PLANNING ANALYSIS AND RECOMMENDATIONS – WINNIPEG INTERNATIONAL AIRPORT

FINAL REPORT | AUGUST 30, 2021

HM AERO
AVIATION CONSULTING

Landmark
Planning & Design Inc.

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Final Report

Province of Manitoba
Manitoba Municipal Relations

August 30, 2021

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Cover Image: Google Earth

Executive Summary

The Province of Manitoba engaged HM Aero Aviation Consulting and Landmark Planning & Design to undertake a technical and planning analysis related to land use in the vicinity of the Winnipeg James Armstrong Richardson International Airport (Winnipeg International Airport). A Noise Exposure Forecast (NEF) Study was previously prepared under separate cover to generate NEF Contours for Winnipeg International Airport in four scenarios:

1. Baseline conditions using historical data from 2019;
2. Future conditions in 2033 based on an independent aircraft movement forecast completed by the project team;
3. Future conditions in 2050 based on forecast aircraft movement activity; and
4. Conditions in a conceptual "ultimate-term" scenario at an indeterminate time in the future, where a third runway is implemented, and the three-runway system operates at its estimated capacity.

Based on the findings of the NEF Study, the following Planning Analysis and Recommendations Report was prepared which contains:

- A planning hierarchy review of relevant federal, provincial, and municipal guidelines and regulations pertaining to land use in the vicinity of Winnipeg International Airport;
- A case study analysis of airport-related planning regulations and guidelines in Richmond, British Columbia; Mississauga, Ontario; and Calgary, Alberta;
- A review of supplementary noise mitigation measures;
- A land use planning analysis of the Ultimate-Term NEF scenario; and
- Planning recommendations and suggested amendments to federal, provincial, and municipal guidelines and regulations.

Key findings of the Report are summarized as follows:

- Updated NEF contours for Winnipeg International Airport could result in a substantial reduction of the physical area impacted by Airport-related regulations;
- There is great variety in land use restrictions within specific NEF Contours, from the restriction of residential uses in the NEF 30 area (Calgary) to the permission of residential development up to the NEF 40 contour (Richmond);
- Certain provinces provide more specific regulations for airport-related land use, and the regulatory framework exists for the implementation of such an approach in Manitoba;
- Supplementary noise mitigation plays an important role in reducing potential land use conflicts;
- Municipal regulations in Winnipeg may require amendment to reflect provincial regulations, should provincial amendments be pursued;
- At minimum, municipal by-laws should be updated/amended to reflect new NEF contours with a corresponding exercise to update land use restriction areas and polices; and
- Updated and streamlined supplemental noise mitigation measures could be explored.

Revision History

Rev.	Date	Status	Notes
0	January 15, 2021	Draft	Issued for review to the Province of Manitoba.
1	January 31, 2021	Final	Issued for use by the Province of Manitoba. Revisions made based on internal comments.
2	February 10, 2021	Final	Issued for use by the Province of Manitoba. Revisions made based on internal comments.
3	August 30, 2021	Final	Issued for use by the Province of Manitoba. Revisions made based on technical changes to the Noise Exposure Forecast Study. Changes include updated NEF contour maps (Section 5.1) and land use analyses (Section 5.2).

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1 INTRODUCTION

1.1 Background

The *Winnipeg Airport Vicinity Development Plan By-law 6378/94* was adopted by Council in 1994, although the plan is now known as the "AVPA" since a 2002 charter amendment (By-law 8162/2002) which saw the name of the document formally changed to the Winnipeg Airport Vicinity Protection Area By-law. The AVPA has guided development in the vicinity of the Winnipeg James Armstrong Richardson International Airport (the "Winnipeg International Airport") for over three decades. Intended primarily to protect the current and future 24-hour operations of the airport, the plan has served the Winnipeg International Airport and City of Winnipeg effectively in this regard.

Most regulatory by-laws are subject to periodic review, and if necessary, amendment. As the AVPA has now been in place for three decades and given increased demand for mixed-use and infill development, this review is timely. In the time since the original AVPA was adopted, there have been several key changes to the local planning and development landscape, both in the vicinity of the Winnipeg International Airport and in Winnipeg as a whole. These include:

- The development of Centreport Canada;
- The construction of Centreport Canada Way;
- The adoption of the *Airport Area West Secondary Plan*;
- The demolition of the former Winnipeg Stadium and its relocation to the University of Manitoba campus;
- The development of large-format standalone retail stores and shopping plazas in the vicinity of Polo Park; and
- Increasing demand for multi-family housing, mixed-use development, and infill development.

1.2 Report Objectives

This Report is intended to provide an overview of the planning hierarchy for airports and land use in Canada. The planning review includes federal, provincial (Manitoba), and municipal (City of Winnipeg, RM of Rosser) policies and regulations. Three case studies from Canadian municipalities with airports in proximity are included (Mississauga, Richmond, and Calgary). A detailed land use analysis based on Noise Exposure Forecast (NEF) contours prepared for Winnipeg International Airport is also included[1]. The above noted review and analysis is included to achieve the following objectives:

- Provide an overview of the existing local policy context;
- Provide an overview of relevant policy context from other locations through a jurisdictional scan;
- Present potential land use implications of newly generated NEF contours and alternate policy directions; and
- Provide potential recommendations for amendments to federal, provincial, and municipal regulations based on above-noted review and analysis.

[1] HM Aero Inc., Landmark Planning & Design Inc. (2021, August 12). *Noise Exposure Forecast Study – Winnipeg International Airport (Final Report).*

2 PLANNING HIERARCHY REVIEW

2.1 Federal Hierarchy

2.1.1 TP1247 – Land Use in the Vicinity of Aerodromes

TP1247 – Land Use in the Vicinity of Aerodromes is published by Transport Canada's Civil Aviation Directorate – Standards Branch, Flight Standards Division. The most recent version, 9th Edition, was released in 2013. As stated in the document abstract, TP1247 provides a series of recommendations and guidelines that can be implemented by provincial and municipal land use authorities. TP1247 is not binding on provinces and municipalities unless a plan, regulation, or by-law is made to implement its recommendations.

TP1247 is intended to familiarize and educate professionals and decision-makers on the relationship between airports and the planning that forms their land use contexts. This has been done given the potential for off-site land uses to negatively impact the safety and / or operational viability of airports across Canada. Specifically, TP1247 provides guidance on the following land use matters:

- **Part I** addresses the heights of buildings and obstacles in the vicinity of airports and the protection of Obstacle Limitation Surfaces. The *Winnipeg International Airport Zoning Regulations* (Section 2.1.2) forms the primary tool for the implementation of the directions provided in this section.
- **Part II** considers how the functioning of electronic navigation aids, radar units, and telecommunication systems can be impacted by nearby development. NAV CANADA's Land Use Program, further described in Section 2.1.4, is the detailed assessment system through which such issues can be identified.
- **Part III** describes how certain land uses can attract birds and wildlife that pose a hazard to aircraft operations, and how appropriate siting and mitigation controls can be used to reduce this risk. The *Winnipeg International Airport Zoning Regulations* (Section 2.1.2) includes a provision with respect to bird hazards, and such matters may also be addressed through provincial and municipal plans and by-laws, where appropriate.
- **Part IV** addresses land use compatibility as a function of aircraft noise and perceived annoyance. The *Winnipeg Airport Vicinity Development Plan* (Section 2.3.4), *Airport Vicinity Acoustics Insultation By-law* (Section 2.3.5), and *Airport Vicinity Protection Area Planned Development Overlay* (Section 2.3.7) are three of the tools currently used in the City of Winnipeg to address matters of aircraft noise. Recommendations pertaining to land use planning in this topic area are addressed later in this Report.
- **Parts V, VI, VII, and VIII** address restrictions to visibility, wind turbines, exhaust plumes, and solar arrays, respectively. These matters can be addressed through provincial and municipal plans and by-laws, the Transport Canada Aeronautical Assessment Process (Section 2.1.3), and the NAV CANADA Land Use Program (Section 2.1.4).

As noted above, Part IV of TP1247 forms the basis for Transport Canada's recommendations on development controls near airports as a function of aircraft noise and perceived annoyance. Shown in Table 2-1 are predictions of community response to commonly modelled NEF contours as provided in TP1247.

Table 2-1 – Community NEF Response Prediction (Transport Canada)

Response Area	Response Prediction*
1 (over 40 NEF)	Repeated and vigorous individual complaints are likely. Concerted group and legal action might be expected.
2 (35-40 NEF)	Individual complaints may be vigorous. Possible group action and appeals to authorities.
3 (30-35 NEF)	Sporadic to repeated individual complaints. Group action is possible.
4 (below 30 NEF)	Sporadic complaints may occur. Noise may interfere occasionally with certain activities of the resident.
* The above community response predictions are generalizations based upon experience resulting from the evolutionary development of various noise exposure units used by other countries. For specific locations, the above response areas may vary somewhat in accordance with existing ambient or background noise levels and prevailing social, economic, and political conditions.	

Table 2-2 outlines Transport Canada's guidelines on the acceptability of different land uses based on their location relative to NEF contours. Table 2-2 is reproduced from TP1247, although not all examples provided by Transport Canada are included. In its explanatory text, Transport Canada notes that it will be necessary for land use authorities to make an appropriate interpretation of what regulations are to apply at a specific location. As shown in Table 2-2, Transport Canada's guidance on land use acceptability considers three scenarios:

1. The land use should be permitted ("YES");
2. The land use should not be permitted ("NO"); and
3. The land use may be permitted with conditions or additional guidance is provided, as shown in a lettered explanatory note.

With respect to residential development, which is understood to be an area of specific focus by the Province, all types of residential uses are discouraged by Transport Canada past the NEF 35 contour. With respect to residential uses in areas between the NEF 30 and NEF 35 contours, Transport Canada states in Note B that:

> *"New residential construction or development should not be undertaken…"*

However, Note B also states that if the respective land use authority chooses to permit residential development between the NEF 35 and NEF 30 contours despite Transport Canada's recommendation:

- Acoustic insultation features should be incorporated in the building design;
- A noise impact assessment should be undertaken demonstrating the compatibility of the development with aircraft noise; and
- The developer should be required to notify prospective tenants and / or purchasers of potential speech interference and annoyance from aircraft noise.

Lastly, with respect to residential development in areas outside of the NEF 30 contour, Transport Canada notes that annoyance from aircraft noise may begin as low as NEF 25. Accordingly, Transport Canada recommends that developers should be made aware of this fact, inform prospective tenants and purchasers, and that development should not proceed without the implementation of satisfactory acoustic insultation features.

Table 2-2 – Select NEF Land Use Compatibility Guidance (Transport Canada)

NEF Value	NEF > 40	NEF 40-35	NEF 35-30	NEF < 30
Residential Uses				
Detached and Semi-Detached Dwellings	NO	NO	NO (B)	YES (A)
Town Houses	NO	NO	NO (B)	YES (A)
Apartments	NO	NO	NO (B)	YES (A)
Outdoor Recreational Uses				
Athletic Fields	NO	J	K	YES
Golf Courses	YES	YES	YES	YES
Park and Picnic Areas	NO	K	YES	YES
Commercial and Industrial Uses				
Factories	I	I	YES	YES
Offices	F	E	D	YES
Retail Sales	F	D	YES	YES
Restaurants	F	D	D	YES
Hotels and Motels	NO	F	G	YES
Warehouses	YES	YES	YES	YES
Public Uses				
Schools	NO	NO	D	C
Churches	NO	NO	D	C
Hospitals	NO	NO	D	C
Explanatory Notes				

A – Annoyance caused by aircraft noise may begin as low as NEF 25. It is recommended that developers be made aware of this fact and that they undertake to so inform all prospective tenants or purchasers of residential units. In addition, it is suggested that development should not proceed until the responsible authority is satisfied that acoustic insulation features, if required, have been considered in the building design.

B – New residential construction or development should not be undertaken. If the responsible authority chooses to proceed contrary to Transport Canada's recommendation, residential construction, or development between NEF 30 and 35 should not be permitted to proceed until the responsible authority is satisfied that: (1) appropriate acoustic insulation features have been considered in the building and (2) a noise impact assessment study has been completed and shows that this construction or development is not incompatible with aircraft noise. Notwithstanding point 2, the developer should still be required to inform all prospective tenants or purchasers of residential units that speech interference and annoyance caused by aircraft noise are, on average, established and growing at NEF 30 and are very significant by NEF 35.

C – These facilities should not be located close to the 30-NEF contour unless the restrictions outlined in Note D below are applied.

D – These uses should not be approved unless a detailed noise analysis is conducted and the required noise insulation features are considered by the architectural consultant responsible for the building design.

E – When associated with a permitted land use, an office may be located in this zone provided that all relevant actors are considered and a detailed noise analysis is conducted to establish the noise reduction features required to provide an indoor environment suited to the specific office function.

F – It is recommended that this specific land use should be permitted only if related directly to aviation-oriented activities or services. Conventional construction will generally be inadequate and special noise insulation features should be included in the building design.

G – Generally, these facilities should not be permitted in this zone. However, where it can be demonstrated that such a land use is highly desirable in a specific instance, construction may be permitted to proceed provided that a detailed noise analysis is conducted and the required noise insulation features are included in the building design. **I –** Many of these uses would be acceptable in all NEF zones. However, consideration should be given to internally generated noise levels, and acceptable noise levels in the working area. **J –** Undesirable if there is spectator involvement. **K –** It is recommended that serious consideration be given to an analysis of peak noise levels and the effects of these levels on the specific land use under consideration.

Summary
Provides guidelines and recommendations on airport land use compatibility
Non-binding on provincial and municipal governments unless implemented through a plan or bylaw
Considers obstacle heights, electronic interference, bird and wildlife hazards, noise, restrictions to visibility, wind turbines, exhaust plumes, and solar arrays

2.1.2 Winnipeg International Airport Zoning Regulations (SOR/81-708)

Section 5.4(2) of the *Aeronautics Act* provides the authority for the federal government (Governor in Council) to make regulations for the purpose of preventing lands in the vicinity of airports from being used or developed in a manner that is incompatible with the operation of an airport, aircraft, and aviation signals and communication systems. The *Winnipeg International Airport Zoning Regulations* were approved on the recommendation of the Minister of Transport pursuant to this authority on September 4, 1981. The Regulations apply to all lands, including public road allowances, within and under the various surfaces described in the Airport Zoning Regulations.

