul> |

- Review of the 10 NM complaint restriction

**Outcome** - decision to lift the restriction:

- capture noise complaint data that represents all areas affected by Toronto Pearson operations
  - reduces confusion for residents regarding the boundary
  - responds to concerns expressed by residents and elected officials
- As of January 1, 2015, the Noise office began accepting complaints from residents living outside the 10 NM boundary

# 2014 Initiatives – Community Outreach & Education

| Action Plan Initiative                  | Description                                                                                                                                  |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Community Outreach and Education</b> |                                                                                                                                              |
| Clarify roles and responsibilities      | <ul style="list-style-type: none"> <li>Clarify roles and responsibilities: GTAA, NavCanada, Transport Canada, Noise office, CENAC</li> </ul> |

- Review of CENAC to ensure that the format, terms of reference and committee composition are relevant and effective

**Outcome** - changes to meeting format and membership composition:

- Membership** revised to better reflect communities impacted by operations and to be aligned with the membership composition of the GTAA Board of Directors and Consultative Committee
- Meeting Format** revised to be more convenient, interactive and responsive to the community.
- New meeting format implemented at February 25, 2015 CENAC meeting

# 2014 Initiatives – Flight Procedures

| Action Plan Initiative     | Description                                                                            |
|----------------------------|----------------------------------------------------------------------------------------|
| <b>Flight Procedures</b>   |                                                                                        |
| Preferential Runway System | <ul style="list-style-type: none"> <li>Review of Preferential Runway system</li> </ul> |

- This is an ongoing initiative
- In process of determining research and metrics required to ensure meaningful review
- Any changes to the Preferential Runway System will require changes to the Noise pages in the Canada Air Pilot (CAP) consistent with Transport Canada Advisory Circular 302-002: Implementation of New or Amended Noise Abatement Procedures. Therefore will be grouped with any other initiatives that trigger this process.

# 2014 Initiatives – Flight Procedures

| Action Plan Initiative            | Description                                                                                                                                                                   |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Flight Procedures</b>          |                                                                                                                                                                               |
| Early Turns Trial and Props Trial | <ul style="list-style-type: none"> <li>• Review of current early jet turn Trial and extended time Trial of the Prop turns</li> <li>• Development of Trial Criteria</li> </ul> |

- This is an ongoing initiative
- In process of determining metrics and developing Trial criteria to ensure meaningful review
- Formalization of the Trials will require changes to the Noise pages in the Canada Air Pilot (CAP) consistent with Transport Canada Advisory Circular 302-002: Implementation of New or Amended Noise Abatement Procedures. Therefore will be grouped with any other initiatives that trigger this process.



## Looking Ahead - Action Plan Goals 2015

# 2015 Initiatives – Ground Operations

| Action Plan Initiative   | Description                                                                       |
|--------------------------|-----------------------------------------------------------------------------------|
| Ground Operations        |                                                                                   |
| Engine Run Up Procedures | <ul style="list-style-type: none"><li>• Update Engine Run up procedures</li></ul> |

Review updated Engine Run Up procedures

# 2015 Initiatives – Flight Procedures

| Action Plan Initiative     | Description                                                                                                                            |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Flight Procedures</b>   |                                                                                                                                        |
| Noise Abatement Procedures | <ul style="list-style-type: none"> <li>Review of current Noise Abatement procedures, identify opportunities for enhancement</li> </ul> |

Are there opportunities for enhancement to the Noise Abatement procedures?



# 2015 Initiatives – Monitoring & Flight Tracking

| Action Plan Initiative                      | Description                                                                                                                             |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Monitoring and Flight Tracking</b>       |                                                                                                                                         |
| Noise System tool upgrades (noise monitors) | <ul style="list-style-type: none"> <li>• Assessment of Noise Monitoring Terminals (NMTs)</li> <li>• Installation of new NMTs</li> </ul> |

Re-assessment of NMT criteria and locations  
Do we need to expand our noise monitoring?

# 2015 Initiatives – Community Outreach & Education

| Action Plan Initiative                           | Description                                                                                                                                                    |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Community Outreach and Education</b>          |                                                                                                                                                                |
| 1. Develop Educational Materials                 | <ul style="list-style-type: none"> <li>Ongoing development of educational materials for use at community outreach sessions, CENAC meetings, website</li> </ul> |
| 2. Strategy for community outreach and education | <ul style="list-style-type: none"> <li>Development of targeted strategy for community outreach</li> </ul>                                                      |

1. Continue to develop educational materials and improve the noise section on website
2. Develop strategy/calendar for ongoing community outreach (similar to Halton Hills Open House in April 2015)  
Develop Toronto Pearson's Good Neighbour Charter and CENAC 2015 Noise Mitigation Initiatives, Consultation and Engagement Process



# CENAC Feedback

# Next Steps and CENAC Feedback

## Next Steps

- Each Initiative will be presented and discussed with background/context

## CENAC Feedback

- Thoughts on 2014 Initiatives?
- Thoughts on 2015 Initiatives?



# Thank you



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# TORONTO PEARSON

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## Toronto Noise Mitigation Initiatives Public Participation Plan

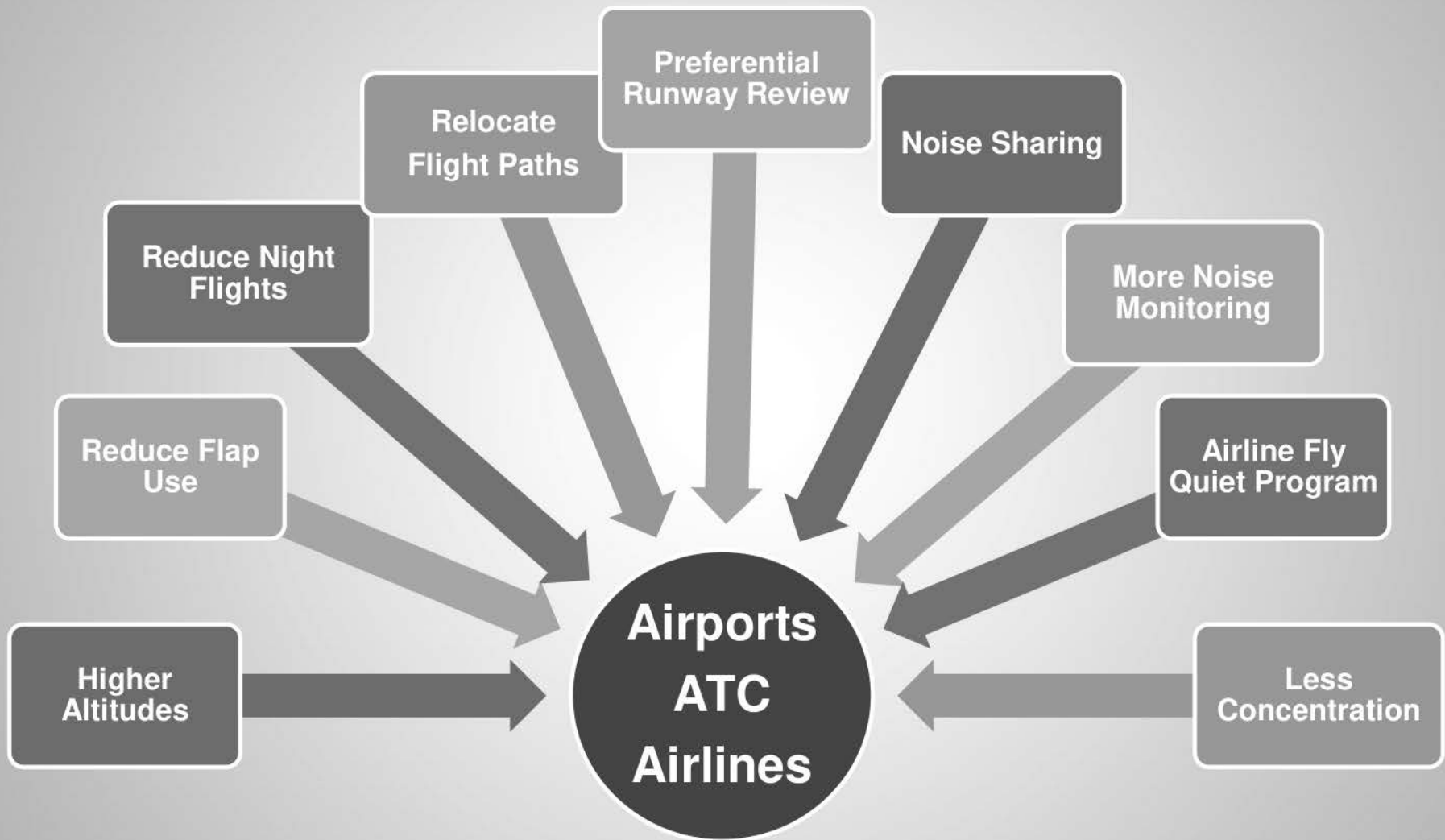
# Being a Good Neighbour

- » Toronto Pearson has an important role to play in community life.
  - Passengers count on us to provide connections to the world
  - Airlines, industry partners and airport employees count on us to operate in a safe way
  - Communities surrounding us count on us to operate in a sustainable manner
- » Being a good neighbour means balancing these diverse and sometimes competing priorities for the constituencies we're in business to serve.

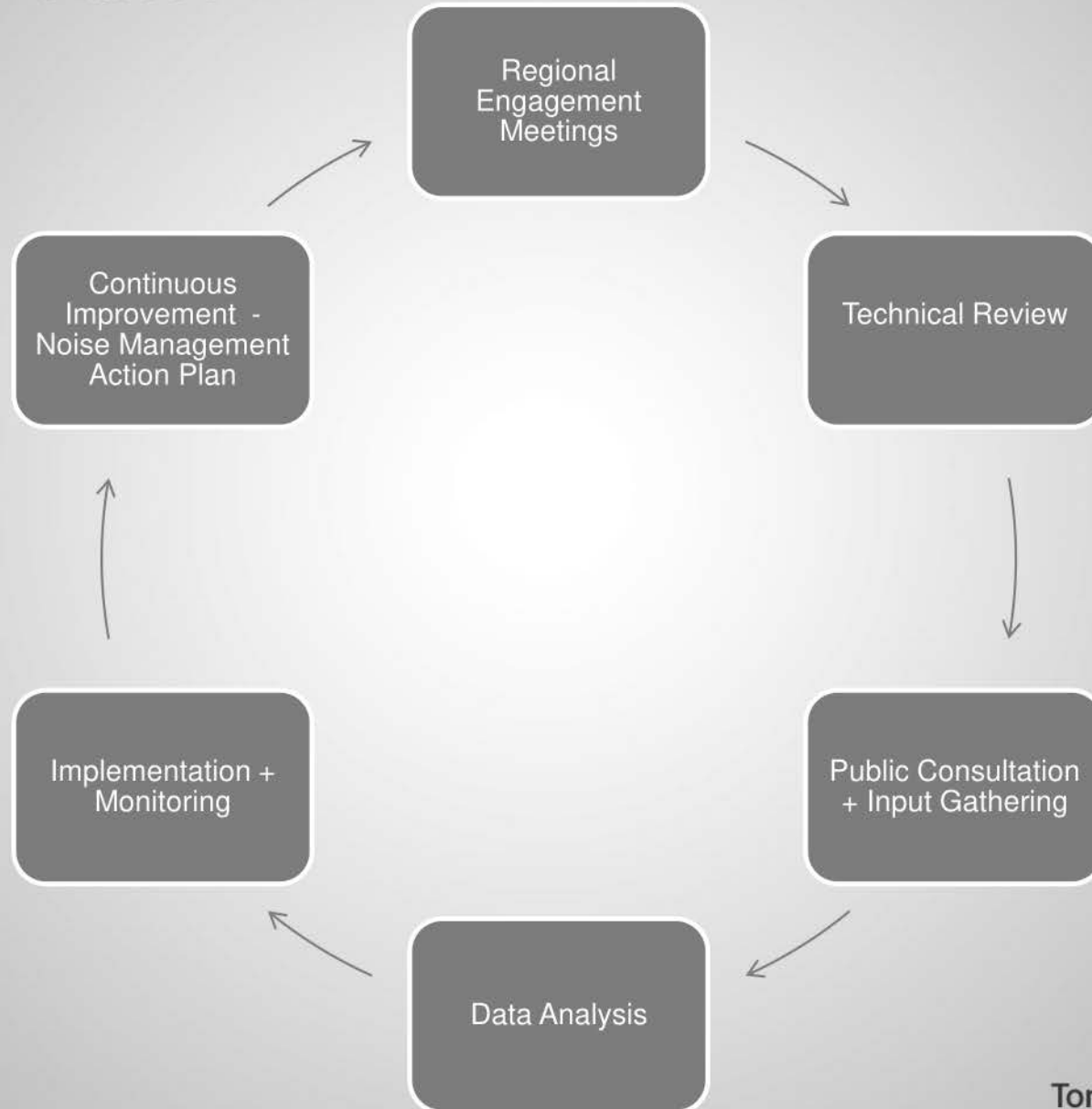
# Toronto Noise Mitigation Initiatives



# What we've been hearing



# Let's Talk



# Regional Engagement Meetings

## » Audience:

- Leaders of community associations and local elected officials
- CENAC representative from their respective region

## » Objective:

- Review and discuss feasibility of preliminary ideas to mitigate community impacts
- Get community input on process and next steps

## » Timelines:

- Summer 2015

# Technical Review

## » Audience:

- Industry – airlines, GTAA operational teams, NAV CANADA

## » Objectives:

- Analysis of noise mitigation initiatives with respect to safety, regulation, noise, efficiency, capacity, and frequency
- Develop designs and consultation materials

## » Timelines:

- Fall – Winter 2015

# Public Consultation + Input Gathering

## » Audience:

- Community associations, broader community, elected officials

## » Objective:

- Ensure broad community understanding of the noise mitigation initiatives under review, and the implementation process
- Collect feedback for consideration

## » Timelines:

- Winter – Spring 2016

# Data Analysis

## » Audience:

- Industry – airlines, GTAA operational teams, NAV CANADA

## » Objective:

- Analyze feedback collected during the consultation process
- Identify which mitigations to implement and timelines

## » Timelines:

- Winter – Spring 2016

# Implementation + Monitoring

## » Audience:

- Community associations, broader community, elected officials, participants in the public consultation process

## » Objective:

- Advise on outcomes of consultation and next steps
- Implement noise mitigation
- Monitor and measure to benchmark outcomes
- Report back to community and industry

## » Timelines:

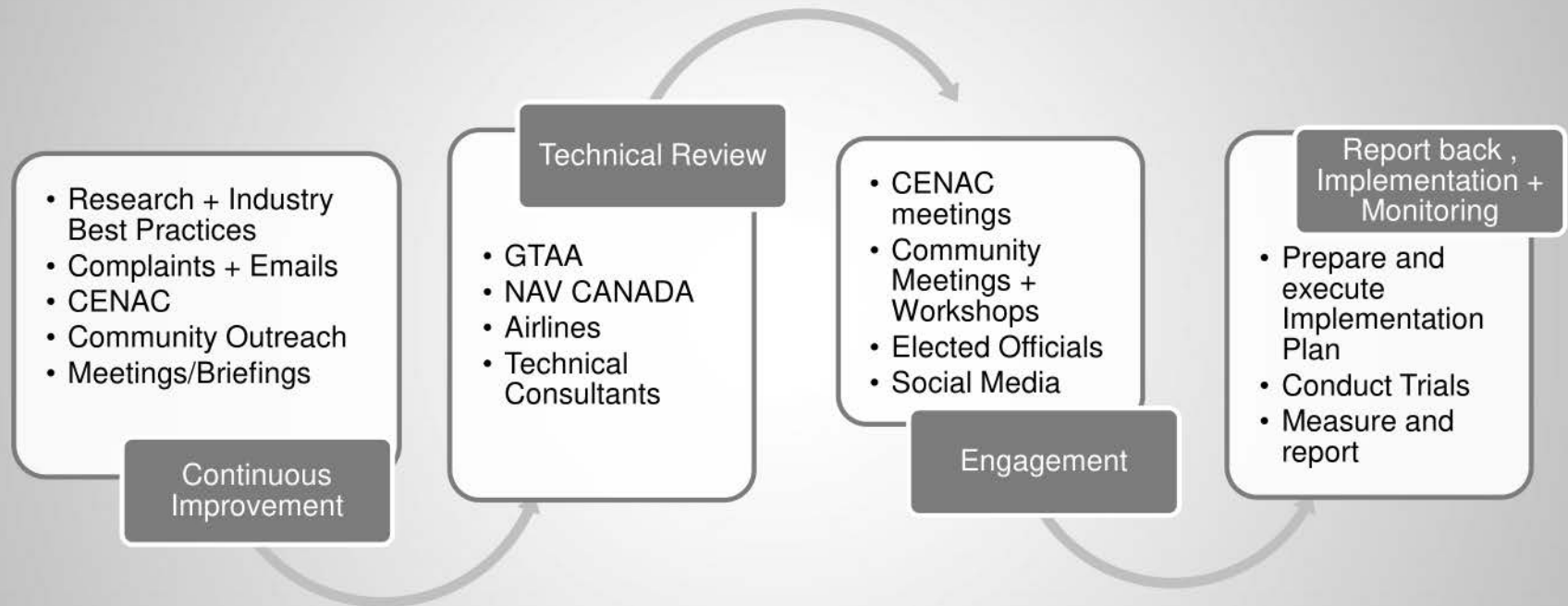
- Spring 2016 – ongoing

# Role of CENAC

- » Participate in the process
- » Input and advise on the initiatives and engagement process
- » Seek community feedback and recommendations
- » Represent community concerns
- » Help reach out to communities about the engagement opportunities



# From Feedback → Engagement



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Q&A

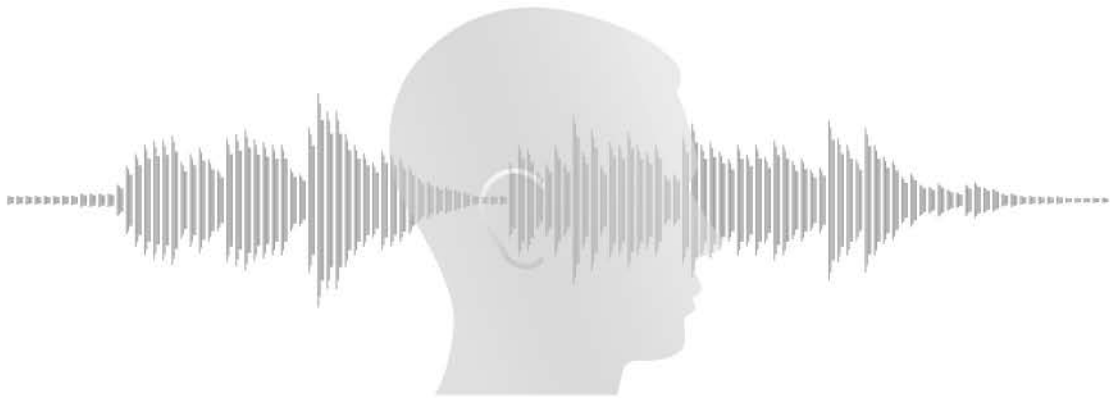


World Health  
Organization

REGIONAL OFFICE FOR

Europe

# ENVIRONMENTAL **NOISE** GUIDELINES for the European Region



## Abstract

Noise is an important public health issue. It has negative impacts on human health and well-being and is a growing concern. The WHO Regional Office for Europe has developed these guidelines, based on the growing understanding of these health impacts of exposure to environmental noise. The main purpose of these guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from various sources: transportation (road traffic, railway and aircraft) noise, wind turbine noise and leisure noise. They provide robust public health advice underpinned by evidence, which is essential to drive policy action that will protect communities from the adverse effects of noise. The guidelines are published by the WHO Regional Office for Europe. In terms of their health implications, the recommended exposure levels can be considered applicable in other regions and suitable for a global audience.

## Keyword

NOISE – ADVERSE EFFECTS, PREVENTION AND CONTROL

ENVIRONMENTAL EXPOSURE – ADVERSE EFFECTS, PREVENTION AND CONTROL

GUIDELINES

EUROPE

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# Environmental Noise Guidelines for the European Region

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## Foreword

Noise is one of the most important environmental risks to health and continues to be a growing concern among policy-makers and the public alike. Based on the assessment threshold specified in the Environmental Noise Directive of the European Union (EU), at least 100 million people in the EU are affected by road traffic noise, and in western Europe alone at least 1.6 million healthy years of life are lost as a result of road traffic noise.

At the request of Member States at the Fifth Ministerial Conference on Environment and Health in Parma, Italy, in March 2010, the WHO Regional Office for Europe has developed these guidelines, based on the growing understanding of the health impacts of exposure to environmental noise. They provide robust public health advice, which is essential to drive policy action that will protect communities from the adverse effects of noise.

These WHO guidelines – the first of their kind globally – provide recommendations for protecting human health from exposure to environmental noise originating from various sources. They not only offer robust public health advice but also serve as a solid basis for future updates, given the growing recognition of the problem and the rapid advances in research on the health impacts of noise. The comprehensive process of developing the guidelines has followed a rigorous methodology; their recommendations are based on systematic reviews of evidence that consider more health outcomes of noise exposure than ever before. Through their potential to influence urban, transport and energy policies, these guidelines contribute to the 2030 Agenda for Sustainable Development and support WHO's vision of creating resilient communities and supportive environments in the European Region.

Following the publication of WHO's community noise guidelines in 1999 and night noise guidelines for Europe in 2009, these latest guidelines represent the next evolutionary step, taking advantage of the growing diversity and quality standards in this research domain. Comprehensive and robust, and underpinned by evidence, they will serve as a sound basis for action. While these guidelines focus on the WHO European Region and provide policy guidance to Member States that is compatible with the noise indicators used in the EU's Environmental Noise Directive, they still have global relevance. Indeed, a large body of the evidence underpinning the recommendations was derived not only from noise effect studies in Europe but also from research in other parts of the world – mainly in Asia, Australia and the United States of America.

I am proud to present these guidelines as another leading example of the normative work undertaken in our Region in the area of environment and health. On behalf of the WHO Regional Office for Europe and our European Centre for Environment and Health in Bonn, Germany, which coordinated the development of the guidelines, I would like to express my gratitude to the large network of experts, partners, colleagues and consultants who have contributed to this excellent publication. I would also like to thank Switzerland and Germany for providing financial support to this complex project, and look forward to following the influence of the guidelines on policy and research in the years to come.

Dr Zsuzsanna Jakab

WHO Regional Director for Europe

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The members of the Steering Group were: Shelly Chadha, Carlos Dora, Rokho Kim, Jurgita Lekaviciute, Srdan Matic, Julia Nowacki, Poonum Wilkhu and Joerdis Wothge (see Annex 1 Table A1.1 for affiliations).

The members of the Guideline Development Group were: Stephen Stansfeld (Chair), Wolfgang Babisch, Goran Belojevic, Mark Brink, Sabine Janssen, Peter Lercher (2013–2014), Marco Paviotti, Göran Pershagen, Kerstin Persson Waye, Anna Preis, Martin van den Berg and Jos Verbeek (methodologist) (see Annex 1 Table A1.2 for affiliations).

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## Abbreviations

|         |                                                                                                                                      |
|---------|--------------------------------------------------------------------------------------------------------------------------------------|
| %HA     | percentage of the population “highly annoyed”                                                                                        |
| %HSD    | percentage of the population “highly sleep-disturbed”                                                                                |
| BMI     | body mass index                                                                                                                      |
| CI      | confidence interval                                                                                                                  |
| CNG     | WHO guidelines for community noise                                                                                                   |
| DALY    | disability-adjusted life-year                                                                                                        |
| dB      | decibel                                                                                                                              |
| DW      | disability weight                                                                                                                    |
| EC      | European Commission                                                                                                                  |
| EEA     | European Environment Agency                                                                                                          |
| END     | European Union Directive 2002/49/EC relating to the assessment and management of environmental noise (Environmental Noise Directive) |
| ERF     | exposure–response function                                                                                                           |
| EU      | European Union                                                                                                                       |
| GDG     | Guideline Development Group                                                                                                          |
| GRADE   | Grading of Recommendations Assessment Development and Evaluation                                                                     |
| ICBEN   | International Commission on Biological Effects of Noise                                                                              |
| IHD     | ischaemic heart disease                                                                                                              |
| JRC     | Joint Research Centre [of the European Commission]                                                                                   |
| mmHg    | millimeters of mercury                                                                                                               |
| NNG     | WHO night noise guidelines for Europe                                                                                                |
| OR      | odds ratio                                                                                                                           |
| PECCOS  | population, exposure, comparator, confounder, outcome and study [framework]                                                          |
| PICOS   | population, intervention, comparator, outcome and study [framework]                                                                  |
| PLD     | personal listening device                                                                                                            |
| RANCH   | Road traffic and aircraft noise exposure and children’s cognition and health [study]                                                 |
| RCT     | randomized control trial                                                                                                             |
| RR      | relative risk                                                                                                                        |
| SCENIHR | Scientific Committee on Emerging and Newly Identified Hazards and Risk                                                               |



## Glossary of acoustic terms

|               |                                                                                                                                                                                                                                             |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A-weighting   | A frequency-dependent correction that is applied to a measured or calculated sound of moderate intensity to mimic the varying sensitivity of the ear to sound for different frequencies                                                     |
| C-weighting   | A frequency-dependent correction that is applied to a measured or calculated sound of moderate intensity to mimic the varying sensitivity of the ear to sound for different frequencies – C-weighting is usually used for peak measurements |
| FAST          | Fast response has a time constant of 125 milliseconds on a sound level meter                                                                                                                                                                |
| $L_{Aeq,T}$   | A-weighted, equivalent continuous sound pressure level during a stated time interval starting at $t_1$ and ending at $t_2$ , expressed in decibels (dB), at a given point in space <sup>1</sup>                                             |
| $L_{A,max}$   | Maximum time-weighted and A-weighted sound pressure level within a stated time interval starting at $t_1$ and ending at $t_2$ , expressed in dB <sup>1</sup>                                                                                |
| $L_{AF}$      | A-weighted sound pressure level with FAST time constant as specified in IEC 61672-1 <sup>1</sup>                                                                                                                                            |
| $L_{AF,max}$  | Maximum time-weighted and A-weighted sound pressure level with FAST time constant within a stated time interval starting at $t_1$ and ending at $t_2$ , expressed in dB                                                                     |
| $L_{AS,max}$  | Maximum time-weighted and A-weighted sound pressure level with SLOW time constant within a stated time interval starting at $t_1$ and ending at $t_2$ , expressed in dB                                                                     |
| $L_E$         | Sound energy density level is the logarithmic ratio of the time-averaged sound energy per unit volume to the reference sound energy density $E_0 = 10^{-12} \text{ J/m}^3$ .                                                                |
| $L_{ex,8h}$   | $L_{eq}$ (equivalent continuous sound level) corrected for the length of the working shift, in this case 8 hours                                                                                                                            |
| $L_{day}$     | Equivalent continuous sound pressure level when the reference time interval is the day <sup>1</sup>                                                                                                                                         |
| $L_{den}$     | Day-evening-night-weighted sound pressure level as defined in section 3.6.4 of ISO 1996-1:2016 <sup>1</sup>                                                                                                                                 |
| $L_{dn}$      | Day-night-weighted sound pressure level as defined in section 3.6.4 of ISO 1996-1:2016 <sup>1</sup>                                                                                                                                         |
| $L_{evening}$ | Equivalent continuous sound pressure level when the reference time interval is the evening <sup>1</sup>                                                                                                                                     |

<sup>1</sup> Source: ISO (2016).

|                       |                                                                                                                                                    |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| $L_{\text{night}}$    | Equivalent continuous sound pressure level when the reference time interval is the night <sup>1</sup>                                              |
| $L_{\text{peak,C}}$   | Level of peak sound pressure with C-weighting, within a specified time interval                                                                    |
| $L_{\text{peak,lin}}$ | Level of peak sound pressure with linear frequency weighting, within a specified time interval                                                     |
| Sound pressure level  | the logarithm of the ratio of a given sound pressure to the reference sound pressure in dB is 20 times the logarithm to the base ten of the ratio. |
| SLOW                  | Slow response has a time constant of 10 000 milliseconds on a sound level meter                                                                    |





## Executive summary

Environmental noise is an important public health issue, featuring among the top environmental risks to health. It has negative impacts on human health and well-being and is a growing concern among both the general public and policy-makers in Europe.

At the Fifth Ministerial Conference on Environment and Health in Parma, Italy, in 2010, WHO was requested by the Member States in the European Region to produce noise guidelines that included not only transportation noise sources but also personal electronic devices, toys and wind turbines, which had not yet been considered in existing guidelines. Furthermore, European Union Directive 2002/49/EC relating to the assessment and management of environmental noise (END) and related technical guidance from the European Environment Agency both elaborated on the issue of environmental noise and the importance of up-to-date noise guidelines.

The WHO Regional Office for Europe has therefore developed environmental noise guidelines for the European Region, proposing an updated set of public health recommendations on exposure to environmental noise.

## Objectives

The main purpose of these guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from various sources: transportation (road traffic, railway and aircraft) noise, wind turbine noise and leisure noise. Leisure noise in this context refers to all noise sources that people are exposed to due to leisure activities, such as attending nightclubs, pubs, fitness classes, live sporting events, concerts or live music venues and listening to loud music through personal listening devices. The guidelines focus on the WHO European Region and provide policy guidance to Member States that is compatible with the noise indicators used in the European Union's END.

The following two key questions identify the issues addressed by the guidelines.

- In the general population exposed to environmental noise, what is the exposure–response relationship between exposure to environmental noise (reported as various indicators) and the proportion of people with a validated measure of health outcome, when adjusted for confounders?
- In the general population exposed to environmental noise, are interventions effective in reducing exposure to and/or health outcomes from environmental noise?

In light of these questions, the guidelines set out to define recommended exposure levels for environmental noise in order to protect population health.

## Methods used to develop the guidelines

The process of developing the WHO guidelines followed a rigorous methodology involving several groups with separate roles and responsibilities. Throughout the process, the Grading of

Recommendations Assessment, Development and Evaluation (GRADE) approach was followed. In particular, the different steps in the development of the guidelines included:

- formulation of the scope and key questions of the guidelines;
- review of the pertinent literature;
- selection of priority health outcome measures;
- a systematic review of the evidence;
- assessment of certainty of the bodies of evidence resulting from systematic reviews;
- identification of guideline exposure levels; and
- setting of the strength of recommendations.

Based on the defined scope and key questions, these guidelines reviewed the pertinent literature in order to incorporate significant research undertaken in the area of environmental noise and health since the community noise guidelines and night noise guidelines for Europe were issued (WHO, 1999; WHO Regional Office for Europe, 2009). In total, eight systematic reviews of evidence were conducted to assess the relationship between environmental noise and the following health outcomes: cardiovascular and metabolic effects; annoyance; effects on sleep; cognitive impairment; hearing impairment and tinnitus; adverse birth outcomes; and quality of life, mental health and well-being. A separate systematic review of evidence was conducted to assess the effectiveness of environmental noise interventions in reducing exposure and associated impacts on health.<sup>2</sup> Once identified and synthesized, the quality of the evidence of the systematic reviews was assessed by the Systematic Review Team. Subsequently, the Guideline Development Group (GDG) formulated recommendations, guided by the Systematic Review Team's assessment and informed by a number of additional contextual parameters. To facilitate the formulation of recommendations, the GDG first defined priority health outcomes and then selected the most relevant health outcome measures for the outcomes. Consecutively, a process was developed to identify the guideline exposure levels with the help of the exposure–response functions provided by the systematic reviews. To reflect the nature of the research (observational studies) underpinning the relationship between environmental noise and health, the GRADE procedures were adapted to the requirements of environmental exposure studies where needed.

## Noise indicators

From a scientific point of view, the best noise indicator is the one that performs best in predicting the effect of interest. There are, however, a number of additional criteria that may influence the choice of indicator. For example, various indicators might be suitable for different health end-points. Some considerations of a more political nature can be found in the European Commission's Position paper on EU noise indicators (EC, 2000).

<sup>2</sup> All systematic reviews are publicly available online in the *International Journal of Environmental Research and Public Health*. A detailed list of links to the individual reviews is provided in section 2.3.2 and in Annex 2 of these guidelines.

The current guidelines are intended to be suitable for policy-making in the WHO European Region. They therefore focus on the most used noise indicators  $L_{\text{den}}$  and/or  $L_{\text{night}}$  (see the glossary of acoustic terms for further details). They can be constructed using their components ( $L_{\text{day}}$ ,  $L_{\text{evening}}$ ,  $L_{\text{night}}$  and the duration in hours of  $L_{\text{night}}$ ), and are provided for exposure at the most exposed façade, outdoors. The  $L_{\text{den}}$  and  $L_{\text{night}}$  indicators are those generally reported by authorities and are widely used for exposure assessment in health effect studies.

## Recommendations

Specific recommendations have been formulated for road traffic noise, railway noise, aircraft noise, wind turbine noise and leisure noise. Recommendations are rated as either strong or conditional.

### Strength of recommendation

- A **strong** recommendation can be adopted as policy in most situations. The guideline is based on the confidence that the desirable effects of adherence to the recommendation outweigh the undesirable consequences. The quality of evidence for a net benefit – combined with information about the values, preferences and resources – inform this recommendation, which should be implemented in most circumstances.
- A **conditional** recommendation requires a policy-making process with substantial debate and involvement of various stakeholders. There is less certainty of its efficacy owing to lower quality of evidence of a net benefit, opposing values and preferences of individuals and populations affected or the high resource implications of the recommendation, meaning there may be circumstances or settings in which it will not apply.

Alongside specific recommendations, several guiding principles were developed to provide generic advice and support for the incorporation of recommendations into a policy framework. They apply to the implementation of all of the specific recommendations.

### Guiding principles: reduce, promote, coordinate and involve

- Reduce exposure to noise, while conserving quiet areas.
- Promote interventions to reduce exposure to noise and improve health.
- Coordinate approaches to control noise sources and other environmental health risks.
- Inform and involve communities potentially affected by a change in noise exposure.

The recommendations, source by source, are as follows.



## Road traffic noise

| Recommendation                                                                                                                                                                                                                                                                                                                                                                                                                      | Strength |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| For average noise exposure, the GDG strongly recommends reducing noise levels produced by road traffic below <b>53 decibels (dB) <math>L_{den}</math></b> , as road traffic noise above this level is associated with adverse health effects.                                                                                                                                                                                       | Strong   |
| For night noise exposure, the GDG strongly recommends reducing noise levels produced by road traffic during night time below <b>45 dB <math>L_{night}</math></b> , as night-time road traffic noise above this level is associated with adverse effects on sleep.                                                                                                                                                                   | Strong   |
| To reduce health effects, the GDG strongly recommends that policy-makers implement suitable measures to reduce noise exposure from road traffic in the population exposed to levels above the guideline values for average and night noise exposure. For specific interventions, the GDG recommends reducing noise both at the source and on the route between the source and the affected population by changes in infrastructure. | Strong   |



## Railway noise

| Recommendation                                                                                                                                                                                                                                                                                                                                | Strength |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| For average noise exposure, the GDG strongly recommends reducing noise levels produced by railway traffic below <b>54 dB <math>L_{den}</math></b> , as railway noise above this level is associated with adverse health effects.                                                                                                              | Strong   |
| For night noise exposure, the GDG strongly recommends reducing noise levels produced by railway traffic during night time below <b>44 dB <math>L_{night}</math></b> , as night-time railway noise above this level is associated with adverse effects on sleep.                                                                               | Strong   |
| To reduce health effects, the GDG strongly recommends that policy-makers implement suitable measures to reduce noise exposure from railways in the population exposed to levels above the guideline values for average and night noise exposure. There is, however, insufficient evidence to recommend one type of intervention over another. | Strong   |



## Aircraft noise

| Recommendation                                                                                                                                                                                                                                                                                                                                  | Strength |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| For average noise exposure, the GDG strongly recommends reducing noise levels produced by aircraft below <b>45 dB <math>L_{den}</math></b> , as aircraft noise above this level is associated with adverse health effects.                                                                                                                      | Strong   |
| For night noise exposure, the GDG strongly recommends reducing noise levels produced by aircraft during night time below <b>40 dB <math>L_{night}</math></b> , as night-time aircraft noise above this level is associated with adverse effects on sleep.                                                                                       | Strong   |
| To reduce health effects, the GDG strongly recommends that policy-makers implement suitable measures to reduce noise exposure from aircraft in the population exposed to levels above the guideline values for average and night noise exposure. For specific interventions the GDG recommends implementing suitable changes in infrastructure. | Strong   |



## Wind turbine noise

| Recommendation                                                                                                                                                                                                                                                                                                                                                            | Strength    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| For average noise exposure, the GDG conditionally recommends reducing noise levels produced by wind turbines below <b>45 dB <math>L_{den}</math></b> , as wind turbine noise above this level is associated with adverse health effects.                                                                                                                                  | Conditional |
| No recommendation is made for average night noise exposure $L_{night}$ of wind turbines. The quality of evidence of night-time exposure to wind turbine noise is too low to allow a recommendation.                                                                                                                                                                       |             |
| To reduce health effects, the GDG conditionally recommends that policy-makers implement suitable measures to reduce noise exposure from wind turbines in the population exposed to levels above the guideline values for average noise exposure. No evidence is available, however, to facilitate the recommendation of one particular type of intervention over another. | Conditional |



## Leisure noise

| Recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Strength    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| For average noise exposure, the GDG conditionally recommends reducing the yearly average from all leisure noise sources combined to <b>70 dB <math>L_{Aeq,24h}</math></b> as leisure noise above this level is associated with adverse health effects. The equal energy principle <sup>3</sup> can be used to derive exposure limits for other time averages, which might be more practical in regulatory processes.                                                                                       | Conditional |
| For single-event and impulse noise exposures, the GDG conditionally recommends following existing guidelines and legal regulations to limit the risk of increases in hearing impairment from leisure noise in both children and adults.                                                                                                                                                                                                                                                                    | Conditional |
| Following a precautionary approach, to reduce possible health effects, the GDG strongly recommends that policy-makers take action to prevent exposure above the guideline values for average noise and single-event and impulse noise exposures. This is particularly relevant as a large number of people may be exposed to and at risk of hearing impairment through the use of personal listening devices. There is insufficient evidence, however, to recommend one type of intervention over another. | Strong      |

## Target audience

The guidelines are published by the WHO Regional Office for Europe. In terms of their health implications, the recommended exposure levels can be considered applicable in other regions and suitable for a global audience, as a large body of the evidence underpinning the recommendations was derived not only from European noise effect studies but also from research in other parts of the world – mainly in America, Asia and Australia.

<sup>3</sup> The equal energy principle states that the total effect of sound is proportional to the total amount of sound energy received by the ear, irrespective of the distribution of that energy in time (WHO, 1999).



# 1. Introduction

Environmental noise features among the top environmental risks to physical and mental health and well-being, with a substantial associated burden of disease in Europe (WHO Regional Office for Europe & JRC, 2011; Hänninen et al., 2014). It has negative impacts on human health and well-being and is a growing concern among both the general public and policy-makers in Europe.

WHO published community noise guidelines (CNG) and night noise guidelines (NNG) for Europe in 1999 and 2009, respectively (WHO, 1999; WHO Regional Office for Europe, 2009). Since then, significant new evidence has accumulated on the health effects of environmental noise.

The need for updated health-based guidelines originates in part from commitments made at the Fifth Ministerial Conference on Environment and Health in Parma, Italy, in 2010, where Member States asked WHO to produce appropriate noise guidelines that would include additional noise sources such as personal electronic devices, toys and wind turbines (WHO Regional Office for Europe, 2010). Furthermore, European Union (EU) Directive 2002/49/EC relating to the assessment and management of environmental noise (the END – EC, 2002a) and related technical guidance from the European Environment Agency (EEA) both elaborated on the issue of environmental noise and the importance of up-to-date noise guidelines (EEA, 2010).

The WHO Regional Office for Europe has therefore developed environmental noise guidelines for the European Region, proposing an updated set of public health recommendations on exposure to environmental noise. The main purpose of these guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from various sources: transportation (road traffic, railway and aircraft) noise, wind turbine noise and leisure noise. The guidelines focus on the WHO European Region and provide policy guidance to Member States that is compatible with the noise indicators used in the EU's END.

The following two key questions identify the issues addressed by the guidelines.

- In the general population exposed to environmental noise, what is the exposure–response relationship between exposure to environmental noise (reported as various indicators) and the proportion of people with a validated measure of health outcome, when adjusted for confounders?
- In the general population exposed to environmental noise, are interventions effective in reducing exposure to and/or health outcomes from environmental noise?

## 1.1 The public health burden from environmental noise

Exposure to noise can lead to auditory and nonauditory effects on health. Through direct injury to the auditory system, noise leads to auditory effects such as hearing loss and tinnitus. Noise is also a nonspecific stressor that has been shown to have an adverse effect on human health, especially following long-term exposure. These effects are the result of psychological and physiological distress, as well as a disturbance of the organism's homeostasis and increasing allostatic load (Basner et al., 2014). This is further outlined in the WHO narrative review of the biological mechanisms of nonauditory effects (Eriksson et al., 2018).



The evidence of the association between noise exposure and health effects is based on experimental work regarding biological plausibility and, in observational studies, consistency among study results, presence of an exposure–response relationship and the magnitude of the effect. Environmental noise risk assessment and risk management relies on established exposure–response relationships (Babisch, 2014).

In 2011 the WHO Regional Office for Europe and the European Commission (EC) Joint Research Centre (JRC) published a report on the burden of disease from environmental noise that quantified the healthy years of life lost in western European countries as a result of environmental noise (WHO Regional Office for Europe & JRC, 2011). The burden of disease is calculated, in a single measure of disability-adjusted life-years (DALYs), as the sum of the years of life lost from premature mortality and the years lived with disability for people living with the disease or health condition or its consequences in the general population (WHO, 2014a).

Sufficient information was deemed available to quantify the burden of disease from environmental noise for cardiovascular disease, cognitive impairment in children, sleep disturbance, tinnitus and annoyance. The report, based on a limited set of data, estimated that DALYs lost from environmental noise in western European countries are equivalent to 61 000 years for ischaemic heart disease (IHD), 45 000 years for cognitive impairment in children, 903 000 years for sleep disturbance, 22 000 years for tinnitus and 654 000 years for annoyance (WHO Regional Office for Europe & JRC, 2011). These results indicate that at least one million healthy years of life are lost every year from traffic-related environmental noise in western Europe. Sleep disturbance and annoyance, mostly related to road traffic noise, constitute the bulk of this burden. Available assessments place the burden of disease from environmental noise as the second highest after air pollution (WHO Regional Office for Europe & JRC, 2011; Hänninen et al., 2014; WHO 2014b). However, a lack of noise exposure data in the central and eastern parts of the WHO European Region means that it is not possible to assess the burden of disease from environmental noise for the whole Region.

## 1.2 The environmental noise policy context in the EU

The EU has been working to develop a harmonized noise policy for more than two decades. 1993 saw the start of the EC's Fifth Environment Action Programme, which stated that "no person should be exposed to noise levels which endanger health and quality of life" (EC, 1993). This was followed by a Green Paper on future noise policy (EC, 1996), which reinforced the importance of noise as one of the main environmental problems in Europe and proposed a new framework for noise policy development.

The Sixth Environment Action Programme had as one of its objectives: "to achieve a quality of environment where the levels of man-made contaminants do not give rise to significant impacts on, or risks to, human health" (EC, 2002b). This paved the way for the Commission to adopt and implement the END in 2002 (EC, 2002a). The main aim of the Directive is "to define a common approach intended to avoid, prevent or reduce on a prioritized basis the harmful effects, including annoyance, due to exposure to environmental noise".

The END obliges the EC to adapt its Annexes I–III (I on noise indicators in addition to  $L_{den}$ <sup>4</sup> and  $L_{night}$ <sup>5</sup>, II on noise assessment methods and III on methods for assessing harmful effects of noise) to technical and scientific progress. While work on revising Annex II was finalized in 2015 and common noise assessment methods were introduced (EC, 2015), revisions of Annex III to establish methods to assess the harmful effects of noise only started in 2015. Annex III would primarily define what exposure–response relationships should be used to assess the effect of noise on populations. EU Member States have already expressed the view that the recommendations from these environmental noise guidelines for the WHO European Region will guide the revision of Annex III. Beside this main directive, few other legislative documents cover different noise sources and other related issues in the EU (EEA, 2014: Annex I).

The Seventh Environment Action Programme, which guides European environment policy until 2020 (EC, 2014a), is committed to safeguarding the EU's citizens from environment-related risks to health by ensuring that by 2020 “noise pollution in the Union has significantly decreased, moving closer to WHO-recommended levels”. A particular requirement for achieving this is “implementing an updated EU noise policy aligned with the latest scientific knowledge, and measures to reduce noise at source, and including improvements in city design”.

In addition to the EU's END, several national governments also have legislation and/or limit values that apply at national and/or regional levels (WHO Regional Office for Europe, 2012). The EEA, through its European Topic Centre on Land Use and Spatial Information, gathers noise exposure data and maintains the Noise Observation and Information Service for Europe, based on strategic noise maps provided by Member States (EEA, 2018). A total of 33 EEA countries, in addition to six cooperating countries in south-eastern Europe, report information on noise exposure to the EEA, following the requirements of the END. The quality and availability of noise exposure assessment differs between EU and non-EU Member States where, even if noise legislation has been harmonized with the Directive, noise mapping and action plans are still at the planning stage (EEA, 2014; 2017a; WHO Regional Office for Europe, 2012).

### 1.2.1 Definition of indicators in the END

The END specifies a number of noise indicators to be applied by Member States in noise mapping and action planning. The most important are  $L_{den}$  and  $L_{night}$ .

The  $L_{den}$  indicator is an average sound pressure level over all days, evenings and nights in a year (EEA, 2010). This compound indicator was adopted by the EU in the END (EC, 2002a). The  $L_{den}$  in decibels (dB) is defined by a specific formula, where:

- $L_{day}$  is the A-weighted long-term average sound level as defined in ISO 1996-1: 2016, determined over all the day periods of a year;
- $L_{evening}$  is the A-weighted long-term average sound level as defined in ISO 1996-1: 2016, determined over all the evening periods of a year; and
- $L_{night}$  is the A-weighted long-term average sound level as defined in ISO 1996-1: 2016, determined over all the night periods of a year (ISO, 2016).

<sup>4</sup> Day-evening-night-weighted sound pressure level as defined in section 3.6.4 of ISO 1996-1:20161 (ISO, 2016).

<sup>5</sup> Equivalent continuous sound pressure level when the reference time interval is the night.

The  $L_{\text{night}}$ , according to the definition in the END, is an equivalent outdoor sound pressure level, measured at the most exposed façade, associated with a particular type of noise source during night time (at least eight hours), calculated over a period of a year (WHO Regional Office for Europe, 2009).

Annex I of the END gives technical definitions for  $L_{\text{den}}$  and  $L_{\text{night}}$ , as well as supplementary noise indicators, which might be useful for monitoring special noise situations. For example, in the case of noisy but short-lived noise like shooting noise or noise emitted by trains,  $L_{\text{A,max}}$  is often used. This is a measure of the maximum sound pressure reached during a defined measurement period. It is used to set noise limits and is sometimes considered in studies to determine certain health effects (such as awakening reactions).

## 1.3 Perceptions of environmental noise in the WHO European Region

### 1.3.1 Trends at the regional level

The general population greatly values the benefits of clean and quiet environments. In Europe, people perceive noise as an important issue that affects human health and well-being (EC, 2008; 2014b). In recent years, several Europe-wide surveys have examined the perception of noise as an issue among the population. Overall, these surveys ask about generic noise, referring to “neighbourhood noise” or “noise from the street”. This type of noise differs significantly in its definition from what is considered “environmental noise” in these guidelines. Nevertheless, in the absence of specific large surveys on perceptions of environmental noise as defined in these guidelines, the results provide insight into the public perception of this issue.

The European quality-of-life surveys, carried out every four years, are unique, pan-European surveys examining both the objective circumstances of lives of European citizens and how they feel about those circumstances and their lives in general. The last (fourth) survey was conducted in 2016–2017, involving nearly 37 000 citizens from all EU Member States and the five candidate countries (Albania, Montenegro, Serbia, the former Yugoslav Republic of Macedonia and Turkey). Respondents were asked whether they had major, moderate or no problems with noise in the immediate neighbourhood of their home. Almost one third (32%) reported problems with noise (ranging from 14% to 51% in individual countries), mainly in cities or city suburbs (49%) (Eurofound, 2017).

A 2010 survey of the then 27 countries in the EU, requested by the EC, showed that 80% of respondents ( $n = 26\ 602$ ) believed that noise affects their health, either to some or to a great extent (EC, 2010).

A Eurobarometer report on attitudes of European citizens towards the environment (EC, 2014b) compiled opinions on various environmental risks from almost 28 000 respondents in 28 EU countries. Results showed that for 15% of respondents, noise pollution is one of the top five environmental issues they are worried about. Furthermore, 17% of respondents said that they lack information about noise pollution.

### 1.3.2 Trends at the national level

Data on perception of specific sources of environmental noise as a problem are not available for the entire WHO European Region. Nevertheless, some countries – including France, Germany, the Netherlands, Slovakia and the United Kingdom – conduct national surveys on noise annoyance, either regularly or on demand (Sobotova et al., 2006; Lambert & Philipps-Bertin, 2008; van Poll et al., 2011; Centraal Bureau voor de Statistiek, 2012; Notley et al., 2014; Umweltbundesamt, 2017).

According to these large-scale surveys, road traffic noise is the most important source of annoyance, generally followed closely by neighbour noise. Aircraft noise can also be a substantial source of annoyance. Railway noise and industrial noise are enumerated less frequently. Only limited data are available on the population's perception of newer sources of noise, such as wind turbines.

While perception surveys do not provide information on actual quantitative relationships between noise exposure and health outcomes, it is important to note that the results of such surveys represent people's preferences and values regarding environmental noise. Despite limitations and an incomplete picture, the available data on perception of environmental noise as a public health problem show concern in Europe. People are not always aware of the health impacts of noise, especially of those related to long-term noise exposure at lower levels. Greater awareness of the issue may further increase positive values and preferences.

## 1.4 Target audience

The environmental noise guidelines for the European Region serve as a reference for an audience made up of different groups, with varied areas of expertise including decision-making, research and advocacy. More specifically, this covers:

- various technical experts and decision-makers at the local, national or international levels, with responsibility for developing and implementing regulations and standards for noise control, urban planning and housing, and other relevant environment and health domains;
- health impact assessment and environmental impact assessment practitioners and researchers;
- national and local authorities responsible for developing and implementing relevant measures and for risk communication;
- nongovernmental organizations and other advocacy groups involved in risk communication and general awareness-raising.

These guidelines are published by the WHO Regional Office for Europe. In terms of their health implications, the recommended exposure levels can be considered applicable in other regions and suitable for a global audience, as a large body of the evidence underpinning the recommendations was derived not only from European noise effect studies but also from research in other parts of the world – mainly in America, Asia and Australia.





## 2. Development of the guidelines

### 2.1 Overview

The process of developing WHO guidelines follows a rigorous methodology and involves several groups with well defined roles and responsibilities (WHO, 2014c). These include: formulation of the scope and key questions of the guidelines; review of the pertinent literature; selection of priority health outcome measures; a systematic review of the evidence; an assessment of certainty of the bodies of evidence resulting from systematic reviews; identification of guideline exposure levels; and setting of the strength of recommendations. Throughout the process, the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach was followed (Morgan et al., 2016).

The development of environmental noise guidelines started in 2013. Following WHO's procedures, the WHO Regional Office for Europe, through its European Centre for Environment and Health in Bonn, Germany, obtained planning approval and established a Steering Group and a Guideline Development Group (GDG). The former was primarily involved in initiating, structuring and executing the guideline development process; the latter was composed of leading experts and end-users, responsible for the process of scoping the guidelines and developing the evidence-based recommendations. During the initiation meeting in October 2013 in Bonn, the GDG members defined the scope of the guidelines, decided on the key questions to be addressed, prioritized health outcomes and set a timeline for completion of the work. Furthermore, authors were appointed for background papers, systematic reviews and different guideline background chapters.

In October 2014 a main evidence review meeting was held between the GDG and the Systematic Review Team in Bern, Switzerland, to discuss the evidence review drafts. In October 2014 and May 2015 the GDG met in Bern and Bonn, respectively, to refine the scope and draft recommendations. The revision and finalization of the systematic reviews of evidence was completed in early 2017. Through a series of remote meetings and teleconferences, the GDG discussed and addressed the remaining outstanding issues and feedback from the peer review of the draft guidelines, and decided on the final formulation of the recommendations. The following sections describe the steps of the guideline development process in detail.

### 2.2 Scope of the guidelines

Defining the scope of the guidelines included the selection of noise sources to be considered, as well as situations in which people are exposed, and noise indicators used for the formulation of recommendations. These guidelines separately consider outdoor exposure to environmental noise from road traffic, railway traffic, aircraft, wind turbines as well as outdoor and indoor exposure during leisure activities (such as attending nightclubs, pubs, fitness classes, live sporting events, concerts or live music venues and listening to loud music through personal listening devices). The guidelines are source specific and not environment specific. They therefore cover all settings where people spend a significant portion of their time, such as residences, educational institutions, workplaces and public venues, although hospital noise is exempted from the list of public institutions owing to the unique characteristics of the population involved.

The GDG agreed not to develop specific recommendations for occupational and industrial noise. Industrial noise can affect both people working at an industrial site and those living in its vicinity. The guidelines do not consider workers' exposure to noise in industrial environments, as these are regulated by workplace standards and may, in some cases, require the wearing of protective equipment or application of other preventive and protective measures. Further, the guidelines do not explicitly consider industrial noise as an environmental noise source, affecting people living in the vicinities of industrial sites. This is mainly due to the large heterogeneity and specific features of industrial noise, and the fact that exposure to industrial noise has a very localized character in the urban population.

Likewise, the current guidelines do not provide specific recommendations for the prevention of health effects linked to neighbourhood noise. Neighbourhood noise may stem from various potential sources of noise (such as ventilation systems; church bells; animals; neighbours; commercial, recreational and occupational activities; or shooting/military). As the sources may be located in close proximity to where people live, they can cause considerable concern even at low levels (Omlin et al., 2011). Several of these sources can also produce low-frequency noise, and as such, require indoor measurements for proper exposure assessment. In general, little scientific research is available on exposure and health outcomes related to neighbourhood noise.

Moreover, the guidelines do not include recommendations about any kind of multiple exposures. In everyday life people are often exposed to noise from several sources at the same time. In Germany, for example, 44% of the population are annoyed by at least two and up to five sources of noise (Umweltbundesamt, 2015). For some health outcomes, such as obesity, new evidence indicates that combined exposure to noise from several means of transportation is particularly harmful (Pyko et al., 2015; 2017).

Research indicates that, alongside exposure to more than one source of noise, combined exposure to different factors – for example, noise and vibration or noise and air pollution – has gained increasing relevance in recent years (Sørensen et al., 2017). The EC estimates that the social cost of noise and air pollution is up to €1 trillion every year (EC, 2016a). WHO acknowledges the need to develop comprehensive models to quantify the effects of multiple exposures on human health. As the main body of evidence on environmental noise still focuses on source-specific impacts of noise on health outcomes and does not incorporate combined exposure effects of multiple noise sources or other pollutants, however, the current guidelines provide recommendations for each source of noise specifically. No attempt has been made to combine noise from multiple sources for any particular health outcome.

### 2.2.1 Key questions

The environmental noise guidelines for the WHO European Region seek to address two main questions, which define the issues addressed by the guideline recommendations.

- In the general population exposed to environmental noise, what is the exposure–response relationship between exposure to environmental noise (reported as various indicators) and the proportion of people with a validated measure of health outcome, when adjusted for confounders?
- In the general population exposed to environmental noise, are interventions effective in reducing exposure to and/or health outcomes from environmental noise?

## 2.2.2 Environmental noise indicators used in the guidelines

From a scientific point of view, the best noise indicator is the one that performs best in predicting the effect of interest. There are, however, a number of additional criteria that may influence the choice of indicator because, for example, various indicators might be suitable for different health end-points and some indicators are more practical to use or easier to calculate than others. Some of these considerations are of a more political nature, as mentioned in the EC's Position paper on EU noise indicators (EC, 2000).

The current guidelines are intended to be suitable for policy-making primarily in the WHO European Region. They are therefore based on the most frequently used average noise indicators in Europe:  $L_{den}$  and  $L_{night}$ . These are often reported by authorities and are used widely for exposure assessment in health effect studies and noise impact assessments in the Region. The  $L_{den}$  (also referred to as "DENL") indicator can be calculated as the A-weighted average sound pressure level, measured over a 24-hour period, with a 10 dB penalty added to the average level in the night (23:00–07:00 or 22:00–06:00), a 5 dB penalty added to the evening (19:00–23:00 or 18:00–22:00) and no penalty added to the daytime period (07:00–19:00 or 06:00–18:00). The penalties are introduced to indicate people's extra sensitivity to noise during the evening and night. The  $L_{night}$  indicator is the A-weighted average sound pressure level, measured over an eight-hour period during night time, usually between 23:00 and 07:00 (EC, 2002a).

In these guidelines,  $L_{den}$  and  $L_{night}$  refer to a measurement or calculation of noise exposure at the most exposed façade, outdoors, reflecting the long-term average exposure. Thus,  $L_{den}$  and  $L_{night}$  represent all the single noise events due to a specific noise source that occur over a longer period of time, such as during a year. Moreover, most health outcomes considered in these guidelines are expected to occur as a result of long-term exposure. It is generally accepted that the most relevant parts of the whole day or night, which especially account for the time when a person is at home, are correctly attributed when using average indicators like  $L_{den}$  or  $L_{night}$ .

The majority of studies that form the body of evidence for the recommendations in these guidelines – among them large-scale epidemiological studies and socioacoustic surveys on annoyance and self-reported sleep disturbance – refer to noise exposure measured outdoors, usually at the most exposed façade of dwellings. Virtually all noise exposure prediction models in use today estimate free-field exposure levels outdoors, and most noise abatement regulations refer to outdoor levels as well. These are the practical reasons why the GDG decided not to recommend any guideline values for noise indoors. Nevertheless, in certain cases it could be helpful to estimate indoor levels based on outdoor values. The differences between indoor and outdoor levels are usually estimated at around 10 dB for open, 15 dB for tilted or half-open and about 25 dB for closed windows. When considering more accurate estimation of indoor levels, using a range of different predictors, the relevant scientific literature can be consulted (Locher et al., 2018).

The GDG was aware of the fact that many countries outside the EU are not bound by the terms of the END (EC, 2002a) and/or use noise indicators other than  $L_{den}$  or  $L_{night}$  in their noise regulations. They still can make use of these guidelines, however, because energy-based average noise indicators are usually highly correlated and "rule of thumb" transformations from one indicator to another are possible with acceptable uncertainty, as long as the conversion accounts for the long-term average



of populations, rather than individual exposure situations. Empirically derived generic conversion terms between a wide range of different noise indicators (including  $L_{den}$ ,  $L_{dn}$ ,  $L_{day}$ ,  $L_{night}$  and  $L_{Aeq,24h}$ ; see the glossary of acoustic terms for further details), with their uncertainty estimates, were published recently (Brink et al., 2018). The GDG encourages the use of these conversions, should the need arise.

In many situations, average noise levels like the  $L_{den}$  or  $L_{night}$  indicators may not be the best to explain a particular noise effect. Single-event noise indicators – such as the maximum sound pressure level ( $L_{A,max}$ )<sup>6</sup> and its frequency distribution – are warranted in specific situations, such as in the context of night-time railway or aircraft noise events that can clearly elicit awakenings and other physiological reactions that are mostly determined by  $L_{A,max}$ . Nevertheless, the assessment of the relationship between different types of single-event noise indicators and long-term health outcomes at the population level remains tentative. The guidelines therefore make no recommendations for single-event noise indicators.

Different noise sources – for example, road traffic noise and railway noise – can be characterized by different spectra, different noise level rise times of noise events, different temporal distributions of noise events and different frequency distributions of maximum levels. Because of the extensive differences in the characteristics of individual noise sources, these guidelines only consider source-specific exposure–response functions (ERFs) and, therefore, formulate only source-specific recommendations.

## 2.3 Evidence base

Based on the overall scope and key questions the current guidelines review the relevant literature in the area of environmental noise and health in order to incorporate significant research undertaken since the publication of previous guidelines. The process of evidence search and retrieval involved several steps. These include the identification, retrieval and synthesis of the evidence, followed by a systematic review and assessment (described in section 2.4).

### 2.3.1 Identification, retrieval and synthesis of evidence

As a first step, the GDG identified key health outcomes associated with environmental noise. Next, it rated the relevance of these health outcomes according to the following three categories:

- critical for assessing environmental noise issues
- important, but not critical for assessing environmental noise issues
- unimportant.

The GDG rated the relevance based on the seriousness and prevalence of the outcomes and the anticipated availability of evidence for an association with noise exposure. The following health outcomes were selected as either critical or important for developing recommendations on the health impacts of environmental noise.

<sup>6</sup>  $L_{A,max}$  is the maximum time-weighted and A-weighted sound pressure level within a stated time interval starting at  $t_1$  and ending at  $t_2$ , expressed in dB.

**Critical health outcome**

Cardiovascular disease  
 Annoyance<sup>7</sup>  
 Effects on sleep  
 Cognitive impairment  
 Hearing impairment and tinnitus

**Important health outcome**

Adverse birth outcomes  
 Quality of life, well-being and mental health  
 Metabolic outcomes

The GDG noted that research into the relationship between noise exposure and its effects on humans brings into focus several questions concerning the definition of health and the boundary between normal social reaction to noise and noise-induced ill health. As stated in WHO's Constitution: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1946). Accordingly, documenting physical health does not present a complete picture of general health; and being undisturbed by noise in all activities, including sleep, constitutes an asset worthy of protection. Therefore, in accordance with the above definition, the GDG regarded (long-term) annoyance and impaired well-being, as well as self-reported sleep disturbance due to noise, as health outcomes.

Regarding sleep disturbance, the health outcome measures considered in these guidelines largely disregard "objective" indicators of sleep disturbance, such as the probability of awakening reactions or other polysomnography parameters. The main reason for this is the nature of the body of evidence on acute, objectively measured effects of noise during sleep. Studies of physiological effects of sleep and especially polysomnographic investigations are complex and resource-demanding; they therefore include only a small number of participants, who are often healthy young volunteers not representative of the general population. For these reasons, the majority of such studies do not meet the requirements for inclusion in the GRADE framework and full-scale meta-analysis, including adjustment for confounders. Furthermore, it is currently unclear how acute physiological reactions that affect the microstructure of sleep but are less well correlated with global sleep parameters, such as total sleep time, are related to long-term health impediments, especially considering the large interindividual differences in susceptibility to noise (Basner et al., 2011).

As sleeping satisfies a basic need and the absence of undisturbed sleep can have serious effects on human health (WHO Regional Office for Europe, 2009), the GDG set self-reported sleep disturbance, in line with the WHO definition of health, as a primary health outcome. Even though self-reported sleep disturbance might differ considerably from objectively measured parameters of sleep physiology, it constitutes a valid indicator in its own right, as it reflects the effects on sleep perceived by an individual over a longer period of time (WHO Regional Office for Europe & JRC, 2011). The importance of considering both annoyance and self-reported sleep disturbance as health outcomes is further supported by evidence indicating that they may be part of the causal pathway of noise-induced cardiovascular and metabolic diseases. This is further elaborated in the narrative review on biological mechanisms (Eriksson et al., 2018).

<sup>7</sup> Noise annoyance is defined as a feeling of displeasure, nuisance, disturbance or irritation caused by a specific sound (Ouis, 2001). In the current guidelines, "annoyance" refers to long-term noise annoyance.

The second step in the evidence retrieval process constituted formulation of the key questions for the critical and important health outcomes and identification of the areas of evidence to be reviewed, following the PICOS/PECCOS approach defined in the WHO handbook for guideline development (WHO, 2014c). PICOS/PECCOS is an evidence-based technique that frames health care-related questions to facilitate the search for suitable studies that can provide answers to the questions at hand (Huang et al., 2006). The PICOS approach divides intervention questions into five elements: population, intervention, comparator, outcome and study design. In exposure studies, PICOS becomes PECCOS, which stands for population, exposure, comparator, confounder, outcome and study design. The specification of the elements of PICOS/PECCOS serves to construct the body of evidence that underpins each recommendation. Due to the complex nature of environmental noise, several distinct areas of evidence were defined to address each of the scoping questions comprehensively.

For each of the critical and important health outcomes a systematic review was conducted (see also section 2.3.2). Health outcomes regarded as important were given less weight in the decision-making process than critical ones. Inclusion and exclusion criteria to be regarded in the systematic evidence reviews were defined in accordance with the PICOS/PECCOS framework for the evaluation of evidence (see Table 1). All evidence that met the inclusion criteria was included in the systematic reviewing process. A detailed description of the types of measure for each of the health outcomes under consideration is provided in the protocol for conducting the systematic reviews (Héroux & Verbeek, 2018a). See Annex 2 for details of all background documents and systematic reviews used in preparation of these guidelines.

**Table 1. Inclusion and exclusion criteria for evidence reviews of health effects of environmental noise**

| Category    | Inclusion criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Exclusion criteria                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Populations | <ul style="list-style-type: none"> <li>• Members of the general population</li> <li>• Specific segments of the population particularly at risk (children or vulnerable groups)</li> <li>• People exposed to noise in occupational settings (if relevant with combined exposure to environmental noise)</li> </ul>                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Does not meet inclusion criteria</li> </ul>                                                                                                                                                                                                                                                                                                                        |
| Exposure    | <ul style="list-style-type: none"> <li>• Noise exposure levels, either measured or calculated and expressed in dB values</li> <li>• Representative of the individual exposure of study participants (for most observational studies the dwelling location or home)</li> <li>• Calculated levels for transportation noise (road, rail, air) based on traffic data reflecting the use of roads, railway lines and in- and outbound flight routes at airports</li> </ul> | <ul style="list-style-type: none"> <li>• Does not meet inclusion criteria; in particular:               <ul style="list-style-type: none"> <li>- studies using hearing loss or hearing impairment as a proxy for (previous) noise exposure</li> <li>- surveys assessing noise exposure or number of listening hours based on subjective ratings given by subjects in a questionnaire</li> </ul> </li> </ul> |
| Confounders | <ul style="list-style-type: none"> <li>• No inclusion criteria applied since the relationship between exposure to noise and a health outcome can be confounded by other risk factors; however, possible confounders taken into account were assessed for every study</li> </ul>                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• No exclusion criteria applied; however, possible confounders taken into account were assessed for every study</li> </ul>                                                                                                                                                                                                                                           |



Table 1. contd.

| Category    | Inclusion criteria                                                                                                                                                                                                                                                                                                              | Exclusion criteria                                                                   |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Outcomes    | <ul style="list-style-type: none"> <li>• Adverse birth outcomes</li> <li>• Annoyance</li> <li>• Cardiovascular disease</li> <li>• Cognitive impairment</li> <li>• Effects on sleep</li> <li>• Hearing impairment and tinnitus</li> <li>• Metabolic outcomes</li> <li>• Quality of life, mental health and well-being</li> </ul> | <ul style="list-style-type: none"> <li>• Does not meet inclusion criteria</li> </ul> |
| Study types | <ul style="list-style-type: none"> <li>• Cohort studies</li> <li>• Case-control studies</li> <li>• Cross-sectional studies</li> <li>• Ecological studies (only for cardiovascular disease)</li> </ul>                                                                                                                           | <ul style="list-style-type: none"> <li>• Does not meet inclusion criteria</li> </ul> |

Alongside the systematic reviews of the critical and important health outcomes, the GDG decided to review the evidence on health effects from noise mitigation measures and interventions to reduce noise levels in order to inform and complement the recommendations.

Interventions on environmental noise were defined according to five broad categories based on the available intervention literature and the experience of decades of environmental noise management (see Table 2 and Brown & van Kamp, 2017).

Table 2. Types of noise intervention

| Intervention type | Intervention category         | Intervention subcategory                                                                                                                                                                                |
|-------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A                 | Source intervention           | <ul style="list-style-type: none"> <li>• change in emission levels of sources</li> <li>• time restrictions on source operations</li> </ul>                                                              |
| B                 | Path intervention             | <ul style="list-style-type: none"> <li>• change in the path between source and receiver</li> <li>• path control through insulation of receiver/receiver's dwelling</li> </ul>                           |
| C                 | New/closed infrastructure     | <ul style="list-style-type: none"> <li>• opening of a new infrastructure noise source</li> <li>• closure of an existing one</li> <li>• planning controls between (new) receivers and sources</li> </ul> |
| D                 | Other physical intervention   | <ul style="list-style-type: none"> <li>• change in other physical dimensions of dwelling/neighbourhood</li> </ul>                                                                                       |
| E                 | Behaviour change intervention | <ul style="list-style-type: none"> <li>• change in individual behaviour to reduce exposure</li> <li>• avoidance or duration of exposure</li> <li>• community education, communication</li> </ul>        |

The GDG recognized that nonacoustic factors are an important possible confounder in both ERFs between noise levels and critical health effects and the effects of acoustic interventions on health outcomes. Whereas the inclusion criteria for confounders were not specified in PECCOS for the systematic reviews of evidence, they were considered at the stage of assessing the quality of

evidence, using the GRADE approach. Depending on the health effect under investigation, possible nonacoustic factors may include:

- gender
- age
- education
- subjective noise sensitivity
- extroversion/introversion
- general stress score
- co-morbidity
- length of residence
- duration of stay at dwelling in the day
- window orientation of a bedroom or living room towards the street
- personal evaluation of the source
- attitudes towards the noise source
- coping capacity with respect to noise
- perception of malfeasance by the authorities responsible
- body mass index
- smoking habits.

In noise annoyance studies nonacoustic factors may explain up to 33% of the variance (Guski, 1999). The higher the quality of evidence, the lower confounding effects of nonacoustic factors may be expected. Nevertheless, as with measurement errors, confounding cannot be avoided.

Based on the retrieval and evaluation of the pertinent literature, the GDG decided to address the association of environmental noise from different sources and health outcomes separately and individually for each source of noise, and for critical and important health outcomes.

In addition to the systematic reviews of the health effects of environmental noise, a narrative review of biological mechanisms of nonauditory effects was conducted (Eriksson et al., 2018). This covers literature related to pathways for nonauditory effects and provides supporting evidence on the association between environmental noise and health outcomes in humans, especially related to cardiovascular and metabolic diseases.

### 2.3.2 Systematic reviewing process

After the retrieval of the evidence based on the PICOS/PECCOS approach, systematic reviews were conducted for all critical and important health outcomes. To meet the demands of the diverse and broad nature of the evidence, it was agreed that systematic reviews could vary in type. For some areas of evidence, a novel and fully fledged systematic reviewing process was needed to summarize the existing evidence; for others, the reviewing process could build upon existing (and mostly published) systematic reviews and summaries of evidence. Thus, the process consisted of two phases.



First, a comprehensive search was conducted for available systematic reviews and meta-analyses on environmental noise effects published after 2000. Each of the reviews was assessed for both relevance and quality. To be included in the evidence review process, studies from these reviews were required to meet a high quality standard, judged according to high scores of the AMSTAR checklist.<sup>8</sup> In cases where quality criteria were met but the review was older than two years (published before 2012), the search of the systematic review was updated to include new papers. If no good quality systematic reviews were available, a new search for original papers was conducted. The Systematic Review Team decided how the results would affect the search strategy for individual studies as part of the second phase. This was based on the assessment of the quality of the systematic reviews and on the coherence between the main research questions of the systematic reviews and the scope of the work of the guidelines.

In the second phase a search for individual papers was conducted, with the search strategy adapted according to the outcome of the first phase. As availability of systematic reviews and meta-analyses differed for the various health outcomes considered in the guidelines, this process varied for each evidence review. The search included cohort studies, case-control studies and cross-sectional studies of people exposed to environmental noise. Where relevant – for example, for the health outcome cardiovascular disease – the search also included ecological studies.

Due to the individualized retrieval of evidence for each of the systematic reviews, the time frames of the literature included varied. An indication of the temporal coverage of the studies included in different systematic review is provided in the relevant tables in Chapter 4.

A detailed description of the methodology used to conduct the systematic evidence reviews, including individual protocols for the reviews of health effects resulting from environmental noise and from noise interventions, is available (Héroux & Verbeek, 2018b). Furthermore, all systematic reviews conducted in the guideline development process are publicly available in the open-access journal *International Journal of Environmental Research and Public Health*:

- systematic review of transport noise interventions and their impacts on health (Brown & van Kamp, 2017);
- systematic review on environmental noise and adverse birth outcomes (Nieuwenhuijsen et al, 2017);
- systematic review on environmental noise and annoyance (Guski et al., 2017);
- systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018);
- systematic review on environmental noise and cognition (Clark & Paunovic, 2018);
- systematic review on environmental noise and effects on sleep (Basner & McGuire, 2018);
- systematic review on environmental noise and permanent hearing loss and tinnitus (Śliwińska-Kowalska & Zaborowski, 2017);
- systematic review on mental health and well-being (Clark & Paunovic, in press).

<sup>8</sup> AMSTAR is an instrument used to assess quality of evidence; it stands for “A Measurement Tool to Assess systematic Reviews” (Shea et al., 2007).

## 2.4 From evidence to recommendations

Once the evidence had been identified and synthesized, the Systematic Review Team assessed its quality. Subsequently, the GDG formulated recommendations, guided by this assessment and consideration of a number of other factors recognized as important. To facilitate the formulation of recommendations, it first prioritized the health outcome measures of the critical and important outcomes. A process was developed to identify the guideline exposure levels from each of the ERFs provided by the systematic reviews of evidence.

The following sections describe the assessment of the overall quality of the evidence based on the GRADE approach, selection of priority health outcome measurements, identification of guideline exposure levels and setting the strength of recommendations.

### 2.4.1 Assessment of overall quality of a body of evidence: the GRADE approach

As set out in the WHO handbook for guideline development (WHO, 2014c), the main framework for producing evidence-informed recommendations is the GRADE approach (Guyatt et al., 2008). This is used to assess the quality of a body of evidence synthesized in a systematic review. The assessment facilitates judgements about the certainty of effect estimates, which increases with the quality of the body of evidence. The quality can be rated high, moderate, low or very low (see Box 1).

#### Box 1 GRADE interpretations of quality of evidence

- **High quality:** further research is very unlikely to change the certainty of the effect estimate
- **Moderate quality:** further research is likely to have an important impact on the certainty of the effect estimate and may change the estimate
- **Low quality:** further research is very likely to have an important impact on the certainty of the effect estimate and is likely to change the estimate
- **Very low quality:** any effect estimate is uncertain

The original GRADE approach was developed specifically to rate the body of evidence resulting from a review of intervention studies. The initial quality level is set by study design: randomized control trials (RCTs) are considered high quality, whereas observational (nonrandomized) study designs are low quality. Then five factors are considered for downgrading the quality of the body of evidence resulting from RCTs or observational studies, and three factors are considered for upgrading the body of evidence resulting from observational studies alone.

The following five factors are used for downgrading the quality of evidence by one or two levels:

- study limitations or risk of bias in all studies that make up the body of evidence
- inconsistency of results between studies
- indirectness of evidence in the studies
- imprecision of the pooled effect estimate
- publication bias detected in a body of evidence.

The following three factors are used for upgrading the quality of evidence:

- high magnitude of the pooled effect
- direction of residual confounding and biases opposes an effect (i.e. when all plausible confounders are anticipated to reduce the estimated effect and there is still a significant effect)
- exposure–response gradient.

The GRADE approach was originally developed for application in the field of clinical medicine, where the majority of studies are randomized trials. However, to assess health effects resulting from an exposure such as environmental noise, randomized controlled trials are not applicable, as it would be unethical to expose participants deliberately to possibly harmful risk factors. The limitations of the application of GRADE to environmental health have been recognized and discussed in the literature (Morgan et al., 2016). Other types of study design dominate the evidence base in the domain of environmental noise research, so it was necessary to adapt the original GRADE approach to the subject of the current guidelines, as follows.

Instead of using the RCT study design as the starting-point for the quality rating, the study design most applicable and available for the field of research at hand was used. Thus, for evidence on the association between noise exposure and clinical health outcome measures, the rating of an evidence base consisting of cohort and case-control studies<sup>9</sup> was initially rated high quality. Cross-sectional studies and ecological studies were rated low quality and very low quality, respectively. This initial point of departure was only adapted for the evidence of the association between noise exposure and annoyance and sleep disturbance. Here, cross-sectional studies were rated high quality because annoyance and sleep disturbance are regarded as an immediate effect of exposure to environmental noise. Finally, in accordance with the original GRADE approach, the starting-point for evidence on the effect of interventions was rated low quality for observational studies. After determining the point of departure, the evidence base was rated down or up whenever one or more of the criteria for downgrading or upgrading (described above) were met. Each of the systematic reviews commissioned for these guidelines includes a detailed report on the assessment of the quality of the evidence.

A detailed discussion of the adaptations of GRADE is provided in the separate methodology publication (Héroux & Verbeek, 2018b).

## 2.4.2 Selection of priority health outcomes

In line with the WHO handbook for guideline development (WHO, 2014c), the GDG selected the key health outcomes associated with environmental noise at the beginning of the evidence retrieval process, and the systematic reviews were commissioned accordingly. The selection of health outcomes was based on the available evidence for the association between environmental noise and the specific outcome, as well as public concern about the health outcome resulting from noise exposure. The following health outcomes were rated critical: cardiovascular disease, annoyance,

<sup>9</sup> In the context of the current guidelines, “cohort studies” refer to longitudinal studies in which the occurrence of the outcome of interest in an exposed group is compared to the occurrence of that outcome in a reference group with no or lower exposure over time.



effects on sleep, cognitive impairment and hearing impairment and tinnitus. Adverse birth outcomes, quality of life, well-being and mental health, and metabolic outcomes were rated important (see also section 2.3.1).

Since all these health outcomes can be measured in various ways, the GDG evaluated each individually and prioritized different outcome measures for each in terms of their representativeness and validity. These measures were used to derive the guideline exposure levels; their prioritization was based on the impact of the disease and the disability weights (DWs) associated with the health outcome measure.<sup>10</sup>

The critical health outcomes, priority outcome measures identified and justifications for their selection are listed in Table 3.

**Table 3. Critical health outcomes, outcome measures identified and justifications for selection**

| Critical health outcome              | Critical health outcome measures (priority measures marked in bold)                                                                                                                                                                                                                                                                                                                                                             | Justification for selection                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cardiovascular disease ( $L_{den}$ ) | Self-reported or measured prevalence, <b>incidence</b> , hospital admission or mortality due to: <ul style="list-style-type: none"> <li>• <b>ischaemic heart disease (IHD) (including angina pectoris and/or myocardial infarction)</b></li> <li>• <b>hypertension</b></li> <li>• stroke</li> </ul>                                                                                                                             | Except for self-reports, these are objective measures of the outcome, affect a large proportion of the population, have important health consequences and can lead to more severe diseases and/or mortality.<br>DW for IHD: 0.405.<br>DW for hypertension: 0.117.                                                                                                                                                                                                               |
| Effects on sleep ( $L_{night}$ )     | <ul style="list-style-type: none"> <li>• <b>percentage of the population highly sleep-disturbed (%HSD)</b>, self-reported, assessed with a standardized scale</li> <li>• polysomnography measured outcomes (probability of additional awakenings)</li> <li>• cardiac and blood pressure outcome measures during sleep</li> <li>• motility measured sleep outcomes in adults</li> <li>• sleep disturbance in children</li> </ul> | This is the most meaningful, policy-relevant measure of this health outcome. Self-reported sleep disturbances are a very common problem in the general population: they affect quality of life directly and may also lead to subsequent health impediments. Effects on sleep may be in the causal pathway to cardiovascular disease. This measure is not a proxy for physiological sleep quality parameters but is an important outcome in its own right.<br>DW for %HSD: 0.07. |
| Annoyance ( $L_{den}$ )              | <ul style="list-style-type: none"> <li>• <b>percentage of the population highly annoyed (%HA), assessed with standardized scale</b></li> <li>• percentage annoyed, preferably assessed with standardized scale</li> </ul>                                                                                                                                                                                                       | This is the most objective measure of this health outcome. Large proportions of the population are affected by noise annoyance, even at relatively low exposure levels. Annoyance may be in the causal pathway to cardiovascular disease.<br>DW for %HA: 0.02.                                                                                                                                                                                                                  |



<sup>10</sup> DWs are ratings that vary between 0 and 1, in which 0 indicates no disability and 1 indicates the maximum amount of disability. The rates are derived from large population surveys in which people are asked to rank a specific disease for its impact on several abilities. The DWs have been proven useful in calculating the burden of disease.

Table 3. contd.

| Critical health outcome                                                  | Critical health outcome measures (priority measures marked in bold)                                                                                                                                                                                                                                              | Justification for selection                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cognitive impairment ( $L_{den}$ )                                       | <ul style="list-style-type: none"> <li>• <b>reading and oral comprehension, assessed with tests</b></li> <li>• impairment assessed with standardized tests</li> <li>• short and long-term memory deficit</li> <li>• attention deficit</li> <li>• executive function deficit (working memory capacity)</li> </ul> | <p>This outcome measure is the most meaningful: it can affect vulnerable individuals (children) and have a significant impact later in life.</p> <p>DW for impaired reading and oral comprehension: 0.006.</p>                                                                                                                                    |
| Hearing impairment and tinnitus ( $L_{Aeq}^{11}$ and $L_{AF,max}^{12}$ ) | <ul style="list-style-type: none"> <li>• <b>permanent hearing impairment, measured by audiometry</b></li> <li>• permanent tinnitus</li> </ul>                                                                                                                                                                    | <p>This outcome measure can affect vulnerable individuals (children) and have a significant impact later in life. It is the most objective measure for which there is an ISO standard (ISO, 2013), specifying how to estimate noise-induced hearing loss.</p> <p>DW for mild severity level (threshold at 25 dB) for childhood onset: 0.0150.</p> |

Table 4 provides a list of the important health outcomes along with the corresponding health outcome measures included in the systematic reviews. There was no prioritization of health outcome measures leading to justification of selection, since important health outcomes had less impact on the development of recommendations.

Table 4. Important health outcomes and health outcome measures reviewed

| Important health outcome                                    | Health outcome measures reviewed                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adverse birth outcomes ( $L_{den}$ )                        | <ul style="list-style-type: none"> <li>• pre-term delivery</li> <li>• low birth weight</li> <li>• congenital anomalies</li> </ul>                                                                                                                                                                                                                                                                                                |
| Quality of life, well-being and mental health ( $L_{den}$ ) | <ul style="list-style-type: none"> <li>• self-reported health and quality of life</li> <li>• medication intake for depression and anxiety</li> <li>• self-reported depression, anxiety and psychological distress</li> <li>• interviewer-assessed depressive and anxiety disorders</li> <li>• emotional and conduct disorders in children</li> <li>• children's hyperactivity</li> <li>• other mental health outcomes</li> </ul> |
| Metabolic outcomes ( $L_{den}$ )                            | <p>prevalence, incidence, hospital admission or mortality due to:</p> <ul style="list-style-type: none"> <li>• type 2 diabetes</li> <li>• obesity</li> </ul>                                                                                                                                                                                                                                                                     |

<sup>11</sup>  $L_{Aeq}$  is an A-weighted, equivalent continuous sound pressure level during a stated time interval starting at t1 and ending at t2, expressed in dB, of a noise at a given point in space.

<sup>12</sup>  $L_{AF,max}$  is the maximum time-weighted and A-weighted sound pressure level with FAST time constant within a stated time interval starting at t1 and ending at t2, expressed in dB.

### 2.4.3 Identification of guideline exposure levels for each noise source

The GDG agreed to set guideline exposure levels based on the definition: “noise exposure levels above which the GDG is confident that there is an increased risk of adverse health effects”. The identification of guideline values for each of the specific noise sources involved five distinct steps:

1. assessment of the validity of ERFs resulting from the systematic reviews of the effects of noise on each of the critical and important health outcomes;
2. assessment of the lowest noise level measured in the studies included in each of the corresponding systematic reviews;
3. assessment of the smallest risk or relative risk (RR) increase for each of the adverse health outcomes considered relevant;
4. determination of the guideline exposure level based on the ERF, starting from the lowest level measured (see step 2) and associated with the smallest relevant risk increase for adverse health outcomes (see step 3);
5. comparison of the guideline exposure levels calculated for each of the critical health outcomes of one source (for example, incidence of IHD, incidence of hypertension, %HA, permanent hearing impairment and reading and oral comprehension for road traffic noise): selection of the guideline exposure level for each noise source was based on the priority health outcome measure with the lowest exposure level for that source.

To define an “increased risk” to set the guideline exposure level, the GDG made a judgement about the smallest risk or RR of the adverse health effect it considered relevant for each of the priority health outcome measures. It is important to note that the relevant risk increases are benchmark values. The GDG agreed to set them in accordance with the guiding principles it had developed, to provide guideline values that illustrate an increased risk of adverse health effects. It used expert judgements for the determination of the benchmark values; these are elaborated further in section 2.4.3.2.

The guideline exposure levels presented are therefore not meant to identify effect thresholds (the lowest observed adverse effect levels for different health outcomes). This is a difference in approach from prior WHO guidelines, like the night noise guidelines for Europe (WHO Regional Office for Europe, 2009), which explicitly aimed to define levels indicating no adverse health effects. The approach to making choices about relevant risk increases is outlined below and summarized in Table 5.

For IHD and hypertension, RR increases were considered; for annoyance and sleep disturbance, absolute risks of %HA and %HSD were considered; and for reading and oral comprehension an average delay of reading age was defined. For the cardiovascular outcomes, incidence measures were prioritized, although much of the epidemiological evidence was based on prevalence data – particularly for hypertension – where almost no longitudinal studies were available. Prevalence data are generally derived from cross-sectional studies, where the temporal aspects are difficult to determine.

Table 5. Priority health outcomes and relevant risk increases for setting guideline levels

| Priority health outcome measure (associated DW) | Relevant risk increase considered for setting of guideline level |
|-------------------------------------------------|------------------------------------------------------------------|
| Incidence of IHD (DW: 0.405)                    | 5% RR increase                                                   |
| Incidence of hypertension (DW: 0.117)           | 10% RR increase                                                  |
| %HA (DW: 0.02)                                  | 10% absolute risk                                                |
| %HSD (DW: 0.07)                                 | 3% absolute risk                                                 |
| Permanent hearing impairment (DW: 0.0150)       | No risk increase due to environmental noise                      |
| Reading and oral comprehension (DW: 0.006)      | One-month delay in terms of reading age                          |

The DWs used to rank the priority critical health outcomes measures were retrieved from the relevant literature. For cardiovascular disease as a group and for hypertension, the burden of disease from environmental noise values (WHO Regional Office for Europe & JRC, 2011) were not considered applicable by the GDG for these guidelines. Thus, for cardiovascular disease, the DW value (DW: 0.405) specifically applied to acute myocardial infarction in the publication outlining the data sources, methods and results of the global burden of disease in 2002 (Mathers et al., 2003) was retained. Since hypertension is mainly viewed as an important risk factor and not as a health outcome, no general DW has been developed. The only other available DW value available is the DW of 0.117 for hypertensive episodes in pregnancy (Mathers et al., 1999). In the absence of any general DW, the GDG agreed on a conservative approach and decided to use this value.

The DWs for high sleep disturbance (DW: 0.07), high annoyance (DW: 0.02) and impaired reading and oral comprehension (DW: 0.006) were developed in the context of calculating the burden of disease from environmental noise (WHO Regional Office for Europe & JRC, 2011). The DW for hearing impairment was not included in that publication, but it was available from the technical paper on the burden of disease from environmental noise (WHO, 2013); the DW for permanent hearing impairment ranged from 0.0031 to 0.3342, depending on severity level. Environmental noise (leisure noise) contributes to the cumulative total noise exposure throughout the life-course, which may lead to permanent hearing impairment and cause more severe disability in the later years of life. As a result, the GDG selected a DW of 0.0150 for moderate severity level ("has difficulty following a conversation in a noisy environment, but no other hearing problems"). For cognitive impairment, the DW was derived from the estimates of the burden of disease from environmental noise (WHO Regional Office for Europe & JRC, 2011). This was at a very conservative value (DW: 0.006) for noise-related impairment of children's cognition, equivalent to a DW for contemporaneous cognitive deficit in the context of a range of cognitive impairments in children ranging from 0.468 for Japanese encephalitis to 0.024 for iron deficiency anaemia (Lopez et al., 2006).

#### 2.4.3.1 Development of ERFs

The systematic reviews of evidence provided either an ERF or other noise exposure value/metric that could be related to a risk increase of the health outcome measure. These ERFs were used to develop guideline exposure levels; however, only those functions where noise exposure demonstrated a statistically significant effect were used.

To obtain the starting level of the ERFs derived in the systematic reviews, a weighted average of the lowest exposure values measured in the individual studies included in the meta-analyses was

calculated. The weighting used the inverse of the variance of the effect estimate of the study. Thus, the lowest exposure value of studies with a small variance (usually with the largest sample size) contributed the most to the assumed onset of the ERF.

#### **2.4.3.2 Relevant risk increase of adverse health effects**

The following sections describe in detail the rationale for the selection of the relevant relative risk (RR) increase percentage for each of the priority health outcome measures considered.

##### **Cardiovascular disease: IHD and hypertension**

High-quality epidemiological evidence described in the systematic review on cardiovascular and metabolic effects of environmental noise indicates that exposure to road traffic noise increases the risk of IHD (van Kempen et al., 2018). The GDG was confident that health risks result from exposure at an RR increase in the order of 5–10% in the incidence of IHD. This is similar to the reasoning in the WHO air quality guidelines for fine particulate matter (PM<sub>2.5</sub>) (WHO, 2006). To determine a relevant risk increase for IHD, the GDG took as a starting-point the RR increase of 5% measured in epidemiological studies of environmental noise or air pollution. Taking into account the incidence of IHD and the seriousness of the disease, it considered lowering the RR increase for IHD to 1%, as a 5% RR increase might imply a comparatively high absolute risk from a population perspective. To decide on the final benchmark value for IHD, several aspects were considered: the number of people in a population affected by IHD; whether health risks caused by noise would make up a large part of the incidence of the disease; other examples of health risks of similar magnitude leading to preventive action. For IHD, in an average EU country with 20 million inhabitants, an RR increase of 5% for IHD would lead to several thousand extra cases attributable to noise yearly. This corresponds to a proportion of cases of IHD attributable to noise exposure of less than 10%, which is still relatively small. After extensive discussion at the very end of the guideline development process, the GDG decided to adhere to 5% as the relevant risk increase.

Hypertension is a common condition and is an important risk indicator for IHD and other cardiovascular diseases. Thus, the hypertension risk increase can be transformed into a risk increase for cardiovascular disease. To derive a relevant risk increase, the GDG focused on the incidence of hypertension, owing to the nature and quality of epidemiological evidence. Since hypertension is less serious than IHD, and not all people with hypertension will progress to cardiovascular disease, the relevant risk increase in the incidence of hypertension needed to be higher than that for IHD. Therefore, the GDG agreed on an RR increase of 10% for hypertension.

##### **Self-reported sleep disturbance and annoyance**

The GDG initially considered 5%HSD and 10%HA due to noise as relevant absolute risks, not to be exceeded at the guideline level. After discussion, however, members agreed that these absolute risks were too large, since a considerable proportion of the population would still be affected; they decided to lower the relevant risk from 5% being highly sleep-disturbed to 3%. In doing so, the GDG referred to the WHO night noise guidelines (WHO, 2009), which concluded that while there was insufficient evidence that physiological effects at noise levels below 40 dB  $L_{\text{night}}$  are harmful to health, there were observed adverse health effects at levels starting from 40 dB  $L_{\text{night}}$ . At 40 dB, about 3–4%



(depending on the noise source) of the population still reported being highly sleep-disturbed due to noise, which was considered relevant to health. The GDG considered it important that this level is consistent with the previous health-based approach adopted by the WHO night noise guidelines, and agreed that the absolute risk associated with the guideline value selected should not exceed 3%HSD to be health protective.

For annoyance, which is considered a less serious health effect than self-reported sleep disturbance (as indicated by the respective DWs), the relevant risk remained at 10%HA. This means the absolute risk associated with the guideline value selected should be closest to, but not above 10%HA, to be health protective.

### Cognitive impairment: reading and oral comprehension

Acquiring skills in reading and oral comprehension at a young age is important for further development: a delay in acquiring these skills can have an impact later in life (Wilson & Lonigan, 2010). This impact cannot be predicted very accurately, but the GDG considered a delay of one month a relevant absolute risk.

### Permanent hearing impairment

The literature on hearing impairment as a result of occupational noise exposure is extensive. A noise exposure level beyond 80 dB during 40 years of working a 40 hour work week can give rise to permanent hearing impairment. Given that environmental exposure to noise is much lower than these levels and that noise-related hearing impairments are not reversible, the GDG considered that there should be no risk of hearing impairment due to environmental noise and considered any increased risk of hearing impairment relevant.

## 2.4.4 Strength of the recommendations

Finally, having determined the guideline exposure levels based on the ranking of prioritized health outcome measures, setting the strength of the recommendation was set as the final step of the guideline development process. This was also guided by the GRADE methodology (Alonso-Coello et al., 2016a; 2016b). According to this approach, strength of recommendation can be set as either strong or conditional (WHO, 2014c).

- A **strong** recommendation can be adopted as policy in most situations. The guideline is based on the confidence that the desirable effects of adherence to the recommendation outweigh the undesirable consequences. The quality of evidence for a net benefit – combined with information about the values, preferences and resources – inform this recommendation, which should be implemented in most circumstances.
- A **conditional** recommendation requires a policy-making process with substantial debate and involvement of various stakeholders. There is less certainty of its efficacy owing to lower quality of evidence of a net benefit, opposing values and preferences of individuals and populations affected or the high resource implications of the recommendation, meaning there may be circumstances or settings in which it will not apply.