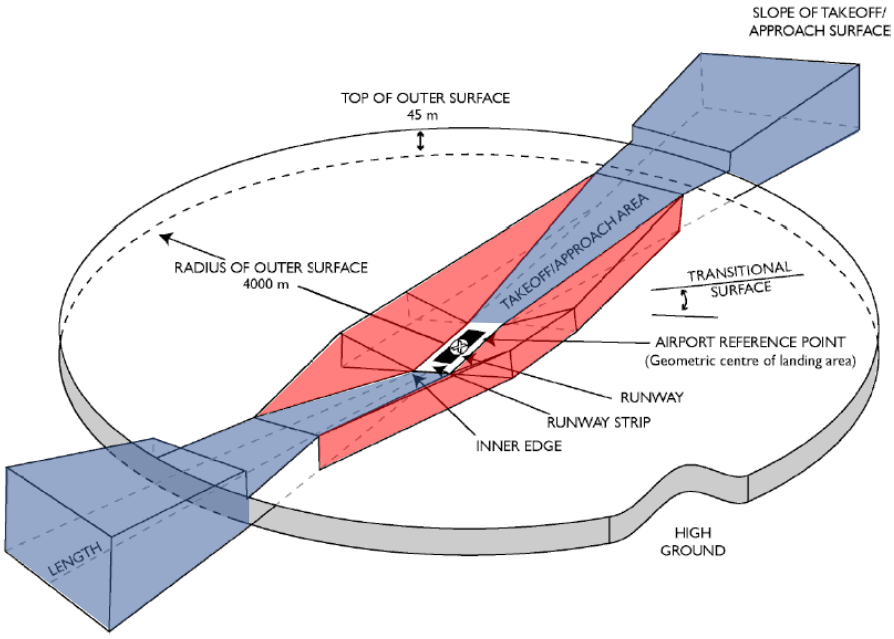
Height Controls

Height controls are established through the Airport Zoning Regulations to protect the Obstacle Limitation Surfaces of Winnipeg International Airport. Obstacle Limitation Surfaces establish the maximum elevation to which objects may project into the airspace associated with the airport to ensure the safety of aircraft operations. In the case of the Winnipeg International Airport Zoning Regulations, three types of Obstacle Limitation Surfaces are established:

- **Approach Surfaces:** An inclined plane that extends upwards and diverges outwards from the end of a runway strip;
- **Transitional Surfaces:** A complex inclined plane that extends upwards and outwards from the edge of a runway strip; and
- **Outer Surface:** A common plane established at 45.7 m above the Airport Reference Point that extends outwards from the airport. As the Airport Reference Point is located at 235.9 m Above Sea Level, the Outer Surface is located at 281.6 m Above Sea Level.

A generalized three-dimensional view of Approach, Transitional, and Outer Obstacle Limitation Surfaces is provided Figure 2-1.

Figure 2-1 – Example Obstacle Limitation Surfaces (TP1247, emphasis added)



Sections 4 and 5 of the Airport Zoning Regulations restrict the heights of all buildings, structures, objects, and natural growth to the limit of the applicable Obstacle Limitation Surface; Section 4 states:

> *"No person shall erect or construct, on any land to which these Regulations apply, any building, structure or object or any addition to any existing building, structure or object, the highest point of which will exceed in elevation at the location of that point any:*
>
> *a) Approach surface;*
>
> *b) Outer surface; or*
>
> *c) Transitional surface."*

The Airport Zoning Regulations define Approach and Transitional Surfaces for five runways:

1. **Runway 13R-31L:** The current Runway 13-31, with an allowance for an extension;
2. **Runway 13L-31R:** A potential runway northeast of and parallel to the current Runway 13-31 which is reserved for in the Transport Canada-approved Land Use Plan;
3. **Runway 07-25:** A former runway which has been permanently decommissioned. An Approach Surface is only defined for the Runway 25 end;
4. **Runway 18L-36R:** The current Runway 18-36, including an allowance for an extension; and
5. **Runway 18R-36L:** A potential runway northwest of and parallel to the current Runway 18-36. An Approach Surface is only defined for the Runway 18R end. The Transport Canada-approved Land Use Plan no longer reserves for this runway.

The Approach, Transitional, and Outer Surfaces of the Winnipeg International Airport Zoning Regulations are shown in Figure 2-2. Development height implications must be calculated on a case-by-case basis for each property subject to the Airport Zoning Regulations; to illustrate how the impacts of the Airport Zoning Regulations vary, three examples are shown in Table 2.3.

Table 2-3 – Airport Zoning Regulation Example Height Restrictions

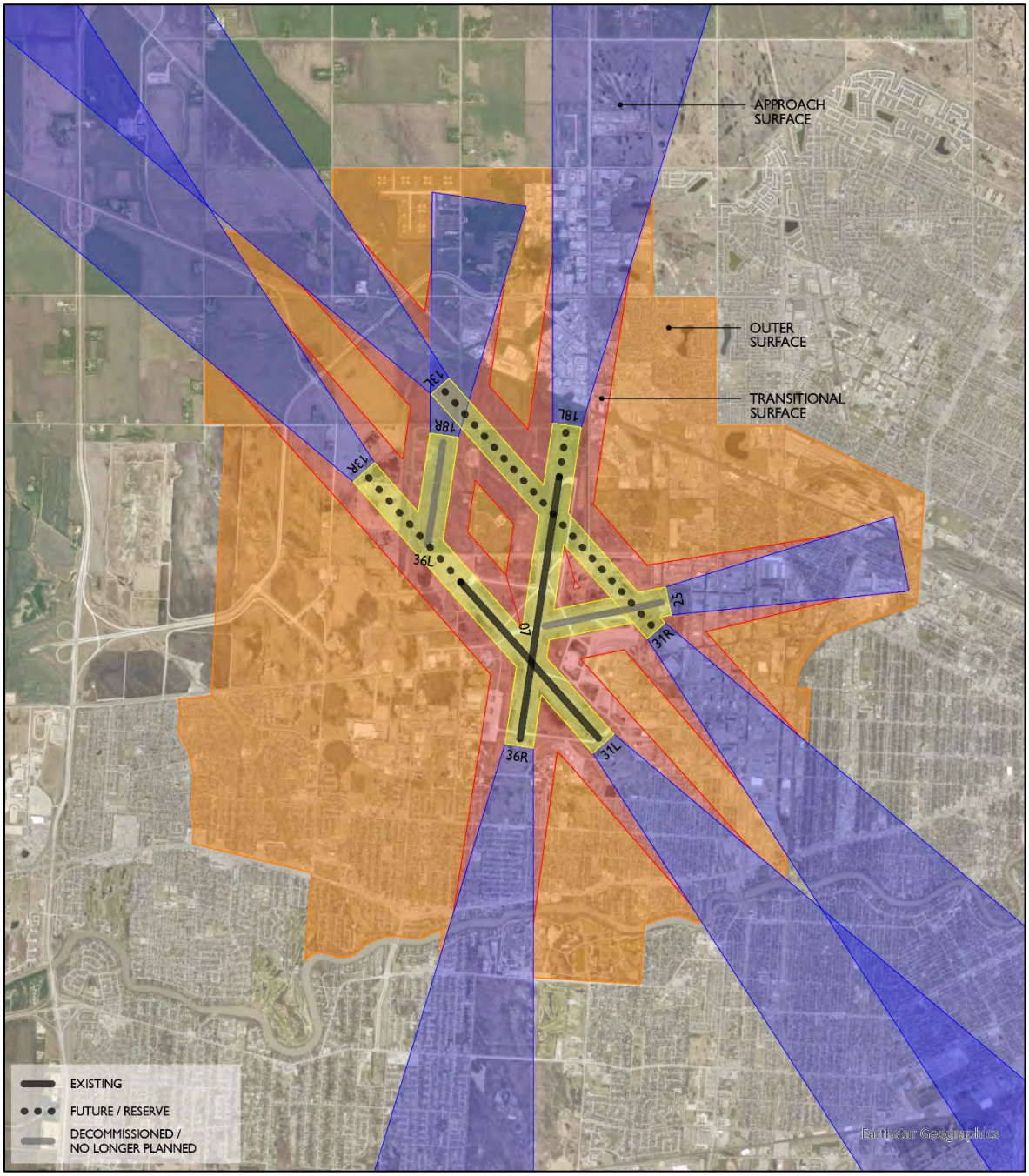
Intersection	AZR Surface	Elevation[1]	Maximum Development Height[1]
Ness Ave. & Hampton St.	Runway 31L (Runway 31) Approach Surface	236 m Above Sea Level	32 m Above Ground Level
Portage Ave. & Mt. Royal Rd.	Runway 36R (Runway 36) Approach Surface	236 m Above Sea Level	41 m Above Ground Level
Keewatin St. & Pacific Ave.	Outer Surface	233 m Above Sea Level	49 m Above Ground Level
[1] Elevations and maximum development heights are calculated based on Google Earth data, and should not be interpreted for planning purposes			

Bird Hazard Controls

Section 6 states that lands within the Airport Zoning Regulation area shall not be used *"…for the disposal of any waste edible by or attractive to birds."* The intent of this provision is to limit the development of new land uses that may attract birds and represent a threat to aviation safety.

Summary
Federal law that is binding on all properties within the Airport Zoning Regulation boundary
Limits the heights of structures, vegetation, and obstacles based on an Outer Surface and the Approach and Transitional Surfaces of five runways
Limits the development of land uses for the disposal of waste that may attract birds

Figure 2-2 – Winnipeg International Airport Zoning Regulations



2.1.3 Transport Canada Aeronautical Assessment Process

Transport Canada has developed an Aeronautical Assessment Form review process for permanent development proposals and temporary structures (e.g., cranes) to determine whether marking and / or lighting is required per Standard 621 of the Canadian Aviation Regulations, and to confirm the conformance of the proposal with applicable Airport Zoning Regulations. An Aeronautical Assessment Form is required for the construction or alteration of structures and appurtenances[2] that satisfy one or more the following criteria:

- The property is subject to an Airport Zoning Regulation;
- The proposal exceeds 90 m Above Ground Level;
- The proposal is of a height that will exceed an airport's Obstacle Identification Surface or Obstacle Limitation Surface as specified in *TP312 – Aerodrome Standards and Recommended Practices*;
- For aerodromes and airports, the proposal exceeds an imaginary surface extending outward and upward at a slope of 2% from the nearest point of the nearest runway for a horizontal distance of 4,500 m and thereafter exceeds a 90 m height out to 6,000 m;
- For water aerodromes, the proposal exceeds an imaginary surface extending outward and upward at a slope of 4% from the water aerodrome location for a horizontal distance of 4,500 m and thereafter exceeds a 90 m height out to 6,000 m;
- For heliports, the proposal exceeds an imaginary surface extending outward and upward at a slope of 4% from the nearest point of the nearest landing and takeoff area for a horizontal distance of 2,250 m and thereafter exceeds a 90 m height out to 6,000 m; or
- For catenaries and similar crossings (e.g., bridges, the proposal is of a height such that any portion of the object exceeds 60 m Above Ground Level above the crossed river or valley.

Development proponents are required to submit an Aeronautical Assessment Form to Transport Canada for review at least 90 days prior to the start of construction. If a response is not received from Transport Canada after the 90-day period expires, construction can commence. However, if markings and / or lighting are subsequently required by Transport Canada, it is the developer's responsibility to make the requested additions and bring the building into compliance. There is no cost to submit an Aeronautical Assessment Form to Transport Canada for processing.

Summary
Federal process for confirming conformity with Airport Zoning Regulations and identifying obstacle marking and lighting requirements
Triggers for the assessment of land use proposals to be verified by proponents based on seven eligibility criteria

[2] The Aeronautical Assessment Form applies to appurtenances more than 12 m in height.

2.1.4 NAV CANADA Land Use Program

The NAV CANADA Land Use Program is the system through which development proposals are assessed to identify impacts to the safety and efficiency of the air navigation system, such as:

- Air Traffic Control tower line of sight obstructions;
- Electronic interference with navigation aids and communication systems;
- Light pollution issues; and
- Conflicts with Instrument Flight Procedures.

Development proponents for projects near airports, such as Winnipeg International Airport, are directed to consult with the NAV CANADA Land Use Program and submit an assessment form to identify potential impacts and mitigation solutions. There is no cost incurred to the proponent in the NAV CANADA submission process.

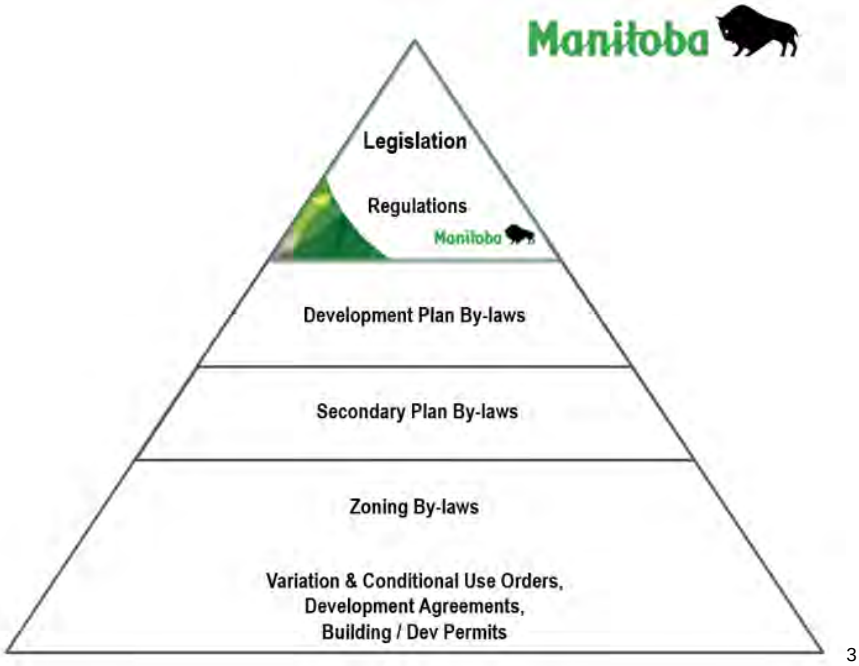
Summary
Assessment process to identify impacts to the safety and efficiency of the air navigation system, such as Instrument Flight Procedures and navigation aid interference
Process to be initiated by development proponents for projects near airports

2.2 Provincial Hierarchy

While the federal government has exclusive jurisdiction over aviation, the responsibility for land use planning rests with provincial and local governments. Provincial regulations and policies can address matters of aeronautics (i.e., off-airport land use compatibility) insofar as they do not impair the federal exercise of its core competencies over aviation. Manitoba's existing provincial-level planning regulations provide policy language related to the Winnipeg International Airport, its importance to the provincial economy, and the need to protect its 24/7 operations. However, there is limited provincial planning guidance related to land use planning specifically in the vicinity of airports.

Provincial regulations ultimately need to be reflected at the local level, and thus directly inform the contents of those documents reviewed in Section 2.3 of this Report. As such, all development plans and local-level regulations must conform to the applicable Provincial regulations as demonstrated in Figure 2-3. It should be noted that the Planning Hierarchy Review focuses on matters related to airports and planning and zoning in the vicinity of airports.

Figure 2-3 – Planning Hierarchy in Manitoba



[3]

2.2.1 Provincial Planning Regulation (81/2011)

The *Provincial Planning Regulation* (PPR) adheres to the *Planning Act* (Manitoba) and informs planning and land use in Manitoba. The PPR *"reflects the provincial government's interest in land and resource use and sustainable development, and provides policy direction for a comprehensive, integrated and coordinated approach to land use planning."*[4]

The Regulation also informs reviews of development plans in the province, and in instances where development plans are not in place, serves as a regulation for land use in that specific municipality. As such, the Regulation only applies to municipalities without development plans in place. However, development plans must be generally consistent with the PPR. Therefore, in the case of the City of Winnipeg and R.M. of Rosser, their respective development plans were informed by, and are generally consistent with, the PPR.

The PPR contains references to land use restrictions in the vicinity of airports and airfields, including the following:

- Development must be restricted in areas that are in the vicinity of airports and airfields, if development is incompatible with aircraft operations or the expansion of airport facilities (7.1.3(b));
- Airports and intermodal facilities must be protected from incompatible land uses that may adversely impact their operation, endanger public safety, or create a potential safety hazard (7.3.8); and
- Development plans must identify a road hierarchy and provincial transportation network, including the location of airports (Part 4 – 3(2)).

[3] Province of Manitoba (2015). *Planning 101*.
[4] Province of Manitoba (2020). *Provincial Planning Regulation Portal*. https://www.gov.mb.ca/mr/plups/index.html. Accessed November 13, 2020.

The PPR also includes a provision specific to the Winnipeg International Airport, requiring the protection of the Airport, its 24-hour operational status, and the clustering of industrial development in the vicinity of the Airport (9.1.3(c)). This policy, while general, provides for a myriad of planning mechanisms and regulations to be implemented.

Summary
Provides policy direction for municipalities in Manitoba
Contains policy direction to restrict incompatible land uses in the vicinity of airports
Contains policy direction to protect the operation and 24-hour status of Winnipeg International Airport

2.2.2 Inland Port Special Planning Area Regulation (48/2016)

The Inland Port Special Planning Area refers to the Centreport Canada lands within the RM of Rosser (a portion of Centreport Canada is located within the City of Winnipeg boundary). The *Inland Port Special Planning Area Regulation* (SPA Regulation) serves as the Development Plan and Zoning By-law for this area, and as such, governs planning and land use within the Special Planning Area (SPA).

The SPA Regulation is broken into two distinct components. First, the Development Plan sets the overall development vision for the SPA and provides objectives and policies to regulate land uses and development. Second, the Zoning By-law regulates land uses and buildings at the site-level, establishing permitted and conditional land uses and dimensional standards for site development.

A general focus of the SPA Regulation is to encourage the development of tri-modal transportation services, meaning the services of Class 1 railroads, Winnipeg International Airport, and Manitoba's major trucking companies. Thus, the protection of Winnipeg International Airport as a 24/7 freight hub is paramount. Key policies in this regard are found in Section 3.8.2 as follows:

1. *Development in the vicinity of the Airport must:*
    - (a) *comply with the regulations under the Aeronautics Act (Canada) governing the operational protection of navigation equipment and land use restrictions associated with the safe passage of aircraft; and*
    - (b) *adhere to the operational characteristics of airports as set out in Transport Canada's Aviation: Land Use in the Vicinity of Airports, which includes guidelines regarding obstacle limitation surfaces, building heights, hazards, visibility maintenance, noise, and lighting impacts.*
2. *The Winnipeg Airports Authority (WAA) shall review all development applications for lands located within the plan area to ensure the proposed plans do not violate the Airport's obstacle limitation surfaces (including building height limitations, lighting impacts, etc.). The WAA's review will be limited to issues pertaining to the jurisdiction of Transport Canada.*
3. *Development within a Noise Exposure Forecast (NEF) zone of accommodations, office, or other uses — if extended exposure to increased noise levels would negatively impact the typical indoor environment — must be designed and built to mitigate the impact of the increased noise (e.g., appropriate insulation and triple-paned windows), thereby improving conditions for those who work, visit, and spend time in these areas*.

The SPA Regulation sets an objective in Section 1.4 to *"ensure no new residential dwellings or land uses are permitted in the plan area"* and provides policies restricting new residential development and establishing existing residential uses as non-conforming with the expectation they will be transitioned out over time (1.4.2 #2).

The Zoning By-law component of the SPA Regulation restricts residential land uses as "not permitted" in all zones in the Use Table. It should be noted that "accommodations" (e.g., hotels and motels) are listed as "permitted" in all zones in the Use Table. As noted in Table 2C of *TP1247 – Land Use in the Vicinity of Aerodromes*, the recommendation is to have noise considerations and potential development restriction on hotels and motels in NEF contours greater than 30.

Summary
Serves as the Development Plan and Zoning By-law for Centreport Canada (Rosser, MB)
Contains references to federal guidelines and regulations pertaining to airports and aeronautics
Contains policy direction to protect the operation and 24-hour status of Winnipeg International Airport
Restricts new residential uses within the Special Planning Area
Requires the design and construction of non-residential uses that may be noise sensitive (e.g., hotels) to incorporate noise insulation

2.2.3 City of Winnipeg Charter (S.M. 2002)

The *City of Winnipeg Charter* is a Manitoba Law that grants certain authorities and powers to the City of Winnipeg, establishes the City's geographic boundaries and wards, establishes Council and its Committees, and sets a framework for city operations, among other items. Of note to this Report is "Division 3 – Airport Vicinity Protection Area" (AVPA) which states that the Lieutenant Governor may make the following regulations:

- *requiring the establishment by Council in Plan Winnipeg of an area of the City adjacent to the Winnipeg International Airport as an airport vicinity protection area (269 (1)(a)).*
- *establishing policies for use of real property, and for development, in the airport vicinity protection area to ensure that the use of real property and development in the area are compatible with the operation of Winnipeg International Airport, and requiring any Plan Winnipeg by-law to be consistent with those policies (269 (1)(b)).*
- *requiring a zoning by-law to be passed by council to control or prohibit any use of real property or development in the airport vicinity protection area, or in a part of it, to ensure that the use of real property and development are compatible with the policies established under clause (b) (269 (1)(c)).*

This provided the framework for the creation of the AVPA Plan (Section 2.3.4) and required the airport vicinity regulation to be incorporated into Plan Winnipeg (now *OurWinnipeg* – see Section 2.3.1), once established. It also established a framework, as noted in (1)(b) above, where the Province can establish standards that must be reflected at the local level.

Sections 269-272 of the Charter provide the regulatory framework for the AVPA Plan, including an appeals process, as follows:

- Requires the Plan to establish policies to ensure that the use of real property and development in the area are compatible with the operation of the Winnipeg International Airport and requires any Plan Winnipeg by-law to be consistent with those policies.
- Requires a zoning by-law passed by Council to control or prohibit any use of real property or development in the AVPA to be compatible with the Plan.
- Provides a mechanism for referral to Municipal Board when changes are proposed to a by-law related to the AVPA:
    - Appeals can be initiated by a municipality or planning district board adjacent to the AVPA, the Government of Canada, or the Government of Manitoba. The City would refer the appeal to the Municipal Board prior to Council giving second reading to the by-law in question.
    - Council would not be able to pass the by-law until changes are made to reflect the decision of the Municipal Board.
- Requires the City to ensure that all zoning by-laws pertaining to land, and all proposed subdivisions and amendments to subdivisions within the AVPA, conform to the AVPA Plan.

This Charter requirement was met in May 1994 when the City of Winnipeg adopted the *Winnipeg Airport Vicinity Development Plan By-law 6378/94.* The Plan is now known as the "AVPA" since a 2002 charter amendment (By-law 8162/2002) which saw the document's name formally changed to the *Winnipeg Airport Vicinity Protection Area By-law* (AVPA Plan). Section 2.3.4 provides a detailed summary of the AVPA Plan.

Summary
Provides the regulatory framework for establishing the AVPA Plan and specific zoning regulations
Establishes the process for the Municipal Board hearing appeals to proposed AVPA Plan amendments
Requires the City to enforce the AVPA Plan

2.3 Municipal Hierarchy

Municipal planning documents, whether in the City of Winnipeg or elsewhere in Manitoba, must adhere to the Provincial Planning Regulations and other higher-order regulations and acts. The City of Winnipeg is empowered to regulate planning within its boundaries through the *City of Winnipeg Charter*. All municipalities in Manitoba must have a development plan and zoning by-law that adheres to the *Provincial Planning Regulation*, as described in Section 2.2.1. Given that the Winnipeg International Airport is located within the City of Winnipeg, the most robust airport-related planning regulations are found in City of Winnipeg planning documents. It should be noted that the Planning Hierarchy Review focuses on matters related to airports and planning and zoning in the vicinity of airports.

2.3.1 OurWinnipeg Plan (67/2010)

OurWinnipeg is the City's municipal development plan and provides overarching land use policies for the City with a goal of providing a framework for sustainable growth. A development plan sets a vision for a municipality at the community level with guidance on sustainability, land use planning, infrastructure, and social and economic interests.

The *OurWinnipeg Plan* operates at a macro level, providing objectives and policies under the banners "A City that Works," "A Sustainable City," and "Quality of Life" while also offering implementation strategies. The document is supplemented by three more focused direction strategies:

1. Complete Communities;
2. Sustainable Transportation; and
3. Sustainable Water & Waste.

The *Complete Communities Direction Strategy* is summarized in Section 2.3.2 of this Report.

There are several direct references to the Winnipeg International Airport, its 24/7 operations, and the AVPA Plan. The "Key Directions for Connecting and Expanding our Sustainable Transportation and Infrastructure Network" section of "A City That Works – Key Directions for the Entire City" (01-1b) states the following:

- Support the role of the James Armstrong Richardson International Airport as a major transportation hub for passengers and cargo.
- Adhere to the Airport Vicinity Development Plan (AVDP) and periodically review the plan in cooperation with relevant stakeholders.
- To maintain compatible land use relationships, regulate land use and building regulations for all those neighbourhoods or portions thereof significantly affected by airport related noise through:
    - The Airport Vicinity Development Plan By-law 6378/94
    - Airport Vicinity Protection Area Planned Development Overlay

OurWinnipeg formally acknowledges in City of Winnipeg policy the important role of the Winnipeg International Airport's 24/7 operations and seeks to protect this strategic economic asset. The Plan speaks directly to the AVPA (referred to as the AVDP[5]) and incorporates Area I and Area II of the AVPA Plan into the City's Urban Structure policy map in Figure 01a.

A review and update of the *OurWinnipeg Plan* is currently underway at the time of this Report's preparation, which has culminated in the *Draft OurWinnipeg 2045 Development Plan*. Drafts of the Plan available at the time this Report was written did not propose substantially different policies relating to airports and land use in the vicinity of airports.

Summary
Serves as the Development Plan for the City of Winnipeg
Contains policy direction to protect the operation and 24-hour status of Winnipeg International Airport
References the AVPA Plan and AVPA PDO as implementation tools for regulating development within the AVPA Area.

[5] The *OurWinnipeg* and *OurWinnipeg Complete Communities* refer to By-law 6378/94 as the Airport Vicinity Development Plan (AVDP). The official By-law title is AIRPORT VICINITY PROTECTION AREA SECONDARY PLAN BY-LAW NO. 6378/94 whereas the Appendix to the by-law containing the Plan is titled WINNIPEG AIRPORT VICINITY DEVELOPMENT PLAN. For consistency with other planning documents this Report uses the acronym AVPA.

2.3.2 OurWinnipeg Complete Communities Direction Strategy (68/2010)

The *OurWinnipeg Complete Communities Direction Strategy* (CCDS) is a sub-document of *OurWinnipeg* which focuses more directly on land use planning and urban development. The Strategy provides policy guidance on development and servicing for the City of Winnipeg and divides the city into the following policy areas:

- New Communities;
- Mature Communities;
- Recent Communities;
- Airport Area; and
- Rural Areas.

The CCDS integrates the Winnipeg International Airport and AVPA Plan into the land use planning policies of the City and establishes the Airport Area as a "special district" with the highest policy hierarchy. This means that the policies of the Airport Area would prevail in instances when they conflict with policy areas lower on the hierarchy, including the Transformative Areas; Parks, Places and Open Spaces; Employment Areas; and Areas of Stability.

The CCDS includes the Airport Area in its policy maps (CCDS Figures 02a and 09a); however, unlike the *OurWinnipeg Plan*, the maps do not detail Area 1 and Area 2 of the AVPA Plan. Specific policies related to the Winnipeg International Airport, its 24/7 operations, and the AVPA Plan include:

- Key direction for the “Airport Area” (Section 09) states that *“the City of Winnipeg will support the role of the James Armstrong Richardson International Airport as a major transportation hub for passengers and cargo”* (P. 118)
- Supporting Direction 1 for the “Airport Area” (Section 09) is to *“support the 24-hour status of airport operations and airport related activities by working with the Winnipeg Airports Authority and All Stakeholders”* (P. 120). This is to be accomplished through adherence to the AVDP, periodically reviewing the plan, and regulating land use through the AVPD[6] and associated AVPA Planned Development Overlay (PDO).
- Supporting Direction 2 for the “Airport Area” (Section 09) is to *“collaborate with the Winnipeg Airports Authority on initiatives that capitalize on the Airport’s capacity to generate strategic economic development.”* This includes promoting multi-modal transportation opportunities and links through strategic partnerships, planning and capital investments, improving transportation between the airport and downtown and working with the WAA to develop the airport as *“a major centre for goods distribution, manufacturing and airport related commercial/employment activity, as well as the possible introduction of limited residential development, where appropriate”* (P. 120).
- Transformative Areas - Regional Mixed-Use Centres - Direction 1: *Promote development within the Polo Park Regional Centre consistent with the Airport Vicinity Protection Area Planned Development Overlay* (p. 46).

[6] Refers to AVPA Plan as “Airport Vicinity Development Plan”.

As part of the *OurWinnipeg 2045* review process, the CCDS is also being reviewed. The draft document, *Complete Communities 2.0*[7], includes policies specific to the Winnipeg International Airport, its 24/7 operations, and the AVPA Plan. Drafts of the Document available at the time this Report was written did not propose substantially different policies relating to airports and land use in the vicinity of airports.

Summary
Serves as the land use and urban development strategy of *OurWinnipeg*
Contains policy direction to protect the operation and 24-hour status of Winnipeg International Airport
References the AVPA Plan and AVPA PDO as implementation tools for regulating development within the AVPA Area.
Calls for collaboration with the WAA and other City entities to build partnerships and economic development

2.3.3 Winnipeg Transportation Master Plan (October 2011)

The *Winnipeg Transportation Master Plan* is the City's official plan for transportation and sets the goal of increasing travel options for residents, workers, and visitors to ensure people are not dependent on a single mode of travel. The Plan establishes short, medium, and long-term strategies to *"ensure that sustainable transportation becomes engrained as part of our culture and that all parties are working to the same goals"* (P. ii).

The *Transportation Master Plan* includes strategies related to the Winnipeg International Airport, its 24/7 operations, and the AVPA Plan, including:

- Direction 2(y) under Section 5.3.2 “Rapid Transit” sets the short-term goal of initiating a study for the Portage Avenue/Airport Link rapid transit corridor as a means of aligning land use and rapid transit.
- Under Section 6 “Goods Movement,” Direction 1(c) sets the enabling direction of continuing to *“work with stakeholders such as the Winnipeg Airports Authority to support the 24-hour operations of the James Armstrong Richardson International Airport as a major centre for goods movement and commercial activity."*

Summary
Serves as the City of Winnipeg’s official transportation plan
Contains policy direction to protect the operation and 24-hour status of Winnipeg International Airport
Contains policy direction to improve rapid transit links to Winnipeg International Airport

[7] As of December 2, 2020, the most recent *Complete Communities 2.0* draft was released in July 2020. The Plan is in draft form at the time of the preparation of this Report and is subject to change and Council approval.

2.3.4 Winnipeg Airport Vicinity Development Plan (As Amended)

The *Winnipeg Airport Vicinity Development Plan By-law 6378/94* (AVPA Plan) was adopted as per Section 269 (1a) of the *City of Winnipeg Charter* (see Section 2.2.3). The AVPA Plan sets a vision for the Airport and its vicinity to be *"Canada's new major transborder air hub"*, provides a set of planning objectives, and lists detailed actions to achieve the vision and objectives. Key areas of focused action provided in the Plan include:

- Economic Development;
- Land Use;
- Noise Management; and
- Performance.