The GRADE approach defines a number of parameters that should be assessed to determine the strength of recommendations: quality of evidence, balance of benefits and harms, values and preference related to the outcomes of interventions to exposure, resources implications, priority of the problem, equity and human rights, acceptability and feasibility (Box 2; Morgan et al., 2016).

### Box 2 Parameters determining the strength of a recommendation

**Quality of evidence** further represents the confidence in the estimates of effect of the evaluated evidence, across outcomes critical and important to decision-making. The higher the quality of evidence, the greater the likelihood of a strong recommendation.

**Balance of benefits and harms** requires an evaluation of the absolute effects of both benefits and harms (or downsides) of the intervention or exposure and their importance. The greater net benefit or net harm associated with an intervention or an exposure, the greater the likelihood of a strong recommendation in favour or against an intervention or exposure.

**Values and preferences related to the outcomes of an intervention or exposure** set out the relative importance assigned to health outcomes by those affected by them; how such importance varies within and across populations; and whether this importance or variability is surrounded by uncertainty. The less uncertainty or variability there is about the values and preferences of people experiencing the critical or important outcomes, the greater the likelihood of a strong recommendation.

**Resource implications** take into consideration how resource-intensive and how cost-effective and substantially beneficial an intervention or exposure is. The more advantageous or clearly disadvantageous the resource implications are, the greater the likelihood of a strong recommendation either for or against the intervention or exposure.

**The priority of the problem** is determined by its importance and frequency (the burden of disease, disease prevalence or baseline risk). The greater the importance of the problem, the greater the likelihood of a strong recommendation.

**Equity and human rights** considerations are an important aspect of the process. The greater the likelihood that the intervention will reduce inequities, improve equity or contribute to the realization of one or several human rights as defined under the international legal framework, the greater the likelihood of a strong recommendation.

**Acceptability** plays a prominent role: the greater the acceptability of an option to all or most stakeholders, the greater the likelihood of a strong recommendation.

**Feasibility** overlaps with values and preferences, resource considerations, existing infrastructures, equity, cultural norms, legal frameworks and many other considerations. The greater the feasibility of an option from the standpoint of all or most stakeholders, the greater the likelihood of a strong recommendation.

The GDG evaluated the strength of the recommendations based on these parameters, following a two-step procedure. Initially, the strength of each recommendation was set as strong or conditional based on an assessment of the quality of evidence. The GDG then identified and assessed contextual

parameters that might have a contributory role (see Box 2 above). Based on this qualitative evaluation, the initial recommendation strength was either adapted or confirmed. It is important to note that while the initial parameter “quality of evidence” was informed by comprehensive systematic reviewing processes, the remaining contextual parameters were assessed by the informed qualitative expert judgement of the GDG.

Furthermore, the GDG agreed to decision-making rules, applied when formulating the recommendations. An evidence rating of low quality or very low quality would lead only to a conditional recommendation. Setting a strong recommendation was only considered if the evidence was at least moderate quality. The final recommendations were formulated based on the consideration of all the parameters and decision rules adopted by the GDG. A detailed exploration of all the recommendations is set out in Chapter 3.

## 2.5 Individuals and partners involved in the guideline development process

The process of WHO guideline development is conducted by several groups with clearly defined roles and responsibilities. Comprising WHO staff members, experts and stakeholders, these are the Steering Group, the GDG, the Systematic Review Team and the External Review Group.

The **Steering Group** includes WHO staff members with different affiliations but whose work experience is relevant to the topic of environmental noise and associated health outcomes. It is involved at all stages of planning, selecting members of the GDG and External Review Group, reviewing evidence and developing potential recommendations at the main expert meetings, as well as ongoing consultation on revisions following peer review. Details of the members of the Steering Group are listed in Table A1.1 in Annex 1.

The **GDG** consists of a group of content experts gathered to investigate all aspects of evidence contributing to the recommendations, including expertise in evidence-based guideline development. This Group defined the key questions and priorities of the research, chose and ranked outcomes and provided advice on any modifications of the scope as established by the Steering Group. The members also outlined the systematic review methods; appraised the evidence used to inform the guidelines; and advised on the interpretation of this evidence, with explicit consideration of the overall balance of benefits and harms. Ultimately the GDG formulated the final recommendations, taking into account the diverse values and preferences of individuals and populations affected. It also determined the strength of the results and responded to external peer reviews. The complete list of GDG members and their specific roles, affiliations and areas of expertise are listed in Table A1.2 in Annex 1.

The **Systematic Review Team** includes experts in the field of environmental health, commissioned by WHO staff to undertake systematic reviews of evidence. The GDG recommended a number of authors to conduct the evidence reviews and summary chapters, based on their expertise. Details of the members of the Systematic Review Team are included in Table A1.3 in Annex 1.

The **External Review Group** is composed of technical content experts and end-users as well as stakeholders, and is balanced geographically and by gender. The experts and end-users were selected for their expertise in the field, and the Group also included representatives of professional groups and industry associations, who will be implementing the guidelines. Members were asked to



review the material at different stages of the development process. The list of technical experts and stakeholders is provided in Tables A1.4 and A1.5, respectively, in Annex 1.

Management of conflict of interest is an integral part of WHO's guideline development procedure. All members of the GDG and authors of the evidence reviews completed WHO declaration of interest forms. These were reviewed by the WHO Secretariat for potential conflicts of interest. A number of conflicts of interest were declared in the forms, but following a standardized management review it was not found necessary to exclude any members of the GDG or authors from their respective roles. Members of the External Review Group (technical experts only) were also asked to complete the form when invited to participate.

In addition, at the start of the meeting of the GDG all members of the GDG received a briefing about the nature of all types of conflict of interest (financial, academic/intellectual and nonacademic) and were asked to declare to the meeting any conflicts they might have. No member of the GDG or the Systematic Review Team was excluded from his/her respective role. A summary of the conflict of interest management is presented in Annex 3.

The GDG set its own rules on how it would work and how contentious issues should be resolved – for instance, by means of a vote. The main decision-making mechanism involved reaching consensus; if a vote was required, the experts involved in developing the underlying evidence for the specific recommendation were excluded from voting, and an agreement was reached via a two thirds majority of the rest of the group.

## 2.6 Previously published WHO guidelines on environmental noise

Prior to this publication, WHO published community noise guidelines (CNG) in 1999 (WHO, 1999) and night noise guidelines for Europe (NNG) in 2009 (WHO Regional Office for Europe, 2009).

### 2.6.1 CNG

The scope of WHO's efforts to develop the CNG in 1999 was similar to that for the current guidelines. The objective was then formulated as: "to consolidate scientific knowledge of the time on the health impacts of community noise and to provide guidance to environmental health authorities and professionals trying to protect people from the harmful effects of noise in nonindustrial environments" (WHO, 1999). The guidelines were based on studies carried out up to 1995 and a few meta-analyses from some years later.

The health risk to humans from exposure to environmental noise was evaluated and guideline values derived. At that time WHO had not yet developed its guideline development process, on which the current guidelines are based (WHO, 2014c). The main differences in content are that the previous guidelines were expert-based and provided more global coverage and applicability, such as issues of noise assessment and control that were addressed in detail. They included a discussion on noise sources and measurement, including the basic aspects of source characteristics, sound propagation and transmission. Adverse health effects of noise were characterized, and combined noise sources and their effects were considered. Furthermore, the guidelines included discussions of strategies and priorities in the management of indoor noise levels, noise policies and legislation, environmental

noise impact and enforcement of regulatory standards; although there were no chapters on wind turbine noise and leisure noise.

### 2.6.2 NNG

In 2009 the WHO Regional Office for Europe published the NNG to provide scientifically based advice to Member States for the development of future legislation and policy action in the area of assessment and control of night noise exposure.

The NNG complement the previous CNG, incorporating the advancement of research on noise and sleep disturbance up to 2006. The working group of experts reviewed available scientific evidence on the health effects of night noise and derived health-based guideline values. Again, WHO had not yet introduced its evidence-based recommendations policy and the NNG were mainly expert-based. They considered the scientific evidence on the threshold of night noise exposure indicated by  $L_{\text{night}}$  as defined in the END (EC, 2002a), and the experts concluded that a  $L_{\text{night}}$  value of 40 dB should be the target of the NNG (for all sources) to protect the public, including the most vulnerable groups such as children, chronically ill and elderly people. Further, an  $L_{\text{night}}$  value of 55 dB was recommended as an interim target for countries that could not follow the guidelines in the short term for various reasons or where policy-makers chose to adopt a stepwise approach.

### 2.6.3 Differences from the prior noise guidelines

The current guidelines differ from the older ones, recommending levels of exposure unlike those previously outlined (especially by the NNG). The following major differences between the previous and current guidelines explain the novel set of recommended values.

- The development process for the current guidelines adhered to a new, rigorous, evidence-based methodology, as outlined in the WHO handbook for guideline development (WHO, 2014c). WHO adopted these internationally recognized standards to ensure high methodological quality and a transparent, evidence-based decision-making process in the guideline development.
- The current guidelines consider cardiovascular disease a critical health outcome measure.
- They also consider a broader set of health outcomes, including adverse birth outcomes, diabetes, obesity and mental well-being. Wherever applicable, incidence, prevalence and mortality were considered separately.
- The current guidelines cover two new noise sources: wind turbines and leisure noise.
- Critical and important health outcomes are considered separately for each of the noise sources.
- The guideline development process included the health effects of intervention measures to mitigate noise exposure from different noise sources for the first time.
- The style of recommendations differs: the current guidelines include an exact exposure value for every health outcome regarded as critical, for each noise source. Guideline recommendation values were set for each of the noise sources separately, based on the exact exposure values and a prioritization scheme, developed with the help of DWs.
- The current guidelines apply a 1 dB increment scheme, whereas prior guidelines (CNG and NNG) formulated or presented recommendations in 5 dB steps.

- In comparison to the 1999 CNG, which defined environment-specific exposure levels, the current guidelines are source specific. They recommend values for outdoor exposure to road traffic, railway, aircraft and wind turbine noise, and indoor as well as outdoor exposure levels for leisure noise.
- Except for leisure noise, all exposure levels recommended in the current guidelines are average sound pressure levels for outdoor exposure.
- The current guidelines make use of the noise indices defined in the END:  $L_{\text{den}}$  and  $L_{\text{night}}$ .

The definition of “community noise” used in the CNG in 1999 was also adapted. The GDG agreed to use the term “environmental noise” instead, and offered an operational definition of: “noise emitted from all sources except sources of occupational noise exposure in workplaces”.

The current environmental noise guidelines for the European Region supersede the CNG from 1999. Nevertheless, the GDG recommends that all CNG indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid.

Furthermore, the current guidelines complement the NNG from 2009. Two main aspects of the NNG constitute this complementarity: the different guiding principles and the comprehensive investigation of the immediate physiological effects of environmental noise on sleep. As guiding principles the NNG defined effect thresholds or “lowest observed adverse health effect levels” for both immediate physiological reactions during sleep (i.e. awakening reactions or body movements during sleep) and long-term adverse health effects (i.e. self-reported sleep disturbance). These guideline exposure levels defined a level below which no effects were expected to occur (corresponding to 30 dB  $L_{\text{night}}$ ) and proceeded to define the level where adverse effects start to occur (corresponding to 40 dB  $L_{\text{night}}$ ), with the aim of protecting the whole population, including – to some extent – vulnerable groups. The development of the NNG values relied on evidence-based expert judgement. In contrast, the current guidelines formulate recommendations more strictly based on the available evidence and following the guiding principle to identify exposure values based on a relevant risk increase of adverse health effects. Thus, the recommended guideline values might not lead to full protection of the population, including all vulnerable groups. The GDG stresses that the aim of the current guidelines is to define an exposure level at which effects certainly begin.

Secondly, the NNG comprehensively investigate the immediate short-term effects of environmental noise during sleep, including physiological reactions such as awakening reactions and body movements. They also provided threshold information about single-event noise indicators (such as the  $L_{A,\text{max}}$ ). In contrast, the current guideline values for the night time are only based on the prevalence of self-reported sleep disturbance and do not take physiological effects into account. The causal link between immediate physiological reactions and long-term adverse health effects is complex and difficult to prove. Thus, the current guidelines are restricted to long-term health effects during night time and therefore only include recommendations about average noise indicators:  $L_{\text{night}}$ . Nevertheless, the evidence review on noise and sleep (Basner & McGuire, 2018) includes an overview of single-event exposure–effect relationships.

### 3. Recommendations

This chapter presents specific recommendations on guideline exposure levels and/or interventions to reduce exposure and/or improve health for individual sources of noise: road traffic, railway, aircraft, wind turbines and leisure noise. The strength of each recommendation is provided (strong or conditional) and a short rationale for how each of the guideline levels was achieved is given.

The GDG discussed extensively the best way to present guideline exposure levels – either as the exact values or in 5 dB steps – and the approach to rounding the values to the nearest integer. The 5 dB increment, rounded down from the exact exposure value to the nearest 5 dB level, was initially chosen as being commonly applied in noise legislation and used in prior guidelines (WHO, 1999; EC, 2002a; WHO Regional Office for Europe, 2009). It was also used to meet the principle of precaution, since imprecision in the exposure assessment in the field of epidemiology tends to attenuate the actual effects in the population.

Use of 5 dB increments resulted in uneven magnitude of rounding down, however, raising concerns of arbitrariness. It became apparent that inclusion of both exact values and the 5 dB rounded-down values might be confusing and could affect the applicability of the guidelines. Hence, the GDG ultimately decided that formulating recommendations based on the exact calculated values, rounded only to the nearest integer, would ensure more clarity and transparency. Furthermore, it noted that adhering to a 5 dB roster might not reflect the progress in the precision of exposure assessment methods in recent decades, which would justify application of a 1 dB step.

The GDG acknowledged that the recommendations might be presented as the exact guideline exposure levels only, leaving the use of 5 dB bands to the potential policy decisions to formulate or revise noise legislation, which are beyond the scope of this publication. The WHO guideline values are public health-oriented recommendations, based on scientific evidence on health effects and on an assessment of achievable noise levels. They are strongly recommended and as such should serve as the basis for a policy-making process in which policy options are quantified and discussed. It should be recognized that in that process additional considerations of costs, feasibility, values and preferences should also feature in decision-making when choosing reference values such as noise limits for a possible standard or legislation.

In addition to the source-specific recommendations in the following sections, a short rationale for the decision-making process by the GDG for developing a particular recommendation is provided, as well as an overview of the evidence considered. This includes a recapitulation of the specific PICOS/PECCOS question (see section 2.3.1), along with a summary of evidence for each of the critical and important health effects from exposure to each of the noise sources, and for the effectiveness of interventions.

Furthermore, a description is provided of the other factors considered according to the GRADE dimensions for the assessment of the strength of recommendations (see section 2.4.4). While the quality of evidence is central to determining this, the process of moving from evidence to recommendations involves several other considerations. These include values and preferences, balance of benefits and harms, consideration of the priority of the problem, resource implications, equity and human rights aspects, acceptability and feasibility (WHO, 2014c).





### 3.1 Road traffic noise

#### Recommendations

For average noise exposure, the GDG **strongly** recommends reducing noise levels produced by road traffic below **53 dB  $L_{den}$** , as road traffic noise above this level is associated with adverse health effects.

For night noise exposure, the GDG **strongly** recommends reducing noise levels produced by road traffic during night time below **45 dB  $L_{night}$** , as road traffic noise above this level is associated with adverse effects on sleep.

To reduce health effects, the GDG **strongly** recommends that policy-makers implement suitable measures to reduce noise exposure from road traffic in the population exposed to levels above the guideline values for average and night noise exposure. For specific interventions, the GDG recommends reducing noise both at the source and on the route between the source and the affected population by changes in infrastructure.

#### 3.1.1 Rationale for the guideline levels for road traffic noise

The exposure levels were derived in accordance with the prioritization process of critical health outcomes described in section 2.4.3. For each of the outcomes, the exposure level was identified by applying the benchmark, set as relevant risk increase to the corresponding ERF. In the case of exposure to road traffic noise, the process can be summarized as follows (Table 6).

Table 6. Average exposure levels ( $L_{den}$ ) for priority health outcomes from road traffic noise

| Summary of priority health outcome evidence                                                                                                                                                                                                         | Benchmark level    | Evidence quality                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------|
| <b>Incidence of IHD</b><br>The 5% relevant risk increase occurs at a noise exposure level of 59.3 dB $L_{den}$ . The weighted average of the lowest noise levels measured in the studies was 53 dB $L_{den}$ and the RR increase per 10 dB is 1.08. | 5% increase of RR  | High quality                          |
| <b>Incidence of hypertension</b><br>One study met the inclusion criteria. There was no significant increase of risk associated with increased noise exposure in this study.                                                                         | 10% increase of RR | Low quality                           |
| <b>Prevalence of highly annoyed population</b><br>There was an absolute risk of 10% at a noise exposure level of 53.3 dB $L_{den}$ .                                                                                                                | 10% absolute risk  | Moderate quality                      |
| Permanent hearing impairment                                                                                                                                                                                                                        | No increase        | No studies met the inclusion criteria |
| Reading skills and oral comprehension in children                                                                                                                                                                                                   | One-month delay    | Very low quality                      |

In accordance with the prioritization process (see section 2.4.3), the GDG set a guideline exposure level of 53.3 dB  $L_{den}$  for average exposure, based on the relevant increase of the absolute %HA. It was confident that there was an increased risk for annoyance below this noise exposure level, but probably no increased risk for other priority health outcomes. In accordance with the defined rounding procedure, the value was rounded to 53 dB  $L_{den}$ . As the evidence on the adverse effects of road traffic noise was rated moderate quality, the GDG made the recommendation strong.

Next, the GDG assessed the evidence for night noise exposure and its effect on sleep disturbance (Table 7).

Table 7. Night-time exposure levels ( $L_{\text{night}}$ ) for priority health outcomes from road traffic noise

| Summary of priority health outcome evidence                                                                                                                | Benchmark level  | Evidence quality |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|
| <b>Sleep disturbance</b><br>3% of the participants in studies were highly sleep-disturbed at a noise level of <b>45.4 dB <math>L_{\text{night}}</math></b> | 3% absolute risk | Moderate quality |

Based on the evidence of the adverse effects of road traffic noise on sleep disturbance, the GDG defined a guideline exposure level of 45.4 dB  $L_{\text{night}}$ . The exact exposure value was rounded to 45 dB  $L_{\text{night}}$ . As the evidence was rated moderate quality, the GDG made the recommendation strong.

The GDG also considered the evidence for the effectiveness of interventions. The results showed that:

- addressing the source by improving the choice of appropriate tyres, road surface, truck restrictions or by lowering traffic flow can reduce noise exposure;
- path interventions such as insulation and barrier construction reduce noise exposure, annoyance and sleep disturbance;
- changes in infrastructure such as construction of road tunnels lower noise exposure, annoyance and sleep disturbance;
- other physical interventions such as the availability of a quiet side of the residence reduce noise exposure, annoyance and sleep disturbance.

Given that it is possible to reduce noise exposure and that best practices already exist for the management of noise from road traffic, the GDG made a strong recommendation.

### 3.1.1.1 Other factors influencing the strength of recommendations

Other factors considered in the context of recommendations on road traffic noise included those related to values and preferences, benefits and harms, resource implications, equity, acceptability and feasibility; moreover, nonpriority health outcomes (the incidence of stroke and diabetes) were considered. Ultimately, the assessment of all these factors did not lead to a change in the strength of the recommendations. Further details are provided in section 3.1.2.3.

### 3.1.2 Detailed overview of the evidence

The following sections provide a detailed overview of the evidence constituting the basis for setting the recommendations on road traffic noise. It is presented and summarized separately for each of the critical health outcomes, and the GDG's judgement of the quality of evidence is indicated (for a detailed overview of the evidence on important health outcomes, see Annex 4). Research into health outcomes and effectiveness of interventions is addressed consecutively.

A comprehensive summary of all evidence considered for each of the critical and important health outcomes can be found in the eight systematic reviews published in the *International Journal of Environmental Research and Public Health* (see section 2.3.2 and Annex 2).



### 3.1.2.1 Evidence on health outcomes

The key question posed was: in the general population exposed to road traffic noise, what is the exposure–response relationship between exposure to road traffic noise (reported as various noise indicators) and the proportion of people with a validated measure of health outcome, when adjusted for main confounders? A summary of the PICOS/PECCOS scheme applied (see section 2.3.1) and the main findings is set out in Tables 8 and 9.

Table 8. PICOS/PECCOS scheme of critical health outcomes for exposure to road traffic noise

| PECO       | Description                                                                                                                                                                                                                                                                                             |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Population | General population                                                                                                                                                                                                                                                                                      |
| Exposure   | Exposure to high levels of noise produced by road traffic (average/night time)                                                                                                                                                                                                                          |
| Comparison | Exposure to lower levels of noise produced by road traffic (average/night time)                                                                                                                                                                                                                         |
| Outcome(s) | For average noise exposure:<br>1. cardiovascular disease<br>2. annoyance<br>3. cognitive impairment<br>4. hearing impairment and tinnitus<br>5. adverse birth outcomes<br>6. quality of life, well-being and mental health<br>7. metabolic outcomes<br>For night noise exposure:<br>1. effects on sleep |

Table 9. Summary of findings for health effects from exposure to road traffic noise ( $L_{den}$ )

| Noise metric                           | Priority health outcome measure | Quantitative risk for adverse health                                   | Lowest level of exposure across studies | Number of participants (studies) | Quality of evidence                                                        |
|----------------------------------------|---------------------------------|------------------------------------------------------------------------|-----------------------------------------|----------------------------------|----------------------------------------------------------------------------|
| <b>Cardiovascular disease</b>          |                                 |                                                                        |                                         |                                  |                                                                            |
| $L_{den}$                              | Incidence of IHD                | RR = 1.08 (95% confidence interval (CI): 1.01–1.15) per 10 dB increase | 53 dB                                   | 67 224 (7)                       | High (upgraded for dose-response)                                          |
| $L_{den}$                              | Incidence of hypertension       | RR = 0.97 (95% CI: 0.90–1.05) per 10 dB increase                       | N/A                                     | 32 635 (1)                       | Low (downgraded for risk of bias and because only one study was available) |
| <b>Annoyance</b>                       |                                 |                                                                        |                                         |                                  |                                                                            |
| $L_{den}$                              | %HA                             | Odds ratio (OR) = 3.03 (95% CI: 2.59–3.55) per 10 dB increase          | 40 dB                                   | 34 112 (25)                      | Moderate (downgraded for inconsistency)                                    |
| <b>Cognitive impairment</b>            |                                 |                                                                        |                                         |                                  |                                                                            |
| $L_{den}$                              | Reading and oral comprehension  | Not estimated                                                          | N/A                                     | Over 2844 (1)                    | Very low (downgraded for inconsistency)                                    |
| <b>Hearing impairment and tinnitus</b> |                                 |                                                                        |                                         |                                  |                                                                            |
| $L_{den}$                              | Permanent hearing impairment    | –                                                                      | –                                       | –                                | –                                                                          |

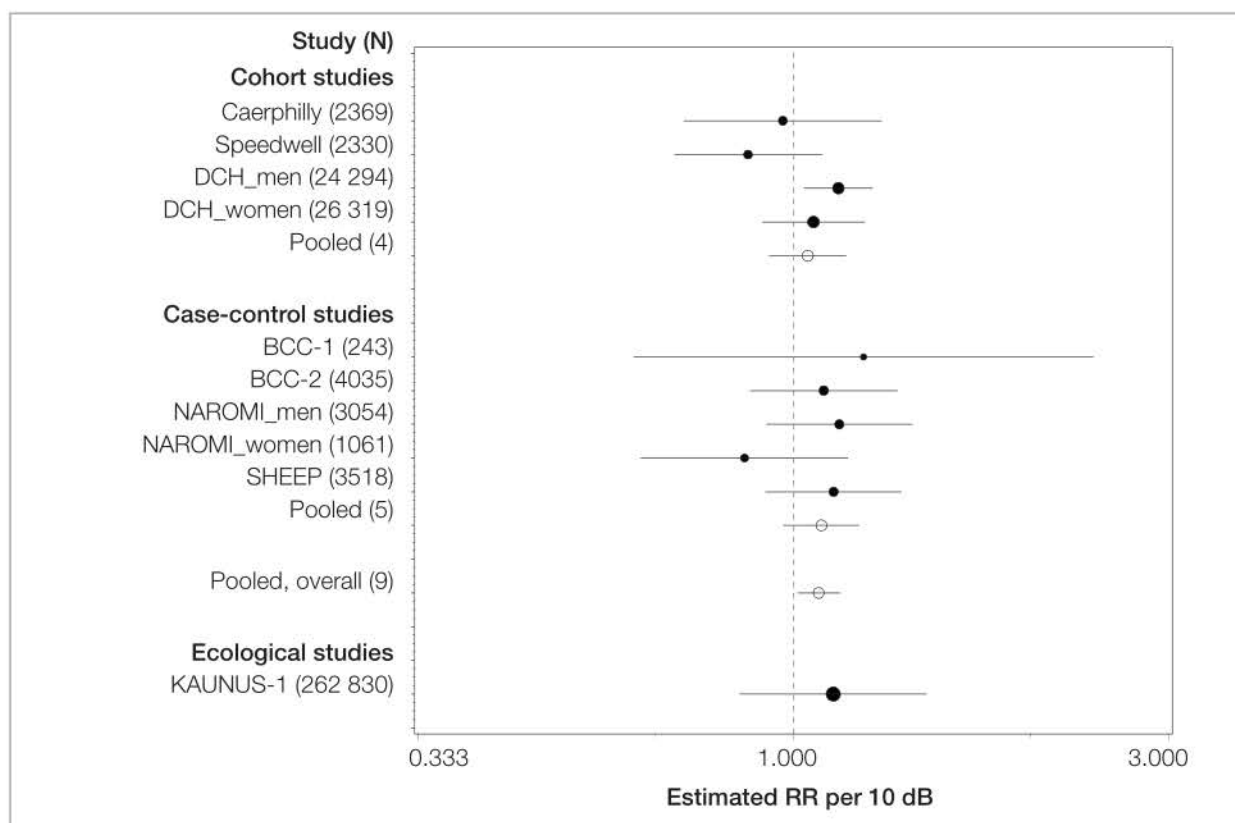
## Cardiovascular disease

### IHD

A total of three cohort (Babisch & Gallacher, 1990; Babisch et al., 1988; 1993a; 1993b; 1999; 2003; Caerphilly and Speedwell Collaborative Group, 1984; Sørensen et al., 2012a; 2012c) and four case-control studies (Babisch, 2004; Babisch et al., 1992; 1994; 2005a; Selander et al., 2009; Wiens, 1995) investigated the relationship between road traffic noise and the incidence of IHD. These involved a total of 67 224 participants, including 7033 cases. As identified in Fig. 1, the overall RR derived from the meta-analysis was 1.08 (95% CI: 1.01–1.15) per 10 dB  $L_{den}$  increase in noise levels, across a noise range of 40 dB to 80 dB. This evidence was rated high quality.

The data were supported by one ecological study conducted with 262 830 participants, including 418 cases, which also reported a statistically significant estimate (Grazuleviciene et al., 2004; Lekaviciute, 2007). In this study, a positive but nonsignificant association was found: RR of 1.12 (95% CI: 0.85–1.48) per 10 dB  $L_{den}$  increase in noise. This evidence was rated very low quality.

Fig. 1. The association between exposure to road traffic noise ( $L_{den}$ ) and incidence of IHD

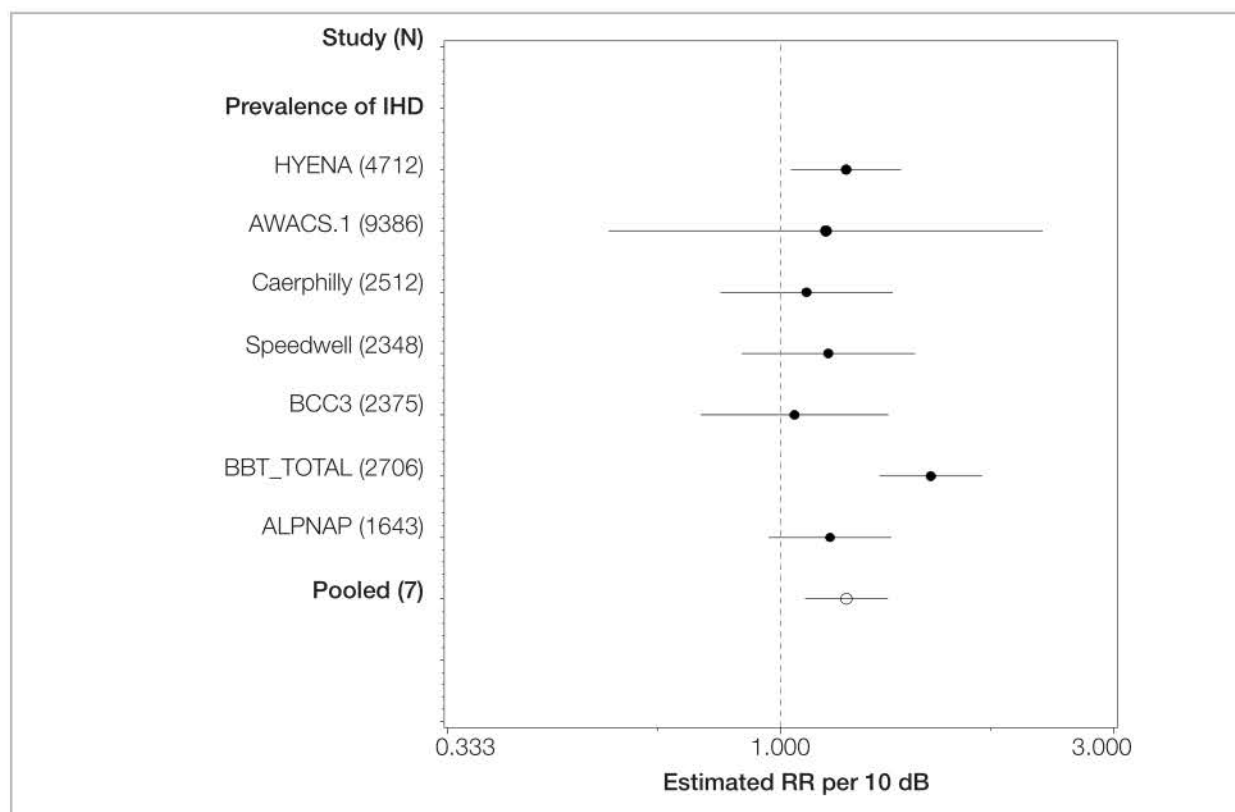


Notes: The dotted vertical line corresponds to no effect of exposure to road traffic noise. The black circles correspond to the estimated RR per 10 dB and 95% CI. The white circles represent the pooled random effect estimates and 95% CI. For further details on the studies included in the figure please refer to the systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018).



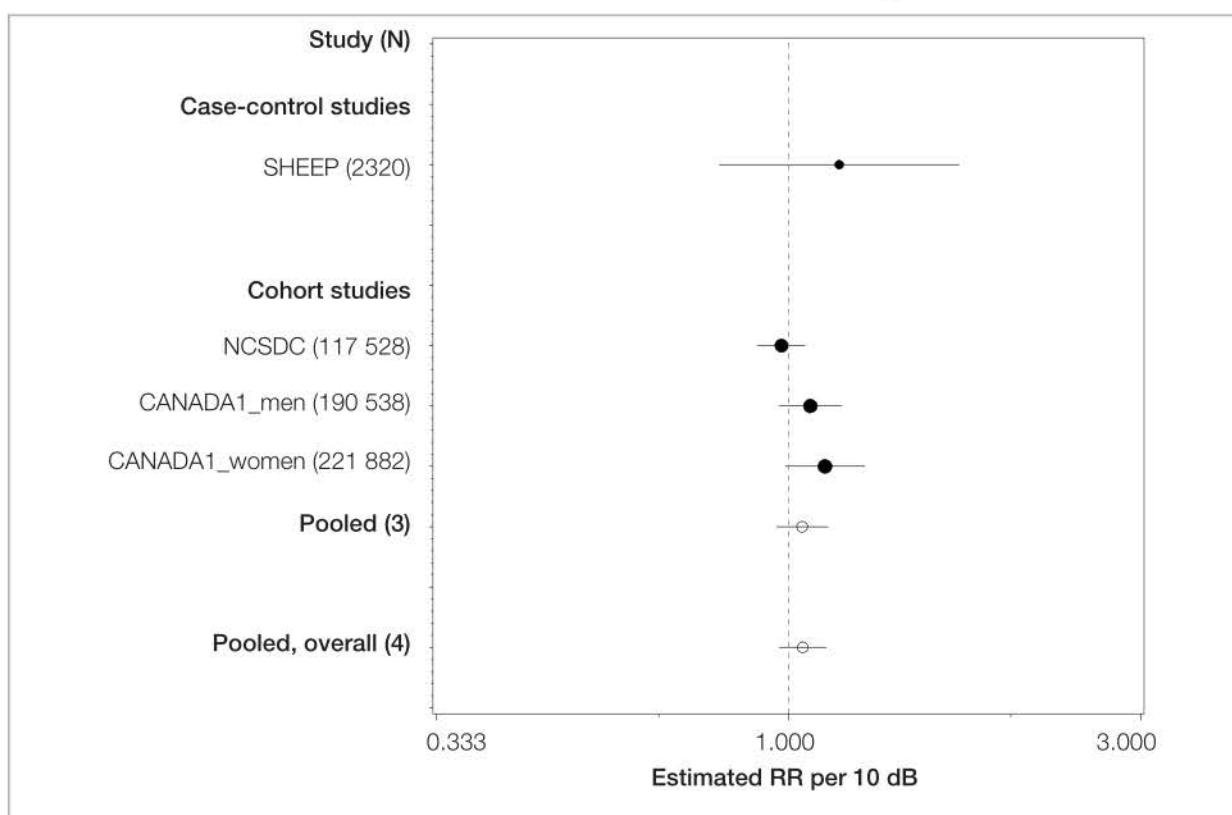
Furthermore, additional evidence was available from eight cross-sectional studies that investigated the relationship between road traffic noise and prevalence of IHD (Babisch & Gallacher, 1990; Babisch et al., 1988; 1992; 1993a; 1993b; 1994; 1999; 2003; 2005a; 2008; 2012a; 2012b; Caerphilly and Speedwell Collaborative Group, 1984; Floud et al., 2011; 2013a; 2013b; Heimann et al., 2007; Jarup et al., 2005; 2008; Lercher et al., 2008; 2011; van Poll et al., 2014; Wiens, 1995). These studies involved a total of 25 682 participants, including 1614 cases. The overall RR was 1.24 (95% CI: 1.08–1.42) per 10 dB  $L_{den}$  increase in road traffic noise levels. The range in noise levels in the studies under evaluation was 30–80 dB. The results of the meta-analysis are presented in Fig. 2. This evidence was rated low quality.

Fig. 2. The association between exposure to road traffic noise ( $L_{den}$ ) and prevalence of IHD



Notes: The dotted vertical line corresponds to no effect of exposure to road traffic noise. The black circles correspond to the estimated RR per 10 dB and 95% CI. The white circle represents the pooled random effect estimates and 95% CI. For further details on the studies included in the figure please refer to the systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018).

Mortality from IHD was also investigated in one case-control (Selander et al., 2009) and two cohort studies (Beelen et al., 2009; Gan et al., 2012), which involved 532 268 participants, including 6884 cases. The quantitative relationship between road traffic noise and mortality from IHD was RR = 1.05 (95% CI: 0.97–1.13) per 10 dB  $L_{den}$  increase in noise levels (see Fig. 3). This evidence was rated moderate quality.

Fig. 3. The association between exposure to road traffic noise ( $L_{den}$ ) and mortality from IHD

Notes: The dotted vertical line corresponds to no effect of exposure to road traffic noise. The black circles correspond to the estimated RR per 10 dB and 95% CI. The white circles represent the pooled random effect estimates and 95% CI. For further details on the studies included in the figure please refer to the systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018).

### Hypertension

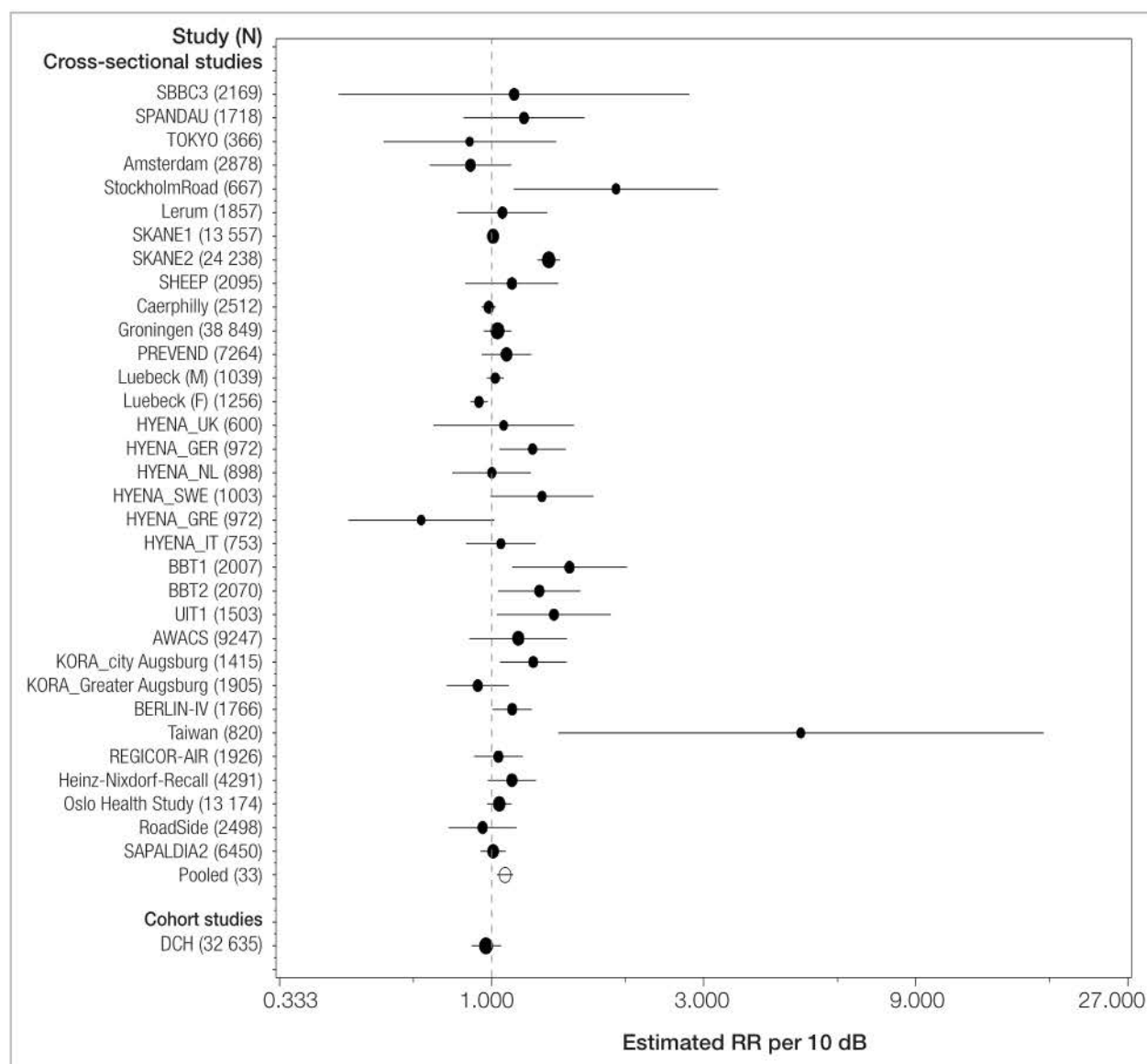
One cohort study into the relationship between road traffic noise and incidence of hypertension was identified; it involved 32 635 participants, including 3145 cases (Sørensen et al., 2011; 2012c). The study found a nonsignificant effect size of 0.97 (95% CI: 0.90–1.05) per 10 dB  $L_{den}$  increase in noise levels, which does not support an increased risk of hypertension due to exposure to road traffic noise. Because of the risk of bias and the availability of only one study, this evidence was rated low quality.

In addition, 26 cross-sectional studies were identified that looked at the association between road traffic noise and prevalence of hypertension (Babisch et al., 1988; 1992; 1994; 2005a; 2008; 2012a; 2012b; 2013a; 2013b; 2014b; 2014c; Barregard et al., 2009; Bjork et al., 2006; Bluhm et al., 2007; Bodin et al., 2009; Caerphilly and Speedwell Collaborative Group, 1984; Chang et al., 2011; 2014; de Kluizenaar et al., 2007a; 2007b; Dratva et al., 2012; Eriksson et al., 2012; Foraster et al., 2011; 2012; 2013; 2014a; 2014b; Fuks et al., 2011; Hense et al., 1989; Herbold et al., 1989; Jarup et al., 2005; 2008; Knipschild et al., 1984; Lercher et al., 2008; 2011; Maschke, 2003; Maschke & Hecht,

2005; Maschke et al., 2003; Oftedal et al., 2011; 2014; Selander et al., 2009; van Poll et al., 2014; Wiens, 1995; Yoshida et al., 1997). In total, these studies involved 154 398 participants, including 18 957 cases. The overall RR for prevalence of hypertension was 1.05 (95% CI: 1.02–1.08) per 10 dB  $L_{den}$  increase in noise levels. The noise range of the studies under evaluation was 20–85 dB. The overall evidence was rated very low quality.

Fig. 4 shows the association between road traffic noise and incidence and prevalence of hypertension.

Fig. 4. The association between exposure to road traffic noise ( $L_{den}$ ) and hypertension



Notes: The dotted vertical line corresponds to no effect of exposure to road traffic noise. The black dots correspond to the estimated RR per 10 dB and 95% CI. The white circle represents the summary estimate and 95% CI. For further details on the studies included in the figure please refer to the systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018).

## Stroke

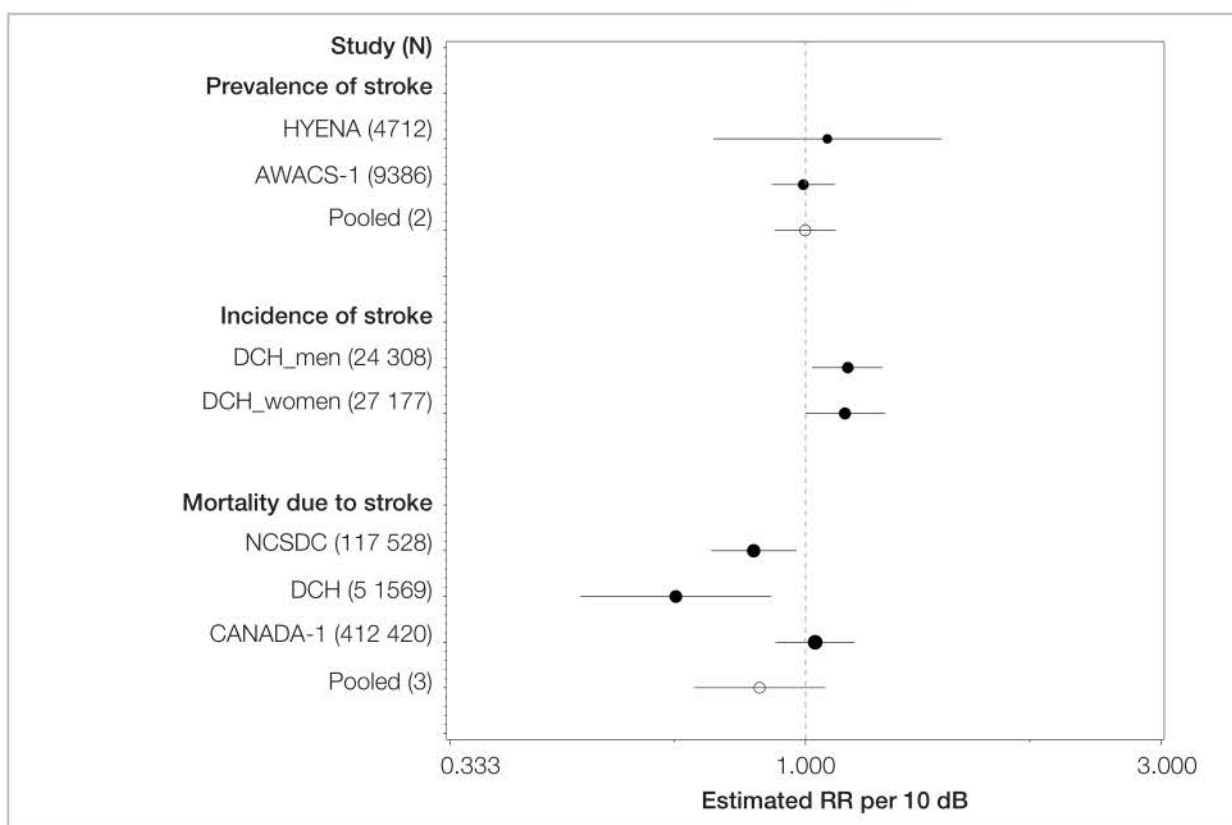
One cohort study into the relationship between road traffic noise and incidence of stroke was identified (Sørensen et al., 2011; 2012b; 2014). It involved 51 485 participants, including 1881 cases, and found an RR of 1.14 (95% CI: 1.03–1.25) per 10 dB  $L_{den}$  increase in noise levels, across a range of around 50–70 dB. The evidence was rated moderate quality.

Two cross-sectional studies on road traffic noise and prevalence of stroke involved 14 098 participants, including 151 cases (Babisch et al., 2005a; 2008; 2012a; 2012b; 2013a; Floud et al., 2011; 2013a; 2013b; Jarup et al., 2005; 2008; van Poll et al., 2014) yielded an estimated RR of 1.00 (95% CI: 0.91–1.10) per 10 dB  $L_{den}$  increase in noise levels. This evidence was rated very low quality.

Furthermore, three cohort studies investigated the relationship between road traffic noise and mortality due to stroke (Beelen et al., 2009; Gan et al., 2012; Sørensen et al., 2011; 2012b; 2014). These involved 581 517 participants, including 2634 cases, and their pooled estimate was a statistically nonsignificant RR = 0.87 (95% CI: 0.71–1.06) per 10 dB  $L_{den}$  increase in road traffic noise levels. This evidence was rated moderate quality.

Fig. 5 presents the results of the meta-analysis for road traffic noise and measures of stroke.

Fig. 5. The association between exposure to road traffic noise ( $L_{den}$ ) and stroke



Notes: The dotted vertical line corresponds to no effect of exposure to road traffic noise. The black dots correspond to the estimated RR per 10 dB and 95% CI. The white circles represent the summary estimate and 95% CI. For further details on the studies included in the figure please refer to the systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018).

### *Children's blood pressure*

Six cross-sectional studies investigated the change in systolic and diastolic blood pressure in children exposed to road traffic noise in residential settings (Belojevic & Evans, 2011; 2012; Bilenko et al., 2013; Liu et al., 2013; 2014; Regecova & Kellerova, 1995; van Kempen et al., 2006). In total, 4197 children were included in these studies; the number of cases was not reported. For each increase in 10 dB  $L_{den}$  in noise levels, there was a statistically nonsignificant increase in systolic and in diastolic blood pressure of 0.08 mmHg (95% CI: -0.48–0.64) and 0.47 mmHg (95% CI: -0.30–1.24), respectively. The overall evidence was rated very low quality.

Furthermore, five cross-sectional studies investigated the association between systolic and diastolic blood pressure in children and exposure to road traffic noise in educational settings (Belojevic & Evans, 2011; 2012; Bilenko et al., 2013; Clark et al., 2012; Paunovic et al., 2013; Regecova & Kellerova, 1995; van Kempen et al., 2006). In total, 4520 children were included in these studies; the number of cases was not reported. Systolic blood pressure decreased statistically nonsignificantly, at -0.60 mm (95% CI: -1.51–0.30) per 10 dB  $L_{den}$  increase in road traffic noise levels. Diastolic blood pressure increased statistically nonsignificantly, at 0.46 mm (95% CI: -0.60–1.53) per 10 dB  $L_{den}$  increase in road traffic noise levels. For both relationships, the evidence was rated very low quality.

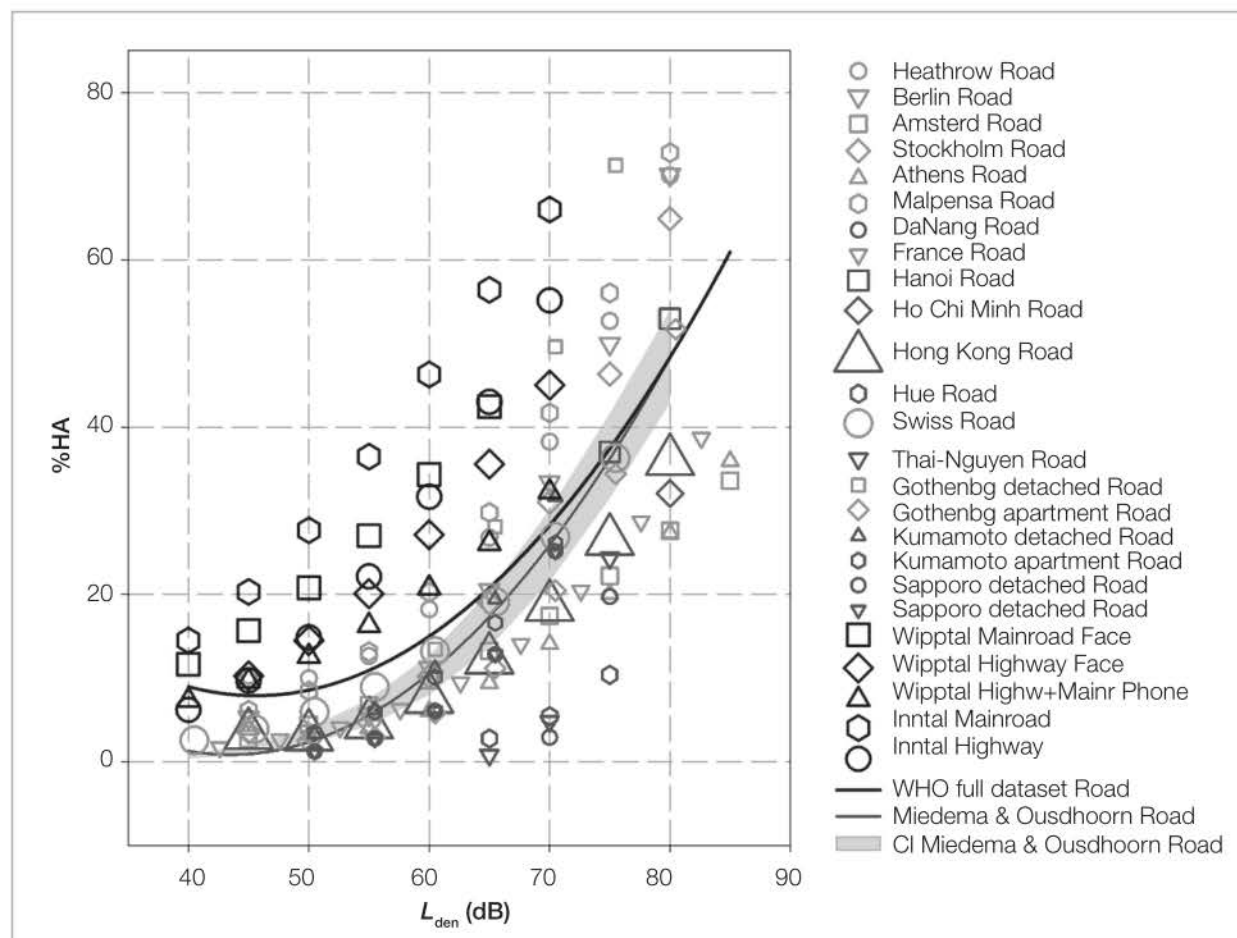
### **Annoyance**

A vast amount of research proves the association between road traffic noise and annoyance. In total, 17 road traffic noise studies were identified that were used to model ERFs of the relationship between  $L_{den}$  and %HA (Babisch et al., 2009; Brink, 2013; Brink et al., 2016; Brown et al., 2014; 2015; Champelovier et al., 2003; Heimann et al., 2007; Lercher et al., 2007; Medizinische Universitaet Innsbruck, 2008; Nguyen et al., 2012a; Pierette et al., 2012; Sato et al., 2002; Shimoyama et al., 2014). These incorporated data from 34 112 study participants. The estimated data points of each of the studies are plotted in Fig. 6, alongside an aggregated ERF including the data from all the individual studies (see the black line for “WHO full dataset”). The lowest category of noise exposure considered in any of the studies, and hence included in the systematic review, is 40 dB, corresponding to approximately 9%HA. The benchmark level of 10%HA is reached at 53.3 dB  $L_{den}$  (see Fig 6).

Table 10 shows the %HA in relation to exposure to road traffic noise. The calculations are based on the regression equation  $\%HA = 78.9270 - 3.1162 \times L_{den} + 0.0342 \times L_{den}^2$  derived from the systematic review (Guski et al., 2017). Even though there is a large evidence base substantiating the association of average road traffic noise and noise annoyance, the overall evidence had to be rated low quality. The main reasons for downgrading included limitations regarding the acoustical data provided, the nature of study design (most of the studies in the realm of annoyance research follow a cross-sectional approach), the inconsistency of results and the variety in the questions asked.

Nevertheless, the general quality of the evidence was substantiated with the help of additional statistical analyses that apply classic health outcome measures to estimate noise annoyance. When comparing road traffic noise exposure at 50 dB and 60 dB, the analyses revealed evidence rated moderate quality for an association between road traffic noise and %HA for an increase per 10 dB (OR = 2.74; 95% CI: 1.88–4.00). Moreover, there was evidence rated high quality for the increase of %HA per 10 dB increase in sound exposure, when data on all sound classes were included (OR = 3.03; 95% CI: 2.59–3.55).

Fig. 6. Scatterplot and quadratic regression of the relationship between road traffic noise ( $L_{den}$ ) and annoyance (%HA)



Notes: The ERF by Miedema & Oudshoorn (2001) is added in red for comparison.

The size of the data points corresponds to the number of participants in the respective study (size =  $\text{SQRT}(N)/10$ ).

If two results from different studies fall on the same data point, the last point plotted may mask the former one.

The black curve is derived from aggregated secondary data, while the red one is derived from individual data.

There is no indication of 95% CIs of the WHO full dataset, as a weighting based on the total number of participants for each 5 dB  $L_{den}$  sound class could not be calculated; weighting based on all participants of all sound classes proved to be unsuitable. The range of data included is illustrated by the distribution of data points.

For further details on the studies included in the figure please refer to the systematic review on environmental noise and annoyance (Guski et al., 2017).



Table 10. The association between exposure to road traffic noise ( $L_{den}$ ) and annoyance (%HA)

| $L_{den}$ (dB) | %HA  |
|----------------|------|
| 40             | 9.0  |
| 45             | 8.0  |
| 50             | 8.6  |
| 55             | 11.0 |
| 60             | 15.1 |
| 65             | 20.9 |
| 70             | 28.4 |
| 75             | 37.6 |
| 80             | 48.5 |

### Cognitive impairment

Evidence rated very low quality was available for the association between road traffic noise and reading and oral comprehension, assessed by tests. The review identified two papers that reported the results of the cross-sectional road traffic and aircraft noise exposure and children's cognition and health (RANCH) study, which examined exposure–effect relationships (Clark et al., 2006; Stansfeld et al., 2005). The study of over 2000 children aged 9–10 years, attending 89 schools around three major airports in the Netherlands, Spain and the United Kingdom did not find an exposure–effect relationship between road traffic noise exposure at primary school, which ranged from 31 to 71 dB  $L_{Aeq,16h}$ , and children's reading comprehension.

Few studies have investigated other health outcome measures related to cognition. Evidence rated low quality was available for an association between road traffic noise and cognitive impairment assessed through standardized tests (Cohen et al., 1973; Lukas et al., 1981; Pujol et al., 2014; Shield & Dockrell, 2008). There was evidence rated very low quality for an association between road traffic noise and long-term memory (Matheson et al., 2010; Stansfeld et al., 2005). No studies examined effects on short-term memory.

There was evidence rated very low quality, however, that road traffic noise does not have a considerable effect on children's attention (Cohen et al., 1973; Stansfeld et al., 2005). Further, there was evidence rated low quality that road traffic noise does not have a substantial effect on executive function (working memory), with studies consistently reporting no association (Clark et al., 2012; Matheson et al., 2010; Stansfeld et al., 2005; van Kempen et al., 2010; 2012).

### Hearing impairment and tinnitus

No studies were found, and therefore no evidence was available for the association between road traffic noise and hearing impairment and tinnitus.

### Sleep disturbance

For road traffic noise and self-reported sleep outcomes (awakenings from sleep, the process of falling asleep and sleep disturbance), 12 studies were identified that included a total of 20 120



participants (Bodin et al., 2015; Brown et al., 2015; Hong et al., 2010; Phan et al., 2010; Ristovska et al., 2009; Sato et al., 2002; Shimoyama et al., 2014); these were cross-sectional studies, conducted in healthy adults. The health outcome was measured by self-reporting via general health and noise surveys that included questions about sleep in general, and other questions about how noise affects sleep (see Table 11).

**Table 11. Summary of findings for health effects from exposure to road traffic noise ( $L_{\text{night}}$ )**

| Noise metric            | Priority health outcome measure | Quantitative risk for adverse health            | Lowest level of exposure across studies | Number of participants (studies) | Quality of evidence                                                                                         |
|-------------------------|---------------------------------|-------------------------------------------------|-----------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Effects on sleep</b> |                                 |                                                 |                                         |                                  |                                                                                                             |
| $L_{\text{night}}$      | %HSD                            | OR: 2.13 (95% CI: 1.82–2.48) per 10 dB increase | 43 dB                                   | 20 120 (12)                      | Moderate (downgraded for study limitations, inconsistency; upgraded for dose-response, magnitude of effect) |



The model in the systematic review (Basner & McGuire, 2018) was based on outdoor  $L_{\text{night}}$  levels between 40 dB and 65 dB only; 40 dB was chosen as the lower limit because of possible inaccuracies of predicting lower noise levels. The range of noise exposure reported in the studies reviewed was 37.5–77.5 dB  $L_{\text{night}}$ . About 2% (95% CI: 0.90–3.15) of the population was characterized as highly sleep-disturbed at  $L_{\text{night}}$  levels of 40 dB. The %HSD at other, higher levels of road traffic noise is presented in Table 12. The association between road traffic noise and the probability of being highly sleep-disturbed was OR: 2.13 (95% CI: 1.82–2.48) per 10 dB increase in noise. This evidence was rated moderate quality.

**Table 12. The association between exposure to road traffic noise ( $L_{\text{night}}$ ) and sleep disturbance (%HSD)**

| $L_{\text{night}}$ (dB) | %HSD | 95% CI     |
|-------------------------|------|------------|
| 40                      | 2.0  | 0.9–3.15   |
| 45                      | 2.9  | 1.40–4.44  |
| 50                      | 4.2  | 2.14–6.27  |
| 55                      | 6.0  | 3.19–8.84  |
| 60                      | 8.5  | 4.64–12.43 |
| 65                      | 12.0 | 6.59–17.36 |

Additional analyses were conducted for other health outcome measures related to sleep, which provided supporting evidence on the overall relationship between road traffic noise and sleep disturbance. When the noise source was not specified in the question, the relationship between road traffic noise and self-reported sleep outcomes was still positive but no longer statistically significant, with an OR of 1.09 (95% CI: 0.94–1.27) per 10 dB increase (Bodin et al., 2015; Brink, 2011; Frei et al., 2014; Halonen et al., 2012). This evidence was rated very low quality.

There was evidence rated moderate quality for an association between road traffic noise and sleep outcomes measured with polysomnography (probability of additional awakenings) with an OR of 1.36 (95% CI: 1.19–1.55) per 10 dB increase in indoor  $L_{AS,max}$ <sup>13</sup> (Basner et al., 2006; Elmenhorst et al., 2012). Further, evidence rated low quality showed an association between road traffic noise and sleep outcomes measured as motility in adults (Frei et al., 2014; Griefahn et al., 2000; Oehrstroem et al., 2006a; Passchier-Vermeer et al., 2007; Pirrera et al., 2014). Finally, there was evidence rated very low quality for an association between road traffic noise and both self-reported and motility-measured sleep disturbance in children (Ising & Ising, 2002; Lercher et al., 2013; Oehrstroem et al., 2006a; Tiesler et al., 2013).

### 3.1.2.2 Evidence on interventions

This section summarizes the evidence underlying the recommendation on the effectiveness of interventions for road traffic noise exposure. The key question posed was: in the general population exposed to road traffic noise, are interventions effective in reducing exposure to and/or health outcomes from road traffic noise? A summary of the PICOS/PECCOS scheme applied and the main findings is set out in Tables 13 and 14.

**Table 13. PICOS/PECCOS scheme of the effectiveness of interventions for exposure to road traffic noise**

| PICO                   | Description                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Population</b>      | <b>General population</b>                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Intervention(s)</b> | The interventions can be defined as: <ul style="list-style-type: none"> <li>(a) a measures that aim to change noise exposure and associated health effects;</li> <li>(b) a measures that aim to change noise exposure, with no particular evaluation of the impact on health; or</li> <li>(c) a measures designed to reduce health effects, but that may not include a reduction in noise exposure.</li> </ul> |
| <b>Comparison</b>      | <b>No intervention</b>                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Outcome(s)</b>      | <div>For average noise exposure:</div> <div>For night noise exposure:</div> <div>1. cardiovascular disease</div> <div>1. effects on sleep</div> <div>2. annoyance</div> <div>3. cognitive impairment</div> <div>4. hearing impairment and tinnitus</div> <div>5. adverse birth outcomes</div> <div>6. quality of life, well-being and mental health</div> <div>7. metabolic outcomes</div>                     |

<sup>13</sup>  $L_{AS,max}$  is the maximum time-weighted and A-weighted sound pressure level with SLOW time constant within a stated time interval starting at t1 and ending at t2, expressed in dB.

Table 14. Summary of findings for road traffic noise interventions by health outcome

| Type of intervention                                                                                                                                                          | Number of participants (studies) | Effect of intervention                                                                                                                                                                                                                                                                                                                                            | Quality of evidence                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <b>Annoyance</b>                                                                                                                                                              |                                  |                                                                                                                                                                                                                                                                                                                                                                   |                                                                            |
| Type A – source interventions (change in traffic flow rate, improved road resurfacing, truck restriction strategy, complex set of barriers, road surfaces and other measures) | 6096 <sup>a</sup><br>(9)         | <ul style="list-style-type: none"> <li>Changes in noise level ranged from around –15 dB to +15.5 dB (various noise metrics).</li> <li>Most studies found that the intervention resulted in a change in annoyance.</li> </ul>                                                                                                                                      | Moderate<br>(downgraded for study limitations; upgraded for dose-response) |
| Type B – path interventions (dwelling insulation, barrier construction, building intervention)                                                                                | 2970<br>(7)                      | <ul style="list-style-type: none"> <li>Changes in noise level ranged from –3 dB to –13 dB (various noise metrics).</li> <li>All studies found that the intervention resulted in a change in annoyance, as estimated by an ERF.</li> </ul>                                                                                                                         | Moderate<br>(downgraded for study limitations; upgraded for dose-response) |
| Type C – changes in infrastructure (new road tunnel infrastructure)                                                                                                           | 1211<br>(2)                      | <ul style="list-style-type: none"> <li>Noise levels reduced by an average of –12 dB (<math>L_{Aeq,24h}</math>).</li> <li>Both studies found lower annoyance responses post intervention, with no change in the controls.</li> </ul>                                                                                                                               | Moderate<br>(downgraded for study limitations; upgraded for dose-response) |
| Type D – other physical interventions (availability of quiet side to the dwelling, existence of nearby green space)                                                           | 26 786<br>(6)                    | <ul style="list-style-type: none"> <li>Because of large variability in noise levels between most and least exposed façade (quiet side), access to quiet side and/or green space resulted in less annoyance.</li> </ul>                                                                                                                                            | Very low<br>(downgraded for study limitations)                             |
| <b>Sleep disturbance</b>                                                                                                                                                      |                                  |                                                                                                                                                                                                                                                                                                                                                                   |                                                                            |
| Type B – path interventions<br>(1: façade insulation;<br>2: enlargement of motorway lanes but with dwelling insulation, barriers and quiet pavement)                          | 1158<br>(2)                      | <ul style="list-style-type: none"> <li>1: façade insulation resulted in a reduction of 7 dB for indoor noise level.</li> <li>2: enlargement led to reduction in the extent of population exposure at higher noise levels (55–65 dB) with an increase in lower levels (45–55 dB)</li> <li>Both path interventions resulted in changes in sleep outcomes</li> </ul> | Moderate<br>(downgraded for study limitations)                             |
| Type C – changes in infrastructure (new road tunnel infrastructure)                                                                                                           | 166<br>(2)                       | <ul style="list-style-type: none"> <li>Noise levels reduced by an average of –12 dB (<math>L_{Aeq,24h}</math>).</li> <li>Both studies found lower sleep disturbance indicators/ improvement in sleep post intervention, with no change in the controls.</li> </ul>                                                                                                | Moderate<br>(downgraded for study limitations)                             |
| Type D – other physical interventions (availability of quiet side to the dwelling)                                                                                            | 100<br>(1)                       | <ul style="list-style-type: none"> <li>An absence of quiet façade resulted in increased reporting of difficulty in falling asleep.</li> </ul>                                                                                                                                                                                                                     | Very low<br>(downgraded for study limitations, inconsistency)              |
| <b>Cardiovascular disease</b>                                                                                                                                                 |                                  |                                                                                                                                                                                                                                                                                                                                                                   |                                                                            |
| Type D – other physical interventions (availability of quiet side to the dwelling)                                                                                            | 9203<br>(4)                      | <ul style="list-style-type: none"> <li>Three studies found changes (including in self-reported hypertension) with and without a quiet side. One study found no change.</li> </ul>                                                                                                                                                                                 | Very low<br>(downgraded for study limitations)                             |

Note: <sup>a</sup> This figure does not include number of participants from the studies by Langdon & Griffiths (1982) and Baughan & Huddart (1993), as the exact number of respondents was not reported.



### Type A – source interventions

Most of the nine source intervention studies – Baughan & Huddart (1993), Brown (1987; 2015), Brown et al. (1985), Griffiths & Raw (1987; 1989), Kastka (1981), Langdon & Griffiths (1982), Pedersen et al. (2013; 2014), Stansfeld et al. (2009b) – showed an effect in annoyance due to changes in road traffic flow rates. In some cases these were combined with other measures like improved road resurfacing, truck restrictions or complex control measures, including barriers or road surfaces. A majority of the changes resulted in reductions of noise levels.

Regarding the strength of association between exposure and annoyance outcome, all intervention studies demonstrated that the response was of at least the magnitude estimated by a steady-state ERF. The limited available evidence on long-term effects shows that this excess response undergoes some attenuation but is largely maintained over several years. In spite of the high risk of bias in all studies, the evidence in the systematic review was initially assessed as high quality, due to an upgrade because of the dose-response effect. However, the GDG decided to downgrade this assessment in an effort to maximize consistency with the grading approach of the remaining systematic reviews. It was therefore rated moderate quality.

### Type B – path interventions

Seven path intervention studies – Amundsen et al. (2011; 2013), Bendtsen et al. (2011), Gidloef-Gunnarsson et al. (2010), Kastka et al. (1995), Nilsson & Berglund (2006), Vincent & Champelovier (1993) – explored the effects on annoyance by interventions related to dwelling insulation, barrier constructions and a combination of both, as well as a full-scale building intervention. With the help of pre/post designs, the studies assessed changes in noise exposure achieved by the interventions over different periods of time. In six studies the path intervention was associated with a change in annoyance outcomes. Four of these showed that the annoyance response to the change was in the same direction and of at least the same magnitude estimated by the ERF. In spite of the high risk of bias in all studies, the evidence in the systematic review was initially assessed as high quality, due to an upgrade because of the dose-response effect. However, the GDG decided to downgrade this assessment in an effort to maximize consistency with the grading approach of the remaining systematic reviews. The evidence was therefore rated moderate quality.

Two of the studies (Amundsen et al., 2013; Bendtsen et al., 2011) assessed path interventions and sleep disturbance. The results showed a reduction in the %HSD after the interventions were conducted. One of the studies included a two-year follow-up, revealing the persistence of the effect. Risk of bias was assessed as high in both studies. The evidence was rated moderate quality.

### Type C – new/closed infrastructure interventions

Two infrastructural intervention studies (Gidloef-Gunnarsson et al., 2013; Oehrstroem, 2004; Oehrstroem & Skanberg, 2000) evaluated the impact on annoyance of major reductions in road traffic flows, combined with other environmental improvements. One was a new road tunnel infrastructure, resulting in substantial traffic and noise levels reductions for residents near the previously heavy-traffic road. Both studies were pre/post designs using repeated measures of annoyance outcomes. Following the reduction in noise levels (around  $-12$  dB  $L_{Aeq,24h}$ ), both studies demonstrated a statistically significant lower degree of annoyance, while there was no change in

the control group. Both also reported that the after-scores in the studies matched those estimated by the ERF, but both reported excess response, meaning that the response to change was in the direction estimated by the ERF but much steeper. In spite of the high risk of bias in all studies, the quality of the evidence in the systematic review was initially assessed as high, due to an upgrade because of the dose-response effect. However, the GDG decided to downgrade this assessment in an effort to maximize consistency with the grading approach of the remaining systematic reviews. The evidence was therefore rated moderate quality.

Two studies investigated the impact of new tunnels that removed traffic flow from surface roads on sleep disturbance (Oehrstroem, 2004; Oehrstroem & Skanberg, 2000; 2004). Subjective and objective measures of sleep quality were assessed before and after the intervention. Both studies demonstrated a statistically significant lower reporting of various sleep disturbance indicators post intervention. One study reported statistically significantly reduced time spent in bed after the intervention, which, according to the authors, could suggest increased sleep efficiency. Risk of bias was assessed as high, so this evidence was rated moderate quality.



### Type D – other physical infrastructure interventions

No intervention studies were available to assess impacts on annoyance of other physical interventions. The only relevant studies (Babisch et al., 2012; de Kluizenaar et al, 2011; 2013; Gidloef-Gunnarsson & Oehrstroem 2007; van Renterghem & Botteldooren, 2012; 2010) did not provide direct evidence of an intervention. Instead, they provided indirect evidence on the magnitude of the likely effect of certain interventions (e.g. using the quiet side of the dwelling, green space in the neighbourhood) by comparing responses from groups with and without the intervention/feature of interest. All studies found an effect of the presence of the dimension investigated; in all but one, the effect was statistically significant. Risk of bias was assessed as high in all studies, so the evidence was rated very low quality.

One study investigated a subjective assessment of difficulty in falling asleep (van Renterghem & Botteldooren, 2012), before and after the intervention. The difference in the proportion of participants reporting difficulty falling asleep “at least sometimes” between homes with and without a quiet side was statistically significant. Absence of a quiet façade resulted in increased reporting of this sleep parameter. Confounding was adjusted for in the analyses of the ERFs, including noise sensitivity, window-closing behaviour and front-façade  $L_{den}$ . Risk of bias was assessed as high, so the evidence was rated very low quality.

Four studies that assessed the effect of other physical interventions on cardiovascular disease were identified (Babisch et al., 2012; 2014a; Bluhm et al., 2007; Lercher et al., 2011). Three of these found changes, including self-reported hypertension, with and without a quiet side of the dwelling; in two the difference was statistically significant. The risk of bias in these studies was generally high, so the evidence was rated very low quality.

### 3.1.2.3 Consideration of additional contextual factors

As the foregoing overview has shown, ample evidence about the adverse health effects of long-term exposure to road traffic noise exists. Based on the quality of the available evidence, the GDG set the strength of the recommendation on road traffic noise at strong. As a second step, it qualitatively



assessed contextual factors to explore whether other considerations could have a relevant impact on the recommendation strength. These considerations mainly concerned the balance of harms and benefits, values and preferences, equity, and resource use and implementation.

When assessing the balance of harms and benefits of interventions to reduce exposure to road traffic noise, the GDG initially noted that road traffic is the most widespread source of noise pollution, measured in terms of the number of affected people both within and outside urban areas. The EEA estimates that more than 100 million people in Europe are exposed to  $L_{den}$  levels above 55 dB; for night-time road traffic noise, over 72 million Europeans are exposed to  $L_{night}$  levels above 50 dB (Blanes et al., 2017).<sup>14</sup> The amount of road traffic noise emitted is unlikely to decrease significantly: both transport demand, including for passenger cars (EC, 2016b), and the number of city inhabitants (Eurostat, 2016) are expected to increase. Considering the significant burden of disease attributable to exposure to road traffic noise (WHO Regional Office for Europe & JRC, 2011), the GDG expects substantial health benefits to evolve from implementing the recommendations to reduce population exposure to road traffic noise. Depending on the intervention measures used (such as restrictions of traffic), possible harms could include effects on the transportation of goods and on individual mobility of the population. Both can have impacts on local, national and international economies. Overall, the GDG estimated that the benefits gained from minimizing adverse health effects due to road traffic noise exposure outweigh the possible (economic) harms.

Considering values and preferences, it has been established that people appreciate quiet areas as beneficial for their health and well-being, especially in urban areas (Shepherd et al., 2013; Gidloef-Gunnarsson & Oehrstroem, 2007; Oehrstroem et al., 2006b). Nevertheless, the GDG recognized that the convenience of individual mobility with the help of passenger cars is valued overall by large parts of the population in the EU, as illustrated by the sustained high volume of passenger kilometres driven in Europe (EEA, 2016a; 2017a). In general, values and preferences are expected to vary throughout society, as exposure to environmental noise and continuous road traffic noise is not equally distributed: those of individuals directly affected by long-term road traffic exposure are likely to differ from those that are not affected. Individuals with a higher average sound pressure level of road traffic noise are, for example, more willing to pay to reduce their noise exposure (Bristow et al., 2014).

In light of the dimension of equity, the GDG highlighted the fact that the risk of exposure to road traffic noise is not equally distributed throughout society. People with lower socioeconomic status and other disadvantaged groups often live in more polluted and louder areas, including in proximity to busy roads (EC, 2016a). Moreover, socioeconomic factors are not only related to differences in exposure to environmental factors such as noise but are also associated with increased vulnerability and poorer coping capacities (Karpati et al., 2002).

With resource use and implementation considerations, the GDG recognized that no comprehensive cost-benefit analysis for the WHO European Region yet exists, so this assessment is based on informed expert judgement regarding the feasibility of implementing the recommendation for the majority of the population. As the systematic review of environmental noise interventions and their

<sup>14</sup> These are gap-filled figures based on the reported data and including the situation both within and outside cities, as defined by the END.

associated impact on health shows, various effective measures exist to reduce noise exposure from road traffic and improve health (Brown & van Kamp, 2017). The resources needed to implement these measures vary as they rely on the type of intervention and the context. The GDG pointed out the following four major solutions, which are known to be cost-effective: choice of appropriate tyres, use of low-noise road surfaces, building of noise barriers and installation of soundproof windows (CSES et al., 2016). Other types of intervention include limitations of speed or type of traffic allowed on roads.

Regarding feasibility of implementation, the GDG was convinced that many of the solutions can be planned as part of regular maintenance processes and accelerated fleet and road modernization. In particular, appropriate tyres and road surfaces are only slightly more expensive than existing products, and various countries have already considered or adopted similar interventions to reduce noise levels (Ohiduzzaman et al., 2016; Sirin, 2016). This indicates that solutions to achieve recommended noise levels can be implemented and carry a reasonable cost on a societal level. The GDG noted, however, that the feasibility of implementing measures can be hindered by the fact that costs and benefits are not evenly distributed. In most cases, the health benefits gained by interventions that reduce long-term road traffic exposure accrue to citizens, whereas the costs are borne by road users, private companies and public authorities. Furthermore, the GDG expects challenges in the implementation of all long-term measures that include changes in behaviour of the population, such as increased use of car-sharing or public transport. Even though the overall costs are expected to be significant, because of the large number of people affected, the benefit of implementation of the recommendation to minimize the risk of adverse health effects due to road traffic noise for a majority of the population exceeds the resources needed.



In light of the assessment of the contextual factors in addition to the quality of evidence, the recommendation remains strong.

### **Other nonpriority adverse health outcomes**

As an additional consideration, although not priority health outcomes and coming from a single study, the GDG noted the evidence rated moderate quality for an association between road traffic noise and the prevalence of diabetes (van Kempen et al., 2018). The noise levels in the study identified ranged from around 50 dB to 70 dB  $L_{den}$ , so the recommendation proposed is thought to be protective enough for this health outcome. Thus, it did not lead to a change in the recommendation.

### **Additional considerations or uncertainties**

Individual noise annoyance judgements of residents are to a large extent moderated by personal variables (such as noise sensitivity and coping capacity). However, further situational factors that apply to many residents should be taken into account when analysing noise annoyance from road traffic noise, as they may moderate the relationship. These include the type(s) of road being considered (highways, urban main roads, secondary roads and so on) and the related traffic composition (share of cars, motorcycles and heavy and loud trucks) and pattern (fluctuation, frequency, intermittency). Moreover, the location of settlements and/or individual dwellings, proximity to the road, and location and availability of a quiet façade can also influence the relationship when predicting health outcomes such as annoyance.



### 3.1.3 Summary of the assessment of the strength of the recommendations

Table 15 provides a comprehensive summary of the different dimensions for the assessment of the strength of the road traffic noise recommendations.

Table 15. Summary of the assessment of the strength of the road traffic noise recommendation

| Factors influencing the strength of recommendation | Decision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Quality of evidence                                | <p><b>Average exposure (<math>L_{den}</math>)</b></p> <p><i>Health effects</i></p> <ul style="list-style-type: none"> <li>Evidence for a relevant RR increase for incidence of IHD at <b>59 dB <math>L_{den}</math></b> was rated <b>high quality</b>.</li> <li>Evidence for the incidence of hypertension was rated <b>low quality</b>.</li> <li>Evidence for a relevant absolute risk of annoyance at <b>53 dB <math>L_{den}</math></b> was rated <b>moderate quality</b>.</li> <li>Evidence for a relevant RR increase for reading and oral comprehension was rated <b>very low quality</b>.</li> </ul> <p><i>Interventions</i></p> <ul style="list-style-type: none"> <li>Evidence on effectiveness of interventions to reduce noise exposure and/or health outcomes from road traffic noise is of varying quality.</li> </ul> <p><b>Night-time exposure (<math>L_{night}</math>)</b></p> <p><i>Health effects</i></p> <ul style="list-style-type: none"> <li>Evidence for a relevant absolute risk of sleep disturbance related to night noise exposure from road traffic at <b>45 dB <math>L_{night}</math></b> was rated <b>moderate quality</b>.</li> </ul> <p><i>Interventions</i></p> <ul style="list-style-type: none"> <li>Evidence on effectiveness of interventions to reduce noise exposure and/or sleep disturbance from road traffic noise is of varying quality.</li> </ul> |
| Balance of benefits versus harms and burdens       | Health benefits can be gained from markedly reducing exposure of the population to road traffic noise; benefits outweigh the harms of interventions to reduce continuous road traffic noise.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Values and preferences                             | Quiet areas are valued by the population, especially by those affected by continuous noise exposure. Some variability is possible between those who benefit from interventions to reduce road traffic noise and those who finance the interventions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Equity                                             | Risk of exposure to road traffic noise is not equally distributed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Resource use and implications                      | No comprehensive cost-effectiveness analysis data are available; nevertheless, a wide range of solutions exists and several are being implemented, showing that effective interventions are both feasible and economically reasonable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Decisions on recommendation strength               | <ul style="list-style-type: none"> <li><b>Strong</b> for guideline level for average noise exposure (<math>L_{den}</math>)</li> <li><b>Strong</b> for guideline value for average night noise exposure (<math>L_{night}</math>)</li> <li><b>Strong</b> for specific interventions to reduce noise exposure</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



## 3.2 Railway noise

### Recommendations

For average noise exposure, the GDG **strongly** recommends reducing noise levels produced by railway traffic below **54 dB  $L_{den}$** , as railway noise above this level is associated with adverse health effects.

For night noise exposure, the GDG **strongly** recommends reducing noise levels produced by railway traffic during night time below **44 dB  $L_{night}$** , as railway noise above this level is associated with adverse effects on sleep.

To reduce health effects, the GDG **strongly** recommends that policy-makers implement suitable measures to reduce noise exposure from railways in the population exposed to levels above the guideline values for average and night noise exposure. There is, however, insufficient evidence to recommend one type of intervention over another.



### 3.2.1 Rationale for the guideline levels for railway noise

The exposure levels were derived in accordance with the prioritizing process of critical health outcomes described in section 2.4.3. For each of the outcomes, the exposure level was identified by applying the benchmark, set as relevant risk increase to the corresponding ERF. In the case of exposure to railway noise, the process can be summarized as follows (Table 16).

Table 16. Average exposure levels ( $L_{den}$ ) for priority health outcomes from railway noise

| Summary of priority health outcome evidence                                                                                                                                 | Benchmark level    | Evidence quality                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------|
| <b>Incidence of IHD</b><br>No studies were available and therefore incidence of IHD could not be used to assess the exposure level.                                         | 5% increase of RR  | No studies met the inclusion criteria/no studies available |
| <b>Incidence of hypertension</b><br>One study met the inclusion criteria. There was no significant increase of risk associated with increased noise exposure in this study. | 10% increase of RR | Low quality                                                |
| <b>Prevalence of highly annoyed population</b><br>There was an absolute risk of 10% at a noise exposure level of 53.7 dB $L_{den}$ .                                        | 10% absolute risk  | Moderate quality                                           |
| <b>Permanent hearing impairment</b>                                                                                                                                         | No increase        | No studies met the inclusion criteria/no studies available |
| <b>Reading skills and oral comprehension in children</b>                                                                                                                    | One-month delay    | No studies met the inclusion criteria/no studies available |

In accordance with the prioritization process (see section 2.4.3), the GDG set a guideline exposure level of 53.7 dB  $L_{den}$  for average exposure, based on the relevant increase of the absolute %HA. In accordance with the defined rounding procedure, the value was rounded to 54 dB  $L_{den}$ . As the evidence on the adverse effects of railway noise was rated moderate quality, the GDG made the recommendation strong.

Next, the GDG assessed the evidence for night noise exposure and its effect on sleep disturbance (Table 17).

**Table 17. Night-time exposure levels ( $L_{\text{night}}$ ) for priority health outcomes from railway noise**

| Summary of priority health outcome evidence                                                                                                                | Benchmark level  | Evidence quality |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|
| <b>Sleep disturbance</b><br>3% of the participants in studies were highly sleep-disturbed at a noise level of <b>43.7 dB <math>L_{\text{night}}</math></b> | 3% absolute risk | Moderate quality |

Based on the evidence of the adverse effects of railway noise on sleep disturbance, the GDG defined a guideline exposure level of 43.7 dB  $L_{\text{night}}$ . The exact exposure value was rounded to 44 dB  $L_{\text{night}}$ . As the evidence was rated moderate quality, the GDG made the recommendation strong.

The GDG also considered the evidence for the effectiveness of interventions. The results showed that:

- intervening at the source by applying rail grinding procedures can reduce noise annoyance;
- behavioural interventions such as informing the community about noise interventions can reduce noise annoyance.

In light of the strong evidence about the adverse health effects, the GDG followed a precautionary approach and made a strong recommendation for interventions on railway noise, as it was confident that interventions are realizable and that best practices already exist for the management of noise from railways. Since the empirical evidence on the effectiveness of different types of intervention was rated either low or very low quality, the GDG felt that no recommendation could be made on the preferred type of intervention, and agreed not to recommend any specific type of intervention over another.

### 3.2.1.1 Other factors influencing the strength of recommendations

Other factors considered in the context of recommendations on railway noise included those related to values and preferences, benefits and harms, resource implications, equity, acceptability and feasibility; moreover, nonpriority health outcomes were considered. The assessment of all these factors – especially the values and preferences involved in railway noise – did not lead to a change in the strength of the recommendations. Further details are provided in Section 3.2.2.3.

## 3.2.2 Detailed overview of the evidence

The following sections provide a detailed overview of the evidence constituting the basis for setting the recommendations on railway noise. It is presented and summarized separately for each of the critical health outcomes, and the GDG's judgement of the quality of evidence is indicated (for a detailed overview of the evidence on important health outcomes, see Annex 4). Research into health outcomes and effectiveness of interventions is addressed consecutively.

A comprehensive summary of all evidence considered for each of the critical and important health outcomes can be found in the eight systematic reviews published in the *International Journal of Environmental Research and Public Health* (see section 2.3.2 and Annex 2).

### 3.2.2.1 Evidence on health outcomes

The key question posed was: in the general population exposed to railway noise, what is the exposure–response relationship between exposure to railway noise (reported as various noise indicators) and the proportion of people with a validated measure of health outcome, when adjusted for main confounders? A summary of the PICOS/PECCOS scheme applied and the main findings is set out in Tables 18 and 19.

Table 18. PICOS/PECCOS scheme of critical health outcomes for exposure to railway noise

| PECO       | Description                                                                                                                                                                                                                                                                                             |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Population | General population                                                                                                                                                                                                                                                                                      |
| Exposure   | Exposure to high levels of noise produced by railway traffic (average/night time)                                                                                                                                                                                                                       |
| Comparison | Exposure to lower levels of noise produced by railway traffic (average/night time)                                                                                                                                                                                                                      |
| Outcome(s) | For average noise exposure:<br>1. cardiovascular disease<br>2. annoyance<br>3. cognitive impairment<br>4. hearing impairment and tinnitus<br>5. adverse birth outcomes<br>6. quality of life, well-being and mental health<br>7. metabolic outcomes<br>For night noise exposure:<br>1. effects on sleep |

Table 19. Summary of findings for health effects from exposure to railway noise ( $L_{den}$ )

| Noise metric                           | Priority health outcome measure | Quantitative risk for adverse health             | Lowest level of exposure across studies | Number of participants (studies) <sup>a</sup> | Quality of evidence                                                             |
|----------------------------------------|---------------------------------|--------------------------------------------------|-----------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------|
| <b>Cardiovascular disease</b>          |                                 |                                                  |                                         |                                               |                                                                                 |
| $L_{den}$                              | Incidence of IHD                | –                                                | –                                       | –                                             | –                                                                               |
| $L_{den}$                              | Incidence of hypertension       | RR = 0.96 (95% CI: 0.88–1.04) per 10 dB increase | N/A                                     | 7249 (1)                                      | Low (downgraded for risk of bias and availability of only one study)            |
| <b>Annoyance</b>                       |                                 |                                                  |                                         |                                               |                                                                                 |
| $L_{den}$                              | %HA                             | OR = 3.53 (95% CI: 2.83–4.39) per 10 dB increase | 34                                      | 10 970 (10)                                   | Moderate (downgraded for inconsistency, directness; upgraded for dose-response) |
| <b>Cognitive impairment</b>            |                                 |                                                  |                                         |                                               |                                                                                 |
| $L_{den}$                              | Reading and oral comprehension  | –                                                | –                                       | –                                             | –                                                                               |
| <b>Hearing impairment and tinnitus</b> |                                 |                                                  |                                         |                                               |                                                                                 |
| $L_{den}$                              | Permanent hearing impairment    | –                                                | –                                       | –                                             | –                                                                               |

Note: <sup>a</sup> Results are partly derived from population-based studies.

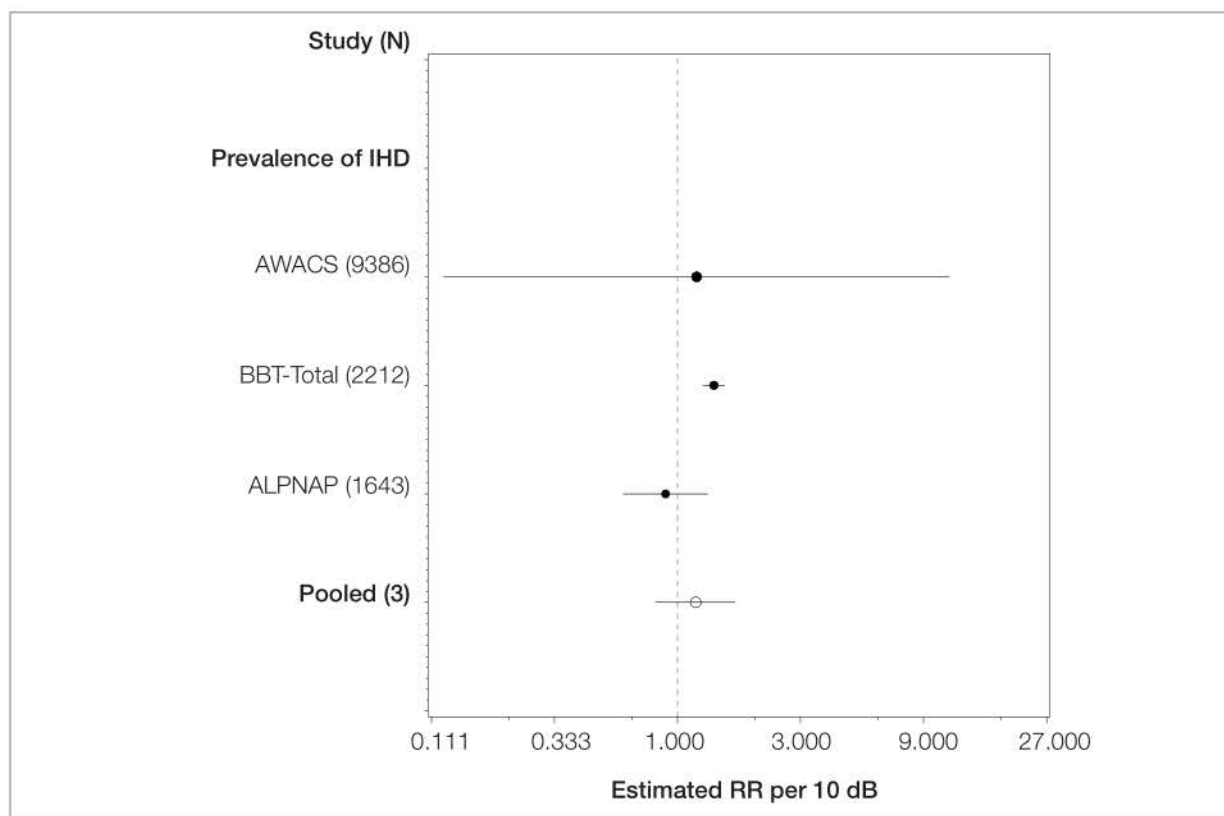


## Cardiovascular disease

### IHD

No evidence was available on the relationship between railway noise and the incidence of or mortality from IHD. Four cross-sectional studies were identified, however, that assessed the prevalence of IHD in a total of 13 241 participants, including 283 cases (Heimann et al., 2007; Lercher et al., 2008; 2011; van Poll et al., 2014). The overall risk was not statistically significantly increased: the RR was 1.18 (95% CI: 0.82–1.68) per 10 dB  $L_{den}$  increase, with inconsistency across studies (see Fig. 7). The evidence was rated very low quality.

Fig. 7. The association between exposure to railway noise ( $L_{den}$ ) and prevalence of IHD



Notes: The dotted vertical line corresponds to no effect of exposure to railway noise. The black circles correspond to the estimated RR per 10 dB and 95% CI. The white circle represents the pooled random effect estimates and 95% CI. For further details on the studies included in the figure please refer to the systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018).

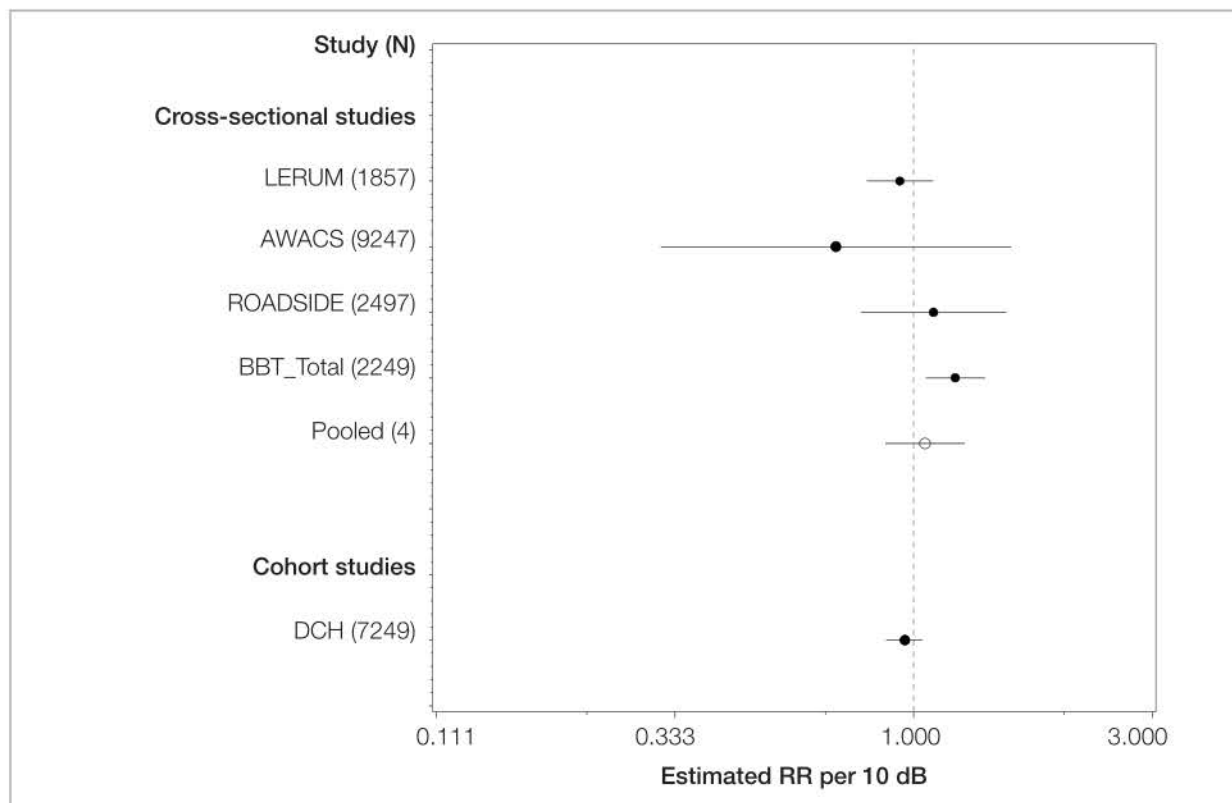
### Hypertension

One cohort study on the relationship between railway noise and hypertension was identified; it assessed the incidence among people living in Denmark (Sørensen et al., 2011; 2012a). The study involved 7249 participants, including 3145 cases. The authors did not find an association between railway noise exposure and incidence of hypertension, with RR = 0.96 (95% CI: 0.88–1.04) per 10 dB  $L_{den}$  increase. This evidence was rated low quality.

In addition, five cross-sectional studies assessed the prevalence of hypertension in 15 850 participants, including 2059 cases (Barregard et al., 2009; Eriksson et al., 2012; Lercher et al., 2008; 2011; van Poll et al., 2014). The overall RR increase was not statistically significant, at 1.05 (95% CI: 0.88–1.26) per 10 dB  $L_{den}$  increase. Moreover, there was inconsistency among the results across studies. The evidence was rated very low quality.

Fig. 8 presents the studies investigating the relationship between railway noise and different measures of hypertension.

Fig. 8. The association between exposure to railway noise ( $L_{den}$ ) and hypertension



Notes: The dotted vertical line corresponds to no effect of exposure to railway noise. The black dots correspond to the estimated RR per 10 dB and 95% CI. The white circle represents the summary estimate and 95% CI.

For further details on the studies included in the figure please refer to the systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018).

### Stroke

As for IHD, no evidence was available on the relationship between railway noise and incidence of or mortality from stroke. However, one cross-sectional study was identified that assessed the prevalence of stroke in 9365 participants, including 89 cases (van Poll et al., 2014). The overall risk was not statistically significantly increased, with RR = 1.07 (95% CI: 0.92–1.25) per 10 dB  $L_{den}$  increase. The evidence was rated very low quality.

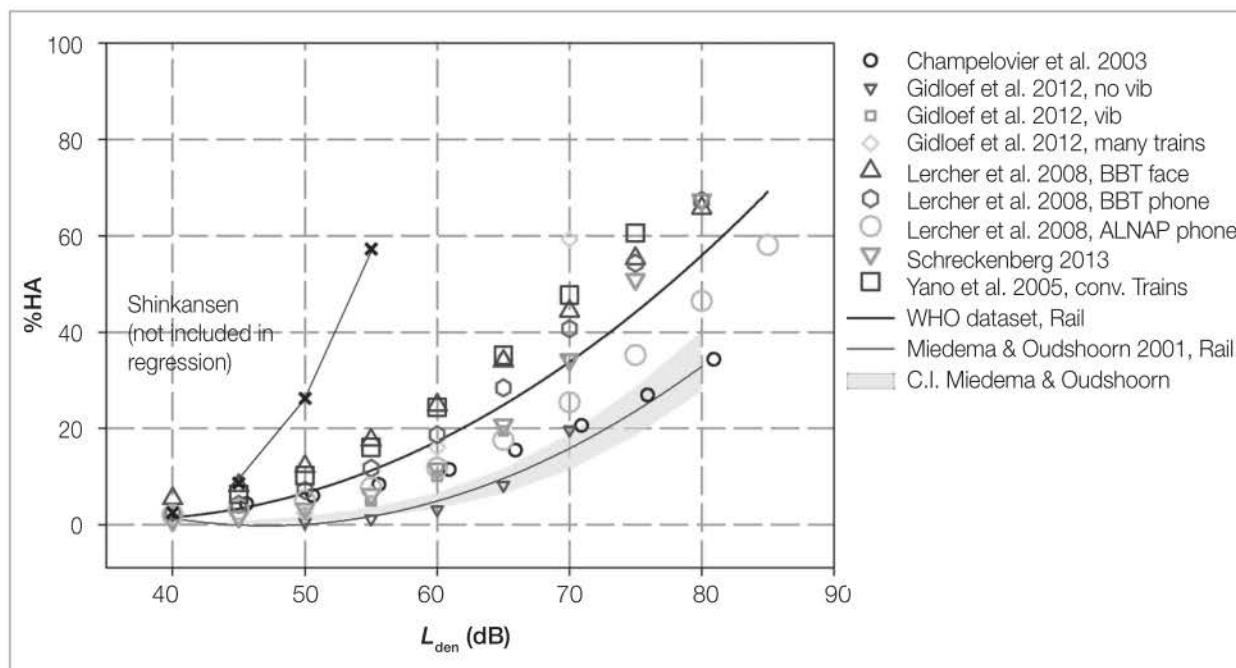
### Children's blood pressure

No evidence was available for the association between railway noise and the systolic and/or diastolic blood pressure of children in residential and/or educational settings.

### Annoyance

In total, 10 studies with ERFs on the association between railway noise and annoyance were included in analyses (Champelovier et al., 2003; Gidloef-Gunnarsson et al., 2012; Lercher et al., 2007; 2008; Sato et al., 2004; Schreckenberg, 2013; Yano et al., 2005; Yokoshima et al., 2008). The studies incorporated individual data from 10 970 participants. The estimated data points of each of these studies are plotted in Fig. 9, alongside an aggregated ERF including the data from all the individual studies (see the black line for “WHO dataset, Rail”). The lowest category of noise exposure considered in any of the studies, and hence included in the systematic review is 40 dB, corresponding to approximately 1.5%HA. The 10% benchmark for %HA is reached at 53.7 dB  $L_{den}$  (see Fig. 9).

Fig. 9. Scatterplot and quadratic regression of the relationship between railway noise ( $L_{den}$ ) and annoyance (%HA)



Notes: The ERF by Miedema & Oudshoorn (2001) is added in red for comparison.

There is no indication of 95% CIs of the WHO dataset curve, as a weighting based on the total number of participants for each 5 dB  $L_{den}$  sound class could not be calculated; weighting based on all participants of all sound classes proved to be unsuitable. The range of data included is illustrated by the distribution of data points.

For further details on the studies included in the figure please refer to the systematic review on environmental noise and annoyance (Guski et al., 2017).



Table 20 shows the %HA for railway noise exposure. The calculations are based on the regression equation  $\%HA = 38.1596 - 2.05538 \times L_{den} + 0.0285 \times L_{den}^2$  derived from the systematic review (Guski et al., 2017). The overall evidence was rated moderate quality. Additional statistical analyses of annoyance outcomes supported these findings. When comparing railway noise exposure at 50 dB and 60 dB, the analyses revealed evidence rated moderate quality for an association between railway noise and %HA for an increase per 10 dB (OR = 3.40; 95% CI: 2.05–5.62). Moreover, evidence rated high quality was available for the increase in %HA per 10 dB increase in sound exposure, when data on all sound classes were included (OR = 3.53; 95% CI: 2.83–4.39).

Table 20. The association between exposure to railway noise ( $L_{den}$ ) and annoyance (%HA)

| $L_{den}$ (dB) | %HA  |
|----------------|------|
| 40             | 1.5  |
| 45             | 3.4  |
| 50             | 6.6  |
| 55             | 11.3 |
| 60             | 17.4 |
| 65             | 25.0 |
| 70             | 33.9 |
| 75             | 44.3 |
| 80             | 56.1 |



### Cognitive impairment

Studies of railway noise on children's reading and oral comprehension were lacking. Nevertheless, other measures of cognition yielded evidence rated very low quality for an association between railway noise and children with poorer performance on standardized assessment tests (Bronzaft, 1981; Bronzaft & McCarthy, 1975). Evidence for the association between railway noise and children having poorer long-term memory (Lercher et al., 2003) was rated very low quality. No studies examined effects on short-term memory.

There was no clear relation between railway noise and attention in children (Lercher et al., 2003), and this evidence was rated very low quality.

### Hearing impairment and tinnitus

No studies were found, and therefore no evidence was available on the association between railway noise and hearing impairment and tinnitus.

### Sleep disturbance

For railway noise and self-reported sleep outcomes (awakenings from sleep, the process of falling asleep and sleep disturbance), five studies were identified that included a total of 7133 participants (Bodin et al., 2015; Hong et al., 2010; Sato et al., 2004; Schreckenberg, 2013). The studies were cross-sectional and conducted on healthy adults. The health outcome was measured by self-reporting via general health surveys and noise surveys that included questions about sleep in general, and other questions about how noise affects sleep (Table 21).

Table 21. Summary of findings for health effects from exposure to railway noise ( $L_{\text{night}}$ )

| Noise metric            | Priority health outcome measure | Quantitative risk for adverse health            | Lowest level of exposure across studies | Number of participants (studies) | Quality of evidence                                                                                         |
|-------------------------|---------------------------------|-------------------------------------------------|-----------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Effects on sleep</b> |                                 |                                                 |                                         |                                  |                                                                                                             |
| $L_{\text{night}}$      | %HSD                            | OR: 3.06 (95% CI: 2.38–3.93) per 10 dB increase | 33 dB                                   | 7133 (5)                         | Moderate (downgraded for study limitations, inconsistency; upgraded for dose-response, magnitude of effect) |

The model in the systematic review (Basner & McGuire, 2018) was based on outdoor  $L_{\text{night}}$  levels between 40 dB and 65 dB only; 40 dB was chosen as the lower limit because of possible inaccuracies in predicting lower noise levels. The range of noise exposure reported in the studies was 27.5–82.5 dB  $L_{\text{night}}$ . About 2% (95% CI: 0.79–3.48) of the population was characterized as highly sleep-disturbed for  $L_{\text{night}}$  levels of 40 dB. The %HSD at other, higher levels of railway noise is presented in Table 17. The association between railway noise and the probability of being sleep-disturbed was OR: 3.1 (95% CI: 2.4–3.9) per 10 dB increase in noise. This evidence was rated moderate quality.

Table 22. The association between exposure to railway noise ( $L_{\text{night}}$ ) and sleep disturbance (%HSD)

| $L_{\text{night}}$ (dB) | %HSD | 95% CI      |
|-------------------------|------|-------------|
| 40                      | 2.1  | 0.79–3.48   |
| 45                      | 3.7  | 1.63–5.71   |
| 50                      | 6.3  | 3.12–9.37   |
| 55                      | 10.4 | 5.61–15.26  |
| 60                      | 17.0 | 9.48–24.37  |
| 65                      | 26.3 | 15.20–37.33 |

Additional analyses were conducted for sleep quality measures, which provided supporting evidence on the overall relationship between railway noise and sleep. When the noise source was not specified in the question, the relationship between railway noise and self-reported sleep outcomes was still positive but no longer statistically significant, with an OR of 1.27 (95% CI: 0.89–1.81) per 10 dB increase (Bodin et al., 2015; Brink, 2011; Frei et al., 2014). This evidence was rated very low quality.

There was evidence rated moderate quality for an association between railway noise and the probability of additional awakenings, measured with polysomnography, with an OR of 1.35 (95% CI: 1.21–1.52) per 10 dB increase in indoor  $L_{\text{AS,max}}$  (Elmenhorst et al., 2012). Finally, evidence rated low quality was available for an association between railway noise and sleep outcomes measured as motility in adults (Griefahn et al., 2000; Hong et al., 2006; Lercher et al., 2010; Passchier-Vermeer et al., 2007), and rated very low quality for an association between railway noise and both self-reported and motility-measured sleep disturbance in children (Ising & Ising, 2002; Lercher et al., 2013; Tiesler et al., 2013).

### 3.2.2.2 Evidence on interventions

This section summarizes the evidence underlying the recommendation on the effectiveness of interventions for railway noise exposure (Tables 23 and 24). The key question posed was: in the

general population exposed to railway noise, are interventions effective in reducing exposure to and/or health outcomes from railway noise? A summary of the PICOS/PECCOS scheme applied and the main findings is set out in Tables 23 and 24.

**Table 23. PICOS/PECCOS scheme of the effectiveness of interventions for exposure to railway noise**

| PICO                   | Description                                                                                                                                                                                                                                                                                                                                        |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Population</b>      | <b>General population</b>                                                                                                                                                                                                                                                                                                                          |
| <b>Intervention(s)</b> | The interventions can be defined as:<br>(a) a measure that aims to change noise exposure and associated health effects;<br>(b) a measure that aims to change noise exposure, with no particular evaluation of the impact on health; or<br>(c) a measure designed to reduce health effects, but that may not include a reduction in noise exposure. |
| <b>Comparison</b>      | <b>No intervention</b>                                                                                                                                                                                                                                                                                                                             |
| <b>Outcome(s)</b>      | For average noise exposure:<br>1. cardiovascular disease<br>2. annoyance<br>3. cognitive impairment<br>4. hearing impairment and tinnitus<br>5. adverse birth outcomes<br>6. quality of life, well-being and mental health<br>7. metabolic outcomes<br><br>For night noise exposure:<br>1. effects on sleep                                        |



**Table 24. Summary of findings for railway noise interventions by health outcome**

| Type of intervention                                                                         | Number of participants (studies) | Effect of intervention                                                                                                                                                                                                                                                  | Quality of evidence                                                     |
|----------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>Annoyance</b>                                                                             |                                  |                                                                                                                                                                                                                                                                         |                                                                         |
| Type A – source interventions (rail grinding)                                                | 81 (1)                           | <ul style="list-style-type: none"> <li>Changes in noise level as a consequence of the intervention ranged from around –7dB to –8 dB.</li> <li>Most studies found changes in annoyance outcomes, persisting more than 12 months after the intervention.</li> </ul>       | Very low (downgraded for study limitations, inconsistency, imprecision) |
| Type C – changes in infrastructure (new rail infrastructure)                                 | 6000 <sup>a</sup> (1)            | <ul style="list-style-type: none"> <li>A very small increase in total noise exposure was found (most had &lt;+1 dB change; some had +2–4 dB change).</li> <li>Original noise from road traffic overwhelmed the train noise for effectively all participants.</li> </ul> | Very low (downgraded for study limitations, inconsistency, imprecision) |
| Type E – behaviour change interventions (informing the community about a noise intervention) | 411 (1)                          | <ul style="list-style-type: none"> <li>Exposure levels were not reported; emission levels reduced by 1–2 dB.</li> <li>A reduction in annoyance of the community as a result of the intervention was reported.</li> </ul>                                                | Very low (downgraded for study limitations, inconsistency, imprecision) |

*Note:* <sup>a</sup> According to Lam & Au (2008), this records the number of invitation letters sent; the response rate was not reported.

Three studies on railway noise interventions met the criteria to be included in the evidence base. All studies consisted of a pre/post design and reported annoyance outcomes at people's dwellings (Lam & Au, 2008; Moehler et al., 1997; Schreckenberg et al., 2013). They could be categorized as a source intervention, a new/closed infrastructure intervention and a communication intervention. In two of the studies, the changes in exposure after the intervention were only small, although there were significant effects on noise annoyance. The study on source interventions and annoyance revealed that a change of  $-10$  dB in noise exposure led to a significant reduction in annoyance, which persisted over a period of 12 months after the intervention. As confounding was not addressed, and railway noise was not the dominant sound source in the studies, the evidence was rated very low quality.

### 3.2.2.3 Consideration of additional contextual factors

As the foregoing overview has shown, sufficient evidence about the adverse health effects of long-term exposure to railway noise exists. Based on the quality of the available evidence, the GDG set the strength of recommendation on railway noise at strong. As a second step, it qualitatively assessed contextual factors to explore whether other considerations could have a relevant impact on the recommendation strength. These contextual considerations mainly concerned the balance of harms and benefits, values and preferences, and resource use and implementation.

When assessing the balance of harms and benefits of interventions to reduce exposure to railway noise and minimize noise-associated adverse health effects, the GDG recognized that railway transportation is the second most dominant source of environmental noise in Europe. Based on EEA estimates, the number of people exposed to  $L_{\text{den}}$  above 55 dB and  $L_{\text{night}}$  above 50 dB from railway noise is 17 million and 15 million, respectively (Blanes et al., 2017).<sup>15</sup> In light of the burden of disease from environmental noise, and railway noise in particular, the GDG agreed that the health benefits from a reduction of long-term railway noise exposure (especially during night time) to the recommended values would be significant. Considering possible harms related to adaptation of the recommended values, the GDG noted that reliance on railway transportation has increased in recent years in Europe and is expected to increase further, as an important component of the shift towards a greener economy. At a societal level, an environmental and economic benefit from the use of rail transportation is expected: trains contribute to lower environmental pollution and carbon emission than road transportation. Therefore, there is a need to balance the expected health benefits from reduced continuous railway noise exposure and the overall positive effects on the health of the population from increased reliance on the comparatively environmentally friendly mode of railway transportation. Overall, the GDG agreed that even though fewer people are exposed to railway noise than road traffic noise, it remains a major source of localized noise pollution; therefore, considerable benefits are gained by reducing exposure to railway noise.

When exploring values and preferences, the GDG acknowledged that, in general, people value rail as an alternative and more sustainable transportation method than air or road traffic (EEA, 2016a; 2016b; 2017b). Furthermore, the values and preferences in relation to implementation of the recommendation are expected to vary: those of individuals living in the vicinity of railway tracks are expected to differ from those of the rest of the population not exposed to railway noise on a long-term basis. Economic depreciation of housing and fear of adverse health effects were assumed

<sup>15</sup> These are gap-filled figures based on the reported data and including the situation both within and outside cities, as defined by the END.

to be two main aspects influencing the evaluation of affected individuals. This especially applies to areas where new railway tracks are being built, as this results in considerable change for local inhabitants. Moreover, the GDG acknowledged that preferences might also vary in the policy-making domain across different countries as the implementation of the recommendations would mean a renunciation of the so-called “railway bonus”.<sup>16</sup>

On resource use and implementation considerations, the GDG pointed out that no comprehensive cost-benefit analysis for the WHO European Region has yet been conducted, so this assessment is based on informed qualitative expert judgement regarding the feasibility of implementing the recommendation for the majority of the population. The systematic review of environmental noise interventions and their associated impact on health shows that various measures to reduce continuous noise from railway traffic exist, although knowledge about their effectiveness remains limited (Brown & van Kamp, 2017). The GDG noted that the resources needed to implement different measures may vary considerably, as they depend on the situation and the type of intervention required. Implementation of some measures is expected to be most feasible during the development of new railway tracks; such as rail pads, bi-bloc sleepers, small noise barriers and – in extreme cases – tunnels, cuttings or earthwork barriers. Other interventions include acoustic rail grinding, noise barriers built alongside the tracks, construction of quieter locomotives and wagons and replacement of brakes on freight trains. The GDG assumed that most of these solutions could be planned as part of regular maintenance or, for instance, by speeding up fleet modernization and track modernization. Even though not broadly implemented, the solutions mentioned above have already been considered or adopted to reduce noise levels from railway noise exposure. Some EU countries (such as Germany), have programmes to replace old brake blocks from freight trains with newer, quieter ones and to ban all freight trains with old brake blocks from 2020 (Umweltbundesamt, 2017). This illustrates that solutions to achieve recommended noise levels can be implemented at a reasonable cost. Overall, the GDG agreed that the benefit of implementation of the recommendation to minimize the risk of adverse health effects due to railway noise for a majority of the population exceeds the (monetary) resources needed.

In light of the assessment of the contextual factors in addition to the quality of evidence, the recommendation remains strong.

### Additional considerations or uncertainties

The GDG acknowledged that the main body of evidence for the recommendations on railway noise for average exposure was based on annoyance studies, conducted mainly in Asia and Europe. Studies are few for other priority health outcomes, and the evidence was generally rated low/very low quality. There is therefore uncertainty about the effects on health outcomes. Nevertheless, as a precautionary approach, a strong recommendation is made for average exposure to  $L_{den}$ , as a broad evidence base exists for health effects from exposure to other sources of transportation noise. However, the GDG stressed the importance of further research into health effects due to long-term exposure to railway noise.

Moreover, situational factors should be taken into account when analysing annoyance from railway noise. In particular, ground-borne vibrations are sometimes an additional exposure variable in railway

<sup>16</sup> The “railway bonus” is a correction factor commonly applied in the noise abatement policy domain in recent decades. It subsidizes the noise rating level for railway transportation by a predefined factor (Schuemer & Schuemer-Kohrs, 1991).





noise situations – especially in the case of annoyance – which may be difficult to separate from noise effects. In the set of 11 studies included in the systematic review on railway noise and annoyance, only two explicitly mentioned ground-borne vibrations as an additional source of annoyance.

Overall, the low-carbon, low-polluting nature of railway transport, especially using electric trains, means that rail is favoured over road and air traffic. However, night-time railway traffic on busy lines, including freight traffic, can be a significant source of sleep disturbance. Thus, guideline values should be set to encourage the development of rail traffic in Europe while at the same time giving adequate protection to residents from sleep disturbance.

### 3.2.3 Summary of the assessment of the strength of the recommendations

Table 25 provides a comprehensive summary of the different dimensions for the assessment of the strength of the railway noise recommendations.

Table 25. Summary of the assessment of the strength of the recommendation

| Factors influencing the strength of recommendation  | Decision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Quality of evidence</b>                          | <p><b>Average exposure (<math>L_{den}</math>)</b></p> <p><i>Health effects</i></p> <ul style="list-style-type: none"> <li>Evidence for a relevant absolute risk of annoyance at <b>54 dB <math>L_{den}</math></b> was rated <b>moderate quality</b>.</li> <li>Evidence for a relevant RR increase of the incidence of hypertension was rated <b>low quality</b>. One study met the inclusion criteria but did not find a significant increase.</li> </ul> <p><i>Interventions</i></p> <ul style="list-style-type: none"> <li>Evidence that different types of intervention reduce noise annoyance from railways was rated <b>very low quality</b>.</li> </ul> <p><b>Night-time exposure (<math>L_{night}</math>)</b></p> <p><i>Health effects</i></p> <ul style="list-style-type: none"> <li>Evidence for a relevant absolute risk of sleep disturbance related to night noise exposure from railways at <b>44 dB <math>L_{night}</math></b> was rated <b>moderate quality</b>.</li> </ul> <p><i>Interventions</i></p> <ul style="list-style-type: none"> <li>No evidence was available on the effectiveness of interventions to reduce noise exposure and/or sleep disturbance from railway noise.</li> </ul> |
| <b>Balance of benefits versus harms and burdens</b> | Railway noise is a major source of localized pollution. The health benefits of adapting the recommendation outweigh the harms. Nevertheless, it is important to consider the relevance of railways as an environmentally friendly mode of transportation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Values and preferences</b>                       | Quiet areas are valued by the population; especially by those affected by continuous noise exposure. Some variability is expected among those directly affected by railway noise and those not affected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Resource implications</b>                        | No comprehensive cost-effectiveness-analysis data are available, although a wide range of interventions exists, indicating that measures are both feasible and economically reasonable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Decisions on recommendation strength</b>         | <ul style="list-style-type: none"> <li><b>Strong</b> for guideline value for average noise exposure (<math>L_{den}</math>).</li> <li><b>Strong</b> for guideline value for night noise exposure (<math>L_{night}</math>).</li> <li><b>Strong</b> for specific interventions to reduce noise exposure.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



### 3.3 Aircraft noise

#### Recommendations

For average noise exposure, the GDG **strongly** recommends reducing noise levels produced by aircraft below **45 dB  $L_{den}$** , as aircraft noise above this level is associated with adverse health effects.

For night noise exposure, the GDG **strongly** recommends reducing noise levels produced by aircraft during night time below **40 dB  $L_{night}$** , as aircraft noise above this level is associated with adverse effects on sleep.

To reduce health effects, the GDG strongly recommends that policy-makers implement suitable measures to reduce noise exposure from aircraft in the population exposed to levels above the guideline values for average and night noise exposure. For specific interventions the GDG recommends implementing suitable changes in infrastructure.



#### 3.3.1 Rationale for the guideline levels for aircraft noise

The exposure levels were derived in accordance with the prioritization process of critical health outcomes described in section 2.4.3. For each of the outcomes, the exposure level was identified by applying the benchmark, set as relevant risk increase to the corresponding ERF. In the case of exposure to aircraft noise, the process can be summarized as follows (Table 26).

Table 26. Average exposure levels ( $L_{den}$ ) for priority health outcomes from aircraft noise

| Summary of priority health outcome evidence                                                                                                                                                                                                                                     | Benchmark level    | Evidence quality                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------|
| <b>Incidence of IHD</b><br>A relevant risk increase from exposure to aircraft noise occurs at 52.6 dB $L_{den}$ . The weighted average of the lowest noise levels measured in the studies was 47 dB $L_{den}$ and the corresponding RR in the meta-analysis was 1.09 per 10 dB. | 5% increase of RR  | Very low quality                      |
| <b>Incidence of hypertension</b><br>One study met the inclusion criteria. There was no significant increase of risk associated with increased noise exposure in this study.                                                                                                     | 10% increase of RR | Low quality                           |
| <b>Prevalence of highly annoyed population</b><br>There was an absolute risk of 10% at a noise exposure level of 45.4 dB $L_{den}$ .                                                                                                                                            | 10% absolute risk  | Moderate quality                      |
| <b>Permanent hearing impairment</b>                                                                                                                                                                                                                                             | No increase        | No studies met the inclusion criteria |
| <b>Reading skills and oral comprehension in children</b><br>A relevant risk increase was found at 55 dB $L_{den}$ .                                                                                                                                                             | One-month delay    | Moderate quality                      |



Based on the evaluation of evidence on relevant risk increases from the prioritized health outcomes, the GDG set a guideline exposure level of 45.4 dB  $L_{den}$  for average exposure to aircraft noise, based on the absolute %HA. It was confident that there was an increased risk for annoyance below this exposure level, but probably no relevant risk increase for other priority health outcomes. In accordance with the defined rounding procedure, the value was rounded to 45 dB  $L_{den}$ . As the evidence on the adverse effects of aircraft noise was rated moderate quality, the GDG made the recommendation strong.

Next, the GDG considered the evidence for night noise exposure and its effect on sleep disturbance (Table 27).

**Table 27. Night-time exposure levels ( $L_{night}$ ) for priority health outcomes from aircraft noise**

| Summary of priority health outcome evidence                                                                       | Benchmark level  | Evidence quality |
|-------------------------------------------------------------------------------------------------------------------|------------------|------------------|
| <b>Sleep disturbance</b><br>11% of participants were highly sleep-disturbed at a noise level of 40 dB $L_{night}$ | 3% absolute risk | Moderate quality |

Based on the evidence of the adverse effects of aircraft noise on sleep disturbance, the GDG defined a guideline exposure level of 40.0 dB  $L_{night}$ . It should be stressed that this recommendation for average aircraft noise levels at night far exceeds the benchmark of 3%HSD defined as relevant risk increase, but since no reliable acoustic data below this level were available, the GDG decided not to lower the guideline exposure level further, as an extrapolation of the exposure–response relationship to achieve these values would have been unavoidable. As the evidence was rated moderate quality, the GDG made the recommendation strong.

The GDG also considered the evidence for the effectiveness of interventions. The results showed that changes in infrastructure (opening and/or closing of runways, or flight path rearrangements) can lead to a reduction in aircraft noise exposure, as well as a decline in cognitive impairment in children and a reduction in annoyance. Moreover, examples of best practice already exist for the management of noise from aircraft, so the GDG made a strong recommendation.

### 3.3.1.1 Other factors influencing the strength of recommendations

Other factors considered in the context of recommendations on aircraft traffic noise included those related to values and preferences, benefits and harms, resource implications, equity, acceptability and feasibility; moreover, nonpriority health outcomes were considered. Ultimately, the assessment of all these factors did not lead to a change in the strength of the recommendations. Further details are provided in section 3.3.2.3.

### 3.3.2 Detailed overview of the evidence

The following sections provide a detailed overview of the evidence constituting the basis for setting the recommendations on aircraft noise. It is presented and summarized separately for each of the critical health outcomes, and the GDG's judgement of the quality of evidence is indicated (for a detailed overview of the evidence on important health outcomes, see Annex 4). Research into health outcomes and effectiveness of interventions is addressed consecutively.

A comprehensive summary of all evidence considered for each of the critical and important health outcomes can be found in the eight systematic reviews published in the *International Journal of Environmental Research and Public Health* (see section 2.3.2 and Annex 2).

#### 3.3.2.1 Evidence on health outcomes

The key question posed was: in the general population exposed to aircraft noise, what is the exposure–response relationship between exposure to aircraft noise (reported as various noise indicators) and the proportion of people with a validated measure of health outcome, when adjusted for main confounders? A summary of the PICOS/PECCOS scheme applied and the main findings is set out in Tables 28 and 29.



Table 28. PICOS/PECCOS scheme of critical health outcomes for exposure to aircraft noise

| PECO       | Description                                                                         |                           |
|------------|-------------------------------------------------------------------------------------|---------------------------|
| Population | General population                                                                  |                           |
| Exposure   | Exposure to high levels of noise produced by aircraft traffic (average/night time)  |                           |
| Comparison | Exposure to lower levels of noise produced by aircraft traffic (average/night time) |                           |
| Outcome(s) | For average noise exposure:                                                         | For night noise exposure: |
|            | 1. cardiovascular disease                                                           | 1. effects on sleep       |
|            | 2. annoyance                                                                        |                           |
|            | 3. cognitive impairment                                                             |                           |
|            | 4. hearing impairment and tinnitus                                                  |                           |
|            | 5. adverse birth outcomes                                                           |                           |
|            | 6. quality of life, well-being and mental health                                    |                           |
|            | 7. metabolic outcomes                                                               |                           |

Table 29 .Summary of findings for health effects from exposure to aircraft noise ( $L_{den}$ )

| Noise metric                           | Priority health outcome measure | Quantitative risk for adverse health              | Lowest level of exposure across studies | Number of participants (studies) <sup>a</sup> | Quality of evidence                                                    |
|----------------------------------------|---------------------------------|---------------------------------------------------|-----------------------------------------|-----------------------------------------------|------------------------------------------------------------------------|
| <b>Cardiovascular disease</b>          |                                 |                                                   |                                         |                                               |                                                                        |
| $L_{den}$                              | Incidence of IHD                | RR = 1.09 (95% CI: 1.04–1.15) per 10 dB increase  | 47 dB                                   | 9 619 082 <sup>a</sup> (2)                    | Very low (downgraded for risk of bias; upgraded for dose-response)     |
| $L_{den}$                              | Incidence of hypertension       | RR = 1.00 (95% CI: 0.77–1.30) per 10 dB increase  | N/A                                     | 4712 (1)                                      | Low (downgraded for risk of bias and because only one study available) |
| <b>Annoyance</b>                       |                                 |                                                   |                                         |                                               |                                                                        |
| $L_{den}$                              | %HA                             | OR = 4.78 (95% CI: 2.27–10.05) per 10 dB increase | 33 dB                                   | 17 094 (12)                                   | Moderate (downgraded for inconsistency)                                |
| <b>Cognitive impairment</b>            |                                 |                                                   |                                         |                                               |                                                                        |
| $L_{den}$                              | Reading and oral comprehension  | 1–2-month delay per 5 dB increase                 | Around 55 dB                            | (4)                                           | Moderate (downgraded for inconsistency)                                |
| <b>Hearing impairment and tinnitus</b> |                                 |                                                   |                                         |                                               |                                                                        |
| $L_{den}$                              | Permanent hearing impairment    | –                                                 | –                                       | –                                             | –                                                                      |

Note: <sup>a</sup> Results are partly derived from population-based studies.

## Cardiovascular disease

### IHD

No cohort or case-control studies on the relationship between aircraft noise and IHD are available. However, two ecological studies were identified that provide information on the relationship between aircraft noise and incidence (hospital admission) of IHD (Correia et al., 2013; Hansell et al., 2013). These involved a total of 9 619 082 participants, including 158 977 cases. The RR was 1.09 (95% CI: 1.04–1.15) per 10 dB  $L_{den}$  increase, and the lowest exposure range was  $\leq 51$  dB and  $< 45$  dB. Given the weights in the meta-analysis of these two studies, the weighted average starting level was calculated as 47 dB. The evidence was rated very low quality.

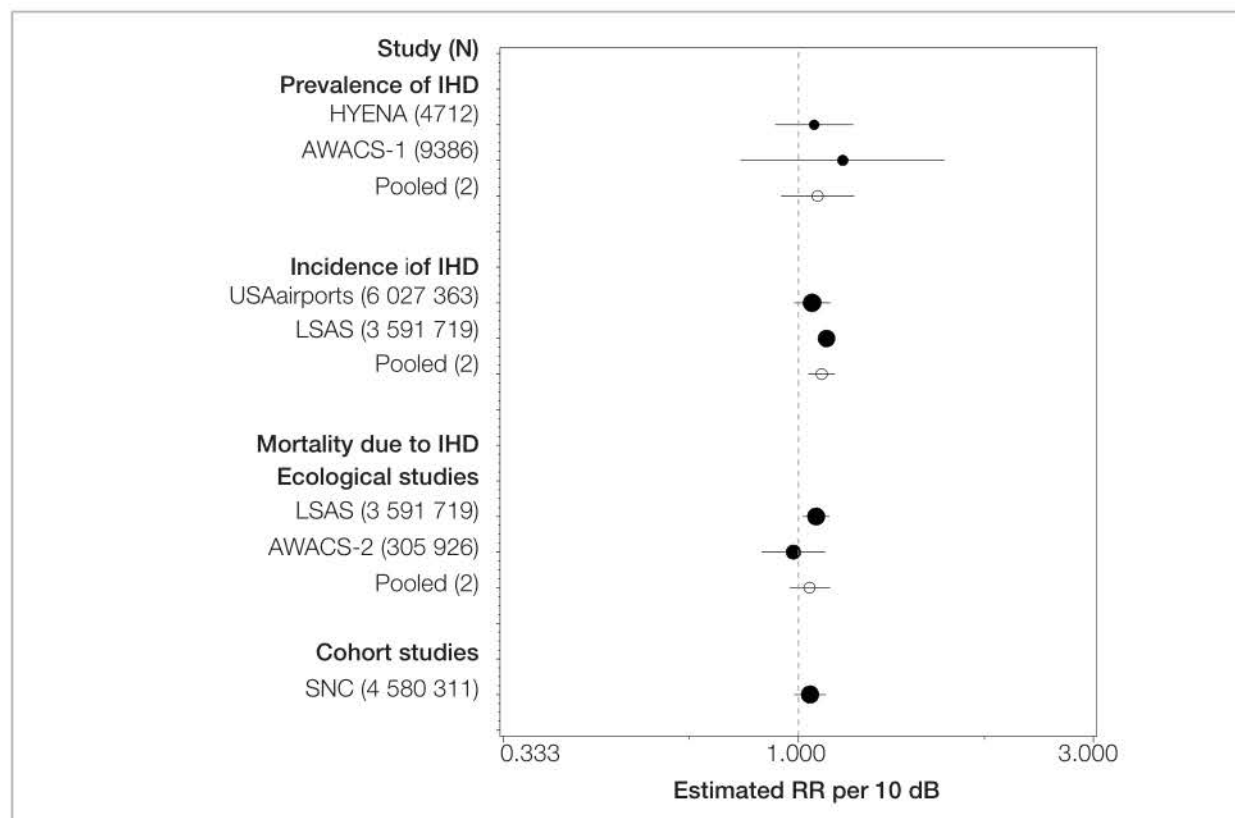
Two cross-sectional studies were identified that assessed the prevalence of IHD in people living in cities located around airports in Europe. The studies involved 14 098 participants, including 340 cases (Babisch et al., 2005b; 2008; 2012a; 2012b; 2013a; Floud et al., 2011; 2013a; 2013b; Jarup et al., 2005; 2008; van Poll et al., 2014). The overall risk was RR = 1.07 (95% CI: 0.94–1.23) per 10 dB  $L_{den}$  increase. The evidence was rated low quality.

With regard to the relationship between aircraft noise and mortality due to IHD, one cohort study (Huss et al., 2010) and two ecological studies (Hansell et al., 2013; van Poll et al., 2014) were identified. The cohort study identified 4 580 311 participants, including 15 532 cases, living in Switzerland, and the authors found an RR of 1.04 (95% CI: 0.98–1.11) per 10 dB  $L_{den}$  increase in noise. The evidence was rated low quality. The two ecological studies identified a total of 3 897 645

participants, including 26 066 cases in the Netherlands and the United Kingdom. The overall RR was 1.04 (95% CI: 0.97–1.12) per 10 dB  $L_{den}$  increase in noise, and the evidence was rated very low quality.

Fig. 10 summarizes the results for the relationship between aircraft noise and different measures of IHD.

Fig. 10. The association between exposure to aircraft noise ( $L_{den}$ ) and IHD



Notes: The dotted vertical line corresponds to no effect of exposure to aircraft noise. The black circles correspond to the estimated RR per 10 dB and 95% CI. The white circles represent the pooled random effect estimates and 95% CI. For further details on the studies included in the figure please refer to the systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018).

## Hypertension

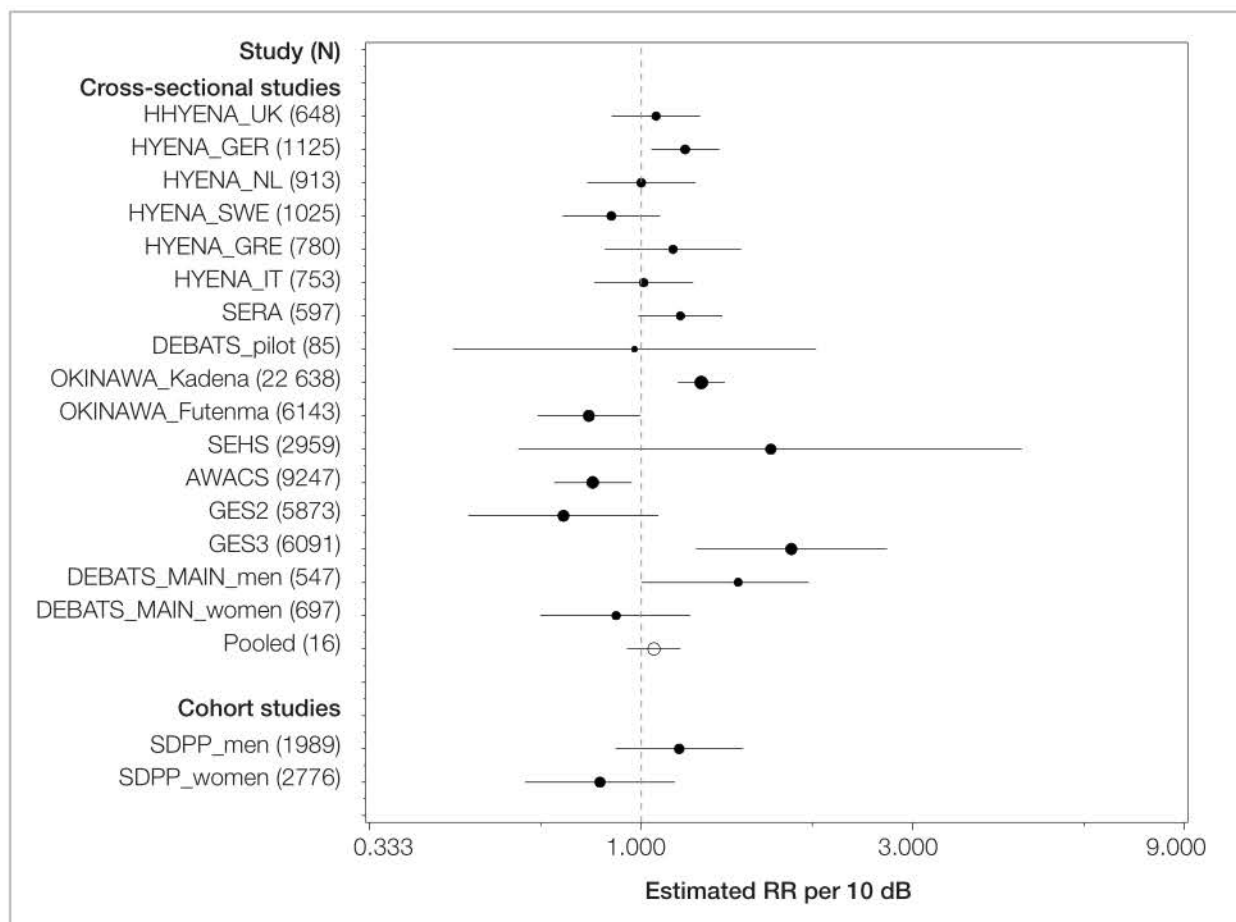
One cohort study was identified that assessed the relationship between aircraft noise and hypertension in people living in Sweden (Bluhm et al., 2004; 2009; Eriksson et al., 2007; 2010). The study involved 4712 participants, including 1346 cases. The authors found a nonstatistically significant effect size of RR = 1.00 (95% CI: 0.77–1.30) per 10 dB  $L_{den}$  increase. This evidence was rated moderate quality.

Furthermore, nine cross-sectional studies assessed the prevalence of hypertension in 60 121 participants, including 9487 cases (Ancona et al., 2010; Babisch et al., 2005b; 2008; 2012a; 2012b; 2013a; Breugelmans et al., 2004; Evrard et al., 2013; 2015; Houthuijs & van Wiechen, 2006; Jarup

et al., 2005; 2008; Matsui, 2013; Matsui et al., 2001; 2004; Rosenlund et al., 2001; van Kamp et al., 2006; van Poll et al., 2014). The overall RR was 1.05 (95% CI: 0.95–1.17) per 10 dB  $L_{den}$  increase, with inconsistency across studies. The evidence was rated low quality.

Fig. 11 summarizes the results for both prevalence and incidence of hypertension.

**Fig. 11. The association between exposure to aircraft noise ( $L_{den}$ ) and hypertension in cross-sectional and cohort studies**



Notes: The dotted vertical line corresponds to no effect of aircraft noise exposure. The black dots correspond to the estimated RR per 10 dB and 95% CI. The white circle represents the pooled summary estimate and 95% CI. For further details on the studies included in the figure please refer to the systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018).

## Stroke

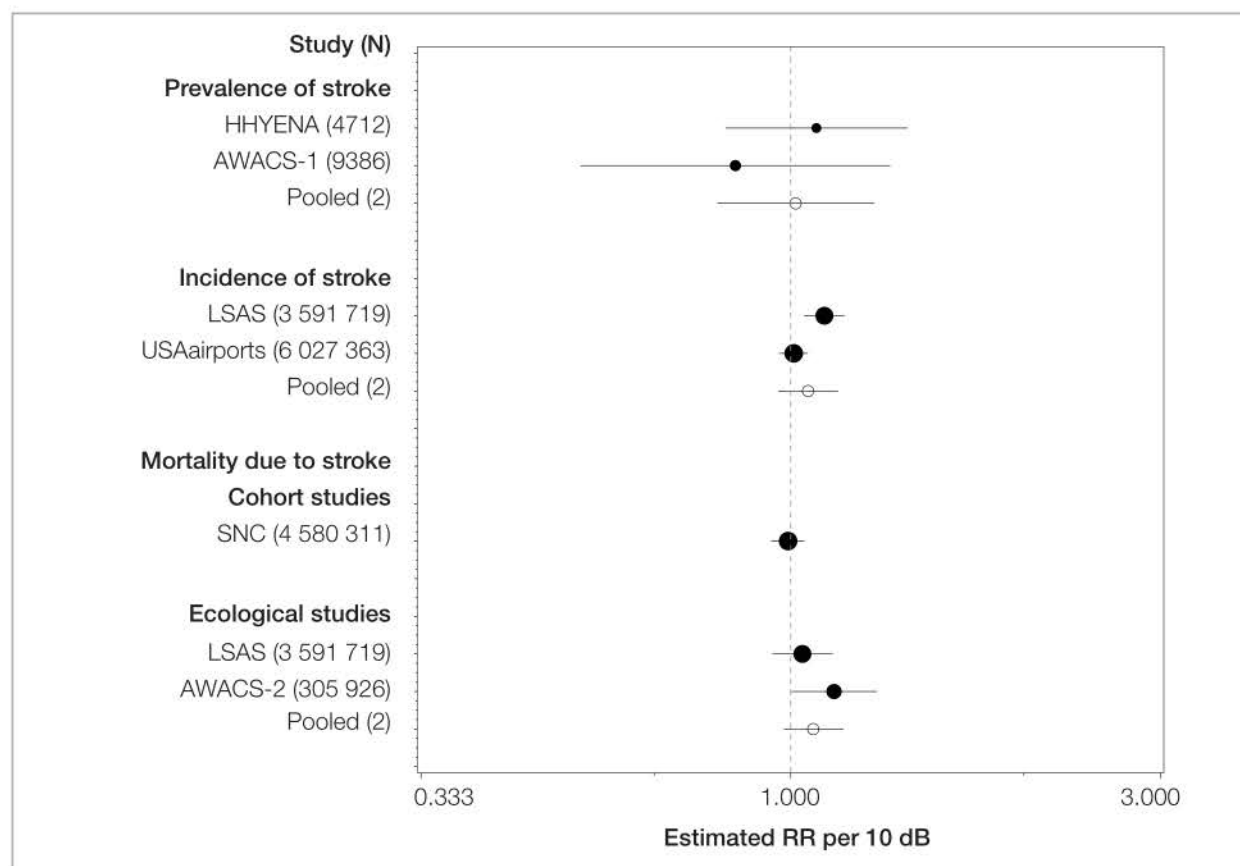
No cohort or case-control studies on the relationship between aircraft noise and incidence (hospital admission) of stroke were available, but two ecological studies were conducted in cities around airports in the United Kingdom and United States of America, involving 9 619 082 participants, including 97 949 cases (Correia et al., 2013; Hansell et al., 2013). An overall RR of 1.05 (95% CI: 0.96–1.15) per 10 dB  $L_{den}$  increase in noise was found. The evidence was rated very low quality.

Two cross-sectional studies were identified that assessed the prevalence of stroke in 14 098 participants, including 151 cases (Babisch et al., 2005b; 2008; 2012a; 2012b; 2013a; Floud et al., 2011; 2013a; 2013b; Jarup et al., 2005; 2008; van Poll et al., 2014). The overall RR was 1.02 (95% CI: 0.80–1.28) per 10 dB  $L_{den}$  increase. The evidence was rated very low quality.

On the relationship between aircraft noise and mortality due to stroke, one cohort study (Huss et al., 2010) and two ecological studies (Hansell et al., 2013; van Poll et al., 2014) were identified. The cohort study identified 4 580 311 participants, including 25 231 cases, living in Switzerland; the authors found an RR of 0.99 (95% CI: 0.94–1.04) per 10 dB  $L_{den}$  increase in noise. The overall evidence was rated moderate quality. The two ecological studies identified a total of 3 897 645 participants, including 12 086 cases, in the Netherlands and the United Kingdom. The overall RR was 1.07 (95% CI: 0.98–1.17) per 10 dB  $L_{den}$  increase in noise. The evidence was rated very low quality.

Fig. 12 summarizes the results for the relationship between aircraft noise and different measures of stroke.

Fig. 12. The association between exposure to aircraft noise ( $L_{den}$ ) and stroke



Notes: The dotted vertical line corresponds to no effect of exposure to aircraft noise. The black dots correspond to the estimated RR per 10 dB and 95% CI. The white circle represents the summary estimate and 95% CI. For further details on the studies included in the figure please refer to the systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018).

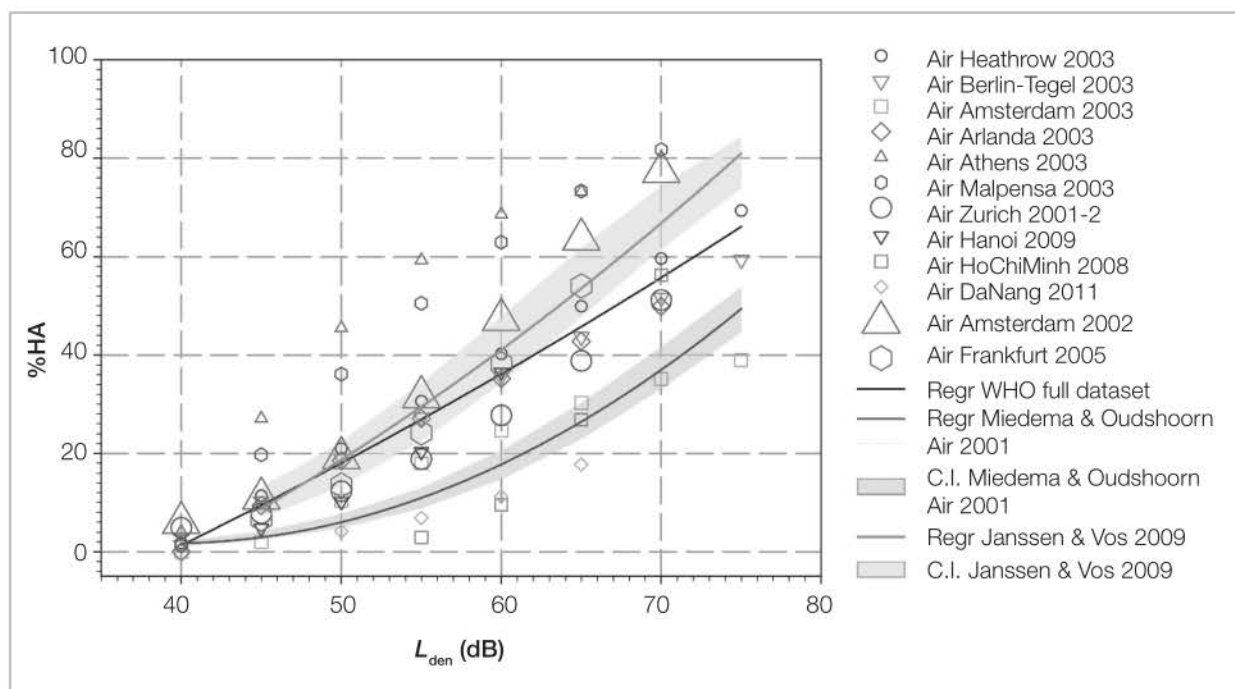
### Children's blood pressure

For the association between aircraft noise and blood pressure in children, two cross-sectional studies were conducted in Australia, the Netherlands and the United Kingdom, including a total of 2013 participants (Clark et al., 2012; Morrell et al., 1998; 2000; van Kempen et al., 2006). The change in both systolic and diastolic blood pressure was assessed, in residential and/or educational settings. There was serious inconsistency in the results and therefore no overall estimate of the effect was developed. The evidence was rated very low quality.

### Annoyance

A vast amount of evidence proves the association between aircraft noise and annoyance. In total, 12 aircraft noise studies were identified that were used to model ERFs of the relationship between  $L_{den}$  and %HA (Babisch et al., 2009; Bartels et al., 2013; Breugelmans et al., 2004; Brink et al., 2008; Gelderblom et al., 2014; Nguyen et al., 2011; 2012a; 2012b; Sato & Yano, 2011; Schreckenberg & Meis, 2007). These include data from 17 094 study participants. The estimated data points of each of the studies are plotted in Fig. 13, alongside an aggregated ERF including the data from all the individual studies (see the black line for "Regr WHO full dataset"). The lowest category of noise exposure considered in any of the studies, and hence included in the systematic review, is 40 dB, corresponding to approximately 1.2%HA. The benchmark level of 10%HA is reached at approximately 45 dB  $L_{den}$  (see Fig. 13).

**Fig. 13. Scatterplot and quadratic regression of the relationship between aircraft noise ( $L_{den}$ ) and annoyance (%HA)**



Notes: ERFs by Miedema & Oudshoorn (2001, red), and Janssen & Vos (2009, green) are added for comparison.

There is no indication of 95% CIs of the WHO dataset curve, as a weighting based on the total number of participants for each 5 dB  $L_{den}$  sound class could not be calculated; weighting based on all participants of all sound classes proved to be unsuitable. The range of data included is illustrated by the distribution of data points. For further details on the studies included in the figure please refer to the systematic review on environmental noise and annoyance (Guski et al., 2017).



Table 30 shows the %HA in relation to exposure to aircraft traffic noise. It is based on the regression equation  $\%HA = -50.9693 + 1.0168 \times L_{den} + 0.0072 \times L_{den}^2$  derived from the systematic review (Guski et al., 2017). As the majority of the studies are cross-sectional, the evidence was rated moderate quality.

The general quality of the evidence was further substantiated with the help of additional statistical analyses that apply classical health outcome measures to estimate noise annoyance. When comparing aircraft noise exposure at 50 dB and 60 dB, the analyses revealed evidence rated high quality for an association between aircraft noise and %HA for an increase per 10 dB (OR = 3.40; 95% CI: 2.42–4.80). Moreover, there was evidence rated high quality for the increase of %HA per 10 dB increase in sound exposure, when data on all sound classes were included (OR = 4.78; 95% CI: 2.27–10.05).

Table 30. The association between exposure to aircraft noise ( $L_{den}$ ) and annoyance (%HA)

| $L_{den}$ (dB) | %HA  |
|----------------|------|
| 40             | 1.2  |
| 45             | 9.4  |
| 50             | 17.9 |
| 55             | 26.7 |
| 60             | 36.0 |
| 65             | 45.5 |
| 70             | 55.5 |



### Cognitive impairment

Evidence rated moderate quality was available for an association between aircraft noise and reading and oral comprehension, assessed by standardized tests. This is based on a narrative review of 14 studies that examined aircraft noise exposure effects on reading and oral comprehension (Clark et al., 2006; 2012; 2013; Evans & Maxwell, 1997; Haines et al., 2001a; 2001b; 2001c; Hygge et al., 2002; Klatte et al., 2014; Matsui et al., 2004; Seabi et al., 2012; 2013; Stansfeld et al., 2005; 2010). Of these studies, 10 were cross-sectional, and only four had a longitudinal and/or intervention design (Clark et al., 2013; Haines et al., 2001c; Hygge et al., 2002; Seabi et al., 2013). Most of the studies (10 of 14) demonstrated a statistically significant association or at least demonstrated a trend between higher aircraft noise exposure and poorer reading comprehension.

This relationship is supported by evidence on other health outcome measures related to cognition. Evidence rated moderate quality was available for an association between aircraft noise and children with poorer performance on standardized assessment tests (Eagan et al., 2004; FICAN, 2007; Green et al., 1982; Sharp et al., 2014). There was also evidence rated moderate quality on aircraft noise being associated with children having poorer long-term memory (Haines et al., 2001b). No studies examined the effects on short-term memory.

However, there was no substantial effect (evidence rated low quality) of aircraft noise on children's attention (Haines et al., 2001a; Hygge et al., 2002; Matsui et al., 2004; Stansfeld et al., 2005; 2010), or on executive function (working memory) (evidence rated very low quality), with studies consistently suggesting no association for aircraft noise (Clark et al., 2012; Haines et al., 2001a;

Haines et al., 2001b; Klatte et al., 2014; Matheson et al., 2010; Stansfeld et al., 2005; 2010; van Kempen et al., 2010; 2012).

### Hearing impairment and tinnitus

No studies were found, and therefore no evidence was available on the association between aircraft noise and hearing impairment and tinnitus.

### Sleep disturbance

For aircraft noise and self-reported sleep outcomes, six studies were identified that included a total of 6371 participants (Nguyen et al., 2009; 2010; 2011; 2012c; 2015; Schreckenberg et al., 2009; Yano et al., 2015). The majority of studies were cross-sectional by design and were conducted in otherwise healthy adults. The model was based on outdoor  $L_{\text{night}}$  levels between 40 dB and 65 dB only; the lower limit of 40 dB was set because of inaccuracies in predicting lower noise levels (Table 31).

**Table 31. Summary of findings for health effects from exposure to aircraft noise ( $L_{\text{night}}$ )**

| Noise metric            | Priority health outcome measure | Quantitative risk for adverse health            | Lowest level of exposure across studies | Number of participants (studies) | Quality of evidence                                                                                         |
|-------------------------|---------------------------------|-------------------------------------------------|-----------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Effects on sleep</b> |                                 |                                                 |                                         |                                  |                                                                                                             |
| $L_{\text{night}}$      | %HSD                            | OR: 1.94 (95% CI: 1.61–2.33) per 10 dB increase | 35 dB                                   | 6371 (6)                         | Moderate (downgraded for study limitations, inconsistency; upgraded for dose-response, magnitude of effect) |

The range of noise exposure reported in studies was 37.5–62.5 dB. Over 11% (95% CI: 4.72–17.81) of the population was characterized as highly sleep-disturbed at  $L_{\text{night}}$  levels of 40 dB. The %HSD at other, higher levels of aircraft noise is presented in Table 27. The table is derived from the regression model in the systematic review specified as  $\%HSD = 16.79 - 0.9293 \times L_{\text{night}} + 0.0198 \times L_{\text{night}}^2$ . The health outcome was measured in the studies by self-reporting, focusing on questions asking about awakenings from sleep, the process of falling asleep and/or sleep disturbance, where the question referred specifically to how noise affects sleep. The same relationship between aircraft noise and reporting being sleep-disturbed (all questions combined) can also be expressed as an OR of 1.94 (95% CI: 1.61–2.33) per 10 dB increase in noise. This evidence was rated moderate quality.

**Table 32. The association between exposure to aircraft noise ( $L_{\text{night}}$ ) and sleep disturbance (%HSD)**

| $L_{\text{night}}$ | %HSD | 95% CI      |
|--------------------|------|-------------|
| 40                 | 11.3 | 4.72–17.81  |
| 45                 | 15.0 | 6.95–23.08  |
| 50                 | 19.7 | 9.87–29.60  |
| 55                 | 25.5 | 13.57–37.41 |
| 60                 | 32.3 | 18.15–46.36 |
| 65                 | 40.0 | 23.65–56.05 |

Additional analyses were included in the systematic review and provided supporting evidence on the association between aircraft noise and sleep. When the noise source was not specified in the survey question, the relationship between aircraft noise and self-reported sleep outcomes was still positive, although no longer statistically significant (OR: 1.17 (95% CI: 0.54–2.53) per 10 dB increase) (Brink, 2011). This evidence was rated very low quality.

Further, there was evidence rated moderate quality for an association between aircraft noise and polysomnography-measured outcomes (probability of additional awakenings), with an OR of 1.35 (95% CI: 1.22–1.50) per 10 dB increase in indoor  $L_{AS,max}$  (Basner et al., 2006). Evidence rated low quality was also available for an association between aircraft noise and motility-measured sleep outcomes in adults (Passchier-Vermeer et al., 2002).

### 3.3.2.2 Evidence on interventions

The following section summarizes the evidence underlying the recommendation on the effectiveness of interventions for aircraft noise exposure. The key question posed was: in the general population exposed to aircraft noise, are interventions effective in reducing exposure to and/or health outcomes from aircraft noise? A summary of the PICOS/PECCOS scheme applied and the main findings is set out in Tables 33 and 34.

Seven studies examining different types of interventions on aircraft noise met the inclusion criteria to become part of the evidence base of the systematic review. Six of these investigated infrastructure interventions (Breugelmans et al., 2007; Brink et al., 2008; Fidell et al., 2002; Hygge et al., 2002), and one assessed a path intervention (Asensio et al., 2014). The majority of studies focused on annoyance as a health outcome, but two also included effects on sleep and one investigated the effects of path interventions on cognitive development in children.

**Table 33. PICOS/PECCOS scheme of the effectiveness of interventions for exposure to aircraft noise**

| PICO                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Population</b>      | <b>General population</b>                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Intervention(s)</b> | The interventions can be defined as: <ul style="list-style-type: none"> <li>(a) a measure that aims to change noise exposure and associated health effects;</li> <li>(b) a measure that aims to change noise exposure, with no particular evaluation of the impact on health; or</li> <li>(c) a measure designed to reduce health effects, but that may not include a reduction in noise exposure.</li> </ul>                                                |
| <b>Comparison</b>      | <b>No intervention</b>                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Outcome(s)</b>      | <div>For average noise exposure:</div> <ol style="list-style-type: none"> <li>1. cardiovascular disease</li> <li>2. annoyance</li> <li>3. cognitive impairment</li> <li>4. hearing impairment and tinnitus</li> <li>5. adverse birth outcomes</li> <li>6. quality of life, well-being and mental health</li> <li>7. metabolic outcomes</li> </ol> <div>For night noise exposure:</div> <ol style="list-style-type: none"> <li>1. effects on sleep</li> </ol> |



Table 34. Summary of findings for aircraft noise interventions by health outcome

| Type of intervention                                                                                  | Number of participants (studies) | Effect of intervention                                                                                                                                                                                                                                                                                                                                              | Quality of evidence                                                        |
|-------------------------------------------------------------------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <b>Annoyance</b>                                                                                      |                                  |                                                                                                                                                                                                                                                                                                                                                                     |                                                                            |
| Type B – path interventions (retrofitting dwellings close to airports with acoustic insulation)       | 689 (1)                          | <ul style="list-style-type: none"> <li>Change in noise levels was not reported.</li> <li>The study found a drop in annoyance following the insulation intervention</li> </ul>                                                                                                                                                                                       | Very low<br>(downgraded for study limitations, inconsistency, precision)   |
| Type C – changes in infrastructure (opening and/or closing of runways, or flight path rearrangements) | 2101 (3)                         | <ul style="list-style-type: none"> <li>There was a wide range of changes in noise levels (from –12 dB to +13.7 dB; most between <math>\pm 1</math> dB and 2 dB; different noise indicators used).</li> <li>All studies found changes in annoyance outcomes as a result of the intervention.</li> </ul>                                                              | Moderate<br>(downgraded for study limitations; upgraded for dose-response) |
| <b>Sleep disturbance</b>                                                                              |                                  |                                                                                                                                                                                                                                                                                                                                                                     |                                                                            |
| Type C – changes in infrastructure (flight path changes)                                              | 1707 (2)                         | <ul style="list-style-type: none"> <li>Changes in noise levels were mostly between <math>\pm 1</math> dB and 2 dB.</li> <li>Both studies found changes in sleep disturbance outcomes as a result of the intervention.</li> </ul>                                                                                                                                    | Low<br>(downgraded for study limitations)                                  |
| <b>Cognitive development of children</b>                                                              |                                  |                                                                                                                                                                                                                                                                                                                                                                     |                                                                            |
| Type C – changes in infrastructure (opening and/or closing of runways, or flight path rearrangements) | 326 (1)                          | <ul style="list-style-type: none"> <li>Changes in noise levels of +9 dB at the new airport and of –14 dB at the old airport were reported.</li> <li>The study found various cognitive effects on children (for both the reduction and the increase in exposure). Effects disappeared when the old airport closed, emerging after the new airport opened.</li> </ul> | Moderate<br>(downgraded for inconsistency)                                 |

The largest body of research concentrated on the opening and closing of runways, leading to subsequent changes in flight paths (Breugelmans et al., 2007; Brink et al., 2008; Fidell et al., 2002). It showed that changes in noise exposure as a consequence of rearrangement of flight paths, step changes or increase or removal of over-flights resulted in statistically significant changes of the annoyance ratings of residents living in the vicinity of airports. The studies investigated both increases and reductions in exposure. Moreover, all the studies provided evidence that the change in response to noise exposure was an excess response to the intervention. As all the studies either adjusted for confounding or ruled out confounding by design, and the risk of bias was high in two studies but low in one, the evidence was rated moderate quality.

Two of these studies also investigated the effects of interventions on sleep disturbance. The results indicated that the percentage of sleep disturbance changed in association with the change in noise exposure caused by flight path adaptations (Breugelmans et al., 2007; Fidell et al., 2002). Both studies adjusted for confounding, but the risk of bias was assessed as high. Thus, the evidence was rated low quality.

One study examined the impact of rearranging flight paths on the cognitive effects on children (Hygge et al., 2002), showing various effects (for both the reduction and the increase in exposure).

The study ruled out confounding by study design and the risk of bias was assessed as low. The evidence was therefore rated moderate quality.

Alongside infrastructure interventions, a Spanish study presented evidence on path interventions (Asensio et al., 2014), showing a drop in annoyance following an insulation intervention. The study did not control for confounding and the risk of bias was assessed as high. The evidence was therefore rated very low quality.

### 3.3.2.3 Consideration of additional contextual factors

As the foregoing overview has shown, substantial evidence about the adverse health effects of long-term exposure to aircraft noise exists. Based on the quality of the available evidence, the GDG set the strength of the recommendation of aircraft noise at strong. As a second step, it qualitatively assessed contextual factors to explore whether other considerations could have a relevant impact on the recommendation strength. These considerations mainly concerned the balance of harms and benefits, values and preferences, equity, and resource use and implementation.

When assessing the balance of harms and benefits from implementing the recommendations on aircraft exposure, the GDG acknowledged that the number of people affected was lower than for road traffic or railway noise, since aircraft noise only affects the areas surrounding airports and under flight paths. Data from the EEA show that the estimated number of people in Europe exposed to  $L_{den}$  levels above 55 dB and  $L_{night}$  levels above 50 dB is 3 million and 1.2 million, respectively (Blanes et al., 2017).<sup>17</sup> Nevertheless, it remains a major source of localized noise pollution and has been predicted to increase (EASA et al., 2016). Furthermore, aircraft noise is regarded as more annoying than the other sources of transportation noise (Schreckenberg et al., 2015; Miedema & Oudshoorn, 2001); it is therefore associated with a significant burden on public health, and the GDG expects substantial health benefits for the population to evolve from implementing the recommendations to reduce exposure to aircraft traffic noise. Furthermore, the GDG noted that, depending on the intervention measure implemented (such as a night flight ban), additional health benefits could evolve, resulting from a simultaneous reduction in air pollution (EC, 2016a). The GDG also acknowledged that intervention measures like night flight bans might also reduce carbon emission, thereby positively influencing the shift towards a greener and more sustainable economy. Possible harms in relation to the applied noise abatement strategy, on the other hand, could include effects on the transportation of goods, as well as individual mobility of the population. Both could have impacts on local, national and international economies. Overall, the GDG estimated that the benefits gained from minimizing adverse health effects due to aircraft noise exposure outweigh the possible (economic) harms.

Considering values and preferences, the GDG noted that negative attitudes towards aircraft noise are especially prevalent in affected individuals who can see and hear aircraft from their house, or who fear that living in proximity of airports will have an impact on their health (Schreckenberg et al., 2015) or property value (economic loss) (Bristow et al., 2014). A lack of trust in the airport and government authorities can enhance these negative attitudes towards airports and aircraft noise (Borsky, 1979; Schreckenberg, 2017). Furthermore, the GDG recognized that values and preferences of individuals living in the vicinity of different airports may vary, as the infrastructural characteristics

<sup>17</sup> These are gap-filled figures based on the reported data and including the situation both within and outside cities, as defined by the END.





of airports have a significant effect on the evaluation of residents. Airports with a stable number of aircraft movements in the near past and no intention to change the number in the future can give rise to a different evaluation of values and preferences than airports with relatively sustained increases in the number of aircraft movements. This can result from the fact that opening new runways or increasing the number of flights usually means considerable change in the environment for inhabitants of the affected area. It has been postulated that the change of exposure itself may be an annoying factor, and this may explain why aircraft noise annoyance is generally higher than that for other sources of transportation noise at a comparable noise level (Brown & van Kamp, 2009). The GDG acknowledged that, in general, air travel is an important means of transportation relevant for businesses, the public and the economy. In Europe, aviation is projected to be the fastest-growing sector from passenger transport demand, by 2050 (EEA, 2016a). The general population tends to value the convenience of travel by air. Moreover, the GDG pointed out that exposure to aircraft noise is not equally distributed throughout society. The preferences of people living in the vicinity of airports are expected to differ from those of the general population that does not experience the same noise burden. This might facilitate variance in the values and preference of the population, as those benefiting from the services and revenues generated by an airport may regard noise reduction measures as an additional, unnecessary extra cost, while those living around an airport and affected by aircraft noise may be in favour of noise reductions, since this concerns their health and well-being. Despite these differences, however, the GDG was confident that a majority of the population would value the minimization of adverse health effects and therefore welcome the implementation of the recommendations.

Regarding the dimension of equity, the GDG highlighted that the risk of exposure to aircraft noise is not equally distributed throughout society. Members of society with a lower socioeconomic status and other disadvantaged groups often live in more polluted and louder areas, including in close proximity to airports (EC, 2016a). In addition to the increased risk of exposure to environmental noise, socioeconomic factors are also associated with increased vulnerability and poorer coping capacities (Karpati et al., 2002).

With resource use and implementation considerations, the GDG acknowledged that the economic evaluation of the health impacts of environmental noise is most elaborate and extensive for aircraft noise (Berry & Sanchez, 2014). Nevertheless, no comprehensive cost-benefit analysis for the WHO European Region yet exists, so this assessment is based on informed qualitative expert judgement regarding the feasibility of implementing the recommendation for the majority of the population. The systematic review of interventions and their associated impact on environmental noise and health shows that various measures to reduce continuous noise from aircraft exist. Moreover, the quality of the evidence was judged to be moderate (Brown & van Kamp, 2017). The GDG noted that the resources needed to implement different intervention measures may vary considerably, because they depend on the situation and the type of intervention required. The distribution of costs also differs from that for other modes of transportation, since exposure to aircraft noise is localized in a more agglomerated way, and overall the population affected is smaller compared to other modes of transportation. The GDG furthermore recognized that multiple cost-effective intervention strategies exist (EC, 2016b). Prohibition or discouragement strategies against citizens moving to the direct proximity of airports, for example, can be implemented in the context of urban planning. Likewise, diverting flight paths above less-populated areas can lead to a reduction in exposure. In principle,

such intervention measures do not involve any direct costs, although safety concerns may limit the feasibility of these strategies. Passive noise abatement measures like the installation of soundproof windows at the dwelling were also regarded as feasible and economically reasonable by the GDG, as these are implemented at several airports already. In relation to active abatement measures, the GDG acknowledged the “balanced approach” elaborated by International Civil Aviation Organization, which states that noise reduction should take place first at the source. As indicated by the Clean Sky Programme, this could, for example, entail shifting towards the introduction of new aircraft. This broad European research programme estimates that, depending on type, the shift to newly produced aircraft could lead to a reduction of approximately 55–79% of the area affected by aircraft noise, and consequently the population exposed. As this solution has been put forward by the aviation sector, it is considered feasible. Overall, this indicates that solutions to achieve recommended noise levels can be implemented and at reasonable costs. The GDG agreed that implementation of the recommendation to minimize the risk of adverse health effects due to aircraft noise for a majority of the population would require a reasonable amount of (monetary) resources. It noted, however, that the feasibility of implementing the measures could be hindered by the fact that costs and benefits are not equally distributed. In most cases, the health benefits citizens gain from interventions that reduce aircraft exposure are borne by private companies and public authorities.

In light of the assessment of the contextual factors in addition to the quality of evidence, the recommendation remains strong.

### Other nonpriority adverse health outcomes

Although not a priority health outcome and coming from a single study, the GDG noted the evidence rated moderate quality for the statistically significant association between aircraft noise and the change in waist circumference (Eriksson et al., 2014). The range of noise levels in the study identified was 48 to 65 dB  $L_{den}$ , and therefore the recommendation would also be protective enough for this health outcome.

In the context of aircraft noise, when considering the impacts of exposure on cognitive impairment in children, these guideline recommendations also apply particularly to the school setting. Noise exposure at primary school and at home is often highly correlated; however, the evidence base considered comes mainly from studies designed around sampling at school and not residences.

### Additional considerations or uncertainties

There is additional uncertainty when characterizing exposure using the acoustical description of aircraft noise by means of  $L_{den}$  or  $L_{night}$ . Use of these average noise indicators may limit the ability to observe associations between exposure to aircraft noise and some health outcomes (such as awakening reactions); as such, noise indicators based on the number of events (such as the frequency distribution of  $L_{A,max}$ ) may be better suited. However, such indicators are not widely used.

The GDG acknowledged that the guideline recommendation for  $L_{night}$  may not be fully protective of health, as it implies that around 11% (95% CI: 4.72–17.81) of the population may be characterized as highly sleep-disturbed at the recommended  $L_{night}$  level. This is higher than the 3% absolute risk considered for setting the guideline level. However, the high calculation uncertainty in predicting noise levels lower than 40 dB prevented the GDG from recommending a lower level. Furthermore,





lower levels would probably require a ban on night or early morning flights altogether, which is not feasible in many situations, given that the general population tends to value the convenience of air travel.

### 3.3.3 Summary of the assessment of the strength of recommendation

Table 35 provides a comprehensive summary of the different dimensions for the assessment of the strength of the aircraft noise recommendations.

Table 35. Summary of the assessment of the strength of the recommendation

| Factors influencing the strength of recommendation | Decision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Quality of evidence                                | <p><b>Average exposure (<math>L_{den}</math>)</b></p> <p><i>Health effects</i></p> <ul style="list-style-type: none"> <li>• Evidence for a relevant RR increase of the incidence of IHD at <b>52 dB <math>L_{den}</math></b> was rated <b>very low quality</b>.</li> <li>• Evidence for a relevant RR increase of the incidence of hypertension was rated <b>low quality</b>.</li> <li>• Evidence for a relevant absolute risk of annoyance at <b>45 dB <math>L_{den}</math></b> was rated <b>moderate quality</b>.</li> <li>• Evidence for a relevant RR increase of impaired reading and oral comprehension at <b>55 dB <math>L_{den}</math></b> was rated <b>moderate quality</b>.</li> </ul> <p><i>Interventions</i></p> <ul style="list-style-type: none"> <li>• Evidence on effectiveness of interventions to reduce noise exposure and/or health outcomes from aircraft noise was of varying quality.</li> </ul> <p><b>Night-time exposure (<math>L_{night}</math>)</b></p> <p><i>Health effects</i></p> <ul style="list-style-type: none"> <li>• Evidence for a relevant absolute risk of sleep disturbance related to night noise exposure from aircraft at <b>40 dB <math>L_{night}</math></b> was rated <b>moderate quality</b>.</li> </ul> <p><i>Interventions</i></p> <ul style="list-style-type: none"> <li>• Evidence on effectiveness of changes in infrastructure (flight path changes) to reduce sleep disturbance from aircraft noise was rated <b>low quality</b>.</li> </ul> |
| Balance of benefits versus harms and burdens       | Aircraft noise is a major source of localized noise pollution. The health benefits of adapting the recommendations are expected to outweigh the harms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Values and preferences                             | Quiet areas are valued by the population, especially by those affected by continuous aircraft noise exposure. Some variability is expected among those directly affected by aircraft noise and those not affected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Equity                                             | Risk of exposure to aircraft noise is not equally distributed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Resource implications                              | No comprehensive cost–effectiveness analysis data are available; nevertheless, a wide variety of interventions exist (some at very low cost), indicating that measures are both feasible and economically reasonable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Decisions on recommendation strength               | <ul style="list-style-type: none"> <li>• <b>Strong</b> for guideline value for average noise exposure (<math>L_{den}</math>)</li> <li>• <b>Strong</b> for guideline value for night noise exposure (<math>L_{night}</math>)</li> <li>• <b>Strong</b> for specific interventions to reduce noise exposure</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



### 3.4 Wind turbine noise

#### Recommendations

For average noise exposure, the GDG **conditionally** recommends reducing noise levels produced by wind turbines below **45 dB  $L_{den}$** , as wind turbine noise above this level is associated with adverse health effects.

To reduce health effects, the GDG **conditionally** recommends that policy-makers implement suitable measures to reduce noise exposure from wind turbines in the population exposed to levels above the guideline values for average noise exposure. No evidence is available, however, to facilitate the recommendation of one particular type of intervention over another.



#### 3.4.1 Rationale for the guideline levels for wind turbine noise

The exposure levels were derived in accordance with the prioritizing process of critical health outcomes described in section 2.4.3. For each of the outcomes, the exposure level was identified by applying the benchmark, set as relevant risk increase to the corresponding ERF. In the case of exposure to wind turbine noise, the process can be summarized as follows (Table 36).

Table 36. Average exposure levels ( $L_{den}$ ) for priority health outcomes from wind turbine noise

| Summary of priority health outcome evidence                                                                                                                                                                                | Benchmark level    | Evidence quality          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------|
| <b>Incidence of IHD</b><br>Incidence of IHD could not be used to assess the exposure level.                                                                                                                                | 5% increase of RR  | No studies were available |
| <b>Incidence of hypertension</b><br>Incidence of hypertension could not be used to assess the exposure level.                                                                                                              | 10% increase of RR | No studies were available |
| <b>Prevalence of highly annoyed population</b><br>Four studies were available. An exposure–response curve of the four studies revealed an absolute risk of 10%HA (outdoors) at a noise exposure level of 45 dB $L_{den}$ . | 10% absolute risk  | Low quality               |
| <b>Permanent hearing impairment</b>                                                                                                                                                                                        | No increase        | No studies were available |
| <b>Reading skills and oral comprehension in children</b>                                                                                                                                                                   | One-month delay    | No studies were available |

In accordance with the prioritization process, the GDG set a guideline exposure level of 45.0 dB  $L_{den}$  for average exposure, based on the relevant increase of the absolute %HA. The GDG stressed that there might be an increased risk for annoyance below this noise exposure level, but it could not state whether there was an increased risk for the other health outcomes below this level owing to a lack of evidence. As the evidence on the adverse effects of wind turbine noise was rated low quality, the GDG made the recommendation conditional.

Next, the GDG considered the evidence for night noise exposure to wind turbine noise and its effect on sleep disturbance (Table 37).

Table 37. Night-time exposure levels ( $L_{night}$ ) for priority health outcomes from wind turbine noise

| Summary of priority health outcome evidence                                                                                                  | Benchmark level  | Evidence quality |
|----------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|
| <b>Sleep disturbance</b><br>Six studies were available; they did not reveal consistent results about effects of wind turbine noise on sleep. | 3% absolute risk | Low quality      |

Based on the low quantity and heterogeneous nature of the evidence, the GDG was not able to formulate a recommendation addressing sleep disturbance due to wind turbine noise at night time.

The GDG also looked for evidence about the effectiveness of interventions for wind turbine noise exposure. Owing to a lack of research, however, no studies were available on existing interventions and associated costs to reduce wind turbine noise.

Based on this assessment, the GDG therefore provided a conditional recommendation for average noise exposure ( $L_{den}$ ) to wind turbines and a conditional recommendation for the implementation of suitable measures to reduce noise exposure. No recommendation about a preferred type of intervention could be formulated; nor could a recommendation be made for an exposure level for night noise exposure ( $L_{night}$ ), as studies were not consistent and in general did not provide evidence for an effect on sleep.

### 3.4.1.1 Other factors influencing the strength of recommendation

Other factors considered in the context of recommendations on wind turbine noise included those related to values and preferences, benefits and harms, resource implications, equity, acceptability and feasibility. Ultimately, the assessment of all these factors did not lead to a change in the strength of recommendation, although it informed the development of a conditional recommendation on the intervention measures. Further details are provided in section 3.4.2.3.

## 3.4.2 Detailed overview of the evidence

The following sections provide a detailed overview of the evidence constituting the basis for setting the recommendations on wind turbine noise. It is presented and summarized separately for each of the critical health outcomes, and the GDG's judgement of the quality of evidence is indicated (for a detailed overview of the evidence on important health outcomes, see Annex 4). Research into health outcomes and effectiveness of intervention is addressed consecutively.

A comprehensive summary of all evidence considered for each of the critical and important health outcomes can be found in the eight systematic reviews published in the *International Journal of Environmental Research and Public Health* (see section 2.3.2 and Annex 2).

It should be noted that, due to the time stamp of the systematic reviews, some more recent studies were not included in the analysis. This relates in particular to several findings of the Wind Turbine Noise and Health Study conducted by Health Canada (Michaud, 2015). Further, some studies were omitted, as they did not meet the inclusion criteria, including, for instance, studies using distance to the wind turbine instead of noise exposure to investigate health effects. The justification for including and excluding studies is given in the systematic reviews (Basner & McGuire, 2018; Brown et al.,

2017; Clark & Paunovic, 2018; in press; Guski et al., 2017; Niewenhuijsen et al., 2017; Śliwińska-Kowalska & Zaborowski, 2017; van Kempen et al., 2018; see Annex 2 for further details).

### 3.4.2.1 Evidence on health outcomes

The key question posed was: in the general population exposed to wind turbine noise, what is the exposure–response relationship between exposure to wind turbine noise (reported as various noise indicators) and the proportion of people with a validated measure of health outcome, when adjusted for main confounders? A summary of the PICOS/PECCOS scheme applied and the main findings is set out in Tables 38 and 39.

Table 38. PICOS/PECCOS scheme of critical health outcomes for exposure to wind turbine noise

| PECO       | Description                                                                                                                                                                                                                                                                                             |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Population | General population                                                                                                                                                                                                                                                                                      |
| Exposure   | Exposure to high levels of noise produced by wind turbines (average/night time)                                                                                                                                                                                                                         |
| Comparison | Exposure to lower levels of noise produced by wind turbines (average/night time)                                                                                                                                                                                                                        |
| Outcome(s) | For average noise exposure:<br>1. cardiovascular disease<br>2. annoyance<br>3. cognitive impairment<br>4. hearing impairment and tinnitus<br>5. adverse birth outcomes<br>6. quality of life, well-being and mental health<br>7. metabolic outcomes<br>For night noise exposure:<br>1. effects on sleep |



Table 39. Summary of findings for health effects from exposure to wind turbine noise ( $L_{den}$ )

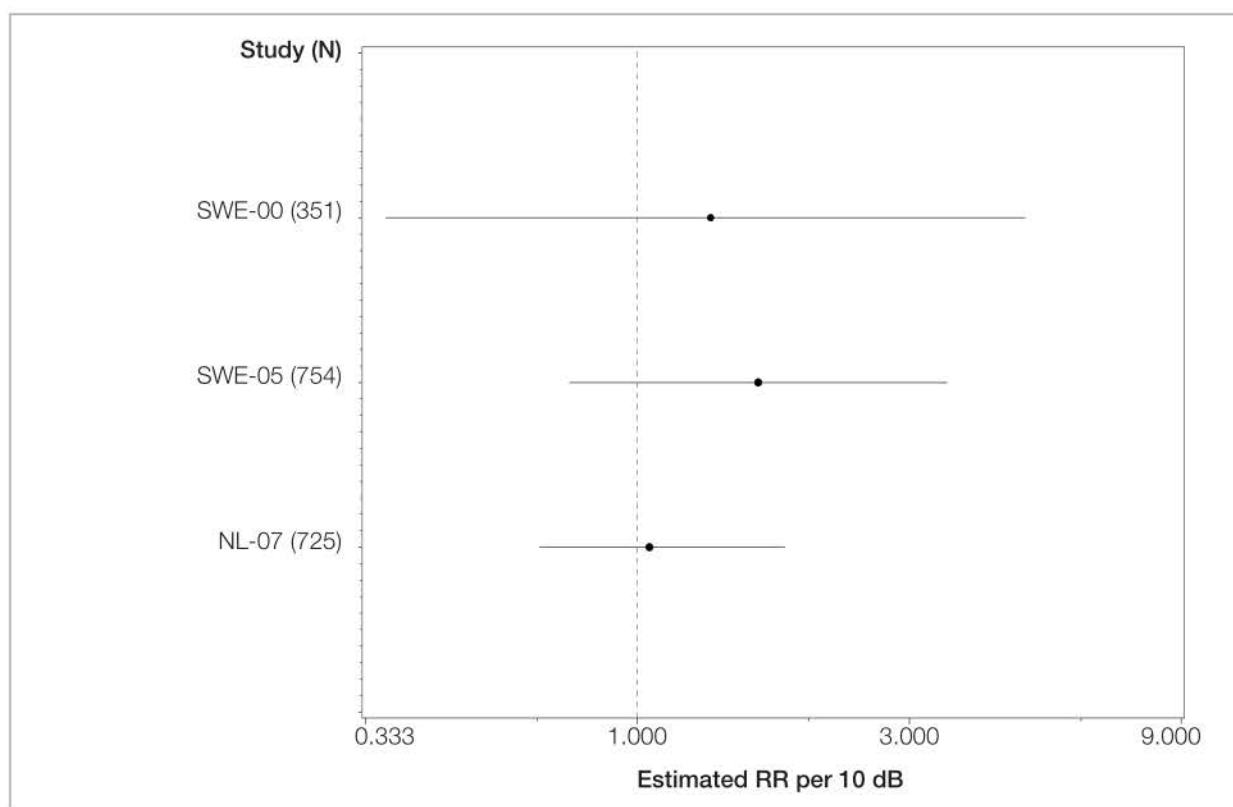
| Noise metric                           | Priority health outcome measure | Quantitative risk for adverse health      | Lowest level of exposure across studies | Number of participants (studies) | Quality of evidence                                |
|----------------------------------------|---------------------------------|-------------------------------------------|-----------------------------------------|----------------------------------|----------------------------------------------------|
| <b>Cardiovascular disease</b>          |                                 |                                           |                                         |                                  |                                                    |
| $L_{den}$                              | Incidence of IHD                | –                                         | –                                       | –                                | –                                                  |
| $L_{den}$                              | Incidence of hypertension       | –                                         | –                                       | –                                | –                                                  |
| <b>Annoyance</b>                       |                                 |                                           |                                         |                                  |                                                    |
| $L_{den}$                              | %HA                             | Not able to pool because of heterogeneity | 30 dB                                   | 2481 (4)                         | Low (downgraded for inconsistency and imprecision) |
| <b>Cognitive impairment</b>            |                                 |                                           |                                         |                                  |                                                    |
| $L_{den}$                              | Reading and oral comprehension  | –                                         | –                                       | –                                | –                                                  |
| <b>Hearing impairment and tinnitus</b> |                                 |                                           |                                         |                                  |                                                    |
| $L_{den}$                              | Permanent hearing impairment    | –                                         | –                                       | –                                | –                                                  |

## Cardiovascular disease

For the relationship between wind turbine noise and prevalence of hypertension, three cross-sectional studies were identified, with a total of 1830 participants (van den Berg et al., 2008; Pedersen, 2011; Pedersen & Larsman, 2008; Pedersen & Persson Waye, 2004; 2007). The number of cases was not reported. All studies found a positive association between exposure to wind turbine noise and the prevalence of hypertension, but none was statistically significant. The lowest levels in studies were either  $<30$  or  $<32.5 L_{den}$ . No meta-analysis was performed, since too many parameters were unknown and/or unclear. Due to very serious risk of bias and imprecision in the results, this evidence was rated very low quality (see Fig. 14).

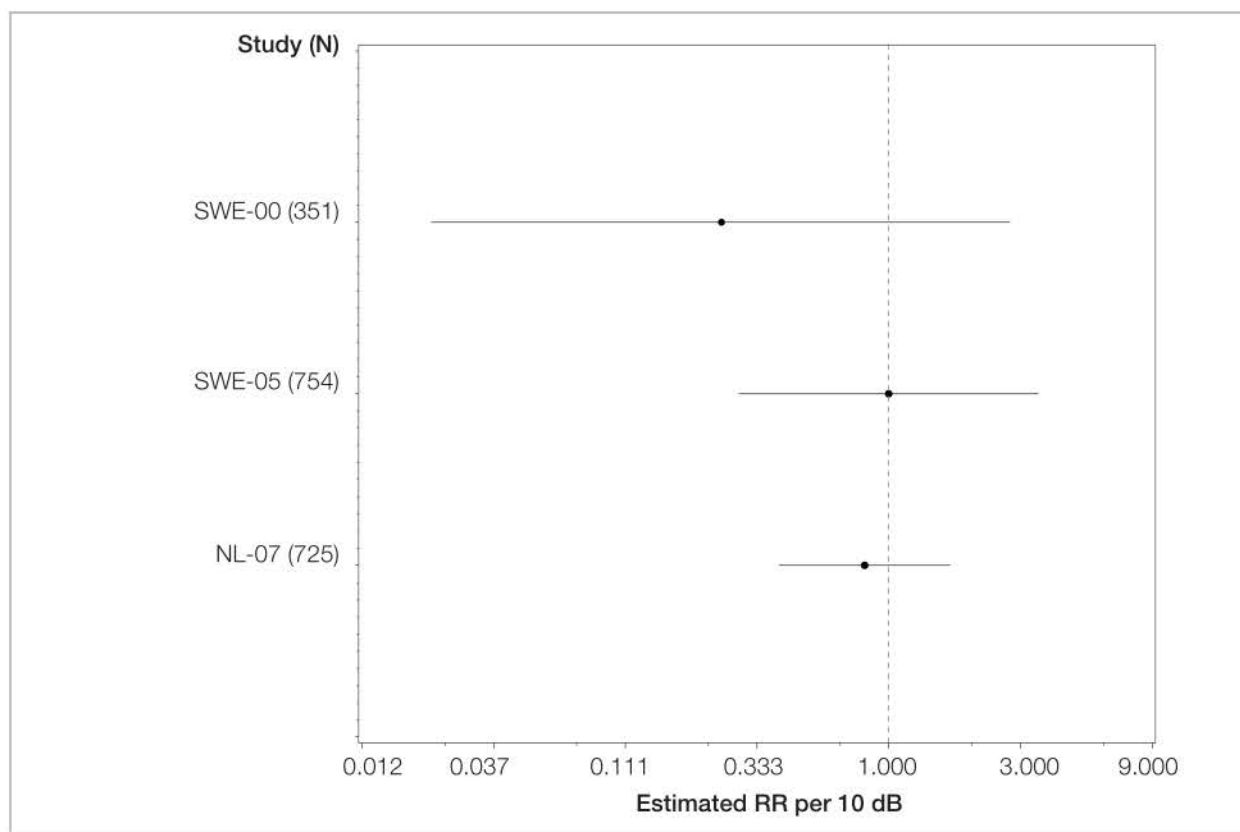
The same studies also looked at exposure to wind turbine noise and self-reported cardiovascular disease, but none found an association. No evidence was available for other measures of cardiovascular disease. As a result, only evidence rated very low quality was available for no considerable effect of audible noise (greater than 20 Hz) from wind turbines or wind farms on self-reported cardiovascular disease (see Fig. 15).

**Fig. 14. The association between exposure to wind turbine noise (sound pressure level in dB) and hypertension**



*Notes:* The dotted vertical line corresponds to no effect of exposure to wind turbine noise. The black dots correspond to the estimated RR per 10 dB and 95% CI. For further details on the studies included in the figure please refer to the systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018).

Fig. 15. The association between exposure to wind turbine noise (sound pressure level) and self-reported cardiovascular disease



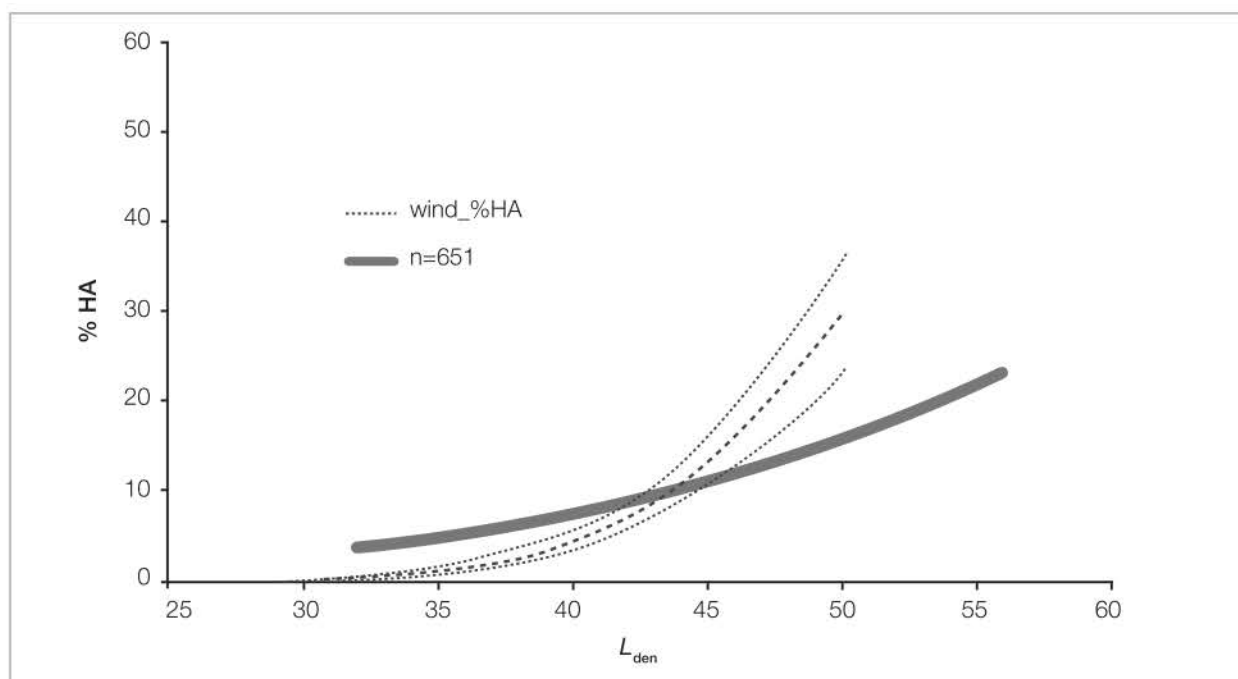
Notes: The dotted vertical line corresponds to no effect of exposure to wind turbine noise. The black circles correspond to the estimated RR per 10 dB (sound pressure level) and 95% CI. For further details on the studies included in the figure please refer to the systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018).

## Annoyance

Two publications containing descriptions of four individual studies were retrieved (Janssen et al., 2011; Kuwano et al., 2014). All four studies used measurements in the vicinity of the respondents' addresses; the noise exposure metrics used in the three original studies (Pedersen, 2011; Pedersen & Persson Waye, 2004; 2007) included in Janssen et al. (2011) were recalculated into  $L_{den}$ . The noise levels in the studies ranged from 29 dB to 56 dB. Different scales were used to assess annoyance, with slightly different definitions of "highly annoyed" and explicit reference to outdoor annoyance in the data used for the Janssen et al. (2011) curve. Construction of the ERFs provided in the two publications differed and they were therefore not further combined in a meta-analysis. Fig. 16 shows the %HA from the two publications. The 10% criterion for %HA is reached at around 45 dB  $L_{den}$  (where the two curves coincide). There was a wide variability in %HA between studies, with a range of 3–13%HA at 42.5 dB and 0–32%HA at 47.5 dB. The %HA in the sample is comparatively high, given the relatively low noise levels. There is evidence rated low quality for an association between wind turbine noise and annoyance, but this mainly applies to the association between wind turbine noise and annoyance and not to the shape of the quantitative relationship.