The AVPA Plan was developed through a consultative process of workshops, seminars, and a "strategic planning process." An Executive Steering Committee, Management Advisory Board, and Administrative Support Group guided the process.

The APVA Plan is an action document that identifies objectives, lists sets of actions according to short, medium, and long-term timeframes, and identifies responsible parties for implementation. The plan establishes key policy frameworks including:

- The incorporation of the 1995 Noise Exposure Forecast (NEF) contours (via amendment 130/2010 - Figure 1);
- The establishment of the AVPA Plan boundary based on the 1995 NEF contours;
- The delineation of Area I and Area II within the Plan boundary (via amendment 130/2010 - Figure 2);
- The framework for amending the Zoning By-law to restrict residential development within the AVPA (see Section 2.3.7); and
- The framework for the *Airport Vicinity Acoustic Insulation By-law 6419/94* (see Section 2.3.5).

Figure 2-4 – Figure 1 from the AVPA Plan – 1995 NEF Contours

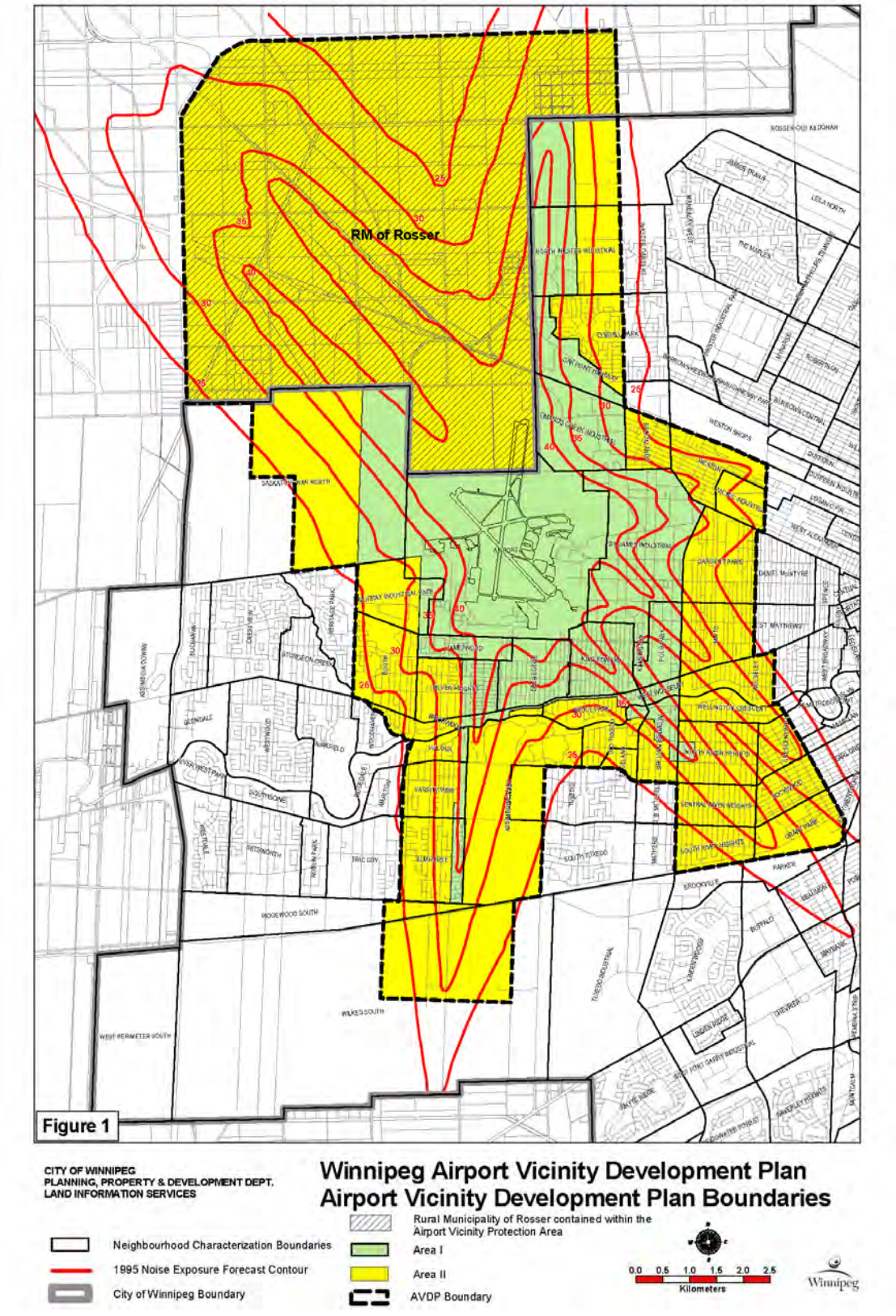
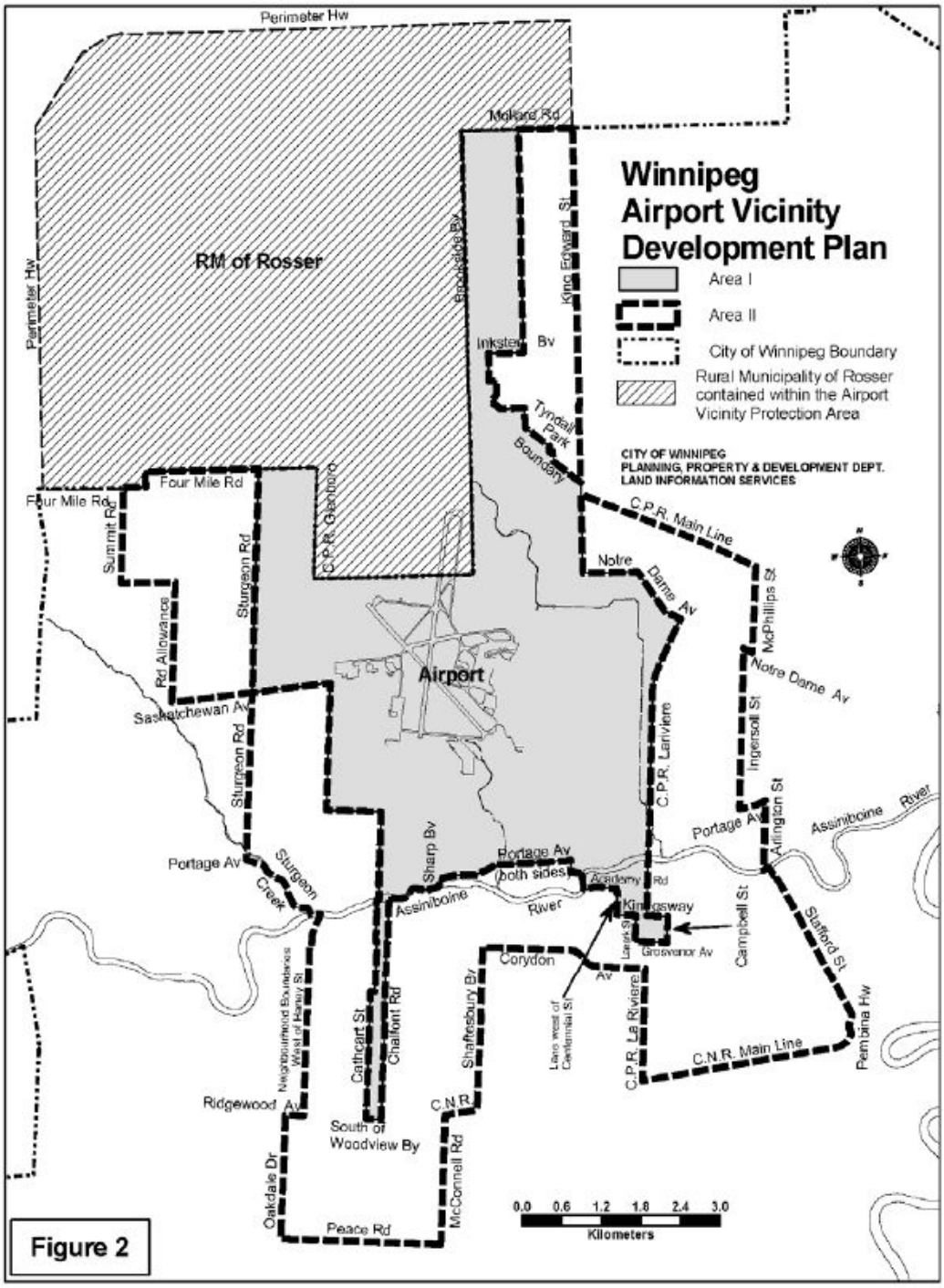


Figure 2-5 – Figure 2 from the AVPA Plan – AVPA Area I and Area II Boundaries



The boundaries of the AVPA Plan, and Area I and Area II within, are a geographic representation of the NEF contours, based on an “ultimate traffic volume” including a third runway. The 25 NEF contour approximates the outer edge of the Plan boundary with clear features such as rivers, roads, and property lines used for ease of interpretation (see Section 5.2.2).

The Land Use component of the plan speaks to the delicate balance of interests in land use management and potential for controversy when land uses are restricted. The Land Use component of the AVPA Plan provides action items for the following:

- Neighbourhoods;
- Portage Avenue Development;
- East Side Development;
- West Side Development;
- North Side Development; and
- South Side Development.

It should be noted that permissions for infill development along the Portage Avenue corridor were contemplated within the original Plan. It was noted that to prevent conflict, the simplest solution was to restrict development. However, in the long-term, development on Portage Avenue was *"both necessary and desirable"* (P. 37). The original Plan included enabling policy provisions for infill development along Portage Avenue in the “Neighborhoods” and “Portage Avenue Development” sections of the Plan’s Land Use component and guidance for Plan Winnipeg amendments and Zoning By-law amendments (Appendix I). A later amendment to the Plan removed the following provision from each section:

> *“…the conversion of single-family properties fronting Portage Avenue for limited multiple-family residential development to a maximum of 85 units per hectare (35 units per acre)”.*

Pertinent actions within the Land Use component of the Plan include the following notable directions:

- The establishment of zoning regulations limiting infill development in the future Area II and restricting it in Area I (see Section 2.3.7);
- The development of what would become CentrePort (see Section 2.2.2);
- The need for an industrial secondary plan for lands west of the Winnipeg International Airport (see Section 2.3.8); and
- Road and transportation improvements in the St. James Industrial area.

The “Performance” section of the APVA Plan calls for amendments to the Zoning By-law to control land use and intensity, and amendments to the Building Code to provide acceptable indoor noise environments. These actions are reflected in the AVPA PDO (see Section 2.3.7) and the *Airport Vicinity Acoustic Insulation By-law 6419/94* (see Section 2.3.5) and amendments to Plan Winnipeg, which are reflected through the existing and draft *OurWinnipeg* and *Complete Communities Direction Strategy* documents.

A scan of other Action Items from within the AVPA Plan indicate most have been accomplished in some form. For example:

- Planning and improvements for roadways and the transportation network on the east side of the Airport have been achieved through the Polo Park Area Study for Traffic Improvement and Development (2001) and the Polo Park Area Infrastructure Improvements (2014);
- The preparation of a concept plan for industrial lands on the west side of the airport has been accomplished through the *Airport Area West Secondary Plan* (Section 2.3.8);
- Collaborative planning with the RM of Rosser concerning transportation, servicing, and development on the north side of the airport has been addressed through Centreport Canada (see Section 2.2.2).

One notable outstanding item is the creation of an informational brochure to explain to potential homeowners the boundaries and land use implications of the AVPA area. There is no evidence available that this was developed. If it was developed after the creation of the AVPA Plan and adoption of the Zoning PDO, there appears to be no evidence that the brochure was ever distributed or is currently in use.

As noted, the AVPA Plan is an action plan that provides the framework for the *Airport Vicinity Protection Area Planned Development Overlay 1* (PDO-1 Airport Vicinity) and the *Airport Vicinity Acoustics Insultation By-law No. 6419-94*, which are the implementation tools of the Plan. The Plan and its enabling and supporting documents call for the periodic review of the AVPA Plan. Outside of minor amendments (7020/97, 8162/2002, 130/2010) there has not been a substantial review of the AVPA Plan, including the 1995 NEF contours that form the basis on the Plan's land use regulations.

Summary
Serves as the secondary plan for lands impacted by the Winnipeg International Airport NEF contours
Establishes Area I and Area II of the AVPA which are based on the Airport's 1995 NEF contours
Effectively restricts new multi-family development within AVPA Area I and limits new residential development within Area II (multi-family limited to 35 units per acre)
Primarily serves as an action plan of which most key tasks have been fulfilled and some are no longer relevant
Sets a framework for the *Airport Vicinity Acoustics Insulation By-law* and *Airport Vicinity Protection Area Planned Development Overlay*, which are the key implementation tools of the AVPA Plan

2.3.5 Airport Vicinity Acoustics Insultation By-law No. 6419-94

The *Airport Vicinity Acoustics Insultation By-law* is a key implementation tool of the AVPA Plan. The By-law applies to single-family, two-family, and multifamily dwellings to be constructed within both Area I and Area II of the AVPA Plan boundary.

The By-law utilizes a calculation of "Acoustic Insulation Factor" as a measure of the reduction in the level of aircraft noise provided by the assemblies forming the exterior envelope of a building. The Acoustic Insulation Factor concept has been in use since the 1970s and was widely used based on its inclusion in Canadian Mortgage and Housing Corporation documents including "New Housing and Airport Noise" in 1976.[8] Due to changing aircraft and construction technologies, this approach has been identified as being "largely obsolete."[9]

A series of tables are used to calculate the Acoustic Insulation Factor for a proposed building, with a building's construction materials being required to achieve set Acoustic Insulation Factors for the various types of interior rooms (e.g., bedrooms, living room, dining room, kitchen, etc.). A sample table for Acoustic Insulation Factor calculation is presented as Figure 2-6.

In addition to the Acoustic Insulation Factor calculations, the By-law requires all buildings intended for residential occupancy within the 25 NEF contour to be constructed with mechanical ventilation systems built to specific standards (3.2.1(1)). Furthermore, all buildings intended for residential occupancy within the 30 NEF contour or greater are to be constructed in such a way that *"an owner or occupant of a dwelling unit, or suite used for residential occupancy need not make changes to the structure or dimensional changes to the ventilation system in order to install an air-conditioning system"* (3.2.1(2)).

The By-law does not note a requirement for works or analysis being performed by a qualified engineering consultant or certified professional.

Figure 2-6 – Sample Table for Acoustic Insulation Factor Calculation

Acoustic Insulation Factor For Each Component Of The Exterior Envelope Of Rooms And Spaces Used For Sleeping																	
Number Of Components Forming Exterior Portion of Room Or Space Envelope	Noise Contour At Building Site																
	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Over 40
1	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	43
2	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	46
3	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	48
4	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	49
5	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	50
6	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	51
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

[8]National Research Council Archives (1981). *New Housing and Airport Noise*. https://nrc-publications.canada.ca/eng/view/accepted/?id=bfa03af7-c3a0-4eca-8bd5-202b8174e91e. Accessed December 17, 2020.
[9] National Research Council Archives (1998). *Insulating Buildings Against Aircraft Noise: A Review* https://nrc-publications.canada.ca/eng/view/ft/?id=6ccfb301-e1ed-44ae-b83a-36d33b2676fb. Accessed December 17, 2020.