Further statistical analyses of annoyance yield evidence rated low quality for an association between wind turbine noise and %HA when comparing an exposure at 42.5 dB and 47.5 dB, with a mean difference in %HA of 4.5 (indoors) and 6.4 (outdoors). There is also evidence rated moderate quality for a correlation between individual noise exposure and annoyance raw scores ( $r = 0.28$ ).

Fig. 16. Overlay of the two wind turbine annoyance graphs



Notes: Overlay of the two wind turbine outdoor annoyance graphs adapted from Janssen et al. (2011, red) and Kuwano et al. (2014, blue). The Kuwano et al. curve is based on  $L_{dn}$ ; no correction for  $L_{den}$  has been applied.<sup>18</sup> For further details on the studies included in the figure please refer to the systematic review on environmental noise and annoyance (Guski et al., 2017).

### Cognitive impairment, hearing impairment and tinnitus, adverse birth outcomes

No studies were found, and therefore no evidence was available on the relationship between wind turbine noise and measures of cognitive impairment; hearing impairment and tinnitus; and adverse birth outcomes.

### Sleep disturbance

Six cross-sectional studies on wind turbine noise and self-reported sleep disturbance were identified (Bakker et al., 2012; Kuwano et al., 2014; Michaud, 2015; Pawlaczyk-Luszczynska et al., 2014; Pedersen & Persson Waye, 2004; 2007). Noise levels were calculated using different methods, and different noise metrics were reported. Three of the studies asked how noise affects sleep; the other three evaluated the effect of wind turbine noise on sleep using questions that explicitly referred to noise (Table 40).

<sup>18</sup>  $L_{dn}$  is the day-night-weighted sound pressure level as defined in section 3.6.4 of ISO 1996-1:2016.



Table 40. Summary of findings for health effects from exposure to wind turbine noise ( $L_{\text{night}}$ )

| Noise metric            | Priority health outcome measure | Quantitative risk for adverse health        | Lowest level of effects in studies | Number of participants (studies) | Quality of evidence                                                 |
|-------------------------|---------------------------------|---------------------------------------------|------------------------------------|----------------------------------|---------------------------------------------------------------------|
| <b>Effects on sleep</b> |                                 |                                             |                                    |                                  |                                                                     |
| $L_{\text{night}}$      | %HSD                            | 1.60 (95% CI: 0.86–2.94) per 10 dB increase | 31 dB                              | 3971 (6)                         | Low<br>(downgraded for study limitations, inconsistency, precision) |

The risk of bias was assessed as high for all six studies, as effects on sleep were measured by self-reported data. There were a limited number of subjects at higher exposure levels. A meta-analysis was conducted for five of the six studies, based on the OR for high sleep disturbance for a 10 dB increase in outdoor predicted sound pressure level. The pooled OR was 1.60 (95% CI: 0.86–2.94). The evidence was rated low quality.

### 3.4.2.2 Evidence on interventions

This section summarizes the evidence underlying the recommendation on the effectiveness of interventions for wind turbine noise exposure. The key question posed was: in the general population exposed to wind turbine noise, are interventions effective in reducing exposure to and/or health outcomes from wind turbine noise? A summary of the PICOS/PECCOS scheme applied is set out in Table 41.

Table 41. PICOS/PECCOS scheme of the effectiveness of interventions for exposure to wind turbine noise

| PICO                   | Description                                                                                                                                                                                                                                                                                                                                        |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Population</b>      | <b>General population</b>                                                                                                                                                                                                                                                                                                                          |
| <b>Intervention(s)</b> | The interventions can be defined as:<br>(a) a measure that aims to change noise exposure and associated health effects;<br>(b) a measure that aims to change noise exposure, with no particular evaluation of the impact on health; or<br>(c) a measure designed to reduce health effects, but that may not include a reduction in noise exposure. |
| <b>Comparison</b>      | <b>No intervention</b>                                                                                                                                                                                                                                                                                                                             |
| <b>Outcome(s)</b>      | For average noise exposure:<br>1. cardiovascular disease<br>2. annoyance<br>3. cognitive impairment<br>4. hearing impairment and tinnitus<br>5. adverse birth outcomes<br>6. quality of life, well-being and mental health<br>7. metabolic outcomes<br><br>For night noise exposure:<br>1. effects on sleep                                        |



No studies were found, and therefore no evidence was available on the effectiveness of interventions to reduce noise exposure from wind turbines.

### 3.4.2.3 Consideration of additional contextual factors

As the foregoing overview has shown, very little evidence is available about the adverse health effects of continuous exposure to wind turbine noise. Based on the quality of evidence available, the GDG set the strength of the recommendation on wind turbine noise to conditional. As a second step, it qualitatively assessed contextual factors to explore whether other considerations could have a relevant impact on the recommendation strength. These considerations mainly concerned the balance of harms and benefits, values and preferences, and resource use and implementation.

Regarding the balance of harms and benefits, the GDG would expect a general health benefit from a marked reduction in any kind of long-term environmental noise exposure. Health effects of individuals living in the vicinity of wind turbines can theoretically be related not only to long-term noise exposure from the wind turbines but also to disruption caused during the construction phase. The GDG pointed out, however, that evidence on health effects from wind turbine noise (apart from annoyance) is either absent or rated low/very low quality (McCunney et al., 2014). Moreover, effects related to attitudes towards wind turbines are hard to discern from those related to noise and may be partly responsible for the associations (Knopper & Ollson, 2011). Furthermore, the number of people exposed is far lower than for many other sources of noise (such as road traffic). Therefore, the GDG estimated the burden on health from exposure to wind turbine noise at the population level to be low, concluding that any benefit from specifically reducing population exposure to wind turbine noise in all situations remains unclear. Nevertheless, proper public involvement, communication and consultation of affected citizens living in the vicinity of wind turbines during the planning stage of future installations is expected to be beneficial as part of health and environmental impact assessments. In relation to possible harms associated with the implementation of the recommendation, the GDG underlined the importance of wind energy for the development of renewable energy policies.

The GDG noticed that the values and preferences of the population towards reducing long-term noise exposure to wind turbine noise vary. Whereas the general population tends to value wind energy as an alternative, environmentally sustainable and low-carbon energy source, people living in the vicinity of wind turbines may evaluate them negatively. Wind turbines are not a recent phenomenon, but their quantity, size and type have increased significantly over recent years. As they are often built in the middle of otherwise quiet and natural areas, they can adversely affect the integrity of a site. Furthermore, residents living in these areas may have greater expectations of the quietness of their surroundings and therefore be more aware of noise disturbance. Negative attitudes especially occur in individuals who can see wind turbines from their houses but do not gain economically from the installations (Kuwano et al., 2014; Pedersen & Persson Waye, 2007; van den Berg et al., 2008). These situational variables and the values and preferences of the population may differ between wind turbines and other noise sources, as well as between wind turbine installations, which makes assessment of the relationship between wind turbine noise exposure and health outcomes particularly challenging.

Assessing resource use and implementation considerations, the GDG noted that reduction of noise exposure from environmental sources is generally possible through simple measures like insulating windows or building barriers. With wind turbines, however, noise reduction interventions are more

complicated than for other noise sources due to the height of the source and because outdoor disturbance is a particularly large factor. As generally fewer people are affected (compared to transportation noise), the expected costs are lower than for other environmental sources of noise. The GDG was not aware of any existing interventions (and associated costs) to reduce harms from wind turbine noise, or specific consequences of having regulations on wind turbine noise. Therefore, it could not assess feasibility, or discern whether any beneficial effects of noise reduction would outweigh the costs of intervention. In particular, there is no clear evidence on an acceptable and uniform distance between wind turbines and residential areas, as the sound propagation depends on many aspects of the wind turbine construction and installation.

In light of the assessment of the contextual factors in addition to the quality of evidence, the recommendation for wind turbine noise exposure remains conditional.

### Additional considerations or uncertainties

Assessment of population exposure to noise from a particular source is essential for setting health-based guideline values. Wind turbine noise is characterized by a variety of potential moderators, which can be challenging to assess and have not necessarily been addressed in detail in health studies. As a result, there are serious issues with noise exposure assessment related to wind turbines.

Noise levels from outdoor sources are generally lower indoors because of noise attenuation from the building structure, closing of windows and similar. Nevertheless, noise exposure is generally estimated outside, at the most exposed façade. As levels of wind turbine noise are generally much lower than those of transportation noise, the audibility of wind turbines in bedrooms, particularly when windows are closed, is unknown.

In many instances, the distance from a wind farm has been used as a proxy to determine audible noise exposure. However, in addition to the distance, other variables – such as type, size and number of wind turbines, wind direction and speed, location of the residence up- or downwind from wind farms and so on – can contribute to the resulting noise level assessed at a residence. Thus, using distance to a wind farm as a proxy for noise from wind turbines in health studies is associated with high uncertainty.

Wind turbines can generate infrasound or lower frequencies of sound than traffic sources. However, few studies relating exposure to such noise from wind turbines to health effects are available. It is also unknown whether lower frequencies of sound generated outdoors are audible indoors, particularly when windows are closed.

The noise emitted from wind turbines has other characteristics, including the repetitive nature of the sound of the rotating blades and atmospheric influence leading to a variability of amplitude modulation, which can be a source of above average annoyance (Schäffer et al., 2016). This differentiates it from noise from other sources and has not always been properly characterized. Standard methods of measuring sound, most commonly including A-weighting, may not capture the low-frequency sound and amplitude modulation characteristic of wind turbine noise (Council of Canadian Academies, 2015).

Even though correlations between noise indicators tend to be high (especially between  $L_{Aeq}$ -like indicators) and conversions between indicators do not normally influence the correlations between the noise indicator and a particular health effect, important assumptions remain when exposure to



wind turbine noise in  $L_{den}$  is converted from original sound pressure level values. The conversion requires, as variable, the statistical distribution of annual wind speed at a particular height, which depends on the type of wind turbine and meteorological conditions at a particular geographical location. Such input variables may not be directly applicable for use in other sites. They are sometimes used without specific validation for a particular area, however, because of practical limitations or lack of data and resources. This can lead to increased uncertainty in the assessment of the relationship between wind turbine noise exposure and health outcomes.

Based on all these factors, it may be concluded that the acoustical description of wind turbine noise by means of  $L_{den}$  or  $L_{night}$  may be a poor characterization of wind turbine noise and may limit the ability to observe associations between wind turbine noise and health outcomes.

### 3.4.3 Summary of the assessment of the strength of recommendations

Table 42 provides a comprehensive summary of the different dimensions for the assessment of the strength of the wind turbine recommendations.

Table 42. Summary of the assessment of the strength of the recommendation

| Factors influencing the strength of recommendation  | Decision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Quality of evidence</b>                          | <p><b>Average exposure (<math>L_{den}</math>)</b></p> <p><i>Health effects</i></p> <ul style="list-style-type: none"> <li>Evidence for a relevant absolute risk of annoyance at <b>45 dB <math>L_{den}</math></b> was rated <b>low quality</b>.</li> </ul> <p><i>Interventions</i></p> <ul style="list-style-type: none"> <li>No evidence was available on the effectiveness of interventions to reduce noise exposure and/or health outcomes from wind turbines.</li> </ul> <p><b>Night-time exposure (<math>L_{night}</math>)</b></p> <p><i>Health effects</i></p> <ul style="list-style-type: none"> <li>No statistically significant evidence was available for sleep disturbance related to exposure from wind turbine noise at night.</li> </ul> <p><i>Interventions</i></p> <ul style="list-style-type: none"> <li>No evidence was available on the effectiveness of interventions to reduce noise exposure and/or sleep disturbance from wind turbines.</li> </ul> |
| <b>Balance of benefits versus harms and burdens</b> | Further work is required to assess fully the benefits and harms of exposure to environmental noise from wind turbines and to clarify whether the potential benefits associated with reducing exposure to environmental noise for individuals living in the vicinity of wind turbines outweigh the impact on the development of renewable energy policies in the WHO European Region.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Values and preferences</b>                       | There is wide variability in the values and preferences of the population, with particularly strong negative attitudes in populations living in the vicinity of wind turbines.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Resource implications</b>                        | Information on existing interventions (and associated costs) to reduce harms from wind turbine noise is not available.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Additional considerations or uncertainties</b>   | There are serious issues with noise exposure assessment related to wind turbines.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Decisions on recommendation strength</b>         | <ul style="list-style-type: none"> <li><b>Conditional</b> for guideline value for average noise exposure (<math>L_{den}</math>)</li> <li><b>Conditional</b> for the effectiveness of interventions (<math>L_{night}</math>)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |



## 3.5 Leisure noise

### Recommendations

For average noise exposure, the GDG **conditionally** recommends reducing the yearly average from all leisure noise sources combined to **70 dB  $L_{Aeq,24h}$** , as leisure noise above this level is associated with adverse health effects. The equal energy principle<sup>19</sup> can be used to derive exposure limits for other time averages, which might be more practical in regulatory processes.

For single-event and impulse noise exposures, the GDG **conditionally** recommends following existing guidelines and legal regulations to limit the risk of increases in hearing impairment from leisure noise in both children and adults.

Following a precautionary approach, to reduce possible health effects, the GDG **strongly** recommends that policy-makers take action to prevent exposure above the guideline values for average noise and single-event and impulse noise exposures. This is particularly relevant as a large number of people may be exposed to and at risk of hearing impairment through the use of personal listening devices (PLDs). There is insufficient evidence, however, to recommend one type of intervention over another.



### 3.5.1 Rationale for the guideline levels for leisure noise

As specific evidence for the relationship between leisure noise and hearing loss is of insufficient quality, the GDG decided to follow a different approach for this noise source, based on knowledge regarding prevention of hearing loss in the workplace and on the CNG (WHO, 1999). There is sufficient evidence that the nature of the noise matters little in causing hearing loss, so using the existing guidelines is a justified step to prevent permanent hearing loss from leisure noise.

In accordance with the procedures for the other noise sources, the GDG would have considered evidence on exposure–response relationships for the prioritized health outcomes. However, no such ERFs could be established in the systematic reviews for any of the health outcomes (Table 43).

Table 43. Average exposure levels ( $L_{Aeq,24h}$ ) for priority health outcomes from leisure noise

| Summary of priority health outcome evidence                                                                                                                                                                                                   | Benchmark level | Evidence quality             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------|
| Incidence of IHD                                                                                                                                                                                                                              |                 | No evidence was available    |
| Incidence of hypertension                                                                                                                                                                                                                     |                 |                              |
| Prevalence of highly annoyed population                                                                                                                                                                                                       |                 |                              |
| Reading skills and oral comprehension in children                                                                                                                                                                                             |                 |                              |
| <b>Permanent hearing impairment</b>                                                                                                                                                                                                           | No increase     | Very low quality/no evidence |
| There is an indication that PLDs have an effect on hearing impairment and tinnitus.                                                                                                                                                           |                 |                              |
| There was no evidence (because no studies were found) for an effect of other sources of leisure noise on hearing impairment or tinnitus. The results of the studies could not be synthesized because of heterogeneity of outcome measurement. |                 |                              |

<sup>19</sup> The equal energy principle states that the total effect of sound is proportional to the total amount of sound energy received by the ear, irrespective of the distribution of that energy in time (WHO, 1999).



In accordance with the evidence on the effects of PLDs on permanent hearing loss from leisure noise, the GDG recommended a guideline exposure level of 70 dB  $L_{Aeq,24h}$  yearly average from all leisure noise sources combined. It was confident that there was no relevant risk increase for permanent hearing impairment below this exposure level of average leisure noise. The GDG recognized that a conversion to alternative time averages for exposure to leisure noise might be helpful for regulatory purposes; thus, a detailed table converting hourly and weekly exposure into yearly averages is provided in the subsection on additional considerations or uncertainties in section 3.5.2.3, Table 49. Furthermore, the GDG recommended sticking to the CNG recommendations for single events to limit the risk of hearing impairment from leisure noise increases for both children and adults (WHO, 1999).<sup>20</sup> Due to the nature and limited amount of available evidence, the GDG made the recommendation conditional.

Next, the GDG assessed the evidence for night noise exposure and its effect on sleep disturbance (Table 44).

**Table 44. Night-time exposure levels ( $L_{night}$ ) for priority health outcomes from leisure noise**

| Summary of priority health outcome evidence | Benchmark level  | Evidence quality          |
|---------------------------------------------|------------------|---------------------------|
| <b>Sleep disturbance</b>                    | 3% absolute risk | No evidence was available |

Because of a lack of evidence, the GDG was not able to formulate a recommendation addressing sleep disturbance due to leisure noise at night time.

The GDG also looked for evidence about the effectiveness of interventions for leisure noise exposure. Owing to a lack of research, however, no studies were available on existing interventions and associated costs to reduce leisure noise. As no evidence was available, it was not possible to develop a recommendation on any specific type of intervention measure. However, following a precautionary approach, to reduce possible health effects, the GDG made a strong recommendation that policy-makers take action to prevent exposures above the guideline values for average noise and single-event and impulse noise exposures. This is particularly relevant as a large number of people may be exposed to and at risk of hearing impairment through the use of PLDs. There is insufficient evidence, however, to recommend one type of intervention over another.

### 3.5. 1.1 Other factors influencing the strength of recommendations

Other factors considered in the context of recommendations on leisure noise included those related to values and preferences, benefits and harms, resource implications, equity, acceptability and feasibility; moreover, nonpriority health outcomes were considered. Ultimately, the assessment of all these factors did not lead to a change in the strength of recommendation. Further details are provided in section 3.5.2.3.

<sup>20</sup> The GDG acknowledged the scarcity of cohort study-based evidence to define a threshold for hearing damage due to single loud exposures. It initially decided to propose  $L_{AFmax} = 110$ , but after much discussion it appeared that the conversion of relevant standing limits (expressed in  $L_{peak,C}$  and others) lacked sufficient basis.

### 3.5.2 Detailed overview of the evidence

The following sections provide a detailed overview of the evidence constituting the basis for setting the recommendations on leisure noise. As noted above, however, only limited evidence was available for several of the prioritized health outcomes, so it is presented and summarized for all critical and important health outcomes where possible, along with indications of the GDG's judgement of the quality of evidence. Research into health outcomes and effectiveness of interventions is addressed consecutively.

A comprehensive summary of all evidence considered for each of the critical and important health outcomes can be found in the eight systematic reviews published in the *International Journal of Environmental Research and Public Health* (see section 2.3.2 and Annex 2).

#### 3.5.2.1 Evidence on health outcomes

The key question posed was: in the general population exposed to leisure noise, what is the exposure–response relationship between exposure to leisure noise (reported as various noise indicators) and the proportion of people with a validated measure of health outcome, when adjusted for main confounders? A summary of the PICOS/PECCOS scheme applied and the main findings is set out in Tables 45 and 46.



Table 45. PICOS/PECCOS scheme of critical health outcomes for exposure to leisure noise

| PECO       | Description                                                                                                                                                                                                                                                                                                                                                                                |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Population | General population                                                                                                                                                                                                                                                                                                                                                                         |
| Exposure   | Exposure to high levels of noise produced by leisure activities (average/night time)                                                                                                                                                                                                                                                                                                       |
| Comparison | Exposure to lower levels of noise produced by leisure activities (average/night time)                                                                                                                                                                                                                                                                                                      |
| Outcome(s) | <div>For average noise exposure:</div> <div>For night noise exposure:</div> <div>1. cardiovascular disease</div> <div>1. effects on sleep</div> <div>2. annoyance</div> <div>3. cognitive impairment</div> <div>4. hearing impairment and tinnitus</div> <div>5. adverse birth outcomes</div> <div>6. quality of life, well-being and mental health</div> <div>7. metabolic outcomes</div> |



Table 46. Summary of findings for health effects from exposure to leisure noise ( $L_{Aeq,24h}$ )

| Noise metric                           | Priority health outcome measure | Quantitative risk for adverse health | Lowest level of exposure across studies <sup>a</sup> | Number of participants (studies) | Quality of evidence                                    |
|----------------------------------------|---------------------------------|--------------------------------------|------------------------------------------------------|----------------------------------|--------------------------------------------------------|
| <b>Cardiovascular disease</b>          |                                 |                                      |                                                      |                                  |                                                        |
| $L_{Aeq,24}$                           | Incidence of IHD                | –                                    | –                                                    | –                                | –                                                      |
| $L_{Aeq,24}$                           | Incidence of hypertension       | –                                    | –                                                    | –                                | –                                                      |
| <b>Annoyance</b>                       |                                 |                                      |                                                      |                                  |                                                        |
| $L_{Aeq,24}$                           | %HA                             | –                                    | –                                                    | –                                | –                                                      |
| <b>Cognitive impairment</b>            |                                 |                                      |                                                      |                                  |                                                        |
| $L_{Aeq,24}$                           | Reading and oral comprehension  | –                                    | –                                                    | –                                | –                                                      |
| <b>Hearing impairment and tinnitus</b> |                                 |                                      |                                                      |                                  |                                                        |
| $L_{Aeq,24}$                           | Permanent hearing impairment    | Not estimated                        | –                                                    | 484 (3)                          | Very low (downgraded for study limitations, precision) |

### Hearing impairment and tinnitus

Several types of leisure activity are accompanied by loud sounds, such as attending nightclubs, pubs and fitness classes; live sporting events; concerts or live music venues; listening to loud music through PLDs. This recommendation is informed by a systematic review that assessed the evidence on permanent hearing loss and tinnitus due to exposure to leisure noise (Śliwińska-Kowalska & Zaborowski, 2017). The review identified two existing systematic reviews that summarized recent estimates of the risk of developing permanent hearing loss from the use of PLDs. It did not identify any studies with objective measurement of exposure to any other type of leisure noise.

The Scientific Committee on Emerging and Newly Identified Hazards and Risk (SCENIHR) (EC, 2008b) report concluded that prolonged exposure to sounds from PLDs may result in temporary hearing threshold shift, permanent hearing threshold shift and tinnitus, as well as poor speech communication in noisy conditions. However, based on the data available, there was no direct evidence for an effect of repeated, regular daily exposure to music through PLDs on development of permanent noise-induced hearing loss. Data on tinnitus were inadequate and therefore inconclusive. No meta-analysis was provided for any of the hearing effects; nor were the exposure–effect curves reported. The SCENIHR report was based on a narrative review of 30 original papers with over 2000 participants and exposure to music sounds that covered a range of 60–120 dB. Studies included in the review were carried out between 1982 and 2007.

In 2014 a second systematic review was published by Vasconcellos et al. (2014). Although the objective of this publication was to determine threshold levels of personally modifiable risk factors for hearing loss in the paediatric population, specific thresholds analyses were limited. Based on the descriptive overview of original papers, the authors identified exposure to loud music (including use of PLDs) and working on a mechanized farm as the main risk factors for hearing loss in children

and teenagers. Thresholds of exposure to music, significantly associated with hearing loss in youth, were:

- more than four hours per week or more than five years of personal headphone usage;
- more than four visits per month to a discotheque.

The evidence review identified five new cross-sectional studies on noise from PLDs since the publication of the SCENIHR report (Feder et al., 2013; Levesque et al., 2010; Sulaiman et al., 2013; 2014; Vogel et al., 2014). Direct measurement of hearing thresholds with pure tone audiometry was performed only in three studies – by Feder et al. (2013) and Sulaiman et al. (2013 and 2014). In total, audiometric data from 484 subjects were analysed; among them, 449 were exposed and 35 were not exposed to PLD music. Two other studies by Levesque et al. (2010) and Vogel et al. (2014) did not perform audiometric measurement but reported on tinnitus in a total of 1067 participants.

Noise from PLDs was estimated based on direct measurement of equivalent sound pressure levels (in dB) in four studies (Feder, 2013; Levesque et al., 2010; Sulaiman et al., 2013; 2014) and based on converting volume-control setting levels of PLD into dB levels in one study (Vogel et al., 2014). The resulting exposure levels ( $L_{Aeq}$  values) had a mean of between 72 dB and 91 dB, although in two studies these data were not provided. In all studies, individual  $L_{Aeq,8h}$  value was calculated based on an estimated level of music and the number of hours a day listening to the music through the PLD declared by an individual in the questionnaire. Resulting  $L_{Aeq,8h}$  mean values were between 62 dB and 83 dB when provided.

Potential confounding was controlled by excluding the subjects with exposure to other sources of high-level noise or prior ear problems (Sulaiman et al., 2013), by excluding those with these factors and ototoxic drug intake (Sulaiman et al., 2014) or by controlling for these confounders by accounting for them in the statistical models. The confounders comprised socioeconomic status, demographic factors, tubes in the ear and leisure exposures in one study (Feder, 2013), and age and sex in one study (Vogel et al., 2014). One of the studies did not adjust for confounding factors (Levesque et al., 2010).

Data on permanent hearing loss were taken from audiometric measurements (Feder, 2013; Sulaiman et al., 2013; 2014), while data about permanent tinnitus were taken from self-reported responses to questionnaires (Levesque et al., 2010; Vogel et al., 2014). In one case, the outcome was defined as “permanent hearing-related symptoms”, but it is not clear what proportion of subjects experienced permanent tinnitus (Vogel et al., 2014).

For permanent hearing loss, there is no pooled effect size, because the authors of the original studies either did not report data or reported in different formats. However, these studies indicate a harmful effect of listening to PLDs. For permanent tinnitus, there is no pooled effect size because the effects of noise from PLDs on permanent tinnitus were contradictory. These results are generally consistent with previous reviews by SCENIHR (EC, 2008b) and Vasconcellos et al. (2014).

The risk of bias was assessed as high for all five studies. The overall evidence for an effect of PLDs on hearing impairment and tinnitus was rated very low quality.



### 3.5.2.2 Evidence on interventions

The following section summarizes the evidence underlying the recommendation on the effectiveness of interventions for leisure noise exposure. The key question posed was: in the general population exposed to leisure noise, are interventions effective in reducing exposure to and/or health outcomes from leisure noise? A summary of the PICOS/PECCOS scheme applied and the main findings is set out in Tables 47 and 48.

**Table 47. PICOS/PECCOS scheme of the effectiveness of interventions for exposure to leisure noise**

| PICO            | Description                                                                                                                                                                                                                                                                                                                                        |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Population      | General population                                                                                                                                                                                                                                                                                                                                 |
| Intervention(s) | The interventions can be defined as:<br>(a) a measure that aims to change noise exposure and associated health effects;<br>(b) a measure that aims to change noise exposure, with no particular evaluation of the impact on health; or<br>(c) a measure designed to reduce health effects, but that may not include a reduction in noise exposure. |
| Comparison      | No intervention                                                                                                                                                                                                                                                                                                                                    |
| Outcome(s)      | For average noise exposure:<br>1. cardiovascular disease<br>2. annoyance<br>3. cognitive impairment<br>4. hearing impairment and tinnitus<br>5. adverse birth outcomes<br>6. quality of life, well-being and mental health<br>7. metabolic outcomes<br><br>For night noise exposure:<br>1. effects on sleep                                        |

**Table 48. Summary of findings for interventions for leisure noise**

| Type of intervention                                                      | Number of participants (studies) | Effect of intervention                                                                                                                                                            | Quality of evidence |
|---------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Hearing impairment</b>                                                 |                                  |                                                                                                                                                                                   |                     |
| Type E – behaviour change interventions<br>(education programme/campaign) | 4151<br>(7)                      | None of the studies involved measurement or estimation of exposure levels or health outcomes.<br><br>Most studies found a significant effect of change in knowledge or behaviour. | –                   |

Seven individual studies on PLDs, attendance at music venues and participation in other recreational activities where there was risk of hearing damage and/or tinnitus were included in the systematic review (Dell & Holmes, 2012; Gilles & Van de Heyning, 2014; Kotowski et al., 2011; Martin et al., 2013; Taljaard et al., 2013; Weichbold & Zorowka, 2003; 2007). All studies examined interventions directed at changes in knowledge or behaviour and hearing impairment.

The studies all sought evidence on the effectiveness of some form of educational programme or campaign aimed at children, adolescents or college students. These addressed perceptions and

knowledge of the risk of high levels of noise – generally, but not exclusively, from PLD sources or from attendance at music events – and actual or intended changes to hearing damage risk behaviours, including avoidance, frequency or duration of exposure, regeneration periods when in high noise, or playback levels.

The outcome assessed in all intervention studies was the change in knowledge and behaviours towards hearing damage risk. The health outcome measures varied widely and included measurements on the youth attitude towards noise scale, participants' knowledge about hearing damage, participants' PLD usage patterns, participants' attitudes to wearing hearing protection (some in general; some at discotheques) and frequency of discotheque attendance. A majority of the studies found a significant effect of change in knowledge or behaviour. No indication on the persistence of knowledge and behavioural change was given, though.

None of the studies included objectively measured outcomes or a measured change in noise level exposure; thus, the effectiveness of the interventions could not be assessed, and the quality of the evidence was not rated according to GRADE.

### 3.5.2.3 Consideration of additional contextual factors

Based on the quality of the available evidence discussed in the foregoing overview, the GDG set the strength of recommendation of leisure noise to conditional. As a second step, it qualitatively assessed contextual factors to explore whether other considerations could have a relevant impact on the recommendation strength. These considerations mainly concerned the balance of harms and benefits, values and preferences, and resource use and implementation.

When assessing the balance of benefits and harms, the GDG recognized that exposure to leisure noise is widespread and frequent. In particular, as many as 88–90% of teenagers and young adults report listening to music through PLDs earphones (Pellegrino et al., 2013; Vogel et al., 2011). In 2015 WHO estimated that 1.1 billion young people worldwide could be at risk of hearing loss due to unsafe listening practices (WHO, 2015a). Furthermore, among young people aged 12–35 years in middle- and high-income countries, nearly 50% listen to unsafe levels of sound through personal audio devices (mp3 players, smartphones and others), and around 40% are exposed to potentially damaging levels of sound at nightclubs, bars and sporting events. Noise-induced hearing loss can be prevented by following safe listening practices, so the GDG concluded that health benefits can be gained from markedly reducing population exposure to leisure noise, including through actions to promote safe listening practices. A reduction of leisure noise is also assumed to reduce nuisance that can be caused to other people than those who enjoy leisure activities, such as neighbours. Furthermore, specifically for PLDs, it can reasonably be expected that a reduction of noise exposure could also lead to a reduction in accidents, injuries and other potential safety risks. In relation to possible harms and burdens, the GDG could not identify any harms (except economic costs, which are addressed in the paragraph on resource use and implementation) arising from implementation of the recommended guideline values.

Considering values and preferences, the GDG recognized that listening to music with the help of a PLD, going to concerts and attending sport events are activities regarded as enjoyable and therefore assumed to be valued by the overall population. Furthermore, it is expected that values and preferences might vary in particular with respect to the use of PLDs and embracing leisure activities





involving loud noise, like concerts, and that some population groups – especially younger individuals – might voluntarily expose themselves to high levels of sound during these activities. Despite this, the GDG was confident that recommendations to lower noise levels for the prevention of hearing damage from leisure noise would be welcome by a majority of the population. Recommendations are expected to be particularly welcome when it comes to protecting the hearing of young children and teenagers, as these vulnerable groups often do not have control over their environment and the noise levels to which they are exposed, such as from noisy toys or at school.

With resource use and implementation, the GDG noted that interventions exist to reduce exposure to leisure noise from PLDs, attendance at music venues and participation in recreational activities, as aggregated by the systematic review on environmental noise interventions and their associated impacts (Brown & van Kamp, 2017). As most of these relate to implementation of a behaviour change, the reduction of exposure to leisure noise is expected to be technically feasible and cheap. None of the empirical investigations objectively measured outcomes or a measured change in noise level exposure, so the effectiveness of such measures cannot be assessed. Nevertheless, it is important to note that there is ample evidence from the occupational health field that high noise levels cause hearing damage, and that occupational interventions to reduce noise exposure are effective at lowering the risk of hearing problems or hearing damage (EC, 2003; Garcia et al., 2018; ISO, 2013; Maassen et al., 2001). In conclusion, resources needed to reduce exposure to leisure noise are not expected to be intensive, but implementation and long-term success of measures might be challenging, owing to cultural factors, as changes in behaviour are expected to be tricky to implement.

In light of the assessment of the contextual factors in addition to the quality of evidence, the recommendation remains conditional.

### **Additional considerations or uncertainties**

The GDG considers the noise levels selected for this recommendation to be reasonable precautionary measures, in view of the rating of very low quality for the available evidence on an effect of leisure noise on permanent hearing impairment and tinnitus identified in the systematic review.

Extensive literature shows hearing impairment in populations exposed to specific types of nonoccupational environments, although these exposures are generally not well characterized. There are no studies with objective measurement of exposure to any other type of leisure noise (except PLDs) and permanent hearing impairment or tinnitus. Nevertheless, this recommendation generally applies to all leisure noise exposures, such as events in public venues (concerts halls, sports events, bars and discotheques) and educational facilities, and use of PLDs. The recommendation also applies to exposure to impulse sounds, such as those in shooting facilities or from the use of toys and firecrackers.

Hearing loss is the resultant value of combined exposures to different sources of leisure noise including, but not limited to, PLDs. Therefore, the recommendations apply to the combined noise levels from all sources.

Noise-induced hearing loss develops very slowly over years of exposure, giving rise to challenges in the assessment of the health impacts from prolonged use of PLDs and exposure to leisure noise. The induction period for the development of hearing impairment and tinnitus is long, and varying

exposure conditions and changing lifestyle habits (including confounding noise sources), particularly among young people, will have an impact. Therefore, recommendations regarding leisure noise have often been inferred from the occupational field, where exposure conditions are more stable over time.

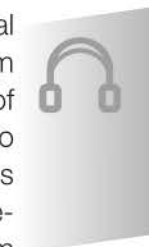
Indeed, long-term exposure to noise, objectively assessed and at levels measured in occupational settings for various professions, can lead to permanent hearing loss and tinnitus. This evidence, while not reviewed systematically as part of the work related to these guidelines, can be used as supportive evidence and justification for the need to develop a recommendation for leisure noise, given that many people could be at risk of developing hearing loss and/or tinnitus from exposure to lower levels of environmental noise. Similar otobiological mechanisms must also be considered for environmental noise.

To date, no commonly accepted method for assessing the risk of hearing loss due to environmental exposure to noise has been developed. One of the main challenges is to conduct a long-term objective exposure assessment of environmental noise and relate this to the development of permanent hearing impairment and tinnitus. The GDG underlined the strong need for research to develop a comprehensive methodology. In the absence of a method, and as long as no other tools are available, the equal energy principle outlined in the ISO standard for the estimation of noise-induced hearing loss (WHO, 1999) can be used as a practical tool for protecting public health from exposure to leisure noise. As a result, the relationship between leisure noise exposure and auditory effects can be quantified for a variety of exposure levels, duration and frequency.

Several organizations have established regulations for the protection of workers from risks to their health and safety arising from exposure to noise, and in particular risk to hearing. Of particular relevance is EU Directive 2003/10/EC on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise) (EC, 2003). Based on the ISO 1999 standard (ISO, 2013), the Directive sets limits of exposure depending on equivalent noise level for an eight-hour working day and obliges the employer to take suitable steps if the limits are exceeded. It recommends three action levels for occupational settings, setting the lowest, most conservative value at  $L_{ex,8hr} = 80$  dB. According to the Directive, no consequences of exposure to occupational noise are expected at this level. While exposure patterns and certain characteristics of occupational and leisure noise exist, knowledge of the hearing impairment risks and preventive interventions can be used to assess health risks associated with leisure noise (Neitzel & Fligor, 2017).

The CNG recommend a limit of  $L_{Aeq,24h} = 70$  dB(A) for preventing hearing loss from industrial, commercial shopping and traffic areas, indoors and outdoors (WHO, 1999). Health and safety regulations are usually based on an exposure profile of a typical worker (eight hours per day, five days per week). Using the existing knowledge from the ISO standard and established health and safety regulations, it is possible to use the equal energy principle to derive the resulting noise exposure level for an exposure profile more appropriately suited for leisure noise. Converting 40 hours at 80 dB to a continuous exposure to noise (24 hours per day, seven days per week), this leads to a yearly average exposure of 71 dB for lifelong exposure.<sup>21</sup> This is the same value as the WHO recommendation of

<sup>21</sup> 71 dB = 80 dB (derived from ISO standard) – 6.2 dB (conversion of yearly average of 40 working hours divided by continuous exposure to noise:  $(10 \log (2080hrs/8760 hrs))$ ) – 3 dB (extrapolation of 40 working years to lifelong exposure).



70 dB (WHO, 1999). Table 49 presents the noise levels per hour for various time averages in order to keep within the recommended yearly average exposure, and assuming that exposure to other noise sources generally does not contribute significantly. For example, for specific events taking place for one-, two- or four-hour averages, once a week (such as visiting a discotheque or watching a loud movie), an hourly noise level of 85 dB would lead to an average yearly exposure of 63 dB, 66 dB and 69 dB, respectively. However, the same hourly exposure of 85 dB for an activity taking place for 14 hours per week (two hours per day, seven days a week) would lead to a yearly exposure of 74 dB, which exceeds the recommendations.

**Table 49. Combination of hourly exposure and number of hours per week to arrive at a yearly average  $L_{Aeq}$**

| Hours of exposure per week              | One-hour exposure level ( $L_{Aeq}$ ) |    |    |    |    |    |     |
|-----------------------------------------|---------------------------------------|----|----|----|----|----|-----|
|                                         | 70                                    | 75 | 80 | 85 | 90 | 95 | 100 |
| 1                                       | 48                                    | 53 | 58 | 63 | 68 | 73 | 78  |
| 2                                       | 51                                    | 56 | 61 | 66 | 71 | 76 | 81  |
| 4                                       | 54                                    | 59 | 64 | 69 | 74 | 79 | 84  |
| 14 (2 hours per day, 7 days per week)   | 59                                    | 64 | 69 | 74 | 79 | 84 | 89  |
| 28 (4 hours per day, 7 days per week)   | 62                                    | 67 | 72 | 77 | 82 | 87 | 92  |
| 40 (8 hours per day, 5 days per week)   | 64                                    | 69 | 74 | 79 | 84 | 89 | 94  |
| 168 (24 hours per day, 7 days per week) | 70                                    | 75 | 80 | 85 | 90 | 95 | 100 |

Note: green = combinations of exposure/duration below current guideline level; red = combinations of exposure/duration above current guideline level; blue = input parameters.

The equal energy principle cannot be used to derive single-event limits because at high levels the ear starts to respond with nonlinear behaviour. The CNG provides several values, in different units:  $L_{AF,max} = 110$  dB for industrial noises (no distance stated),  $L_{peak,lin} = 140$  dB for adults and  $L_{peak,lin} = 120$  dB for children (measured at 100 mm) (WHO, 1999). EU Directive 2003/10/EC on the minimum health and safety requirements regarding the exposure of workers recommends a lower action level of  $L_{peak,C} = 135$  dB (at 100 mm). In a recent overview Hohmann (2015) provided an ERF for hearing damage caused by shooting noise, from which it appears that a safe level of  $L_E = 120$  dB can be derived.

Although it is clear that high noise levels cause acute hearing damage, there is no agreement on a safe level. Further research is highly recommended. In the mean time, existing guidelines should be applied.



### 3.5.3 Summary of the assessment of the strength of recommendation

Table 50 provides a comprehensive summary of the different dimensions for the assessment of the strength of the leisure noise recommendations.

Table 50. Summary of the assessment of the strength of the recommendation

| Factors influencing the strength of recommendation | Decision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Quality of evidence                                | <p><b>Average exposure (<math>L_{Aeq,24h}</math>)</b></p> <p><i>Health effects</i></p> <ul style="list-style-type: none"> <li>Evidence of an effect from PLDs on hearing impairment and tinnitus, in the absence of evidence for other health outcomes and absence of evidence on hearing impairment and tinnitus from other types of leisure noise besides PLDs, was rated <b>very low quality</b>.</li> </ul> <p><i>Interventions</i></p> <ul style="list-style-type: none"> <li>No evidence was available on the effectiveness of interventions to reduce noise exposure and/or health outcomes from leisure noise.</li> </ul> |
| Balance of benefits versus harms and burdens       | The general benefit from reduction of leisure noise outweighs any potential harms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Values and preferences                             | There is variability in the values and preferences of the general population.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Resource implications                              | The resources needed to reduce exposure to leisure noise are not expected to be intensive, but implementation and the long-term success of measures may be challenging, mainly due to cultural factors.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Decision on strength of recommendation             | <ul style="list-style-type: none"> <li><b>Conditional</b> for guideline level for average noise exposure (<math>L_{Aeq,24h}</math>)</li> <li><b>Conditional</b> for single-event and impulse noise</li> <li><b>Strong</b> for interventions to reduce noise exposure</li> </ul>                                                                                                                                                                                                                                                                                                                                                   |

## 3.6 Interim targets

An interim target was proposed in the NNG (WHO Regional Office for Europe, 2009), “recommended in situations where the achievement of NNG is not feasible in the short run for various reasons”. The NNG emphasized that an interim target is “not a health-based limit value by itself. Vulnerable groups cannot be protected at this level”.

The GDG discussed whether to propose interim targets as part of the current guidelines, and if so, what process would be needed to derive those values. The current recommendations are health-based and already provide guideline values per noise source (for both  $L_{den}$  and  $L_{night}$ ). They also include information on exposure–response relationships for various health outcomes, which can be used by policy-makers or other stakeholders to inform the selection of different values, if needed. Further, interim targets may work differently in different countries and for different noise sources, and it may not be optimal to propose them Europe-wide. As a result, there was consensus among members of the GDG not to provide interim targets.



## 4. Implications for research

The development of these environmental noise guidelines for the WHO European Region has made evident some key knowledge gaps and research needs. The main ones specific to the guideline recommendations are presented as implications for research in the sections that follow.

### 4.1 Implications for research on health impacts from transportation noise

For the assessment of health effects from the main sources of transportation noise (road traffic, railways and aircraft), the various evidence reviews show the following knowledge gap: there is a need for longitudinal studies on the health impacts from exposure to environmental noise, to inform future recommendations properly (Table 51).

**Table 51. Implications for research on health impacts from transportation noise (air, rail, road)**

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Current state of the evidence</b> | Limited evidence is available on health impacts from transportation noise from large-scale cohort and case-control studies, with objective measurement of both noise exposure and health outcomes.                                                                                                                                                                                                                                                                                                                    |
| <b>Population of interest</b>        | Research is needed into effects of exposure on children and adults exposed to environmental noise from transportation sources.                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Exposure of interest</b>          | Objective measurement or calculation of transportation noise exposure is required; in particular, from studies of health effects related to combined exposure to different noise sources.                                                                                                                                                                                                                                                                                                                             |
| <b>Comparison of interest</b>        | The data should be compared to the effects of lower levels of transportation noise.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Outcomes of interest</b>          | Measures of the following health outcomes is required, assessed objectively and harmonized where possible – for example, according to common protocols: <ul style="list-style-type: none"> <li>• annoyance</li> <li>• effects on sleep</li> <li>• cardiovascular and metabolic effects</li> <li>• adverse birth outcomes</li> <li>• cognitive impairment</li> <li>• mental health, quality of life and well-being</li> <li>• hearing impairment and tinnitus</li> <li>• any other relevant health outcome.</li> </ul> |
| <b>Time stamp</b>                    | The systematic review included studies between October 2014 and December 2016.                                                                                                                                                                                                                                                                                                                                                                                                                                        |

#### 4.1.1 Specific implications for annoyance

To predict absolute %HA at the full range of levels (and the corresponding CIs), an integrated analysis of the original raw data from all of individual studies would be necessary. The evidence review conducted as part of the guidelines focused only on secondary data handling and therefore does not replace a full meta-analysis of all individual data. The development of a generic exposure–response relationship (from a full meta-analysis based on all individual data) is suggested as a priority research recommendation (see Table 52).

Table 52. Recommendation for research addressing the exposure–response relationship

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Current state of the evidence</b> | The evidence review on annoyance conducted as part of the guidelines does not provide a generalized ERF but points to significant differences compared to the curves used in the past. It shows that the available generalized ERFs are in need of adjustment, preferably as a result of undertaking a full meta-analysis. This is especially the case for the sources aircraft and railway noise, which new data show are more annoying than previously documented. |
| <b>Population of interest</b>        | Research is needed into effects of exposure on children and adults exposed to air, rail and/or road traffic noise.                                                                                                                                                                                                                                                                                                                                                   |
| <b>Exposure of interest</b>          | Objective measurement of transportation noise exposure is required.                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Comparison of interest</b>        | The data should be compared to the effects of lower levels of transportation noise.                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Outcomes of interest</b>          | Measures of health outcomes are required, assessed objectively according to common protocols (such as the International Commission on Biological Effects of Noise (ICBEN) scale for annoyance).                                                                                                                                                                                                                                                                      |
| <b>Time stamp</b>                    | The systematic review included studies up to October 2014.                                                                                                                                                                                                                                                                                                                                                                                                           |

## 4.2 Implications for research on health impacts from wind turbine noise

Further research into the health impacts from wind turbine noise is needed so that better-quality evidence can inform any future public health recommendations properly. For the assessment of health effects from wind turbines, the evidence was either unavailable or rated low/very low quality. Recommendations for research addressing this priority are proposed in Table 53.

Table 53. Implications for research on health impacts from wind turbine noise

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Current state of the evidence</b> | The current evidence on health outcomes related to wind turbine noise is unavailable or of low/very low quality and mainly comes from cross-sectional studies. Methodologically robust longitudinal studies with large samples investigating the quantitative relationship between noise from wind turbines and health effects are needed.                                                                                                           |
| <b>Population of interest</b>        | Research is needed into effects of exposure on children and adults exposed and living near sources of wind turbine noise. Studies should assess subgroup differences in effects for vulnerable groups such as children, elderly people and those with existing poor physical and mental health.                                                                                                                                                      |
| <b>Exposure of interest</b>          | Exposure to noise at a wide range of levels and frequencies (including low-frequency noise), with information on noise levels measured outdoors and indoors (particularly relevant for effects on sleep) at the residence is needed. The noise exposure should be measured objectively and common protocols for exposure to wind turbine noise should be established, considering a variety of noise characteristics specific to wind turbine noise. |
| <b>Comparison of interest</b>        | The data should be compared to the effects in similar areas without wind turbines. Pre/post studies of new wind turbine installations are needed, especially if “before measures” unbiased by the stress and knowledge of potential wind turbine farm development need to be developed.                                                                                                                                                              |
| <b>Outcomes of interest</b>          | Measures of health outcomes are required, assessed objectively – for example, according to common protocols (ICBEN scale for annoyance and self-reported sleep disturbance). The studies should include the most important situational and personal confounding variables, such as negative attitudes towards wind turbines, visual impact, economic gain and other socioeconomic factors.                                                           |
| <b>Time stamp</b>                    | The systematic review included studies between October 2014 (review on annoyance) and December 2016 (review on cardiovascular disease).                                                                                                                                                                                                                                                                                                              |

Alongside the defined needs for research on wind turbine noise it should be noted that research regarding industrial noise in general is required. More specifically, there is a need to investigate stationary sources (including heat, ventilation and acclimatization devices) and their impacts on health. Studies on hearing disorders from impulse and/or intermittent sounds are also needed; these would enable assessment of adverse effects created by one or several sounds of short duration with a high maximum sound level or impulse sound level.

### 4.3 Implications for research on health impacts from leisure noise

For the assessment of effects from leisure noise, the evidence to make a recommendation on the ERF to use for health risk assessment, or of a threshold for effects, was either unavailable or rated very low quality. This is a research gap: longitudinal studies with longer follow-up are needed; these should measure noise objectively, not only from PLDs but also from other types of leisure noise.

There is uncertainty in the measurement of early hearing disorders among young people using the tonal audiometry commonly applied. Precise methods to identify early hearing impairment and other hearing disorders are needed. Owing to long induction periods, however, adequate research may be difficult to perform, particularly among young people who change their exposure in terms of sound level and frequency as they age (for example, changing their music listening habits and venue visits). As a result, the recommendations refer to the results derived from stationary noise sources in the occupational field, in conjunction with the equal energy principle (see Table 54).

**Table 54. Implications for research on health impacts from leisure noise**

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Current state of the evidence</b> | Currently, no evidence is available on hearing impairment and tinnitus from large-scale cohort and case-control studies, with objective measurement of noise exposure and using a suitable method to assess hearing impairment in young people.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Population of interest</b>        | Research is needed into effects of exposure on children and adults exposed to environmental noise from different sources and in different settings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Exposure of interest</b>          | Objective measurement of leisure noise exposure is required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Comparison of interest</b>        | The data should be compared to the effects of no leisure noise exposure from these sources.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Outcomes of interest</b>          | <p>The primary outcomes identified are:</p> <ul style="list-style-type: none"> <li>• hearing loss measured by audiometry;</li> <li>• specific threshold analyses focused on stratifying the risk of permanent hearing loss according to clearly defined levels of exposure to leisure noise, such as music through PLDs;</li> <li>• concise methods to identify early hearing impairment and other hearing disorders;</li> <li>• temporary threshold shift after exposure to leisure noise, as it may be reasonably predictive of future permanent threshold shift;</li> <li>• age-related hearing loss progression depending on early-age exposure to leisure noise, such as to loud music; and</li> <li>• tinnitus, measured objectively and subjectively.</li> </ul> |
| <b>Time stamp</b>                    | The systematic review included studies up to June 2015.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

#### 4.4 Implications for research on effectiveness of interventions to reduce exposure and/or improve public health

The quality of the evidence on the effectiveness of interventions to reduce exposure to and health outcomes from environmental noise was variable. Further studies directly linking noise interventions to health outcomes are required, particularly for sources other than road traffic noise, and for human health outcomes other than annoyance.

Most studies involved road traffic noise (63%), followed by aircraft noise (13%) and railway noise (6%). The remaining interventions were for leisure noise (13%) and noise in hospital settings (4%). No interventions were identified that either addressed wind turbine noise or focused on educational settings.

Exposure-related interventions were mainly associated with a reduction in environmental noise exposure. However, in five studies (four road traffic noise studies and one aircraft noise study) some or all of the participants experienced noise exposure increases.

There is no clear evidence with respect to thresholds, which are defined as:

- the smallest change in exposure levels that results in a change in outcome; and
- the minimum before-level, regarding changes in health outcomes as a result of interventions.

The limited evidence base on the health effects of environmental noise interventions is thinly spread across different noise source types, outcomes and intervention types. Diversity exists between studies even within intervention types in terms of study designs, methods of analysis, exposure levels and changes in exposure experienced as a result of the interventions. For these reasons, carrying out a meta-analysis across studies examining the association between changes in level and changes in outcome was not possible.

To remedy this main research gap, longitudinal studies assessing noise exposure and health outcomes objectively should be developed, taking into account the most relevant confounders. The establishment of common protocols for future research is warranted (see Table 55).

Authorities should include significant funding for the design and implementation of studies to evaluate the effectiveness of interventions to reduce noise and their impact on health.

Table 55. Implications for research on effectiveness of interventions to reduce exposure and/or improve public health

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Current state of the evidence</b> | The current evidence on effectiveness of interventions to reduce health outcomes is limited and of varying quality. Few longitudinal studies have been done that take into account the most relevant confounders and measure the noise exposure and the outcomes objectively.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Population of interest</b>        | Research is needed into effects of interventions on defined populations exposed to and/or living near sources of environmental noise.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Intervention of interest</b>      | Research into any noise intervention at various points along the system pathway between source and outcome, for a variety of noise sources, is required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Comparison of interest</b>        | <p>The data should be compared to:</p> <ul style="list-style-type: none"> <li>• a steady-state control group, in similar areas with various exposure gradients from environmental noise sources;</li> <li>• the noise exposure in the same population, through a series of sequential measurements assessing the change before and after the intervention, preferably with multiple after measurements.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Outcomes of interest</b>          | <p>Future intervention studies should use validated and, where possible, harmonized measures of exposure and outcome, as well as of moderators and confounders.</p> <p>The studies should use measures of exposure including noise exposure at a wide range of levels and frequencies (including low-frequency noise), with information on noise levels outdoors and indoors (particularly relevant for effects on sleep).</p> <p>They should also use measures of health outcomes, including the following outcomes assessed objectively – for example, according to common protocols (ICBEN scale for annoyance) – with consideration that the change in human response for some health outcomes from a step change in exposure may have a different time course to that of the change in exposure:</p> <ul style="list-style-type: none"> <li>• annoyance</li> <li>• effects on sleep</li> <li>• cardiovascular and metabolic diseases</li> <li>• adverse birth outcomes</li> <li>• cognitive impairment</li> <li>• mental health, quality of life and well-being</li> <li>• hearing impairment and tinnitus</li> <li>• any other relevant health outcome.</li> </ul> <p>Further, they should use measures of moderators and confounders, including repeated measurements of situational and personal variables such as activity interference, potential confounders such as noise sensitivity, coping strategies and a range of other attitudinal variables.</p> |
| <b>Time stamp</b>                    | The systematic review included studies up to October 2014.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |





## 5. Implementation of the guidelines

### 5.1 Introduction

These guidelines focus on the WHO European Region and provide guidance to Member States that is compatible with the noise indicators used in the EU's END (EC, 2002a). They provide information on the exposure–response relationships between exposure to environmental noise from different noise sources and the proportion of people affected by certain health outcomes, as well as interventions that are considered efficient in reducing exposure to environmental noise and related health outcomes.

The WHO guideline values are evidence-based public health-oriented recommendations. As such, they are recommended to serve as the basis for a policy-making process in which policy options are considered. In the policy decisions on reference values, such as noise limits for a possible standard or legislation, additional considerations – such as feasibility, costs, preferences and so on – feature in and can influence the ultimate value chosen as a noise limit. WHO acknowledges that implementing the guideline recommendations will require coordinated effort from ministries, public and private sectors and nongovernmental organizations, as well as possible input from international development and finance organizations. WHO will work with Member States and support the implementation process through its regional and country offices.

### 5.2 Guiding principles

Four guiding principles provide generic advice and support when incorporating the recommendations into a policy framework, and apply to the implementation of all the recommendations.

The **first principle** is to reduce exposure to noise, while conserving quiet areas. The recommendations focus on reduction of population exposure to environmental noise from a variety of sources, in different settings. The general population can be exposed regularly to more than one source of noise simultaneously (including, in some cases, occupational noise), as well as to other nonacoustic factors that can modify the response to noise (such as vibration from railways, air pollution from traffic or visual aspects of wind turbines). Thus, overall reduction of exposure from all sources should be promoted. Furthermore, noise exposure reduction in one area should not come at the expense of an increase in noise elsewhere; existing large quiet outdoor areas should be preserved.

The **second principle** is to promote interventions to reduce exposure to noise and improve health. The evidence from epidemiological studies on adverse health effects at certain noise levels, used as a basis to derive the guideline values proposed in the recommendations, supports the promotion of noise interventions. The potential health impacts from environmental noise are significant, especially when considering the widespread exposure to environmental noise across the population and the high baseline rates for various health outcomes associated with environmental noise.

There are challenges in assessment of the effectiveness of interventions to reduce noise exposure and/or improve health, as there is often a significant time lag between the intervention and a measurable change in exposure and related health benefits. The lack of – or limited direct evidence

for – quantifiable health benefits of some specific interventions does not imply that measures to achieve population exposure according to the proposed guidelines should be ignored.

Given the different factors that determine noise exposure, a single measure alone may not be sufficient to reduce exposure and/or improve health significantly, and a combination of methods may be warranted. Nevertheless, it is widely acknowledged that the most effective actions to reduce exposure tend to be those that reduce noise at the source. Such actions have the biggest potential, whereas other measures can be less effective or sustained over time, especially when they depend on behaviour change or noise reductions inside houses.

The **third principle** is to coordinate approaches to control noise sources and other environmental health risks. Considering the common transport-related sources of environmental noise and air pollution, and in particular the evidence of independent effects on the cardiovascular system, a coordinated approach to policy development in the sectors related to urban planning, transport, climate and energy should be adopted for policies with an impact on environmental noise, air quality and/or climate. Such an approach should yield multiple benefits through increased commitment and financial resources; increased attention to securing health considerations in all policies; and use of policy to control noise and other environmental risks such as air pollutants, including short-lived climate pollutants. There is wide consensus on the value of pursuing coordinated policies that can deliver health and other benefits, such as those associated with the local environment and economic development. Furthermore, coordinated policy-making is potentially cost-saving.

The **fourth principle** is to inform and involve communities that may be affected by a change in noise exposure. In planning new urban and/or rural developments (transport schemes, new infrastructures in less densely populated areas, noise abatement and mitigation strategies), bringing together planners, environmental professionals and public health experts with policy-makers and citizens is key to public acceptability and involvement and to the successful guidance of the decision-making process. Potential health effects from environmental noise should be included as part of health impact assessments of future policies, plans and projects, and the communities potentially affected by a positive or negative change in noise exposure should be well informed and engaged from the outset to maximize potential benefits to health. Introducing measures incrementally may help with acceptance.

### 5.3 Assessment of national needs and capacity-building

National needs, including the need for capacity-building, differ between Member States in the WHO European Region. They depend on the existence and level of implementation of national and/or European and international noise policies; these are more likely to be implemented fully in EU countries thanks to the legally binding provisions of the EU's END (EC, 2002a). In most countries in the Region noise is perceived as a major and growing environmental health and public health problem. Noise mapping and action plans are carried out in accordance with the END in EU Member States, and in south-eastern European countries noise legislation has mainly been harmonized with the END. Nevertheless, significant differences still exist in the completeness and regular updating of noise exposure assessment between countries. Noise exposure assessment is a required input for noise health impact assessments, along with exposure-response relationships and population baseline data.

WHO has identified some common needs for knowledge transfer and capacity-building for health risk assessment of environment noise in the Member States that joined the EU after 2003, the newly independent states and south-eastern European countries (WHO Regional Office for Europe, 2012):

- implementation of the END and its annexes, especially in the preparation of strategic noise mapping and action plans;
- human resources development through education and training in health risk assessment and burden of diseases stemming from environmental noise;
- methodological guidance for health risk assessment of environmental noise.

These guidelines mostly recommend exposure–response relationships related to the exposure indicators  $L_{den}$  and  $L_{night}$ . They are therefore of particular relevance to EU countries and those applying the END. In countries that do not use these indicators, users of the guidelines need to convert their noise indicators into  $L_{den}$  and  $L_{night}$  before being able to apply the recommendations. Conversion between indicators is possible, using a certain set of assumptions (Brink et al., 2018).

## 5.4 Usefulness of guidelines for target audiences

The provision of guideline values as a practical tool for guiding exposure reduction and the design of effective measures and policies is widely seen as useful. The WHO guidelines equip policy-makers and other end-users with a range of different needs with the necessary evidence base to inform their decisions. As indicated in section 1.4, these guidelines serve as a reference for several target audiences, and for each group they can be useful in different ways.

- For technical experts and decision-makers, the guidelines can be used to provide exposure–response relationships that give insight into the consequences of certain regulations or standards on the associated health effects. They also can be useful at the national and international level when developing noise limits or standards, as they provide the scientific basis to identify the levels at which environmental noise causes a significant health impact. Based on these recommendations, national governments and international organizations can be better informed when introducing noise limits, to ensure protection of people's health.
- For health impact assessment and environmental impact assessment practitioners and researchers, these guidelines provide exposure–response relationships that give insight into the expected health effects at observed or expected noise exposure levels. They offer recommendations on the maximum admissible noise levels for some sources and provide important input to assist in deriving the health burden from noise; in that sense, they can be used when producing studies such as noise maps and action plans to obtain an evaluation of the magnitude of the health problem. The systematic reviews developed in support of these guidelines allow practitioners to raise awareness of the credibility of the issue of noise as a public health problem and to use the recommended exposure–response relationships uniformly. Researchers will also benefit from the guidelines as they clearly identify critical data gaps that need to be filled in the future to better protect the population from the harmful effects of noise.
- The guideline recommendations provide a useful tool for national and local authorities when deciding about noise reduction measures, as they provide data to estimate the health burden on the population and therefore allow comparison among different policy options. These options

can include measures to reduce the noise emitted by the sources, measures aimed at impeding the transmission of noise from the sources to people and measures aimed at better planning the location of houses (urban planning).

- The guideline recommendations can also be used by civil society, patients and other advocacy groups to raise awareness and encourage actions to protect the population, including vulnerable groups, from exposure to noise.

Regarding noise abatement and mitigation of noise sources, practical exposure–response relationships for various noise sources are useful quantitative input to determine the impact of noise on health. They can be valuable information to use in cost–effectiveness and cost–benefit analyses of various policies for noise abatement. In this respect, the guideline recommendations can be an integral part of the policy process for noise reduction by various institutions; they are of great value for communicating the health risks and potential cost-effective solutions to reduce noise.

National and local authorities and nongovernmental organizations responsible for risk communication and general awareness-raising can use these guidelines for promotion campaigns and appropriate risk communication. The guidelines provide scientific evidence on a range of health effects associated with noise and facilitate appropriate risk communication to specific vulnerable groups. They therefore need to be promoted broadly to citizens, national and local authorities and nongovernmental organizations responsible for risk communication.

## 5.5 Methodological guidance for health risk assessment of environmental noise

A health risk assessment is the scientific evaluation of potential adverse health effects resulting from human exposure to a particular hazard – in this case, environmental noise. The main purpose of the assessment is to estimate and communicate the health impact of exposure to noise or changes in noise in different socioeconomic, environmental and policy circumstances.

The guideline recommendations, along with the detailed information contained in the systematic evidence reviews, can be used to assess health impacts in order to answer a variety of policy questions on:

- the public health burden associated with current or projected levels of noise;
- the human health benefits associated with changing a noise policy or applying a more stringent noise standard;
- the impacts on human health of emissions from specific sources of noise for selected economic sectors (and the benefits of policies related to them); and
- the human health impacts of current policy or implemented action.

The results from a health risk assessment are usually reported as the number of attributable deaths, number of cases, years of life lost, years lost due to disability or DALYs.

The quantification of the impacts for one combination of noise source, noise exposure indicator and health outcome may to some extent include effects attributable to another. Consequently, for any particular set of combinations, consideration should be given to potential double counting.

It is also important to note the uncertainties in quantification of the health impacts. One set of uncertainties relates to the CIs associated with the recommended ERFs; these quantify the random



error and variability attributed to heterogeneity in the epidemiological studies used for health risk assessment. Other types of uncertainty include modelling/calculation of noise exposure, estimates of population background rates for morbidity and mortality, and transferability of ERFs from locations where studies were carried out or data were otherwise gathered to another location. This is especially true for noise annoyance, for which there is often considerable heterogeneity in effect sizes of studies because estimates vary between noise sources and are to some degree dependent on the situation and context. Furthermore, cultural differences around what is considered annoying are significant, even within Europe. It is therefore not possible to determine the “exact value” of %HA for each exposure level in any generalized situation. Instead, data and exposure–response curves derived in a local context should be applied whenever possible to assess the specific relationship between noise and annoyance in a given situation. If, however, local data are not available, general exposure–response relationships can be applied, assuming that the local annoyance follows the generalized average annoyance. Despite the challenges in applying a “generalized” ERF to specific local situations, the GDG believes that the percentage of high annoyance defined in section 2.4.3 is an acceptable estimate of the “average” %HA at a certain noise level – for example, in Europe.

When performing a health risk assessment of environmental noise, it is important to note several considerations. The selection of particular noise source(s), noise exposure indicator(s) and health outcome combinations to be used for estimation of the health impacts depends on the particular policies and/or measures being assessed. These guidelines propose recommendations for four types of noise source using noise indicators  $L_{den}$  and/or  $L_{night}$  (road traffic, railway noise, aircraft noise and wind turbine noise) and one recommendation using  $L_{Aeq,24h}$  (leisure noise). Any population may be exposed to different noise sources associated with the same health outcome. Estimated impacts should not be added together without recognizing that addition will, in most practical circumstances, lead to some overestimation of the true impact. Impacts estimated for only one combination will, on the other hand, underestimate the true impact of the noise mixture, if other sources of noise also affect that same health outcome.

The scientific evidence reviewed and summarized in these guidelines implies that the following health outcomes can be quantified in a health risk assessment, and that their effects are cumulative:

- from road traffic noise – incidence of IHD, annoyance and sleep disturbance, and potentially incidence of stroke and diabetes;
- from railway noise – annoyance and sleep disturbance;
- from aircraft noise – annoyance, reading and oral comprehension in children, sleep disturbance and potentially change in waist circumference and incidence of IHD;
- from wind turbine noise: annoyance.

The DWs suggested in section 2.4.3 can be used to calculate DALYs.

Data on incidence and prevalence of some health outcomes related to noise (mainly cardiovascular disease) can be found at a national level in online databases available on the WHO Regional Office for Europe website (WHO Regional Office for Europe, 2017).

General principles of relevance for environmental factors when conducting health risk assessments and quantifying the burden of disease can be found elsewhere (European Centre for Health Policy, 1999; Murray, 1994; Murray & Acharya, 1997; Murray & Lopez, 2013; Quigley et al., 2006; WHO,

2014a; 2014b; WHO Regional Office for Europe, 2016). In particular, the WHO Regional Office for Europe and JRC jointly published the first estimates of the burden of disease from environmental noise in 2011 (WHO Regional Office for Europe & JRC, 2011). The publication includes guidance on the procedure for the health risk assessment of environmental noise, exemplary estimates of the burden of the health impacts of environmental noise and a discussion of the uncertainties and limitations of the procedure to calculate the environmental burden of disease. The reader is referred to this publication for more detailed explanations on quantitative risk assessment methods for environmental noise.

## 5.6 Route to implementation: policy, collaboration and the role of the health sector

Preventing noise and related health impacts relies on effective action across different sectors: health, environment, transport, urban planning and so on. The health sector needs to be engaged effectively in different sectors' policy processes at national, regional and international levels. It needs to provide authoritative advice about the health impacts of noise and policy options that will bring the greatest benefits to health.

In most countries in the WHO European Region, the commitment of the health sector to engage in action to address environmental noise issues needs to be improved and better coordinated. A more coherent overall response is needed, taking into account relevant linkages with existing health priorities and concerns. Thus, some actions can be seen as aspects of the role of the health sector:

- engaging in proper communication with relevant sectors about noise exposure from different sectors and sources (environmental, urban development, transport and so on) to ensure that health issues are adequately addressed as part of international, regional, national and/or local efforts to address environmental noise – the implementation approach may differ across sectors, depending on the level of awareness of noise as a public health problem;
- promoting the guideline recommendations to policy-makers from different sectors and organizing information campaigns and awareness-raising activities in collaboration with national health authorities and WHO country offices to inform citizens and health practitioners about the health risks of environmental noise;
- using decision support instruments such as health impact and health risk assessments to quantify health risks and potential benefits associated with policies and interventions aimed at addressing environmental noise, including presenting information about the severity of the health effects (for example, with cardiovascular disease) to convey the serious impacts of noise and to try to change attitudes and behaviours of policy-makers and the general public;
- promoting the guidelines to health practitioners and physicians, especially at the community level (through associations of physicians, cardiologists and so on as part of the stakeholder group);
- supporting the establishment of national health institutions capable of initiating and developing health promotion measures, and conducting research, monitoring and reporting on health impacts from environmental noise and its different sources;



- organizing capacity-building workshops and training to increase knowledge of the guidelines as well as creating tools, skills and resources for health risk assessment and developing intersectoral collaboration, particularly in non-EU countries;
- promoting relevant research initiatives and shaping the research agenda, in part based on critical research recommendations and gaps identified in the guidelines, as well as on the impact and effectiveness of interventions and experience with their implementation;
- developing and updating guidelines and policies that influence national, regional and international benchmarks and targets related to environmental noise, as well as advocating the inclusion of the guidelines in development and shaping of national, regional and international noise policies and standards;
- working with other sectors to strengthen noise level monitoring and evaluation, particularly in non-EU countries, to ensure proper conducting of health risk assessments of environmental noise.

## 5.7 Monitoring and evaluation: assessing the impact of the guidelines

Exposure–response relationships and other recommendations provided by these guidelines should be incorporated into national health policies and the main related policy documents. They should be used for health impact and health risk assessments to identify health risks and potential benefits associated with policies and interventions related to environmental noise.

Population noise exposure should be monitored and assessed at a national scale, at least in urban areas. Furthermore, information on trends in occurrence of noise-related health outcomes considered in these guidelines, such as annoyance or sleep disturbance, should be gathered. These monitoring activities should be performed on a regular basis to ensure proper health risk assessments of noise.

## 5.8 Updating the guidelines

The progress and pace of noise and health research has intensified over the last 10 years, including new studies published after the completion of the systematic reviews done for these guidelines. This is partly related to the growing car fleet and resulting traffic, the density of urbanization, demographic changes and shifts towards renewable energy, including wind turbines, which have caused an increase in public perception and political awareness of the environmental noise problem. Noise exposure assessment has also improved, due partly to European legislation, and this has provided useful data for epidemiological studies on the health effects of environmental noise. Considering this, the recommendations proposed in these guidelines are expected to remain valid for a period of about 10 years. WHO will monitor the development of the scientific advancements on noise and health research in order to inform any updated guidance on environmental noise.



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# Annexes

## Annex 1. Steering, advisory and external review groups

Tables A1.1–A1.5 give details of the various teams involved in the development of the WHO environmental noise guidelines for the European Region.

**Table A1.1 WHO Steering Group**

| Name                | Role                                               | Affiliation                                                                                                                               |
|---------------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Shelly Chadha       | Technical Officer, Office for Hearing Impairment   | WHO headquarters, Geneva, Switzerland                                                                                                     |
| Carlos Dora         | Coordinator                                        | WHO headquarters, Department of Public Health and Environment, Geneva, Switzerland                                                        |
| Marie-Eve Héroux    | Technical Officer, Air Quality and Noise           | WHO Regional Office for Europe, European Centre for Environment and Health, Bonn, Germany                                                 |
| Dorota Jarosinska   | Programme Manager, Living and Working Environments | WHO Regional Office for Europe, European Centre for Environment and Health, Bonn, Germany                                                 |
| Rokho Kim           | Environmental Health Specialist, Team Leader       | WHO Regional Office for the Western Pacific, Division of Noncommunicable Diseases and Health through the Life-Course, Manila, Philippines |
| Jurgita Lekaviciute | Consultant, Noise                                  | WHO Regional Office for Europe, European Centre for Environment and Health, Bonn, Germany                                                 |
| Srdan Matic         | Coordinator, Environment and Health                | WHO Regional Office for Europe, Copenhagen, Denmark                                                                                       |
| Julia Nowacki       | Technical Officer, Health Impact Assessment        | WHO Regional Office for Europe, European Centre for Environment and Health, Bonn, Germany                                                 |
| Elizabet Paunovic   | Head of Office                                     | WHO Regional Office for Europe, European Centre for Environment and Health, Bonn, Germany                                                 |
| Poonum Wilkhu       | Consultant, Noise                                  | WHO Regional Office for Europe, European Centre for Environment and Health, Bonn, Germany                                                 |
| Jödis Wothge        | Consultant, Noise                                  | WHO Regional Office for Europe, European Centre for Environment and Health, Bonn, Germany                                                 |

Table A1.2. Guideline Development Group

| Area of expertise                                                                   |                                                                                                                                                                | Reference | Area of expertise                                                   |   | Reference |   |   |   |   |   |    |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------|---|-----------|---|---|---|---|---|----|
| Noise sources and their measurement                                                 |                                                                                                                                                                | 1         | Annoyance                                                           |   | 6         |   |   |   |   |   |    |
| Biological mechanisms of effects                                                    |                                                                                                                                                                | 2         | Cognitive impairment, quality of life, mental health and well-being |   | 7         |   |   |   |   |   |    |
| Cardiovascular and metabolic diseases                                               |                                                                                                                                                                | 3         | Adverse birth outcomes                                              |   | 8         |   |   |   |   |   |    |
| Sleep disturbance                                                                   |                                                                                                                                                                | 4         | Environmental noise interventions                                   |   | 9         |   |   |   |   |   |    |
| Hearing impairment/tinnitus                                                         |                                                                                                                                                                | 5         | Methodology and guideline development                               |   | 10        |   |   |   |   |   |    |
| Area of expertise sought for guideline development<br>(see reference numbers above) |                                                                                                                                                                |           |                                                                     |   |           |   |   |   |   |   |    |
| Name                                                                                | Position and affiliation                                                                                                                                       |           |                                                                     |   |           |   |   |   |   |   |    |
|                                                                                     |                                                                                                                                                                | 1         | 2                                                                   | 3 | 4         | 5 | 6 | 7 | 8 | 9 | 10 |
| Wolfgang Babisch                                                                    | Senior Scientific Officer (retired)<br>Federal Environment Agency<br>Germany                                                                                   |           | X                                                                   | X |           | X |   |   |   |   |    |
| Goran Belojevic                                                                     | Professor<br>Institute of Hygiene and Medical<br>Ecology Faculty of Medicine<br>University of Belgrade<br>Serbia                                               |           |                                                                     | X |           |   | X |   |   |   |    |
| Mark Brink                                                                          | Senior Scientist<br>Federal Office for the Environment<br>Switzerland                                                                                          | X         |                                                                     |   | X         |   | X |   |   |   |    |
| Sabine Janssen                                                                      | Senior Scientist<br>Department of Sustainable Urban<br>Mobility and Safety<br>Netherlands Organisation for<br>Applied Scientific Research (TNO)<br>Netherlands |           |                                                                     |   | X         |   | X |   |   |   |    |
| Peter Lercher<br>(2013–2014)                                                        | Professor<br>Medical University of Innsbruck<br>Austria                                                                                                        |           |                                                                     |   |           |   |   | X | X |   |    |
| Marco Paviotti                                                                      | Policy Officer<br>Directorate-General for Environment<br>European Commission<br>Belgium                                                                        | X         |                                                                     |   |           |   |   |   |   | X |    |
| Göran Pershagen                                                                     | Professor<br>Institute of Environmental Medicine<br>Karolinska Institute<br>Sweden                                                                             |           | X                                                                   | X |           |   |   |   | X |   |    |





Table A1.2. contd

| Area of expertise                     |                                                                                                                       | Reference                                                                           | Area of expertise                                                   |   | Reference |   |   |   |   |   |    |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------|---|-----------|---|---|---|---|---|----|
| Noise sources and their measurement   |                                                                                                                       | 1                                                                                   | Annoyance                                                           |   | 6         |   |   |   |   |   |    |
| Biological mechanisms of effects      |                                                                                                                       | 2                                                                                   | Cognitive impairment, quality of life, mental health and well-being |   | 7         |   |   |   |   |   |    |
| Cardiovascular and metabolic diseases |                                                                                                                       | 3                                                                                   | Adverse birth outcomes                                              |   | 8         |   |   |   |   |   |    |
| Sleep disturbance                     |                                                                                                                       | 4                                                                                   | Environmental noise interventions                                   |   | 9         |   |   |   |   |   |    |
| Hearing impairment/tinnitus           |                                                                                                                       | 5                                                                                   | Methodology and guideline development                               |   | 10        |   |   |   |   |   |    |
| Name                                  | Position and affiliation                                                                                              | Area of expertise sought for guideline development<br>(see reference numbers above) |                                                                     |   |           |   |   |   |   |   |    |
|                                       |                                                                                                                       | 1                                                                                   | 2                                                                   | 3 | 4         | 5 | 6 | 7 | 8 | 9 | 10 |
| Kerstin Persson Waye                  | Professor<br>Occupational and Environmental Medicine<br>The Sahlgrenska Academy<br>University of Gothenburg<br>Sweden | X                                                                                   |                                                                     |   | X         |   | X |   |   |   |    |
| Anna Preis                            | Professor<br>Institute of Acoustics<br>Adam Michiewicz University<br>Poland                                           |                                                                                     |                                                                     |   |           | X | X |   |   |   |    |
| Stephen Stansfeld (Chair)             | Professor/Head of the Centre for Psychiatry<br>Barts and Queen Mary University of London<br>United Kingdom            |                                                                                     |                                                                     |   |           |   |   | X |   |   |    |
| Martin van den Berg                   | Senior Noise Expert<br>Ministry of Infrastructure and Environment<br>Netherlands                                      | X                                                                                   |                                                                     |   |           |   |   |   |   |   |    |
| GRADE methodologist                   |                                                                                                                       |                                                                                     |                                                                     |   |           |   |   |   |   |   |    |
| Jos Verbeek                           | Senior Researcher<br>Finnish Institute of Occupational Health<br>Finland                                              | X                                                                                   |                                                                     |   |           |   |   |   |   |   |    |

Table A1.3. Systematic Review Team

| Systematic review topics                           | Experts involved          | Affiliation                                                                                                         |
|----------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------|
| Cardiovascular and metabolic diseases              | Elise van Kempen          | National Institute of Public Health and the Environment (RIVM), Netherlands                                         |
|                                                    | Göran Pershagen           | Institute of Environmental Medicine, Karolinska Institute, Sweden                                                   |
|                                                    | Maribel Casas Sanahuja    | Institute for Global Health (ISGlobal), Spain                                                                       |
|                                                    | Maria Foraster            | Barcelona Institute for Global Health (ISGlobal), Spain and Swiss Tropical and Public Health Institute, Switzerland |
| Sleep disturbance                                  | Mathias Basner            | Department of Psychiatry, Perelman School of Medicine at the University of Pennsylvania, United States of America   |
|                                                    | Sarah McGuire             | Department of Psychiatry, Perelman School of Medicine at the University of Pennsylvania, United States of America   |
| Hearing impairment and tinnitus                    | Mariola Sliwiska-Kowalska | Nofer Institute of Occupational Medicine, Poland                                                                    |
|                                                    | Kamil Rafal Zaborowski    | Nofer Institute of Occupational Medicine, Poland                                                                    |
| Annoyance                                          | Rainer Guski              | Department of Psychology, Ruhr-University, Germany                                                                  |
|                                                    | Dirk Schreckenberg        | ZEUS GmbH, Centre for Applied Psychology, Environmental and Social Research, Germany                                |
|                                                    | Rudolf Schuemer           | Consultant for ZEUS GmbH, Centre for Applied Psychology, Environmental and Social Research, Germany                 |
| Cognitive impairment, mental health and well-being | Charlotte Clark           | Ove Arup & Partners, United Kingdom                                                                                 |
|                                                    | Katarina Paunovic         | Institute of Hygiene and Medical Ecology, Faculty of Medicine, University of Belgrade, Serbia                       |
| Adverse birth outcomes                             | Mark Nieuwenhuijsen       | Institute for Global Health (ISGlobal), Spain                                                                       |
|                                                    | Gordana Ristovska         | Institute of Public Health of Republic of Macedonia, the former Yugoslav Republic of Macedonia                      |
|                                                    | Payam Dadvand             | Institute for Global Health (ISGlobal), Spain                                                                       |
| Interventions                                      | Lex Brown                 | Griffith School of Environment/Urban Research Program, Griffith University, Australia                               |
|                                                    | Irene Van Kamp            | National Institute of Public Health and the Environment (RIVM), Netherlands                                         |

Table A1.4. External Review Group

| Area of expertise                     |  | Reference | Area of expertise                                  |  | Reference |
|---------------------------------------|--|-----------|----------------------------------------------------|--|-----------|
| Cardiovascular and metabolic diseases |  | 1         | Cognitive impairment, mental health and well-being |  | 5         |
| Sleep disturbance                     |  | 2         | Adverse birth outcomes                             |  | 6         |
| Hearing impairment/ Tinnitus          |  | 3         | Environmental noise interventions                  |  | 7         |
| Annoyance                             |  | 4         | Recommendations and implementation guidance        |  | 8         |

| Name                    | Affiliation                                                                                                     | Area of expertise sought for guideline development (see reference numbers above) |   |   |   |   |   |   |   |
|-------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---|---|---|---|---|---|---|
|                         |                                                                                                                 | 1                                                                                | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Gunn Marit Aasvang      | Norwegian Institute of Public Health, Norway                                                                    |                                                                                  | X |   |   |   |   |   |   |
| Bernard Berry           | Berry Environmental Limited, United Kingdom                                                                     |                                                                                  |   |   |   |   |   | X |   |
| Dick Botteldooren       | Department of Information Technology, Ghent University, Belgium                                                 |                                                                                  |   |   | X |   |   |   |   |
| Stephen Conaty          | South Western Sydney Local Health District, Australia                                                           |                                                                                  |   |   |   |   |   |   | X |
| Ulrike Gehring          | Institute for Risk Assessment Sciences, Utrecht University, Netherlands                                         |                                                                                  |   |   |   |   | X |   |   |
| Truls Gjestland         | SINTEF, Department of Acoustics, Norway                                                                         |                                                                                  |   |   | X |   |   |   |   |
| Mireille Guay           | Healthy Environments and Consumer Safety Branch, Health Canada/Government of Canada, Canada                     |                                                                                  | X |   | X |   |   |   |   |
| Ayşe Güven              | Audiology Department, Faculty of Health Sciences, Baskent University, Turkey                                    |                                                                                  |   | X |   |   |   |   |   |
| Anna Hansell            | Centre for Environmental Health & Sustainability, George Davies Centre, University of Leicester, United Kingdom | X                                                                                |   |   |   |   |   |   | X |
| Stylianos Kephelopoulou | European Commission, DG Joint Research Centre, Italy                                                            |                                                                                  |   |   |   |   |   | X | X |
| Yvonne de Kluizenaar    | The Netherlands Organization for applied scientific research (TNO), Netherlands                                 |                                                                                  |   |   |   |   |   | X |   |
| David S. Michaud        | Healthy Environments and Consumer Safety Branch, Health Canada/Government of Canada, Canada                     |                                                                                  | X |   | X |   |   |   |   |
| Arnaud Norena           | Université Aix-Marseille, Fédération de Recherche, Laboratoire Cognitive Neuroscience, France                   |                                                                                  |   | X |   |   |   |   |   |
| Enembe Okokon           | National Institute for Health and Welfare, Finland                                                              |                                                                                  |   |   |   |   |   |   | X |
| Dieter Schwela          | Stockholm Environment Institute, University of York, United Kingdom                                             |                                                                                  |   |   |   |   |   |   | X |
| Daniel Shepherd         | AUT University, Auckland, New Zealand                                                                           |                                                                                  |   |   |   | X |   |   |   |
| Mette Sørensen          | Danish Cancer Society Research Centre, Denmark                                                                  | X                                                                                |   |   |   |   |   |   | X |
| Rupert Thornley-Taylor  | Rupert Taylor Ltd, Noise and Vibration Consultants                                                              |                                                                                  |   |   |   |   |   | X | X |
| David Welch             | School of Population Health, Faculty of Medical and Health Sciences, University of Auckland, New Zealand        |                                                                                  |   | X |   |   |   | X |   |

Table A1.5. Stakeholders and end users that participated in the stakeholder consultation

| Area of expertise/interest                              | Reference | Area of expertise                                       | Reference |
|---------------------------------------------------------|-----------|---------------------------------------------------------|-----------|
| Implementation of recommendations on railway noise      | 1         | Implementation of recommendations on wind turbine noise | 4         |
| Implementation of recommendations on aircraft noise     | 2         | Implementation of recommendations on leisure noise      | 5         |
| Implementation of recommendations on road traffic noise | 3         | Implementation of overall recommendations               | 6         |

| Organization                                                           | Area of expertise specifically sought for Guidelines (see reference number above) |   |   |   |   |   |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|---|---|---|---|
|                                                                        | 1                                                                                 | 2 | 3 | 4 | 5 | 6 |
| Airlines for Europe                                                    |                                                                                   | X |   |   |   |   |
| Airports Council International Europe (ACI)                            |                                                                                   | X |   |   |   |   |
| Anderson Acoustics                                                     |                                                                                   | X |   |   |   |   |
| Bundesverband der Deutschen Luftverkehrswirtschaft e.V.                |                                                                                   | X |   |   |   |   |
| European Automobile Manufacturers' Association (ACEA)                  |                                                                                   |   | X |   |   |   |
| European Aviation Safety Agency                                        |                                                                                   | X |   |   |   |   |
| European Express Association                                           | X                                                                                 |   |   |   |   |   |
| European Noise Barrier Federation                                      |                                                                                   |   |   |   |   | X |
| Flughafenverband (ADV)                                                 |                                                                                   | X |   |   |   |   |
| International Air Transport Association (IATA)                         |                                                                                   | X |   |   |   |   |
| International Civil Aviation Organization (ICAO)                       |                                                                                   | X |   |   |   |   |
| International Union of Railways                                        | X                                                                                 |   |   |   |   |   |
| Landesamt fuer Natur, Umwelt und Verbraucherschutz Nordrhein-Westfalen |                                                                                   |   |   |   |   | X |
| Public Health Agency of Sweden                                         |                                                                                   |   |   |   |   | X |
| Stephen Turner Acoustics                                               |                                                                                   |   |   |   | X | X |
| Union Européenne Contre les Nuisances Aeriennes                        |                                                                                   | X |   |   |   |   |
| Vie en.ro.se.                                                          |                                                                                   |   |   |   |   | X |

Note: in total 53 organizations and institutions had been approached to participate in the stakeholder consultation.

## Annex 2. Systematic reviews and background documents used in preparation of the guidelines

Annex 2 provides a detailed list of all the supplementary documents accompanying the WHO environmental noise guidelines for the European Region.<sup>22</sup>

### Systematic reviews

- Basner M, McGuire S (2018). WHO environmental noise guidelines for the European Region: a systematic review on environmental noise and effects on sleep. *Int J Environ Res Public Health*. 15(3):pii: E519 (<http://www.mdpi.com/1660-4601/15/3/519/htm>).
- Brown AL, van Kamp I (2017). WHO environmental noise guidelines for the European Region: a systematic review of transport noise interventions and their impacts on health. *Int J Environ Res Public Health*. 14(8). pii: E873 (<http://www.mdpi.com/1660-4601/14/8/873/htm>).
- Clark C, Paunovic K (2018). WHO environmental noise guidelines for the European Region: a systematic review on environmental noise and cognition. *Int J Environ Res Public Health*. 15(2). pii: E285 (<http://www.mdpi.com/1660-4601/15/2/285/htm>).
- Clark C, Paunovic K (in press). WHO Environmental noise guidelines for the European Region: a systematic review on environmental noise and quality of life, wellbeing and mental health. *Int J Environ Res Public Health*.
- Guski R, Schreckenber D, Schuemer R (2017). WHO environmental noise guidelines for the European Region: a systematic review on environmental noise and annoyance. *Int J Environ Res Public Health*. 14(12). pii: 1539 (<http://www.mdpi.com/1660-4601/14/12/1539/htm>).
- Nieuwenhuijsen MJ, Ristovska G, Dadvand P (2017). WHO environmental noise guidelines for the European Region: a systematic review on environmental noise and adverse birth outcomes. *Int J Environ Res Public Health*. 14(10). pii: E1252 (<http://www.mdpi.com/1660-4601/14/10/1252/htm>).
- Śliwińska-Kowalska M, Zaborowski K (2017). WHO environmental noise guidelines for the European Region: a systematic review on environmental noise and permanent hearing loss and tinnitus. *Int J Environ Res Public Health*. 14(10). pii: E1139 (<http://www.mdpi.com/1660-4601/14/10/1139/htm>).
- van Kempen E, Casas M, Pershagen G, Foraster M (2018). WHO environmental noise guidelines for the European Region: a systematic review on environmental noise and cardiovascular and metabolic effects: a summary. *Int J Environ Res Public Health*. 15(2). pii: E379 (<http://www.mdpi.com/1660-4601/15/2/379/htm>).

<sup>22</sup> All references were accessed on 27 June 2018.

## Background documents

- Eriksson C, Pershagen G, Nilsson M (2018). Biological mechanisms related to cardiovascular and metabolic effects by environmental noise. Copenhagen: WHO Regional Office for Europe (<http://www.euro.who.int/en/health-topics/environment-and-health/noise/publications/2018/biological-mechanisms-related-to-cardiovascular-and-metabolic-effects-by-environmental-noise>).
- Héroux ME, Verbeek J (2018a). Results from the search for available systematic reviews and meta-analyses on environmental noise. Copenhagen: WHO Regional Office for Europe (<http://www.euro.who.int/en/health-topics/environment-and-health/noise/publications/2018/results-search-for-available-systematic-reviews-environmental-noise>).
- Héroux ME, Verbeek J (2018b). Methodology for systematic evidence reviews for the WHO environmental noise guidelines for the European Region. Copenhagen: WHO Regional Office for Europe (<http://www.euro.who.int/en/health-topics/environment-and-health/noise/publications/2018/methodology-systematic-evidence-reviews-who-environmental-guidelines-for-the-european-region>).



### Annex 3. Summary of conflict of interest management

All external contributors to the guidelines, including members of the GDG, Systematic Review Team and External Review Group, completed WHO declaration of interest forms in accordance with WHO's policy for experts. Further, at the initial stage of the project WHO technical staff reviewed and accepted *curricula vitae* of the candidates for the GDG.

At the beginning of the GDG meetings, the participants declared any conflict of interest by submitting declaration of interest forms. Updated declarations of interest were also collected from the members of the GDG, Systematic Review Team and External Review Group at the final stage of the project.

The conflict of interest assessment was done according to WHO procedures. If a conflict was declared, an initial review was undertaken by the WHO Secretariat to assess its relevance and significance. A declared conflict of interest is insignificant or minimal if it is unlikely to affect or to be reasonably perceived to affect the expert's judgment. Insignificant or minimal interests are: unrelated or only tangentially related to the subject of the activity or work and its outcome; nominal in amount or inconsequential in importance; or expired and unlikely to affect current behaviour.

The WHO Secretariat reviewed and assessed the declarations. In one case the legal unit was consulted for advice; in another the potential conflict was reported in the updated declaration of interest at the final stage of the process and assessed unlikely to affect expert's performance; in a further case a member of the GDG was also a co-author of a systematic review owing to the need to support systematic review authors with additional expertise, but there was no remuneration for this activity.

No member of the GDG or the Systematic Review Team was excluded from his or her role in the guideline development process. The declared conflicts of interest of the External Review Group members were considered when interpreting comments during the external review process.

## Annex 4. Detailed overview of the evidence of important health outcomes

As a first step of the evidence retrieval process, the GDG defined two categories of health outcome associated with environmental noise: those considered (i) critical or (ii) important, but not critical for decision-making in the guideline development process.

The GDG relied on the critical health outcomes to inform its decisions on priority health outcomes, so only these were used to inform the recommendations. Nevertheless, as the relevance of some of important health outcomes was difficult to estimate *a priori*, systematic reviews were conducted for both critical and important health outcomes.

This annex provides a detailed overview of the evidence of the important health outcomes – namely adverse birth outcomes, quality of life, well-being and mental health and metabolic outcomes – for each of the noise sources. A comprehensive discussion of all the evidence considered (both critical and important) is available in the published systematic reviews (see section 2.3.2 and Annex 2 for details).

### 1. Road traffic noise

#### 1.1 Adverse birth outcomes

In total, the systematic review found five studies (two with more or less the same population) on road traffic noise and birth outcomes and three related studies on total ambient noise, likely to be mostly road traffic noise. Too few studies for each of the various measures related to adverse birth outcomes were available to undertake a quantitative meta-analysis. There was evidence rated low quality for a relationship between road traffic noise and low birth weight (Dadvand et al., 2014; Gehring et al., 2014; Hjortebjerg et al., 2016; Wu et al., 1996); however, the estimates were imprecise and in some cases not statistically significant. Further, there was no clear relation between exposure to road traffic noise and pre-term delivery, but there was a positive association between road traffic noise and small for gestational age (OR = 1.09; 95% CI: 1.06–1.12 per 6 dB increase). The evidence for both measures of adverse birth outcomes comes from the same publications and this evidence was rated low quality (Gehring et al., 2014; Hystad et al., 2014).

This evidence was supported by one ecological time-series study published recently looking at total ambient noise and various measures related to adverse birth outcomes (Arroyo et al., 2016a; 2016b; Diaz et al., 2016).

#### 1.2 Quality of life, well-being and mental health

Evidence rated moderate quality was found for an effect of road traffic noise on emotional and conduct disorders in childhood (Belojevic et al., 2012; Crombie et al., 2011; Hjortebjerg et al., 2015; Ristovska et al., 2004; Stansfeld et al., 2005; 2009a; Tiesler et al., 2013) and evidence rated moderate quality for an association of road traffic noise with hyperactivity in children (Hjortebjerg et al., 2015; Tiesler et al., 2013).

There was no clear relationship, however, between road traffic noise exposure and self-reported quality of life (evidence rated low quality) (Barcelo Perez & Piñeiro, 2008; Brink, 2011; Clark et al., 2012; Honold et al., 2012; Roswall et al., 2015; Schreckenbergen et al., 2010b; Stansfeld et al., 2005; 2009b; van Kempen et al., 2010); medication intake for depression and anxiety (evidence rated very low quality) (Floud et al., 2011; Halonen et al., 2014); depression, anxiety and psychological distress (evidence rated very low quality) (Honold et al., 2012; Stansfeld et al., 2009b); and interview measures of depression and anxiety (evidence rated very low quality) (Stansfeld et al., 2009b).

### 1.3 Metabolic outcomes

#### 1.3.1 Diabetes

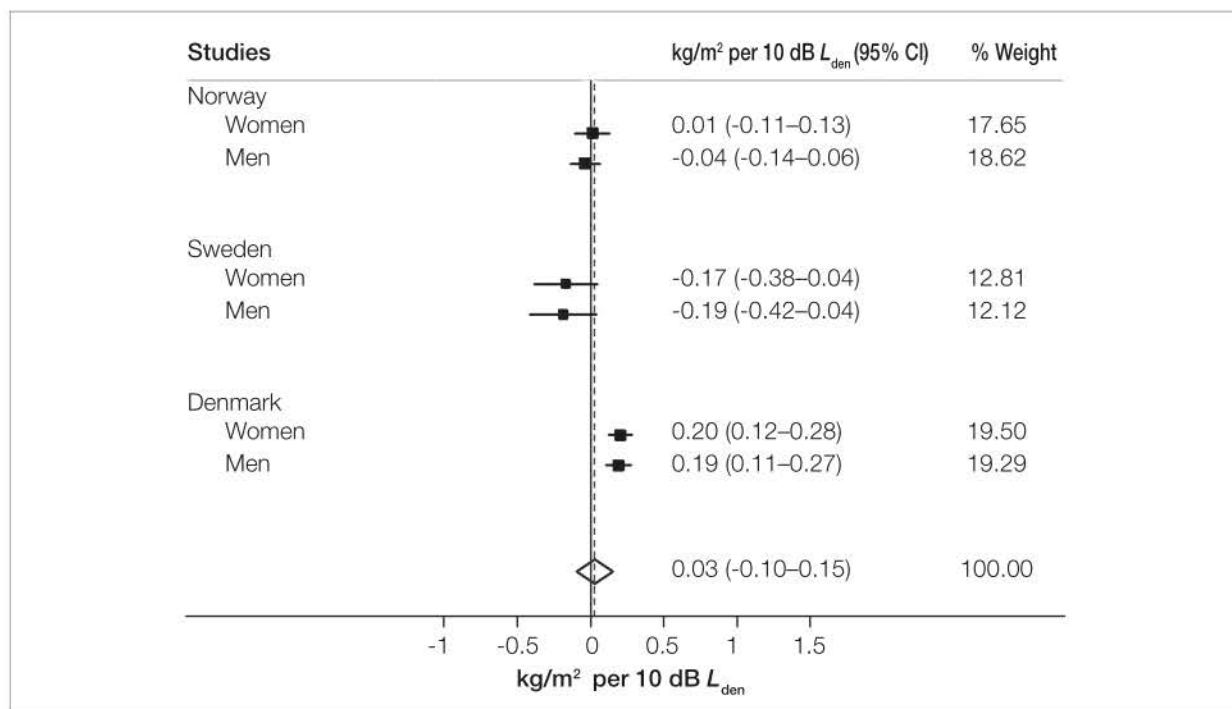
For the relationship between road traffic noise and the incidence of diabetes, one cohort study was identified, which included 57 053 participants and 2752 cases (Sørensen et al., 2013). The estimate of the effect was  $RR = 1.08$  (95% CI: 1.02–1.14) per 10 dB  $L_{den}$  increase in noise across the range of 50–70 dB, and therefore the evidence was rated moderate quality.

Furthermore, two cross-sectional studies were identified that looked at the prevalence of diabetes (Selander et al., 2009; van Poll et al., 2014). The studies included 11 460 participants and 242 cases. Both studies reported a harmful effect of noise, and one showed a statistically significant association. However, the results were imprecise and with serious risk of bias, so the evidence was rated very low quality.

#### 1.3.2 Obesity

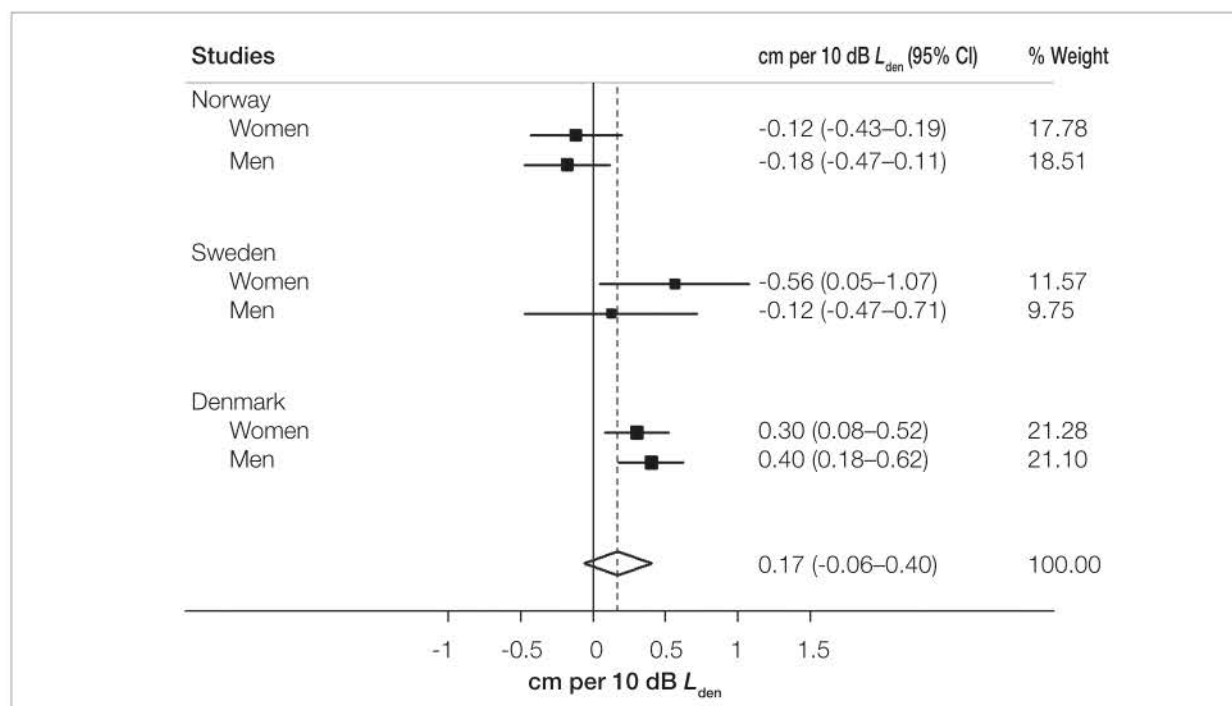
With regard to the association between road traffic noise and change in body mass index (BMI) and waist circumference, three cross-sectional studies were identified, with 71 431 participants (Christensen et al., 2016; Oftedal et al., 2014; 2015; Pyko et al., 2015). For each 10 dB increase in road traffic noise, there was a statistically nonsignificant increase in BMI of 0.03 kg/m<sup>2</sup> (95% CI: –0.10–0.15 kg/m<sup>2</sup>) and in waist circumference of 0.17 cm (95% CI: –0.06–0.40 cm). There was inconsistency in the results between the studies; therefore, for both associations, the evidence was rated very low quality (Fig. A4.1 and Fig. A4.2).

**Fig. A4.1 The association between exposure to road traffic noise ( $L_{den}$ ) and BMI in three Nordic studies**



*Notes:* The black vertical line corresponds to no effect of noise exposure. The black dots correspond to the estimated slope coefficients per 10 dB for each sex in each study, with 95% CIs. The diamond designates summary estimates and 95% CIs based on random effects models. The dashed red line corresponds to these summary estimates. Heterogeneity between studies:  $p = 0.000$ ; heterogeneity between genders:  $p = 0.360$ ; overall (I-squared = 84.4%,  $p = 0.000$ ). Weights are from random effect analysis.

**Fig. A4.2 The association between exposure to road traffic noise ( $L_{den}$ ) and waist circumference in three Nordic studies**



Notes: The black vertical line corresponds to no effect of noise exposure. The black dots correspond to the estimated slope coefficients per 10 dB for each sex in each study, with 95% CIs. The diamond designates summary estimates and 95% CIs based on random effects models. The dashed red line corresponds to these summary estimates. Heterogeneity between studies:  $p = 0.001$ ; heterogeneity between genders:  $p = 0.842$ ; overall (I-squared = 69.0%,  $p = 0.007$ ). Weights are from random effect analysis.

## 2. Railway noise

### 2.1 Adverse birth outcomes

No studies were found, and therefore no evidence was available on the association between railway noise and adverse birth outcomes.

### 2.2 Quality of life, well-being and mental health

Evidence rated very low quality was found for a weak effect of railway noise exposure on self-reported quality of life or health, albeit from a limited number of studies (Roswall et al., 2015; Torre et al., 2007). There was evidence rated moderate quality for an effect of railway noise on emotional and conduct disorders in childhood (Hjortebjerg et al., 2015), but no clear relationship between railway noise and children's hyperactivity (Hjortebjerg et al., 2015); this evidence was rated moderate quality.

## 2.3 Metabolic outcomes

### 2.3.1 Diabetes

One cohort study was identified that looked at the relationship between railway noise and the incidence of diabetes (Sørensen et al., 2013). The cohort study of 57 053 participants, including 2752 cases, found evidence rated moderate quality that there was no considerable effect of railway noise on diabetes, with an RR of 0.97 (95% CI: 0.89–1.05) per 10 dB  $L_{den}$  increase in noise.

Furthermore, one cross-sectional study was identified that looked at the relationship between railway noise and the prevalence of diabetes (van Poll et al., 2014), including 9365 participants and 89 cases. An RR of 0.21 (95% CI: 0.05–0.82) per 10 dB  $L_{den}$  increase in noise was found, but the reasons for the beneficial effect were not immediately apparent. The evidence in the study was rated very low quality.

### 2.3.2 Obesity

Regarding the association between railway noise and change in BMI and waist circumference, two cross-sectional studies were identified, with 57 531 participants (Christensen et al., 2016; Pyko et al., 2015). Christensen and colleagues observed a statistically significant increase of 0.18 kg/m<sup>2</sup> (95% CI: 0.00–0.36 kg/m<sup>2</sup>) per 10 dB for BMI and 0.62 cm (95% CI: 0.14–1.09 cm) per 10 dB for waist circumference in those exposed to railway noise, at levels above 60 dB  $L_{den}$ . Pyko and colleagues found a statistically significant increase in waist circumference of 0.92 cm (95% CI: 0.06–1.78 cm) per 10 dB  $L_{den}$ . The corresponding estimate for BMI was statistically nonsignificant, at 0.06 kg/m<sup>2</sup> (95% CI: –0.02–0.16 kg/m<sup>2</sup>). The evidence was rated low/very low quality.

## 3. Aircraft noise

### 3.1 Adverse birth outcomes

Evidence rated very low quality was available for an association between aircraft noise and pre-term delivery, low birth weight and congenital anomalies, as evidenced by six studies included in the systematic review (Ando & Hattori, 1973; Edmonds et al., 1979; Jones & Tauscher, 1978; Knipschild et al., 1981; Matsui et al., 2003; Schell, 1981). The potential for risk of bias in these was high and the results tended to be inconsistent.

### 3.2 Quality of life, well-being and mental health

Evidence rated very low quality was available for an effect of aircraft noise on medication intake for depression and anxiety (Floud et al., 2011). There was evidence rated very low quality for an effect of aircraft noise exposure on interview measures of depression and anxiety (Hardoy et al., 2005) and rated low quality for an association of aircraft noise with hyperactivity in children (Clark et al., 2013; Crombie et al., 2011; Stansfeld et al., 2009a).

The evidence showed, however, no substantial effect of aircraft noise on self-reported quality of life or health (Clark et al., 2012; Schreckenberget al., 2010a; 2010b; Stansfeld et al., 2005; van Kempen et al., 2010) or on emotional and conduct disorders in childhood (Clark et al., 2012; 2013; Crombie et al., 2011; Stansfeld et al., 2005; 2009a). This evidence was rated very low quality.



### 3.3 Metabolic outcomes

#### 3.3.1 Diabetes

For the relationship between aircraft noise and incidence of diabetes one cohort study was identified, including 5156 participants and 1346 cases (Eriksson et al., 2014). The estimate of the effect was imprecise, with an RR of 0.99 (95% CI: 0.47–2.09) per 10 dB  $L_{den}$  increase in noise; the evidence was therefore rated very low quality.

Furthermore, one cross-sectional study was identified that looked at the prevalence of diabetes (van Poll et al., 2014), including 9365 participants and 89 cases. The RR was 1.01 (95% CI: 0.78–1.31) per 10 dB increase in aircraft noise. The evidence was rated very low quality.

#### 3.3.2 Obesity

For the association between aircraft noise and change in BMI and waist circumference, one cohort study was identified, with 5156 participants (Eriksson et al., 2014). For each 10 dB increase in aircraft noise level, the increase in BMI was 0.14 kg/m<sup>2</sup> (95% CI: –0.18–0.45) (evidence rated low quality), and the increase in waist circumference was 3.46 cm (95% CI: 2.13–4.77) (evidence rated moderate quality). The range of noise levels in the study was 48–65 dB  $L_{den}$ . In the case of BMI, the change over the whole range in noise values was not statistically significant and was less than what could be considered clinically relevant (3–5% change in BMI); however, for waist circumference, the change was equivalent to an increase of 5.8 cm.

## 4. Wind turbine noise

### 4.1 Quality of life, well-being and mental health

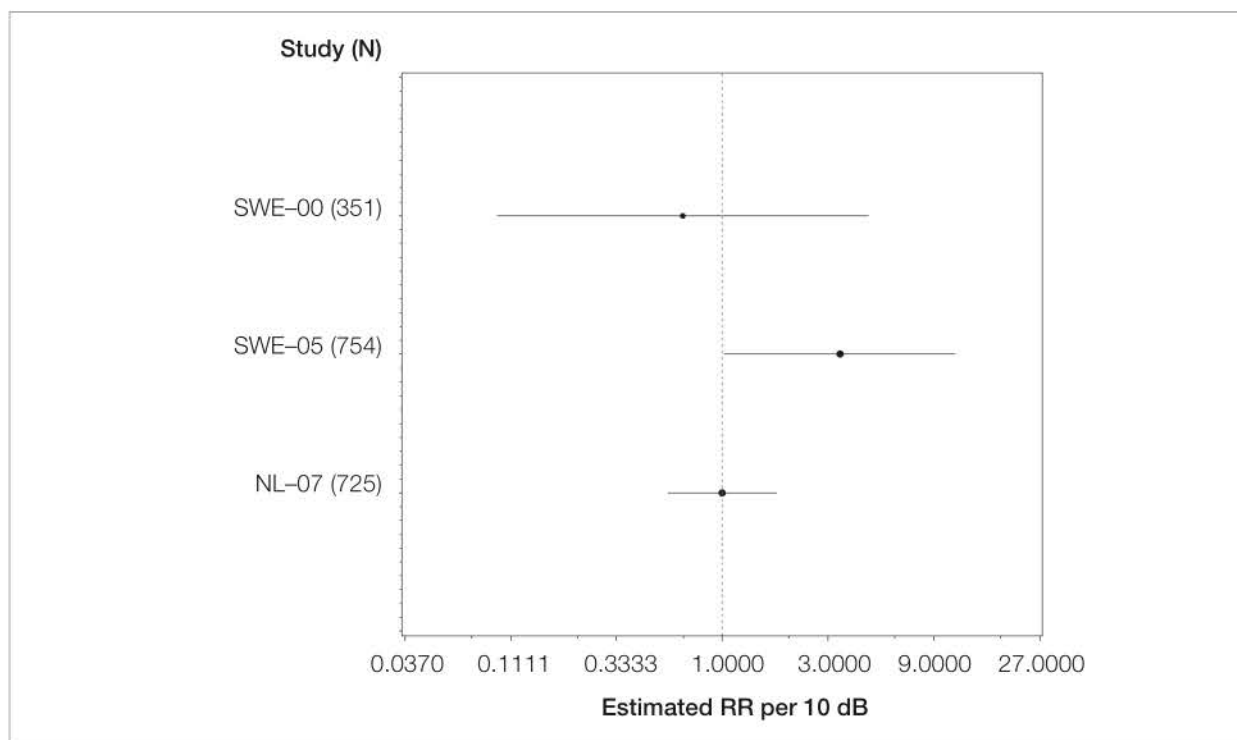
Five low-quality systematic reviews of wind turbine noise effects on mental health and well-being have been carried out (Ellenbogen et al., 2012; Kurpas et al., 2013; Merlin et al., 2013; Onakpoya et al., 2015; Schmidt & Klokke, 2014 ). These reviews differed in their conclusions and delivered inconsistent evidence that wind turbine noise exposure is associated with poorer quality of life, well-being and mental health. Therefore, the evidence for no substantial effect of wind turbine noise on quality of life, well-being or mental health was rated very low quality.

### 4.2 Metabolic outcomes

#### 4.2.1 Diabetes

For the relationship between wind turbine noise and prevalence of diabetes, three cross-sectional studies were identified, with a total of 1830 participants (Bakker et al., 2012; Pedersen, 2011; Pedersen & Larsman, 2008; Pedersen & Persson Waye, 2004; 2007; Pedersen et al., 2009; van den Berg et al., 2008). The number of cases was not reported. The effect sizes varied across studies, and only one study found a positive association between exposure to wind turbine noise and the prevalence of diabetes; therefore, no meta-analysis was performed. Due to very serious risk of bias and imprecision in the results, this evidence was rated very low quality. As a result, there is no clear relationship between audible noise (greater than 20 Hz) from wind turbines or wind farms and prevalence of diabetes (Fig. A4.3).

**Fig. A4.3 The association between exposure to wind turbine noise (sound pressure level) and self-reported diabetes**



*Note:* The dotted vertical line corresponds to no effect of exposure to wind turbine noise. The black circles correspond to the estimated RR per 10 dB (sound pressure level) and 95% CI.

For further details on the studies included in the figure please refer to the systematic review on environmental noise and cardiovascular and metabolic effects (van Kempen et al., 2018).

## 5. Leisure noise

Owing to a lack of evidence meeting the criteria for systematic reviewing, no results for any of the important health outcomes can be given for exposure to leisure noise.

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## The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

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Noise is an important public health issue. It has negative impacts on human health and well-being and is a growing concern. The WHO Regional Office for Europe has developed these guidelines, based on the growing understanding of these health impacts of exposure to environmental noise. The main purpose of these guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from various sources: transportation (road traffic, railway and aircraft) noise, wind turbine noise and leisure noise. They provide robust public health advice underpinned by evidence, which is essential to drive policy action that will protect communities from the adverse effects of noise. The guidelines are published by the WHO Regional Office for Europe. In terms of their health implications, the recommended exposure levels can be considered applicable in other regions and suitable for a global audience.

ISBN 9789289053563



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Transport Canada  
Transports Canada

4900 Yonge St. 3<sup>rd</sup> Floor  
Toronto ON M2N 6A5

Your file    Votre référence

Our file    Notre référence

RDIMS Number    Numéro de SGDDI  
20353655

June 13, 2024

19 (1)

Dear 19 (1)

Thank you for your email of May 26, 2024, to the Minister of Transport regarding air traffic noise around your residence. Your correspondence has been forwarded to me for a response.

Transport Canada is responsible for developing and overseeing the transportation policies, programs, and goals set by the Government of Canada to ensure the national transportation system is safe, efficient, and accessible to all its users.

One of the tools available to assist airports includes a process through which airport operators develop noise abatement procedures and operating restrictions by consulting aviation stakeholders and local communities. Noise abatement procedures for Toronto Pearson International Airport are in place. These are in addition to the Night Flight Program, which limits nighttime noise and balances growing regional demand. This program limits the number of movements during the restricted hours of 12:30 a.m. to 6:29 a.m. For more information, you may wish to visit [Night Flights](#), [Noise Management Program](#) and [Toronto InsightFull](#) ([torontopearson.com](http://torontopearson.com)).

Noise management is a complicated and often difficult issue faced by airport authorities and communities around the country. It is an issue that must be managed while ensuring that aviation safety is not compromised. Transport Canada's experience has shown that noise issues are most effectively addressed at the local community level. Therefore, the department encourages dialogue with the airport authority directly, as Transport Canada is not involved in the daily operations of airports, including Toronto Pearson International Airport.

The airport operator, the Greater Toronto Airports Authority, may be reached at 416-247-7682 or through its website at [Toronto Pearson- Contact Us](#).

Canada

[www.tc.gc.ca](http://www.tc.gc.ca)

02) 03-0418 (1307-

Thank you for writing.

Yours sincerely,

A handwritten signature in black ink that reads "ME George". The "ME" is written in a stylized, cursive font, and "George" is written in a more standard cursive script.

Marcia George  
Regional Director  
Civil Aviation, Ontario Region

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Transport Canada Transports Canada

4900 Yonge St. 3<sup>rd</sup> Floor  
Toronto ON M2N 6A5

Your file Votre référence

Our file Notre référence

RDIMS Number Numéro de SGDDI  
20399716

June 27, 2024

19 (1)

Dear 19 (1)

Thank you for your email of June 23, 2024, to the Minister of Transport regarding air traffic noise around your residence. Your correspondence has been forwarded to me for a response.

Transport Canada is responsible for developing and overseeing the transportation policies, programs, and goals set by the Government of Canada to ensure the national transportation system is safe, efficient, and accessible to all users.

One of the tools available to assist airports includes a process through which airport operators develop noise abatement procedures and operating restrictions by consulting aviation stakeholders and local communities. Noise abatement procedures for Toronto Pearson International Airport are in place. These are in addition to the Night Flight Program, which limits nighttime noise and balances growing regional demand. Specifically, it limits the number of movements during the restricted hours of 12:30 am to 6:29 am. For more information, you may wish to visit [Night Flights](#), [Noise Management Program](#) and [Toronto InsightFull](#) ([torontopearson.com](http://torontopearson.com)).

Noise management is a complicated and often difficult issue faced by airport authorities and communities around the country. It is an issue that must be managed while ensuring that aviation safety is not compromised. Transport Canada's experience has shown that noise issues are most effectively addressed at the local community level. Therefore, the department encourages dialogue with the airport authority directly, as Transport Canada is not involved in the daily operation of airports, including Toronto Pearson International Airport. In this instance, the airport operator is the Greater Toronto Airports Authority, which can be reached at 416-247-7682 or through its website at [Toronto Pearson- Contact Us](#).

Thank you for writing.

X

Signed by: Scott, Blake

Regards,  
Blake Scott  
A/Regional Director  
Civil Aviation, Ontario Region

Canada

[www.tc.gc.ca](http://www.tc.gc.ca)

03-0418 (1307-02)

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Transport  
Canada

Transports  
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4900 Yonge St. 3<sup>rd</sup> Floor  
Toronto ON M2N 6A5

Your file    Votre référence

Our file    Notre référence

RDIMS Number    Numéro de SGDDI  
20518789

August 29, 2024

19 (1)

Dear 19 (1)

Thank you for your email of August 2, 2024, to the Minister of Transport regarding aircraft noise concerns around your residence and the nighttime preferential runway system. Your correspondence has been forwarded to me for a response.

Transport Canada focuses on the safety and security of the aviation system in Canada. Through the development and administration of policies, regulations, and programs, the department strives to work with partners and stakeholders to achieve an efficient, effective, and environmentally responsible transportation system.

Further to the correspondence issued to you on April 4, 2024, the department maintains the same recommendation referenced in that communication, which is to continue constructive dialogue with the Greater Toronto Airports Authority (GTAA) directly. Transport Canada is not involved in daily operations at Toronto Pearson International Airport and these issues are best discussed directly with the airport authority.

Thank you for writing.

Regards,

Marcia George  
Regional Director  
Civil Aviation, Ontario Region

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Toronto ON M2N 6A5

Your file Votre référence

Our file Notre référence

RDIMS Number Numéro de SGDDI  
20518779

August 29, 2024

19 (1)

Dear 19 (1)

Thank you for your email of July 30, 2024, to the Minister of Transport regarding the aircraft noise concerns around your residence. Your correspondence has been forwarded to me for a response.

Transport Canada focuses on the safety and security of the aviation system in Canada. Through the development and administration of policies, regulations, and programs, the department strives to work with partners and stakeholders to achieve an efficient, effective, and environmentally responsible transportation system.

Further to the correspondence issued to you on June 27, 2024, the department maintains the same recommendation referenced in that communication, which is to continue constructive dialogue with the Greater Toronto Airports Authority (GTAA) directly. Transport Canada is not involved in daily operations at Toronto Pearson International Airport, including noise monitoring handled by the GTAA. Indeed, these issues are best discussed directly with the airport authority.

Again, thank you for writing.

Regards,

Marcia George  
Regional Director  
Civil Aviation, Ontario Region

[www.tc.gc.ca](http://www.tc.gc.ca)03-0418 (1307-  
02)



## POLICY GROUP

## SCENARIO NOTE

**MINISTER MEETING WITH TORONTO AREA MINISTERS AND  
MEMBERS OF PARLIAMENT ON AIRCRAFT NOISE**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Date / Time:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | April 21, 2016, 4:00 pm to 5:00 pm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Location:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Boardroom 2912, 330 Sparks Street, Tower C, Ottawa, Ontario                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Subject:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Meeting to discuss Toronto area aircraft noise issues                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Participants:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p><b>Transport Canada:</b><br/>The Honourable Marc Garneau, Minister of Transport<br/>Michael Stephenson, Regional Director General, Ontario Region</p> <p><b>Ministers and Parliamentarians*:</b></p> <ul style="list-style-type: none"> <li>• <i>The Honorable Carolyn Bennett, Minister of Indigenous and Northern Affairs (Toronto–St. Paul's)</i></li> <li>• The Honorable Chrystia Freeland, Minister of International Trade (University–Rosedale)</li> <li>• The Honorable Navdeep Singh Bains, Minister of Innovation, Science and Economic Development (Mississauga–Malton)</li> <li>• <i>Rob Oliphant, M.P. (Don Valley West)</i></li> <li>• <i>Yasmin Ratansi, M.P. (Don Valley East)</i></li> <li>• Marco Mendicino, M.P. (Eglinton — Lawrence)</li> <li>• <i>Pam Damoff, M.P. (Oakville North — Burlington)</i></li> <li>• <i>John Oliver, M.P. (Oakville)</i></li> <li>• <i>Arif Virani, M.P. (Parkdale — High Park)</i></li> <li>• Julie Dzerowicz (Davenport)</li> </ul> <p><i>* Italicized names indicate individuals (and/or their staff) who received a technical briefing from NAV CANADA and the GTAA on April 13, 2016.</i></p> |
| <p><b>Departmental Objectives</b></p> <p>This meeting, convened by you, presents an opportunity to clarify and confirm the roles and responsibilities of the various entities involved in managing aircraft noise in the Greater Toronto Area (GTA) with your colleagues who represent this area. The meeting will focus specifically on aircraft noise emanating from the Toronto Pearson International Airport (Pearson) and the efforts of local advocacy groups in the GTA. Background material from Transport Canada briefing notes on the matter are attached at Annex A).</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## POLICY GROUP

**Stakeholder Objectives**

Many of the participants have written to you (see Annex B for correspondence to date), seeking action on this issue, or in some cases, endorsing the views of the advocacy group known as the Toronto Aviation Noise Group (T.A.N.G.), and the recommendations presented by Captain David Inch (NAV CANADA analysis if the Inch Report is attached at Annex C).

NAV CANADA and the Greater Toronto Airports Authority (GTAA) are the key players involved in managing aircraft noise in this area. At a technical briefing from NAV CANADA and the GTAA on April 13, 2016, participants noted the following issues and questions with respect to federal government actions on the file:

1. Moving/sharing the flight path: This is the most important, and in some ways only, 'action' they see as a solution to noise issues in Toronto. More specifically, the participants would like to see the option of "sharing flight paths" (i.e. flight paths are changed periodically to go over different neighborhoods at different times—which the GTAA sees as effectively expanding the affected area even further).
2. Participants would like Transport Canada to regulate the human health impacts of continuous aircraft noise and frequency in communities.
3. The current issues in the area appear to stem from the flight paths that were changed as result of NAV CANADA's 2012 *Toronto-Ottawa-Montreal Airspace Review* changes. Participants wanted to understand why Transport Canada has not simply moved the flight paths back, or investigated the Review.

Additionally, participants had specific questions with regard to this issue. A summary of those questions and suggested answers is attached at Annex D.

Participants at the meeting on April 21, 2016 will likely vary in their knowledge of the issues and their awareness of the technical, scientific, and regulatory considerations in managing aircraft noise. Most will be seeking a way to reassure their constituents that the government is doing all it can to alleviate aircraft noise in their communities. Ideally, they would hope that the concerns of their constituents would be resolved.

**Meeting Management**

The current aircraft noise concerns in the GTA stem from flight path changes implemented by NAV CANADA in 2012 as a result of an airspace review. There have been a number of actions put into place such as the *Airspace Change Communications and Consultations Protocol*, as well as the Noise Management Initiatives Plan currently underway by NAV CANADA and the GTAA (more information on these initiatives and the work being undertaken is included at Annex E).

It is anticipated, however, that this meeting will focus mainly on the three issues noted in the April 13, 2016 meeting and less on the NAV CANADA/GTAA actions currently being undertaken.

**POLICY GROUP**

Some stakeholders and advocacy groups such as T.A.N.G. have voiced their opposition to these actions, claiming that the Protocol does not answer the current issue and that the NAV CANADA/GTAA Plan does not go far enough or take into account the majority of the Inch Report recommendations.

NAV CANADA's assessment of the Captain Inch report found that the majority of the recommendations specifically addressing the flight paths opposed by T.A.N.G. were technically unfeasible and that they do not take into account the complexity of the Toronto airspace more generally. However, some of the more general proposals may be broadly applicable and include processes and procedures that NAV CANADA is currently working on.

It will be important to remind the participants that Transport Canada's role is to assess the regulatory impact of noise mitigation measures and flight path changes from a safety perspective, and not to determine to what extent a proposed course of action mitigates aircraft noise. Key messages have been prepared to support you in this regard.

**Opening Remarks**

- Thank you everyone for joining me. Aircraft noise is a contentious issue, not only in the Toronto area, but in other communities across Canada as well.
- You are the representatives of your communities, and I know many of your constituents are seeking federal action on this issue. I am glad we have all gotten together today to discuss these important challenges.
- Before specifically speaking about the noise issue, I want us to remember the important economic engine that is the Lester B. Pearson Airport. We need to balance the issues we are reviewing today against the economics of this important strategic infrastructure. For example:
  - In 2014, the GTAA reported total revenues of \$1.2 billion, compared to \$1.1 billion in 2013. Total operating expenses in 2014 were \$732.3 million, which included \$165.1 million in ground rent and payments-in-lieu of real property taxes, compared to \$713.2 million in 2013.
  - The GTAA contributes more than \$35 billion annually to the economy and across the country.

## POLICY GROUP

- On the issue of noise, I understand that you received a technical brief from NAV CANADA and the GTAA on April 13, 2016 on the technical aspects of the issue, and the roles and responsibilities of the entities that are directly responsible for managing aircraft noise. Let me know if you have further questions on this. Understanding these challenges is key to formulating an appropriate path forward.

*The Airspace Change Communications and Communications Protocol*

- It is important to note that NAV CANADA conducts consultations as part of its regulatory requirements for any changes it makes to airspace design or levels of service at an airport. Before making the changes as part of its 2012 *Toronto-Ottawa-Montreal Airspace Review*, they did undertake consultations with local residents and local government.
- Given concerns that the consultations did not go far enough, NAV CANADA and the Canadian Airports Council developed and implemented the *Airspace Change Communications and Communications Protocol*. The Protocol was launched in June 2015.
- In the Toronto area, I recognize that local advocacy groups such as T.A.N.G. were actively involved with NAV CANADA, the GTAA, and several levels of government in seeking to action on the issue.
- The co-chairs of T.A.N.G. wrote to me on March 14, 2016 in fact, noting their view that neither the Protocol nor the Noise Mitigation Initiatives Plan would have occurred without their representation. We have assurance from the Canadian Airports Council and NAV CANADA that they are adhering to the new Protocol.
- I would note, however, that the Protocol is only a tool for improving how airspace changes and noise mitigation initiatives are communicated. It is one part of the picture. It does not speak to actions to manage aircraft noise, merely, how to communicate these changes.
- As you know, NAV CANADA and the GTAA have launched the Noise Mitigation Initiatives Plan in an effort to take into consideration the views of stakeholders and will be seeking, through the six ideas in the Plan, as way to further mitigate aircraft noise in the Toronto area.

## POLICY GROUP

- Many of you are aware of the Report drafted by Captain Inch. I want to reassure you that the proposals made by Captain Inch have been reviewed. Unfortunately, many of them are not technically feasible. Those that may be feasible are in the process of being implemented or are being factored into the Noise Mitigation Initiatives Plan and will be further deliberated upon during the GTAA/NAV CANADA consultations that are underway.
- They began these consultations last summer. I believe several of you attended these sessions.
- **(Minister Bennett/ Ms. Damoff/ Mr. Oliver/ Mr. Oliphant)**, you were present at these consultations, what were your impressions? Did NAV CANADA and the GTAA address the concerns of the participants as best they could?

*Moving/Sharing Flight Paths:*

- I understand that you have asked whether there would be an option to rotate the flight paths, dispersing the issue. There are concerns regarding this proposal:
  - First, by dispersing the noise, we would be creating issues in even more neighbourhoods. This could result in even more Toronto residents raising concerns.
  - Second, revolving flight patterns would add a great deal of complexity for aircraft destined to Toronto Pearson, and this could then create challenges for airport safety. My bottom line must always be to ensure the safety of our airports.
- NAV CANADA will have to be consulted, since they are responsible for planning, managing, and coordinating the air space around Toronto. This is not a simple problem.
- So, we need to consider: is this a viable option from a technical and safety perspective? And, even if it was, would it just expand the area affected by aircraft noise?



**POLICY GROUP***Human Health Impacts:*

- I know some of you are concerned about the impacts of aircraft noise on human health, and whether this is something the Government of Canada should explore regulating.
- I understand that this type of regulation is under the purview of the Minister of Health; however, I am open to exploring whether the Minister would be interested in pursuing this issue further.
- The regulation of airport noise is a complex issue with many stakeholders including NAV CANADA, the local airport authority and health officials.
- Transport Canada regulations can be and are part of the solution as we already regulate the noise signature of new aircraft as they are developed. We can also use airport zoning regulations and flight operations restrictions to achieve the best compromise between airport operations, flight safety and local population impact. I and my officials remain open to working with the local authorities to achieve what is the best solution for all concerned.
- I would note that the 2012 flight paths changes improved the environmental health of the Montreal-Ottawa-Toronto corridor, reducing greenhouse gas emissions by 14,300 metric tons – a reduction equivalent to the annual emissions from 2,800 passenger cars.

*2012 Flight Path Changes*

- You have also asked why NAV CANADA could not reverse the flight path changes made in 2012. It is important to note that many of those changes were made around Toronto, Ottawa and Montréal to increase the efficiency of aircraft operations and reduce flight times while maintaining or increasing the safety of the system. For example:
  - New lanes were added to the flight path structure in the Toronto, Ottawa, Montreal corridor and new arrival procedures were introduced for all runways at the three airports;



**POLICY GROUP**

- At Toronto Pearson, new departure procedures were introduced, as well as a new arrival route from the east over Pickering/Scarborough; and,
- New design criteria under Transport Canada's safety standard TP 308, which instituted minimum flight segment lengths to harmonize with the United States Federal Aviation Administration standards, resulted in a relocation of the southern downwind portion of the Pearson arrival flight path by 1.8 km further south than its previous location.
- The changes were extensively analyzed in flight simulators and air traffic control simulators to assess their impact. This analysis indicates that these changes:
  - reduced greenhouse gas emissions by 14,300 metric tons – a reduction equivalent to the annual emissions from 2,800 passenger cars;
  - reduced aircraft fuel burn by 5.4 million litres annually, resulting in an annual savings of approximately \$4.3 million in avoided fuel costs; and
  - reduced cumulative flight time by over 10 hours daily based on 2012 traffic volumes.
- The 2012 changes increased air traffic over some areas of the cities, and decreased it in others.
- All of the changes complied with current noise mitigation and abatement procedures as set out in Transport Canada's National Aircraft Noise Policy. As well, as I mentioned earlier, changes were only made following public consultations undertaken by NAV CANADA.
- The FAA standards are internationally accepted, and designed by qualified experts in airspace design. In this case, to revert to the old flight path for the southern downwind portion of the arrival path – which is the cause of the most vocal opposition – would be to revert to an older safety standard which is no longer valid, and would introduce a discrepancy with U.S. regulations.

## POLICY GROUP

- It would require a redesign of the Toronto airspace and would likely just move the problem elsewhere. It would not reduce aircraft noise.
- In the end, we need ask ourselves whether this is feasible and/or an initiative worth pursuing?

### *Wrap-up*

- Understanding the practical realities of the challenges that we face, I think you would agree that we need to let the airports and NAV CANADA complete their consultations, as they have committed to doing under the Noise Protocol.
- Significant and extensive consultations have already taken place. More are planned. I would suggest that these need to move forward. Let's see how it goes, then make adjustments if necessary.

### *Going forward*

- On the important issue of responding to our constituents, I would like to hear from you. How can we more effectively respond to the concerns being raised? Key, I am sure that you agree, is being consistent in our messaging on this.
- These are often very technical issues. I think that we need to make sure that we leave those issues with the experts best positioned to assess them.

### **Closing remarks:**

- This has been a very productive meeting. Aircraft noise is a national issue, as it is a concern for many communities across Canada. I look forward to continuing to work with you on the important issues being raised by the residents of Toronto.

## **POLICY GROUP**

### **Annexes:**

Annex A - Update to stakeholders on the Noise Management Initiatives Plan currently underway by NAV CANADA and the GTAA

Annex B - Correspondence received from the participants and T.A.N.G. on aircraft noise in Toronto

Annex C - Roles and Responsibilities on aircraft noise issues and other background information on the 2012 flight path changes

Annex D - Questions from the April 13, 2016 technical briefing with suggested answers

Annex E - A list of community-based ideas in the Toronto area and NAV CANADA's analysis

**POLICY GROUP****Annex A - Questions from the April 13, 2016 technical briefing with suggested answers****MP Virani: What is regulatory overlay for noise? Health?**

*Answer:*

Transport Canada regulates noise from a number of perspectives:

- A first key element to Transport Canada's approach is the control of aircraft noise at the source. Transport Canada regulates the noise performance of aircraft through its Canadian Aviation Regulations (CARs). These are aircraft design standards that ensures that as new aircraft are designed, they generate less noise. The design standards evolve over time and the requirements become increasingly more stringent.
- Transport Canada's TP1247 "Land-use in the Vicinity of Aerodromes" provides guidance as to acceptable land-uses near airports based on noise exposure forecasts prepared by airports. The land-use recommendations are based on historical studies relating aircraft noise to annoyance. These provide land-use planning guidelines to municipal and provincial land-use authorities, recognizing that land-use is a provincial jurisdiction.
- The final element includes noise abatement procedures and operating restrictions. Through a Canadian Aviation Regulation "Noise Operating Criteria", a process exists for airports to develop noise abatement procedures and operating restrictions for their airport which are enforceable. These are subject to Transport Canada approval and become enforceable through the enabling regulation. The main requirement within these procedures is consultation with the communities in the vicinity of the airports.
- With respect to the question of regulation of health impacts, this issue is addressed in the speaking points. A Health Canada circular on human health effects from aircraft noise is attached at Annex H.

**MP Damoff: Why has flight plan changed for Toronto-to-Vancouver (passing over Surrey) in 2007 following noise complaints? And why can't same thing be done now for GTA?**

*Answer:*

- The Toronto airspace is larger and more complex than that of Vancouver. In the case of Vancouver, NAV CANADA was able to move the flight path over the waters of Boundary Bay. In the case of Toronto, the flight path cannot be moved over the water, as aircraft approaches would interfere with operations at Billy Bishop airport.
- Further, the flight path options in Toronto are particularly constrained by the combination of parallel runways, and obstacles (e.g., downtown sky scrapers and the CN Tower).

**POLICY GROUP***Supplemental points on flight path changes:*

- As such, even were a decision to be taken to forsake the improved efficiency and environmental performance of the 2012 changes (which contribute to increased airport capacity and lower carrier costs) in order to be more sensitive to residents, there are few options available at Pearson due to evolutions in safety regulations and the operating constraints noted above.
- As noted in the preceding Annex, following the announcement of the Protocol in June 2015, many local residents mistakenly believed that the announcement or Protocol meant that the 2012 flight paths, particularly those over the neighbourhood represented by T.A.N.G. (Don Valley West), would be moved.
- Any change would not eliminate impact on residential areas. It would simply move it to a different area. It would also require that the same procedure undertaken in the most recent changes be followed again (i.e. a lengthy process to design and approve the new flight path, and additional public consultation with the newly affected residents).
- The question of Ministerial authority is clear: changes can only be directed where matters of safety are concerned, which is not the case in the current circumstances. As noted above, the greatest concerns involve the southern downwind arrival flight path in Toronto. In this case, to revert to the old flight path for the southern downwind portion of the arrival path – which is the cause of the most vocal opposition – would be to revert to an older design standard which is no longer valid, and would introduce a discrepancy with U.S. regulations. As such, returning to the old flight path is not an option.

NAV CANADA Background information on 2007 airspace changes in Vancouver:

- In May 2007 NAV CANADA implemented a large number of airspace changes in Vancouver that affected not only Vancouver but Abbotsford and Victoria. There was one particular transborder Standard Term Arrival Route (STAR) from the south to YVR that following implementation was contentious in areas south and southeast of YVR.
- Complaints from Surrey and Tsawwassen areas about new overflight and noise occurred. In that area we had some options to move one leg on the STAR in a small way and to change a vectoring area to bring traffic offshore of the Crescent Beach area west of South Surrey.
- NAV CANADA moved quickly. The change to the vectoring procedures was implemented via an Ops Bulletin within the YVR ACC and the adjustment to the STAR itself was implemented in February 2008. Complaints did not go away but dropped off significantly.
- “The difference is in YVR we had options and they were good options that allowed us to relocate a flight path from a residential area to a non-residential area (the waters of Boundary Bay to be specific). But Toronto airspace does not give us options in the same way. Could the current downwind be moved?”

**POLICY GROUP**

We haven't said it couldn't move but it can't move over the lake and moving it to a new place over land would just put it over new people."

**MP Ratansi: Who are you consulting with? How is consultation conducted?**

- Per Transport Canada regulations, the responsibility for consultations rests with those undertaking the change in flight path or level of service, NAV CANADA and the airports.

**MP Damoff: Do you track number of complaints? Number of individuals complainants? Do you follow up on complaints?**

- Transport Canada does not track noise complaints. As noted in the airport leases and confirmed in the Protocol, that is the responsibility of the airports. The Greater Toronto Airport Authority provided you with materials at the April 13, 2016 meeting that show the tracking of complaints and complainants in your riding. These are attached at Annex J.
- I have received almost 150 letters and emails from Canadians regarding aircraft noise in Canada.

**Other points noted:**

**Minister Bennett** noted that there is no regulation regarding noise impacts on community, health. She argued that consultations are taking place but there is no evidence that people are actually being listened to or that these consultations are leading to any change of policies. She asked about the possibility of flights being redirected over Don Valley Expressway. Mentioned "sharing of pain."

- Air traffic increases at a rate of 3%-4% per year; and consequently, there are more aircraft using the routes, triggering the industry to continuously look for a way of improving the provision of service in an effective and efficient manner.
- Toronto Pearson notes that the airport maintains a cap of 90 aircraft movements per hour in order to maintain operational efficiency and better manage aircraft noise. The industry standard for an airport of this size is roughly 120 movements per hour.
- The issue of flight path "sharing" is noted in the speaking points.
- The issue of human health impacts and regulations is noted above.

**Minister Bennett** also noted that NAV CANADA and the GTAA did not take into account the ideas of the community when developing the six ideas in Noise Mitigation Initiatives Plan. Evidence to the contrary is presented at Annex I, showing a list of community-based ideas and NAV CANADA's analysis of the ideas. The ideas that were technically feasible were incorporated into Plan.

**MP Oliphant** remarked that voluntary protocols are not having impact, argued that national mood has changed and public wants regulation in public interest and not simply in interests of industry.



**POLICY GROUP**

- Regarding the remark made by MP Oliphant that the public wants regulations in the public interest and not simply in interests of industry, it is important to mention that the industry (NAV CANADA, air carriers) are developing strategies to meet the Government of Canada's plan on Green House Gas Emission and are using new technologies (GPS and accuracy of air navigation) to develop routes that reduce the time spent flying in order to reduce the emissions.
- With respect to the claim that the voluntary protocol on consultations is not having an impact, it is worth noting that NAV CANADA and the airports are we always regulated to consult for changes in flight paths and levels of service, and that the Protocol goes even further. The Protocol has been in place since July 2015, and Calgary is the first airport to be undertaking consultations under the Protocol.

**MP Damoff** urged that the report by Captain Inch is acknowledged and responded to.

- This answer is noted in the speaking points, and NAV CANADA's analysis of Captain Inch's proposal is at Annex C. Captain Inch's assessment of NAV CANADA/GTAA's Noise Mitigation Initiatives Plan is at Annex F. In his assessment, Captain Inch notes the elements of his proposal that have been incorporated in the six ideas of the Plan.

## **POLICY GROUP**

### **Annex B – Correspondence received from the participants and T.A.N.G on aircraft noise in Toronto**

## POLICY GROUP

**Annex C- Roles and Responsibilities on aircraft noise issues and other background information on the 2012 flight path changes***Roles and Responsibilities on aircraft noise issues*

- Wherever aircraft operations and residents co-exist, there is inevitably tension. In much of the world, including Canada, strategies to reduce the tension focus on restricting development near airports (zoning controls), improving noise mitigation in residential construction (building codes), restrictions on-airport and aircraft operations (noise abatement procedures, hours of operation, types of aircraft) and exhortation or support through other means including regulation for the development of new aircraft technologies that are quieter.
- Additionally, it is a wide-spread practice that the public be consulted on changes to flight paths and that airports have community noise committees to help manage noise from flight and airport operations.
- Under the *Civil Air Navigation Services Commercialization Act*, NAV CANADA has the authority to plan and manage airspace in Canada, subject to regulations under the *Aeronautics Act*, NAV CANADA makes airspace changes to:
  - conform to safety standards;
  - increase efficiency in the en route environment (i.e., fuel burn, time in system, capacity; GHG emissions, total cost);
  - provide predictable and consistent service; and/or,
  - Implement performance based navigation routings and procedures (i.e., Area Navigation, Reduced tactical intervention).
- Transport Canada (TC) regulates the safety of the air navigation system, including the regulations and standards for airspace design and associated flight paths. As the Minister of Transport, you can alter or move an existing flight path, but only for safety reasons.
  - To varying degrees, aircraft noise is an issue around major Canadian airports, particularly in the past few years. One particularly contentious issue occurred in Toronto that sparked the attention of industry and TC.

*Noise issues in Toronto*

- In February 2012, NAV CANADA introduced airspace changes affecting air traffic patterns around Toronto, Ottawa and Montréal to increase the efficiency of aircraft operations, and reduce flight times, which result in reductions of GHG emissions, while maintaining or increasing the safety of the system:
  - New lanes were added to the flight path structure in the Toronto, Ottawa, Montréal corridor and new arrival procedures were introduced for all runways at the three airports;

**POLICY GROUP**

- At Toronto Pearson (Pearson), new departure procedures were introduced, as well as a new arrival route from the east over Pickering/Scarborough; and,
  - New design criteria under TC's safety standard TP 308, which instituted minimum flight segment lengths to harmonize with the United States Federal Aviation Administration standards, resulted in a relocation of the southern downwind portion of the Pearson arrival flight path by 1.8 km further south than its previous location.
- The changes increased air traffic over some areas of the cities, and decreased it in others. While all of the changes comply with current noise mitigation and abatement procedures as set out in TC's National Aircraft Noise Policy, and notwithstanding changes were only made following public consultation, some Toronto residents in the vicinity of the southern downwind portion of the arrival flight path raised significant concerns.
  - Affected residents mounted a significant lobby to all levels of government, industry (NAV CANADA and the Greater Toronto Airports Authority (GTAA)) seeking change and relief.
  - A public interest group representing residents in Leaside-Davisville, the Toronto Aviation Noise Group (TANG), was particularly strategic in putting forward its messages. It not only attempted to prove how the noise was affecting residents' lives but also put forward a number of proposals on how to reduce the noise impacts in their neighbourhood but also Toronto in general. Details of their work and communications with Transport Canada, NAV CANADA and the Greater Toronto Airports Authority are included in the following timeline.

*Moving the 2012 Flight Paths*

- Following the announcement of the Protocol in June 2015, many local residents mistakenly believed that the announcement or Protocol meant that the 2012 flight paths, particularly those over the neighbourhood represented by T.A.N.G. (Don Valley West), would be moved.
- As outlined above, the federal government does not have the authority to move flight paths except for reasons of safety. In addition, to revert to the former flight path would not comply with current regulatory requirements, and moving the flight path to another location would not eliminate the noise, it would just make it somebody else's problem.
- The extensive consultation process outlining the potential impact of the change and reasons for it, pursuant to the Protocol, would also be required.
- Further, as noted above, the 2012 changes reduced GHG emissions for flight arriving at Toronto Pearson, that benefit could be lost if flight paths were moved.

## POLICY GROUP

**Annex D- Update to stakeholders on the Noise Management Initiatives Plan currently underway by NAV CANADA and the GTAA**

**From:** Petrie, Lee [19 (1)]@gtaa.com] on behalf of ZZG-Community Engagement [Community.Engagement@gtaa.com]  
**Sent:** Thursday, April 07, 2016 3:41 PM  
**To:** ZZG-Community Engagement  
**Subject:** Update: GTAA/NAV CANADA Stakeholder Roundtables

Hello,

In Summer 2015, you participated in a Stakeholder Roundtable to learn about the Six Ideas (see below) that NAV CANADA and the GTAA are studying that we think may lead to some noise relief for the communities surrounding Toronto Pearson International Airport. We are writing to provide an update on the progress of the technical analysis being undertaken, and lay out next steps.

**Update on Technical Analysis**

As we shared in a September 30 Update, all Six Ideas discussed in the Stakeholder Roundtables moved forward to Phase 2 - Technical Analysis.

Since that update, the GTAA and NAV CANADA have been working together to:

- Develop guiding principles for the study
- Determine the Base Cases and identifying Option Cases
- Identify specific analysis required for the third party noise modeling

The technical analysis [20 (1) (b)]

[20 (1) (b)] we continue to make meaningful progress on the items identified in our work plan.

***Determining the Base Case + Identifying Option Cases***

A big piece of the work has been establishing a Base Case, which is an analysis of the current state of airport operations and operational impacts. [20 (1) (b)]

[20 (1) (b)] form the Base Case for this exercise. All of the Base Case data has now been collected.

We have also been working to identify Option Cases for the measures discussed last summer. Option Cases for [20 (1) (b)] will be measured against the Base Case scenario to understand the benefits, the impacts, and the operational sustainability of each idea against the Base Case. This analysis will also help us understand the impacts of no change versus the benefits or impacts of implementing any one, or combination of, the Six Ideas. The operational technical analysis and feasibility studies of these Option Cases are nearing completion.

Following that, noise modelling will be undertaken by a third party who will assess the noise impact of current operations and determine what noise benefits proposed Option

**POLICY GROUP**

Cases can be expected to deliver. This part of the process is critical to understanding the benefits and impacts for various communities.

Once the benefits and impacts have been identified, we will proceed to full Public Consultation. These consultations will be held in communities across the Greater Toronto Area. We welcome your input and ideas on how best to engage your community, and also to engage residents in communities that could be newly impacted as a result of these potential changes.

**The Process at A Glance:**

- Idea
- Understand Base Case and how each Idea would operate in 2015
- Identify Option Cases for each Idea
- Technical Feasibility of the Option Cases in 2015, 2018, 2023 against the Base Case
  - Elements that are considered in understanding the technical feasibility of an option include 20 (1) (b)
- Noise Modelling for each Option Case against Base Case to understand noise benefits and impacts
- Public Consultation on Option Case + Subsequent Noise Benefits and Impacts

**Stay Involved:**

The GTAA Community Environment and Noise Advisory Committee (CENAC) was recently briefed on the operational technical analysis that we have accomplished to-date. In addition, briefings with elected officials are ongoing to ensure we are meeting their need to understand the airport operations and the benefits and impacts on their communities.

***Mark Your Calendars - Upcoming Briefings***

- CENAC, April 20 2016 6:30 pm
  - An update will be shared at the Public Meetings; more details on CENAC [here](#).
- Technical Briefings, May 2016
  - Technical briefings will be open to Stakeholder Roundtable Participants. This is your opportunity to review the option cases and provide your input before the noise modelling phase begins.
  - These briefings will happen in May. Details on dates and registration will be emailed to you shortly.

We value the input you provided during last summer's sessions and ask for your continued patience as we work towards mitigations that achieve our objective of reducing the noise impact of airport operations on the community.

Thank you.



## POLICY GROUP

- Together, NAV CANADA and the GTAA are studying six ideas we think will benefit the surrounding communities. Below is an overview of the ideas.

| IDEA                                                                                    | OVERVIEW                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. New approaches for night-time operations                                             | <p>During busy daytime periods, the safe management of air traffic necessitates certain restrictions. However, when traffic volumes are lighter at night and single runway operations are being used, there are options to improve descent profiles that could reduce noise impacts.</p> <p><i>Proposed Approach:</i> NAV CANADA will design new approaches for use during designated night-time operations.</p>                                                         |
| 2. New departure procedures for night-time operations                                   | <p>There are opportunities to alter night-time departure procedures during lower traffic volume periods when only one runway is in use for departures. Increasing the altitude achieved before aircraft turns are permitted may deliver noise benefits for those under the departure flight path.</p> <p><i>Proposed Approach:</i> NAV CANADA will design new departures for use during designated night-time periods.</p>                                               |
| 3. Increase downwind arrival speeds                                                     | <p>Changing the published speeds on the “downwind” portion of the arrival flight path from 200 knots to 210 knots may reduce noise in some areas of the city by decreasing the need for flap use by pilots of larger aircraft needing to slow their airspeed.</p> <p><i>Proposed Approach:</i> NAV CANADA will study the noise benefits of increasing speeds.</p>                                                                                                        |
| 4. Use new technology to reduce the need for low altitude leveling by arriving aircraft | <p>Aircraft arriving at parallel runways require a level portion in the descent of each aircraft to ensure safe separation. There are noise impacts associated with power increases necessary to achieve low altitude level flight. New technologies could reduce the need for those level portions in flight profile and permit quieter, constant descent operations.</p> <p><i>Proposed Approach:</i> NAV CANADA will study the potential use of new technologies.</p> |
| 5. Establish weekend preferential runways                                               | <p>Traffic volumes on Saturdays and most of Sunday tend to be lower than other days of the week. The establishment of weekend preferential runways could facilitate runway alternation on weekends. Alternating runways could provide periods of weekend respite from noise for communities impacted by these operations.</p> <p><i>Proposed Approach:</i> NAV CANADA and GTAA will study the feasibility of establishing weekend preferential runways.</p>              |
| 6. Alternate night-time preferential runways                                            | <p>Preferential runways exist to ensure that aircraft landing and departing overnight impact the fewest people. The possibility to alternate use of night-time</p>                                                                                                                                                                                                                                                                                                       |

## POLICY GROUP

preferential runways might result in sharing night-time noise impacts from aircraft operations across more communities.

*Proposed Approach:* GTAA is currently reviewing the continued appropriateness of its existing night-time preferential runways to ensure they meet the stated objectives.



**Community Outreach and Programs, 416-776-5739**

Greater Toronto Airports Authority |  
Stakeholder Relations and Communications  
P.O. Box 6031, 3111 Convair Drive, Toronto  
AMF, Ontario, L5P 1B2

[www.torontopearson.com/noisemanagement](http://www.torontopearson.com/noisemanagement)

## **POLICY GROUP**

Annex E – A list of community-based ideas in the Toronto area and NAV CANADA's analysis.



Transport Canada Transports Canada

4900 Yonge St. 3<sup>rd</sup> Floor  
Toronto ON M2N 6A5

Your file Votre référence

Our file Notre référence

RDIMS Number Numéro de SGDDI

November 1, 2023

19 (1)

Dear 19 (1)

Thank you for your email of September 29, 2023, to the Minister of Transport, Pablo Rodriguez regarding the aircraft noise concerns around Vaughan, Ontario. Your correspondence has been forwarded to me for a response.

Transport Canada focuses on the safety and security of the aviation system in Canada. Through the development and administration of policies, regulations, and programs, the department strives to work with partners and stakeholders to achieve an efficient, effective and environmentally responsible transportation system. In doing so, the department exercises its authority through the *Aeronautics Act* and the Canadian Aviation Regulations (CARs). The CARs are available to the public at the following website: <http://laws-lois.justice.gc.ca/eng/regulations/SOR-96-433/>.

I regret to hear of the difficulties experienced when trying to contact our offices. For more information on the Ontario region contacts, please visit: [Regional Service Centres- Ontario Region](#).

Regarding the aircraft operations and associated noise, please note that there are no regulatory restrictions or limitations on the time of day, volume, or type of aircraft that can utilize the airspace in your area. However, the department understands that noise management is a complicated and often difficult issue faced by airport authorities and communities around the country. It is an issue that must be managed while ensuring aviation safety is not compromised.

With Transport Canada's experience, noise issues have been most effectively addressed at the local community level. Therefore, the department recommends continued dialogue with the Greater Toronto Airports Authority (GTAA) ([Noise Management | Pearson Airport \(torontopearson.com\)](#)) directly.

Additionally, TC is not involved in the day-to-day operations of the airport or approval of changes to individual routings of flight paths, other than to confirm that the design meets the appropriate regulations and standards. Any further questions regarding flight paths around Toronto should be directed to NAV CANADA at [service@navcanada.ca](mailto:service@navcanada.ca).

If at any time it is suspected that a pilot is operating an aircraft in an unsafe manner and in contravention of the CARs, I encourage you to take down as much information as possible

Canada

(for example: photos or videos, date, time, registration number, color of aircraft, other identifying marks) and to report your concerns through our [Civil Aviation Communications Centre Contact Form](#).

Thank you for writing.

Yours sincerely,

Imtiazali (Imi) Waljee  
Regional Director  
Civil Aviation, Ontario Region



Transport  
Canada

Transports  
Canada

4900 Yonge St. 3<sup>rd</sup> Floor  
Toronto ON M2N 6A5

UNCLASSIFIED / NON CLASSIFIÉ

Your file / Votre référence

Our file / Notre référence

RDIMS Number / Numéro de SGDDI

November 1, 2023

23

Dear 23

Thank you for your email of September 29, 2023, to the Minister of Transport, Pablo Rodriguez regarding the aircraft noise concerns around Vaughan, Ontario. Your correspondence has been forwarded to me for a response.

Transport Canada focuses on the safety and security of the aviation system in Canada. Through the development and administration of policies, regulations, and programs, the department strives to work with partners and stakeholders to achieve an efficient, effective and environmentally responsible transportation system. In doing so, the department exercises its authority through the *Aeronautics Act* and the Canadian Aviation Regulations (CARs). The CARs are available to the public at the following website: <http://laws-lois.justice.gc.ca/eng/regulations/SOR-96-433/>.

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[www.tc.gc.ca](http://www.tc.gc.ca)

03-0418 (1307-02)



UNCLASSIFIED / NON CLASSIFIÉ

(for example: photos or videos, date, time, registration number, color of aircraft, other identifying marks) and to report your concerns through our [Civil Aviation Communications Centre Contact Form](#).

Thank you for writing.

Yours sincerely,

Imtiazali (Imi) Waljee  
Regional Director  
Civil Aviation, Ontario Region



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4900 Yonge St. 3<sup>rd</sup> Floor  
Toronto ON M2N 6A5

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Your file / Votre référence

Our file / Notre référence

RDIMS Number / Numéro de SGDDI

November 14, 2023

19 (1)

Dear 19 (1)

Thank you for your email of October 28, 2023, to the Minister of Transport, Pablo Rodriguez regarding your concerns with the flight activity and aircraft noise concerns around your residence. Your correspondence has been forwarded to me for a response.

Transport Canada is responsible for developing and overseeing the transportation policies, programs and goals set by the Government of Canada to ensure the national transportation system is safe, efficient, and accessible to all its users. The Transport Canada Civil Aviation mission is to develop and administer policies and regulations for the safest civil aviation system for Canada and Canadians with a vision to an integrated and progressive civil aviation system that promotes a proactive safety culture. In doing so, the department exercises its authority through the *Aeronautics Act* and the Canadian Aviation Regulations (CARs). The CARs are available to the public at the following website: <http://laws-lois.justice.gc.ca/eng/regulations/SOR-96-433/>.

Regarding the aircraft operations and associated noise, please note that there are no regulatory restrictions or limitations on the time of day, volume, or type of aircraft that can utilize the airspace in your area. However, the department understands that noise management is a complicated and often difficult issue faced by airport authorities and communities around the country. It is an issue that must be managed while ensuring aviation safety is not compromised.

The airport authority, the Greater Toronto Airports Authority (GTAA) manages a Night Flight Restriction Program aimed at limiting aircraft noise during restricted hours. For more information and to express concerns with this program, please contact the GTAA directly.

Additionally, with Transport Canada's experience, noise issues have been most effectively addressed at the local community level. Therefore, engaging in constructive dialogue with the (GTAA) is recommended. More information may be accessed at the following: [Noise Management | Pearson Airport \(torontopearson.com\)](#).

Thank you for writing.

Canada

[www.tc.gc.ca](http://www.tc.gc.ca)

03-0418 (1307-02)

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Yours sincerely,

Imtiazali (Imi) Waljee  
Regional Director  
Civil Aviation, Ontario Region

Transport  
CanadaTransports  
Canada

4900 Yonge Street  
4<sup>th</sup> Floor  
Toronto, ON M2N 6A5

Our file    Notre référence  
5151-1-157  
RDIMS Number    Numéro de SGDDI  
14142023

May 30, 2018

Ms. Lyla Barrett  
Manager, Aviation Regulatory Programs  
Greater Toronto Airports Authority  
P.O. Box 6031, 3111 Convair Drive  
Toronto AMF, ON L5P 1B2

**Re: Noise Mitigation Procedures – Toronto Lester B. Pearson International Airport**

Dear Ms. Barrett:

Transport Canada conducted an on-site review of the Toronto Lester B. Pearson International Airport night flight records on April 30, 2018. The review covered the period from November 1, 2016 to October 31, 2017 and was done with respect to the June 13, 2013 night flight operations letter to Mr. Howard Eng from Ms. D. Taylor.

The records reviewed did not identify any items of non-compliance with the June 2013 Letter Agreement.

The GTAA's assistance provided to us during the on-site review is appreciated. Should you require any further information, please contact the undersigned at (416) 276-2807.

Yours truly,

Brenda Miller  
Civil Aviation Safety Inspector  
Specialties – Aerodromes and Air Navigation  
Ontario Region

**From:** [Biffin, Adam](#)  
**To:** [Barrett, Lyla](#)  
**Cc:** [Pollock, Mary \(mary.pollock@tc.gc.ca\)](#)  
**Subject:** AC 302-002 Process to Amend Noise Abatement Procedures Update Request  
**Date:** Thursday, February 18, 2021 2:42:00 PM

---

Good Afternoon Lyla,

Can please provide an update on where the airport is in the process outlined in Transport Canada Advisory Circular AC 302-002 - Implementation of New or Amended Noise Abatement Procedures (<https://tc.canada.ca/en/aviation/reference-centre/advisory-circulars/advisory-circular-ac-no-302-002>), to amend the preferential runway system at Toronto-Lester B. Pearson International Airport.

Also, please provide the target or estimated date for completion of this process.

If you have any questions, please do not hesitate to contact me.

Thanks and Best Regards,

Adam Biffin

Civil Aviation Safety Inspector - Aerodromes and Air Navigation  
Transport Canada / Government of Canada  
[adam.biffin@tc.gc.ca](mailto:adam.biffin@tc.gc.ca) / Telephone 416-669-1651 / Facsimile 416-952-0050 / TTY 1-888-675-6863

Inspecteur de la sécurité de l'Aviation civile - aérodomes et navigation aérienne  
Transports Canada / Gouvernement du Canada  
[adam.biffin@tc.gc.ca](mailto:adam.biffin@tc.gc.ca) / Téléphone 416-669-1651 / Télécopieur 416-952-0050 / ATS 1-888-675-6863



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## NOTICE OF MEETING

|                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------|---------------------------------------------------------|------------------------------------------|---------------------------|------------|-----------------------------------|---------------|----------------------|--------------|--------------------------------|--------|---------------------------|---------|-----------|---------|------------|---------|----------|---------|--------------|-------|
| <b>TO:</b>                                              | <table> <tr><td>S. Shaw</td><td>GTAA</td></tr> <tr><td>L. McKee</td><td>GTAA</td></tr> <tr><td>L. McCoomb</td><td>GTAA</td></tr> <tr><td>N. Doshi</td><td>GTAA</td></tr> <tr><td>J. Kaldeway</td><td>GTAA</td></tr> <tr><td>D. Washington</td><td>TC -PH</td></tr> <tr><td>P. Short-Gallé</td><td>TC -PHP</td></tr> <tr><td>E. Larson</td><td>TC -PHN</td></tr> <tr><td>D. Bayliss</td><td>TC -PAD</td></tr> <tr><td>G. Deska</td><td>TC -PHN</td></tr> <tr><td>M. Starcevic</td><td>PWGSC</td></tr> </table> | S. Shaw                           | GTAA                                                        | L. McKee                                                | GTAA                                     | L. McCoomb                | GTAA       | N. Doshi                          | GTAA          | J. Kaldeway          | GTAA         | D. Washington                  | TC -PH | P. Short-Gallé            | TC -PHP | E. Larson | TC -PHN | D. Bayliss | TC -PAD | G. Deska | TC -PHN | M. Starcevic | PWGSC |
| S. Shaw                                                 | GTAA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| L. McKee                                                | GTAA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| L. McCoomb                                              | GTAA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| N. Doshi                                                | GTAA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| J. Kaldeway                                             | GTAA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| D. Washington                                           | TC -PH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| P. Short-Gallé                                          | TC -PHP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| E. Larson                                               | TC -PHN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| D. Bayliss                                              | TC -PAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| G. Deska                                                | TC -PHN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| M. Starcevic                                            | PWGSC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| <b>SUBJECT:</b>                                         | Pickering Liaison Meeting, Transport Canada, Programs -GTAA                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| <b>AGENDA OR REMARKS</b>                                | <table> <tr> <td>1. Zoning Update</td><td><b>ACTION BY</b><br/>D. Bayliss</td></tr> <tr> <td>2. Green Space Update<br/>(including GSSAC announcement)</td><td>P. Short-Gallé</td></tr> <tr> <td>3. Airport Studies Update</td><td>N. Doshi</td></tr> <tr> <td>4. CEEA Feedback</td><td>D. Washington</td></tr> <tr> <td>5. GIS Demonstration</td><td>M. Starcevic</td></tr> <tr> <td>6. Other<br/>- Baseline Studies</td><td></td></tr> <tr> <td>7. Round Table/Highlights</td><td>All</td></tr> </table>     | 1. Zoning Update                  | <b>ACTION BY</b><br>D. Bayliss                              | 2. Green Space Update<br>(including GSSAC announcement) | P. Short-Gallé                           | 3. Airport Studies Update | N. Doshi   | 4. CEEA Feedback                  | D. Washington | 5. GIS Demonstration | M. Starcevic | 6. Other<br>- Baseline Studies |        | 7. Round Table/Highlights | All     |           |         |            |         |          |         |              |       |
| 1. Zoning Update                                        | <b>ACTION BY</b><br>D. Bayliss                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| 2. Green Space Update<br>(including GSSAC announcement) | P. Short-Gallé                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| 3. Airport Studies Update                               | N. Doshi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| 4. CEEA Feedback                                        | D. Washington                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| 5. GIS Demonstration                                    | M. Starcevic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| 6. Other<br>- Baseline Studies                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| 7. Round Table/Highlights                               | All                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
|                                                         | <table> <tr> <td><b>Location:</b></td><td>4<sup>th</sup> Floor, RDG's Boardroom<br/>4900 Yonge Street</td></tr> <tr> <td><b>Date:</b></td><td>Tuesday, October 22<sup>th</sup>, 2002</td></tr> <tr> <td><b>Time:</b></td><td>10:30 a.m.</td><td><b>Proposed Duration:</b> 1 ½ hr.</td></tr> </table>                                                                                                                                                                                                          | <b>Location:</b>                  | 4 <sup>th</sup> Floor, RDG's Boardroom<br>4900 Yonge Street | <b>Date:</b>                                            | Tuesday, October 22 <sup>th</sup> , 2002 | <b>Time:</b>              | 10:30 a.m. | <b>Proposed Duration:</b> 1 ½ hr. |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| <b>Location:</b>                                        | 4 <sup>th</sup> Floor, RDG's Boardroom<br>4900 Yonge Street                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| <b>Date:</b>                                            | Tuesday, October 22 <sup>th</sup> , 2002                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
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| <b>CHAIRPERSON:</b>                                     | <table> <tr> <td><b>Name:</b></td><td>Dave Washington</td></tr> <tr> <td><b>Telephone:</b></td><td>416-952-0489</td></tr> </table>                                                                                                                                                                                                                                                                                                                                                                            | <b>Name:</b>                      | Dave Washington                                             | <b>Telephone:</b>                                       | 416-952-0489                             |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| <b>Name:</b>                                            | Dave Washington                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |
| <b>Telephone:</b>                                       | 416-952-0489                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                   |                                                             |                                                         |                                          |                           |            |                                   |               |                      |              |                                |        |                           |         |           |         |            |         |          |         |              |       |





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## NOTICE OF MEETING

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------|-------------------------------------------------|------------------------------------------|---------------------------|------------|-----------------------------------|-----------|--------------------------------|-----------|---------------------------|--------|----------------|---------|-----------|---------|------------|---------|-----------|---------|
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| S. Shaw                                         | GTAA                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| L. McKee                                        | GTAA                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| L. McCoomb                                      | GTAA                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| N. Doshi                                        | GTAA                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| J. Kaldeway                                     | GTAA                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| D. Washington                                   | TC -PH                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| P. Short-Gallé                                  | TC -PHP                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| E. Larson                                       | TC -PHN                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| D. Bayliss                                      | TC -PAD                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| S. Sattar                                       | TC -PHE                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| <b>SUBJECT:</b>                                 | Pickering Liaison Meeting, Transport Canada, Programs -GTAA                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| <b>AGENDA OR REMARKS</b>                        | <table> <tr> <td>1. Zoning Update</td><td><b>ACTION BY</b><br/>D. Bayliss</td></tr> <tr> <td>2. Green Space Update<br/>(Consultant and GSSAC)</td><td>P. Short-Gallé</td></tr> <tr> <td>3. Airport Studies Update</td><td>N. Doshi</td></tr> <tr> <td>4. CEAA Feedback</td><td>S. Sattar</td></tr> <tr> <td>6. Other<br/>- Baseline Studies</td><td>S. Sattar</td></tr> <tr> <td>7. Round Table/Highlights</td><td>All</td></tr> </table>                         | 1. Zoning Update                  | <b>ACTION BY</b><br>D. Bayliss                                            | 2. Green Space Update<br>(Consultant and GSSAC) | P. Short-Gallé                           | 3. Airport Studies Update | N. Doshi   | 4. CEAA Feedback                  | S. Sattar | 6. Other<br>- Baseline Studies | S. Sattar | 7. Round Table/Highlights | All    |                |         |           |         |            |         |           |         |
| 1. Zoning Update                                | <b>ACTION BY</b><br>D. Bayliss                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| 2. Green Space Update<br>(Consultant and GSSAC) | P. Short-Gallé                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| 3. Airport Studies Update                       | N. Doshi                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| 4. CEAA Feedback                                | S. Sattar                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| 6. Other<br>- Baseline Studies                  | S. Sattar                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| 7. Round Table/Highlights                       | All                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
|                                                 | <table> <tr> <td><b>Location:</b></td><td>4<sup>th</sup> Floor, Regional Director's Boardroom<br/>4900 Yonge Street</td></tr> <tr> <td><b>Date:</b></td><td>Tuesday, February 4<sup>th</sup>, 2002</td></tr> <tr> <td><b>Time:</b></td><td>10:00 a.m.</td><td><b>Proposed Duration:</b> 1 ½ hr.</td></tr> </table>                                                                                                                                                | <b>Location:</b>                  | 4 <sup>th</sup> Floor, Regional Director's Boardroom<br>4900 Yonge Street | <b>Date:</b>                                    | Tuesday, February 4 <sup>th</sup> , 2002 | <b>Time:</b>              | 10:00 a.m. | <b>Proposed Duration:</b> 1 ½ hr. |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| <b>Location:</b>                                | 4 <sup>th</sup> Floor, Regional Director's Boardroom<br>4900 Yonge Street                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| <b>Date:</b>                                    | Tuesday, February 4 <sup>th</sup> , 2002                                                                                                                                                                                                                                                                                                                                                                                                                          |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| <b>Time:</b>                                    | 10:00 a.m.                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Proposed Duration:</b> 1 ½ hr. |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| <b>CHAIRPERSON:</b>                             | <table> <tr> <td><b>Name:</b></td><td>Dave Washington</td></tr> <tr> <td><b>Telephone:</b></td><td>416-952-0489</td></tr> </table>                                                                                                                                                                                                                                                                                                                                | <b>Name:</b>                      | Dave Washington                                                           | <b>Telephone:</b>                               | 416-952-0489                             |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| <b>Name:</b>                                    | Dave Washington                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |
| <b>Telephone:</b>                               | 416-952-0489                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                   |                                                                           |                                                 |                                          |                           |            |                                   |           |                                |           |                           |        |                |         |           |         |            |         |           |         |

**From:** Saiyed, Akram (TC/TC)  
**To:** 19 (1)  
**Subject:** Air traffic noise after 11pm is unacceptable  
**Date:** Tuesday, May 07, 2024 9:36:02 AM  
**Attachments:** 2024-05-07 - Letter Response to 19 (1).pdf

---

UNCLASSIFIED / NON CLASSIFIÉ

Good morning 19 (1)

Please see the attached response sent on behalf of Marcia George, Regional Director Civil Aviation, Ontario Region.

Regards,

**Akram Saiyed**

Executive Assistant, Civil Aviation

Transport Canada / Government of Canada

[akram.saiyed@tc.gc.ca](mailto:akram.saiyed@tc.gc.ca) / Cel: 437-431-4493 / TTY: 1-888-675-6863

Adjointe Exécutif, Aviation Civile

Transports Canada / Gouvernement du Canada

[akram.saiyed@tc.gc.ca](mailto:akram.saiyed@tc.gc.ca) / Tél Cel: 437-431-4493 / ATS: 1-888-675-6863

---

**From:** 19 (1)

**Sent:** Tuesday, April 30, 2024 11:18 PM

**To:** Cynthia Woods <[cynthia.woods@gtaa.com](mailto:cynthia.woods@gtaa.com)>; ZZG-Community Engagement <[communityengagement@gtaa.com](mailto:communityengagement@gtaa.com)>; Navcanada Service <[service@navcanada.ca](mailto:service@navcanada.ca)>; Francesco M.P. Sorbara <[francesco.sorbara@parl.gc.ca](mailto:francesco.sorbara@parl.gc.ca)>; Minister of Transport / Ministre des Transports (TC) <[TC.MinisterofTransport-MinistredesTransports.TC@tc.gc.ca](mailto:TC.MinisterofTransport-MinistredesTransports.TC@tc.gc.ca)>

**Cc:** 19 (1)

19 (1)

**Subject:** [External/Externe]: Air traffic noise after 11pm is unacceptable  
XAP-2024-533242

Hello,

Please see below:

19 (1)

19 (1)

Resident of Woodbridge, ON



Virus-free. [www.avast.com](http://www.avast.com)



Transport Canada Transports Canada

4900 Yonge St. 3<sup>rd</sup> Floor  
Toronto ON M2N 6A5

Your file Votre référence

Our file Notre référence

RDIMS Number Numéro de SGDDI  
20288031

May 7, 2024

19 (1)

Dear 19 (1)

Thank you for your email of April 30, 2024, to the Minister of Transport regarding nighttime air traffic noise around your residence. Your correspondence has been forwarded to me for a response.

Transport Canada is responsible for developing and overseeing the transportation policies, programs, and goals set by the Government of Canada to ensure the national transportation system is safe, efficient, and accessible to all its users.

One of the tools available to assist airports includes a process through which airport operators develop noise abatement procedures and operating restrictions by consulting aviation stakeholders and local communities. Noise abatement procedures for Toronto Pearson International Airport are in place, in addition to the Night Flight Program, which limits nighttime noise and balances growing regional demand. This night flight restriction program limits the number of movements during the restricted hours (12:30 am to 6:29 am).

For more information, you may wish to visit [Night Flights](#), [Noise Management Program](#) and [Toronto InsightFull \(torontopearson.com\)](#).

We are aware that noise management is a complicated and often difficult issue faced by airport authorities and communities around the country. It is an issue that must be managed while ensuring that aviation safety is not compromised. Transport Canada's experience has shown that noise issues are most effectively addressed at the local community level. Therefore, the department encourages dialogue with the airport authority directly, as Transport Canada is not involved in the daily operations of airports, including Toronto Pearson International Airport.

The airport operator, the Greater Toronto Airports Authority (GTAA), may be reached at 416-247-7682 or through its website at [Toronto Pearson- Contact Us](#).

Thank you for writing.

Canada

Yours sincerely,

A handwritten signature in black ink that reads "ME George". The letters are cursive and fluid, with the "ME" being slightly larger and more prominent than the "George".

Marcia George  
Regional Director  
Civil Aviation, Ontario Region

c.c. Office of Francesco Sorbara, M.P.  
Vaughan–Woodbridge

**From:** Saiyed, Akram (TC/TC)  
**To:** [19 (1)]  
**Subject:** Airplane noise complaint  
**Date:** Tuesday, May 07, 2024 1:39:17 PM  
**Attachments:** 2024-05-07 - Letter Response to [19 (1)] pdf

---

UNCLASSIFIED / NON CLASSIFIÉ

Good afternoon [19 (1)]

Please see the attached response sent on behalf of Marcia George, Regional Director Civil Aviation, Ontario Region.

Regards,

Akram Saiyed  
 Executive Assistant, Civil Aviation  
 Transport Canada / Government of Canada  
 akram.saiyed@tc.gc.ca / Cel: 437-431-4493 / TTY: 1-888-675-6863

Adjointe Exécutif, Aviation Civile  
 Transports Canada / Gouvernement du Canada  
 akram.saiyed@tc.gc.ca / Tél Cel: 437-431-4493 / ATS: 1-888-675-6863

-----Original Message-----

**From:** [19 (1)]  
**Sent:** Friday, March 8, 2024 10:43 PM  
**To:** Minister of Transport / Ministre des Transports (TC) <TC.MinisterofTransport-MinistredesTransports.TC@tc.gc.ca>  
**Subject:** [External/Externe]: Airplane noise complaint

XAP-2024-532305

Hello,

I admit I'm not overly optimistic of receiving a reply here but I don't know exactly what to do with my issue.

As a resident of Vaughan, Ontario [19 (1)] I'm well aware of what [19 (1)] Ontario (and Vaughan in its entirety) used to be and what it has become. I can't help but be very disappointed at what has become of the noise pollution from planes in recent years. Things have become out of control and increasing worse to date. Low flying planes at all hours of the day and night creating incredibly loud noises. It is literally non stop every few minutes for hours on end (including right now as I write this email). The train noise is another issue entirely, especially from all day and night activity of that train yard by [19 (1)]

Why has this become a reality? Can something not be done as clearly it never used to happen. I've tried corresponding directly with the train company and airport, but absolutely nothing is done and they simply don't reply to me. I have also written to my local MP who has advised their office has communicated the concerns of many residents to your office recently.

I just want some peace and quiet for my family.

Regards,

[19 (1)]



Transport Canada Transports Canada

4900 Yonge St. 3<sup>rd</sup> Floor  
Toronto ON M2N 6A5

Your file Votre référence

Our file Notre référence

RDIMS Number Numéro de SGDDI  
20191939

May 7, 2024

19 (1)

Dear 19 (1)

Thank you for your email of March 8, 2024, to the Minister of Transport, Pablo Rodriguez, regarding flight activity around your residence in Vaughan, Ontario. Your correspondence has been forwarded to me for a response.

Transport Canada is responsible for developing and overseeing the transportation policies, programs, and goals set by the Government of Canada to ensure the national transportation system is safe, efficient, and accessible to all users. The mission of Transport Canada's Civil Aviation branch is to develop and administer policies and regulations for the safest civil aviation system for Canada and Canadians, with a vision of an integrated and progressive system that promotes a proactive safety culture. In doing so, the department exercises its authority through the *Aeronautics Act* and the Canadian Aviation Regulations (CARs).

The CARs state that, except when taking off or landing, aircraft may not be operated over a built-up area at an altitude lower than 1,000 feet above the highest obstacle within a horizontal distance of 2,000 feet from the aircraft (or 500 feet for helicopters). When not operating over a built-up area, aircraft must maintain a minimum distance of 500 feet from any person, vessel, vehicle, or structure.

The department understands that noise management is a complicated and often difficult issue faced by airport authorities and communities around the country. It is an issue that must be managed while ensuring aviation safety is not compromised.

It is Transport Canada's experience that noise issues are most effectively addressed at the local community level. Therefore, the department recommends continued dialogue with the Greater Toronto Airports Authority (GTAA) (Noise Management | Pearson Airport (torontopearson.com)) directly.

Additionally, Transport Canada is not involved in the day-to-day operation of the airport or approval of changes to individual routings of flight paths, other than to confirm that the design meets the appropriate regulations and standards. Any further questions regarding flight paths around Toronto should be directed to NAV CANADA at [service@navcanada.ca](mailto:service@navcanada.ca).



If at any time it is suspected that a pilot is operating an aircraft in an unsafe manner and in contravention of the CARs, I encourage you to take down as much information as possible (for example: photos or videos, date, time, registration number, color of aircraft, and other identifying marks) and report your concerns through our [Civil Aviation Communications Centre Contact Form](#).

Regarding your complaint on train noise, under the *Railway Safety Act*, Transport Canada is responsible for regulating the safety of railway operations throughout Canada.

The Canadian Transportation Agency (CTA) can assist you in addressing these matters. The CTA is an independent quasi-judicial tribunal that makes decisions on a wide range of matters involving federally regulated modes of transportation. The Agency offers a mediation service that can be used to help resolve rail issues, such as service obligations, noise, crossings, and rail line and rail yard expansion. For additional details on this process, I invite you to visit the Agency's [website](#) or contact the Agency directly at the following coordinates:

Canadian Transportation Agency  
Ottawa, Ontario  
K1A 0N9

Telephone: 1-888-222-2592  
E-mail: [info@cta-otc.gc.ca](mailto:info@cta-otc.gc.ca)

Thank you for writing.

Regards,

A handwritten signature in black ink that reads "ME George". The signature is written in a cursive, flowing style.

Marcia George  
Regional Director  
Civil Aviation, Ontario Region

## To all Residents living in River Oaks:

On Feb. 9, 2012, NAV Canada made changes to their arrivals flight path over our neighborhoods without our knowledge. The net result that has been observed over our neighbourhood is a dramatic increase in arrivals traffic during the day and in the evenings till approximately 12:30 a.m. In addition, this is causing increased noise over our homes and neighbourhoods.

Lastly, on June 13, 2013 Transport Canada approved Toronto Pearson's request to amend the annual night flight budget. This will have additional negative effects on night time sleep from (12:30 am - 6:30 a.m.).

Since we don't have any representation/committee in Oakville to voice our concerns over aircraft noise, we urge you to complain to your local councillors, Marc Grant and Jeff Knoll and our mayor, Rob Burton and make them aware of this impact. In addition, you may write or call directly to voice your concerns:

Minister of Transport – 905-693-0166

The Honourable Lisa Raitt - [lisa.raitt.c1@parl.gc.ca](mailto:lisa.raitt.c1@parl.gc.ca)

Transport Canada: 1-800-305-2059 press #1 and #4 for low flying aircraft

NAV Canada – 1-800-876-4693 – [service@navcanada.ca](mailto:service@navcanada.ca)

HELP STOP THE AIRCRAFT FREEWAYS OVER OUR  
COMMUNITY AND PROTECT OUR HEALTH AND  
ENVIRONMENT

**From:** [ONTTORCIV429](#)  
**To:** [Holmes, Jennifer](#)  
**Subject:** An E-Mail has arrived from printer ONTTORCIV429  
**Date:** Thursday, June 20, 2013 2:42:04 PM  
**Attachments:** Document.pdf

---

This document was digitally sent to you using an HP Digital Sending device.

Rec'd in RDG's office  
on June 20, 2013.  
C. Kozycz



Transport Canada    Transports Canada

4900 Yonge Street, 4th Floor  
Toronto ON M2N 6A5

UNCLASSIFIED

Your file    Votre référence

Our file    Notre référence  
RDIMS #7248996 v14

June 13, 2013

Mr. Howard Eng  
President & Chief Executive Officer  
Greater Toronto Airports Authority  
P.O. Box 6031  
3111 Convair Drive  
Toronto AMF, ON L5P 1B2

Dear Mr. Eng:

**RE: NIGHT FLIGHT OPERATIONS AT LESTER B. PEARSON  
INTERNATIONAL AIRPORT**

Further to the Greater Toronto Airports Authority's (GTAA) letter to Transport Canada dated December 22, 2011 regarding Night Flight Operations at Lester B. Pearson International Airport (LBPIA), this Letter Agreement replaces and supersedes the December 10, 1997 Letter Agreement between Transport Canada and the GTAA regarding the same.

Like all other airports operating in the National Airports System (NAS), the GTAA must balance the economic benefits of both the users and the community at large with the views of the local community when making decisions with respect to airport operations.

This Letter Agreement sets out the method that shall be used to determine the maximum annual number of takeoffs and landings that can occur at LBPIA during the "Restricted Hours."

**Definitions**

In this Letter Agreement:

- "Restricted Hours" means 0030 a.m. to 0630 a.m. or as otherwise agreed to by Transport Canada and the GTAA.
- "Annual Period" means the period from November 1 of one calendar year to October 31 of the following calendar year.
- "Base Year Annual Period" means November 1, 2011 to October 31, 2012.

www.tc.gc.ca

RDIMS / SGDDI # 7248996

Canada

- “**Annual Flights**” means the total number of landings and take-offs during the Restricted Hours within an Annual Period.
- “**Number of Passengers**” means the total number of enplaned and deplaned passengers.
- “**Extensions**” may be granted by the GTAA to allow aircraft operations that were scheduled within normal airport hours (0630 a.m. to 0029 a.m.) and that are delayed on the day of operation due to unforeseen circumstances such as weather, mechanical, security, or Air Traffic Control problems, to operate during the Restricted Hours. Operating extension approvals may be denied by the GTAA.
- “**Exemptions**” are operations during the Restricted Hours and are pre-planned and may be granted by the GTAA to allow operations of aircraft meeting or exceeding Chapter 3 (or equivalent standards) if the granting of the Exemptions will not derogate from passenger or aircraft safety and is in the best interests of the public at large by contributing to the overall economic benefit or development of the surrounding communities and/or the country as a whole.

#### **Base Year maximum Annual Flights**

The maximum Annual Flights during the Base Year Annual Period was 20 (1) (b)

#### **Increase in maximum Annual Flights**

The maximum Annual Flights shall increase beyond the amount in the Base Year Annual Period as follows:

(1) The maximum Annual Flights shall increase by 20 (1) (b)  
20 (1) (b)

(2) Notwithstanding (1) above, 20 (1) (b)  
20 (1) (b)

In that event, the increase in the maximum Annual Flights shall be 20 (1) (b)  
20 (1) (b)

The maximum Annual Flights 20 (1) (b)  
20 (1) (b)

For example:

|                                | Annual<br>Period 1 | Annual<br>Period 2 | Annual<br>Period 3 | Annual<br>Period 4 | Annual<br>Period 5 | Annual<br>Period 6 |
|--------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Annual<br>No. of<br>Passengers | 20 (1) (b)         |                    |                    |                    |                    |                    |
| Maximum<br>Annual<br>Flights   | 20 (1) (b)         |                    |                    |                    |                    |                    |

- (3) In addition to increases in the maximum Annual Flights in accordance with (1) and (2) above, if  
20 (1) (b)

|  |
|--|
|  |
|--|

For example:

|                                       | Annual<br>Period 1 | Annual<br>Period 2 | Annual<br>Period 3 | Annual<br>Period 4 | Annual<br>Period 5 | Annual<br>Period 6 |
|---------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Annual<br>No. of<br>Passengers        | 20 (1) (b)         |                    |                    |                    |                    |                    |
| Maximum<br>Annual<br>Flights          |                    |                    |                    |                    |                    | 20 (1) (b)         |
| No. of<br>actual<br>Annual<br>Flights |                    |                    |                    |                    |                    |                    |

There shall be 20 (1) (b) as outlined in Paragraph 3 above.

**Maximum Annual Flights allowed for the November 1, 2012 to October 31, 2013 Annual Period**

The maximum Annual Flights for the November 1, 2012 to October 31, 2013 Annual Period shall not exceed 20 (1). This number is based on 20 (1) (b)

20 (1) (b)

(a) 20 (1) (b)

Because the actual number of Annual Flights for November 1, 2011 to October 31, 2012 Annual Period 20 (1) (b)

20 (1) (b)

**Extensions and Exemptions**

The GTAA may grant Extensions and Exemptions for aircraft meeting or exceeding Chapter 3 (or equivalent standard) aircraft.

The GTAA shall maintain records of all Exemptions and Extensions granted.

**Other**

The GTAA has established a noise management committee ("CENAC") which includes the Minister or his designate as a member in accordance with the requirement under section 8.12 of the Ground Lease between Her Majesty the Queen in right of Canada represented by the Minister of Transport and the GTAA (the "Ground Lease"). The GTAA shall maintain and make available to the public under Section 9.03 of the Ground Lease the following records, on which the GTAA shall also report annually to CENAC, in the respect of each Annual Period:

- the actual number of aircraft movements during the Restricted Hours;
- the number of Extensions and Exemptions the GTAA issued for operations during the Restricted Hours;
- the number of Restricted Hours violations, if any; and
- the actual Number of Passengers.

The GTAA has established a community consultative committee ("Consultative Committee") in accordance with the requirement under section 9.04 of the Ground Lease. Consistent with the Terms of Reference for the Consultative Committee, the GTAA will continue to report to the Consultative Committee on noise and environmental issues with potential economic value, and the GTAA shall report annually to the Consultative Committee, to a reasonable extent, on the



economic value of the Restricted Hours operational aspect of the Airport, including with respect to any increase to the maximum Annual Flights.

Should the GTAA in the course of an Annual Period wish to increase the maximum number of Annual Flights beyond what is allowed in this Letter Agreement, the GTAA shall request Transport Canada to approve an increased number of flights for that Annual Period. Transport Canada may in their sole discretion, grant or refuse the increase.

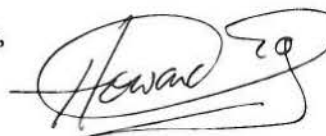
I request that you acknowledge concurrence with this Letter Agreement.

Yours truly,



Debra Taylor  
Regional Director General  
Ontario Region

I concur,



Howard Eng  
President & Chief Executive Officer  
Greater Toronto Airports Authority

Date: June 14, 2013

## COMMUNITY NOISE MITIGATION SUGGESTIONS

Toronto Noise Mitigation Initiatives  
September 2015

### COMMUNITY NOISE MITIGATION SUGGESTIONS

Toronto Pearson is one of North America's fastest growing global hub airports, handling nearly 40 million passengers today, and well on its way to reaching greater than 64 million passengers by 2033. As a significant contributor to the local and national economies, a job creator, and a facilitator for trade and foreign investment, Toronto Pearson knits Canada together and helps our country compete globally.

We recognize that airports have impacts, such as noise on local communities. While airplane noise can't be eliminated entirely, we know the community served by the airport expects us to be a good neighbour. One important way to do this is to lessen the impact of our operations on our neighbours by reducing aircraft noise where possible.

NAV CANADA and the GTAA are studying six ideas we think will have benefits for the communities surrounding Toronto Pearson and we've been out talking about them at Stakeholder Roundtables throughout the GTA.