Summary
Is an implementation tool of the AVPA Plan
Insulation is required for new dwellings constructed within AVPA Area I and Area II
Utilizes the Acoustic Insulation Factor as a measure of the reduction of aircraft noise provided by exterior building construction
Requires mechanical ventilation systems built to specific standards
Does not require works to be performed by a qualified consultant or certified professional

2.3.6 Zoning By-law No. 200/2006

The City of Winnipeg Zoning By-law (ZBL) is intended to promote orderly development and implement the policies of Plan Winnipeg (*OurWinnipeg*). The ZBL applies to the entire City outside of the downtown, which has its own ZBL with standards specific to the downtown context. Zoning By-laws divide the City into zones, provide site-specific regulations in terms of permitted and conditional uses, dimensional standards, and a framework for permits and procedures.

The ZBL contains several elements related to the Winnipeg International Airport as a specific land use. Part 2: Definitions includes the following use definition:

> *"airport and associated facilities" means land or water which is used or intended for the landing or take-off of aircraft and any associated areas which are used or intended for use for airport buildings or other airport facilities or rights-of-way, including taxi-ways, aircraft storage and tie-down areas, hangers, helipads, and other related buildings and open spaces."*

The "airport and associated facilities" use is included as a "conditional" use in the Agricultural Zone and as a "permitted" use in the M2 Manufacturing General and M3 Manufacturing Heavy Zones.

Most notably, the ZBL includes the *Airport Vicinity Protection Area Planned Development Overlay 1* (AVPA PDO) as Schedule D of the by-law. The ZBL makes a provision for planned development overlays, or PDOs, that set specific zoning regulations for a designated area. A PDO can either be a PDO-1 (District) or PDO-3 (Site Specific) mechanism.

Using the AVPA Plan boundary, and Area I and Area II within the Plan boundary, the ZBL provides a specific set of zoning regulations as a means of implementing the AVPA Plan. The regulations within the AVPA PDO are grounded in the AVPA Plan. The priority of the AVPA PDO is clearly stated in Part 3 of the ZBL such that when there is a conflict between the AVPA PDO and another site-specific or district PDO, the regulations of the AVPA PDO shall prevail.

Summary
Regulates the use of land and the form of buildings in the City of Winnipeg as an implementation tool of *OurWinnipeg*
Contains the Airport Vicinity Protection Area Planned Development Overlay 1

2.3.7 Airport Vicinity Protection Area Planned Development Overlay

The *Airport Vicinity Protection Area Planned Development Overlay 1* (AVPA PDO) is the main implementation tool of the AVPA Plan, in terms of land use restrictions. The AVPA Plan called for amendments to the ZBL as an action item in the AVPA Plan; the ZBL and the AVPA PDO reflect this implementation.

The purpose of the AVPA PDO is noted within Schedule D as follows:

> *The Airport Vicinity Protection Area planned development overlay district is intended to minimize exposure of residential and other sensitive land uses to aircraft and their potential impacts, including noise, to minimize risks to public safety from aircraft accidents, and to discourage traffic congestion and incompatible land uses proximate to, and within, airport influence areas. In addition, the District is intended to ensure that the 24-hour operation of Winnipeg's airport continues to contribute to the economic vitality of the city and the region by avoiding or mitigating potential land use conflicts* (P. D-1)

To achieve the above-noted purpose, the PDO utilizes the Area I and Area II framework from the AVPA Plan to assign a set of stringent land use regulations.

Area I Regulations

Area I is generally found within the 1995 NEF 35 contour and is subject to the most stringent development restrictions with new residential development nearly completely restricted, except for the replacement of destroyed or demolished buildings. In such cases, multifamily building replacements shall not exceed the density of the building being replaced (3a). The PDO does make provisions for "minor residential infilling" in existing residential areas as a conditional use, except for residential single-family lot splits on existing streets with a full range of municipal services (3b).

Area II Regulations

Area II provides less stringent development restrictions than Area I and is generally found within the 1995 NEF 25-35 contours. New single-family development is not restricted within Area II by the PDO. However, new multifamily development in Area II is limited as follows:

- Limited to 35 units per acre (approximately RMF-S density as per the ZBL) unless fronting on Portage Avenue;
- Densities in excess of 35 units per acre may be approved via a Conditional Use (requires a public hearing); and
- Damaged or destroyed buildings may be replaced but shall not exceed the density of the building being replaced.

All Areas within PDO

The PDO requires that all new single-family, two-family, and multiple-family dwellings, including replacement and infill dwellings, must comply with the construction standards set out in the *Airport Vicinity Acoustic Insulation By-law* (see Section 2.3.5).

Summary
Is an implementation tool of the AVPA Plan
Sets zoning regulations for lands within Area I and Area II of the AVPA
Restricts residential development within Area I to the replacement of existing structures, with some provision for minor infilling
Limits residential development within Area II to single family homes and multi-family development up to 35 units per acre (greater density requires a conditional use)

2.3.8 Airport Area West Secondary Plan (By-law No. 8097/2002)

The *Airport Area West Secondary Plan* aims to take advantage of economic development opportunities by accommodating industrial and commercial development on lands west of the Winnipeg International Airport that are compatible with the facility's operations and are complimentary to Airport-related industries. The Secondary Plan was adopted in 2002 and the Plan Area encompasses over 2,000 acres. The Secondary Plan Area consists of lands that were designated "Industrial" in Plan Winnipeg, and as such the Plan does not accommodate residential land uses[10]. As a result, there is minimal policy direction within the document pertaining to the protection of the Winnipeg International Airport and its operations.

The Secondary Plan references the importance of the Winnipeg International Airport and focuses on industrial land uses that benefit from Airport adjacency and are compatible with 24-hour Airport operations in an urban context (Plan Section 1.4). As noted on the Overall Land Use Plan, there are only two land use designations within the Plan Area: "Airport Related" and "Airport Compatible." However, the Secondary Plan does not reference the AVPA Plan specifically, nor does it include airport-specific policies.

The policy framework within the *Airport Area West Secondary Plan* is general in nature, restricting new residential development but offering only general land use policies for the Airport Related and Airport Compatible land use designations. A major component of the Plan speaks to servicing and cost-sharing requirements to service the Plan Area.

At the time of this Report's preparation, a review of the *Airport Area West Secondary Plan* was in process and as of November 2020, a draft has been completed and submitted to the City of Winnipeg for approval.

Summary
Serves as the secondary plan for industrial lands west of Winnipeg International Airport
Restricts new residential development within the Plan Area

2.3.9 South Interlake Planning District Development Plan (No. 310)

The *South Interlake Planning District Development Plan* sets the overall development vision for the South Interlake Planning District and provides objectives and policies to regulate land uses and development in the municipalities of Stonewall, Rockwood, Teulon, and Rosser. Of interest to this Report is the Rural Municipality of Rosser directly to the north of the City of Winnipeg, with the furthest northwest extent of the Winnipeg International Airport's NEF contours reaching into the municipality.

[10] Although it does speak to the potential of re-designating some lands west of the Airport for residential use (which ultimately occurred in 2014 via By-law No. 121/2013 (SPA 4/2013).

Section 2.1 of the *South Interlake Planning District Development Plan* defers land use planning policies for the Centreport lands which fall within the RM to the *Inland Port Special Planning Area Regulation* (see Section 2.2.2). Notably, the Development Plan does not include NEF contours or make mention of the Winnipeg International Airport within its policies. However, the Policy Map for the RM of Rosser (Map 5) designates all the lands that would be within the NEF contours as "Agriculture Rural Area" which has very limited opportunity for residential development.

Summary
Serves as the Development Plan for the South Interlake Planning District, including the RM of Rosser
Restricts / limits new residential development on lands within NEF contours through the Agriculture Rural Area land use designation
Does not contain policies specific to Winnipeg International Airport
Does not contain Winnipeg International Airport NEF contours in its policies or mapping

3 CASE STUDY ANALYSIS

3.1 City of Richmond (Vancouver International Airport)

The Vancouver International Airport is located on an island at the mouth of the Fraser River and is bordered by the City of Vancouver to the north and City of Richmond to the south. In 2019, the Vancouver International Airport was the second busiest in Canada after Lester B. Pearson International Airport in Toronto[11].

The *City of Richmond Official Community Plan (By-law 9000)* is reviewed as part of this Report. An Official Community Plan (OCP) is similar to a development plan in that it sets a vision for a municipality at a community-wide level, providing objectives and policies to guide decision making on sustainability, land use planning, infrastructure, social and economic matters. Given the presence of Vancouver International Airport directly to the north of the City of Richmond, policies related to the airport and planning for aircraft noise are contained within the OCP.

Section 3.6.3 of the OCP is dedicated to Noise Management. The interpretation section of the OCP (p. vii) clearly states that the Aircraft Noise Sensitive Development (ANSD) land use policies within Section 3.6.3 supersede any policies located within other land use sections of the Plan. Furthermore, throughout the OCP the idea of regulating (i.e., facilitating and restricting) ANSD is tied to goals of a healthy and economically prosperous community.

Section 3.6.3 "Noise Management" provides objectives and policies related to general urban noise, noise from rapid transit lines, and aircraft. Objectives 3 and 4 of the Section pertain specifically to the Vancouver International Airport and aircraft noise. Objective 3 is *"to encourage the effective management of aircraft noise at the source."* The following policies are provided:

- Continue to cooperate with the Vancouver International Airport Authority to manage and reduce aircraft noise to minimize its disturbance to the community;
- Encourage the Vancouver International Airport Authority to reduce aircraft noise at the source, where feasible;
- Encourage regular reviews and implementation of the Vancouver International Airport Authority's Noise Management Plan to achieve maximum noise reduction; and
- Ensure community input through participation in the Vancouver International Airport Authority Noise Management Committee initiatives.

Objective 4 is to *"to manage aircraft noise sensitive development, areas and nuisance."* The policies pertaining to Objective 4 establish that ANSD includes residential, school, daycare, and hospital land uses. While the policies of Section 3.6.3 specifically pertain to aircraft noise sensitive land uses, development proponents and owners of other land uses "are encouraged to" view their properties through the lens of current and future aircraft noise areas and provide noise mitigation, where appropriate, to limit aircraft noise nuisance (policy "b").

Central to Section 3.6.3 are the table and map included in this Report as Figures 3-1, 3-2, 3-3, 3-4, and 3-5.

[11] Statistics Canada (2019). *Total aircraft movements at top 10 Canadian airports, January 2019.* https://www150.statcan.gc.ca/n1/daily-quotidien/190328/cg-d002-eng.htm. Accessed November 28,2020.

While the OCP lays out distinct policy direction in the below tables and maps, there are policies that provide opportunity for pragmatism and case-by-case consideration. For instance, Policy "f" states:

> *Caution - The "Aircraft Noise Sensitive Development Map" means that, in the areas where aircraft noise sensitive land uses are "considered", those uses (e.g., residential) may or may not actually be developed, due to a wide range of City priorities and requirements, and senior government, stakeholder and private sector decisions.*

Policy "g" provides direction for what factors should be accounted for when development may be considered, including:

- Growth needs;
- City corporate needs;
- Corporate policies;
- Community planning considerations;
- Services and Infrastructure;
- Stakeholder considerations; and
- Other, as determined by Council.

The City of Richmond OCP contains tables and a map that outline the key land use regulations for ANSD in the municipality, including a requirement for the registration of Restrictive Covenants on titles of affected properties. Table A, shown below, clearly states which land uses are "aircraft noise sensitive" while Table B provides the land use regulations that correspond to the ANSD Map.

Figure 3-1 – City of Richmond OCP Table A

A. AIRCRAFT NOISE SENSITIVE LAND USES DEFINED:	
Residential	Defined as all residential uses, including live/work, work/live uses, nursing homes.
School	Defined as public and private places in which K-12 education is offered, as per provincial requirements.
Day Care	Defined as licensed day care uses.
Hospital	Defined as places which provide medical services, as per provincial requirements, where patients stay overnight or for longer periods of time.

Figure 3-2 – City of Richmond OCP Table B (Part 1)

Areas NOTE 1	Reference NEF Contours	Objective	Requirements
1A. Restricted Area.	Approximately greater than NEF 35.	• **Objective: To avoid all new aircraft noise sensitive land uses.** • New Aircraft Noise Sensitive Land Uses are prohibited.	• Restrictive Covenants.NOTE 2
1B. Restricted Area.	Approximately NEF 30 to NEF 35.	• **Objective: To avoid all new residential land uses.** • New Residential Land Uses are prohibited. • Consider other aircraft noise sensitive land uses.	• Restrictive Covenants.NOTE 2 • An Acoustic Report.NOTE 3 • Noise mitigation incorporated in construction.
2. High Aircraft Noise Area.	Approximately NEF 30 to NEF 40.	• **Objective: To consider all new aircraft noise sensitive land uses, except new single family.** • All new Aircraft Noise Sensitive Land Uses may be considered, except new single family, more specifically: - new single family detached development requiring amendments to the OCP, Area Plan, or existing zoning other than "Single Detached (RS1; RS2)" are prohibited, however, - rezonings from one "Single Detached (RS1/RS2)" sub-zone to: - another "Single Detached (RS1; RS2)" sub-zone (e.g., RS1/A-K; RS2/A-K); or, - the "Compact Single Detached (RC1; RC2)" zone; may be considered, subject to all applicable Policies (e.g., Sub-Area Plans, Single-Family Lot Size Policies, and Richmond Zoning Bylaw 8500).	• Restrictive Covenants.NOTE 2 • An Acoustic Report.NOTE 3 • Noise mitigation incorporated in construction. • Mechanical ventilation incorporated in construction. • Central air conditioning system incorporated in construction.NOTE 4 • Required Design Guidelines for siting and/or replacement of outdoor amenity areas with indoor amenity areas (e.g., enclosed balconies and increased size and type of indoor amenity areas).
3. Moderate Aircraft Noise Area.	Approximately NEF 30 to NEF 35.	• **Objective: To consider all new aircraft noise sensitive land uses.** • All Aircraft Noise Sensitive Land Uses may be considered.	• Restrictive Covenants.NOTE 2 • An Acoustic Report.NOTE 3 • Noise mitigation incorporated in construction. • Mechanical ventilation incorporated in construction. • Central air conditioning capability (e.g., ductwork).NOTE 4

Figure 3-3 – City of Richmond OCP Table B (Part 2)

Areas NOTE 1	Reference NEF Contours	Objective	Requirements
4. Aircraft Noise Notification Area.	Approximately NEF 25 to NEF 30.	• **Objective: To consider all aircraft noise sensitive land uses.** • All Aircraft Noise Sensitive Land Uses may be considered.	• Restrictive Covenants.[NOTE 2] • An Acoustic Report.[NOTE 3] • Noise mitigation incorporated in construction (as required).
Residential Uses on the Fraser River New residential uses (e.g., house boats) on the Fraser River which are above the 30+ NEF contour are only allowed in certain areas (see OCP Map).			
Not designated.	Approximately less than NEF 25.	• **Objective: No aircraft noise sensitive concerns or considerations.** • All Aircraft Noise Sensitive Land Uses may be considered.	Not required.

Figure 3-4 – City of Richmond OCP Table B Notes

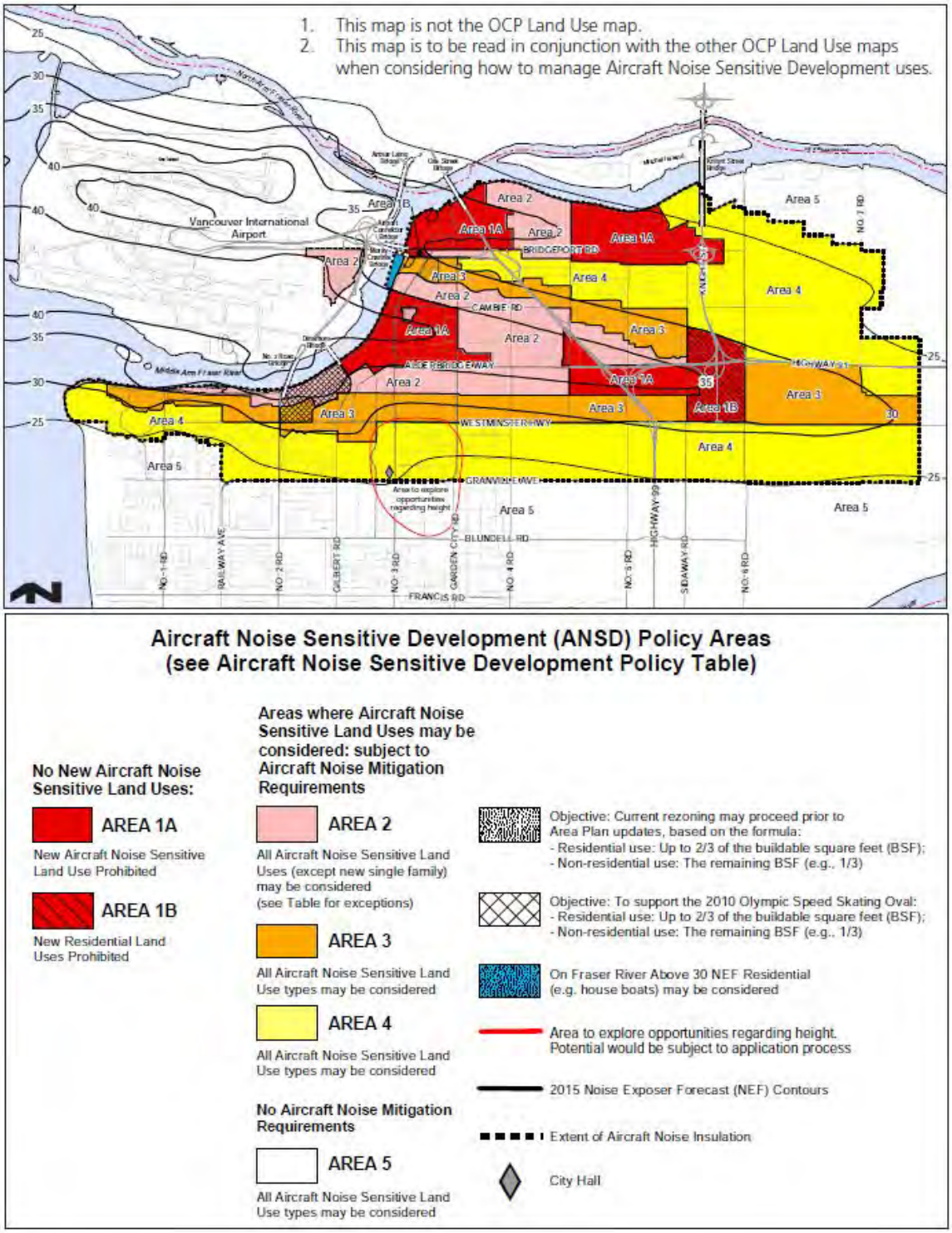
Notes

1. The Areas in the above Table are identified on the "Aircraft Noise Sensitive Development Map".
2. Restrictive Covenants on Land Titles include information to address aircraft noise mitigation and public awareness.
3. Indoor Sound Level Mitigation—Building Components (e.g., walls, windows) must be designed to achieve the following indoor sound level mitigation criteria (with doors and windows closed):

Portions of Dwelling Units	Noise Levels (decibels)
Bedrooms	35 dB
Living, dining, and recreation rooms	40 dB
Kitchen, bath, hallways, and utility rooms	45 dB

4. The standard required for air conditioning systems and their alternatives (e.g., ground source heat pumps, heat exchangers and acoustic ducting) is the ASHRAE 55-2004 "Thermal Environmental Conditions for Human Occupancy" standard and subsequent updates as they may occur.

Figure 3-5 – City of Richmond OCP Map of ANSD Policy Areas



Of note, Area 2 allows for multi-family residential in the NEF 30 to NEF 40 contours but restricts single-family residential, presumably because multi-family buildings can be constructed to achieve noise attenuation targets more easily. Also, Section 3.6.4 of the OCP calls for the exploration of increasing the Transport Canada mandated limit on building heights in Central Richmond, in the vicinity of City Hall.

The Richmond OCP contains sets of "Development Permit Guidelines" for multifamily development (non-regulatory design guidelines). Several components of these guidelines pertain to the ANSD and noise impact mitigation. For example, Section 14.4.5-c addresses outdoor balconies and open spaces in the ANSD and recommends:

- Private balcony space in aircraft noise sensitive development should mitigate the impact of aircraft noise by appropriate siting and/or by using appropriate noise mitigation techniques and architectural treatment (e.g., enclosed balconies) that do not result in the balcony being indoor living space.
- Private open space (e.g., patios, decks) in aircraft noise sensitive development should mitigate the impact of aircraft noise by appropriate siting and/or by using appropriate noise mitigation techniques and architectural treatment (e.g., canopies, fences, landscaping) that do not result in the area being indoor living space.

Section 14.4.5-f addresses outdoor amenity space in the ANSD, suggesting:

- Outdoor amenity space in aircraft noise sensitive development should mitigate the impact of aircraft noise by appropriate siting and/or replacing outdoor amenity space with an equivalent area of additional indoor amenity space designed to facilitate children's play, senior's enjoyment, or other appropriate passive recreational use.

Section 4.4.7 of the OCP "Acoustics" provides regulations to mitigate the impacts of aircraft, transit, and traffic on residential development. Section 14.4.7.B specifies that all development permits within the ANSD Policy Areas shall:

> *"require evidence in the form of a report and recommendations prepared by a person trained in acoustics and current techniques of noise measurement, demonstrating that the noise level in those portions of the dwelling units listed below shall not exceed the noise level and thermal condition standards set out in the corresponding right-hand column and the ASHRAE 55- 2004 "Thermal Environmental Conditions for Human Occupancy". The noise level utilized is an A-weighted 24-hour equivalent (leq) sound level and will be defined simply as noise level in decibels."*

The regulation also discourages the use of skylights within the ANSD Policy Area and requires that a "trained professional" assist with the design of outdoor areas, materials selection, and space planning to minimize the impacts of aircraft noise levels.

Summary
Serves as the Development Plan/Community Plan for the City of Richmond
Provides objectives and policies for development in the airport noise sensitive area
Limits residential development to specific areas within the policy area
Requires an acoustic report prepared by a qualified professional that addresses sound mitigation levels and noise mitigation in construction
Requires a restrictive covenant registered on title

3.2 City of Mississauga (Lester B. Pearson International Airport)

Lester B. Pearson International Airport (Toronto Pearson International Airport) is a major international passenger hub and historically has been Canada's busiest airport.[12] Located in the Greater Toronto Area, the airport serves a densely populated area and has seen increased residential development in its vicinity. Under the Ontario Planning Act, the Greater Toronto Airports Authority is a commenting agent on development proposals in the vicinity of Toronto Pearson International Airport.

The *Mississauga Official Plan* (OP), like a development plan, sets a vision for the municipality at a community-wide level providing objectives and policies to guide decision making on sustainability, land use planning, infrastructure, social and economic matters. Given the presence of Toronto Pearson International Airport in the northeast corner of the City of Mississauga, policies related to the airport and planning for aircraft noise are contained within the OP.

Section 6.10.2 – "Aircraft Noise" contains policies that restrict development in areas subject to airport noise. The OP utilizes the Airport Operating Area (AOA) as established by the Greater Toronto Airports Authority in their planning documents. The AOA was established to assist with land use planning in the municipalities within which Toronto Pearson International Airport is located or is directly adjacent to. As such, the AOA is included in the Official Plans of[13]:

- Peel Region;
- City of Brampton;
- City of Toronto; and
- City of Mississauga.

The boundary of the AOA is generally defined by the 30 NEF contour, although some areas fall within the 25-30 NEF area, and some within the 30-35 NEF area. Within the AOA, noise studies are required, tenants and purchasers are required to be notified when a proposed development is located within the 25 NEF contour or greater, and a "noise warning clause" will be *"included in agreements that are registered on title, including condominium disclosure statements and declarations"* (6.10.2.3).

Within the AOA, new residential and noise-sensitive development is restricted except for two "Exception Areas" (16.10.2.4). Where noise-sensitive development is permitted within the AOA, there are stringent requirements as part of a development approval (16.10.2.5). Much of the land within the AOA is zoned for Airport, Industrial, Employment, or Commercial uses. The areas within the AOA that currently accommodate residential land uses are located within the Exception Areas.

[12] Statistics Canada (2019). *Total aircraft movements at top 10 Canadian airports, January 2019.* https://www150.statcan.gc.ca/n1/daily-quotidien/190328/cg-d002-eng.htm. Accessed November 28,2020.

[13] Toronto Pearson (2020). *Land Use Planning*. https://www.torontopearson.com/en/community/noise-management/noise-management-program/land-use-planning Accessed December 17, 2020.

Section 6.10.2.5 details the requirements that must be met to undertake residential or noise-sensitive development within one of the Exception Areas. These include:

- Submitting a "feasibility noise impact study" with development applications to verify that mitigated indoor and outdoor noise levels will not exceed the sound level limits established by the applicable Provincial Government environmental noise guideline[14];
- Completing a detailed noise impact study prior to development application approval;
- Appropriate conditions relating to noise mitigation that are consistent with the findings of the detailed noise impact study being included in the final approval; and
- An "Aircraft Noise Warning Agreement" between the City of Mississauga, Greater Toronto Airports Authority (or its successor), and the developer are included in the approval.

An Aircraft Noise Warning Agreement is defined in the OP as:

> *"an agreement between the Corporation of the City of Mississauga, the Greater Toronto Airports Authority (or its successor) and the Developer to be registered on title that provides for, among other things, the following: a development agreement incorporating conditions related to noise mitigation consistent with findings of the detailed noise impact study; enforcement obligations, post-construction certification that development approval conditions have been satisfied, aircraft noise warning signage, and aircraft noise warning clauses regarding both indoor and outdoor activities in Purchase and Sale Agreements, sales materials, and in enrollment documents for schools and daycares"*

Relevant tables and maps are included in this Report as Figures 3-6, 3-7, and 3-8.

[14] This policy refers to *Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning* (NPC-300). Interior noise levels are calculated on an interior NEF scale, looking to achieve a 0 NEF in bedrooms and a 5 NEF in other interior areas.

Figure 3-6 – Mississauga Official Plan Noise Study Requirements

<table>
<tr><th rowspan="2">LAND USE[2]</th><th colspan="3">Noise Exposure Projection (NEP)/Noise Exposure Forecast (NEF) Composite Noise Contour[1]</th></tr>
<tr><th>25 - <30</th><th>30 - <35</th><th>35 or Greater</th></tr>
<tr><td>Residential
Public and private schools
Daycare facilities3
Libraries
Place of religious assembly
Cemeteries
Theatres - Outdoor
Auditoria
Hospitals
Nursing Homes
Community Centres</td><td colspan="3">Noise Study Required</td></tr>
<tr><td>Hotels
Motels
Retail or service commercial
Office
Athletic fields
Stadiums
Theatres - Indoor</td><td></td><td colspan="2">Noise Study Required</td></tr>
<tr><td>Park and picnic areas
Playgrounds
Tennis Courts
Industrial
Laboratories
Arena[4]</td><td colspan="2"></td><td>Noise Study Required</td></tr>
<tr><td colspan="4">1. Reference Figure 6-26
2. Land uses extracted from Transport Canada's TP1247 – Aviation – Land Use in the Vicinity of Aerodromes, 9th Edition
3. Land use not specifically identified within TP1247
4. Land use not specifically identified within TP1247</td></tr>
</table>

Figure 3-7 – Mississauga Official Plan AOA Policy Map

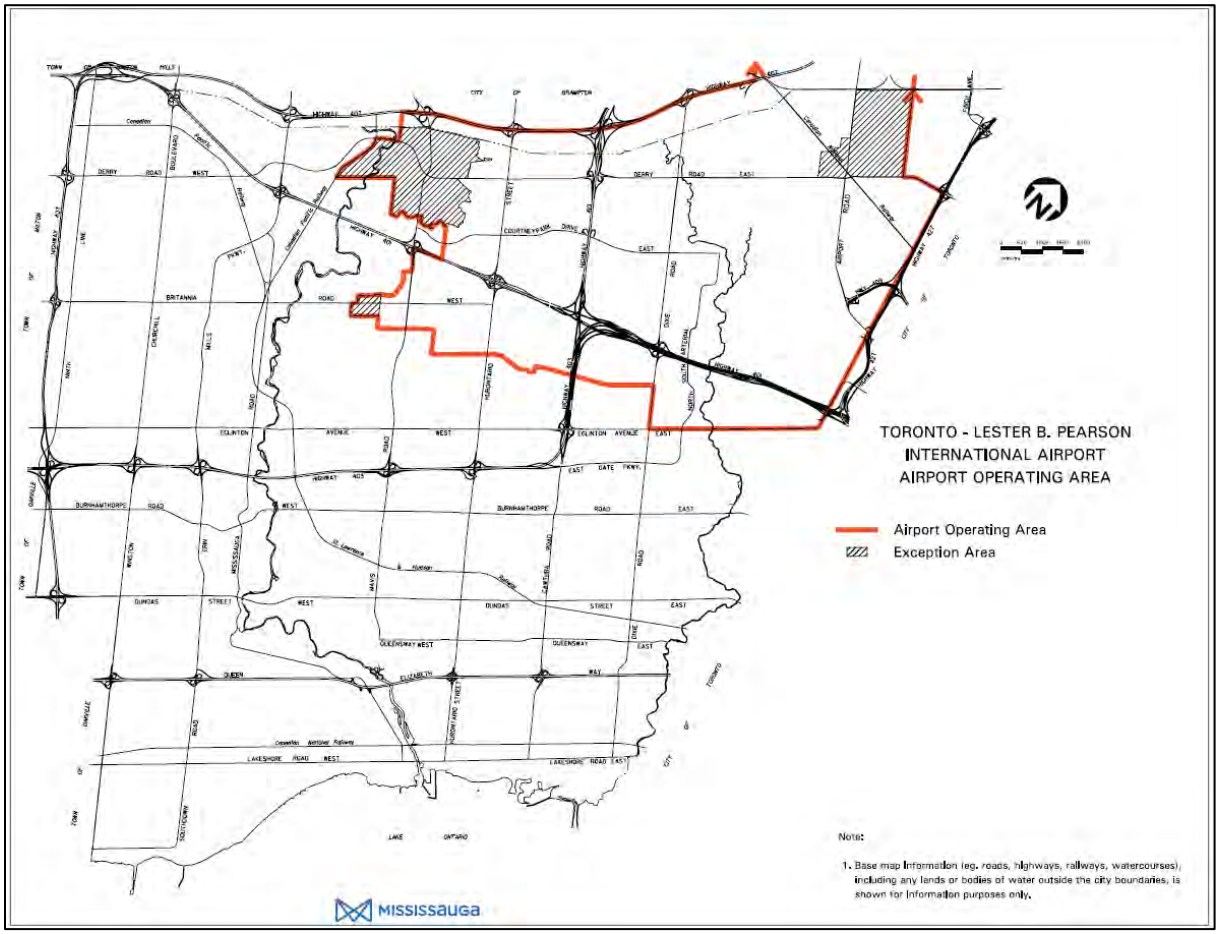


Figure 3-8 – Toronto Pearson International Airport Operating Area boundary and Conditions[15]

Summary
Serves as the Development Plan / Community Plan for the City of Mississauga
Provides objectives and policies for development in the Airport Operating Area
Limits residential development to specific areas within the policy area
Requires a noise study prepared by a qualified professional speaking to sound mitigation and levels and noise mitigation in construction
Requires aircraft noise warning agreement registered on title

[15] Toronto Pearson (2020). *Land Use Planning*. https://www.torontopearson.com/en/community/noise-management/noise-management-program/land-use-planning Accessed December 17, 2020.