The ideas that were reviewed as part of the Stakeholder Roundtables come, in part, from suggestions that have been provided by the community. The full list of community suggestions is below along with an explanation of how they are reflected in one or more of the six ideas under consideration, or why they were considered not feasible:

| Suggestion                                                                                                                                                   | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                       | Is suggestion reflected in the 6 Ideas currently under consideration? |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| <b>Increase Downwind Altitudes:</b> Suggestions to reduce noise in portions of the flight path by increasing altitude of aircraft operations on the downwind |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
| 1. Lengthen the downwind to extend beyond the residential areas before turning base leg.                                                                     | <ul style="list-style-type: none"> <li>This would increase altitudes over some communities overflown today, but would also overfly new neighbourhoods.</li> <li>An Instrument Landing System (ILS) guides arriving aircraft to the runway. The strength of the ILS signal is not certified outside of 24 NM. Extending the downwind takes aircraft beyond the limit, and would require the aircraft controller to tactically maintain</li> </ul> | Not reflected                                                         |



## COMMUNITY NOISE MITIGATION SUGGESTIONS

Toronto Noise Mitigation Initiatives  
September 2015

| Suggestion                                                                                        | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Is suggestion reflected in the 6 Ideas currently under consideration?                                                        |
|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                   | <p>vertical separation until the aircraft could be established on the ILS.</p> <ul style="list-style-type: none"> <li>This would compromise parallel arrival operations, reducing capacity at the airport considerably.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                              |
| 2. Have aircraft join final approach at 4000/5000' ASL instead of 3000/4000' ASL as they do today | <ul style="list-style-type: none"> <li>The requirement to intercept final approach at 3,000 ft ASL is a published noise abatement procedure.</li> <li>Amending that procedure to intercept final approach at 4,000 ft ASL would extend the base leg out by 3 NM (5.5 km), over new communities and add 6 NM of flight distance to each flight.</li> <li>While some communities on the downwind portion of the flight path would be overflown at slightly higher altitudes than today, the noise benefit of 1,000 ft of additional altitude is expected to be small (1-2 dBA at most).</li> <li>Communities under the final approach would be overflown at the same altitudes experienced today.</li> </ul> | Not reflected                                                                                                                |
| 3. Eliminate high/low arrival procedures                                                          | <ul style="list-style-type: none"> <li>There is a potential to eliminate high/low arrival procedures with the use of Required Navigation Performance (RNP) flight paths in the future. This would require the adoption of new separation standards and technology for RNP operations.</li> <li>Without the high/low procedures, existing technologies do not allow non-RNP equipped arrivals to maintain safe separation in a parallel operation without significantly compromising capacity.</li> <li>This is because safety standards require that separation between aircraft in the Terminal area be either 3 NM laterally or 1000 ft vertically until established on final</li> </ul>                 | Yes. This is incorporated into Idea 4 - Use new technology to reduce the need for low altitude leveling by arriving aircraft |



## COMMUNITY NOISE MITIGATION SUGGESTIONS

Toronto Noise Mitigation Initiatives  
September 2015

| Suggestion                                                                                              | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Is suggestion reflected in the 6 Ideas currently under consideration? |
|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
|                                                                                                         | <p>approach.</p> <ul style="list-style-type: none"> <li>• In parallel operations where the runways are closer than 3NM, such as at Toronto Pearson, vertical separation (altitude) must be used.</li> <li>• Eliminating high/low procedures would mean vertical separation would not be achieved, so all arrivals would have to meet lateral separation. This would require arrivals to be staggered, reducing the hourly airport arrival rate (the number of planes that can land in an hour) below the demand.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                       |
| <p>4. Reverse high/low – make north of airport the low side and south of the airport the high side.</p> | <ul style="list-style-type: none"> <li>• Airport layout is a key driver for the design of airport operations.</li> <li>• In east-west operations, Toronto Pearson has one “north side” runway (runway 05/23) and two “south side” runways (24L/06R and 24R/06L).</li> <li>• Under normal daytime operations, the single runway on the north-end is operated as both a landing and departing runway. This requires larger spacing between arriving aircraft so that a departure can occur between arrivals.</li> <li>• On the south side, one of the south parallel runways is generally used for arrivals while the other is used for departures. As a result, minimal spacing can occur between arrivals in order to meet arrival rate demand.</li> <li>• Simulation has shown that using a higher altitude intercept on the south side decreases sequencing options.</li> <li>• Implementing this suggestion would be likely to reduce overall airport capacity below demand, and lower the</li> </ul> | <p>Not reflected</p>                                                  |



## COMMUNITY NOISE MITIGATION SUGGESTIONS

Toronto Noise Mitigation Initiatives  
September 2015

| Suggestion                                                                                                             | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Is suggestion reflected in the 6 Ideas currently under consideration? |
|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
|                                                                                                                        | altitudes that aircraft fly in other areas of the GTA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                       |
| 5. Remove all descent guidance from the STAR at the beginning of the downwind and implement controller managed descent | <ul style="list-style-type: none"> <li>The current STAR provides common descent guidance, optimized for flights on a close in base leg, while allowing air traffic controllers to cancel STAR altitude restrictions when traffic warrants, such as when a longer downwind is required for sequencing purposes.</li> <li>The absence of descent guidance in the STAR would require air traffic controllers to provide specific instructions to each pilot and for the instructions to be repeated back by each pilot, significantly increasing the complexity of the procedure, and pilot and controller workload and congestion on ATC radio frequencies.</li> <li>In addition, there is no guarantee that these procedures would result in altitudes that are higher than those experienced today or that operations would be quieter.</li> <li>In fact, evidence shows that aircraft tend to be higher today, at comparable places in the downwind portion of the approach than they were prior to 2012.</li> <li>While it has been noted that several busy international airports continue to use controller managed descent it is not the trend, nor is it seen as best practice.</li> </ul> | Not reflected                                                         |
| <b>Adjust Arrival Flight Paths:</b> Suggestions for relocating a portion of the flight path                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                       |
| 6. Move the current downwind that lies south of the airport further south                                              | <ul style="list-style-type: none"> <li>While the downwind could conceivably be relocated further south, there are no viable locations to move the downwind that would result in the majority of the flight path being located over industrial or non/residential areas.</li> <li>Depending on how much the flight path were to be moved, there would be impacts on operations at Billy</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Not reflected                                                         |



## COMMUNITY NOISE MITIGATION SUGGESTIONS

Toronto Noise Mitigation Initiatives  
September 2015

| Suggestion                                                                                                    | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Is suggestion reflected in the 6 Ideas currently under consideration? |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
|                                                                                                               | <p>Bishop Airport.</p> <ul style="list-style-type: none"> <li>This also has the potential to complicate sequencing procedures and create even longer level segments in the approach. (Level segments can result in an increase in noise.)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                       |
| 7. Widen the downwind flight path to create more variation in where aircraft overfly                          | <ul style="list-style-type: none"> <li>Enabling aircraft to fly the downwind with variation (e.g. offsets) is not viable technically. This suggestion is not manageable from an air traffic controller or pilot perspective.</li> <li>Small variation in the location of the flight path would be unlikely to result in material reductions in noise.</li> <li>Removing flight paths entirely and resorting to air traffic controller vectoring would introduce variation but this would create safety, capacity issues and is contrary to the direction put forward by ICAO and is incompatible with the wider efficiencies of a PBN airspace system.</li> </ul> | Not reflected                                                         |
| 8. Create three or four alternate downwind flight paths in order to share the noise over various communities. | <ul style="list-style-type: none"> <li>Introducing variation in which STAR (arrival routes) pilots are to file and fly would introduce the potential for safety impacts to the operation.</li> <li>This is not done in Canada and we are not aware of this being done anywhere in North America.</li> </ul>                                                                                                                                                                                                                                                                                                                                                       | Not reflected                                                         |
| 9. Overfly industrial areas, water/roads                                                                      | <ul style="list-style-type: none"> <li>There are no viable options to connect industrial or non-residential areas in the Greater Toronto Area and meet instrument procedure design standards.</li> <li>Placing flight paths over roads is not effective as a noise mitigation measure as the noise generated by an aircraft extends beyond the width of a highway.</li> </ul>                                                                                                                                                                                                                                                                                     | Not reflected                                                         |
| 10. Relocate the downwind over Lake Ontario                                                                   | <ul style="list-style-type: none"> <li>In a normal east-west configuration, Canadian airspace over Lake Ontario is used for south, east and southwest</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Yes. Elements (overnight period) incorporated into Idea 1 - New       |



## COMMUNITY NOISE MITIGATION SUGGESTIONS

Toronto Noise Mitigation Initiatives  
September 2015

| Suggestion                                                                                                        | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Is suggestion reflected in the 6 Ideas currently under consideration?                                                          |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                   | <p>bound climbing departure traffic and for the management of traffic flows to and from Billy Bishop Airport. It is not possible to safely accommodate Toronto Pearson arrival flight paths in this airspace as well.</p> <ul style="list-style-type: none"> <li>While this concept is not possible during busy periods there may be opportunities to redesign arrival flight paths utilized at night, when departure traffic levels are lower and Billy Bishop airport is closed to commercial traffic.</li> <li>It must be recognized however that the base leg portion of any new arrival path would overfly new neighbourhoods at night.</li> </ul>                                                                                                                           | Approaches for night-time operations depending on final design                                                                 |
| 11. Create a new Pearson arrival STAR - LINNG direct to base leg (i.e. MAROD) that overflies Billy Bishop Airport | <ul style="list-style-type: none"> <li>A new STAR in this configuration is not possible during busy traffic periods due to crossing departure traffic from Toronto Pearson. Additionally it would reduce sequencing flexibility needed to manage high traffic volumes.</li> <li>During overnight periods in which there are reduced arrival and departure volumes from Toronto Pearson and Billy Bishop airport is closed to commercial traffic, such a flight path may be viable. In fact, air traffic controllers already vector aircraft in this area on occasion.</li> <li>It must be recognized however that the arrival path would overfly new neighbourhood, including neighbourhoods that are today impacted by aircraft operations from Billy Bishop Airport.</li> </ul> | Yes. Elements (overnight period) incorporated into Idea 1 - New Approaches for night-time operations depending on final design |
| <b>Runway Utilization:</b> Suggestions involving changes to runway usage at Toronto Pearson.                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                |
| 12. Increase the use of runways 15L/R and 33L/R                                                                   | <ul style="list-style-type: none"> <li>The two north/south runways at Toronto Pearson have reduced capacity as compared to the three east /west runways. Often the capacity level of 15/33 operations would fall below the demand of daytime operations,</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Not reflected                                                                                                                  |





## COMMUNITY NOISE MITIGATION SUGGESTIONS

Toronto Noise Mitigation Initiatives  
September 2015

| Suggestion                                                                                                             | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Is suggestion reflected in the 6 Ideas currently under consideration?                                                                                        |
|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                        | <p>causing significant delays for aircraft and passengers. Today, approximately ninety-two per cent of the time, daytime operations use the east/west runways.</p> <ul style="list-style-type: none"> <li>Land use directly south of the airport is not zoned to accommodate noise levels associated with significantly higher aircraft traffic. There is a potential that an increase in traffic could mean an extension of the 30NEF contour into this area which is incompatible with residential land use.</li> </ul>                         |                                                                                                                                                              |
| 13. Review Preferential Runways                                                                                        | <ul style="list-style-type: none"> <li>Preferential runways exist in an effort to have aircraft operating at night affect the fewest residential neighbourhoods.</li> <li>A review of Toronto Pearson's night time preferential runway system is being undertaken. Among other factors, this review will consider land development patterns around the airport since the preferential runways were established.</li> </ul>                                                                                                                        | Yes. This principle is incorporated into Idea 6 – Night-time preferential runway review                                                                      |
| <b>Management of Traffic during Quiet Hours:</b> Suggestions to improve how traffic is managed during overnight period |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                              |
| 14. Provide night relief by improving the design of flight paths used at night                                         | <ul style="list-style-type: none"> <li>During lower traffic periods at night, air traffic is often managed by landing on one runway and departing on the other. This provides some opportunity to change how traffic is managed.</li> <li>For example, we may be able to improve descent profiles to eliminate the need for level flight segments. (Level segments can result in an increase in noise.)</li> <li>It is believed that improved approaches and departures can be designed for use during lower traffic periods at night.</li> </ul> | Yes. This principle is incorporated into Ideas 1 – New approaches for night-time operations, and Idea 2 – New departure procedures for night-time operations |
| <b>Capacity Limits:</b> Suggestions involving limiting traffic levels at the airport                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                              |



## COMMUNITY NOISE MITIGATION SUGGESTIONS

Toronto Noise Mitigation Initiatives  
September 2015

| Suggestion                                                                                            | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Is suggestion reflected in the 6 Ideas currently under consideration? |
|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| 15. Increase the CYYZ restricted night flight period to cover more hours than currently (12:30-6:30). | <ul style="list-style-type: none"> <li>Toronto Pearson operates around-the-clock, seven days a week. Generally, only 3 per cent of our flights taking off and landing at Toronto Pearson occur between 12:30 a.m. and 6:30 a.m.</li> <li>The number of flights permitted at night is capped annually under an agreement with <u>Transport Canada</u>, which has been in place since 1997. We call this the budget. Toronto Pearson is the only North American airport with a budget.</li> <li>Toronto Pearson always has – and will continue – to work diligently to manage night flights to ensure that only those flights that must operate at night take off and land between 12:30 a.m. and 6:30 a.m.</li> </ul> | Ideas 1, 2 and 6 look for opportunities for nighttime noise relief.   |
| 16. Prescribe limits on traffic during hours adjacent to night flight period                          | <ul style="list-style-type: none"> <li>While the restricted hours are in effect between 12:30 a.m. and 6:30 a.m., the Preferential Runway system is in effect between 12:00 a.m. and 6:30 a.m. Traffic isn't limited prior to the restricted hours, but it is handled differently through the use of the Preferential Runway system under which runways are used that impact the fewest people.</li> <li>A review of the Preferential Runway system is reflected in Idea 6 - Night-time preferential runway review</li> </ul>                                                                                                                                                                                        | Ideas 1, 2 and 6 look for opportunities for nighttime noise relief.   |
| 17. Eliminate all night flights other than emergency flights (e.g. medevac)                           | <ul style="list-style-type: none"> <li>Toronto Pearson reviews each night flight request and approves or denies the requests on a case-by-case basis.</li> <li>A variety of factors are considered when approving scheduled flights which account for 80 per cent of the budget. Factors include: environmental and community impacts, economic impact and alignment with our mandate to support the economic development of the</li> </ul>                                                                                                                                                                                                                                                                          | Ideas 1, 2 and 6 look for opportunities for nighttime noise relief.   |



## COMMUNITY NOISE MITIGATION SUGGESTIONS

Toronto Noise Mitigation Initiatives  
September 2015

| Suggestion                                                                                                            | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Is suggestion reflected in the 6 Ideas currently under consideration?                              |
|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|                                                                                                                       | <p>region</p> <ul style="list-style-type: none"> <li>We reserve approximately 20 per cent of our budgeted flights to allow for situations outside of our control, such as weather delays, medevac flights, mechanical delays and for security reasons.</li> <li>Toronto Pearson always has – and will continue – to work diligently to manage night flights to ensure that only those flights that must operate at night take off and land between 12:30 a.m. and 6:30 a.m.</li> </ul>                                                                |                                                                                                    |
| 18. Limit traffic volumes on weekends and holidays                                                                    | <ul style="list-style-type: none"> <li>There is growing demand from travellers and businesses in the GTHA, Ontario and across Canada for more flight options. To constrain traffic would affect the ability of the airport to meet the growing demands for traffic which would have negative implications for the economy.</li> <li>Traffic levels are lower during much of the weekend than they are at other times. Current levels provide some opportunity to manage traffic differently on weekends than during other peak times.</li> </ul>      | Managing weekend traffic differently incorporated in Idea 5 – Establish Weekend Runway Alternation |
| <b>Procedure Design:</b> Suggestions that involved specific changes to the design of arrival or departure procedures. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                    |
| 19. Eliminate early turns on departure                                                                                | <ul style="list-style-type: none"> <li>Early turns are in effect for select eligible jet types between 7:00 a.m. and 11:00 p.m. and for propeller aircraft between 6:30 a.m. and 11:30 p.m. only.</li> <li>These early turns are critical to the overall capacity of the airport.</li> <li>Elimination of this procedure would require significant increases in spacing between departing aircraft to accommodate wake turbulence, and the differing speed and climb performance between aircraft types causing significant flight delays.</li> </ul> | Not reflected                                                                                      |



## COMMUNITY NOISE MITIGATION SUGGESTIONS

Toronto Noise Mitigation Initiatives  
September 2015

| Suggestion                                                                      | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Is suggestion reflected in the 6 Ideas currently under consideration?              |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 20. Increase downwind speed to reduce the need for flaps/speed brakes by pilots | <ul style="list-style-type: none"> <li>Increased speeds do not preclude the use of flaps or speed brakes by pilots but may contribute to the reduced need for them in some instances.</li> <li>In 2012, the downwind speed was increased from 190 kts to 200 kts. That speed is sufficient for most aircraft fleet types operating at Toronto Pearson to operate in a clean configuration (without the need for flaps/speed brakes).</li> <li>New design criteria now in place enable that speed to be increased to 210 kts. Note: While 220 kts has been suggested by some parties, that speed is not permitted by design criteria and it is believed that would have the impact of simply moving the location on the flight path where speed brakes are deployed by pilots.</li> </ul>            | Yes. This principle is incorporated into Idea 3 – Increase downwind arrival speeds |
| <b>Other</b>                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                    |
| 21. Eliminate altitude anchor points on the downwind portion of the STAR        | <ul style="list-style-type: none"> <li>Anchor altitudes exist on the STAR to ensure the aircraft flight management system provides the pilot with appropriate descent guidance to enable early base leg turns.</li> <li>The location of the anchor point has been designed to provide constant descent guidance from the downwind to the 3,000 ft glide path intercept point.</li> <li>When traffic sequencing requirements necessitate an extended downwind, these altitude restrictions are often cancelled by air traffic controllers so that aircraft can remain higher, longer.</li> <li>The integration of RNP procedures into Toronto airspace in the future may alter the need for anchor points, however until that time they are a necessary component of the airspace design.</li> </ul> | Not reflected                                                                      |



## COMMUNITY NOISE MITIGATION SUGGESTIONS

Toronto Noise Mitigation Initiatives  
September 2015

| Suggestion                                                                     | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Is suggestion reflected in the 6 Ideas currently under consideration?              |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 22. Keep aircraft at clean speed until base or final approach                  | <ul style="list-style-type: none"> <li>A "clean configuration" refers to an aircraft with its flaps, speed brakes, and landing gear retracted – resulting in the aircraft operating with minimal drag. This configuration is believed to reduce, but not eliminate, airframe noise – the noise caused by air moving over the aircraft.</li> <li>The speed at which a "clean configuration" is possible varies for different aircraft fleet types and even from day-to-day, according to wind conditions.</li> <li>Toronto Pearson has a broad mix of aircraft fleet types that operate every day. During busy traffic periods in particular, speed must be consistent between forward and trailing aircraft in order to reduce the risk of loss of separation.</li> <li>In some instances, when traffic levels are lower, air traffic controllers will cancel published speed restrictions in order to enable the pilot to choose an appropriate speed for their operation. This does not guarantee that a "clean configuration" speed will be flown.</li> <li>The concept of increasing the published speed in a portion of the flight path in order to increase the number of aircraft that can operate clean is included in Idea 3.</li> </ul> | Yes. This principle is incorporated into Idea 3 – Increase downwind arrival speeds |
| 23. Analyze best practices in noise management at other international airports | <ul style="list-style-type: none"> <li>NAV CANADA and the Greater Toronto Airports Authority regularly work with air traffic services and airport operators in other countries to share best practices.</li> <li>We intend to send a study team to several international airports to review noise abatement procedures and other operational practices in 2016. Airports referenced by community groups will be included in this project.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Yes. Incorporated in all Ideas.                                                    |





# Toronto Pearson

## *A partner in your community*

Toronto Pearson has an important role to play in community life. Our passengers count on us to provide connections to the world, our employees count on us to operate in a safe way, the communities surrounding us count on us to operate in a sustainable manner, and everyone counts on us to operate transparently. Being a good neighbour means balancing these diverse and sometimes competing priorities for the constituencies we're in business to serve.

### Our Role as a Region-Builder

With 40,000 employees (11,000 of which are Toronto residents), 41 million passengers and 450,000 tonnes of cargo in 2015, Toronto Pearson is not only a significant economic gateway for our region, but for the entire province and the rest of Canada. In 2015, Toronto Pearson facilitated nearly **6% of the province's GDP** and **277,000 jobs across Ontario**.

The GTAA is actively engaged in discussions about regional transportation with all levels of government, planners and employers in the airport employment zone to advocate for better transit connectivity for passengers, employees and local residents.



*A recent study of the airport's economic impact concluded that if Toronto Pearson were able to attract 10% more connecting passengers by 2030, this would create 21,000 jobs.*

### Growing Responsibly

Toronto Pearson is committed to ensuring all airport activities are carried out in a sustainable manner while also meeting the demands of a growing air travel industry. In 1999, Toronto Pearson was the first North American airport to achieve ISO 14001:2004 certification for environmental management. The airport continues to be recognized as a leader in sustainability, evidenced recently by Corporate Knights awarding us second place for our sustainability performance in 2015 in its ranking of Canadian medium-sized enterprises.

Below are some examples of our sustainability programs that benefit our neighbours and the natural environment.



#### Toronto Pearson Apiary

15 hives, up to 1 million bees, supporting dwindling honey bee population.



#### Tree Planting

Volunteers from our Partners in Project Green team planted nearly 800 trees and shrubs along Etobicoke Creek.

#### GHG Emissions

GHG emissions have dropped by ~50 per cent since 2006 - the equivalent of 44,800 tonnes of CO<sub>2</sub>.



#### Air Quality Study

In 2015, we completed an Air Quality Study and Human Health Risk Assessment, which concluded that despite our anticipated growth, the general population is not likely at risk of adverse health effects due to our operations.

#### Propeller Project

Toronto Pearson. Investing in Communities.

investing in communities that surround the airport. Through the Propeller Project, we provide funding and support to enable great neighbourhood-building initiatives.

We believe that being a good neighbour means balancing our operations by

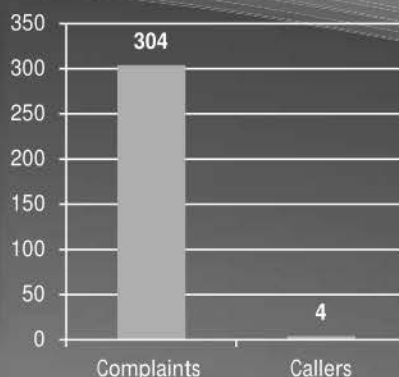


## Your Riding at a Glance: Davenport



■ Arrivals ■ Departures ■ Overflights

Davenport  
2015 Complaints & Callers



Davenport is impacted by the downwind of arrivals on Runways 23, 24L, 24R, 33L, 33R, as well as departures off Runways 06L, 06R.

## Our Noise Management Program

Airports are the 'front door' for the aviation industry when it comes to responding to community noise concerns. Our Noise Management Program helps to balance the growth of the airport with community concerns. The Program consists of:

- Noise Operating Restrictions
- Noise Abatement Procedures
- Land Use Planning
- Enforcement Office
- Noise Office
- Consultation and Community Outreach
- Night Flight Budget

## Night Flights

Toronto Pearson operates 24/7, 365 days of the year. Night flights at Toronto Pearson are not overflow from daytime operations; they're scheduled flights to accommodate travel distance, scheduling requirements, and product delivery timelines. Generally, only 3 per cent of flights taking off and landing at Toronto Pearson occur during the nighttime hours of 12:30 AM to 6:30 AM.

## Engaging your constituents

There are many opportunities for the public to interact with the Toronto Pearson team to discuss the airport's operations, activities and aircraft noise. We can engage with your constituents directly through the following:

### *Community Environment Noise Advisory Committee (CENAC) Meetings*

The Community Environment & Noise Advisory Committee (CENAC) provides a forum 4-5 times a year where the public can openly discuss and ask questions about noise and environment related issues at Toronto Pearson. We're the only Canadian airport to make these meetings open to the public, and to post minutes on [TorontoPearson.com](http://TorontoPearson.com).

### *Checking In*

Community members can stay in-the-know about events and activities at Toronto Pearson by signing up for our community e-newsletter, Checking In, at [torontopearson.com/en/stayintheknow](http://torontopearson.com/en/stayintheknow)

### *Community Open Houses*

We host open houses in the community to talk one on one with residents about the airport and its operations. For more information about community open houses, please contact: (416) 776-5739.

### *Registering Noise Complaints*

Residents with questions about airport operations or who wish to register a noise complaint are encouraged to contact the Toronto Pearson Noise Office using any of the following means:

- Online  
Using WebTrak to investigate aircraft operations and register complaints, or our online Complaint Form found at [TorontoPearson.com/NoiseManagement](http://TorontoPearson.com/NoiseManagement)
- Phone: (416) 247-7682





# Toronto Pearson

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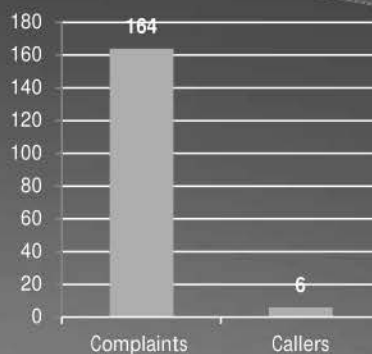
We believe that being a good neighbour means balancing our operations by

## Your Riding at a Glance: Don Valley East



■ Arrivals ■ Departures ■ Overflights

Don Valley East  
2015 Complaints & Callers



Don Valley East is impacted by the downwind and base turn of arrivals on Runways 24L, 24R, as well as departures off Runways 06L, 06R.

## Our Noise Management Program

Airports are the 'front door' for the aviation industry when it comes to responding to community noise concerns. Our Noise Management Program helps to balance the growth of the airport with community concerns. The Program consists of:

- Noise Operating Restrictions
- Noise Abatement Procedures
- Land Use Planning
- Enforcement Office
- Noise Office
- Consultation and Community Outreach
- Night Flight Budget

## Night Flights

Toronto Pearson operates 24/7, 365 days of the year. Night flights at Toronto Pearson are not overflow from daytime operations; they're scheduled flights to accommodate travel distance, scheduling requirements, and product delivery timelines. Generally, only 3 per cent of flights taking off and landing at Toronto Pearson occur during the nighttime hours of 12:30 AM to 6:30 AM.

## Engaging your constituents

There are many opportunities for the public to interact with the Toronto Pearson team to discuss the airport's operations, activities and aircraft noise. We can engage with your constituents directly through the following:

### Community Environment Noise Advisory Committee (CENAC) Meetings

The Community Environment & Noise Advisory Committee (CENAC) provides a forum 4-5 times a year where the public can openly discuss and ask questions about noise and environment related issues at Toronto Pearson. We're the only Canadian airport to make these meetings open to the public, and to post minutes on [TorontoPearson.com](http://TorontoPearson.com).

### Checking In

Community members can stay in-the-know about events and activities at Toronto Pearson by signing up for our community e-newsletter, Checking In, at [torontopearson.com/en/stayintheknow](http://torontopearson.com/en/stayintheknow)

### Community Open Houses

We host open houses in the community to talk one on one with residents about the airport and its operations. For more information about community open houses, please contact: (416) 776-5739.

### Registering Noise Complaints

Residents with questions about airport operations or who wish to register a noise complaint are encouraged to contact the Toronto Pearson Noise Office using any of the following means:

- Online

Using WebTrak to investigate aircraft operations and register complaints, or our online Complaint Form found at [TorontoPearson.com/NoiseManagement](http://TorontoPearson.com/NoiseManagement)

- Phone: (416) 247-7682



## CENAC - Night Flight Update



**Toronto Pearson**

International Airport | Aéroport International

# Overview

- **Review of Night Flights at Toronto Pearson**
- **Night Flights in 2011 – Budget Crunch**
- **Night Flight Budget – A Look Ahead**

# Toronto Pearson's Nighttime Budget

- Night Flights are flights permitted at Toronto Pearson
- Annual cap on the number of flights permitted during the night hours (00:30 – 6:30)
- Number of flights increases annually based on percentage increase in passenger traffic
- GTAA is required to manage nighttime activity within this budget



# Noise Management Program

- GTAA Noise Management Office - actively manage night time activity
- CENAC and other engagement activities - builds awareness and understanding
- GTAA Noise Abatement Procedures
  - Arrival and Departure procedures
- Noise Operating Restrictions
  - Preferential Runway Assignment
  - Engine Maintenance Run-ups
  - Night Flight Restriction Program

# Industry Changes

- 20 (1) (b)  

- Aircraft are Quieter - impacts on community have decreased significantly
- NEF contours show impacts on community have decreased significantly

Significant  
reduction in  
noise complaints  
since 1996



# 2011 Night Flight Budget

- 2011 Night Flight Budget is
- Budget year: November 1 – October 31
- Current status:
  - As of September 19, the number of night flights is
  - With 45 days remaining, unused capacity is
- High demand in 2011 for nighttime operations primarily due to weather related delays

# 2011 Night Flight Budget

- We have worked hard to stay within the budget
  - Regular monthly meetings with specific air carriers and operators
  - Advisory issued to airport community August 10 stating that the budget is approaching capacity and some requests may be denied
  - New exemption requests have been and continue to be denied
  - Technical Noise Committee briefed on September 8
  - Supplemental Advisory to be issued by end of week

# 2011 Night Flight Budget

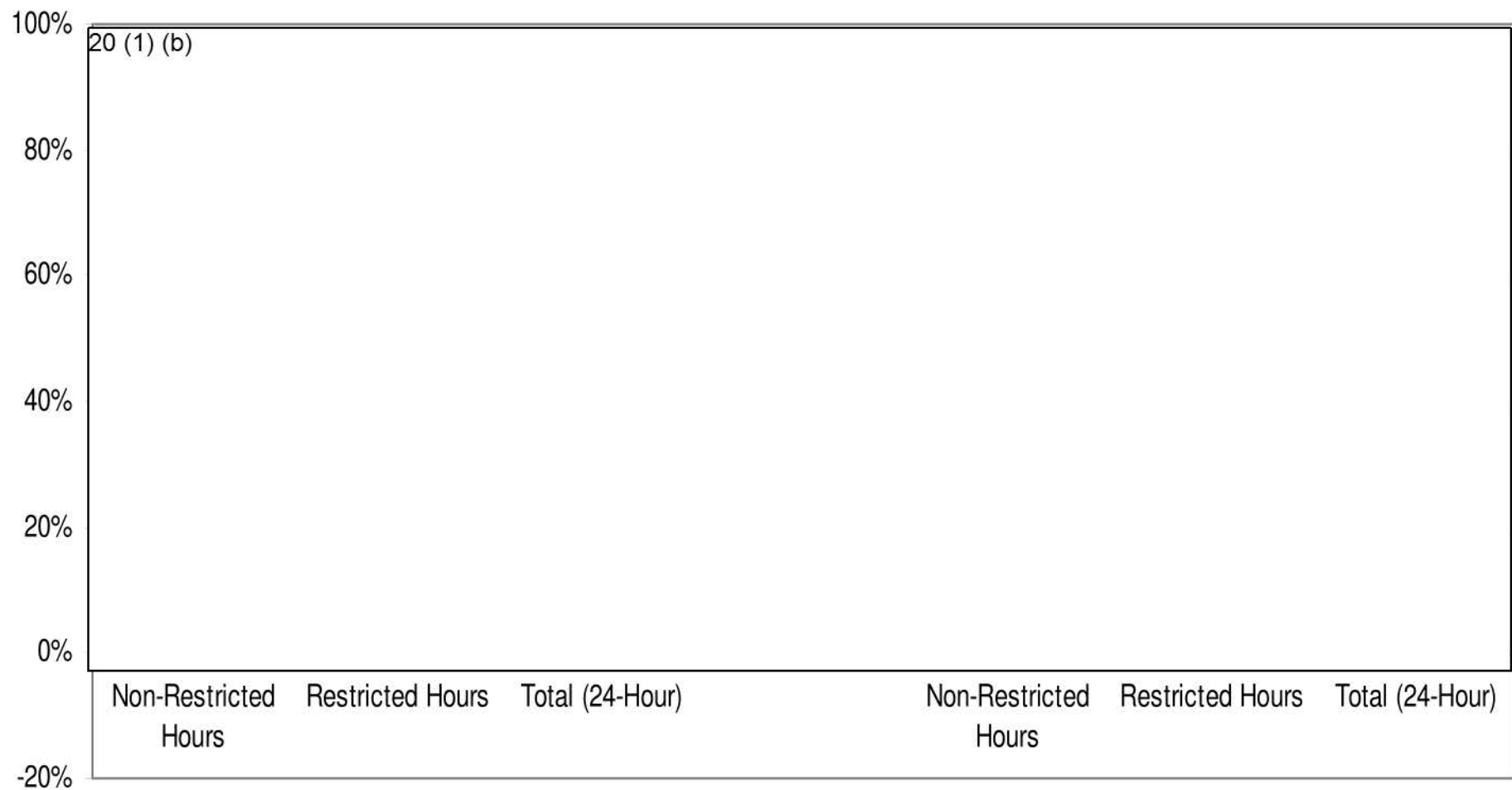
- GTAA has notified Transport Canada that we are reaching nighttime cap
- GTAA submitted a written request with justification
- “Ask”: 20 (1) (b)
- Provides for approx. 20 (1) (b)  
20 (1) (b)

# Long-term Night Flight Budget

- 2011 budget crunch is evidence of a longer-term problem
- Long-term forecasts show 20 (1) (b)  
20 (1) (b)
- Nature of global aviation industry and of Toronto as a region is evolving
- Night time demand is 20 (1) (b)  
20 (1) (b)

# Night growth v. non-restricted and 24 hour growth

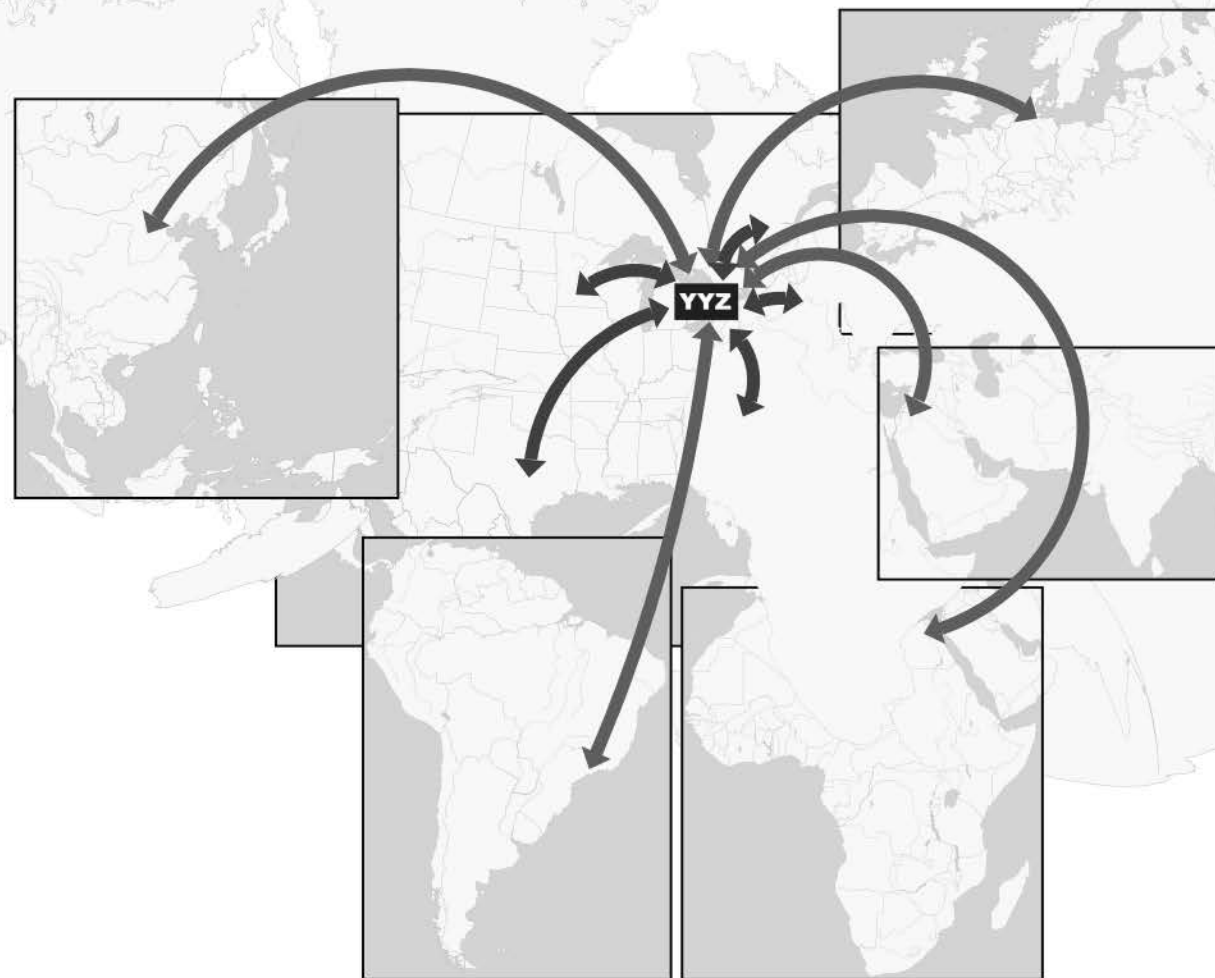
**Traffic Growth at Toronto Pearson (2000-2010)**



# What's Driving Night Demand

- Strength and growth of the Toronto Region
- Strong Origin of Destination Traffic
- Growth in connecting traffic at Toronto Pearson
- Sun destination travel - two roundtrip operations
- Requirement to meet transfer bank timings at airline's overseas hubs
- Aircraft technology converts one-stop to non-stop
- Developments in Alliances/partnerships by our 2 Canadian Airlines

# Night Operations Average Growth Rates: 2011-2025



| Region            | Growth Rate |
|-------------------|-------------|
| YYZ-Asia          | 20 (1) (b)  |
| YYZ-Africa        |             |
| YYZ-Middle East   |             |
| YYZ-Caribbean     |             |
| YYZ-Europe        |             |
| YYZ-South America |             |
| YYZ-U.S.          |             |
| YYZ-Domestic      |             |
| <b>Overall</b>    |             |



# Our Challenge

- [20 (1) (b)]  
[20 (1) (b)] to meet the  
Global Hub demand
- Additional capacity at night is triggered by actual demand if/when demand materializes
- Implementation needs to meet the growing demand in a manner responsible to our neighbours and our guests

To avoid the budget concerns of 2011, and begin to realize the long-term opportunities of our Global Hub Strategy, [20 (1) (b)]

# Next Steps

- Finalize our ask and recommended plan to phase-in
- Community Engagement/Briefings
- Review and reflect feedback
- Submission to Transport Canada

# CENAC Role

- Provide input on our ask and our the community engagement plan (special briefing in early October 2011)
  - Advise on approach, sequencing and community leaders for consultation
- Understand the challenges and change being requested
- Provide insight on community questions and concerns
- Regular briefings during the consultation process
  - Assist in identification of community issues
- Review and advise on final consultation report



# Questions and answers



*For You. The World.*



**Toronto Pearson**  
International Airport | Aéroport International

**From:** [Gillespie, Robert](#)  
**To:** ["Barrett, Lyla"](#)  
**Cc:** [Miller, Brenda \(PAX-TOR\)](#)  
**Subject:** Chapter 2 and Noise Restrictions  
**Date:** Tuesday, June 19, 2018 4:01:19 PM

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Hello Lyla;

I was able to briefly chat with our noise expert from our Headquarters. He confirmed my belief that it would be possible to have an aircraft under the weight limit mentioned in CAR 602.150 but that only met the Chapter 2 noise requirements.

He was not able to name a type of aircraft that would fit into those two requirements either.

Please let me know if there are further questions surrounding this inquiry.

Robert Gillespie

Technical Team Lead - Flight Operations

Transport Canada / Government of Canada

[Robert.Gillespie@tc.gc.ca](mailto:Robert.Gillespie@tc.gc.ca) / Tel: 905-405-3298 / Cel: 647-449-8847 / TTY: 1-888-675-6863

Chef d'équipe technique - Opérations aériennes

Transports Canada / Gouvernement du Canada

[Robert.Gillespie@tc.gc.ca](mailto:Robert.Gillespie@tc.gc.ca) / Tél: 905-405-3298 / Tél cell: 647-449-8847 / ATS: 1-888-675-6863

**From:** [Chum, Amanda](#)  
**To:** [Williams, Duwayne](#); [Basra, Netasha](#); [Dawson, Dave](#); [Reble, David](#); [Apraku, Baffour](#); [Fernandes, Jason](#); [Waljee, Imi](#); [Mawji, Hanif](#); [Frank, Clifford](#); [Quach, Stephanie](#)  
**Cc:** [TC.F ONT PC Group / Groupe PC F.TC](#)  
**Subject:** Debrief: GTAA Consultative Committee Meeting - June 7, 2022  
**Date:** Friday, June 10, 2022 3:32:36 PM  
**Attachments:** [RDIMS-#18666669-v1-DEBRIEF - GTAA CONSULTATIVE COMMITTEE MEETING - JUNE 7 2022.DOC](#)

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UNCLASSIFIED / NON CLASSIFIÉ

Good afternoon,

Please see the attached for the GTAA consultative committee meeting debrief notes from the June 7<sup>th</sup> meeting.

Thank you,

Amanda Chum

Policy Analyst

Coordination & Policy Branch, Ontario Region

Transport Canada / Government of Canada

[amanda.chum@tc.gc.ca](mailto:amanda.chum@tc.gc.ca) / Cell: 647-355-8011

Analyste des politiques

Direction de coordination et conseils en politiques, Région de l'Ontario

Transports Canada / Government du Canada

[amanda.chum@tc.gc.ca](mailto:amanda.chum@tc.gc.ca) / Cell: 647-355-8011

**De-brief – GTAA Consultative Committee meeting – June 7, 2022 (virtual)**

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Participants: GTAA – Lorrie McKee, Michael Mendel, Ingrid Pringle, Greg Owens, Atul Sharma, Eileen Waechter, Fares Khouri

Committee Members:

- Aylin Lusi, Toronto Region Board of Trade representative
- Brad Butt, Trevor MacPherson, Mississauga Board of Trade representatives
- Suzanne Acton-Gervais, National Airlines Council of Canada
- Shane Rayman, City of Toronto resident representative
- Darrell Shipp, City of Mississauga resident representative
- Ivan Battye, Town of Whitby resident representative
- Savik Ramkay, Seneca College
- Steven Tufts, Toronto Airport Workers Council
- John Davidson, Halton Region representative
- Sabbir Saiyed, Peel Region Representative
- Badar Shamim, Brampton Board of Trade representative

Resource Members:

- Walter Garrison, City of Mississauga
- Alessandra Bianchi, Ontario Ministry of Transportation (MTO)
- Daryl Van Moorsel, City of Brampton
- Amanda Chum, Chris Brodtkin, Kieran Lawlor, Transport Canada

**GTAA's asks of Transport Canada / Government of Canada:**Immediately:

- Continue to increase staffing at all government checkpoints; and
- Initiate a process that tactically suspends MRT during low traffic periods during the day, curated and coordinate leadership daily



**De-brief – GTAA Consultative Committee meeting – June 7, 2022 (virtual)**

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By June 30:

- Eliminate vaccine mandate for workers and travellers – simplifying process and allow return of experienced and credentialed workforce
- Return BSO processing time back to pre-pandemic 15-20 seconds per passenger, with the following to aid this process improvement:
  - Eliminate CBSA process that vets all international arriving passengers only to identify 1900 for mandatory random testing and advance IT solutions that select travellers upstream
  - Move testing off site and into the community (including wastewater levels); and
  - Leverage existing opportunities in the Customs Act to leverage e-gate technology – reduce passengers requirement to present a paper receipt to CBSA officer
- Introduce a true Trusted Traveller pilot, like a TSA Pre-Check
- Commit to increase staffing to support globally competitive service levels, including how to manage when CBSA student officers leave in the fall:
  - CATSA: 85% of passengers processed in 15 min or less during all hours of day including peak periods; all connections in 20 min or less.
  - CBSA: 90% of passengers processed in 20 min or less during peak periods.

| Agenda Item                                                                                    | Highlights                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| <b>1. GTAA update</b><br><br>Michael Mendel, Manager, Public Affairs and Stakeholder Relations | <b>Q1 2022 Financials and Passenger Traffic:</b> <ul style="list-style-type: none"> <li>• May 10: GTAA released Q1 results:</li> <li>• Passenger activity increased by 384.5% in Q1 2022 compared to the same period in 2021</li> <li>• Q1 2022 net loss: \$44.6 million</li> <li>• All operating activity continues to be well below pre-pandemic 2019 levels</li> <li>• Due to the impact of COVID-19, government restrictions, ongoing delays in passenger flow at peak travel times due to legacy public health requirements and staffing shortages at government checkpoints, there is limited visibility on travel demand.</li> </ul><br><b>Departure and Arrival Delays, Government Asks:</b> <ul style="list-style-type: none"> <li>• May 30 Press Conference: GTAA Board Chair Doug Allingham, Mississauga Mayor Bonnie Crombie, Mississauga Tourism CEO Victoria Clarke, Mississauga Board of Trade President and CEO Trevor McPherson kicked off National Tourism Week by calling on the federal government to remove mandatory random testing at airports and remove duplicate</li> </ul> |

**De-brief – GTAA Consultative Committee meeting – June 7, 2022 (virtual)**

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|  | <p>health checks and questions at customs.</p> <ul style="list-style-type: none"> <li>• Thanked government to increase agency staffing at Pearson and committed to collaboration with the federal government, but needs more to be done ahead of the summer travel season.</li> <li>• As the second largest employment zone and largest airport in Canada, Pearson plays a critical role in supporting Canada's economic recovery.</li> <li>• Air passengers need to be confident that they will have a smooth and efficient experience.</li> </ul> <p><b>GTAA President and CEO Deborah Flint meets with USCBP reps in Washington</b></p> <ul style="list-style-type: none"> <li>• Ms. Flint travelled to Washington in May to speak with USCBP representatives to ensure that Pearson has the resources and capacity needed to handle increases in passenger demand at their pre-clearance process at Pearson.</li> </ul> <p><b>ECWE Transit Funding in Provincial Budget</b></p> <ul style="list-style-type: none"> <li>• April 28<sup>th</sup>: Government of Ontario announced it will provide \$24.4 million to advance the next phase of study to connect the Eglinton Crosstown West Extension (ECWE) with Pearson.</li> <li>• Proposed airport segment of ECWE would extend the route an additional 4.7km from Renforth Dr. to Pearson.</li> <li>• Pearson will work with all levels of government to ensure that there are better regional transit connections to Pearson to help connect people to jobs, employers to workers and our province's regions. Capital funding is needed, particularly with ECWE, and future airport connections for the Finch West LRT, Kitchener GO corridor and the 407.</li> </ul> <p><b>Ontario's Skills Development Fund</b></p> <ul style="list-style-type: none"> <li>• GTAA will receive over \$1.6 million from Ontario's Ministry of Labour, Training and Skills Development to create Pearson's first ever airport wide job portal called Pearson Works! Online.</li> <li>• Pearson Works! Online will support the recovery, reskilling and upskilling of the Toronto Pearson workforce. The portal will connect more than 400 airport employers and thousands of airport workers with job opportunities, training and supports, while helping one of the hardest hit sectors of Ontario's economy.</li> </ul> <p><b>New airline routes out of Pearson</b></p> <ul style="list-style-type: none"> <li>• April 5: American Airlines began direct service to Boston, operating 3x daily.</li> </ul> |
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**De-brief – GTAA Consultative Committee meeting – June 7, 2022 (virtual)**

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Flair Airlines launched direct flights to JFK Airport in New York, operating twice weekly. Flair also began nonstop service to Nashville on April 14<sup>th</sup>, with two flights per week.</li> </ul> <p><b>Airport IT Partners Collaboration on Airport Projects</b></p> <ul style="list-style-type: none"> <li>In 2021, the GTAA's IT and Airport Development group created an enhanced connections area for Terminal 1 passengers.</li> <li>The new technology includes kiosk and e-gate technology solutions, touchless processing and queue management for connecting international passengers, optimized traffic flow and curbside vehicle congestion at both Terminals and updated critical IT infrastructure.</li> <li>There was also work to deploy security improvements including drone detection and improvements to the baggage system including video encode and new lateral displays to streamline and optimize baggage processes.</li> </ul>                                                                                                                                                                                                                                                                                                                                         |
| <p><u>2.</u> Toronto Pearson Update –<br/>Unlock the Summer:</p> <p>The Challenge with Federal<br/>Agency Resourcing</p> <p>Atul Sharma, Manager,<br/>Government Affairs, Stakeholder<br/>Relations, GTAA</p> <p>Greg Owen, Associate Director,<br/>Government Agency Programs,<br/>GTAA</p> | <p><b>Arrival and Departure</b></p> <ul style="list-style-type: none"> <li>Canadian airline passengers are encountering massive delays at major airports as outdated COVID measures and staffing shortages lead to slow processing for international arrivals and passenger security screening.</li> <li>With summer approaching, there will be more operational gridlock for Canadian travellers, potentially impacting vacation plans and work travel.</li> <li>Outside of addressing staffing issues, Canada needs to adapt to global best practices: removing testing at airports, implement a true trusted traveller program, and increase screening efficacy to reduce reject bags.</li> </ul> <p><b>Operational Impact</b></p> <p><u>CATSA</u></p> <ul style="list-style-type: none"> <li>45-60 min wait times for people waiting to screen through CATSA at peak periods</li> <li>Part of working group with TC to find solutions; additional CATSA staffing in past 3 weeks is having a positive impact</li> </ul> <p><u>CBSA</u></p> <ul style="list-style-type: none"> <li>Until recently, GTAA was able to manage with the process before, but now seeing 35,000 passengers inbound daily, and this will become 45,000 in the summer. The increased CATSA staffing will be overtaken by this increase in summer travel.</li> </ul> |

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- CBSA officer passenger processing time: increased from 15 seconds to 2 min
- Processing times are 2-4 times longer. Once Customs hall reaches capacity limits, airport has to move passengers into arrivals area, once that fills up, hold passengers on planes.
- Believe the cause is due to duplicate questions on health questions asked at check-in for flights, then ArriveCAN, then CBSA officer.
- Government staffing shortages, streamlining processes, and move testing (1900 per day, 35,000 passengers have to be vetted for random testing)
- Testing, health related questions are related to inbound travel
- Every week, about 100,000 passengers representing 50% are being affected by holds and metering.
- Continuing to operate at 50% traffic levels and at certain times during peaks, processing more than 2019 levels

**Actions Underway:***Immediate:*

- GTAA actively engaged/leading HQ-level and Border Processing Working Groups
- Expedited approvals of RAICs
- Process and tech improvements for continuous flow for international arrivals
- Supporting ArriveCan compliance
- Communicating availability of Advanced Declaration

*CATSA:*

- 200 of new 300 screening officers onboard. Expect another 100 officers by end of June, brings CATSA staffing level to February 2020 levels by end of June 2022.
- Additional screening lanes available: Passengers balanced between checkpoints to ensure flow; preparation tables being deployed, more signs to assist passengers

*CBSA:*

- 175 new summer Border Services Officers and recall of full-time officers. Additional officer podiums, Primary Inspection Kiosks (PIK) and 12 new e-gates (T1) added.
- Advanced Declaration on ArriveCan expected on June 28: expect to save 50% of time at both PIK and e-gate

**De-brief – GTAA Consultative Committee meeting – June 7, 2022 (virtual)**

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- Changes to terminals/capacity to process international arriving students and hold passengers in terminal rather than planes
- Ongoing efforts at national and local level to improve 1300 non-compliant ArriveCan as it affects processing times
- Ongoing efforts with CBSA to ensure officers reduce questioning and rely on questions already answered on PIK/e-gate/Nexus

*USCBP*

- USCBP committed throughput time is 45-60 min, but GTAA will continue to advocate for faster times
- Temporary Duty Officers (TDY's) are being added to assist from May to early September
- Significant increase in OT budget to support operations, especially in peaks
- USCBP staffing increasing over summer as permanent officers are repositioned to Toronto

## Advanced Declaration Demo:

Brad Butt, MBOT:

**De-brief – GTAA Consultative Committee meeting – June 7, 2022 (virtual)**

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|                                             | <ul style="list-style-type: none"> <li>• Inquired about media scrum with Minister Alghabra, who suggested that the backlog was because of the scheduling of international flights at the same time</li> <li>• GTAA response: Minister is not necessarily wrong, but airports have the ability to keep certain slots and filed in January 2022 - got 6 months ahead of time. Those flights operated pre-covid and GTAA protected those flights for airlines, but it means in afternoon from 1-9pm, there is very heavy passenger volumes. Very large aircraft coming in - large volumes of passengers, in addition to weather, then pushes the previous load into the next hour. The processing time at CBSA contributes to the delays.</li> </ul> <p><u>Steven Tufts, Toronto Airport Workers Council:</u></p> <ul style="list-style-type: none"> <li>• Labour shortage at the airport was predicted pre-COVID.</li> <li>• Other airport workers are negatively affected when passengers are not screened in a timely manner. CBSA officers are overworked with OT.</li> <li>• Calls on other unions to join GTAA in their call to government for improvements</li> <li>• More security is needed at the airport because of passenger threats towards airport workers due to delays.</li> </ul> <p><u>Savik Ramkay, Seneca College:</u></p> <ul style="list-style-type: none"> <li>• Government needs to take accountability for these delays</li> <li>• GTAA should look at issue of how slots are being designated</li> </ul> <p><u>Suzanne Acton-Gervais, National Airlines Council of Canada:</u></p> <ul style="list-style-type: none"> <li>• Welcome kiosks and additional resources, but continuing public health restrictions is the main issue.</li> <li>• Now, need to look at what is in place and in the view, the public health measures will create bottlenecks. Air travel accounts for less than 1% of covid transmission, and only air industry has these measures. Over 50 countries have dropped public health measures for travel industry.</li> </ul> |
| <p><u>3.</u> Why Pearson Matters Update</p> | <ul style="list-style-type: none"> <li>• GTAA is undertaking a discovery exercise to engage its stakeholders and communities and better understand how Pearson can enhance its value proposition as an economic enabler and community builder.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



**De-brief – GTAA Consultative Committee meeting – June 7, 2022 (virtual)**

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| <p>Eileen Waechter, Director,<br/>Corporate Relations and<br/>Strategic Partnerships, GTAA</p> | <ul style="list-style-type: none"> <li>• This information will help to inform an updated strategy and capital investment plan.</li> </ul> <p><b>Government – Key Insights</b></p> <p><i>Perspectives:</i></p> <ul style="list-style-type: none"> <li>• Recognize economic importance of Pearson and its role as international hub</li> <li>• Understand how transit connections to Pearson supports passenger and goods movement</li> <li>• Acknowledge GTAA's strong relationships with all levels of government</li> </ul> <p><i>Challenges:</i></p> <ul style="list-style-type: none"> <li>• Airport recovery is counted on by the federal government</li> <li>• Governments in Canada contribute significantly less than in other jurisdictions, particularly during COVID-19</li> <li>• Airports often seen by province as a matter of federal jurisdiction</li> </ul> <p><i>Government Priorities:</i></p> <ul style="list-style-type: none"> <li>• Supply chain resilience is top of mind</li> <li>• Eager to see how aviation can be more sustainable and support net-zero commitments</li> </ul> <p><b>Business Stakeholders – Key Insights</b></p> <p><i>Restoring Access and Reliability</i></p> <ul style="list-style-type: none"> <li>• Current experience of travelling through Pearson creates a lack of confidence to do business in Canada</li> <li>• Return of direct passenger flights needed for cost competitive goods movement and supply chain stability</li> <li>• Pearson plays important role in delivering timely healthcare services in Ontario (i.e. Northern Ontario does not have certain lab technologies available in southern Ontario)</li> <li>• Pearson's connectivity to key markets is crucial for business that needs to be conducted face-to-face: "You don't write \$20M cheques to people you have never met."</li> <li>• Pearson supports the pursuit of talent and competitiveness of post-secondary institutions – access to key recruitment markets.</li> <li>• Pearson needs to digitalize the goods movement process and passenger journey.</li> </ul> |
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**De-brief – GTAA Consultative Committee meeting – June 7, 2022 (virtual)**

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|               | <p><i>Leadership, Advocacy and Innovation to Unlock Economic Growth and Build the Airport of the Future</i></p> <ul style="list-style-type: none"> <li>• Expect that Pearson can be a convenor across sectors to champion a bold vision for economic development</li> <li>• Employers in the AEZ and beyond want to collaborate and advocate for transit connectivity and employment growth</li> <li>• Want Pearson to lead on advancing new technologies and sustainability for aviation sector – investments that enable zero-emission aircraft/vehicles, autonomous tech.</li> <li>• As a “first impression” of Ontario and Canada, Pearson can showcase made-in-Canada innovations and technologies to build a positive brand for the region and enhance the airport experience.</li> </ul> <p><u>Online survey closes June 17<sup>th</sup>: identifies community values – <a href="http://www.howwelead.ca/how_we_lead">www.howwelead.ca/how we lead</a></u></p> <ul style="list-style-type: none"> <li>• Eileen will send out a survey to GTAA Consultative Committee for feedback as well.</li> </ul> |
| 4. Roundtable | <p><b>Aylin Lusi (TRBOT)</b></p> <ul style="list-style-type: none"> <li>• Upcoming events: June 23rd: Annual TRBOT luncheon with John Tory</li> <li>• June 24: Release of green ribbon report on sustainability and economic growth</li> <li>• June 28: Summer social - last TRBOT will be hosting in current office before relocating</li> </ul> <p><b>Alessandra Bianchi (MTO) - no updates</b></p> <p><b>Brad Butt (MBOT)</b></p> <ul style="list-style-type: none"> <li>• Mayor Crombie State of the City address today, stated importance of the airport to Mississauga economy</li> </ul> <p><b>Councillor Fonseca (City of Mississauga)</b></p> <ul style="list-style-type: none"> <li>• Need to ensure strong economy for the airport, connecting community with transportation</li> <li>• Municipal election year coming up</li> </ul>                                                                                                                                                                                                                                                              |

**De-brief – GTAA Consultative Committee meeting – June 7, 2022 (virtual)**

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|  | <ul style="list-style-type: none"> <li>Inquired about runway updates: GTAA - Public meeting and elected officials briefing - will give ad hoc noise forum update - late June - should be sending invite out shortly.</li> </ul> <p><b>Ivan Battye (Town of Whitby resident)</b></p> <ul style="list-style-type: none"> <li>Question: Is GTAA is prepared to give southern Ontario a realistic estimate and dates for the possibility for a 6th runway?</li> <li>Michael Mendel, GTAA: No plans for a 6th runway; SOAN is working together as well</li> </ul> <p><b>Sabbir Saiyed (Region of Peel)</b></p> <ul style="list-style-type: none"> <li>Master Plan - will start in Fall, complete by end of 2023</li> <li>Several projects with U of T, York, TMU, McMaster, Smart Freight Centre, Peel Goods Movement Project</li> </ul> <p><b>Suzanne Acton-Gervais (NACC)</b></p> <ul style="list-style-type: none"> <li>NACC eager to work with GTAA and GC for seamless experience for passengers and workers</li> </ul> <p><b>Steven Tufts (TAWC)</b></p> <ul style="list-style-type: none"> <li>Encourage the work together between union members, GTAA, businesses</li> <li>Address labour shortage; appreciate funding for skills portal</li> <li>Labour shortage downfall: Forcing people to work overtime and coming in sick</li> <li>Employers are opening up collective agreement to raise min. wages</li> <li>Stress on workers from irate passengers is concerning</li> </ul> <p><b>Walter Garrison (City of Mississauga)</b></p> <ul style="list-style-type: none"> <li>Hosted Advanced Transportation Manufacturing Summit in May 2022, first event in over 2 years</li> <li>220 decision makers; 10 countries; 250 companies; previously was at Congress Centre, held at International Centre this time; 500 people attended</li> </ul> |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Next meeting:** September 13, 2022

# hp LaserJet 9050mfp series



## Fax Call Report

1

Transport Canada  
416-952-0370  
2010-Apr-07 12:20 PM

| Job  | Date/Time            | Type | Identification | Duration | Pages | Result  |
|------|----------------------|------|----------------|----------|-------|---------|
| 5039 | 2010-Apr-07 12:17 PM | Send | 99058549871    | 1:45     | 2     | Success |



Transport Canada Transports Canada

4900 Yonge Street, 4<sup>th</sup> Floor  
Toronto ON M2N 6A5

UNCLASSIFIED

Your file Votre référence

Our file Notre référence  
P 5151-1-157

7 April 2010

19 (1)

Campbellville, ON 19 (1)

Facsimile Number: 905-854-9871

Dear Ms. 19 (1)

I am writing in response to your two facsimiles to me at Transport Canada, dated today and yesterday (April 6, 2010).

I regret that it appears you did not receive my response to those facsimiles dated 23 February 2010. It was faxed to you but it seems that you did not receive it. I am attaching a copy of that letter.

I cannot answer your question as to the particular reason the specific aircraft in question were not aligned north of your property on their approach to Lester B. Pearson International Airport. As I have mentioned previously, inbound aircraft move through the general area above your residence while being vectored to line up with the approach to the Airport.

Sincerely,

Joseph M. Szwalek  
A/Regional Director Civil Aviation  
Ontario Region  
4900 Yonge St. 4th floor  
Toronto, ON M2N 6A5

Canada

www.tc.gc.ca

RDIMS / SGDDI 5770412 v1



Transport Canada Transports Canada

4900 Yonge Street, 4<sup>th</sup> Floor  
Toronto ON M2N 6A5

UNCLASSIFIED

Your file Votre référence

Our file Notre référence  
P 5151-1-157

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A/Regional Director Civil Aviation  
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RDIMS / SGDDI 5770412 v1



Transport Canada Transports Canada

4900 Yonge Street, 4<sup>th</sup> Floor  
Toronto ON M2N 6A5

UNCLASSIFIED

Your file Votre référence

Our file Notre référence  
P 5151-1-157

23 February 2010

19 (1)

Campbellville, ON 19 (1)

Facsimile Number: 905-854-9871

Dear Ms. 19 (1)

I am writing in response to your three facsimiles to me at Transport Canada, dated January 24 and 30 and February 7, 2010.

I regret that there is very little I can add to previous letters I've written to you, except to say that inbound aircraft that are moving through the area above your residence are being vectored to line up with the approach at Toronto's Lester B. Pearson International Airport. Some of these aircraft can and are routed through airspace that overlies the Kelso Conservations area, however it is unsafe to have too many aircraft within the same portion of airspace. As such, while some of the inbound aircraft can be routed through the airspace directly overlying Kelso Conservation Area, it would be unsafe to route all aircraft into the same space.

As I wrote to you on November 24, 2009, these aircraft are following established flight paths to bring their passengers and airplane to a safe and controlled landing at Pearson. They are not in contravention of the Canadian Aviation Regulations.

Sincerely,

*ORIGINAL SIGNED BY*

Joseph M. Szwalek  
A/Regional Director Civil Aviation  
Ontario Region  
4900 Yonge St. 4th floor  
Toronto, ON M2N 6A5

Canada

www.tc.gc.ca

RDIMS / SGDDI 5604753 v1

FROM : 00000000000000

PHONE NO. : 0

Apr. 07 2010 10:58AM P1

April 7, 2010

FAX TO: 416-952-0165

WITHOUT PREJUDICE

Mr. Joseph M. Szwalek  
A/Regional Director Civil Aviation  
Ontario Region  
4900 Yonge Street  
Toronto, Ont. M2N 6A5

Dear Mr. Szwalek:

It is disappointing that you do not respond to my letters of Jan. 24, 2010, Feb. 1, 2010, Feb. 7, 2010 and April 6, 2010. This morning, Wednesday, April 7, 2010, noisy aircraft awoke us abruptly at 1:55 a.m. Needless to say we had another sleepless night. Now at midmorning, being exhausted, sleepy and not able to concentrate, time sensitive work is not being completed.

At the above time, no aircraft was observed flying over the flight path north of our house. A flight path which can and is used sometimes. This flight path would be in line with the industrial section of Milton going toward the airport.

I am asking you why this northerly flight path was not used at the above time. What safety and/or security issues existed at the above mentioned time that necessitated the aircraft to fly over our home.

A faxed response to my questions would be appreciated. (fax. no. 19 (1)).

Yours truly

19 (1)

Cc: M.P Lisa Raitt 905-693-0704

FROM : 000000000000

PHONE NO. : 0

Apr. 06 2010 01:23PM P1

April 6, 2010

FAX TO: 416-952-0165

WITHOUT PREJUDICE

Mr. Joseph M. Szwalek  
A/Regional Director Civil Aviation  
Ontario Region  
4900 Yonge Street  
Toronto, Ont. M2N 6A5

Dear Mr. Szwalek:

It was disappointing that you did not respond to my letters of Jan. 24, 2010, Feb. 1, 2010 and Feb. 7, 2010. This morning, Tuesday, April 6, 2010, noisy aircraft awoke us abruptly at 5:30 a.m. This was followed by a noisy airplane at 5:33 a.m. Then again at 6:11 a.m. and 6:25 a.m. the airplane was so loud that it drowned out the radio. Here it is 1:12 p.m. on April 6, 2010 and I am unable to concentrate and complete work, as a result of the airplane noise.

At the above times, no aircraft were observed flying over the flight path north of our house. A flight path which can and is used sometimes. This flight path would be in line with the industrial section of Milton going toward the airport.

I am asking you why this northerly flight path was not used on the above times. What safety and/or security issues existed at the above mentioned times?

A faxed response to my questions would be appreciated. (fax. no. 19 (1)).

Yours truly,

19 (1)

Cc: M.P Lisa Raitt 905-693-0704





Transport Canada  
Ontario Region

Transports Canada  
Région de l'Ontario

Regional Director General

Directeur général régional

4900 Yonge Street  
Suite 300  
North York, Ontario  
M2N 6A5

December 10, 1997

Mr. Louis Turpen  
President and Chief Executive Officer  
Greater Toronto Airports Authority  
Lester B. Pearson International Airport  
P.O. Box 6031  
Toronto AMF, Ontario  
L5P 1B2

*Via Facsimile: (905) 676-3339*

Dear Mr. Turpen: *Loe*

**Re: Noise Mitigation Procedures - Toronto Lester B. Pearson International Airport**

As you know, the National Airports Policy, announced in 1994, established a clear framework for the federal government's role at Canadian airports by shifting from a role of operator and regulator to that of landlord and regulator.

The transfer of Lester B. Pearson International Airport (LBPIA) to the Greater Toronto Airports Authority (GTAA) on December 2, 1996, has enhanced the viability and competitiveness of the airport by allowing it to operate in a more commercial and cost-efficient manner. Like all other airports operating in the National Airports System (NAS), the GTAA must balance the economic benefits of both the users and the community at large with the views of the local community when making decisions with respect to airport operations.

As required by Sections 8.11 and 8.12 of the Ground Lease the Greater Toronto Airports Authority (GTAA) must adopt the same Noise Mitigation Procedures for Lester B. Pearson International Airport (LBPIA), as practised by Transport Canada immediately prior to transfer. The procedures are as follows:

**General**

Noise Operating Restrictions and Noise Abatement Procedures apply, at Lester B. Pearson International Airport, to all aircraft operators. These procedures are described in the Canada Air Pilot and Canada Flight Supplement.

.... /2

Canada



CANADA'S YEAR OF  
ASIA PACIFIC 1997  
L'ANNÉE CANADIENNE  
DE L'ASIE-PACIFIQUE

- 2 -

As the previous airport operator, Transport Canada, exercised this authority and permitted extensions for aircraft operations outside of the published restrictions, for unforeseen circumstances such as weather, Air Traffic Control delays, mechanical difficulties and exemptions for operational reasons where newer generation quieter aircraft were used. Included in these exemptions, for operational reasons, were some night time trials.

While the GTAA does not have the authority to change the Noise Operating Restrictions as published without Transport Canada approval, they do have the authority to grant extensions and exemptions on the same basis as practised by Transport Canada prior to transfer.

Accordingly, the GTAA as the airport operator may authorize extensions and exemptions in the same manner, and subject to, the same and following conditions:

#### **Extensions**

The aircraft operator must submit a request with justification to the Airport Operations Duty Manager not more than 24 hours in advance of the proposed operation.

The GTAA may approve extensions for delays caused by weather, mechanical, security, ATC problems or other unforeseen circumstances of a like nature.

#### **Exemptions**

The Director of Operations, GTAA may grant an exemption for ICAO Annex 16, Vol. 1 Chapter 3 aircraft in response to a written request from an air operator if the granting of the exemption will not derogate from passenger or aircraft safety and provides circumstances that are in the best interests of the public at large by contributing to the overall economic benefit or development of the surrounding communities.

As in the past with Transport Canada, the number of night flight operations would normally fluctuate due to passenger and traffic increases.

However, the granting of exemptions must not cause the total number of all flights within the restricted hours, within the calendar year, in relation to the year for which the exemption is sought, to exceed the base calendar year of 1996 [20 (1) operations), plus an

20 (1) (b)

20 (1) (b)

passenger movements). (The base year 1996 is the last year Transport Canada operated the airport.)

The GTAA shall maintain records of all exemptions granted and shall make an annual report to the Noise Management Committee within the first quarter of the following year.

.... /3

- 3 -

Should the GTAA in the course of a calendar year wish to grant exemptions in excess of the permitted number, the GTAA shall request Transport Canada to approve the increased number of flights for that calendar year. Transport Canada may in their sole discretion, grant or refuse the increase.

**Noise Operating Restrictions**

To support a recommendation for a change to the Noise Operating Restrictions, the GTAA may conclude it desirable to conduct tests for information gathering. Should these tests exceed the permitted number of annual flights, the GTAA shall seek the prior written approval of Transport Canada.

I request that you acknowledge that this clarifies the Noise Mitigation Procedures for LBPIA.

Yours truly,



Terry Gibson  
Regional Director General  
Ontario Region

19 (1)

Louis Turpen

19  
(1)

Date

12/11/97

**From:** [Frank, Clifford](#)  
**To:** [Jordan, Robbi](#)  
**Subject:** EMAIL DATED SEPTEMBER 18, 2008 FROM [19 (1)] RE NOISE COMPLAINT NIGHTTIME NOISE FROM TORONTO/LESTER B. PEARSON INTL AIRPORT  
**Date:** Tuesday, September 23, 2008 10:06:07 AM  
**Attachments:** RDIMS-4396070.MSG.DRF

---

Hi Robbi.

As discussed, attached is a noise complaint for response.

Thanks,

***Clifford Frank Jr.***

Acting Regional Manager Aerodromes and Air Navigation/

Gestionnaire régional intérimaire Aérodrômes et Navigation aérienne

416-952-0248 | facsimile/télécopieur 416-952-0050 | TTY/ATS 613-990-4500

[frankc@tc.gc.ca](mailto:frankc@tc.gc.ca)

Transport Canada | 300-4900 Yonge St, (PAD), Toronto, Ontario M2N 6A5

Transports Canada | 300-4900 rue Yonge, (PAD), Toronto (Ontario) M2N 6A5

Government of Canada | Gouvernement du Canada

**From:** [19 (1)]  
**Sent:** Thu, 18 Sep 2008 08:14:52 -0700 (PDT)  
**To:** Frank, Clifford  
**Cc:** Wrzesnewskyj@parl.gc.ca; councillor\_ford@toronto.ca;  
 [19 (1)]@toronto.ca  
**Subject:** Nighttime Noise from Pearson Airport

Dear Mr. Frank:

I live approximately [19 (1)] of Lester B. Pearson airport and find that the noise associated with night time operations (particularly departures) is becoming unbearable. My sleep is disturbed at least several times a week. The main reason for this is that the GTAA is not respecting the preferential runway assignments during restricted hours. As you are aware, runway 23 is the first priority for departures. The GTAA regularly uses 33R/L which results in extremely loud rollback noise. In addition, runway 15L is sometimes used even though it is not even in the preferential runway assignment. Only rarely are these uses justified by weather or construction considerations.

Having lived in the same location for [19 (1)] can tell you that noise has not been a major issue until the past 4 years or so. Notwithstanding the excessive use of runway 33L (that is another issue), it is no exaggeration to say that the noise during the restricted hours is worse than it is during the day. Part of this is due to the GTAA's overzealous drive to sign up cargo carriers which operate in the middle of the night. The fact that these "hush kitted" planes are "Chapter 3 compliant" does not alter the fact that they are the noisiest of planes departing day or night. All of the regulations regarding preferential runways, noise level certifications and night flight budgets are ineffectual when one is regularly woken up in the middle of the night.

Filing a complaint with the Noise Management Office has absolutely no effect; the situation only continues to worsen. The GTAA is in violation of Transport Canadas Ground Lease which requires it to deal with any noise complaint. It is not sufficient to merely make note of and compile statistics on complaints. Furthermore, in dealing with the NMO I have found that I am often given false information regarding runway operations (e.g. being told that runways were switched due to wind, when in fact wind conditions were calm).

The GTAA only pays lip service to the noise concerns of the surrounding community and their actions speak louder than words. Despite all of the complaints regarding night time cargo flights, the GTAA has allowed Fedex to increase the number of operations with the same noisy B727s on the basis of Fedex's exemplary performance. As there is no penalty for disturbing the surrounding community and an economic incentive for adding more flights, it is no surprise that community interests are sacrificed.

Appealing to the NMC/CENAC is equally futile. In addition to having no power over GTAA decisions, their role of being an advocate for the community can also be called into question. When I attended a meeting several years ago to complain about the noise, one member implied that perhaps I should get new windows. One other attendee with a complaint, was told that "a plane is no louder than a vacuum cleaner". Despite there only being two community members in attendance, we were told to limit our comments to 5 minutes apiece; hardly a forum for soliciting input from the public.

The system as it is structured does not work for the community. I have found that all supposed avenues of appeal wind up in dead ends. It is apparent that the GTAA is given free reign to do as it pleases with very little regulation or oversight. It cannot even comply with existing regulations. That is why I am informing you of the issues surrounding the violation of preferential runway assignments. I hope you can take the time to investigate and emphasize to the GTAA that they do in fact have some obligations towards the community. I appreciate your taking the time to read this message and hope to hear from you.

Regards,

19 (1)

Toronto, Ont

19 (1)

**From:** Quach, Stephanie  
**To:** Waljee, Imi  
**Subject:** FOR DIRECT REPLY: Ministerial XAO-2022-511045- Gail Gwozdz-Bombardier GTAA noise abuse issue  
**Date:** Wednesday, May 25, 2022 8:50:00 AM  
**Attachments:** RDIMS-#18613460-v1-DRAFT RESPONSE 511045.DOCX

---

Good morning Imi,  
Please find the attached draft for your direct reply.  
Once sent, please provide me with the RDIMS number and I will attach it to the CCM record.  
Thank you,  
**Stephanie Quach**

A/Regional Manager, Issues Management  
Transport Canada / Government of Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tel.: 647-394-5485/ TTY: 1-888-675-6863  
A/Gestionnaire régional, Gestion d'enjeux  
Transports Canada / Gouvernement du Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tél.: 647-394-5485/ ATS : 1-888-675-6863

---

**From:** 19 (1)  
**Sent:** Monday, March 21, 2022 2:57 PM  
**To:** Minister of Transport / Ministre des Transports (TC) &ltTC.MinisterofTransport-MinistredesTransports.TC@tc.gc.ca>  
**Subject:** Bombardier GTAA noise abuse issue  
XAO-2022-511045

To whom it may concern,

The continuation of abuse by Bombardier and the GTAA to the residents of East Brampton is the reason for this email. While I do understand sometimes exceptions to existing rules must be made, the ongoing excessive noise for the "safety" of airplanes because of a private company doing construction does not justify the ongoing abuse of the residents of Brampton.

Last year, the L6T and all north area postal codes in Brampton spent two weeks inundated with flights overhead every 3 minutes day and night. All for a for profit company to "move construction equipment" thru the airport. In fact this is very similar to a truck convoy blowing airhorns nonstop, something you may be familiar with.

The north south runway is restricted to "safety" use and as backup for airport repairs. Usually the GTAA advises residents to expect noise abuse and for what period of time. As a resident for over 19 (1)

19 (1) this has happened and while annoying it is understandable. Last year, the GTAA didn't bother to advise residents about a large airport maintenance job and then following that provided Bombardier with access to the airport that required using our north/south runway "for safety" as the equipment moving would interfere with other runway operations. Traditionally "safety" issues at the airport are weather related, storms or wind. I do not consider a for profit company moving a "safety" issue

For the last three weeks and for two more weeks the GTAA and Bombardier have decided that using the north/south runway from 10pm until 5am for a crane to operate (to prevent causing "safety" issues to planes) would be preferable, noise wise, than an increase of flights during daytime hours. Not a very logical argument but I guess an excuse of some kind had to be formulated.

Of course, as soon as this intrusion is over another 6 month airport repair begins meaning another summer of planes flying overhead on a regular basis. At least the GTAA managed to advise residents



about this noise abuse with a robocall and on the webtrak portion of the noise complaint website. Bombardier's bombarding residents with noise pollution was not transparent, in fact it was hidden in the bowels of the GTAA website and uses "technical" language a laymen cannot understand. This is unacceptable to the residents of Brampton.

I am writing to try to get some measure of control back for my living situation. Our houses are not designed to withstand the kind of noise these jets cause especially on takeoff and the nights are the WORST time to abuse people. The GTAA has never been a "perfect" neighbour but we have live beside each other for <sup>19 (1)</sup> without me having to write and complain to anyone else. As a resident it is not my responsibility to search thru a website to find the reason why my sleep is being disrupted nightly for hours on end every three minutes for what will be months at a time. Nor should this happen on such a regular basis and for such a long period of time in order to accommodate a private for profit company. Its actually cruel.

Thank you for your time,

<sup>19 (1)</sup>

Brampton

Sent from [Mail](#) for Windows



Transport  
Canada

Transports  
Canada

4900 Yonge St. 4<sup>th</sup> Floor  
Toronto ON M2N 6A5

Your file    Votre référence

Our file    Notre référence

RDIMS Number    Numéro de SGDDI

May 25, 2022

19 (1)

Dear 19 (1)

I am writing in response to your email of March 21, 2022, to the Honourable Omar Alghabra, Minister of Transport, regarding noise issues pertaining to the Greater Toronto Airport Authority (GTAA). I apologize for the delay in replying.

Transport Canada's focus is on the safety and security of the civil aviation system, which we regulate through the *Aeronautics Act* and the Canadian Aviation Regulations.

While the department is the safety regulator for aviation in Canada, airport operators play a key role in managing noise in the vicinity of airports. The department provides a regulatory framework to assist airports in managing noise through the implementation of noise abatement procedures and operating restrictions that are regulatory in nature and specific to each airport. For more information on the noise abatement procedures in place at Toronto Pearson International Airport, you may wish to visit [Airport Noise Abatement Procedures | Pearson Airport \(torontopearson.com\)](#).

It is important to note that noise management is a complicated and often difficult issue faced by airport authorities and communities throughout the country. It is an issue that must be managed while ensuring that aviation safety is not compromised. Transport Canada's experience has shown that noise issues are most effectively addressed at the local community level. Therefore, we recommend you contact the airport operator directly.

Although you have used online resources, such as the WebTrak tool and the GTAA's website, I encourage direct dialogue with the airport operator, given that they may be able to provide a much more comprehensive response regarding the different levels of noise and traffic around facilities under their control. For more information on contacting the airport operator, please visit: <https://www.torontopearson.com/en/community/noise->

Canada

[www.tc.gc.ca](http://www.tc.gc.ca)

03-0418 (1307-02)

management/noise-management-program/noise-management-office/noise-complaint.  
Alternatively, they can be reached by phone at 416-247-7682.

I trust my response will be of interest.

Sincerely,

Imtiazali (Imi) Waljee  
Regional Director  
Civil Aviation, Ontario Region

**From:** [ONT Civil Aviation Issues / Enjeux Aviation Civile ONT \(TC/TC\)](#)  
**To:** [Quach, Stephanie \(TC/TC\)](#)  
**Subject:** FOR DISPATCH APPROVAL 19 (1)  
**Date:** Tuesday, August 26, 2025 8:00:00 PM

---

Hi Stephanie,

Standard Response - Aircraft Noise - GTAA - Approved template. Complaint at end of thread.

---

## RESPONSE

Good day, 19 (1)

Thank you for contacting Transport Canada (TC).

TC is responsible for developing and overseeing the transportation policies, programs, and goals set by the Government of Canada to ensure the national transportation system is safe, efficient, and accessible to all its users. The Transport Canada Civil Aviation mission is to develop and administer policies and regulations for the safest civil aviation system for Canada and Canadians with a vision of an integrated and progressive civil aviation system that promotes a proactive safety culture.

As the safety regulator for the transportation system in Canada, the department exercises its authority through the *Aeronautics Act* and the [Canadian Aviation Regulations \(CARs\)](#).

The CARs state that, except when taking off or landing, aircraft may not be operated over a built-up area at an altitude lower than 1,000 feet above the highest obstacle within a horizontal distance of 2,000 feet from the aircraft (or 500 feet for helicopters). When not operating over a built-up area, aircraft must maintain a minimum distance of 500 feet from any person, vessel, vehicle, or structure.

One of the tools to assist airports includes a process through which airport operators develop noise abatement procedures and operating restrictions by consulting aviation stakeholders and local communities. We advise that noise abatement procedures for the Toronto Pearson International Airport are in place, in addition to the Night Flight Restriction Program (known as the night flight budget). This program limits the number of movements during the restricted hours of 12:30 am to 6:29 am, aimed at reducing nighttime noise while balancing the growing regional demand.

Unfortunately, noise management is a complicated and often difficult issue faced by airport

authorities and communities around the country. It is an issue that must be managed while ensuring that aviation safety is not compromised. TC's experience has shown that noise issues are most effectively addressed at the local community level.

As TC is not involved in the daily operations at Toronto Pearson International Airport, the department encourages constructive dialogue directly with the airport operator, which is responsible for managing noise concerns. Their contact information is as follows:

The Greater Toronto Airports Authority (GTAA) may be contacted at the following:

Phone: 416-247-7682

Website: [Noise Management Program | Pearson Airport \(torontopearson.com\)](#)

Of course, if at any time you do suspect that a pilot is operating an aircraft in an unsafe manner and in contravention of the CARs, I encourage you to take down as much information as possible (for example: photos or videos, date, time, registration number, color of aircraft, other identifying marks) and to report your concerns to the [Ontario Region Issues Management](#) inbox.

Regards,

---

**From:** Popowich, Stephen <stephen.popowich@tc.gc.ca>

**Sent:** Wednesday, August 13, 2025 3:03 PM

**To:** ONT Civil Aviation Issues / Enjeux Aviation Civile ONT (TC/TC) <TC.ONTCivAvIssues-EnjeuxAvCivONT.TC@tc.gc.ca>

**Cc:** Jones, Tara (TC/TC) <tara.jones@tc.gc.ca>; Quach, Stephanie (TC/TC) <Stephanie.Quach@tc.gc.ca>

**Subject:** Low flying aircraft - 19 (1)

UNCLASSIFIED / NON CLASSIFIÉ

Good afternoon,

Name: 19 (1)

Contact info: 19 (1)

Date and time of occurrence: all day everyday

Location of Aircraft: 19 (1) Etobicoke, On

Registration number:

Colour/identifying marks:

Any other info: Complaining that the constant air traffic is noisy. (lives near the airport, moved in in

19 (1)

Thank you,

**Steve Popowich**

Operational Support

Transport Canada / Government of Canada

[stephen.popowich@tc.gc.ca](mailto:stephen.popowich@tc.gc.ca)

Soutien des opérations

Transports Canada / Gouvernement du Canada

[stephen.popowich@tc.gc.ca](mailto:stephen.popowich@tc.gc.ca)

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*<http://www.canada.ca/payments-air>.*

**From:** Quach, Stephanie  
**To:** Waljee, Imi (he/him / il/lui) (TC/TC); Mawji, Hanif; Pollock, Mary; Chum, Amanda (TC/TC)  
**Subject:** For Info: Ministerial- Letter from GTAA to Health Canada  
**Date:** Tuesday, October 25, 2022 2:12:00 PM  
**Attachments:** Health Canada letter.pdf

---

Good afternoon,

Sharing the attached letter sent to the Minister from the GTAA to Health Canada for awareness. The GTAA is requesting for Health Canada to update their 2010 health publication of Aircraft Noise in the Vicinity of Airports due to increasing concerns for communities around Pearson, and the requests for updated Canadian research.

Regards,

**Stephanie Quach**

A/Regional Manager, Issues Management  
 Transport Canada / Government of Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tel.: 647-394-5485/ TTY: 1-888-675-6863

A/Gestionnaire régional, Gestion d'enjeux  
 Transports Canada / Gouvernement du Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tél.: 647-394-5485/ ATS : 1-888-675-6863

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**From:** Alghabra, Omar - M.P.  
**Sent:** Thursday, October 20, 2022 4:53 PM  
**To:** Minister of Transport / Ministre des Transports (TC)  
**Subject:** Fw: Health Canada letter  
 XAO-2022-520953

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**From:** Connelly, Robyn [19 (1)] <[redacted]@gtaa.com>  
**Sent:** Thursday, October 20, 2022 4:22 PM  
**To:** 'tim.singer@sc-sc.gc.ca' <[tim.singer@sc-sc.gc.ca](mailto:tim.singer@sc-sc.gc.ca)>; Alghabra, Omar - M.P.  
 <[Omar.Alghabra@parl.gc.ca](mailto:Omar.Alghabra@parl.gc.ca)>  
**Subject:** Health Canada letter

Hello Mr. Singer,

My name is Robyn Connelly and I'm the Director of Sustainability and Social Impact for the Greater Toronto Airports Authority (GTAA). Please see the attached letter regarding continued concerns by residents affected by Toronto Pearson operations for updated, Canadian research on the health impacts of aircraft noise.

Please let me know if you have any questions or would like to discuss further.

Regards,

**Robyn Connelly** (she/her/hers)

Director, Sustainability and Social Impact  
 Stakeholder Relations & Communications

(W) [19 (1)] | (C) [19 (1)]





October 18, 2022

Tim Singer  
Director General,  
Environmental and Radiation Health Sciences  
70 Columbine Dr. Way  
Ottawa, ON  
K1A 0K9

**Greater Toronto  
Airports Authority**  
P.O. Box 6031  
3111 Conair Drive  
Toronto ON M9W 6Z9  
Canada L5P 1B2

P 416.776.3000  
F 416.776.7746

GTAA.com

Dear Mr. Singer:

My name is Robyn Connelly and I'm the Director of Sustainability and Social Impact for the Greater Toronto Airports Authority (GTAA). In my role, I co-chair the Noise Management Forums - a series of working groups facilitating effective collaboration between Toronto Pearson and the community on noise management issues. Stakeholders include elected officials, community leaders and members of the public. It is in this capacity that I am writing to you.

I wrote to Health Canada on September 21 2017 requesting that the agency, in its capacity of providing advice to the public and regulatory authorities such as Transport Canada, update the 2010 study: *Aircraft Noise in the Vicinity of Airports*. In your October 13, 2017 response you indicated that "while there are no immediate plans to update the 2010 publication, Health Canada scientists will continue to monitor the scientific literature on noise and health, and contribute to the development of relevant international standards, such as those produced by the American National Standard Institute." I responded to your letter on September 28, 2018 with a request for discussion on relevant scientific research supported by Health Canada.

I am now writing to you again on this matter as it continues to be of concern for communities surrounding Toronto Pearson.

Although there have been health studies conducted in other areas of the world, residents affected by Toronto Pearson operations continue to call for updated, Canadian research.

The need for updated Canadian guidelines regarding the health impacts of aircraft noise was also reflected in the 2019 Transportation Committee's report to the Transport Minister Assessing the Impact of Aircraft Noise in the Vicinity of Major Canadian Airports recommendations 9 and 12a.



**Toronto  
Pearson**  
International Airport  
Aéroport International

torontopearson.com

October 18, 2022

Page 2 of 2



### **Recommendation 9 – World Health Organization Standards**

That Transport Canada assess how noise exposure forecasts are conducted and consider implementing and complying with the World Health Organization standard on noise around large Canadian airports.

### **Recommendation 12 — Cooperation with Municipal, Provincial and Territorial Health Authorities**

That the Government of Canada work in cooperation with municipal, provincial and territorial health authorities to:

- a. support research to better understand the impact of aircraft noise-related annoyance on human health, including location-specific epidemiological studies as well as examining mitigation measures for individuals who are sensitive to noise disturbances;

The Minister's response to these recommendations included the following statement:

Transport Canada and Health Canada are considering the path forward on updating government guidance. This could include different levels of government.

The human health impacts of aircraft noise are a growing concern of community members affected by Toronto Pearson operations. For major Canadian airports such as Toronto Pearson to meet the growing demand for travel and cargo, while protecting the health and well-being of local community members, we need to rely on studies and recommendations specific to the Canadian environment.

I therefore once again call upon Health Canada to update its 2010 study and provide guidelines to airports so Canadian citizens and airports can understand and work together to address and mitigate any potential existing or future human health effects related to aircraft noise.

Thank you,

19 (1)

Robyn Connelly  
Director, Sustainability and Social Impact

Cc: The Honourable Omar Alghabra, Minister of Transport  
Karen Mazurkewich, GTAA Vice President Stakeholder Relations and Communications  
Lorrie McKee, GTAA Director Public Affairs and Stakeholder Relations  
Members of the Toronto Pearson Neighbourhood Table  
Members of the Toronto Pearson Noise Accountability Board

**From:** [Quach, Stephanie](#)  
**To:** [Waljee, Imi](#)  
**Subject:** FOR REVIEW: Toronto Pearson Air Traffic Return & Airside Maintenance- XAN-2021-503987  
**Date:** Tuesday, August 03, 2021 4:08:00 PM

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Good Afternoon Imi,

We received the below ministerial from the GTAA which is an informative piece regarding the anticipated return to travel and noise management, along with an update on construction/runway maintenance work at Toronto Pearson.

The GTAA mentions a new tool they are launching called InsightFull, which allows residents to seek more information about their home in relation to aircraft movements. They also mention additional ways for the community to learn more about their operations and provided a list of resources. The construction taking place is on Bombardier's Global Manufacturing Centre and the runway maintenance work will occur in October, resulting in a closure of 5 days on that particular runway.

I wanted to forward this over to you as an FYI and to double check if any further action on this would be required, or if I'm able to route it back to RDGO for it to be closed out?

Thank you,

**Stephanie Quach**

Issues Management Officer, Civil Aviation  
 Transport Canada / Government of Canada  
[Stephanie.quach@tc.gc.ca](mailto:Stephanie.quach@tc.gc.ca) / Tel: (647)-394-5485 / TTY: 1-888-675-6863

Agent, Gestion d'enjeux, Aviation civile  
 Transports Canada / Gouvernement du Canada  
[Stephanie.quach@tc.gc.ca](mailto:Stephanie.quach@tc.gc.ca) / Tél: (647)-394-5485 / ATS: 1-888-675-6863

---

**From:** GTAA Public Affairs <[Public.affairs@gtaa.com](mailto:Public.affairs@gtaa.com)>  
**Sent:** Wednesday, July 28, 2021 3:44 PM  
**To:** Alghabra, Omar - M.P. <[Omar.Alghabra@parl.gc.ca](mailto:Omar.Alghabra@parl.gc.ca)>  
**Cc:** [michael.mendel@gtaa.com](mailto:michael.mendel@gtaa.com) <[michael.mendel@gtaa.com](mailto:michael.mendel@gtaa.com)>; [atul.sharma@gtaa.com](mailto:atul.sharma@gtaa.com) <[atul.sharma@gtaa.com](mailto:atul.sharma@gtaa.com)>

**Subject:** Toronto Pearson Air Traffic Return & Airside Maintenance

Hello Minister Alghabra,

With August on the horizon and with the recent launch of Toronto Pearson's "[When You're Ready](#)" program, we thought it would be helpful to update you about the anticipated return to air travel and construction/runway maintenance work at Toronto Pearson.

#### **Return to travel**

As government restrictions on air travel are eased in a measured and health-focused way, Canadians are beginning to think about air travel again. While air traffic volumes won't hit pre-pandemic levels for some time, we anticipate that communities around the airport will begin to experience an increase in aircraft noise, given that air traffic has been at levels not seen since 1970 due to the pandemic. This aircraft noise isn't "new noise," however, communities may experience it that way.

We understand that airport operations have an impact on the surrounding communities, and we

work closely with our industry partners to make sure that noise management remains a central part of the conversation as the airport recovers from the impacts of COVID-19.

Just as we work hard to give our passengers the information they need to travel confidently, we want to ensure that you have the resources you need to better understand the impacts that a measured return to air travel may have on your community. There are several ways for your residents to learn about operations overhead, notably a new tool called InsightFull, which puts more details in the hands of residents who are seeking information about their home in relation to aircraft movements. Toronto Pearson was the first airport in North America to launch InsightFull and we'd be happy to host a virtual introduction for you or your constituents:

- Visit InsightFull, our interactive tool to help residents access information specific to their location: <https://airportnoise.torontopearson.com/>

Other ways for your residents to learn about our operations:

- Connect with Toronto Pearson's Noise Management Office at 416-247-7682
- Submit a noise complaint or operational question at: <https://www.torontopearson.com/en/community/noise-management/noise-management-program/noise-management-office/noise-complaint>
- Attend the Pearson Public Meeting to learn more about airport operations, hear about noise management efforts, and provide feedback to industry partners
- Invite a representative from the Noise Management Office to attend a community meeting or conduct on tutorial on operations and how to maximize our interactive tools by emailing [community.engagement@gtaa.com](mailto:community.engagement@gtaa.com)

As Canada's largest airport, we're proud of the essential role that Toronto Pearson has played during the pandemic to repatriate Canadians and keep critical goods like food, medical equipment and vaccines moving. We look forward to welcoming passengers back to Toronto Pearson: When you're ready to travel, we're here to help you do it safely.

### **Construction on Bombardier's Global Manufacturing Centre**

Construction of Bombardier's Global Manufacturing Centre continues at Toronto Pearson. The new facility is expected to create roughly 3,000 jobs and help to rebuild the Airport Employment Zone, which pre-COVID contained the second-largest concentration of jobs in Canada.

This work has been ongoing since March 2021 with generally low impact and we've been sharing regular public updates, particularly through our Noise Advisory page. The construction work requires the closure of Runway 05/23. Effective August 1, 2021, the work will move to the nighttime period to accommodate increasing traffic levels during daytime operations and to minimize community impacts. This means that Runway 05/23 is not available during the nighttime period. This may result in greater use of the south end East/West runways as well as the East/West maintenance preferential runways during the overnight period. This phase of the project is expected to be completed by the end of November 2021.

### **Runway Maintenance Work – October 2021**

At Toronto Pearson, safety is our top priority. Runway maintenance activities required to ensure continued safe airport operations will begin in mid-September and are expected to last until mid-October. The activities primarily consist of adjusting the Runway 23 threshold.

The GTAA has worked closely with its many partners to develop a plan where the majority of

the work will take place in the overnight period when Runway 05/23 is already closed due to the construction of the Bombardier facility. However, there will be still be a need for a daytime closure of just five days. North-South runway operations are anticipated for the duration of this five-day daytime closure in early October, which will impact communities to the North and South of Toronto Pearson.

The GTAA regularly posts Noise Advisories to keep residents updated on airside work and how that may change operations, including the projects mentioned above. You can find the Noise Advisories, [here](#).

Don't hesitate to respond to this email with any questions. A further update for elected officials and staff will take place on Sept 21 as part of the GTAA's regularly scheduled [Noise Forums](#).

Best Regards,

**GTAA Public Affairs Team**

Greater Toronto Airports Authority

Public Affairs and Stakeholder Relations

[public.affairs@gtaa.com](mailto:public.affairs@gtaa.com)

[www.torontopearson.com](http://www.torontopearson.com)

**From:** [Quach, Stephanie \(TC/TC\)](#)  
**To:** [Cavuto-Carter, Lisa \(she/her | elle/la\) \(TC/TC\)](#)  
**Subject:** For Review/Input: MPQ - Response on Pearson Night Flights (13637)  
**Date:** Tuesday, March 18, 2025 8:56:00 AM  
**Attachments:** [image001.gif](#)  
[FW Aviation Enforcement Standards DN Stats - O3.msg](#)  
[MinO Outreach- Response on Pearson Night Flights -13637.docx](#)

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Good morning Lisa,

CivAv was tasked with an MPQ on Pearson Night Flights and I have drafted a response as attached in the Word document.

May I please request for your review of the line highlighted in green as it speaks to the REU's role? Additionally, would you recommend that I keep the links to the published violations, or refer to the stats as noted in the attached email?