3.3 City of Calgary (Calgary International Airport)

The C*algary International Airport Vicinity Protection Area Regulation* (AVPR) is a provincial regulation governing land use within the vicinity of the Calgary International Airport. The Regulation applies to areas of the City of Calgary, Rocky View County, and the City of Airdrie that fall within Calgary International Airport's 25 NEF contour, or greater.

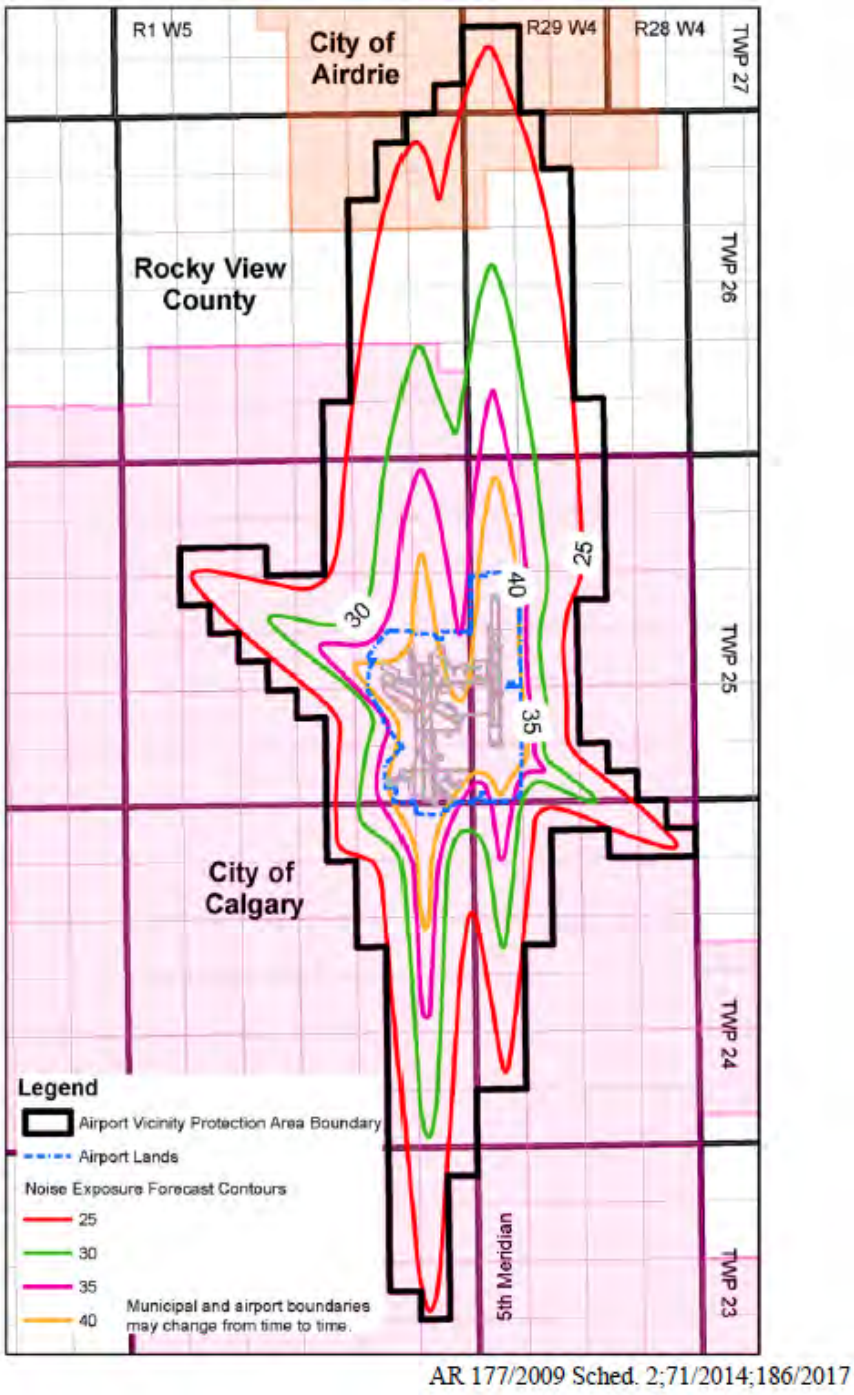
The Regulation provides a set of restricted land uses within each of the NEF contour areas as shown in Figure 3-9. New residential uses are restricted in the 30-35 NEF contour area, or greater. Existing residential uses are permitted. Figure 3-10 shows the NEF Contour Policy Map from the AVPR. There are acoustical requirements included as part of the AVPR. However, Section 5(1) of the Regulation refers to the Alberta Building Code to determine standards for acoustic insulation with in the AVPR.

The AVPR does not utilize geographically simplified interpretations of the NEF contours, instead directly relying on the contour map to determine land use regulations. As such, Sections 5(1) and 5(2) of the Regulation specify that when a building or site falls within two NEF areas, the site can be divided according to the NEF contour (if greater than 0.2 hectares) or the NEF contour should be adjusted to the next closest geographical boundary if less than 0.2 hectares in area.

Figure 3-9 – Calgary AVPR Land Use Table

Land Uses	NEF 40+ area	NEF 35-40 area	NEF 30-35 area	NEF 25-30 area
Residences	✖	✖	✖	-
Schools	✖	✖	✖	-
Day cares	✖	✖	-	-
Clinics	✖	-	-	-
Medical care facilities	✖	✖	✖	-
Halls and auditoriums	✖	✖	-	-
Places of worship	✖	✖	-	-
Outdoor eating establishments	✖	-	-	-
Outdoor exhibition and fairgrounds	✖	✖	-	-
Outdoor spectator entertainment / sports facilities	✖	✖	-	-
Campgrounds	✖	✖	✖	✖

Figure 3-10 – Calgary AVPR Policy Map



AR 177/2009 Sched. 2;71/2014;186/2017

In 2009, amendments were made to the AVPR to relax select restrictions on residential development within the NEF 30-35 area. This resulted in provisions to allow for the development of basement and backyard secondary suites and minor infilling (of up to two lots mid-block or four lots on corners) in select neighbourhoods.[16] Parcels where residential infilling is permitted are specifically detailed by neighbourhood and parcel legal descriptions within the AVPR.

In 2020, amendments were proposed to the AVPR Policy Map as part of an overall process to update and "modernize" the Regulation and "balance the interests of both the City of Calgary and the Calgary Airport Authority." Furthermore, the updated contours are intended to:

> *"reflect and maintain commitment to the benefits of the AVPA Regulation in protecting airport operations, while recognizing the benefits modernized NEF contour areas will have in supporting the continued development in Calgary through appropriate regulation that is not unnecessarily restrictive."*[17]

The proposed amendment was determined through a collaborative process between the Calgary Airport Authority (CAA), City of Calgary, and other relevant parties. To generate the new contours:

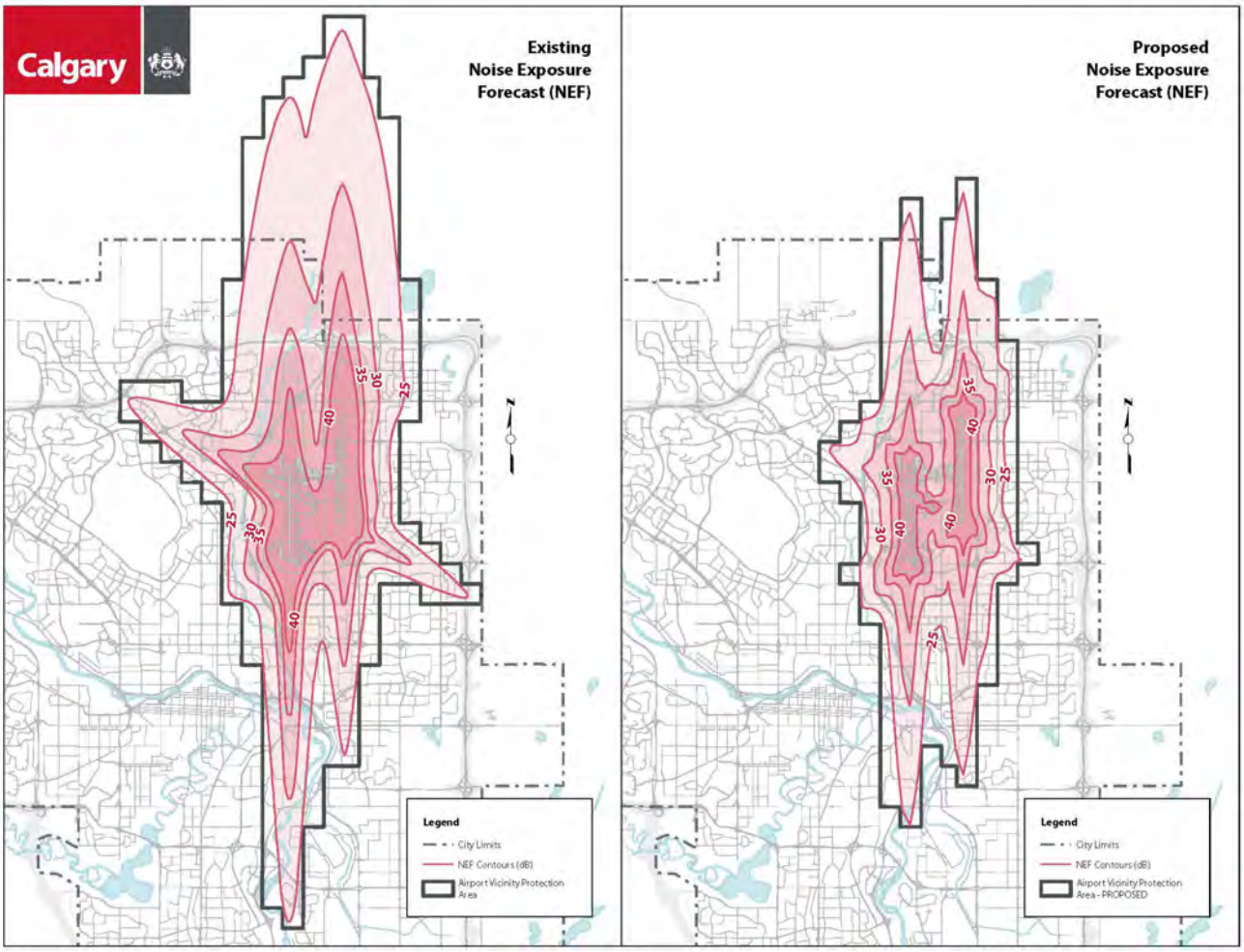
> *"the CAA engaged a third-party aviation consultant, AirBiz, to conduct this review and analysis. The analysis applied a consistent methodology to consider aircraft type as an indicator of noise expectations and considered airport operational protocols such as management of runway usage and new landing procedures."*

Based on the NEF contour data generated by AirBiz, the proposed amendment would see the overall area covered by the AVPR reduced by over 3,000 hectares with many properties moving to less restrictive NEF contours. A comparison of the existing and proposed NEF contours is included in Figure 3-11.

[16] City of Calgary (2020). *Airport vicinity protection area: Proposed amendments to the Noise Exposure Forecast (NEF) contour areas.* https://www.calgary.ca/pda/pd/calgary-land-use-bylaw-1p2007/airport-vicinity-protection-area.html Accessed December 17, 2020

[17] City of Calgary (2020). Amendments to the Airport Vicinity Protection Area (AVPA). https://pub-calgary.escribemeetings.com/filestream.ashx?DocumentId=139521. Accessed December 21, 2020

Figure 3-11 – Calgary AVPR Existing and Proposed NEF Contours



Summary
Provincial regulation governing land use and development in the AVPR
Restricts airport-sensitive land uses, including residential development, according to NEF contours
Recent amendments have allowed for a degree of infill and secondary suite development in existing residential areas
Currently undergoing a potential amendment of the NEF contours which would result in a reduced geographic footprint of the Contour areas

3.4 Case Study Findings

Considering the case studies of Richmond, Mississauga, and Calgary together, key findings are summarized as follows:

- There are varying approaches to regulating noise-sensitive land uses (primarily residential and institutional uses);
- There are varying levels of restriction on development within specific NEF contours;
- In some cases, development is permitted to occur within the NEF 35-40 contours with conditions;
- Limiting multi-family or residential *density* in higher NEF contours is not a universal approach, however, strict requirements such as the completion of sound studies and notes/caveats on title are associated with any such permissions;
- Interjurisdictional cooperation between airport operators, municipalities, provinces, and regional authorities appears critical in each case;
- Sound studies and / or acoustic insulation standards are crucial for development within NEF contours; however, no standard mechanism exists for undertaking noise insulation studies;
- Requiring a sound study prepared by a certified engineer or professional is key; and
- Intensive urban development does occur in the vicinity of major airports; however, the need for detailed planning also increases with such development, which necessitates extra layers of communication, planning, and engagement including:
    - Noise committees;
    - Noise reports;
    - Complaint liaisons; and
    - Noise insulation of existing buildings.

Table 3-1 provides a summary of case study features.

Table 3-1 – Case Study Summary

	Richmond	Mississauga	Calgary	Winnipeg
NEF Contour Year	2015	1996 and 2000 (composite)	N/A[18]	1995
Land Use Restrictions	Yes	Yes	Yes	Yes
Planning Boundaries	Geographic Areas	Geographic Areas	NEF Contours	Geographic Areas
New Development Permitted in NEF Contour > 35	Yes, with conditions	Yes, with conditions	No	No
Sound Study/Insulation Requirements	Yes	Yes	No	Yes
Airport Review of Development Applications	N/A[19]	Yes	Yes	Yes
Notes Registered on Title	Yes	Yes	No	No

When comparing the diverse regulations of the three case studies with those of the City of Winnipeg, notable observations include:

- Winnipeg's AVPA Plan is more restrictive compared to the plans of Richmond and Mississauga, but is more permissive when compared to Calgary;
- The utilization of Area I and Area II within the AVPA Plan to delineate policy areas is simple and easy to interpret;
- Additional mechanisms such as registering caveats on title, entering into agreements, and notifying purchasers of airport noise considerations are tools that could be utilized in addition to land use restrictions in the Winnipeg context; and
- The noise mitigation requirements and calculations included in the *Airport Vicinity Acoustics Insulation By-law* appear complicated. This is particularly evident when compared to Richmond's approach of requiring an engineering report / sound study and setting decibel levels that must be achieved within dwellings.