Thank you,

**Stephanie Quach**

Regional Manager, Issues Management  
Civil Aviation, Ontario Region  
Transport Canada / Government of Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tel.: 647-394-5485/ TTY: 1-888-675-6863

Gestionnaire régional, Gestion d'enjeux  
Aviation civile, Région de l'Ontario  
Transports Canada / Gouvernement du Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tél.: 647-394-5485/ ATS : 1-888-675-6863

Steph

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**From:** George, Marcia (TC/TC) <[marcia.george@tc.gc.ca](mailto:marcia.george@tc.gc.ca)>  
**Sent:** Monday, March 17, 2025 10:55 AM  
**To:** Quach, Stephanie (TC/TC) <[Stephanie.Quach@tc.gc.ca](mailto:Stephanie.Quach@tc.gc.ca)>  
**Subject:** RE: FOR APPROVAL: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hello,

Two things:

1. Please insert a sentence on REU enforcement, which is published online. TC has pursued enforcement action for night flight violations. This info should be published. REU/Lisa can probably provide the link

2. <sup>21 (1) (b)</sup>

I would like to re-review once amended.

Thank you

marcia

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**From:** Quach, Stephanie (TC/TC) <[Stephanie.Quach@tc.gc.ca](mailto:Stephanie.Quach@tc.gc.ca)>  
**Sent:** Monday, March 17, 2025 10:44 AM  
**To:** George, Marcia (TC/TC) <[marcia.george@tc.gc.ca](mailto:marcia.george@tc.gc.ca)>  
**Subject:** FOR APPROVAL: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hi Marcia,

Please see the attached MPQ response on page 2, for your approval. I have consulted with Ops Specialties for this info.

Thank you,  
 Steph

---

**From:** Holmes, Jennifer (TC/TC) <[jennifer.holmes@tc.gc.ca](mailto:jennifer.holmes@tc.gc.ca)>  
**Sent:** Thursday, March 13, 2025 2:30 PM  
**To:** Quach, Stephanie (TC/TC) <[Stephanie.Quach@tc.gc.ca](mailto:Stephanie.Quach@tc.gc.ca)>  
**Subject:** FW: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hi Steph, could we please have a response back by March 20<sup>th</sup>?



**From:** Denis, Lisa (TC/TC) <[lisa.denis@tc.gc.ca](mailto:lisa.denis@tc.gc.ca)>

**Sent:** Thursday, March 13, 2025 2:23 PM

**To:** Holmes, Jennifer (TC/TC) <[jennifer.holmes@tc.gc.ca](mailto:jennifer.holmes@tc.gc.ca)>; Bergeron, Michelle (TC/TC) <[michelle.bergeron@tc.gc.ca](mailto:michelle.bergeron@tc.gc.ca)>; TC.F ONT PX RDGO / BDGR PX F.TC <[ONTPXRDGO-BDGRPX@tc.gc.ca](mailto:ONTPXRDGO-BDGRPX@tc.gc.ca)>

**Cc:** SS Information / Information SS <[TC.SSInfo-InfoSS.TC@tc.gc.ca](mailto:TC.SSInfo-InfoSS.TC@tc.gc.ca)>; TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC <[XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca](mailto:XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca)>

**Subject:** RE: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hi Jennifer,

Yes, thank you! [@TC.F ONT PX RDGO / BDGR PX F.TC](mailto:@TC.F ONT PX RDGO / BDGR PX F.TC) Kindly inquiring if your team would be able to take the lead on this request?

Merci,

Lisa Denis

**Coordination and Special Projects Officer**, Departmental Liaison Team

Policy & Issues Management Directorate

Office of the Deputy Minister

Transport Canada, Government of Canada

[Lisa.Denis@tc.gc.ca](mailto:Lisa.Denis@tc.gc.ca) | Tel: 343-574-4691

**Agente de coordination et des projets spéciaux**, Équipe de liaison départementale

Direction des politiques et de la gestion des enjeux,

Cabinet du sous-ministre, Transports Canada, Gouvernement du Canada

[Lisa.Denis@tc.gc.ca](mailto:Lisa.Denis@tc.gc.ca) | Tél: 343-574-4691

---

**From:** Holmes, Jennifer (TC/TC) <[jennifer.holmes@tc.gc.ca](mailto:jennifer.holmes@tc.gc.ca)>

**Sent:** Thursday, March 13, 2025 2:00 PM

**To:** Denis, Lisa (TC/TC) <[lisa.denis@tc.gc.ca](mailto:lisa.denis@tc.gc.ca)>; Bergeron, Michelle (TC/TC) <[michelle.bergeron@tc.gc.ca](mailto:michelle.bergeron@tc.gc.ca)>; TC.F ONT PX RDGO / BDGR PX F.TC <[Page 395 / 2990](mailto:ONTPXRDGO-</a></p></div><div data-bbox=)

[BDGRPX@tc.gc.ca](mailto:BDGRPX@tc.gc.ca); TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC  
<[XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca](mailto:XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca)>  
**Cc:** SS Information / Information SS <[TC.SSInfo-InfoSS.TC@tc.gc.ca](mailto:TC.SSInfo-InfoSS.TC@tc.gc.ca)>  
**Subject:** RE: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hi Lisa, could you please re-assign this one to the region? Thanks!

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**From:** Bergeron, Michelle (TC/TC) <[michelle.bergeron@tc.gc.ca](mailto:michelle.bergeron@tc.gc.ca)>  
**Sent:** Thursday, March 13, 2025 10:42 AM  
**To:** TC.F ONT PX RDGO / BDGR PX F.TC <[ONTPXRDGO-BDGRPX@tc.gc.ca](mailto:ONTPXRDGO-BDGRPX@tc.gc.ca)>  
**Cc:** SS Information / Information SS <[TC.SSInfo-InfoSS.TC@tc.gc.ca](mailto:TC.SSInfo-InfoSS.TC@tc.gc.ca)>  
**Subject:** FW: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hello! Would this be your lead?

---

**From:** Denis, Lisa (TC/TC) <[lisa.denis@tc.gc.ca](mailto:lisa.denis@tc.gc.ca)>  
**Sent:** Tuesday, March 11, 2025 5:04 PM  
**To:** TC.F NCR AA ADMO / BSMA RCN F.TC <[AAADMO-BSMA@tc.gc.ca](mailto:AAADMO-BSMA@tc.gc.ca)>  
**Cc:** TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC <[XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca](mailto:XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca)>  
**Subject:** MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Good afternoon S&S colleagues,

We received an MPQ pertaining to the lack of transparency and claimed corruption at the Greater Toronto Airport Authority (GTAA).

Context:

- Many constituents are expressing their frustration regarding the issues with Airport noise.

- MinO has provided this response:

*" Here's our website on noise.*

*<https://www.torontopearson.com/en/community/noise-management>. Toronto Pearson has a Noise Management Office dedicated to working with residents to address concerns and provide insights into airport operations. The team is committed to keeping our community informed and engaged.*

*There are several ways residents can connect with Pearson's Noise Management Office:*

- **Phone:** Call 416-247-7682 to ask questions or share concerns.
- **Online Flight Tracking Tool (WebTrak):** Track flights in real-time and see noise levels in your area.
- **Insightful Online Portal:** Access information about noise management and learn more about aircraft operations through this easy-to-use online resource.
- **Noise Complaint Form:** Submit up to 50 noise complaints at once via the online form.
- **Checking In:** Stay up to date on airport operations and community updates.
- Attend our **Pearson Public Meeting** on Noise Management

*These resources help residents stay informed and connected. Pearson is always happy to engage with its community to address any concerns.*

*In addition to our Noise Management Team, we actively engage with the community in many ways to keep our neighbours informed and involved. We sponsor community events, partner with schools for career talks, partner with elected officials to host open houses and give back to the community through employee volunteering and charitable giving. This summer alone, we participated in over 75 community events, reaching more than 10,000 residents.*

*Through these efforts, we regularly share updates on our operations, our role as an economic anchor providing local jobs and supporting development, and how to connect with our team.*

*Specifically on the flights between 2am and 6am that you mentioned they have stated:*

*However, we severely limit the number of flights in and out of Pearson through the **Night Flight Restriction Program**, which limits the number of movements (arrivals and departures) during the restricted hours (12:30 AM to 06:29 AM). Transport Canada helped create this program to limit nighttime noise and balance growing regional demand. This is referred to as the "night flight*

*budget.” Toronto Pearson is the only airport in Canada to have a budget system.*

*The vast majority of flight movements between the hours you specified (02:00 to 06:00) are arriving flights. Night flights are needed to accommodate travel distance, scheduling requirements and product delivery timelines, and accommodate late-arriving or departing flights delayed due to factors such as weather, mechanical or security issues; as well as other operationally necessary night flights. Medevac flights and military and police operations are counted towards the night flight budget.*

*We also operate the **Nighttime Preferential Runway system** - between midnight and 6:30 am, we prioritize the use of runways to minimize the number of residents overflown. “*

- MinO has been informed that these problems are persisting, and that the MP's Office has received a large amount of correspondence on this issue.

Question:

- Could the department kindly provide information in regard to transparency requirements and anything that would counteract corruption claims?

**Due Date: March 21, 2025**

Would it be possible to please provide some information that we can pass along to MinO in which they can relay to the MP office?

Merci,

Lisa Denis

—  
The following request has been assigned to you for appropriate action in Tasking Database. To access it, click on the « GOTO » link.

La demande suivante vous a été transférée pour exécution dans la base de données des tâches. Pour y accéder, cliquez sur le lien « GOTO ».

=====

=====  
Tasking # / No de tâche: TASK-013637

Request Type / Type de demande: MPQ

Topic / Sujet: RESPONSE ON PEARSON NIGHT FLIGHTS

Assigned To / Assigné à: AA

Submit By / Date de soumission: 3/21/2025

Request / Demande: PLEASE FIND ALL CONTEXT IN TASKING EMAIL / VEUILLEZ TROUVER TOUT LE CONTEXTE DANS LE COURRIEL

=====

=====

[http://ccmenterprise.tc.gc.ca:80/Enterprise/Services/Authorization/Login?  
rootid=30633806&segmentid=2989866](http://ccmenterprise.tc.gc.ca:80/Enterprise/Services/Authorization/Login?rootid=30633806&segmentid=2989866)

**From:** George, Marcia (TC/TC)  
**Sent:** Tue, 18 Mar 2025 04:04:32 +0000  
**To:** Quach, Stephanie (TC/TC)  
**Subject:** FW: Aviation Enforcement Standards DN Stats - Q3  
**Attachments:** FOR APPROVAL: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hi Stephanie

Some enforcement numbers (below) to support attached MPQ response

Again, recommending that REU/Lisa help with wording.

Thank you

Marcia

---

**From:** Meunier, Félix (TC/TC) <[felix.meunier@tc.gc.ca](mailto:felix.meunier@tc.gc.ca)>  
**Sent:** Monday, March 10, 2025 12:12 PM  
**To:** Mawji, Hanif (TC/TC) <[hanif.mawji@tc.gc.ca](mailto:hanif.mawji@tc.gc.ca)>; George, Marcia (TC/TC) <[marcia.george@tc.gc.ca](mailto:marcia.george@tc.gc.ca)>  
**Subject:** RE: Aviation Enforcement Standards DN Stats - Q3

UNCLASSIFIED / NON CLASSIFIÉ

Sounds good thanks.

---

**De :** Mawji, Hanif (TC/TC) <[hanif.mawji@tc.gc.ca](mailto:hanif.mawji@tc.gc.ca)>  
**Envoyé :** lundi, mars 10, 2025 12:08  
**À :** George, Marcia (TC/TC) <[marcia.george@tc.gc.ca](mailto:marcia.george@tc.gc.ca)>; Meunier, Félix (TC/TC) <[felix.meunier@tc.gc.ca](mailto:felix.meunier@tc.gc.ca)>  
**Objet :** RE: Aviation Enforcement Standards DN Stats - Q3

UNCLASSIFIED / NON CLASSIFIÉ

Hi Felix

There are at least 2 for which AMPs have been issued, and 26 which are under investigation and should be processed in short order. I believe we have sorted out the disconnect in receiving these so the numbers will go up shortly

| Month        | No. of NV files | Notes:                                                                                                 |
|--------------|-----------------|--------------------------------------------------------------------------------------------------------|
| 01-Apr-24    | 0               |                                                                                                        |
| 01-May-24    | 2               | Case 2024-1126: AMP Issued. Monetary penalty valued at \$4,145.00 paid. 2024-1136 - Closed - Rejected. |
| 01-Jun-24    | 0               |                                                                                                        |
| 01-Jul-24    | 0               |                                                                                                        |
| 01-Aug-24    | 0               |                                                                                                        |
| 01-Sep-24    | 0               |                                                                                                        |
| 01-Oct-24    | 1               | Rejected - Statutory Limitation                                                                        |
| 01-Nov-24    | 1               | 2024-1274: Amp issued. Awaiting payment.                                                               |
| 01-Dec-24    | 19              | All active investigations.                                                                             |
| 01-Jan-25    | 7               | All active investigations.                                                                             |
| 01-Feb-25    | 0               |                                                                                                        |
| 01-Mar-25    | 0               |                                                                                                        |
|              |                 |                                                                                                        |
| <b>TOTAL</b> | <b>30</b>       |                                                                                                        |

Hanif Mawji

Associate Director, Operations East

Transport Canada / Government of Canada

[Hanif.mawji@tc.gc.ca](mailto:Hanif.mawji@tc.gc.ca) / Tel: 416-954-2058 / Cel: 416-525-2421 / TTY: 1-888-675-6863

Directeur associé, Opérations Est

Transports Canada / Gouvernement du Canada

[Hanif.mawji@tc.gc.ca](mailto:Hanif.mawji@tc.gc.ca) / Tél. : 416-954-2058/ Tél. cell. : 416-525-2421 / ATS : 1-888-675-6863

---

**From:** George, Marcia (TC/TC) <[marcia.george@tc.gc.ca](mailto:marcia.george@tc.gc.ca)>

**Sent:** Monday, March 10, 2025 9:56 AM

**To:** Meunier, Félix (TC/TC) <[felix.meunier@tc.gc.ca](mailto:felix.meunier@tc.gc.ca)>

**Cc:** Mawji, Hanif (TC/TC) <[hanif.mawji@tc.gc.ca](mailto:hanif.mawji@tc.gc.ca)>

**Subject:** Re: Aviation Enforcement Standards DN Stats - Q3

Hanif is looking in to this for you

I am off this week. 19 (1)

Marcia

Sent from my iPhone

On Mar 10, 2025, at 9:18 AM, Meunier, Félix (TC/TC) <[felix.meunier@tc.gc.ca](mailto:felix.meunier@tc.gc.ca)> wrote:



PROTECTED A / PROTÉGÉ A

No 602-105c violations (noise) at all in Ontario this year?

Rgds,  
FM

---

**De :** Pilon, Jeannot (TC/TC) <[jeannot.pilon@tc.gc.ca](mailto:jeannot.pilon@tc.gc.ca)>

**Envoyé :** mardi, mars 04, 2025 10:18

**À :** Kovacic, Linda (TC/TC) <[linda.kovacic@tc.gc.ca](mailto:linda.kovacic@tc.gc.ca)>

**Cc :** Meunier, Félix (TC/TC) <[felix.meunier@tc.gc.ca](mailto:felix.meunier@tc.gc.ca)>; Champagne, Bernard (TC/TC) <[bernard.champagne@tc.gc.ca](mailto:bernard.champagne@tc.gc.ca)>

**Objet :** Aviation Enforcement Standards DN Stats - Q3

PROTECTED A / PROTÉGÉ A

Linda,  
Please find attached the stats for Q3.  
These were done monthly but have been changed to quarterly, as requested by the regions.  
Regards,

***Jeannot Pilon A/Chief – Chef intérimaire***

*Aviation Enforcement, Standards Branch / Application de la loi en aviation, Direction des normes*

*Office / Work Cell: 343-553-2890*

*E-Mail / Courriel: [jeannot.pilon@tc.gc.ca](mailto:jeannot.pilon@tc.gc.ca)*

*Transports Canada / Transport Canada*

*330 Sparks Street, 4th Floor, AARTE*

*Ottawa, Ontario, K1A 0N8*

*Gouvernement du Canada / Government of Canada*

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**From:** Quach, Stephanie (TC/TC)  
**Sent:** Mon, 17 Mar 2025 14:44:26 +0000  
**To:** George, Marcia (TC/TC)  
**Subject:** FOR APPROVAL: MPQ - Response on Pearson Night Flights (13637)  
**Attachments:** MinO Outreach- Response on Pearson Night Flights -13637.docx

UNCLASSIFIED / NON CLASSIFIÉ

Hi Marcia,

Please see the attached MPQ response on page 2, for your approval. I have consulted with Ops Specialties for this info.

Thank you,  
Steph

---

**From:** Holmes, Jennifer (TC/TC) <jennifer.holmes@tc.gc.ca>  
**Sent:** Thursday, March 13, 2025 2:30 PM  
**To:** Quach, Stephanie (TC/TC) <Stephanie.Quach@tc.gc.ca>  
**Subject:** FW: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hi Steph, could we please have a response back by March 20<sup>th</sup>?

---

**From:** Denis, Lisa (TC/TC) <lisa.denis@tc.gc.ca>  
**Sent:** Thursday, March 13, 2025 2:23 PM  
**To:** Holmes, Jennifer (TC/TC) <jennifer.holmes@tc.gc.ca>; Bergeron, Michelle (TC/TC) <michelle.bergeron@tc.gc.ca>; TC.F ONT PX RDGO / BDGR PX F.TC <ONTPXRDGO-BDGRPX@tc.gc.ca>  
**Cc:** SS Information / Information SS <TC.SSInfo-InfoSS.TC@tc.gc.ca>; TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC <XMLIssuesManagement-GestiondesenjeuxXM@tc.gc.ca>  
**Subject:** RE: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hi Jennifer,

Yes, thank you! [@TC.F ONT PX RDGO / BDGR PX F.TC](#) Kindly inquiring if your team would be able to take the lead on this request?

Merci,

Lisa Denis

**Coordination and Special Projects Officer**, Departmental Liaison Team  
Policy & Issues Management Directorate  
Office of the Deputy Minister  
Transport Canada, Government of Canada  
[Lisa.Denis@tc.gc.ca](mailto:Lisa.Denis@tc.gc.ca) | Tel: 343-574-4691

**Agente de coordination et des projets spéciaux**, Équipe de liaison départementale  
Direction des politiques et de la gestion des enjeux,  
Cabinet du sous-ministre, Transports Canada, Gouvernement du Canada  
[Lisa.Denis@tc.gc.ca](mailto:Lisa.Denis@tc.gc.ca) | Tél: 343-574-4691



---

**From:** Holmes, Jennifer (TC/TC) <[jennifer.holmes@tc.gc.ca](mailto:jennifer.holmes@tc.gc.ca)>  
**Sent:** Thursday, March 13, 2025 2:00 PM  
**To:** Denis, Lisa (TC/TC) <[lisa.denis@tc.gc.ca](mailto:lisa.denis@tc.gc.ca)>; Bergeron, Michelle (TC/TC) <[michelle.bergeron@tc.gc.ca](mailto:michelle.bergeron@tc.gc.ca)>; TC.F ONT PX RDGO / BDGR PX F.TC <[ONTPXRDGO-BDGRPX@tc.gc.ca](mailto:ONTPXRDGO-BDGRPX@tc.gc.ca)>; TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC <[XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca](mailto:XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca)>  
**Cc:** SS Information / Information SS <[TC.SSInfo-InfoSS.TC@tc.gc.ca](mailto:TC.SSInfo-InfoSS.TC@tc.gc.ca)>  
**Subject:** RE: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hi Lisa, could you please re-assign this one to the region? Thanks!

---

**From:** Bergeron, Michelle (TC/TC) <[michelle.bergeron@tc.gc.ca](mailto:michelle.bergeron@tc.gc.ca)>  
**Sent:** Thursday, March 13, 2025 10:42 AM  
**To:** TC.F ONT PX RDGO / BDGR PX F.TC <[ONTPXRDGO-BDGRPX@tc.gc.ca](mailto:ONTPXRDGO-BDGRPX@tc.gc.ca)>  
**Cc:** SS Information / Information SS <[TC.SSInfo-InfoSS.TC@tc.gc.ca](mailto:TC.SSInfo-InfoSS.TC@tc.gc.ca)>  
**Subject:** FW: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hello! Would this be your lead?

---

**From:** Denis, Lisa (TC/TC) <[lisa.denis@tc.gc.ca](mailto:lisa.denis@tc.gc.ca)>  
**Sent:** Tuesday, March 11, 2025 5:04 PM  
**To:** TC.F NCR AA ADMO / BSMA RCN F.TC <[AAADMO-BSMA@tc.gc.ca](mailto:AAADMO-BSMA@tc.gc.ca)>  
**Cc:** TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC <[XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca](mailto:XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca)>  
**Subject:** MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Good afternoon S&S colleagues,

We received an MPQ pertaining to the lack of transparency and claimed corruption at the Greater Toronto Airport Authority (GTAA).

Context:

- Many constituents are expressing their frustration regarding the issues with Airport noise.
- MinO has provided this response:

*"Here's our website on noise.*

*<https://www.torontopearson.com/en/community/noise-management>. Toronto Pearson has a Noise Management Office dedicated to working with residents to address concerns and provide insights into airport operations. The team is committed to keeping our community informed and engaged.*

*There are several ways residents can connect with Pearson's Noise Management Office:*

- **Phone:** Call 416-247-7682 to ask questions or share concerns.
- **Online Flight Tracking Tool ([WebTrak](#)):** Track flights in real-time and see noise levels in your area.
- **[Insightful Online Portal](#):** Access information about noise management and learn more about aircraft operations through this easy-to-use online resource.
- **[Noise Complaint Form](#):** Submit up to 50 noise complaints at once via the online form.
- **[Checking In](#):** Stay up to date on airport operations and community updates.
- Attend our **Pearson Public Meeting** on Noise Management

*These resources help residents stay informed and connected. Pearson is always happy to engage with its community to address any concerns.*

*In addition to our Noise Management Team, we actively engage with the community in many ways to keep our neighbours informed and involved. We sponsor community events, partner with schools for career talks, partner with elected officials to host open houses and give back to the community through employee volunteering and charitable giving. This summer alone, we participated in over 75 community events, reaching more than 10,000 residents.*

*Through these efforts, we regularly share updates on our operations, our role as an economic anchor providing local jobs and supporting development, and how to connect with our team.*

*Specifically on the flights between 2am and 6am that you mentioned they have stated:*

*However, we severely limit the number of flights in and out of Pearson through the **Night Flight Restriction Program**, which limits the number of movements (arrivals and departures) during the restricted hours (12:30 AM to 06:29 AM). Transport Canada helped create this program to limit nighttime noise and balance growing regional demand. This is referred to as the “night flight budget.” Toronto Pearson is the only airport in Canada to have a budget system.*

*The vast majority of flight movements between the hours you specified (02:00 to 06:00) are arriving flights. Night flights are needed to accommodate travel distance, scheduling requirements and product delivery timelines, and accommodate late-arriving or departing flights delayed due to factors such as weather, mechanical or security issues; as well as other operationally necessary night flights. Medevac flights and military and police operations are counted towards the night flight budget.*

*We also operate the **Nighttime Preferential Runway system** - between midnight and 6:30 am, we prioritize the use of runways to minimize the number of residents overflown. “*

- MinO has been informed that these problems are persisting, and that the MP’s Office has received a large amount of correspondence on this issue.

Question:

- Could the department kindly provide information in regard to transparency requirements and anything that would counteract corruption claims?

**Due Date: March 21, 2025**

Would it be possible to please provide some information that we can pass along to MinO in which they can relay to the MP office?

Merci,

Lisa Denis

---

The following request has been assigned to you for appropriate action in Tasking Database. To access it, click on the « GOTO » link.

La demande suivante vous a été transférée pour exécution dans la base de données des tâches. Pour y accéder, cliquez sur le lien « GOTO ».

=====

=====

Tasking # / No de tâche: TASK-013637

Request Type / Type de demande: MPQ

Topic / Sujet: RESPONSE ON PEARSON NIGHT FLIGHTS

Assigned To / Assigné à: AA

Submit By / Date de soumission: 3/21/2025

Request / Demande: PLEASE FIND ALL CONTEXT IN TASKING EMAIL / VEUILLEZ TROUVER TOUT LE CONTEXTE DANS LE COURRIEL

=====

=====

<http://ccmenterprise.tc.gc.ca:80/Enterprise/Services/Authorization/Login?rootid=30633806&segmentid=2989866>

**Task- MinO Outreach: Response on Pearson Night Flights (13637)****Context:**

**Many constituents are expressing their frustration regarding the issues with Airport noise.**

**MinO has provided this reponse:**

- "Here's our website on noise. <https://www.torontopearson.com/en/community/noise-management>. Toronto Pearson has a Noise Management Office dedicated to working with residents to address concerns and provide insights into airport operations. The team is committed to keeping our community informed and engaged. There are several ways residents can connect with Pearson's Noise Management Office:
  - Phone: Call 416-247-7682 to ask questions or share concerns.
  - Online Flight Tracking Tool (WebTrak): Track flights in real-time and see noise levels in your area.
  - Insightful Online Portal: Access information about noise management and learn more about aircraft operations through this easy-to-use online resource.
  - Noise Complaint Form: Submit up to 50 noise complaints at once via the online form.
  - Checking In: Stay up to date on airport operations and community updates.
  - Attend our Pearson Public Meeting on Noise Management
 These resources help residents stay informed and connected. Pearson is always happy to engage with its community to address any concerns.

*In addition to our Noise Management Team, we actively engage with the community in many ways to keep our neighbours informed and involved. We sponsor community events, partner with schools for career talks, partner with elected officials to host open houses and give back to the community through employee volunteering and charitable giving. This summer alone, we participated in over 75 community events, reaching more than 10,000 residents.*

*Through these efforts, we regularly share updates on our operations, our role as an economic anchor providing local jobs and supporting development, and how to connect with our team.*

*Specifically on the flights between 2am and 6am that you mentioned they have stated:*

*However, we severely limit the number of flights in and out of Pearson through the Night Flight Restriction Program, which limits the number of movements (arrivals and departures) during the restricted hours (12:30 AM to 06:29 AM). Transport Canada helped create this program to limit nighttime noise and balance growing regional demand. This is referred to as the "night flight budget." Toronto Pearson is the only airport in Canada to have a budget system.*

*The vast majority of flight movements between the hours you specified (02:00 to 06:00) are arriving flights. Night flights are needed to accommodate travel distance, scheduling requirements and product delivery timelines, and accommodate late-arriving or departing flights delayed due to factors such as weather, mechanical or security issues; as well as other operationally necessary night flights. Medevac flights and military and police operations are counted towards the night flight budget.*

*We also operate the Nighttime Preferential Runway system - between midnight and 6:30 am, we prioritize the use of runways to minimize the number of residents overflown. "*

MinO has been informed that these problems are persisting, and that the MP's Office has received a large amount of correspondence on this issue.

**Question:**

**Could the department kindly provide information in regard to transparency requirements and anything that would counteract corruption claims?**



**Response:**

- Thank you for contacting Transport Canada (TC).
- TC is responsible for developing and overseeing the Government of Canada's transportation policies and programs which, in the context of civil aviation, are primarily exercised through the *Aeronautics Act* and the Canadian Aviation Regulations (CARs).
- This request was reviewed by departmental subject matter experts who confirm the Greater Toronto Airports Authority (GTAA) is fulfilling its obligations and responsibilities outlined in the Ground Lease regarding noise management in a responsible and effective manner.
- The relationship and communication between Transport Canada Civil Aviation and the GTAA Aviation Services Team has been highly effective with open communication and availability for meetings, along with the timely transmittal of information as soon as it becomes available.
- The Toronto Pearson International Airport is the only international airport in Canada with a night flight budget (during restricted hours).
- TC continues to oversee safety and monitor the total number of permitted annual flights during these restricted hours. Over the past five years, the GTAA has consistently adhered to the threshold of total permitted number of flights during the restricted hours.
- In addition to the GTAA's Noise Management Committee, there is a dedicated website, [InsightFull for Toronto Pearson](#) offering interactive monthly and quarterly operational reports, complaints reports, and is supported by their "Enforcement Office," which monitors every flight for compliance with noise abatement procedures and the Night Flight Restriction Program.

**Task- MinO Outreach: Response on Pearson Night Flights (13637)****Context:**

**Many constituents are expressing their frustration regarding the issues with Airport noise.**

**MinO has provided this reponse:**

- "Here's our website on noise. <https://www.torontopearson.com/en/community/noise-management>. Toronto Pearson has a Noise Management Office dedicated to working with residents to address concerns and provide insights into airport operations. The team is committed to keeping our community informed and engaged. There are several ways residents can connect with Pearson's Noise Management Office:
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*The vast majority of flight movements between the hours you specified (02:00 to 06:00) are arriving flights. Night flights are needed to accommodate travel distance, scheduling requirements and product delivery timelines, and accommodate late-arriving or departing flights delayed due to factors such as weather, mechanical or security issues; as well as other operationally necessary night flights. Medevac flights and military and police operations are counted towards the night flight budget.*

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MinO has been informed that these problems are persisting, and that the MP's Office has received a large amount of correspondence on this issue.

**Question:**

**Could the department kindly provide information in regard to transparency requirements and anything that would counteract corruption claims?**

**Response:**

- Thank you for contacting Transport Canada (TC).
- TC is responsible for developing and overseeing the Government of Canada's transportation policies and programs which, in the context of civil aviation, are primarily exercised through the *Aeronautics Act* and the Canadian Aviation Regulations (CARs).
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- The relationship and communication between Transport Canada Civil Aviation and the GTAA Aviation Services Team has been highly effective with open communication and availability for meetings, along with the timely transmittal of information as soon as it becomes available.
- The Toronto Pearson International Airport is the only international airport in Canada with a night flight budget (during restricted hours).
- TC continues to oversee safety and monitor the total number of permitted annual flights during these restricted hours. Over the past five years, the GTAA has consistently adhered to the threshold of total permitted number of flights during the restricted hours.
- Should there be any deviances to the number of permitted flights, TC's Regional Enforcement Unit (REU) will investigate the occurrences and alleged violations to ascertain whether or not a violation has occurred. For more information regarding the roles and responsibilities of the REU, you may wish to visit: [Aviation Offences and Enforcement](#). For a list of published enforcement actions, please see: [Aviation Corporate Offenders](#) and [Aviation Non-Corporate Offenders](#).
- In addition to the GTAA's Noise Management Committee, there is a dedicated website, [InsightFull for Toronto Pearson](#), offering interactive monthly and quarterly operational reports, complaints reports, and is supported by their "Enforcement Office," which monitors every flight for compliance with noise abatement procedures and the Night Flight Restriction Program.

**From:** Quach, Stephanie (TC/TC)  
**To:** Scott, Blake (TC/TC); Saaved, Akram (TC/TC)  
**Subject:** FOR SIGNATURE/DISPATCH- Ministerial: Airplane Noise  
**Date:** Wednesday, June 26, 2024 12:30:00 PM  
**Attachments:** generic-social.jpg  
RDIMS-#20399716.DRF

Hi Blake,  
Please see the attached HQ-approved ministerial reply for your signature.  
Hi Akram, over to you once signed please.  
Thanks,

**Stephanie Quach**

Regional Manager, Issues Management  
Civil Aviation, Ontario Region  
Transport Canada / Government of Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tel.: 647-394-5485/ TTY: 1-888-675-6863  
Gestionnaire régional, Gestion d'enjeux  
Aviation civile, Région de l'Ontario  
Transports Canada / Gouvernement du Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tél.: 647-394-5485/ ATS : 1-888-675-6863

**From:** Rodriguez, Pablo - Député  
**Sent:** Sunday, June 23, 2024 11:49 AM  
**To:** Minister of Transport / Ministre des Transports (TC)  
**Subject:** [External/Externe]: TR: Airplane Noise  
XAP-2024-534282(3)

**De :** 19 (1)

**Envoyé :** 23 juin 2024 11:11

**À :** 19 (1)

**Cc :** Sgro, Judy - M.P. <[judy.sgro@parl.gc.ca](mailto:judy.sgro@parl.gc.ca)>; Cynthia Woods <19 (1)@gtaa.com>; Prime Minister's Office <[pm@pm.gc.ca](mailto:pm@pm.gc.ca)>; Rodriguez, Pablo - Député <[Pablo.Rodriguez@parl.gc.ca](mailto:Pablo.Rodriguez@parl.gc.ca)>; ZZG-Community Engagement <[communityengagement@gtaa.com](mailto:communityengagement@gtaa.com)>; Poilievre, Pierre - M.P. <[pierre.poilievre@parl.gc.ca](mailto:pierre.poilievre@parl.gc.ca)>; 19 (1)

19 (1)

Sorbara, Francesco - M.P. <[Francesco.Sorbara@parl.gc.ca](mailto:Francesco.Sorbara@parl.gc.ca)>; Singh, Jagmeet - M.P. <[Jagmeet.Singh@parl.gc.ca](mailto:Jagmeet.Singh@parl.gc.ca)>; 19 (1)

19 (1)

19 (1)

[info@cityline.tv](mailto:info@cityline.tv); 19 (1)

19 (1)

19 (1) Councillor Perruzza <[councillor\\_perruzza@toronto.ca](mailto:councillor_perruzza@toronto.ca)>; Tom Rakocovic <[TRakocovic-CO@ndp.on.ca](mailto:TRakocovic-CO@ndp.on.ca)>; Mayor Chow <[mayor\\_chow@toronto.ca](mailto:mayor_chow@toronto.ca)>; [doug.fordco@pc.ola.org](mailto:doug.fordco@pc.ola.org); [Matias.deDovitiis@toronto.ca](mailto:Matias.deDovitiis@toronto.ca)



**Objet :** Re: Airplane Noise

19 (1)

This the preferential nighttime runway system that Pearson has developed. They started in 2018 & conducted trials during the pandemic. It's another one of these things in which they say they changed nothing but they actual have made changes in how they use runways. Especially at night.



Idea 1: Night-time approaches

[torontopearson.com](https://torontopearson.com)

Based on the feedback from your community I would say whatever system has developed for arrivals is not an improvement for your community.

At one point I was very frustrated with the presentation of data & terminology. Some of which lead to changes in the terminology and how data was presented to officials. As is typical GTAA used the data to make things appear much more positive than the reality for local communities.

I would suggest asking questions about this new nighttime system to determine if it has any influence on the nighttime impacts your community is experiencing that differ from your historical lived experience.

Take Care & hope you get some rest soon.

19 (1)

On Jun 23, 2024, at 7:41 AM, 19 (1) wrote:

Hello Everyone,

This morning, I was woken up at 4:18 am by a loud plane that passed over my house. I called the Pearson Airport Complaints Department and MP Judy Sgro, and I left messages for both of them.

At 5:40 am, Pearson Airport began to receive incoming planes. It sounds like it will be a busy morning for airplane traffic, starting earlier than expected. The new start time had been 6:30 am. More planes are great for GTAA CEO Deborah Flint; that is why she was hired to increase activity at Pearson Airport, supported by the Federal Liberal Government. However, it's not great health-wise for the many residents living in flight paths around the airport. By 6:30 am, the planes over my house are very, very loud.

I will be awaiting a reply this week from Federal Minister of Transportation Pablo Rodriguez regarding his plans to address the airplane noise. A lack of reply would suggest that the Federal Liberal Government is not too concerned about the noise

issues affecting certain communities around Pearson Airport, as it affects only a small percentage of the population.

I have left messages for MPP Tom Rakocevic to ask him why insurance rates are higher for certain postal codes, but I have not received a reply from him yet. If a correlation could ever be made between postal codes, accidents, and flight path areas, then I think it will be a bigger problem for all governments to figure out. Studies have shown that people who lose an hour of sleep are more likely to be involved in an accident. Hopefully, MPP Tom Rakocevic replies to me by the end of the week.

Plane noise does affect students' learning capabilities, and our Councillor's office is aware of this issue and is working on it.

Sincerely,

19 (1)

**From:**

19 (1)

**Sent:** June 22, 2024 8:18 AM

**To:** Sgro, Judy - M.P. <judy.sgro@parl.gc.ca>; Cynthia Woods

19 (1)

<[REDACTED]@gtaa.com>; Prime Minister | Premier Ministre <PM@pm.gc.ca>;

pablo.rodriguez@parl.gc.ca <pablo.rodriguez@parl.gc.ca>; ZZG-Community

Engagement <communityengagement@gtaa.com>

**Cc:** pierre.poilievre@parl.gc.ca <pierre.poilievre@parl.gc.ca>; 19 (1)

19 (1)

francesco.sorbara@parl.gc.ca <francesco.sorbara@parl.gc.ca>;

jagmeet.singh@parl.gc.ca <jagmeet.singh@parl.gc.ca>; 19 (1)

19 (1)

19 (1)

info@cityline.tv

<info@cityline.tv>; 19 (1)

19 (1)



19 (1) [redacted] 'Councillor Perruzza' <councillor\_perruzza@toronto.ca>; Tom Rakocevic <TRakocevic-CO@ndp.on.ca>; Mayor Chow <mayor\_chow@toronto.ca>; [doug.fordco@pc.ola.org](mailto:doug.fordco@pc.ola.org) <doug.fordco@pc.ola.org>; [Matias.deDovitiis@toronto.ca](mailto:Matias.deDovitiis@toronto.ca) <Matias.deDovitiis@toronto.ca>

**Subject:** Re: Airplane Noise

Hello Everyone,

The planes from Pearson Airport are extremely loud this morning... as in LOUD. The first plane screeched over my house at 6:21 am. Air traffic after midnight could be heard until 12:45 am. The morning before, planes could be heard flying until 1:30 am, and then again throughout the rest of the morning, offering me the chance at only a couple of hours of sleep. It takes work to file the complaints in the morning.

Minister of Transportation Pablo Rodriguez, please provide my community with an answer by the end of the month on how Prime Minister Trudeau plans to improve our noisy living situation here, with Pearson Airport nearby. Another airport should have been built in Pickering, and the two North and South runways need to be spaced farther apart from each other so that they can be used simultaneously. This way, we do not have to rely solely on the three East/West runways, where planes fly over the most populated parts of areas around Pearson Airport at peak times

MP Judy Sgro is aware of how plane noise becomes worse for us in warmer weather, with planes flying at lower altitudes. Nothing has been done about the plane noise in my community over the last few years. MP Judy Sgro initially stated to a few of us in a meeting that we live in the city and we must learn to live with the airplane noise. I believe she has come to realize over the last few years that her initial statement to us was unacceptable.

There should be at least 7 hours between the last plane of the night and the first one of the day, with midnight as the cutoff time and 7 am as the startup time. Proper sleep is essential for a healthy life. It becomes stressful for me because I never know when the last plane will come or when I will hear the first one. I could be up until 1:30 am with airplane noise. Pearson Airport unfortunately has a significant influence on my sleep patterns, and its unpredictability adds to the challenge. I know my days are more enjoyable when I hear fewer planes.

I don't want to call Pearson Airport to complain about the plane noise several times a day or spend time writing emails to important figures in public office. I want to enjoy my life! Former Minister of Transportation Lisa Raitt publicly criticized Pearson noise complaints, where she was vocal and honest and told people the complaints are collected and then left to collect dust. I find myself believing her more and more each day.

It would be wonderful if CEO of the GTAA, Deborah Flint, would make time for a meeting to listen to complaints and provide solutions to residents greatly affected by airplane noise. Unfortunately, it seems to me she is not readily available to engage with communities impacted by her decisions. This situation is concerning and needs to improve.

Sincerely,

19 (1)

**From:** 19 (1)

**Sent:** June 21, 2024 3:38 PM

**To:** Sgro, Judy - M.P. <judy.sgro@parl.gc.ca>; Cynthia Woods <cynthia.woods@gtaa.com>; Prime Minister | Premier Ministre <PM@pm.gc.ca>; pablo.rodriguez@parl.gc.ca <pablo.rodriguez@parl.gc.ca>; ZZG-Community Engagement <communityengagement@gtaa.com>

**Cc:** pierre.poilievre@parl.gc.ca <pierre.poilievre@parl.gc.ca>; 19 (1)

19 (1)

francesco.sorbara@parl.gc.ca <francesco.sorbara@parl.gc.ca>; jagmeet.singh@parl.gc.ca <jagmeet.singh@parl.gc.ca>; 19 (1)

19 (1)

19 (1); info@cityline.tv <info@cityline.tv>; 19 (1)

19 (1)

19 (1) Pat Taney <pat.taney@rci.rogers.com>; ZZG-Community Engagement <communityengagement@gtaa.com>; 19 (1)

19 (1)

**Subject:** Airplane Noise

Hello Everyone,

I contacted MP Judy Sgro's office this afternoon and asked to speak with her, but I was informed that she was not in the office today. The person I spoke to, 19 (1) confirmed she would inform 19 (1) the office manager, about the emails 19 (1) had sent today to MP Judy Sgro.

MP Judy Sgro presented the airplane noise petition for Humber River - Black Creek to the House of Commons, and it has been approved for investigation. However, I am uncertain about the duration of this process. I believe that during the review process, there should be a temporary reduction in air traffic to Pearson Airport not an increase.

It is warmer weather now, planes fly at lower altitudes and the result is increased noise. GTAA CEO Deborah Flint, MP Judy Sgro, Minister of Transportation Pablo Rodriguez, NAV Canada, and Pearson Airport are all aware of the noise issue. The noise levels are high and have negative impacts on people's health. Despite reaching out to these people over the last few years, the situation has not improved. Furthermore, GTAA CEO Deborah Flint publicly stated intentions to increase air traffic, to make the noise problem worse and Prime Minister Trudeau along with his Minister of Transportation Pablo Rodriguez did not say no to this plan.

What can our community do about the airplane noise? I understand it is Friday, and I may not receive a response today. However, Minister of Transportation Pablo Rodriguez, this question is directed to you, not MP Judy Sgro who should not be taking responsibility of handling your job. What is your proposed solution?

Prime Minister Trudeau, if Minister of Transportation Pablo Rodriguez does not address our noise concerns regarding airplane traffic and noise from Pearson Airport for Humber River - Black Creek by the end of the month, I will be deeply disappointed once again in the Federal Liberal Government. Perhaps it is time for new leadership in the federal government, and now is the opposition's opportunity to voice their stance on this issue. I have not heard a reply from the opposition parties here.

MP Judy Sgro wrote a detailed letter about the airplane noise issues faced in Humber River - Black Creek a couple of years ago to Prime Minister Trudeau and the then Federal Minister of Transportation, Omar Alghabra, but neither of them responded to MP Judy Sgro. I asked MP Judy Sgro if she could find out why her letter was not replied to, and she seemed hesitant and afraid to approach either of them to ask. It is not good!

I would love to see the noise complaints handled differently, as <sup>19(1)</sup> described a new plan to everyone here, where residents of this community could give consent for NAV WebTracker to file a complaint if the decibel reading reaches a certain level in our community. I hope Cynthia Woods, the Manager of Pearson Airport Complaints Department, has considered adopting this idea. Why should I, a resident of this community affected by airplane noise, have to take time out of

my day to contact Pearson Airport Complaints Department when technology exists to file a complaint on my behalf? When I am woken up early in the morning, it takes time to check the date and time and then find the device to file the complaint on. It's not easy to file a noise complaint, and sometimes I'm too upset with the airplane noise to bother doing it.

MP Judy Sgro, can you follow up with Cynthia Woods and provide Humber River - Black Creek with an answer by the end of this month to see if she have Pearson Airport adopt this new complaint format? I give this responsibility to you MP Judy Sgro or your office to speak to Manager of Pearson Airport Complaints Department Cynthia Woods by the end of this month and give Humber River - Black Creek an answer.

CEO of GTAA Deborah Flint needs to make herself available to speak to communities where her decisions with increases to air traffic are affecting the health and well being of the residents living in flight paths to Pearson Airport.

I hope the weekend is quiet with little airplane noise because this morning was hell. Humber River - Black Creek wants improvement and answers, not to be ignored!

Take care,

19 (1)

**From:** 19 (1)

**Sent:** June 21, 2024 9:20 AM

**To:** Sgro, Judy - M.P. <judy.sgro@parl.gc.ca>; pierre.poilievre@parl.gc.ca <pierre.poilievre@parl.gc.ca>; jagmeet.singh@parl.gc.ca <jagmeet.singh@parl.gc.ca>; francesco.sorbara@parl.gc.ca <francesco.sorbara@parl.gc.ca>

**Cc:** 19 (1)

19 (1)

19 (1)

19 (1)

info@cityline.tv &lt;info@cityline.tv&gt;; 19 (1)

19 (1)

**Subject:** Ask the Courts of Justice to place an Injunction

God day Honourable Judy Sgro,

I do not intend to be disrespectful, but as a responsible citizen, I feel it is important to bring the following to your attention.

You should rely on people like me to bring attention to an issue, not to perform your job. It is utterly unfair to place the onus on the people to do the job our representatives have been elected and are being paid to perform.

I would like to request that, as our representative at the federal level, you ask the Courts of Justice to place an injunction on Pearson Airport.

Specifically, I request the suspension of all night traffic, except for emergencies, and the imposition of a cap to stop any increase in air traffic.

The rationale for these requests is as follows:

1. **Irreparable Damage to Students:** Students living in the communities surrounding the airport are experiencing detrimental impacts from airplane noise. Numerous empirical studies demonstrate the negative effects of such noise on students' academic performance and overall well-being.
2. **Irreparable Damage to Health:** The health of citizens living in the surrounding communities is being compromised. There is a wealth of empirical studies showing the harmful effects of airplane noise on people's health, including increased risk of cardiovascular diseases, sleep disturbances, and other health issues.
3. **Potential for Irreparable Damage:** Consider a scenario where a truck driver from my community falls asleep at the wheel due to sleep deprivation caused by airplane noise, leading to a tragic accident involving a bus with 40 school children. The insurance company would likely determine that Transport Canada policies permitting the airport to operate 24/7 contributed to the sleep deprivation. In such a case, the courts would likely hold the state responsible. The policymakers would not personally bear the costs; instead, the state would, meaning that the financial burden would ultimately fall on the taxpayers. To put it simply, it is the people who would have to pay for the consequences of these policies.

I urge you to take immediate action to address these concerns and protect the well-being of our community.

Regards,

19 (1)

On Tuesday, June 18, 2024 at 05:32:33 p.m. EDT, Sgro, Judy - M.P.

<judy.sgro@parl.gc.ca> wrote:

Good day 19 (1)

Thank you for providing the below detailed and thorough recommendations.  
The Hon. Judy Sgro, supports any initiative or ideas that may improve the quality of life for residents in the area.

We have seen that a few of GTAA representatives are included in your initial email, however we can ensure that the appropriate offices are sent your valuable recommendations.

Our office relies on individuals such as yourself to continue to provide constructive ideas to better our community.

Thank you again for reaching out to our office.

Best regards,

**Office of the Hon. Judy A. Sgro**

Member of Parliament for Humber River-Black Creek

Chair Standing Committee on International Trade

Privy Council

Room 1180 Valour Building

House of Commons

Ottawa (Ontario) K1A 0A6

613-992-7774 Telephone

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Constituency Office:

2201 Finch Ave. West, Unit # 25

North York, ON M9M 2Y9

Tel: 416-744-1882

Fax: 416-952-1696

**From:** 19 (1)

**Sent:** Sunday, June 16, 2024 11:09 AM

**To:** Sgro, Judy - M.P. <judy.sgro@parl.gc.ca>; ZZG-Community Engagement <communityengagement@gtaa.com>; Matias.deDovitiis@toronto.ca; Poilievre, Pierre - M.P. <pierre.poilievre@parl.gc.ca>; Tom Rakoccevic <trakoccevic-co@ndp.on.ca>; Minister of Transport / Ministre des Transports (TC) <tc.ministeroftransport-ministredestransports.tc@tc.gc.ca>; Singh, Jagmeet - M.P. <Jagmeet.Singh@parl.gc.ca>; 'Councillor Perruzza' <councillor\_perruzza@toronto.ca>; Sorbara, Francesco - M.P. <Francesco.Sorbara@parl.gc.ca>; 19 (1) @gtaa.com;

19 (1) @gtaa.com

**Cc:** 19 (1)

19 (1)

19 (1)

19 (1)

19 (1)

info@cityline.tv;

**Subject:** Request for immediate changes to complaint form  
To all individuals in positions of power associated with YYZ,

This includes those at Nav Canada, the Greater Toronto Airports Authority (GTAA), and Canadian government officials,

Needless to say I expect you to reply to my emails.

I am writing to express my concerns regarding the current complaint form for noise disturbances. The existing form is overly cumbersome and effectively discourages individuals from filing complaints.

As someone who experiences adverse effects from aircraft noise exceeding 55dB, the current system is impractical. Pearson Airport handles approximately 1,850 flights daily, with around 500 of these flights passing over my residence. Given that the form allows a maximum of 8 events per submission, I would need to complete it 62.5 times daily. At an estimated 15 minutes per form, this amounts to 937.5 minutes or approximately 15.6 hours each day.

This cumbersome process seems designed to discourage complaints. Therefore, I propose the following changes to the complaint form:

1. **Automated Complaint Submission:** Include a field where individuals can authorize the system to automatically file a complaint for every aircraft exceeding 55dB, based on data from the community noise monitor.
2. **Accessible Noise Data:** Provide detailed information at each noise monitoring station, including the number of flights exceeding noise thresholds, categorized by departures and arrivals, along with corresponding dB levels and timestamps.

These changes are essential to ensure that the process is accessible and fair, particularly for those you are making vulnerable, traumatized, humiliated, and marginalized individuals.

Thank you for your attention to this matter.

19 (1)



**From:** Quach, Stephanie (TC/TC)  
**To:** Waljee, Imi (he,him | il,lui) (TC/TC)  
**Subject:** FOR URGENT APPROVAL: Ministerial XAO-2023-526740(3)- Re: Urgent Action Needed: Excessive Airplane Noise in Humber River Black Creek  
**Date:** Tuesday, June 20, 2023 1:22:00 PM  
**Attachments:** image001.png  
 ExternalExterne Fw Urgent Action Needed Excessive Airplane Noise in Humber River Black Creek.msg  
**Importance:** High

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UNCLASSIFIED / NON CLASSIFIÉ

Good afternoon Imi,

Please see the below draft in response to three ministerials received from an MP and one of their constituents.

For your urgent approval please.

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**DRAFT:**

Dear MP Judy Sgro,

Thank you for your letter of June 2, 2023, to the Honourable Omar Alghabra, Minister of Transport, regarding the aircraft noise experienced by your constituents in the Humber River Black Creek community. The department also acknowledges the emails of June 14 and 19, 2023 from your constituent, <sup>19 (1)</sup> [REDACTED] Your correspondence has been forwarded to me for a response.

Transport Canada is responsible for developing and overseeing the transportation policies, programs and goals set by the Government of Canada to ensure the national transportation system is safe, efficient, and accessible to all its users. The Transport Canada Civil Aviation mission is to develop and administer policies and regulations for the safest civil aviation system for Canada and Canadians with a vision to an integrated and progressive civil aviation system that promotes a proactive safety culture. In doing so, the department exercises its authority through the *Aeronautics Act* and the Canadian Aviation Regulations (CARs). The CARs are available to the public at the following website: <http://laws-lois.justice.gc.ca/eng/regulations/SOR-96-433/>.

The information noted in your letter and your constituent's emails were reviewed and noted. I wish to advise that while Transport Canada is the safety regulator for aviation in Canada, the department does not get involved in the daily operations of airports and concerns such as noise disturbances should be discussed directly with the appropriate airport authority. It is further noted that there are no regulatory restrictions or limitations on the time of day, volume, or type of aircraft that can utilize the airspace in the Humber River Black Creek area.

The department understands noise management is a complicated and often difficult issue faced by airport authorities and communities around the country. It is an issue that must be managed while ensuring aviation safety is not compromised. With Transport Canada's experience, noise issues have been most effectively addressed at the local community level. Therefore, the department recommends for the community to continue engaging in dialogue with the airport authority directly. For the Pearson International Airport, the Greater Toronto Airports Authority (GTAA) is the corresponding airport authority.

The GTAA's contact information is as follows:

Noise Complaints: <https://www.torontopearson.com/en/community/noise-management/noise-management-program/noise-management-office/noise-complaint>

Phone: 416-247-7678

Online Feedback Form: <https://torontopearson.freshdesk.com/support/tickets/new>

Additionally, the GTAA has made their WebTrak tool publicly available. WebTrak is an online tool that provides a near real-time view of the airspace above the GTA. This tool may be used to identify aircraft that affected your community and file a noise complaint directly from the platform. To access this tool, visit: <https://www.torontopearson.com/en/community/noise-management/noise-management-program/noise-management-office/noise-complaint#webtrak>.

Lastly, it is noted that the department does not approve changes to individual flight paths or routings, other than to confirm that the design meets the appropriate regulations and standards. Therefore, concerns pertaining to this issue should be directed to Nav Canada at:

[service@navcanada.ca](mailto:service@navcanada.ca).

Thank you for writing.

Sincerely,

**Stephanie Quach**

A/Regional Manager, Issues Management

Transport Canada / Government of Canada

[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tel.: 647-394-5485/ TTY: 1-888-675-6863

A/Gestionnaire régional, Gestion d'enjeux

Transports Canada / Gouvernement du Canada

[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tél.: 647-394-5485/ ATS : 1-888-675-6863

**From:** Minister of Transport / Ministre des Transports (TC)

**Sent:** Monday, June 19, 2023 10:12 AM

**To:** XMS Ministerial Registry Unit / Unité du registre ministériel XMS

**Subject:** FW: [External/Externe]: Re: Urgent Action Needed: Excessive Airplane Noise in Humber River Black Creek

UNCLASSIFIED / NON CLASSIFIÉ

XAO-2023-526740(3)

**From:** [19 (1)]

**Sent:** Sunday, June 18, 2023 5:33 PM

**To:** Sgro, Judy - M.P. <[judy.sgro@parl.gc.ca](mailto:judy.sgro@parl.gc.ca)>; Meneses, Albert (Sgro, Judy A. - MP) <[albert.meneses.521@parl.gc.ca](mailto:albert.meneses.521@parl.gc.ca)>

**Cc:** [19 (1)]

[19 (1)]

[19 (1)] 'Councillor Perruzza' <[councillor\\_perruzza@toronto.ca](mailto:councillor_perruzza@toronto.ca)>; [doug.fordco@pc.ola.org](mailto:doug.fordco@pc.ola.org); MayorTO <[MayorTO@toronto.ca](mailto:MayorTO@toronto.ca)>; [19 (1)]

[19 (1)]

[19 (1)]; Sara Mojtehedzadeh <[smojtehedzadeh@thestar.ca](mailto:smojtehedzadeh@thestar.ca)>;

[19 (1)]

19 (1)

19 (1)

Councillor Perruzza'

<councillor\_perruzza@toronto.ca>; [Matias.deDovitiis@toronto.ca](mailto:Matias.deDovitiis@toronto.ca); [doug.fordco@pc.ola.org](mailto:doug.fordco@pc.ola.org);  
MayorTO <MayorTO@toronto.ca>; Tom Rakoccevic <TRakoccevic-CO@ndp.on.ca>;

[newstips@thestar.ca](mailto:newstips@thestar.ca); [gopublic@cbc.ca](mailto:gopublic@cbc.ca); [bkennedy@thestar.ca](mailto:bkennedy@thestar.ca); 19 (1) W5@ctv.ca;  
Alghabra, Omar - M.P. <[omar.alghabra@parl.gc.ca](mailto:omar.alghabra@parl.gc.ca)>; Minister of Transport / Ministre des Transports  
(TC) <[TC.MinisterofTransport-MinistredesTransports.TC@tc.gc.ca](mailto:TC.MinisterofTransport-MinistredesTransports.TC@tc.gc.ca)>

**Subject:** [External/Externe]: Re: Urgent Action Needed: Excessive Airplane Noise in Humber River  
Black Creek

Hello MP Judy Sgro,

I am curious to see if the Minister of Transport of Canada Omar Alghabra has replied to your email regarding excessive airplane noise in the Humber River Black Creek area?

If the Minister of Transport of Canada has not responded to your, will you be contacting him again to see if a reply can be obtained from him?

Did you inform or discuss your email and letter with the Minister of Transport of Canada before you sent it to him? It would have been considerate of you I believe, if you had of made him aware of what you were planning on doing.

It seems like the ball is being passed around here and no one really wants to take ownership on the airplane noise issues that unfortunately affects some people living in the Humber River Black Creek flightpath area.

MOE and Provincial Government has bylaws in place for excessive noise, but NAV Canada along with Ministry of Transport of Canada has no noise restriction limits on the planes that fly over our homes routinely each and every day. This is difficult for me to understand and comprehend....so airplanes have no noise restrictions limits, 19 (1) does and both noises are heard by me and processed by me in the same manner....one noise is okay and the other noise is not....one noise reaching higher than 60 decibels breaks a bylaw and the other noise which is louder does not.

Toronto Pearson Complaints Dept. have told me on numerous occasions now that they cannot do nothing to help me out with the airplane noise; they take my complaint calls and they file them and this is all they can do

19 (1)

19 (1)

Former Minister of Transport of Canada Lisa Raitt boldly stated that all of the noise complaints made to Toronto Pearson are filed, sit in an office and collect dust.

The City and your office knew that an airplane noise monitoring device in my neighbourhood was not operational for several months because of an electrical issue supply to it and that it was not recording data from the airplanes. I had to complain to your office, put in a few service requests to 311 and the City - a few of these service requests were closed, call Toronto

Hydro and I tried to contact NAV Canada and Minister of Transport of Canada office - I could not contact them.

Toronto Pearson with its frequent delays, is overbooked and cannot handle the amount of air traffic that it schedules each day but it continually accepts more. Delays make Toronto Pearson the worst airport in Canada and near to the top of the World's worst airports for delays.

There was a plan, years ago for Buttonville Airport to become a secondary major airport to Toronto Pearson to help alleviate some of the air traffic. Buttonville airport I understand will be closed shortly. Billy Bishop will never become a major airport because of many wealthy people who live near to the airport and are opposed to it becoming a major airport. Why isn't there plan now to build another major airport for Toronto? Shouldn't your government, the provincial government and municipal government be pushing for one to be built now?

Canada population topped 40,000,000 recently, thru immigration primarily and most of these welcomed new citizens of Canada I understand have chosen to live near TO. I would expect Pearson Airport to become much busier in the years ahead with a number of new Canadian citizens wanting to visit families and friends from their original countries once or twice a year or have their families or friends come visit them. Did the Federal Government put any thought into airport planning here for Toronto, or will this be a big surprise to governments on all levels on how busy Pearson Airport will become in the years ahead?

How much money does Pearson Airport generate for the Federal Government each year?

I did ask Pearson Complaints Dept recently. if they could provide me details of how much money the airport makes for each takeoff and landing. I don't expect an answer from them.

We live in a world where money is considered a major factor in all of our everyday decisions. What is more important the airplane noise that affects only a few thousand people who live near the airport or the money that can be generated by the airport with increased air traffic? This seems like an easy answer for the Federal Government to answer.

19 (1)

Last year when major repairs were being made to one of the runways at Pearsons, my neighbourhood received a significant amount of air traffic and a number of people who called into Pearson Airport to complain about the plane noise were given a \$100 Visa gift card by Pearson. Pearson openly admitted with the Visa gift card that the plane noise was definitely a problem. It is unfortunate that not everyone in my community who was affected by the airplane noise were not also give a Visa Card.

I understand that there were discussions to lower property taxes for people in my community affected by the increased noise during the many months that it took to repair the runway. The lowered property were not approved.

Another major airport for Toronto needs to be built sometime in the near future!

Take care,

19 (1)

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**From:** Sgro, Judy - M.P. <[judy.sgro@parl.gc.ca](mailto:judy.sgro@parl.gc.ca)>

**Sent:** June 8, 2023 6:14 PM

**To:** Meneses, Albert (Sgro, Judy A. - MP) <[albert.meneses.521@parl.gc.ca](mailto:albert.meneses.521@parl.gc.ca)>

**Subject:** FW: Urgent Action Needed: Excessive Airplane Noise in Humber River Black Creek

Dear Minister Alghabra,

I hope this email finds you in good health and high spirits. I am writing to you today as a concerned Member of Parliament representing the constituents of Humber River Black Creek. I would like to bring to your attention a pressing matter that requires immediate action: the persistent issue of excessive airplane noise in our community.

Attached to this email, you will find a letter outlining the details of the problem and the impact it has on our residents. I have outlined several suggested actions, including a comprehensive review of flight paths and air traffic management strategies in the vicinity of Humber River Black Creek.

I firmly believe that through collaboration, proactive communication, and a commitment to finding viable solutions, we can alleviate the burden of excessive airplane noise on the residents of Humber River Black Creek. I trust in your dedication to serving the interests of Canadians and ensuring a high quality of life for all citizens.

Thank you for your attention to this matter. I eagerly anticipate your swift action and ongoing support in resolving this pressing issue. Please do not hesitate to contact me should you require any further information or assistance.

Yours sincerely,



HOUSE  
OF COMMONS

Office of Hon. Judy A. Sgro,  
Chair Standing Committee on International  
Trade  
Privy Council, Member of Parliament  
Humber River Black-Creek  
Ottawa Office: 613-992-7774  
Constituency Office: 416-744-1882

**From:** Alhabra, Omar - M.P.  
**Sent:** Wed, 14 Jun 2023 16:16:50 +0000  
**To:** Minister of Transport / Ministre des Transports (TC)  
**Subject:** [External/Externe]: Fw: Urgent Action Needed: Excessive Airplane Noise in Humber River Black Creek  
**Attachments:** Urgent Request for Action on Airplane Noise Issue.pdf

XAO-2023-526740(2)

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**From:** 19 (1)  
**Sent:** Tuesday, June 13, 2023 6:58 AM  
**To:** Sgro, Judy - M.P. <judy.sgro@parl.gc.ca>; Meneses, Albert (Sgro, Judy A. - MP) <albert.meneses.521@parl.gc.ca>  
**Cc:** Alhabra, Omar - M.P. <Omar.Alhabra@parl.gc.ca>; 19 (1)  
 19 (1)  
 19 (1) 'Councillor Perruzza' <councillor\_perruzza@toronto.ca>; Matias.deDovitiis@toronto.ca <Matias.deDovitiis@toronto.ca>; MayorTO <MayorTO@toronto.ca>; 19 (1) torsun.citydesk@sunmedia.ca <torsun.citydesk@sunmedia.ca>; newstips@thestar.ca <newstips@thestar.ca>; gopublic@cbc.ca <gopublic@cbc.ca>; 19 (1)  
**Subject:** Fw: Urgent Action Needed: Excessive Airplane Noise in Humber River Black Creek

Hello MP Judy Sgro,

I would like to express my concern with the way Toronto Pearson Noise Complaint Dept has handled my noise complaints in my community recently.

At the meeting that you arranged in April for my community to speak with Toronto Pearson Noise Complaint Dept directly; 19 (1)

19 (1)  
 19 (1) Why wasn't this supervisor also sitting down at a table taking questions too from my community? 19 (1)  
 19 (1)

Most recently I was told by a representative at Toronto Pearson Noise Complaint Dept. - call in centre - 19 (1)



19 (1)

The sound monitoring device that Pearson Airport has located near my community was not working for a few months. I had a better relationship with Toronto Pearson Complaint Dept several months ago and the person from this department informed me of this issue - I would never have found this information out unless it was through casual conversation with the person in this department. There was no urgency it seemed by the City, your office, Minister of Transport or Toronto Pearson Airport at the time to get it fixed. I had to complain several times to try and get it fixed. The excuses for it not getting fixed and the time taken for the repair to be made was terrible. This is important information and it was not recorded for several months.

I am not sure if present Minister of Transport is aware of a comment made by former Minister of Transport Lisa Raitt with regards to noise complaints made to Toronto Pearson Airport?

**"Noise complaints with Toronto Pearson Airport are flawed when I realized the registered complaints are monitored but gathered dust in offices!"**

Nothing is done about the airplane noise complaints and according to Toronto Pearson Airport from a former Minister of Transport.

Toronto Pearson Noise Complaint Dept. does not have the ability to do anything anyways about the noise complaints that they receive. \*Why even have this Complaint Dept????\*

NAV Canada gets to write their own rules and regulations, planes that fly over my house can make as much noise as they want without concern to my health or well-being.

MOE and NAV Canada terms to noise violation do not compare any way, shape or form. It boggles the mind how this can happen!

The reason must be money! The more planes that take off and land at Toronto Pearson the more money that is made and who cares about the health or well-being of the few people that are unfortunate to reside in the flight path of Toronto Pearson Airport. The Airport is a 24/7 operation now!

Whatever happened to government money being invested in a second major airport for Toronto. Buttonville? Government is broke and doesn't want to invest in another airport. Immigration should be stalled until another major airport is built for Toronto!



Have yourself a wonderful day!

Take care,

19 (1)

---

**From:** Sgro, Judy - M.P. <judy.sgro@parl.gc.ca>

**Sent:** June 8, 2023 6:14 PM

**To:** Meneses, Albert (Sgro, Judy A. - MP) { 19 (1) }@parl.gc.ca>

**Subject:** FW: Urgent Action Needed: Excessive Airplane Noise in Humber River Black Creek

Dear Minister Alhabra,

I hope this email finds you in good health and high spirits. I am writing to you today as a concerned Member of Parliament representing the constituents of Humber River Black Creek. I would like to bring to your attention a pressing matter that requires immediate action: the persistent issue of excessive airplane noise in our community.

Attached to this email, you will find a letter outlining the details of the problem and the impact it has on our residents. I have outlined several suggested actions, including a comprehensive review of flight paths and air traffic management strategies in the vicinity of Humber River Black Creek.

I firmly believe that through collaboration, proactive communication, and a commitment to finding viable solutions, we can alleviate the burden of excessive airplane noise on the residents of Humber River Black Creek. I trust in your dedication to serving the interests of Canadians and ensuring a high quality of life for all citizens.

Thank you for your attention to this matter. I eagerly anticipate your swift action and ongoing support in resolving this pressing issue. Please do not hesitate to contact me should you require any further information or assistance.

Yours sincerely,



Office of Hon. Judy A. Sgro,  
Chair Standing Committee on International Trade  
Privy Council, Member of Parliament  
Humber River Black-Creek  
Ottawa Office: 613-992-7774  
Constituency Office: 416-744-1882



**The Hon. Judy Sgro M.P.**  
Humber River-Black Creek

**Constituency  
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[judy.sgro@parl.gc.ca](mailto:judy.sgro@parl.gc.ca)



June 2<sup>nd</sup>, 2023

The Honourable Omar Alghabra  
Minister of Transport  
Transport Canada  
Ottawa, Ontario  
Canada

Subject: Urgent Request for Action on Airplane Noise Issue

Dear Minister Alghabra,

I hope this letter finds you in good health and high spirits. I am writing to you today as a concerned Member of Parliament representing the constituents of Humber River Black Creek. I would like to bring to your attention a pressing matter that requires immediate action: the persistent issue of excessive airplane noise in our community.

Over the past several months, I have received numerous complaints and concerns from constituents regarding the disruptive impact of airplane noise on their daily lives. The frequency and intensity of aircraft passing over our community have significantly increased, causing distress, sleep disturbances, and a decrease in the overall quality of life for our residents.

The residents of Humber River Black Creek have expressed their frustration and dissatisfaction with the current situation. They feel that their concerns have not been adequately addressed, and they are seeking resolution to this ongoing problem. As their elected representative, I share their sentiments and believe that it is our responsibility to address these issues and provide relief to our constituents.

I understand that managing air traffic is a complex task, and it requires coordination and collaboration among various stakeholders. However, I urge you to prioritize this matter and work towards finding viable solutions that can mitigate the impact of airplane noise on our community.

I kindly request that you undertake a comprehensive review of the flight paths and air traffic management strategies in the vicinity of Humber River Black Creek. It is essential to explore all possible measures, including adjusting flight paths, implementing noise reduction technologies, and engaging with relevant agencies to develop and enforce stricter noise regulations.

Moreover, I encourage you to consult directly with the affected residents and community representatives to gain firsthand insights into the challenges they face. Their experiences and perspectives will provide valuable guidance in formulating effective strategies to address the airplane noise issue and restore tranquility to our community.



**The Hon. Judy Sgro M.P.**  
Humber River-Black Creek

**Constituency  
Office**

2201 Finch Ave. West  
Unit 25  
Toronto, Ontario  
CANADA M9M 2Y9

416-744-1882 ph  
416-952-1696 fx

[judy.sgro@parl.gc.ca](mailto:judy.sgro@parl.gc.ca)

**Parliament Hill  
Office**

Valour Building  
Room 1180  
House of Commons  
Ottawa, Ontario  
CANADA K1A 0A6

613-992-7774 ph  
613-947-8319 fx

[judy.sgro@parl.gc.ca](mailto:judy.sgro@parl.gc.ca)

I believe that through collaboration, proactive communication, and a commitment to finding viable solutions, we can alleviate the burden of excessive airplane noise on the residents of Humber River Black Creek. I trust in your dedication to serving the interests of Canadians and ensuring a high quality of life for all citizens.

Thank you for your attention to this matter. I eagerly anticipate your swift action and ongoing support in resolving this pressing issue. Please do not hesitate to contact me should you require any further information or assistance.

Yours sincerely,

A handwritten signature in cursive script that reads "Judy A. Sgro".

*Hon. Judy A. Sgro, Privy Council*  
**Member of Parliament**  
**Humber River-Black Creek.**



**From:** Gillespie, Robert  
**To:** Frank, Clifford; Nicholl, Gregory; Miller, Brenda (PAX-TOR)  
**Subject:** FW: How to Publish Changes to Noise Abatement  
**Date:** Tuesday, September 04, 2018 3:36:10 PM  
**Attachments:** image003.png

---

Hello All;

Here is the answer to how we would publish a temporary change to the noise abatement rules.

Robert Gillespie

Technical Team Lead - Flight Operations

Transport Canada / Government of Canada

[Robert.Gillespie@tc.gc.ca](mailto:Robert.Gillespie@tc.gc.ca) / Tel: 905-405-3298 / Cel: 647-449-8847 / TTY: 1-888-675-6863

Chef d'équipe technique - Opérations aériennes

Transports Canada / Gouvernement du Canada

[Robert.Gillespie@tc.gc.ca](mailto:Robert.Gillespie@tc.gc.ca) / Tél: 905-405-3298 / Tél cell: 647-449-8847 / ATS: 1-888-675-6863

---

**From:** McKenzie, Andrew (Navigation & Airspace) [mailto:19 (1)@navcanada.ca]  
**Sent:** Tuesday, September 04, 2018 12:46 PM  
**To:** Gillespie, Robert <[robert.gillespie@tc.gc.ca](mailto:robert.gillespie@tc.gc.ca)>  
**Cc:** Cushnie, Blake 19 (1)@navcanada.ca>  
**Subject:** RE: How to Publish Changes to Noise Abatement

Hi Robert,

We have confirmed with our standards folks that since this is a temporary change (call it tempo of sorts until the trial is successful) then a NOTAM should be fine.

I presume this is for initiative #6?

**Andrew McKenzie**

Senior CNS Operations Technology Specialist | Spécialiste principal, technologie, opérations CNS

**NAV CANADA**

19 (1)@navcanada.ca

761-77 rue Metcalfe St., Ottawa, ON K1P 5L6

T. 19 (1) C. 19 (1)

[www.navcanada.ca](http://www.navcanada.ca)



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Page 435 /  
2990

**From:** Gillespie, Robert [<mailto:robert.gillespie@tc.gc.ca>]  
**Sent:** August 29, 2018 9:08 AM  
**To:** Cushnie, Blake <19 (1) [REDACTED]@navcanada.ca>  
**Subject:** How to Publish Changes to Noise Abatement

Hello Blake;

I was wondering if you might be able to direct me to someone in Nav Canada regarding publishing noise abatement data.

We are looking at making changes to the noise abatement procedures at Toronto to facilitate a trial procedure for the GTAA. If approved, we would publish this in the CFS and CAP4. Until the updates are printed we would look at publishing a NOTAM. When discussing this, my manager recalled in the past that Nav Canada had objections to doing it this way— but he could not recall the details of the objection.

Could you recommend someone I could contact to discuss Nav Canada's procedures for something of this nature?

Thank you Blake.

Robert Gillespie

Technical Team Lead - Flight Operations  
Transport Canada / Government of Canada  
[Robert.Gillespie@tc.gc.ca](mailto:Robert.Gillespie@tc.gc.ca) / Tel: 905-405-3298 / Cel: 647-449-8847 / TTY: 1-888-675-6863

Chef d'équipe technique - Opérations aériennes  
Transports Canada / Gouvernement du Canada  
[Robert.Gillespie@tc.gc.ca](mailto:Robert.Gillespie@tc.gc.ca) / Tél: 905-405-3298 / Tél cell: 647-449-8847 / ATS: 1-888-675-6863

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**From:** [ONT Aviation Services / Services aviation ONT \(TC\)](#)  
**To:** [ONT Civil Aviation Issues / Enjeux Aviation Civile ONT \(TC/TC\)](#)  
**Subject:** FW: [External/Externe]: Aircraft Noise Concerns-Novick  
**Date:** Friday, April 11, 2025 6:58:09 PM

---

UNCLASSIFIED / NON CLASSIFIÉ

Hello,

FYI/A – please see email below.

Thanks!

**Tamara Henry**

Service Team Officer, Civil Aviation Services  
 Transport Canada/ Government of Canada  
 Tel: 1-800-305-2059/ TTY: 1-888-675-6863\

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Agente de l'équipe de service, Services de l'Aviation Civile  
 Transports Canada / Gouvernement du Canada  
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**From:** 19 (1)  
**Sent:** Friday, April 11, 2025 4:48 PM  
**To:** ONT Aviation Services / Services aviation ONT (TC) <aviation.ont@tc.gc.ca>  
**Subject:** [External/Externe]: Aircraft Noise Concerns

Hello, can you assist with my concern below? I am trying to find the right person/department to discuss.

19 (1)

----- Forwarded message -----

**From:** Info <[Info@otc-cta.gc.ca](mailto:Info@otc-cta.gc.ca)>  
**Date:** Fri, Apr 11, 2025, 9:57 AM  
**Subject:** RE: [Externe/External]:Aircraft Noise Concerns  
**To:** 19 (1)

Dear 19 (1)

Thanks for contacting the Canadian Transportation Agency (CTA).

Unfortunately, your complaint does not fall under the mandate of the Canadian Transportation Agency. The Agency doesn't have jurisdiction over air traffic noise.

We would suggest you contact Transport Canada, which has authority on this matter. You can contact them at: <https://tc.canada.ca/en/corporate-services/contact-transport-canada>

Best regards,

info@ Team

Office des transports du Canada / Gouvernement du Canada

[info@otc-cta.gc.ca](mailto:info@otc-cta.gc.ca) / Tél: 1-888-222-2592 / ATS: 1-800-669-5575

Canadian Transportation Agency / Government of Canada

[info@otc-cta.gc.ca](mailto:info@otc-cta.gc.ca) / Telephone 1-888-222-2592

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**From:** 19 (1)  
**Sent:** Friday, April 11, 2025 12:37 AM  
**To:** Info <[Info@otc-cta.gc.ca](mailto:Info@otc-cta.gc.ca)>  
**Subject:** [Externe/External]:Aircraft Noise Concerns

Hello,

I have concerns with jet aircraft noise late at night from air traffic flying over my home in Oakville.

Who do I contact about this? The issue seems to have started recently.

19 (1)

**From:** [ONT Aviation Services / Services aviation ONT \(TC\)](#)  
**To:** [ONT Civil Aviation Issues / Enjeux Aviation Civile ONT \(TC/TC\)](#)  
**Subject:** FW: [External/Externe]: Constant low overflight altitude over house  
**Date:** Monday, December 15, 2025 9:28:01 AM

---

UNCLASSIFIED / NON CLASSIFIÉ

Good Morning,

FYI/A – please see email below.

Thanks!

**Tamara Henry**

Service Team Officer, Civil Aviation Services  
 Transport Canada/ Government of Canada  
 Tel: 1-800-305-2059/ TTY: 1-888-675-6863\

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Agente de l'équipe de service, Services de l'Aviation Civile  
 Transports Canada / Gouvernement du Canada  
 Tél: 1-800-305-2059 / ATS: 1-888-675-6863

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**From:** [REDACTED]  
**Sent:** Saturday, December 13, 2025 5:29 PM  
**To:** service@navcanada.ca; Crossan, Irelande <[REDACTED]@navcanada.ca>;  
 [REDACTED] <[REDACTED]@navcanada.ca>;  
 [REDACTED] <[REDACTED]@navcanada.ca>  
 [REDACTED] <[REDACTED]@navcanada.ca>  
 [REDACTED] <[REDACTED]@navcanada.ca>  
**Subject:** [External/Externe]: Constant low overflight altitude over house

Hi there,

I've reached out to each of the areas on this email chain individually over the past few months because the neighbours in our area are concerned with the frequent (every minute) overflight altitude and associated noise.

We have definitely noticed increased traffic over the past few months as well as increased noise so it is possible to change it but we were looking for a reduction in the cumulative noise exposure.

There are at least 4 families dealing with significant health concerns that would greatly benefit from this reduction.

I'm hoping that by including everyone at least one person could get this email to a person who would be able to help us instead of referring me back and forth between each of these people on this list.

Thank you in advance for making this very important issue for us less difficult to resolve.

19 (1)



**From:** Quach, Stephanie (TC/TC)  
**To:** Miller, Brenda (TC/TC)  
**Subject:** FW: [External/Externe]: Fw: Upcoming NAV CANADA Flight Checks: Second semi-annual test  
**Date:** Tuesday, July 25, 2023 3:57:00 PM

UNCLASSIFIED / NON CLASSIFIÉ

Hi Brenda,  
 Just sharing the below for awareness.  
 Thanks!  
 Steph

**From:** Alghabra, Omar - M.P.  
**Sent:** Friday, July 21, 2023 12:04 PM  
**To:** Minister of Transport / Ministre des Transports (TC)  
**Subject:** [External/Externe]: Fw: Upcoming NAV CANADA Flight Checks: Second semi-annual test XAO-2023-527864

**From:** Fares Khouri 19 (1) [@gtaa.com](mailto:fares.khouri@gtaa.com)>  
**Sent:** Friday, July 21, 2023 11:57 AM  
**To:** Alghabra, Omar - M.P. <[Omar.Alghabra@parl.gc.ca](mailto:Omar.Alghabra@parl.gc.ca)>  
**Subject:** Upcoming NAV CANADA Flight Checks: Second semi-annual test

Hello,  
 NAV Canada regularly conducts instrument landing system (ILS) check at Toronto Pearson. This is a routine operation that ensures the accuracy and safety of the country's navigation aids and instrument approach procedures. The ILS is a precision approach system that provides navigational guidance signals and information on a cockpit display to guide pilots accurately to the point of landing in periods of poor visibility.

Historically, these checks have happened during the daytime hours and do not elicit many resident complaints. NAV Canada preformed the first nighttime checks in March 2023, these checks were moved to the nighttime period to minimize disruption to the operation. Community reaction to the nighttime checks conducted in March was limited. The second semi-annual test of 2023 will take place between July 24 and 26 from approx. 11:30PM to 2:00AM (weather contingency date on July 26 11:30pm to July 27 2:00 am) and will involve all runways at Toronto Pearson. It will take approximately 20 minutes per runway.

Pre-approved flights do operate in the overnight hours in accordance with the Night Flight Restriction program in effect between 12:30 am and 6:30 am. However, given that the flight checks will involve flight patterns of repeated approaches for the runways at varying combinations of height, speed, and direction, we wanted to inform you that there might be noise impacts in your riding.

We will be posting the information on our [Noise Advisory Calendar](#) by Friday, July 21, as well as posting a message on [WebTrak](#).

Affected residents can feel free to reach out to the Toronto Pearson Noise Management Office directly if they have any questions or wish to submit a noise complaint:

- [Online](#) using WebTrak or the complaint form
- By phone 416-247-7682

Best,

Public Affairs Team

**From:** Quach, Stephanie (TC/TC)  
**To:** ONT Civil Aviation Issues / Enjeux Aviation Civile ONT (TC/TC)  
**Subject:** FW: [External/Externe]: Overnight airplane noise torture  
**Date:** Tuesday, May 20, 2025 1:07:52 PM  
**Attachments:** IMG\_3903.PNG  
 ExternalExterne Midnight airplane noise torture .msg

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UNCLASSIFIED / NON CLASSIFIÉ

Hi Patricia,

Yes, agree with your approach. If possible, recommend further emphasis on TC's mandate and regulatory authority under the CARs and the concerns he has are best addressed by the airport authority.

Thanks,  
 Steph

---

**From:** ONT Civil Aviation Issues / Enjeux Aviation Civile ONT (TC/TC) <TC.ONTCivAvlIssues-EnjeuxAvCivONT.TC@tc.gc.ca>  
**Sent:** Tuesday, May 20, 2025 12:53 PM  
**To:** Quach, Stephanie (TC/TC) <Stephanie.Quach@tc.gc.ca>  
**Subject:** FW: [External/Externe]: Overnight airplane noise torture

UNCLASSIFIED / NON CLASSIFIÉ

Hi Steph,

This member of the public 19 (1) received a response from us. He has sent 2 subsequent emails but has not provided any information. In his latest email below, he has included a snippet of his complaint to the GTAA regarding noise.  
 At this point, there is nothing further to advise him on. He was sent the standard low flying / noise – GTAA contact info email.

Shall I draft a short email reiterating/ summarizing the original email?

Thank you,

Patricia



(she, her | elle, la)

A/Issues Management Officer  
 Transport Canada / Government of Canada  
[patricialynn.rebia@tc.gc.ca](mailto:patricialynn.rebia@tc.gc.ca) / Cel : 437-518-6008 / TTY: 1-888-675-6863

A/Agente, Gestion des Enjeux  
 Transports Canada / Gouvernement du Canada  
[patricialynn.rebia@tc.gc.ca](mailto:patricialynn.rebia@tc.gc.ca) / Tél Cel: 437-518-6008 / ATS: 1-888-675-6863

---

**From:** 19 (1)  
**Sent:** Monday, May 19, 2025 6:14 AM  
**To:** ONT Civil Aviation Issues / Enjeux Aviation Civile ONT (TC/TC) <[TC.ONTCivAvIssues-EnjeuxAvCivONT.TC@tc.gc.ca](mailto:TC.ONTCivAvIssues-EnjeuxAvCivONT.TC@tc.gc.ca)>  
**Subject:** [External/Externe]: Overnight airplane noise torture

Hi guys ,

I have not heard back from you about my last email. I am forwarding you a copy of my complaint submitted to GTAA at around 3.15 am today. I am sleepy ,tired and frustrated as I write this email to you at 6am on Victoria Day long weekend. I was woken up at 3.15 am and have been up since. I was suppose to 19 (1) as a don't want to drive half asleep.Please stop destroying our life and torturing us in the middle of the night, when we are in deep sleep. I know you all are enjoying your long weekend but you have succeeded in ruining ours.Please fix this fundamentally flawed policy.Hope to hear back and some action taken by you ASAP.

Regards

19 (1)

**From:** [19 (1)]  
**Sent:** Wed, 7 May 2025 16:06:31 -0400  
**To:** ONT Civil Aviation Issues / Enjeux Aviation Civile ONT (TC/TC)  
**Subject:** [External/Externe]: Midnight airplane noise torture

Hello ,My Name is [19 (1)] and my address is [19 (1)] Brampton Ontario [19 (1)]. I have been [19 (1)]

I appreciate your email response dated may1,2025 to my complaint .Unfortunately I am not getting any response, to my multiple on line complaints ,from GTAA.Their standard answer-on the phone is that they have no plans to change the discriminating ,outdated and flawed policy of preferred overnight flights routes.

Last night I went to bed at 11 pm and was woken up at 12.48 am by the loud noise of a plane flying over my house and then the planes kept coming till 2.30 am . I sat in my bed frustrated and angry.

I can't [19 (1)] after I have been tortured all night.This needs to fixed and I deserve to have a basic human right to be able to sleep in my own bedroom.

Please fix your policy so that I can live safely and [19 (1)]

Hoping for a quick resolution .

Regards

[19 (1)]

4:01

We Have Received Your Complaint(s)

Thank you. We have received your complaint(s).

[Submit another complaint](#)

Complaint submitted at: May 19 2025 04:01 AM

First name: 19 (1)

Last name: 19 (1)

Address: 19 (1)

City: 19 (1)

Postal Code: 19 (1)

Cell phone: 19 (1)

Email: 19 (1)

Complaint date: May 19 2025

Please give details: 3:41 am Monday morning and woken up by loud low flying airplane it seems like you are angry with me and want to make sure to torture me intentionally.  
3:55 am and here comes the next plane  
Please stop this madness/torture ASAP

Would you like us to contact you? Yes

By submitting this form, I am confirming that I am the person named in the complaint.

AA complaint-ca.emsbk.com

< >   

Sent from my iPhone

**From:** [ONT Aviation Services / Services aviation ONT \(TC\)](#)  
**To:** [ONT Civil Aviation Issues / Enjeux Aviation Civile ONT \(TC/TC\)](#)  
**Subject:** FW: [External/Externe]: Urgent Concern: Excessive Airplane Noise Over Residential Area (19 (1)) – Request for Action  
**Date:** Tuesday, July 15, 2025 12:33:34 PM  
**Attachments:** Gmail - RE 2023-1 [External Externe] Contact us #102624.pdf

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UNCLASSIFIED / NON CLASSIFIÉ

Please see below.

Thanks

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**From:** (19 (1))  
**Sent:** Friday, July 11, 2025 10:33 PM  
**To:** ONT Aviation Services / Services aviation ONT (TC) <aviation.ont@tc.gc.ca>  
**Subject:** [External/Externe]: Urgent Concern: Excessive Airplane Noise Over Residential Area (L9T 8J8) – Request for Action

Hi,

I hope you are well.

I am writing to you on request of my MP Adam Van Koeverden. I am doing so not only as a concerned resident of **Milton** (19 (1)), but also as (19 (1))

For some time now, I have been dealing with **severe and relentless airplane noise** directly over my home. This is not a general Milton-wide issue — it is **specific to our part of town**. I (19 (1)) and on many days, **200 to 250 planes fly over my house**, including at **very late hours (sometimes as late as 2:00 AM)**. It has become impossible to concentrate, rest properly, or enjoy peace at home.

This constant disruption has taken a **serious toll on my mental health**. I have

(19 (1)) and I'm currently (19 (1))  
 (19 (1)) I can provide if needed.

I have already contacted the **Greater Toronto Airports Authority (GTAA)**, and while they say that noise levels are “within limits,” their data doesn't reflect the **real, lived experience** of residents under these flight paths. The sheer **frequency and volume** are unbearable — even if each individual flight complies with official limits. I did reach out to Transport Canada before as well but the answer was very vague and extremely non-genuine.

The recent **airplane incident in India** has further heightened my fear and concern about

safety. Here's a link to that news story:

<https://www.cnn.com/world/live-news/ahmedabad-india-plane-crash-06-12-25>

There's also compelling research showing how **long-term exposure to aircraft noise increases risks of heart disease and other health issues:**

NIH Study: Aircraft Noise and Cardiovascular Health

When I purchased my home, **there was no warning** about flight noise in this area. In Mississauga, homes in noise-affected zones have visible **aircraft noise warning signs**, but none were present in my case. I'm attaching a photo of those signs as a reference. Now, I don't want you to install such signs in Milton because it's too late and property prices will fall if you do.

I've also attached a **video recording** of the noise level over my home to demonstrate how serious the issue is. I've tried every solution I could think of — **sound-blocking curtains, noise reduction tools, etc.** — but none have helped.

I urge you to please **take concrete action**. It's very likely these flight paths were laid out **before Milton became so densely populated**. It's time to reassess these routes and prioritize **directing flights over rural or less populated areas**, rather than over established urban neighborhoods like ours.

I sincerely hope you will take this issue seriously. Thank you for your time and commitment.

Sincerely,

[19 (1)]

[19 (1)] Milton ON [19 (1)]

#### **Attachments:**

1. Video clip of airplane noise

[19 (1)]

2. Photo of Mississauga aircraft noise warning sign
3. Email of my past communication with Transport Canada



19 (1)

**RE: 2023-1 [External/Externe]: Contact us #102624****Shaikh, Farha (TC/TC)** <farha.shaikh@tc.gc.ca>

Fri, Dec 8, 2023 at 4:07 PM

To: 19 (1)

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Hello

19 (1)

Thank you for contacting Transport Canada.

Transport Canada is responsible for developing and overseeing the transportation policies, programs, and goals set by the Government of Canada to ensure the national transportation system is safe, efficient, and accessible to all its users. The Transport Canada Civil Aviation mission is to develop and administer policies and regulations for the safest civil aviation system for Canada and Canadians with a vision of an integrated and progressive civil aviation system that promotes a proactive safety culture.

As the safety regulator for the transportation system in Canada, the department exercises its authority through the *Aeronautics Act* and Canadian Aviation Regulations (CARs). The CARs are available to the public at the following website: <http://laws-lois.justice.gc.ca/eng/regulations/SOR-96-433/>.

The CARs state that, except when taking off or landing, aircraft may not be operated over a built-up area at an altitude lower than 1,000 feet above the highest obstacle within a horizontal distance of 2,000 feet from the aircraft (or 500 feet for helicopters). When not operating over a built-up area, aircraft must maintain a minimum distance of 500 feet from any person, vessel, vehicle or structure.

Unfortunately, noise management is a complicated and often difficult issue faced by airport authorities and communities around the country. It is an issue that must be managed while ensuring that aviation safety is not compromised. Transport Canada's experience has shown that noise issues are most effectively addressed at the local community level.

One of the tools to assist airports includes a process through which airport operators develop noise abatement procedures and operating restrictions by consulting aviation stakeholders and local communities. We advise that noise abatement procedures for the Toronto Pearson International Airport are in place, in addition to the Night Flight Program, which limits nighttime noise and balances the growing regional demand. This night flight restriction program limits the number of movements during the restricted hours (12:30 am to 6:29 am). For more information, please visit:

7/5/25, 6:59 PM

Gmail - RE: 2023-1 [External/Externe]: Contact us #102624

<https://www.torontopearson.com/en/community/noise-management/noise-management-program>. In addition, the department encourages dialogue with the airport operator directly, as Transport Canada is not involved in the daily operations at Toronto Pearson International Airport.

The contact for the airport operators are noted below:

The Greater Toronto Airports Authority (GTAA)

Phone: 416-247-7682

Website: <https://www.torontopearson.com/en/community/noise-management/noise-management-program/noise-management-office/noise-complaint>

Burlington Airpark

Website: <https://burlingtonairpark.com/contact/>

Thank you for writing.

Farha Shaikh

Issues Management Officer

Transport Canada/ Government of Canada

[farha.shaikh@tc.gc.ca](mailto:farha.shaikh@tc.gc.ca)/ Tel: 647-221-0685/ TTY: 1-888-675-6863

Agenté, Gestion d'enjeux

Transports Canada / Gouvernement du Canada

[farha.shaikh@tc.gc.ca](mailto:farha.shaikh@tc.gc.ca) / Tél. : 647-221-0685 / ATS : 1-888-675-6863

---

**Sent:** Tuesday, October 17, 2023 8:55 PM

**To:** Civil Aviation Communications Centre - Centre de communications de l'Aviation civile <[services@tc.gc.ca](mailto:services@tc.gc.ca)>

**Subject:** [External/Externe]: Contact us #102624

Submitted on Tue, 10/17/2023 - 20:54



7/5/25, 6:59 PM

Gmail - RE: 2023-1 [External/Externe]: Contact us #102624

Submitted by: Anonymous

Submitted values are:

**First name:**

19 (1)

**Last name:**

19 (1)

**Address:**

19 (1)

Milton, ON 19 (1)

**Email:**

19 (1)

**Member of the industry**

No

**Member of the public**

Yes

**Follow up on previous enquiry**

No

**New enquiry / comment**

No

**Message:**

Hi,

I just moved to a new location in Milton, and I have some serious concerns about the aircraft noise. On a regular day around 70-80 planes fly above my house. Some even late in the night. I decibels are pretty high when they fly over and I can hear then through my windows even though they are double glazed.

This is causing me stress and I am sure it is not good for my health.

The planes flying are both commercial airliners going to Pearson & going to the flying school located at Burlington.

It is particularly bad from 3pm to 8pm

**From:** [George, Marcia \(TC/TC\)](#)  
**To:** [Quach, Stephanie \(TC/TC\)](#)  
**Subject:** FW: Aviation Enforcement Standards DN Stats - Q3  
**Date:** Tuesday, March 18, 2025 12:05:17 AM  
**Attachments:** [image001.png](#)  
[FOR APPROVAL MPO - Response on Pearson Night Flights \(13637\).msg](#)

---

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Hi Stephanie

Some enforcement numbers (below) to support attached MPQ response

Again, recommending that REU/Lisa help with wording.

Thank you

Marcia

---

**From:** Meunier, Félix (TC/TC) <[felix.meunier@tc.gc.ca](mailto:felix.meunier@tc.gc.ca)>  
**Sent:** Monday, March 10, 2025 12:12 PM  
**To:** Mawji, Hanif (TC/TC) <[hanif.mawji@tc.gc.ca](mailto:hanif.mawji@tc.gc.ca)>; George, Marcia (TC/TC) <[marcia.george@tc.gc.ca](mailto:marcia.george@tc.gc.ca)>  
**Subject:** RE: Aviation Enforcement Standards DN Stats - Q3

UNCLASSIFIED / NON CLASSIFIÉ

Sounds good thanks.

---

**De :** Mawji, Hanif (TC/TC) <[hanif.mawji@tc.gc.ca](mailto:hanif.mawji@tc.gc.ca)>  
**Envoyé :** lundi, mars 10, 2025 12:08  
**À :** George, Marcia (TC/TC) <[marcia.george@tc.gc.ca](mailto:marcia.george@tc.gc.ca)>; Meunier, Félix (TC/TC) <[felix.meunier@tc.gc.ca](mailto:felix.meunier@tc.gc.ca)>  
**Objet :** RE: Aviation Enforcement Standards DN Stats - Q3

UNCLASSIFIED / NON CLASSIFIÉ

Hi Felix

There are at least 2 for which AMPs have been issued, and 26 which are under investigation and should be processed in short order. I believe we have sorted out the disconnect in receiving these so the numbers will go up shortly



Hanif Mawji  
Associate Director, Operations East  
Transport Canada / Government of Canada  
[Hanif.mawji@tc.gc.ca](mailto:Hanif.mawji@tc.gc.ca) / Tel: 416-954-2058 / Cel: 416-525-2421 / TTY: 1-888-675-6863

Directeur associé, Opérations Est  
Transports Canada / Gouvernement du Canada  
[Hanif.mawji@tc.gc.ca](mailto:Hanif.mawji@tc.gc.ca) / Tél. : 416-954-2058/ Tél. cell. : 416-525-2421 / ATS : 1-888-675-6863

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**From:** George, Marcia (TC/TC) <[marcia.george@tc.gc.ca](mailto:marcia.george@tc.gc.ca)>  
**Sent:** Monday, March 10, 2025 9:56 AM  
**To:** Meunier, Félix (TC/TC) <[felix.meunier@tc.gc.ca](mailto:felix.meunier@tc.gc.ca)>  
**Cc:** Mawji, Hanif (TC/TC) <[hanif.mawji@tc.gc.ca](mailto:hanif.mawji@tc.gc.ca)>  
**Subject:** Re: Aviation Enforcement Standards DN Stats - Q3

Hanif is looking in to this for you

I am off this week. 19 (1)

Marcia

Sent from my iPhone

On Mar 10, 2025, at 9:18 AM, Meunier, Félix (TC/TC) <[felix.meunier@tc.gc.ca](mailto:felix.meunier@tc.gc.ca)> wrote:

PROTECTED A / PROTÉGÉ A

No 602-105c violations (noise) at all in Ontario this year?

Rgds,  
FM

---

**De :** Pilon, Jeannot (TC/TC) <[jeannot.pilon@tc.gc.ca](mailto:jeannot.pilon@tc.gc.ca)>

**Envoyé :** mardi, mars 04, 2025 10:18

**À :** Kovacic, Linda (TC/TC) <[linda.kovacic@tc.gc.ca](mailto:linda.kovacic@tc.gc.ca)>

**Cc :** Meunier, Félix (TC/TC) <[felix.meunier@tc.gc.ca](mailto:felix.meunier@tc.gc.ca)>; Champagne, Bernard (TC/TC) <[bernard.champagne@tc.gc.ca](mailto:bernard.champagne@tc.gc.ca)>

**Objet :** Aviation Enforcement Standards DN Stats - Q3

PROTECTED A / PROTÉGÉ A

Linda,

Please find attached the stats for Q3.

These were done monthly but have been changed to quarterly, as requested by the regions.

Regards,

**Jeannot Pilon A/Chief – Chef intérimaire**

*Aviation Enforcement, Standards Branch / Application de la loi en aviation, Direction des normes*

*Office / Work Cell: 343-553-2890*

*E-Mail / Courriel: [jeannot.pilon@tc.gc.ca](mailto:jeannot.pilon@tc.gc.ca)*

*Transports Canada / Transport Canada*

*330 Sparks Street, 4th Floor, AARTE*

*Ottawa, Ontario, K1A 0N8*

*Gouvernement du Canada / Government of Canada*

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| Month        | Record released pursuant to the Access to Information Act / Document divulgué en vertu de la Loi sur l'accès à l'information | No. of NV files | Notes.                                                                                                 |
|--------------|------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------------------------------------|
| 01-Apr-24    |                                                                                                                              | 0               |                                                                                                        |
| 01-May-24    |                                                                                                                              | 2               | Case 2024-1126: AMP Issued. Monetary penalty valued at \$4,145.00 paid. 2024-1136 - Closed - Rejected. |
| 01-Jun-24    |                                                                                                                              | 0               |                                                                                                        |
| 01-Jul-24    |                                                                                                                              | 0               |                                                                                                        |
| 01-Aug-24    |                                                                                                                              | 0               |                                                                                                        |
| 01-Sep-24    |                                                                                                                              | 0               |                                                                                                        |
| 01-Oct-24    |                                                                                                                              | 1               | Rejected - Statutory Limitation                                                                        |
| 01-Nov-24    |                                                                                                                              | 1               | 2024-1274: Amp issued. Awaiting payment.                                                               |
| 01-Dec-24    |                                                                                                                              | 19              | All active investigations.                                                                             |
| 01-Jan-25    |                                                                                                                              | 7               | All active investigations.                                                                             |
| 01-Feb-25    |                                                                                                                              | 0               |                                                                                                        |
| 01-Mar-25    |                                                                                                                              | 0               |                                                                                                        |
|              |                                                                                                                              |                 |                                                                                                        |
| <b>TOTAL</b> |                                                                                                                              | <b>30</b>       | Page 455 / 2990                                                                                        |

**From:** Quach, Stephanie (TC/TC)  
**Sent:** Mon, 17 Mar 2025 14:44:26 +0000  
**To:** George, Marcia (TC/TC)  
**Subject:** FOR APPROVAL: MPQ - Response on Pearson Night Flights (13637)  
**Attachments:** MinO Outreach- Response on Pearson Night Flights -13637.docx

UNCLASSIFIED / NON CLASSIFIÉ

Hi Marcia,

Please see the attached MPQ response on page 2, for your approval. I have consulted with Ops Specialties for this info.

Thank you,  
Steph

---

**From:** Holmes, Jennifer (TC/TC) <jennifer.holmes@tc.gc.ca>  
**Sent:** Thursday, March 13, 2025 2:30 PM  
**To:** Quach, Stephanie (TC/TC) <Stephanie.Quach@tc.gc.ca>  
**Subject:** FW: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hi Steph, could we please have a response back by March 20<sup>th</sup>?

---

**From:** Denis, Lisa (TC/TC) <lisa.denis@tc.gc.ca>  
**Sent:** Thursday, March 13, 2025 2:23 PM  
**To:** Holmes, Jennifer (TC/TC) <jennifer.holmes@tc.gc.ca>; Bergeron, Michelle (TC/TC) <michelle.bergeron@tc.gc.ca>; TC.F ONT PX RDGO / BDGR PX F.TC <ONTPXRDGO-BDGRPX@tc.gc.ca>  
**Cc:** SS Information / Information SS <TC.SSInfo-InfoSS.TC@tc.gc.ca>; TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC <XMLIssuesManagement-GestiondesenjeuxXM@tc.gc.ca>  
**Subject:** RE: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hi Jennifer,

Yes, thank you! [@TC.F ONT PX RDGO / BDGR PX F.TC](#) Kindly inquiring if your team would be able to take the lead on this request?

Merci,

Lisa Denis

**Coordination and Special Projects Officer**, Departmental Liaison Team  
Policy & Issues Management Directorate  
Office of the Deputy Minister  
Transport Canada, Government of Canada  
[Lisa.Denis@tc.gc.ca](mailto:Lisa.Denis@tc.gc.ca) | Tel: 343-574-4691

**Agente de coordination et des projets spéciaux**, Équipe de liaison départementale  
Direction des politiques et de la gestion des enjeux,  
Cabinet du sous-ministre, Transports Canada, Gouvernement du Canada  
[Lisa.Denis@tc.gc.ca](mailto:Lisa.Denis@tc.gc.ca) | Tél: 343-574-4691



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**From:** Holmes, Jennifer (TC/TC) <[jennifer.holmes@tc.gc.ca](mailto:jennifer.holmes@tc.gc.ca)>  
**Sent:** Thursday, March 13, 2025 2:00 PM  
**To:** Denis, Lisa (TC/TC) <[lisa.denis@tc.gc.ca](mailto:lisa.denis@tc.gc.ca)>; Bergeron, Michelle (TC/TC) <[michelle.bergeron@tc.gc.ca](mailto:michelle.bergeron@tc.gc.ca)>; TC.F ONT PX RDGO / BDGR PX F.TC <[ONTPXRDGO-BDGRPX@tc.gc.ca](mailto:ONTPXRDGO-BDGRPX@tc.gc.ca)>; TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC <[XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca](mailto:XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca)>  
**Cc:** SS Information / Information SS <[TC.SSInfo-InfoSS.TC@tc.gc.ca](mailto:TC.SSInfo-InfoSS.TC@tc.gc.ca)>  
**Subject:** RE: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Hi Lisa, could you please re-assign this one to the region? Thanks!

---

**From:** Bergeron, Michelle (TC/TC) <[michelle.bergeron@tc.gc.ca](mailto:michelle.bergeron@tc.gc.ca)>  
**Sent:** Thursday, March 13, 2025 10:42 AM  
**To:** TC.F ONT PX RDGO / BDGR PX F.TC <[ONTPXRDGO-BDGRPX@tc.gc.ca](mailto:ONTPXRDGO-BDGRPX@tc.gc.ca)>  
**Cc:** SS Information / Information SS <[TC.SSInfo-InfoSS.TC@tc.gc.ca](mailto:TC.SSInfo-InfoSS.TC@tc.gc.ca)>  
**Subject:** FW: MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ



Hello! Would this be your lead?

---

**From:** Denis, Lisa (TC/TC) <[lisa.denis@tc.gc.ca](mailto:lisa.denis@tc.gc.ca)>

**Sent:** Tuesday, March 11, 2025 5:04 PM

**To:** TC.F NCR AA ADMO / BSMA RCN F.TC <[AAADMO-BSMA@tc.gc.ca](mailto:AAADMO-BSMA@tc.gc.ca)>

**Cc:** TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC <[XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca](mailto:XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca)>

**Subject:** MPQ - Response on Pearson Night Flights (13637)

UNCLASSIFIED / NON CLASSIFIÉ

Good afternoon S&S colleagues,

We received an MPQ pertaining to the lack of transparency and claimed corruption at the Greater Toronto Airport Authority (GTAA).

Context:

- Many constituents are expressing their frustration regarding the issues with Airport noise.
- MinO has provided this response:

*"Here's our website on noise.*

*<https://www.torontopearson.com/en/community/noise-management>. Toronto Pearson has a Noise Management Office dedicated to working with residents to address concerns and provide insights into airport operations. The team is committed to keeping our community informed and engaged.*

*There are several ways residents can connect with Pearson's Noise Management Office:*

- **Phone:** Call 416-247-7682 to ask questions or share concerns.
- **Online Flight Tracking Tool ([WebTrak](#)):** Track flights in real-time and see noise levels in your area.
- **[Insightful Online Portal](#):** Access information about noise management and learn more about aircraft operations through this easy-to-use online resource.
- **[Noise Complaint Form](#):** Submit up to 50 noise complaints at once via the online form.
- **[Checking In](#):** Stay up to date on airport operations and community updates.
- Attend our **Pearson Public Meeting** on Noise Management

*These resources help residents stay informed and connected. Pearson is always happy to engage with its community to address any concerns.*

*In addition to our Noise Management Team, we actively engage with the community in many ways to keep our neighbours informed and involved. We sponsor community events, partner with schools for career talks, partner with elected officials to host open houses and give back to the community through employee volunteering and charitable giving. This summer alone, we participated in over 75 community events, reaching more than 10,000 residents.*

*Through these efforts, we regularly share updates on our operations, our role as an economic anchor providing local jobs and supporting development, and how to connect with our team.*

*Specifically on the flights between 2am and 6am that you mentioned they have stated:*

*However, we severely limit the number of flights in and out of Pearson through the **Night Flight Restriction Program**, which limits the number of movements (arrivals and departures) during the restricted hours (12:30 AM to 06:29 AM). Transport Canada helped create this program to limit nighttime noise and balance growing regional demand. This is referred to as the “night flight budget.” Toronto Pearson is the only airport in Canada to have a budget system.*

*The vast majority of flight movements between the hours you specified (02:00 to 06:00) are arriving flights. Night flights are needed to accommodate travel distance, scheduling requirements and product delivery timelines, and accommodate late-arriving or departing flights delayed due to factors such as weather, mechanical or security issues; as well as other operationally necessary night flights. Medevac flights and military and police operations are counted towards the night flight budget.*

*We also operate the **Nighttime Preferential Runway system** - between midnight and 6:30 am, we prioritize the use of runways to minimize the number of residents overflown. “*

- MinO has been informed that these problems are persisting, and that the MP's Office has received a large amount of correspondence on this issue.

Question:

- Could the department kindly provide information in regard to transparency requirements and anything that would counteract corruption claims?

**Due Date: March 21, 2025**

Would it be possible to please provide some information that we can pass along to MinO in which they can relay to the MP office?

Merci,

Lisa Denis

—  
The following request has been assigned to you for appropriate action in Tasking Database. To access it, click on the « GOTO » link.

La demande suivante vous a été transférée pour exécution dans la base de données des tâches. Pour y accéder, cliquez sur le lien « GOTO ».

=====

====

Tasking # / No de tâche: TASK-013637

Request Type / Type de demande: MPQ

Topic / Sujet: RESPONSE ON PEARSON NIGHT FLIGHTS

Assigned To / Assigné à: AA

Submit By / Date de soumission: 3/21/2025

Request / Demande: PLEASE FIND ALL CONTEXT IN TASKING EMAIL / VEUILLEZ TROUVER TOUT LE CONTEXTE DANS LE COURRIEL

=====

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<http://ccmenterprise.tc.gc.ca:80/Enterprise/Services/Authorization/Login?rootid=30633806&segmentid=2989866>

**Task- MinO Outreach: Response on Pearson Night Flights (13637)****Context:**

**Many constituents are expressing their frustration regarding the issues with Airport noise.**

**MinO has provided this reponse:**

- *"Here's our website on noise. <https://www.torontopearson.com/en/community/noise-management>. Toronto Pearson has a Noise Management Office dedicated to working with residents to address concerns and provide insights into airport operations. The team is committed to keeping our community informed and engaged. There are several ways residents can connect with Pearson's Noise Management Office:*
    - *Phone: Call 416-247-7682 to ask questions or share concerns.*
    - *Online Flight Tracking Tool (WebTrak): Track flights in real-time and see noise levels in your area.*
    - *Insightful Online Portal: Access information about noise management and learn more about aircraft operations through this easy-to-use online resource.*
    - *Noise Complaint Form: Submit up to 50 noise complaints at once via the online form.*
    - *Checking In: Stay up to date on airport operations and community updates.*
    - *Attend our Pearson Public Meeting on Noise Management*
- These resources help residents stay informed and connected. Pearson is always happy to engage with its community to address any concerns.*

*In addition to our Noise Management Team, we actively engage with the community in many ways to keep our neighbours informed and involved. We sponsor community events, partner with schools for career talks, partner with elected officials to host open houses and give back to the community through employee volunteering and charitable giving. This summer alone, we participated in over 75 community events, reaching more than 10,000 residents.*

*Through these efforts, we regularly share updates on our operations, our role as an economic anchor providing local jobs and supporting development, and how to connect with our team.*

*Specifically on the flights between 2am and 6am that you mentioned they have stated:*

*However, we severely limit the number of flights in and out of Pearson through the Night Flight Restriction Program, which limits the number of movements (arrivals and departures) during the restricted hours (12:30 AM to 06:29 AM). Transport Canada helped create this program to limit nighttime noise and balance growing regional demand. This is referred to as the "night flight budget." Toronto Pearson is the only airport in Canada to have a budget system.*

*The vast majority of flight movements between the hours you specified (02:00 to 06:00) are arriving flights. Night flights are needed to accommodate travel distance, scheduling requirements and product delivery timelines, and accommodate late-arriving or departing flights delayed due to factors such as weather, mechanical or security issues; as well as other operationally necessary night flights. Medevac flights and military and police operations are counted towards the night flight budget.*

*We also operate the Nighttime Preferential Runway system - between midnight and 6:30 am, we prioritize the use of runways to minimize the number of residents overflown. "*

MinO has been informed that these problems are persisting, and that the MP's Office has received a large amount of correspondence on this issue.

**Question:**

**Could the department kindly provide information in regard to transparency requirements and anything that would counteract corruption claims?**

**Response:**

- Thank you for contacting Transport Canada (TC).
- TC is responsible for developing and overseeing the Government of Canada's transportation policies and programs which, in the context of civil aviation, are primarily exercised through the *Aeronautics Act* and the Canadian Aviation Regulations (CARs).
- This request was reviewed by departmental subject matter experts who confirm the Greater Toronto Airports Authority (GTAA) is fulfilling its obligations and responsibilities outlined in the Ground Lease regarding noise management in a responsible and effective manner.
- The relationship and communication between Transport Canada Civil Aviation and the GTAA Aviation Services Team has been highly effective with open communication and availability for meetings, along with the timely transmittal of information as soon as it becomes available.
- The Toronto Pearson International Airport is the only international airport in Canada with a night flight budget (during restricted hours).
- TC continues to oversee safety and monitor the total number of permitted annual flights during these restricted hours. Over the past five years, the GTAA has consistently adhered to the threshold of total permitted number of flights during the restricted hours.
- In addition to the GTAA's Noise Management Committee, there is a dedicated website, [InsightFull for Toronto Pearson](#) offering interactive monthly and quarterly operational reports, complaints reports, and is supported by their "Enforcement Office," which monitors every flight for compliance with noise abatement procedures and the Night Flight Restriction Program.

**From:** Quach, Stephanie  
**To:** Pollock, Mary  
**Subject:** FW: Checking In - January 2023  
**Date:** Tuesday, January 31, 2023 11:18:00 AM

---

Hi Mary,  
 Just sharing the below for awareness.  
 Thanks,  
**Stephanie Quach**

A/Regional Manager, Issues Management  
 Transport Canada / Government of Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tel.: 647-394-5485/ TTY: 1-888-675-6863  
 A/Gestionnaire régional, Gestion d'enjeux  
 Transports Canada / Gouvernement du Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tél.: 647-394-5485/ ATS : 1-888-675-6863

---

**From:** [REDACTED]  
**Sent:** Thursday, January 26, 2023 8:35 PM  
**To:** [REDACTED]@gtaa.com  
**Cc:** Jenny Ribeiro [REDACTED]; James.Maloney@parl.gc.ca; Baker, Yvan - M.P. ; Minister of Transport / Ministre des Transports (TC)  
**Subject:** Fwd: Checking In - January 2023  
 XAO-2023-523198

Hi Deborah: This is the latest of several emails I have either sent to you or copied you on concerning aircraft noise at Pearson.

In the checking in you promote the good work Nav Canada has done to reduce aircraft noise impact on surrounding communities. Unfortunately you cannot provide a similar story highlighted increased restrictions on night flights because the GTAA refuses to take action. Even renege on a commitment in your 5 year action plan.

Just to remind you, I was the [REDACTED]

[REDACTED]

Cynthia Woods came into the noise office from Gate Assignment during [REDACTED]

[REDACTED]

In the last several years I have been a member of the [REDACTED]

[REDACTED] If you are not aware this committee has declined in relevance with several people resigning due to lack of action by GTAA to actually do something significant to reduce aircraft noise. The meetings now are filled with GTAA dog and pony shows with little or no (December 2022 meeting) time for input from committee members. I have become frustrated and considered resigning myself but will hold out for the 1/3 meeting time for community input specified in the [REDACTED] terms of reference.

Items such as the A320 modifications and a trial sound proofing of a school are near window dressing actions. The GTAA has done nothing to reduce noise at night since 1996, but instead has increased the number of aircraft in the restricted hours at a greater rate than the overall total aircraft movements. In 1995 under Transport Canada there were 9600 aircraft movements in the restricted

hours while now under GTAA operation the night flight budget allows over 20,000 flights. By comparison Heathrow is allowed 5800 annual flights during the 23:30 to 06:00 restricted hours. It is the UK government that sets that limit which has remained unchanged since 2017.

GTAA claims that more night restrictions can not be considered while the industry recovers are weak. As I have stated before the GTAA has not adjusted the ICAO Annex 16 Chapter 3 aircraft restrictions or the restricted hours in the last 27 years while other major international airports have changed to Chapter 4 or even Chapter 14 or similar quieter night restrictions.

One short term step that could be taken is to enact a deadline date for operation of the MD11 aircraft ( the loudest aircraft type at Pearson) in the restricted hours. FedEx does have other quieter aircraft types. Don't let FedEx decide what is permitted at Pearson, they must meet greater restrictions at other airports in their network. <sup>19 (1)</sup>

<sup>19 (1)</sup>

There are several other noise management ideas I would like to discuss at the <sup>19 (1)</sup> but also directly with aircraft operators and government representatives.

<sup>19 (1)</sup>

----- Forwarded message -----

From: **Toronto Pearson Community Engagement** <[community.engagement@gtaa.com](mailto:community.engagement@gtaa.com)>

Date: Thu, Jan 26, 2023, 1:45 PM

Subject: Checking In - January 2023

To: <sup>19 (1)</sup>

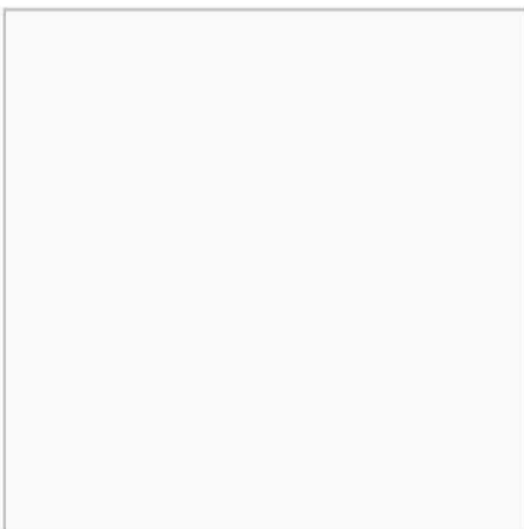
[View this email in your browser](#)



## Letter from our CEO, Deborah Flint

As we begin this new year, we at Toronto Pearson are committed to increasing the resiliency of our air travel industry and improving the



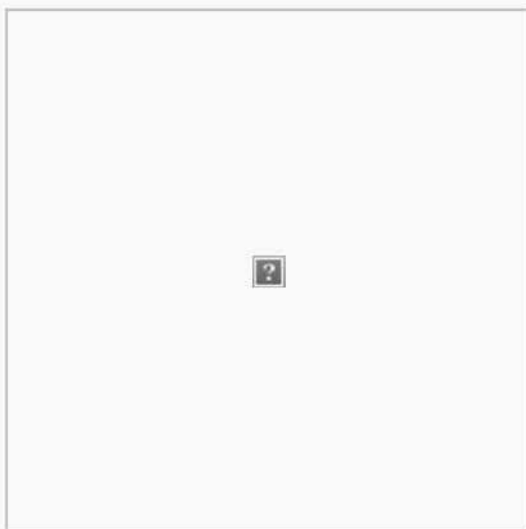


experience for travelers and employees. Toronto Pearson is important to Canadians as the front door to the country. Therefore, we are steadfast to move past pandemic recovery to deliver on a vision for all, putting the joy back into travel and making YYZ the chosen place to fly and for employment.

This holiday season was a difficult one for some of our travelers who were looking forward to reconnecting with family and friends for the first time in three years. Instead, they found themselves at the centre of a perfect storm of bad weather across the continent and an industry still recovering from the pandemic shutdown. While the Christmas storm was disruptive, it's important to separate some of the distinct differences since the summer restart. Many travel processes improved or were eliminated, and strategies have been implemented to bring more reliability and predictability to passengers. Pearson launched several new innovations to assist with the recovery, such as YYZ Express, which allows passengers to pre-book a space in security lines. We are working with the government and our partners to make the industry more resilient. There are many great jobs across the airport, and our partners need to attract and retain the best of talent. We are investing in the future –both in technology and our physical environment. We look forward to sharing more with you as we move

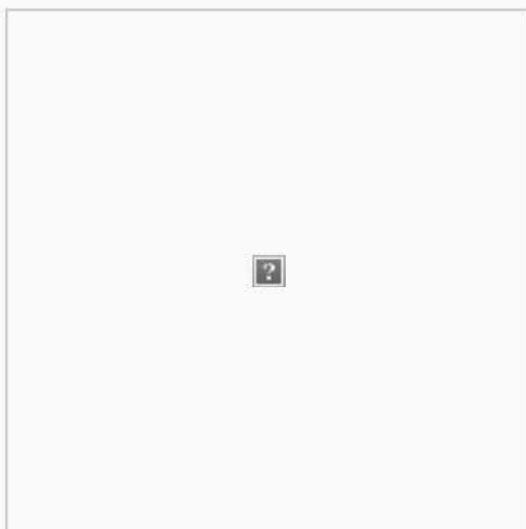
quickly in creating the airport of the future. Thank you for being Pearson's champions.

In 2023, I look forward to a year of creating a bright future, together.



## **Survey: How would a medical center at Pearson benefit your community?**

We're exploring the potential of a medical clinic at the airport that would serve employees, passengers and community members. Let us know how you think we can make it community focused, equitable and accessible. Survey closes January 29, 2023. [Learn more.](#)



## **Reminder: NAV CANADA implements RNP-AR, new approach procedures that reduce noise impacts**

Based on feedback from a 2021 consultation, NAV CANADA, in collaboration with the GTAA, implemented a new approach procedure at Toronto Pearson Airport in November 2022. This procedure supports environmental sustainability efforts by significantly reducing greenhouse gases and the overflight of residential communities in the Greater Toronto Area. Some communities may notice changes to air traffic patterns overhead. [Learn more.](#)



## **Volunteer with the Toronto Pearson Welcome Team**

Whether it's a friendly greeting, showing someone the way or simply making passengers feel at ease in their journey through the airport, the Welcome Team helps lend a hand every day. If you or someone you know can volunteer on a bi-weekly basis for a four-hour shift, please join us at an upcoming information session and learn more:

- Wednesday, February 1st from 5:30 pm to 7:30 pm – [Register now](#)
- Friday, February 3rd from 11:00 am to 1:00 pm – [Register now](#)
- Saturday, February 4th from 9:30 am to 11:30 am – [Register now](#)

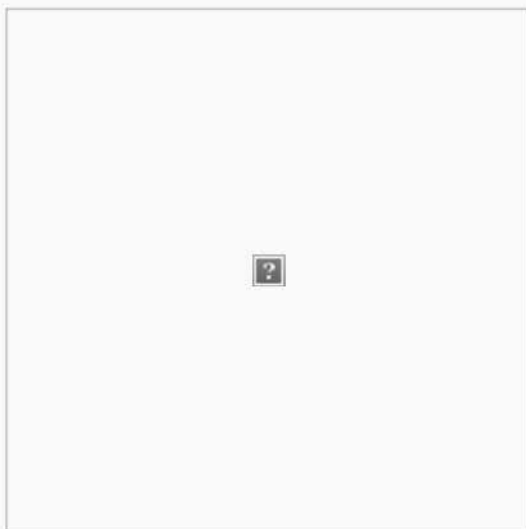
[Learn more about the team and opportunity](#)



## **Pearson launches new art installation to bring the excitement of Toronto to the terminals**

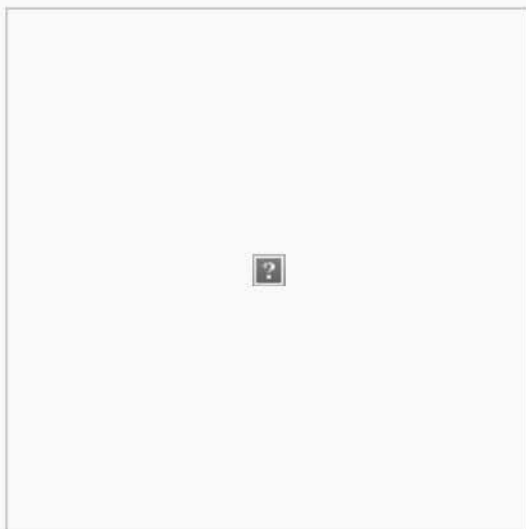
In partnership with Destination Toronto, Toronto Pearson is bringing a new sense of place to our terminals by welcoming our passengers with our latest and largest photography installation by award-winning local artists, Take Your Seat. The cinematic photos located in T1 baggage halls and the T3 Domestic baggage hall represent every facet of Toronto and the communities our employees and many of our passengers call home.

[Learn more](#)



## People of Pearson: Randy and Spencer

Randy and Spencer are a father-son photographer duo behind a recent dazzling photographic installation at Toronto Pearson. Together, they have given a chair a voice, one that speaks a universal language of unity, responsibility, and individual power that is being shared with audiences around the world. [Read their story](#)



## People of Pearson: Patricia

Patricia started her career in aviation in 2004. Currently she's an In Charge Flight Attendant at Canada Jetlines, one of Canada's newest airlines. [Read more.](#)



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PO Box 6031  
Mississauga, ON, L5P 1B2, Canada

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Toronto Pearson International Airport/GTAA · 3111 Convair Drive · Toronto AMF · Toronto, ON L5P 1B2 · Canada

**From:** [ONT Aviation Services / Services aviation ONT \(TC\)](#)  
**To:** [ONT Civil Aviation Issues / Enjeux Aviation Civile ONT \(TC/TC\)](#)  
**Subject:** FW: Contact us #263058  
**Date:** Friday, May 23, 2025 7:53:35 AM  
**Attachments:** [image001.png](#)  
[image002.png](#)  
[image003.png](#)

---

UNCLASSIFIED / NON CLASSIFIÉ

For your action.

Thank you,  
Tara

---

**From:** Civil Aviation Communications Centre - Centre de communications de l'Aviation civile  
<[services@tc.gc.ca](mailto:services@tc.gc.ca)>  
**Sent:** Thursday, May 22, 2025 10:48 AM  
**To:** ONT Aviation Services / Services aviation ONT (TC) <[aviation.ont@tc.gc.ca](mailto:aviation.ont@tc.gc.ca)>  
**Subject:** FW: Contact us #263058

UNCLASSIFIED / NON CLASSIFIÉ

Please see comm center request below for Ontario region.

Thank you,

Marc Hebert  
Issues Management Officer/  
**Transport Canada Civil Aviation**  
Director General's Office / Bureau du Directeur général  
Transport Canada / Transports Canada  
Government of Canada / Gouvernement du Canada



Transport  
Canada

Transports  
Canada

Canada

---

**From:** Transport Canada <[tc.donotreply-nepasrepondre.tc@tc.gc.ca](mailto:tc.donotreply-nepasrepondre.tc@tc.gc.ca)>  
**Sent:** Thursday, May 22, 2025 10:27 AM  
**To:** Civil Aviation Communications Centre - Centre de communications de l'Aviation civile  
<[services@tc.gc.ca](mailto:services@tc.gc.ca)>

**Subject:** [External/Externe]: Contact us #263058

Submitted on Thu, 05/22/2025 - 10:27

Submitted by: Anonymous

Submitted values are:

**First name:**

19 (1)

**Last name:**

19 (1)

**Address:**

19 (1)

Mississauga, ON. 19 (1)

**Email:**

19 (1)

**Member of the industry**

No

**Member of the public**

No

**Follow up on previous enquiry**

No

**New enquiry / comment**

Yes

**Message:**

Hello, I live in a community about 20km from YYZ, and have been enduring low flying aircrafts every 2min from 6AM till well after midnight daily, including weekends and holidays.

The noise is relentless, and I am aware of many complaints lodged with GTAA by community members, including my own.

The blanket response I've received is that it's permitted by NAV CANADA, and they're working their rights to continue.



The noise has increased significantly over the last few yrs, by has become unbearable in the last two.

I've reached out to the municipal, provincial and federal representatives, however, it seems the only recourse for residents is to keep complaining to GTAA, and they're free to ignore the complaints and continue on.

I'd like to know who made the decision, who was consulted and agreed that flying low over residential areas over 20km away from the airport till well after midnight (we had flights going till 1am on occasion), and resuming around 6am, giving residents about 5 hrs daily of peaceful sleep is acceptable???

Who was consulted and agreed that flights over same residential areas every 2min of everyday of the week, including weekends and holidays, year round is acceptable???

I'll appreciate a response with direction how this issue should be resolved

**From:** 19 (1)  
**To:** 19 (1)  
**Subject:** Re: flight paths, altitudes and speed issues  
**Date:** Tuesday, November 13, 2018 11:54:44 AM  
**Attachments:** image001.png  
 image003.jpg  
 image005.png  
 image006.jpg

Hi Frank,

We met at the last GTAA meeting and you gave me your card to follow up on the issues a lot of people voiced there.

I was trying to get answers from GTAA first not to bother you but was unsuccessful. As you can see from the correspondence below, it has been over a month since my first email and other than general information I was not able to get any concrete answers.

Maybe you are actually in a better position to reply to my questions(7) and even better can spare some time to evaluate the flight path for the arriving planes to be considered of people living in 19 (1) North York (maybe other areas as well) that get flight traffic for no logical reason. The planes fly extra miles in the opposite direction from where they were coming from only to be able to turn over residential areas and flight back to the airport. Can they lower the altitude early and turn early?

My main point is that operational path have definitely changed recently. That is what most people at the meeting mentioned as well if you remember but GTAA refuses to admit it. Before more planes were turning over highways as opposed to residential areas. Also, it is unclear why do planes need to turn at such a low altitudes? It is the turns that produce most of the noise. And the speed that they fly over the city is also absolutely unacceptable.

I do not know who is responsible for what area between GTAA, NAV Canada and Transport Canada. As I was told by my MP that GTAA is a private organization and there is nothing they can do. But, I assume, living in Canada, there should be an organization that can influence private corporations when well being of millions of people is effected.

I would appreciate your response in writing before the next GTAA meeting. But please reply to me that you received the email first.

Thank you very much for your time,

19 (1)

**From:** 19 (1)  
**Sent:** October 31, 2018 11:24 AM  
**To:** Hawrylyshyn, Laila  
**Subject:** Re: Follow-up on September 28 phone call

Hi Laila,

While I am waiting for your answers, I came up with more questions.

1. What was the recent change in the flight paths, turns, altitude, speeds, etc and when was it done? Please provide an abstract from the regulation.
2. Which organization (NAV Canada, Transport Canada or GTAA) is responsible for these regulations and I need a name and a position of a person who signed the most recent regulation.
3. What kind of control flight controllers and their managers have on routing, turning, altitude and speed of planes arriving to Toronto? Please provide a short summary of flight controllers' procedures. I know it is all depends on the weather. But other than that, how do they decide the coordinates where the planes should fly and turn?

I hope I get all the answers by December before GTAA public meeting, so I would not ask stupid questions there.

P.S. By the way, I noticed planes are turning more now directly over my house or very close to it. As if somebody is doing it on purpose because I am complaining.

Thank you for your assistance,

19 (1)

**From:** 19 (1)  
**Sent:** October 26, 2018 10:19 AM  
**To:** Hawrylyshyn, Laila  
**Subject:** Re: Follow-up on September 28 phone call

Hi Laila,

I am still waiting for your answer to my 2 questions below.

And I have two more:

1. Most of the planes flying over my house on so called 'final approach' are not flying from the east but rather from the lake and then are turning near my street or flying even farther and turn there. I need your detailed explanation backed up by abstracts from NAV Canada or Transport Canada explaining why the planes that are coming from the lake can not lower their altitude when they are still over the lake and then turn early to the final approach somewhere over highway instead of flying extra miles all the way to North York and turning over residential areas.
2. Why not all the planes are displayed on the webtrack?

Please copy your answer to my 4 questions to your management. I need to know that they are aware of my questions and your answers. And it would be more official if I need to take the issues farther.

Thanks a lot,

19 (1)

**From:** 19 (1)  
**Sent:** October 10, 2018 2:52 PM  
**To:** Hawrylyshyn, Laila  
**Subject:** Re: Follow-up on September 28 phone call

Hi Laila,

Thank you for the detailed explanation.

1. Please provide an abstract from regulations regarding at what distance from the airport the final approach should start (at what distance planes should go as low as 2400).
2. Please explain why a wider path can not be used more often. Why planes should fly on one line as if they are trains.

Thank you,

19 (1)

**From:** Hawrylyshyn, Laila <Laila.Hawrylyshyn@gtaa.com>  
**Sent:** October 10, 2018 1:10 PM  
**To:** 19 (1)  
**Subject:** Follow-up on September 28 phone call

Dear Ms 19 (1)

This e-mail is a follow-up on the phone call received on Friday, September 28, 2018 regarding your complaints for September 26, 2018 and October 3, 2018. Below you will find the requested information on the flight paths impacting your location from before and after the Summer, further information regarding your complaints and our Noise Abatement Procedures (explanation for the height restrictions of arriving and departing aircraft). Before I address your recent inquiry, I would like to provide you with some background on Toronto Pearson, the Noise Management Program, how runway operations are selected and our noise abatement procedures.

#### Background

Toronto Pearson is Canada's largest and North America's second largest international airport and a hub for the movement of people and goods across the country, the continent and around the globe. In 2017, we saw 47.1

million passengers travel through the airport, up from 44 million in 2016 and we expect to see continued growth in the coming years.

Toronto Pearson has an important role to play in community life. Our passengers count on us to provide connections to the world, our employees count on us to operate in a safe way, the communities surrounding us count on us to operate in a sustainable way and everyone counts on us to operate transparently. Being a good neighbour means balancing these diverse and sometimes competing priorities for the constituencies we're in business to serve.

#### Noise Management Program

Noise management is a complex issue that must take many variables into consideration, issues ranging from safety, meeting the travelers' demand for more options, to increasing operational efficiency while operating in an intensely – and growing – urban environment.

Our Noise Management Program works to strike a balance between operating a growing airport and regional economic engine with the impact on our neighbours.

The Noise Management Program includes:

- **Noise Operating Restrictions** (Night Flight Restriction Program, Engine Run-up Restrictions, Preferential Runway Assignment from midnight-6:30)
- **Noise Abatement Procedures** are arrival and departure procedures designed to minimize noise impacts on neighbouring communities
- **Land Use Planning** that includes an Airport Operating Area (AOA) incorporated in the official plans of the surrounding municipalities to limit incompatible land used within the AOA
- **Enforcement Office** that investigates, audits and reports on potential violations of the noise operating restrictions, noise abatement procedures and the night flight restriction program
- **Noise Office** that investigates noise complaints and acts as an informational resource to the public and elected officials
- **Consultation and Community Outreach**, our community relations program is a critical tool in helping us deal with questions about noise and build awareness and understanding about the airport, and includes a range of activities from hosting large scale events at the airport such as the Runway Run, outreach initiatives such as participation in community events, consultations, public meetings and airport tours to the publication of a monthly community e-newsletters.

**Five Year Noise Management Action Plan** - The Greater Toronto Airports Authority (GTAA) has created an updated the Noise Management Action Plan titled, [Growing Responsibly: The 2018-2022 Noise Management Action Plan](#). The Action Plan outlines ten new commitments related to consultation, environmental responsibility, operational changes, monitoring and reporting aircraft noise, and industry collaboration that the GTAA commits to taking a leadership role in developing concrete action on.

#### Noise Abatement Procedures

An arriving aircraft needs to be at 3000' Above Sea Level (ASL) – equivalent to 2400' Above Ground Level (AGL) when it begins its final approach to the runway. The altitude is related to the remaining distance to final approach. Departing jet aircraft are required to reach an altitude of 3600' ASL (3000' AGL) – prior to making a turn from the runway heading. However, turns lower than 3000' AGL (early turns) are permitted for propeller aircraft between 6:30 a.m. and 11:30 p.m. and for select eligible jet types between 7:00 a.m. and 11:00 p.m. To learn more about early turns, click [here](#).

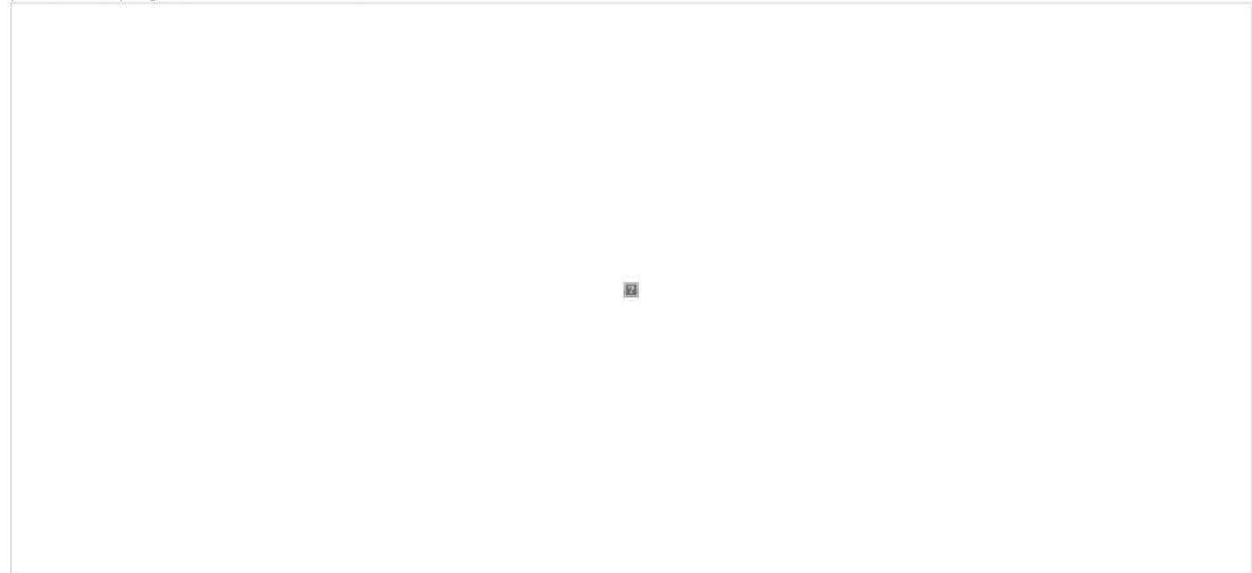
#### Runway Operations at Toronto Pearson

Runways are assigned based on the following factors: wind direction and wind speed, runway conditions/availability, operational efficiency and time of day. As the prevailing winds are from the west, the most common runway configuration at Toronto Pearson supports a westerly flow, which means arrivals from the east and departures to the west using Runways 23, 24Left (L), 24Right (R). The second most common configuration supports an easterly flow - arrivals from the west and departures to the east using Runways 05, 06L and 06R.

When wind speed reaches a point where it is no longer safe for aircraft to land and depart in one of these directions, the runways are re-assigned to allow aircraft to land and depart into the wind. It is important to note that runway conditions are also a factor. Friction is reduced in wet or snow covered runway conditions and so a lower wind speed level will prompt an 'into the wind' runway assignment than when operating in dry runway conditions.

#### Operations affecting your area

Your area is mainly impacted by aircraft arriving from the east onto Runways 24L and 24R during the final approach stage of their flight. This is when the aircraft is lined up with the runway on which it will be landing. I have provided some sample flight tracks below. Your home is indicated in the blue dot.



#### January – September 2018: Arrivals and Departures in numbers

Below is a summary of our arrivals onto our runways from January to September 2018. Highlighted are the Runways 24L and 24R, the ones you are mostly impacted by.

| Month | 05   | 06L  | 06R  | 15L | 15R | 23   | 24L  | 24R  | 33L  | 33R | Total |
|-------|------|------|------|-----|-----|------|------|------|------|-----|-------|
| Jan   | 2941 | 504  | 576  | 122 | 98  | 4673 | 1035 | 7315 | 1336 | 160 | 18600 |
| Feb   | 2747 | 578  | 409  | 43  | 60  | 5133 | 1206 | 6273 | 770  | 50  | 17219 |
| Mar   | 8834 | 3169 | 684  | 75  | 332 | 2222 | 570  | 2717 | 1489 | 127 | 20092 |
| Apr   | 4657 | 1148 | 1209 | 95  |     | 3719 | 1955 | 4604 | 1368 | 188 | 18755 |
| May   | 5604 | 1523 | 1467 | 221 | 32  | 4438 | 3229 | 3390 | 414  | 34  | 20318 |
| Jun   | 7066 | 2296 | 1083 | 154 | 1   | 3222 | 1393 | 4573 | 736  | 108 | 20524 |
| Jul   | 6175 | 1742 | 1281 | 236 | 9   | 4236 | 1890 | 6102 | 78   | 2   | 21749 |
| Aug   | 3993 | 2117 | 589  | 217 | 138 | 5562 | 2524 | 6221 | 355  | 101 | 21716 |
| Sep   | 6864 | 2241 | 758  | 283 | 109 | 4250 | 762  | 4650 | 216  | 34  | 20133 |

As the data shows, the total number of arrivals onto Runways 24L and 24R between January and September 2018 is fairly consistent. As I mentioned above, weather is a prime factor in determining which runways are used which accounts for a fluctuation in the distribution of runway usage.

#### September 26, 2018 Noise Complaints

We received a total of four complaints for September 26 and we were able to correlate and register all of them. I have provided a report with details on the flights that impacted you and the flight tracks below. Your home is indicated in the blue dot.

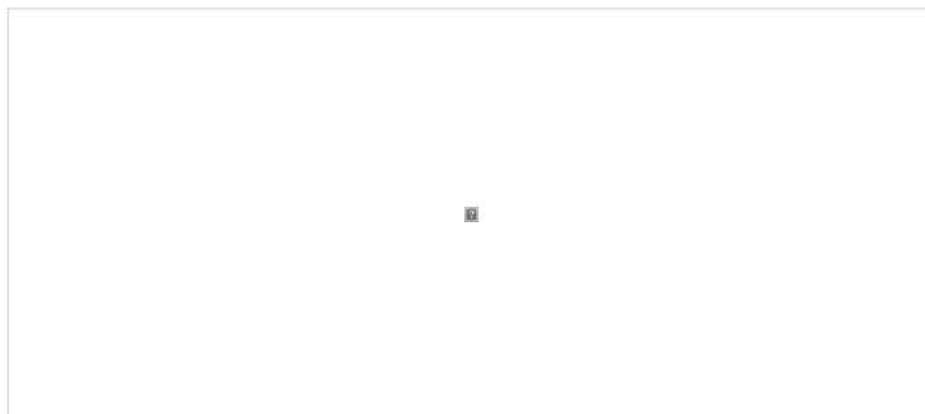
| Event Date/Time | Operation Type | Runway | Aircraft Type | Altitude (ft) AGL |
|-----------------|----------------|--------|---------------|-------------------|
| 9/26/2018 20:01 | ARRIVAL        | 24R    | A319          | 2431              |
| 9/26/2018 20:03 | ARRIVAL        | 24R    | A319          | 2520              |
| 9/26/2018 20:04 | ARRIVAL        | 24R    | B738          | 2430              |
| 9/26/2018 20:04 | ARRIVAL        | 24R    | B737          | 2422              |



October 3, 2018 Noise Complaints

We received a total of seven complaints for October 3 and we were able to correlate and register all of them. I have provided a report with details on the flights that impacted you and the flight tracks below. Your home is indicated in the blue dot.

| Event Date/Time | Operation Type | Runway | Aircraft Type | Altitude ft (AGL) |
|-----------------|----------------|--------|---------------|-------------------|
| 10/3/2018 21:46 | ARRIVAL        | 24L    | B763          | 2434              |
| 10/3/2018 21:47 | ARRIVAL        | 24R    | B734          | 2431              |
| 10/3/2018 21:51 | ARRIVAL        | 24R    | B712          | 2427              |
| 10/3/2018 21:54 | ARRIVAL        | 24R    | B737          | 2422              |
| 10/3/2018 21:59 | ARRIVAL        | 24R    | B738          | 2428              |
| 10/3/2018 22:00 | ARRIVAL        | 24R    | E190          | 2428              |
| 10/3/2018 22:02 | ARRIVAL        | 24R    | A320          | 2425              |



I hope this information is helpful. I'd be happy to arrange a visit to the noise office so we can review these operations and answer any other questions that you may have.  
Best regards,  
Laila

Page 0476 / 2990 to/à Page 0477 / 2990

withheld pursuant to section / sont retenues en vertu de l'article

19 (1)

of the Access to Information Act / de la Loi sur l'accès à l'information



Page 0479 / 2990

withheld pursuant to section / sont retenues en vertu de l'article

19 (1)

of the Access to Information Act / de la Loi sur l'accès à l'information



**From:** Quach, Stephanie  
**To:** Shaikh, Farha  
**Subject:** FW: For Approval Ministerial- Noise Monitoring Terminal in 19 (1) Mississauga  
**Date:** Wednesday, October 05, 2022 8:56:00 AM  
**Attachments:** image001.jpg  
 TC Letterhead MInisterial Template.doc

---

Hi Farha,  
 Please input the approved response into the attached template.  
 Thanks!

### Stephanie Quach

A/Regional Manager, Issues Management  
 Transport Canada / Government of Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tel.: 647-394-5485/ TTY: 1-888-675-6863  
 A/Gestionnaire régional, Gestion d'enjeux  
 Transports Canada / Gouvernement du Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tél.: 647-394-5485/ ATS : 1-888-675-6863

---

**From:** Waljee, Imi (he,him | il,lui) (TC/TC)  
**Sent:** Tuesday, October 04, 2022 4:17 PM  
**To:** Shaikh, Farha  
**Cc:** Quach, Stephanie  
**Subject:** RE: For Approval Ministerial- Noise Monitoring Terminal in 19 (1),  
 Mississauga

Hi Farha,  
 Approved.

Regards,  
 Imtiazali (Imi) Waljee  
 (he, him, il)

Regional Director Civil Aviation – Ontario Region  
 Transport Canada / Government of Canada  
[imi.waljee@tc.gc.ca](mailto:imi.waljee@tc.gc.ca) / Tel: 416-952-0167 / Cel: 416-540-2367 / TTY: 1-888-675-6863  
 Directeur régional de l'aviation civile – Région de l'Ontario  
 Transports Canada / Gouvernement du Canada  
[imi.waljee@tc.gc.ca](mailto:imi.waljee@tc.gc.ca) / Tél. : 416-952-0167 / Tél. cell. : 416-540-2367 / ATS : 1-888-675-6863

\*My work hours may differ from yours, please do not feel the need to respond to my message if it is received outside of your work hours.

\*Mes heures de travail sont peut-être différentes des vôtres alors ne vous sentez pas obligé de répondre si c'est en dehors de vos heures de travail.

---

**From:** Shaikh, Farha <[farha.shaikh@tc.gc.ca](mailto:farha.shaikh@tc.gc.ca)>  
**Sent:** Tuesday, October 04, 2022 3:41 PM  
**To:** Waljee, Imi (he,him | il,lui) (TC/TC) <[imi.waljee@tc.gc.ca](mailto:imi.waljee@tc.gc.ca)>  
**Cc:** Quach, Stephanie <[Stephanie.Quach@tc.gc.ca](mailto:Stephanie.Quach@tc.gc.ca)>  
**Subject:** For Approval Ministerial- Noise Monitoring Terminal in 19 (1), Mississauga  
 Hello Imi,

Below is the Ministerial for your Approval – slight edit from previous email.

Thanks,

Farha Shaikh

A/Issues Management Officer

Transport Canada/ Government of Canada

[farha.shaikh@tc.gc.ca](mailto:farha.shaikh@tc.gc.ca) / Tel: 647-221-0685/ TTY: 1-888-675-6863

A/Agenté, Gestion d'enjeux

Transports Canada / Gouvernement du Canada

[farha.shaikh@tc.gc.ca](mailto:farha.shaikh@tc.gc.ca) / Tél. : 647-221-0685 / ATS : 1-888-675-6863

Dear 19 (1)

Thank you for your email of September 25, 2022, to the Honourable Omar Alghabra, Minister of Transport, regarding a noise monitoring terminal in south Mississauga.

Transport Canada is responsible for developing and overseeing the transportation policies, programs and goals set by the Government of Canada to ensure the national transportation system is safe, efficient, and accessible to all its users. The Transport Canada Civil Aviation mission is to develop and administer policies and regulations for the safest civil aviation system for Canada and Canadians with a vision to an integrated and progressive civil aviation system that promotes a proactive safety culture. In doing so, the department exercises its authority through the Aeronautics Act and the Canadian Aviation Regulations (CARs). The CARs are available to the public at the following website: <http://laws-lois.justice.gc.ca/eng/regulations/SOR-96-433/>.

The CARs state that, except when taking off or landing, aircraft may not be operated over a built-up area at an altitude lower than 1,000 feet above the highest obstacle within a horizontal distance of 2,000 feet from the aircraft (or 500 feet for helicopters). When not operating over a built-up area, aircraft must maintain a minimum distance of 500 feet from any person, vessel, vehicle or structure. It is important to note there are no regulatory restrictions or limitations on the time of day, volume, or type of aircraft that can utilize the airspace in your area. As long as the associated aircraft are flying at the appropriate heights and distances and operating according to the rules and regulations, Transport Canada cannot intervene.

Unfortunately, noise management is a complicated and often difficult issue faced by airport authorities and communities around the country. It is an issue that must be managed while ensuring that aviation safety is not compromised. Transport Canada's experience has shown that noise issues are most effectively addressed at the local community level.

One of the tools to assist airports includes a process through which airport operators develop noise abatement procedures and operating restrictions through the consultation of aviation stakeholders and local communities. We wish to advise that noise abatement procedures for the Toronto Pearson International Airport are in place. For more information, please visit:

<https://www.torontopearson.com/en/community/noise-management/noise-management-program>.

In addition, the department encourages direct dialogue with the airport operator directly as Transport Canada is not involved in the daily operations that take place at Toronto Pearson International Airport.

The contact for the airport operator, the Greater Toronto Airports Authority (GTAA) is noted below:

Phone: 416-247-7682

Website: <https://www.torontopearson.com/en/community/noise-management/noise-management-program/noise-management-office/noise-complaint>

Additionally, the department does not approve changes to individual flight paths, other than to confirm that the design meets the appropriate regulations and standards. Therefore, any further questions regarding flight paths around Toronto should be directed to NAV CANADA at [service@navcanada.ca](mailto:service@navcanada.ca).

Thank you for writing.

Yours sincerely,

---

**From:** Quach, Stephanie <[Stephanie.Quach@tc.gc.ca](mailto:Stephanie.Quach@tc.gc.ca)>

**Sent:** Monday, October 03, 2022 1:12 PM

**To:** Shaikh, Farha <[farha.shaikh@tc.gc.ca](mailto:farha.shaikh@tc.gc.ca)>

**Subject:** For Action: Ministerial- Noise Monitoring Terminal in [REDACTED] Mississauga  
Hi Farha,

Below is a ministerial received regarding noise and flight paths for your action.

With ministerials, the wording is slightly different where it is more formal overall and we incorporate the following introductory sentence:

"Thank you for your email of (DATE), to the Honourable Omar Alghabra, Minister of Transport, regarding (SUBJECT)."

Regarding the concerns noted from this individual with noise monitoring, we can refer to much of the standard noise info in the FAQ document, along with referencing the noise abatement committee at Pearson, and the different ways of contacting the GTAA regarding noise-related issues. In terms of the flight path, a reference made that air traffic is dependant on the operations of the airport and questions about individual routings should be directed to NAV Canada directly.

Please let me know if you have any questions.

Thanks!

**Stephanie Quach**

A/Regional Manager, Issues Management  
Transport Canada / Government of Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tel.: 647-394-5485/ TTY: 1-888-675-6863

A/Gestionnaire régional, Gestion d'enjeux  
Transports Canada / Gouvernement du Canada  
[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tél.: 647-394-5485/ ATS : 1-888-675-6863

---

**From:** Alghabra, Omar - M.P. <[Omar.Alghabra@parl.gc.ca](mailto:Omar.Alghabra@parl.gc.ca)>

**Sent:** Monday, September 26, 2022 11:43 AM

**To:** Minister of Transport / Ministre des Transports (TC) <[TC.MinisterofTransport-MinistredesTransports.TC@tc.gc.ca](mailto:TC.MinisterofTransport-MinistredesTransports.TC@tc.gc.ca)>

**Subject:** Fw: Noise Monitoring Terminal in [REDACTED] Mississauga  
XAO-2022-520498

---

**From:** [REDACTED]

**Sent:** Sunday, September 25, 2022 9:49 PM

**To:** Alghabra, Omar - M.P. <[Omar.Alghabra@parl.gc.ca](mailto:Omar.Alghabra@parl.gc.ca)>

**Cc:** [REDACTED]

**Subject:** Noise Monitoring Terminal in [REDACTED] Mississauga

Hello, my family lives in [19 (1)] and are directly in a Pearson flight path. Why is there no Noise Monitoring Terminal in South Mississauga?

There is a large gap if you review the attached from Pearson's website.

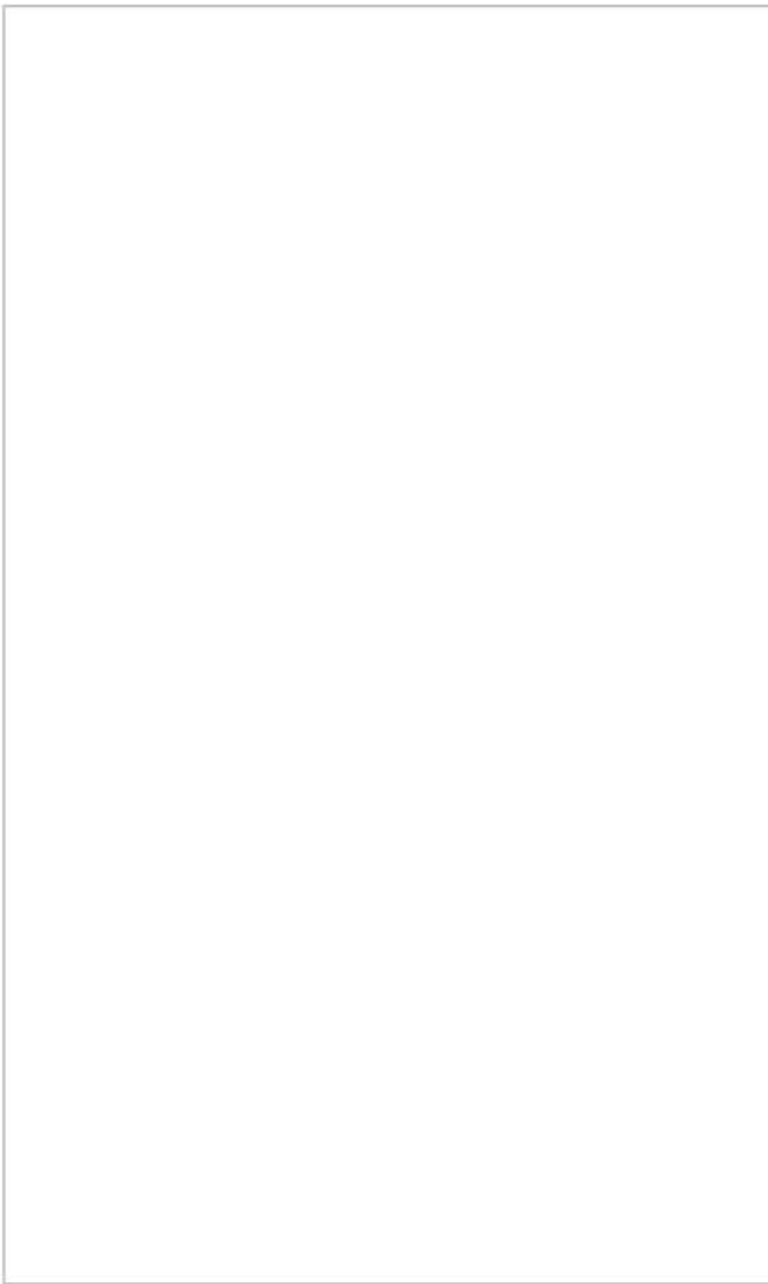
Domestic and international companies are clearly taking advantage of there not being a NMT in this flight path, which is often right over our home. They fly very low and create noise that we had a reading of over 100 dBA.

Up until 3 years ago we lived much closer to the airport and had less of an issue. Likely because the NMT helped control the airplanes.

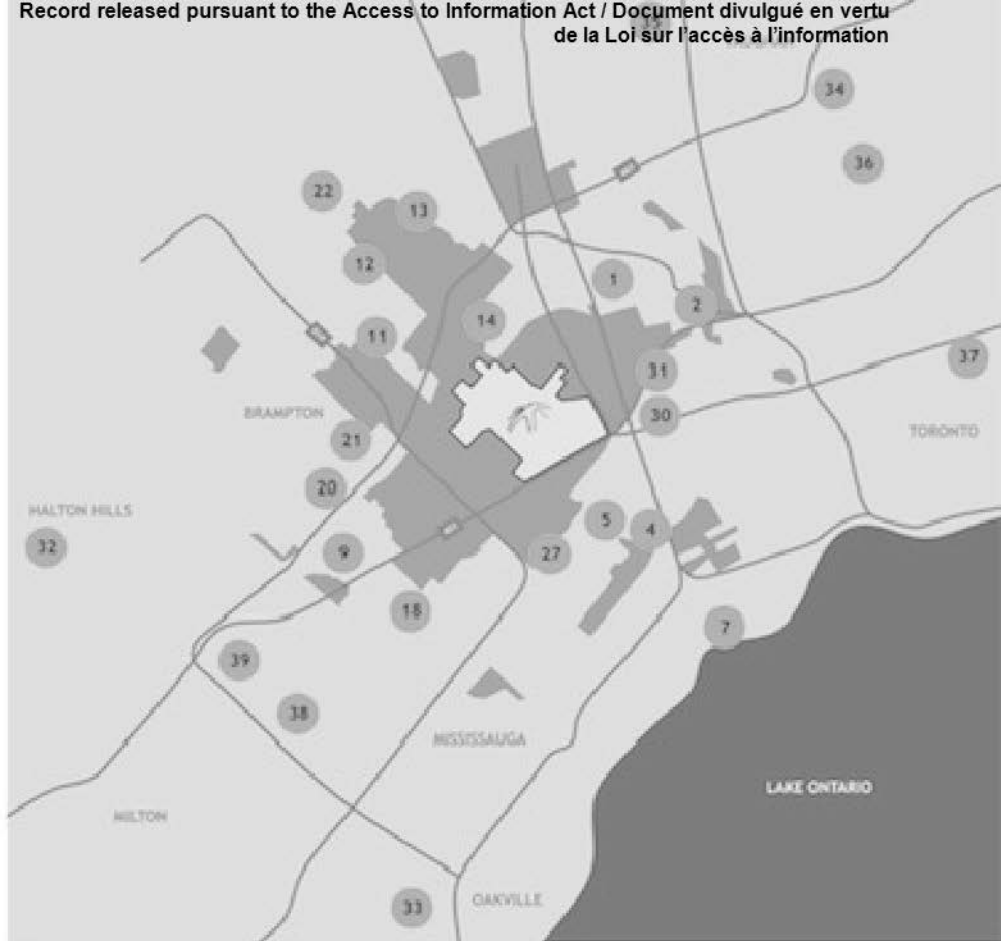
Thank you,

[19 (1)]

>



>



## Operationally Required:

- |    |                                  |    |                            |
|----|----------------------------------|----|----------------------------|
| 1  | West Humber Collegiate Institute | 22 | Brampton Fire Station #209 |
| 2  | Acadia Ave.                      | 27 | Meadow Glen Park           |
| 4  | Eriksdale Ave.                   | 30 | Richview Ambulance Station |
| 5  | Garnetwood Park                  | 31 | Blackfriar Park            |
| 7  | James S. Bell Public School      | 32 | Halton Hills               |
| 9  | Nav Canada Pond Street           | 33 | Oakville                   |
| 11 | Balmoral Park                    | 34 | Wade Gate Park             |
| 12 | Grenoble Public School           | 35 | Matthew Park               |
| 13 | New Life Community Church        | 36 | Robert Hicks Park          |

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Transport Canada    Transports Canada

4900 Yonge St. 4<sup>th</sup> Floor  
Toronto ON M2N 6A5

Your file    Votre référence

Our file    Notre référence

RDIMS Number    Numéro de SGDDI

DATE

NAME

EMAIL

Dear \_\_\_\_\_,

Thank you for writing.

Yours sincerely,

Imtiazali (Imi) Waljee  
Regional Director  
Civil Aviation, Ontario Region



**From:** [Waljee, Imi \(he,him | il,lui\) \(TC/TC\)](#)  
**To:** [Quach, Stephanie \(TC/TC\)](#)  
**Subject:** FW: FOR APPROVAL: MPQ: Toronto Pearson International Airport Noise Levels (11135)  
**Date:** Friday, August 25, 2023 1:23:21 PM  
**Attachments:** RDIMS-#19735808.DRF

---

Good Afternoon Stephanie,

Approved.

Regards,

Imtiazali (Imi) Waljee

(he, him, il)

Regional Director Civil Aviation – Ontario Region

Transport Canada / Government of Canada

[imi.waljee@tc.gc.ca](mailto:imi.waljee@tc.gc.ca) / Cel: 416-540-2367 / TTY: 1-888-675-6863

Directeur régional de l'aviation civile – Région de l'Ontario

Transports Canada / Gouvernement du Canada

[imi.waljee@tc.gc.ca](mailto:imi.waljee@tc.gc.ca) / Tél. cell. : 416-540-2367 / ATS : 1-888-675-6863

*\*My work hours may differ from yours, please do not feel the need to respond to my message if it is received outside of your work hours.*

*\*Mes heures de travail sont peut-être différentes des vôtres alors ne vous sentez pas obligé de répondre si c'est en dehors de vos heures de travail.*

---

**From:** Quach, Stephanie (TC/TC)

**Sent:** Friday, August 25, 2023 1:15 PM

**To:** Waljee, Imi (he,him | il,lui) (TC/TC)

**Subject:** FOR APPROVAL: MPQ: Toronto Pearson International Airport Noise Levels (11135)

Hi Imi,

Please find the attached MPQ response to the below highlighted query received. I have consulted with Adam for the info.

For your approval.

Thank you,

**Stephanie Quach**

Regional Manager, Issues Management

Transport Canada / Government of Canada

[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tel.: 647-394-5485/ TTY: 1-888-675-6863

Gestionnaire régional, Gestion d'enjeux

Transports Canada / Gouvernement du Canada

[stephanie.quach@tc.gc.ca](mailto:stephanie.quach@tc.gc.ca) / Tél.: 647-394-5485/ ATS : 1-888-675-6863

---

**From:** Holmes, Jennifer (TC/TC) <[jennifer.holmes@tc.gc.ca](mailto:jennifer.holmes@tc.gc.ca)>

**Sent:** Thursday, August 24, 2023 4:36 PM

**To:** Quach, Stephanie (TC/TC) <[Stephanie.Quach@tc.gc.ca](mailto:Stephanie.Quach@tc.gc.ca)>

**Subject:** FW: MPQ: Toronto Pearson International Airport Noise Levels (11135)

Hey Steph,

Would you be able to have a response for us by the 5<sup>th</sup>? If you have any information to share or even if it says to contact the GTA directly that works.

---

**From:** Henderson, Olivia (TC/TC) <[olivia.henderson@tc.gc.ca](mailto:olivia.henderson@tc.gc.ca)>

**Sent:** Thursday, August 24, 2023 3:31 PM

**To:** TC.F ONT PX RDGO / BDGR PX F.TC <ONTPXRDGO-BDGRPX@tc.gc.ca>

**Cc:** TC.F NCR XM Issues Management / Gestion des enjeux XM RCN F.TC <[XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca](mailto:XMIssuesManagement-GestiondesenjeuxXM@tc.gc.ca)>

**Subject:** MPQ: Toronto Pearson International Airport Noise Levels (11135)

Good afternoon Ontario region colleagues,

We received an MPQ pertaining to the following:

A constituent expressed concerns with the Toronto Pearson International Airport noise levels and potential health impacts.

The constituent and MP are looking for information on a possible study requested by the Greater Toronto Airports Authority (GTAA) on this issue.

Would it be possible for the team to please provide background information that MinO can share with the MP?

**Due date: September 7, 2023**

Thank you.

**Olivia Henderson** (she/her/elle)

**Coordination and Special Projects Officer**

Issues Management Directorate, Executive Office

Transport Canada

Cell: 613-558-7750

### Agente de coordination et des projets spéciaux

Direction de la gestion des enjeux, Bureau de la haute direction

Transports Canada

Cell: 613-558-7750

1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 26

The following request has been assigned to you for appropriate action in Tasking Database. To access it, click on the « GOTO » link.

La demande suivante vous a été transférée pour exécution dans la base de données des tâches. Pour y accéder, cliquez sur le lien « GOTO ».

Tasking # / No de tâche: TASK-011135

Request Type / Type de demande: MPQ

Topic / Sujet: MPQ: TORONTO PEARSON INTERNATIONAL AIRPORT NOISE LEVELS

Assigned To / Assigné à: PX

Submit By / Date de soumission: 9/7/2023

Request / Demande: PLEASE FIND ALL CONTEXT IN TASKING EMAIL.

<https://can01.safelinks.protection.outlook.com/?>

[url=http%3A%2F%2Fccmenterprise.tc.gc.ca%2FEnterprise%2FServices%2FAuthorization%2FLogin%3Frootid%3D17052692%26segmentid%3D2989866&data=05%7C01%7Ccolivia.henderson%40tc.gc.ca%7C75551102f933423cf0e08dba4d856b1%7C2008ffa9c9b24d979ad94ace25386be7%7C0%7C0%7C638285021314361628%7CUnknown%7CTWfPbGZsb3d8eyJWljoIMC4wLjAwMDAiLCJQljoiv2luMzliLCJBtIl6lk1haWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=PJI2%2FR%2FQwQkDVpvqU%2BUGnaO5nnPlc8wehGNDhZEJZZU%3D&reserved=0](http%3A%2F%2Fccmenterprise.tc.gc.ca%2FEnterprise%2FServices%2FAuthorization%2FLogin%3Frootid%3D17052692%26segmentid%3D2989866&data=05%7C01%7Ccolivia.henderson%40tc.gc.ca%7C75551102f933423cf0e08dba4d856b1%7C2008ffa9c9b24d979ad94ace25386be7%7C0%7C0%7C638285021314361628%7CUnknown%7CTWfPbGZsb3d8eyJWljoIMC4wLjAwMDAiLCJQljoiv2luMzliLCJBtIl6lk1haWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=PJI2%2FR%2FQwQkDVpvqU%2BUGnaO5nnPlc8wehGNDhZEJZZU%3D&reserved=0)

**TASK- 11135– Toronto Pearson International Airport Noise Levels****Request / Demande:**

A constituent expressed concerns with the Toronto Pearson International Airport noise levels and potential health impacts.

The constituent and MP are looking for information on a possible study requested by the Greater Toronto Airports Authority (GTAA) on this issue.

**Information for MinO:**

- Noise issues are best addressed by the airport authority directly. A referral for direct engagement is recommended.
- The study requested by the Greater Toronto Airports Authority (GTAA) can be found online: (December 6, 2022 meeting date): <https://www.torontopearson.com/en/community/noise-management/noise-forums/meeting-materials>, or directly attached here:



18-10-22 Health  
Canada EN.pdf

- Transport Canada is unaware of the status of the request contained in the letter. The constituent is encouraged to contact the GTAA.

**Response:**

- Thank you for contacting Transport Canada.
- Transport Canada is responsible for most of the transportation policies, programs, and goals set by the Government of Canada to ensure the national transportation system is safe, efficient, and accessible to all its users. As the safety regulator in Canada, the department's jurisdiction only extends to matters essential or integral to aeronautics.
- The department understands noise management is a complicated and often difficult issue faced by airport authorities and communities around the country. It is an issue that must be managed while ensuring aviation safety is not compromised. With Transport Canada's experience, noise issues have been most effectively addressed at the local community level.
- The study regarding noise levels and potential health impacts is accessible on the Greater Toronto Airports Authority's (GTAA) website. You may access it here: <https://www.torontopearson.com/en/community/noise-management/noise-forums/meeting-materials>
- The department recommends that you contact the GTAA directly as they are in the best position to provide the applicable information and solutions. The GTAA can be reached at 416-247-7678 or through its website at: [Contact Toronto Pearson Airport](#) | [Pearson Airport](#)



October 18, 2022

Tim Singer  
Director General,  
Environmental and Radiation Health Sciences  
70 Columbine Dr. Way  
Ottawa, ON  
K1A 0K9

**Greater Toronto  
Airports Authority**  
P.O. Box 6031  
3111 Convoir Drive  
Toronto AMF, Ontario  
Canada L5P 1B2

P 416.776.3000  
F 416.776.7746

GTAA.com

Dear Mr. Singer:

My name is Robyn Connelly and I'm the Director of Sustainability and Social Impact for the Greater Toronto Airports Authority (GTAA). In my role, I co-chair the Noise Management Forums - a series of working groups facilitating effective collaboration between Toronto Pearson and the community on noise management issues. Stakeholders include elected officials, community leaders and members of the public. It is in this capacity that I am writing to you.

I wrote to Health Canada on September 21 2017 requesting that the agency, in its capacity of providing advice to the public and regulatory authorities such as Transport Canada, update the 2010 study: *Aircraft Noise in the Vicinity of Airports*. In your October 13, 2017 response you indicated that "while there are no immediate plans to update the 2010 publication, Health Canada scientists will continue to monitor the scientific literature on noise and health, and contribute to the development of relevant international standards, such as those produced by the American National Standard Institute." I responded to your letter on September 28, 2018 with a request for discussion on relevant scientific research supported by Health Canada.

I am now writing to you again on this matter as it continues to be of concern for communities surrounding Toronto Pearson.

Although there have been health studies conducted in other areas of the world, residents affected by Toronto Pearson operations continue to call for updated, Canadian research.

The need for updated Canadian guidelines regarding the health impacts of aircraft noise was also reflected in the 2019 Transportation Committee's report to the Transport Minister Assessing the Impact of Aircraft Noise in the Vicinity of Major Canadian Airports recommendations 9 and 12a.



torontopearson.com

October 18, 2022

Page 2 of 2



**Recommendation 9 – World Health Organization Standards**

That Transport Canada assess how noise exposure forecasts are conducted and consider implementing and complying with the World Health Organization standard on noise around large Canadian airports.

**Recommendation 12 — Cooperation with Municipal, Provincial and Territorial Health Authorities**

That the Government of Canada work in cooperation with municipal, provincial and territorial health authorities to:

- a. support research to better understand the impact of aircraft noise-related annoyance on human health, including location-specific epidemiological studies as well as examining mitigation measures for individuals who are sensitive to noise disturbances;

The Minister's response to these recommendations included the following statement:

Transport Canada and Health Canada are considering the path forward on updating government guidance. This could include different levels of government.

The human health impacts of aircraft noise are a growing concern of community members affected by Toronto Pearson operations. For major Canadian airports such as Toronto Pearson to meet the growing demand for travel and cargo, while protecting the health and well-being of local community members, we need to rely on studies and recommendations specific to the Canadian environment.

I therefore once again call upon Health Canada to update its 2010 study and provide guidelines to airports so Canadian citizens and airports can understand and work together to address and mitigate any potential existing or future human health effects related to aircraft noise.

Thank you,

Robyn Connelly  
Director, Sustainability and Social Impact

Cc: The Honourable Omar Alghabra, Minister of Transport  
Karen Mazurkewich, GTAA Vice President Stakeholder Relations and Communications  
Lorrie McKee, GTAA Director Public Affairs and Stakeholder Relations  
Members of the Toronto Pearson Neighbourhood Table  
Members of the Toronto Pearson Noise Accountability Board

**From:** Quach, Stephanie (TC/TC)  
**To:** Shaikh, Farha (TC/TC)  
**Subject:** FW: FOR INPUT: Ministerial for approval  
**Date:** Friday, December 08, 2023 12:37:00 PM

UNCLASSIFIED / NON CLASSIFIÉ

Hey! Can you pls save this info in our FAQ?

**From:** Mateen, Ovais (TC/TC)  
**Sent:** Wednesday, December 06, 2023 1:40 PM  
**To:** Shaikh, Farha (TC/TC)  
**Cc:** Quach, Stephanie (TC/TC) ; Biffin, Adam (TC/TC)  
**Subject:** RE: FOR INPUT: Ministerial for approval

UNCLASSIFIED / NON CLASSIFIÉ

Hi Farha,

Two points. Firstly, I've taken over the Pearson Airport and now the Principal Aerodrome Inspector - CYYZ.

Secondly, yes, I agree that Night Flight program info can and should be added.

The GTAA's website has some information. The weblink is

<https://www.torontopearson.com/en/community/noise-management/noise-management-program/operating-restrictions>.

Information from the GTAA's page:

“To limit nighttime noise and balance growing regional demand, Transport Canada created a night flight restriction program, which limits the number of movements during the restricted hours (12:30 am to 6:29 am). This is referred to as the “night flight budget.” Toronto Pearson is the only airport in Canada to have a budget system.

The night flight budget is a function of how many passengers fly through Toronto Pearson during the year. As the number of total passengers grows, so does the night flight budget.”

“The night flight budget schedule is from November 1 to October 31 and accounts for approximately 4% of total annual air traffic movements at Toronto Pearson. We manage this night flight budget by pre-scheduling 80% of the budgeted restricted hour slots. The remaining 20% are allocated to accommodate flights that were delayed due to the weather, mechanical, security or other operationally necessary flights. Medevac flights and military and police operations are also counted towards the night flight budget.”

We can use this information as it explains the night flight budget well. Change the word in the above text from “WE” to “GTAA” and we have a good explanation of the night flight budget.

Hope this helps.

Ovais M.

Ovais Mateen

Civil Aviation Safety Inspector, Aerodromes and Air Navigation

Transport Canada / Government of Canada

[ovais.mateen@tc.gc.ca](mailto:ovais.mateen@tc.gc.ca) / Cel: 416-414-0350 / TTY: 1-888-675-6863

Inspecteur de la sécurité de l'aviation civile, Aérodomes et navigation aérienne

Transports Canada / Gouvernement du Canada

[ovais.mateen@tc.gc.ca](mailto:ovais.mateen@tc.gc.ca) / Tél. cell. : 416-414-0350 / ATS: 1-888-675-6863

---

**From:** Shaikh, Farha (TC/TC) <[farha.shaikh@tc.gc.ca](mailto:farha.shaikh@tc.gc.ca)>

**Sent:** Wednesday, December 06, 2023 12:03 PM

**To:** Biffin, Adam (TC/TC) <[adam.biffin@tc.gc.ca](mailto:adam.biffin@tc.gc.ca)>

**Cc:** Quach, Stephanie (TC/TC) <[Stephanie.Quach@tc.gc.ca](mailto:Stephanie.Quach@tc.gc.ca)>; Mateen, Ovais (TC/TC) <[ovais.mateen@tc.gc.ca](mailto:ovais.mateen@tc.gc.ca)>

**Subject:** FOR INPUT: Ministerial for approval

UNCLASSIFIED / NON CLASSIFIÉ

Hello Adam,

Please see the comments below from Nicole, can you please provide your input on this matter.

"The response doesn't address their concerns about Night Flights at Pearson and accusations that we aren't enforcing/monitoring it? Can we include details on the enforcement program or reporting process or something to better acknowledge that aspect of their complaint?"

Thanks,

Farha Shaikh

Issues Management Officer

Transport Canada/ Government of Canada

[farha.shaikh@tc.gc.ca](mailto:farha.shaikh@tc.gc.ca) / Tel: 647-221-0685/ TTY: 1-888-675-6863

Agenté, Gestion d'enjeux

Transports Canada / Gouvernement du Canada

[farha.shaikh@tc.gc.ca](mailto:farha.shaikh@tc.gc.ca) / Tél. : 647-221-0685 / ATS : 1-888-675-6863

---

**From:** Quach, Stephanie (TC/TC) <[Stephanie.Quach@tc.gc.ca](mailto:Stephanie.Quach@tc.gc.ca)>

**Sent:** Wednesday, December 06, 2023 10:03 AM

**To:** Shaikh, Farha (TC/TC) <[farha.shaikh@tc.gc.ca](mailto:farha.shaikh@tc.gc.ca)>

**Subject:** Fwd: Ministerial for approval

Hey, can you please consult with Adam and also include Ovais in the email? He will be taking over Pearson for Adam.

Thanks!

Steph

Begin forwarded message:

**From:** "Holmes, Jennifer (TC/TC)" <[jennifer.holmes@tc.gc.ca](mailto:jennifer.holmes@tc.gc.ca)>

**Date:** December 6, 2023 at 9:24:48 AM EST

**To:** "Quach, Stephanie (TC/TC)" <[Stephanie.Quach@tc.gc.ca](mailto:Stephanie.Quach@tc.gc.ca)>, "Shaikh, Farha (TC/TC)" <[farha.shaikh@tc.gc.ca](mailto:farha.shaikh@tc.gc.ca)>

**Subject: FW: Ministerial for approval**

UNCLASSIFIED / NON CLASSIFIÉ

Over to you.

-----Original Message-----



From: Nel, Nicole (TC/TC) <[nicole.nel@tc.gc.ca](mailto:nicole.nel@tc.gc.ca)>  
Sent: Wednesday, December 06, 2023 9:23 AM  
To: Holmes, Jennifer (TC/TC)  
<[jennifer.holmes@tc.gc.ca](mailto:jennifer.holmes@tc.gc.ca)>  
Subject: RE: Ministerial for approval

UNCLASSIFIED / NON CLASSIFIÉ

The response doesn't address their concerns about Night Flights at Pearson and accusations that we aren't enforcing/monitoring it? Can we include details on the enforcement program or reporting process or something to better acknowledge that aspect of their complaint?

Thank you,

Nicole Nel  
Acting Executive Regional Director – Issues and  
Program Management Regional Director General's  
Office – Ontario Region  
(she/her/elle)  
Transport Canada/ Government of Canada  
[nicole.nel@tc.gc.ca](mailto:nicole.nel@tc.gc.ca) / Cell: 647-262-8961 / TTY: 1-888-  
675-6863

A/Directrice régionale exécutive intérimaire – Gestion  
de programmes et questions d'intérêts Bureau du  
Directeur général régional - Région de l'Ontario  
Transports Canada / Gouvernement du Canada  
[nicole.nel@tc.gc.ca](mailto:nicole.nel@tc.gc.ca) / Tél. cell. : 647-262-8961 / ATS : 1-  
888-675-6863

I am certified in Mental Health First Aid

-----Original Message-----

From: [jennifer.holmes@tc.gc.ca](mailto:jennifer.holmes@tc.gc.ca)  
<[jennifer.holmes@tc.gc.ca](mailto:jennifer.holmes@tc.gc.ca)>  
Sent: Wednesday, December 06, 2023 9:13 AM  
To: Nel, Nicole (TC/TC) <[nicole.nel@tc.gc.ca](mailto:nicole.nel@tc.gc.ca)>  
Subject: Ministerial for approval

<https://can01.safelinks.protection.outlook.com/?>

[url=http%3A%2F%2Fccmenterprise.tc.gc.ca%2FEnterprise%2FServices%2FAuthorization%2FLogin%3Frootid%3D18043826%26segmentid%3D2952694&data=05%7C01%7CStephanie.Quach%40tc.gc.ca%7Ccb60ee4b9b1349f8ce6208dbf6671921%7C2008ffa9c9b24d979ad94ace25386be7%7C0%7C0%7C638374694877346953%7CUnknown%7CTWFpbGZsb3d8eyJWlloiMC4wLjAwMDAiLCJQljoiv2luMzliLCJBTil6lk1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=7D7jEqsksSB67q4OGMBSRf9QvqQ9wjiZfTWSvgQmnh0%3D&reserved=0](http%3A%2F%2Fccmenterprise.tc.gc.ca%2FEnterprise%2FServices%2FAuthorization%2FLogin%3Frootid%3D18043826%26segmentid%3D2952694&data=05%7C01%7CStephanie.Quach%40tc.gc.ca%7Ccb60ee4b9b1349f8ce6208dbf6671921%7C2008ffa9c9b24d979ad94ace25386be7%7C0%7C0%7C638374694877346953%7CUnknown%7CTWFpbGZsb3d8eyJWlloiMC4wLjAwMDAiLCJQljoiv2luMzliLCJBTil6lk1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=7D7jEqsksSB67q4OGMBSRf9QvqQ9wjiZfTWSvgQmnh0%3D&reserved=0)

**From:** Quach, Stephanie (TC/TC)  
**To:** Mateen, Ovais (TC/TC)  
**Subject:** FW: For Input: Pearson Noise Forum Meeting - Sept 29/23 - Status on Updated Canadian Research & Guidelines on Health Impacts of Major Airports  
**Date:** Thursday, November 09, 2023 10:49:00 AM  
**Attachments:** FW ExternalExterne 2 planes just over a 1m apart PCA less than a mile.msg

UNCLASSIFIED / NON CLASSIFIÉ

Hi Ovais,

This is one of the items concerning a ministerial. The attached is another complaint from the same writer which HQ is going to attach to this existing ministerial, XAP-2023-529337.

The full details of the complaint can be found below.

Thank you,

Steph

**From:** Quach, Stephanie (TC/TC)  
**Sent:** Tuesday, November 07, 2023 11:57 AM  
**To:** Biffin, Adam (TC/TC)  
**Subject:** FW: For Input: Pearson Noise Forum Meeting - Sept 29/23 - Status on Updated Canadian Research & Guidelines on Health Impacts of Major Airports

UNCLASSIFIED / NON CLASSIFIÉ

Hey Adam,

Following up on the below please. Is there anything specific I should reference beyond the usually standard messaging?

Thanks,

Steph

**From:** Quach, Stephanie (TC/TC)  
**Sent:** Tuesday, October 31, 2023 10:36 AM  
**To:** Biffin, Adam (TC/TC) <adam.biffin@tc.gc.ca>  
**Subject:** For Input: Pearson Noise Forum Meeting - Sept 29/23 - Status on Updated Canadian Research & Guidelines on Health Impacts of Major Airports

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Good morning Adam,

Please see the below ministerial received regarding the noise concerns and forum meeting.

Is there any specific input I could reference beyond the standard lines and referral to GTAA?

Thanks,

Steph

**From:** [REDACTED]  
**Sent:** Friday, September 29, 2023 11:57 AM  
**To:** Francesco Sorbara <francesco.sorbara@parl.gc.ca>; [REDACTED]  
 Minister of Transport / Ministre des Transports (TC) <TC.MinisterofTransport-MinistredesTransports.TC@tc.gc.ca>; hcinfo.infosc@canada.ca  
**Cc:** bspurr@thestar.ca; Cynthia Woods [REDACTED]@gtaa.com>; icaohq@icao.int; eatkins@globeandmail.com; omoore@globeandmail.com  
**Subject:** [External/Externe]: Pearson Noise Forum Meeting - Sept 29/23 - Status on Updated Canadian Research & Guidelines on Health Impacts of Major Airports  
 XAP-2023-529337

MP Sorboro, MP Sgro, Health Canada & Transport Canada

Did anyone from the federal government either a local MP or staff responsible for oversight attend the noise forum meeting last night?

It was really bad. NavCanada admitted that they made an operational decision that they have done nothing to try to mitigate or understand community impacts and don't know how much longer this decision will be in effect. They might as well have told the community members that they don't care about public feedback or the impacts of operations decisions, that they've made a business decision to appease airline preference for the longest runway 05/23, that it's easier for them to operate with a dedicated runway configuration and have no intention of ever considering the impacts that this 'airline preference' has upon the community day in and day out. They also admitted that aircraft are larger than pre-pandemic but clearly, the community impact of more frequent movements of larger impacts has not been evaluated. The public noise forum was so unimportant to NavCanada that their representative was late and lost connection when he finally joined the meeting; he appeared unprepared.

This is the exact opposite of the Recommendation 1 in the 2019 Report Assessing the Impact of Aircraft Noise in the Vicinity of Major Canadian Airports.

***"Recommendation 1 — Consideration of Noise Impacts That Transport Canada recommend that NAV CANADA, airport authorities and airlines carefully consider noise impacts in their operational decisions, policies and equipment-purchasing decisions."***

I was woken up at 1:43 a.m. last night. I woke up to planes at 6:30 a.m. this morning. I have tried to be patient but I've been waiting 3 months for a response from my local MP and it is increasingly evident to me that ***part of the response needs to come from the government.*** <sup>19 (1)</sup>

<sup>19 (1)</sup>

<sup>19 (1)</sup>

The operational decision was and is to run dedicated departures off 05/23. This decision was made as far as I can tell the same month (Nov, 2022) that Pearson implemented the new RNP arrival flight path, on the same runway. It makes absolutely no sense and even worse the public can't provide any meaningful feedback because we don't know if we are being impacted by the new RNP procedures or NavCan's operational decision to run dedicated departures off the same runway. The latter implemented and acknowledged by NavCanada as well as the GTAA with no public consultation, noise notification, or indication if it's is permanent or temporary. There are people in <sup>19 (1)</sup> Miss who think they are going nuts because of arrivals as a result of the new RNP. The reality is they are experiencing dedicated arrivals on 24 L/R that have nothing to do with RNP, it was the result of NavCanada's operational decision.

Was Transport Canada advised of this operational decision? Are there any approved departure and arrival operating procedures that contemplate a dedicated runway configuration? I really don't think so because I don't think that Pearson has ever operated in a dedicated configuration on a long-term basis before.

It is evident that recent changes have only shifted impacts, there has been no actual mitigation or reduction in noise and we don't have the monitoring or data to validate or invalidate what the community is telling you they are experiencing; impacts are significantly different pre and post-pandemic. There was no data provided at last night's meeting that shows the intensity of impacts, how localized impacts are

experienced, if it's worse over residential or employment areas, no attempt to understand document or provide feedback on community impacts that result from RNP or the operational decision made by NavCanada. There is zero consideration or mitigation for turning planes that create rollback noise, one after the other. The impact is compounded by running dedicated departures on a sole runway. I am sure there are also impact for a runway with dedicate arrivals. There are clearly very significant impacts on individuals at night, impacting their ability to sleep restfully. The nighttime preferential system is not working, it's misleading because the impacts on communities are not equitable even though it tries to present itself in such a manner. It's absurd to tell the community that 95% of flights run east and west and then in the same breath say that the nighttime preferential system is better because north departures are preferred when GTAA, NavCan fully knows prevailing wind patterns will rarely allow this configuration.

There is nothing happening here that is based on evidence, best practices or the recommendations in the 2019 Report. **Transport Canada is absent** and the public deserves a response, otherwise, we have no choice but to determine a path forward that will escalate our concerns and force them to be prioritized by the GTAA, NavCan and the federal government. At this point, I don't think Transport Canada is overseeing anything and there is zero accountability from NavCanada while the GTAA claims mercy to those that regulate them. Everyone claims they are practicing sustainable corporate, social, and environmental governance.

There is no excuse for the lack of response and finger-pointing that has clearly been going on for over a decade. There has been no response to the letter sent by GTAA to Health Canada dated Dec. 2022. At least not shared with the community. What is the status, where is Transport Canada? Where is Health Canada?

How can Transport Canada approve the new RNP arrivals flight path proposed by NAVCANADA but not respond to the community concerns to update Canadian research and guidelines regarding the health impacts of major airports? How can you ask us for public feedback and not analyze the proposed route to understand health impacts with updated guidelines and research? - it is a paradox - Worse operational decisions are clearly made that fail to take any consideration of cumulative impacts upon the local community. There is more concern about overflying passengers, about passengers waiting in the airport than there is for those of us surrounding the airport that are impacted by plane after plane after plane every day.

My local municipality and provincial MP are absent on any impacts from airport

operations yet are pushing development closer and closer to the airport, approvals are not considerate or mindful of preserving corridors for aircraft movement to minimize sensitive land use conflicts. I don't live anywhere near the area of influence, I'm 15km away from Pearson, but there are days when my sky sounds like a constant low-hanging rumble as plane after plane turns. Sometimes so loud I can't talk to my neighbour I have to wait for the plane to pass. For me it is not just the decibel level it is the frequency and duration. This is not captured in any study because research, guidelines have not been updated, there is nothing monitoring the noise where planes are actually turning. During the wildfire smoke I wondered what the role of Pearson is if there is an air quality warning. The impacts were actually worse for me because there was low visibility. At that point, I started looking at air monitoring stations and there is nothing near me that would capture emissions in my community. I also live near [19 (1)] so it is especially concerning to me that lack of monitoring.

Has the initiative for Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) resulted in the difference in impacts that the community is articulating? I want to support initiatives that would reduce carbon emissions but it is difficult to do so if the noise rubs me raw because it happens for days on end and wakes me up at night.

I have cc'd the International Civil Aviation Organization (ICAO) to ensure that if the NavCan, GTAA, or Transport Canada come forth with best practices or other positive reports they understand the reality for local communities is not one and the same.

The communities surrounding Pearson await your response.

Thank you,

[19 (1)]



**From:** Holmes, Jennifer (TC/TC)  
**Sent:** Thu, 9 Nov 2023 15:12:52 +0000  
**To:** Quach, Stephanie (TC/TC)  
**Subject:** FW: [External/Externe]: 2 planes just over a 1m apart PCA less than a mile

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You ok with that approach?

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**From:** XMS Ministerial Registry Unit / Unité du registre ministériel XMS <XMSMinisterialRegistryUnit-UniteDuRegistreMinisteriel@tc.gc.ca>  
**Sent:** Thursday, November 09, 2023 10:04 AM  
**To:** TC.F ONT PX RDGO / BDGR PX F.TC <ONTPXRDGO-BDGRPX@tc.gc.ca>  
**Cc:** Holmes, Jennifer (TC/TC) <jennifer.holmes@tc.gc.ca>  
**Subject:** FW: [External/Externe]: 2 planes just over a 1m apart PCA less than a mile

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Good morning,

I am wondering if the correspondence below can be added to docket XAP-2023-529337 as it is currently open for direct reply on a similar but not identical topic.

Please advise.

Thank you,  
 Kelly

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**From:** 19 (1)  
**Sent:** Wednesday, November 08, 2023 10:17 PM  
**To:** Navcanada Service <service@navcanada.ca>; 19 (1)  
 francesco.sorbara@parl.gc.ca; Cynthia Woods 19 (1) @gtaa.com>; ZZG-Community  
 Engagement <communityengagement@gtaa.com>; Minister of Transport / Ministre des Transports (TC)  
 <TC.MinisterofTransport-MinistredesTransports.TC@tc.gc.ca>  
**Subject:** [External/Externe]: 2 planes just over a 1m apart PCA less than a mile

This is insane.

Never ever was a flight path approved but NavCan operates as if it is approved.

This is an operational decision to run plane after plane over the same area, to turn them, compound the noise over a residential neighborhood. It is always east of highway 400. Worse it's an operational decision abusing previous approvals by operating in a manner never contemplated nor transparently presented to regulators or the public.

If it's allowed explain it to me? Provide evidence regulations, SOP...most importantly evidence that the



studies, mitigation was actually done not just an ad-hoc operational decision that somehow has become permanent.

It's not even that I have no rights, I had no way of knowing upon purchasing my home because it's not approved nor documented.