[18] It is unclear which year's NEF contours are used in the current regulation. However, the City of Calgary is undergoing a proposed amendment to adopt new NEF contours and a corresponding new AVPR area, as shown in Figure 3-11 – Calgary AVPR Existing and Proposed NEF Contours.

[19] Authors were unable to confirm whether the Airport Authority reviews development applications within the AVPR.

4 SUPPLEMENTARY NOISE MITIGATION MEASURES

4.1 Building Design and Standards

This Section pertains primarily to building design and sound insulation. It must be clearly stated that this is a general review of available resources and this Section was not exhaustive, nor was it prepared by an engineer or technician.

To quote the National Academy of Sciences:

> *"Airborne sound is a rapid fluctuation of air pressure and local air velocity. Sound has properties of both fluids and waves. It propagates outward from its source at high speed, bends around interposing structures, is partially reflected and partially absorbed by incident surfaces, and radiates through structures, which attenuate (i.e., reduce) the transmitted sound."*[20]

The goal of sound insulation is to construct or retrofit buildings to increase the difference between exterior and interior sound levels by using materials and elements with higher sound transmission loss properties. Incorporating insulation and building standards to reduce interior noise from aircraft into building codes generally, and / or development approvals in the vicinity of airports more specifically, is a widespread practice.

Over the last several decades, improvements in technology, the retirement of older aircraft fleets, and increased regulatory oversight have resulted in aircraft which produce less audible noise being used at many Canadian airports. These reductions in aircraft noise are coupled with continued advances in construction and insulation technologies as well as heating and cooling systems for residential and non-residential construction. As noted in Section 2.3.5, methods such as the Acoustic Insulation Factor currently used in the Winnipeg context do not reflect changes to aircraft and construction materials / techniques and can be viewed as requiring updates.[21]

Interestingly, a review of documents from Transport Canada, Canadian Mortgage and Housing Corporation, National Research Council, and other Canadian sources reveals little new literature in the last two decades regarding this topic.

The Outdoor-Indoor Transmission Class (OITC) is a measure to determine the insulative properties of various building components and assign a decibel value to the effectiveness of impeding sound transmission. For example, if a particular sound is measured at 100db outside and at 90db within a building, the OITC would be 10db. A basic wood-stud construction with lightweight exterior materials, such as gypsum board, would offer an OITC of approximately 25db whilst the same wall with a brick exterior would offer an OITC of approximately 40db. Notable components of sound insulation and OITC include: [22]

[20] National Academy of Sciences (2013). *Guidelines for Airport Sound Insulation Programs*. https://www.nap.edu/download/22519 Accessed December 17, 2020.
[21] National Research Council Archives (1998). *Insulating Buildings Against Aircraft Noise: A Review* https://nrc-publications.canada.ca/eng/view/ft/?id=6ccfb301-e1ed-44ae-b83a-36d33b2676fb. Accessed December 17, 2020.
[22] National Research Council Archives (2003). *Sound Barriers*. https://nrc-publications.canada.ca/eng/view/accepted/?id=53f69f73-1457-4f70-9101-d998b586adb1 Accessed December 20, 2020.

- Standard double-glazed windows have an OITC of +/- 22db, however, the introduction of storm windows and increased airspace between panes can increase the OITC to +/- 30db;
- Wood stud construction, which is widespread for single-family and many multi-family constructions in Canada, has limited effectiveness in limiting common low-frequency outdoor noise;
- Roof construction is an important consideration given that it is the largest area of a building with direct exposure to aircraft noise. A sloped, truss construction roof with gypsum board, asphalt shingles and roof vents can achieve an OITC of +/- 43db. Flat roofs have slightly lower OITC than sloped roofs with otherwise similar construction; and
- Installation of building components must be performed correctly to achieve the full sound-insulation and OITC potential of various construction materials.

Building and design standards regarding aircraft noise insulation are a complicated field. The review of the AVPA Plan and other jurisdictions included in this Report reveals no single standard to the approach of determining appropriate construction methods and noise thresholds. Given the various construction materials available, the approach taken by the City of Richmond OCP (see Section 3.1) of setting specific decibel limits for interior rooms, to be confirmed by an engineered noise study appears to be the most straightforward. Also, of note, the Richmond OCP provides guidelines related to design of outdoor spaces. It also defers to the expertise of qualified professionals. Ultimately, crafting and implementing the policies of any noise insulation by-law will require the input of qualified acoustic engineers and construction professionals.

4.2 Legal and Notification Mechanisms

Ensuring that all current and prospective developers, property owners, and tenants are informed of the potential impacts of airport operations and aircraft noise is a cornerstone of limiting noise complaints and land use conflict. Section 3 of this Report provides case studies of Canadian municipalities, including Richmond and Mississauga. Both Richmond and Mississauga utilize mechanisms to notify landowners, developers, purchasers, and tenants of a property's location within areas impacted by aircraft noise, as well as placing notices and caveats on the titles of properties.

Cooperation between airport operators, municipalities and approval authorities, and the real estate and development industries is critical. Major airports in Canada have noise management plans in place to set direction for noise mitigation at the source (aircraft) through airport operational procedures and land management, as well as setting a framework for managing and addressing noise complaints.

The *Greater Toronto Airport Authority Noise Management Plan* calls for the use of real estate agreements and educational programs for real estate agents.[23] Also, the *[Vancouver International Airport] Noise Management Plan* calls for partnering with real estate associations to develop "real estate disclosures" to create awareness of airport operations and ensure homebuyers are aware of aircraft noise factors to make informed decisions.[24]

[23] Greater Toronto Airport Authority (2018). *Growing Responsibly: 2018-2022 Noise Management Action Plan*. https://tpprodcdnep.azureedge.net/-/media/project/pearson/content/community/get-involved/community-conversations/quieter-operations/gtaa-noise-management-action-plan.pdf Accessed December 17th, 2020.
[24] Vancouver International Airport (2019). *YVR Noise Management Plan*. https://www.yvr.ca/en/about-yvr/noise-management/noise-management-plan Accessed December 17, 2020.

The AVPA Plan called for the development of a "real estate brochure," but there is no evidence of this being completed nor currently being utilized. Further to this cooperation, an appropriate regulatory framework is essential. Placing notes or caveats on title requires enabling legislation at the provincial level. It was outside the scope of this Report to undertake a detailed legal analysis of real property regulations in each province. However, both Ontario and British Columbia appear to have appropriate regulations in place as airport-related policies in both Richmond and Mississauga include requirements for registrations on title.

It is the understanding of the project team that Manitoba currently does not have enabling legislation for this approach in the *Real Property Act*. According to the *Canadian Bar Review*, under the Torrens system caveats may serve as a "warning."[25] Manitoba's *Real Property Act* specifies that a person must be claiming an estate or interest in land or in a mortgage, encumbrance, or lease to file a caveat. Thus, the *Real Property Act* does not currently provide a mechanism to file notices, such as warning about noise, flooding or any other considerations, directly on title, unless related to a registered interest. Thus, legislative amendments would be required to provide a mechanism to place notices or warnings directly on a title.[26]

4.3 Non-Acoustic Factors

Perceived noise factors are more complex than those created through modelling, such as NEF contours or laboratory conditions of acoustic measurements. Factors for this include the actual variation of the type of noise, conditions occurring at the time when changes in noise level occur, and that all modelling accounts for noise levels produced over time, whereas an actual noise event is an immediate occurrence, subject to the influence of the period between noise events.[27] Simply, what you are doing, how you are feeling, the time of day, and the frequency with which aircraft noise enters your life are all factors in how much of a negative impact or level of annoyance someone may experience.

Research indicates that factors such as concerns of property devaluation, distrust of governments and authorities, noise sensitivity, age, and general fear of the danger of aircraft operations are all non-acoustic factors that may lead to noise complaints and land use conflicts. Despite the reduction in noise due to quieter aircraft, and in some cases, reduced aircraft movements, some research suggests that people are more annoyed by aircraft noise now compared to three to four decades ago.[28]

Non-acoustic factors are difficult to account for in land use planning regulations. As such, these factors are arguably best addressed via market functions such as ensuring potential purchasers, tenants, and developers are informed of the potential impacts of aircraft noise through mechanisms discussed in Section 4.2 of this Report.

The use of NEF contours is currently the benchmark for making land use decisions in the vicinity of airports and the basis of Transport Canada's guidance. While it was outside the scope of this Report to conduct detailed research on non-acoustic factors, this emerging field should be noted and may warrant consideration as part of any detailed review or amendment process for the AVPA Plan and other local-level planning documents. Considerations given to non-acoustic factors would ultimately be supplemental to more technical evaluations of noise contours.

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[25] The Canadian Bar Review (1924). The Caveat in the Torrens System. https://cbr.cba.org/index.php/cbr/article/download/866/866 Accessed January 10, 2021.
[26] The Province of Manitoba (2020). *The Real Property Act.* https://web2.gov.mb.ca/laws/statutes/ccsm/r030e.php. Accessed December 10, 2020.
[27] National Academy of Sciences (2013). *Guidelines for Airport Sound Insulation Programs*. https://www.nap.edu/download/22519 Accessed December 17, 2020.
[28] Sparrow et. al (2019). *Aviation Noise Impacts White Paper*. https://www.icao.int/environmental-protection/Documents/ScientificUnderstanding/EnvReport2019-WhitePaper-Noise.pdf Accessed January 4, 2021.

5 NOISE EXPOSURE FORECAST LAND USE PLANNING ANALYSIS

5.1 NEF Contour Generation

The *Noise Exposure Forecast Study – Winnipeg International Airport*[29] presents NEF contours for historical traffic in 2019, forecasted traffic in 2033 and 2050, and activity in a conceptual 'ultimate-term' scenario at an indeterminate time in the future.

5.1.1 1995 NEF Contours

The current AVPA Plan and local policy context is based on NEF contours from 1995, as shown in Figure 2-4.

5.1.2 Scenario 1 – 2019 Baseline Conditions

The 95th percentile busy day for 2019 consisted of 22 local movements and 336 itinerant movements, for a total of 358 movements. The resulting noise contours for 2019 are presented as Figure 5-1.

5.1.3 Scenario 2 – 2033 Forecast Contours

Based on the aircraft movement forecasts presented in the 2021 *Noise Exposure Forecast Study*, the 95th percentile busy day for 2033 is assumed to consist of 24 local movements and 363 itinerant movements, for a total of 387 movements. The resulting noise contours for 2033 are presented as Figure 5-2.

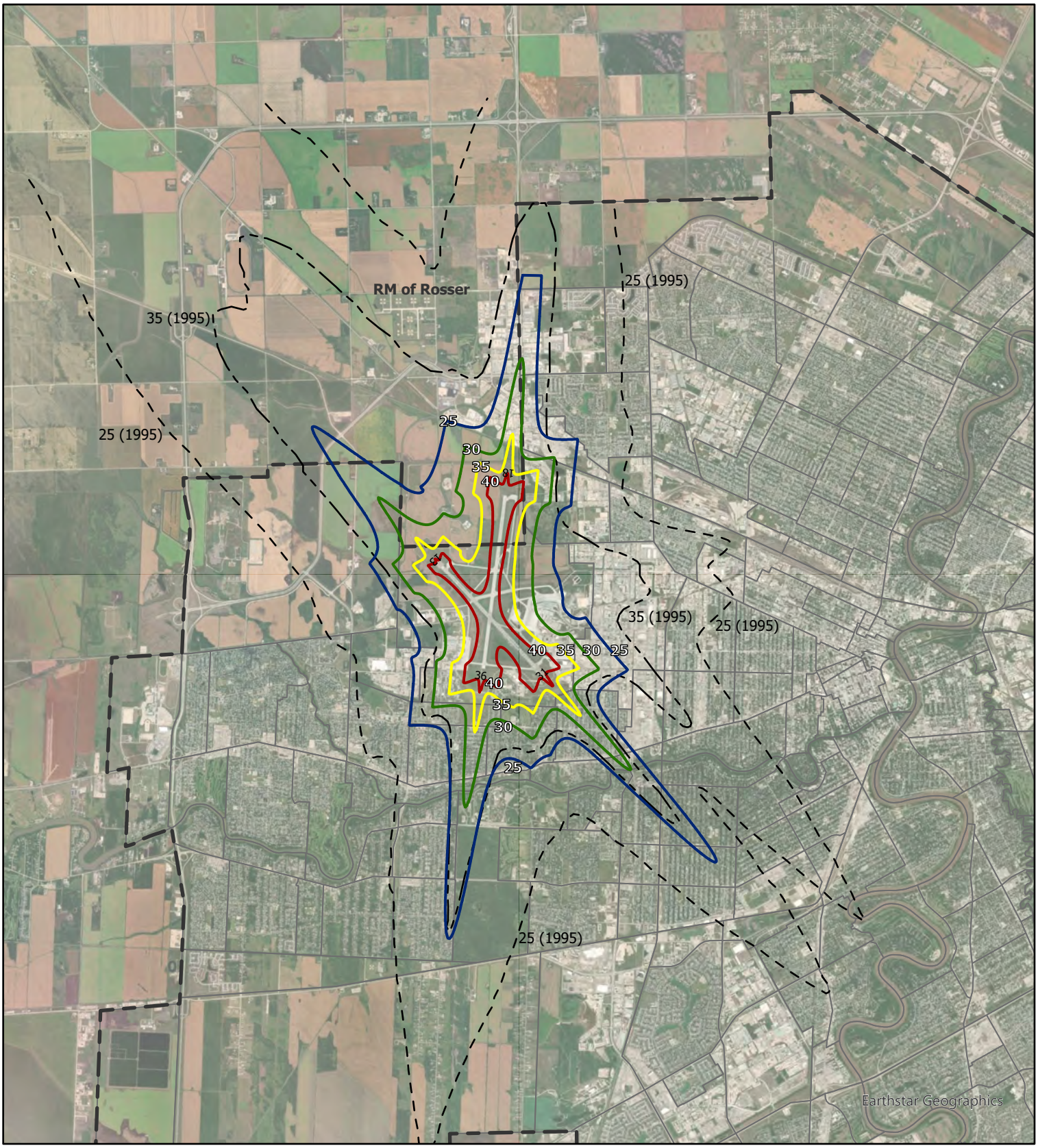
5.1.4 Scenario 3 – 2050 Forecast Conditions

The 95th percentile busy day for 2050 was forecast to consist of 423 total movements, including 26 local movements and 397 itinerant movements. The resulting noise contours for 2050 are presented as Figure 5-3.

5.1.5 Scenario 4 – Ultimate-Term Conceptual Conditions

The 95th percentile busy day for Scenario 4 – Ultimate-Term Conceptual Conditions includes 77 local movements and 1,168 itinerant movements, for a total of 1,245 movements. The resulting ultimate-term conceptual noise contours are presented as Figure 5-4.

[29] HM Aero Inc., Landmark Planning & Design Inc. (2021, August 12). *Noise Exposure Forecast Study – Winnipeg International Airport (Final Report).*



NOISE EXPOSURE FORECAST STUDY - WINNIPEG INTERNATIONAL AIRPORT

FIGURE 5.1 - 2019 BASELINE CONTOURS

JULY 2021

HM AERO AVIATION CONSULTING

Landmark Planning & Design Inc.

NEF25 — 1995 NEF25

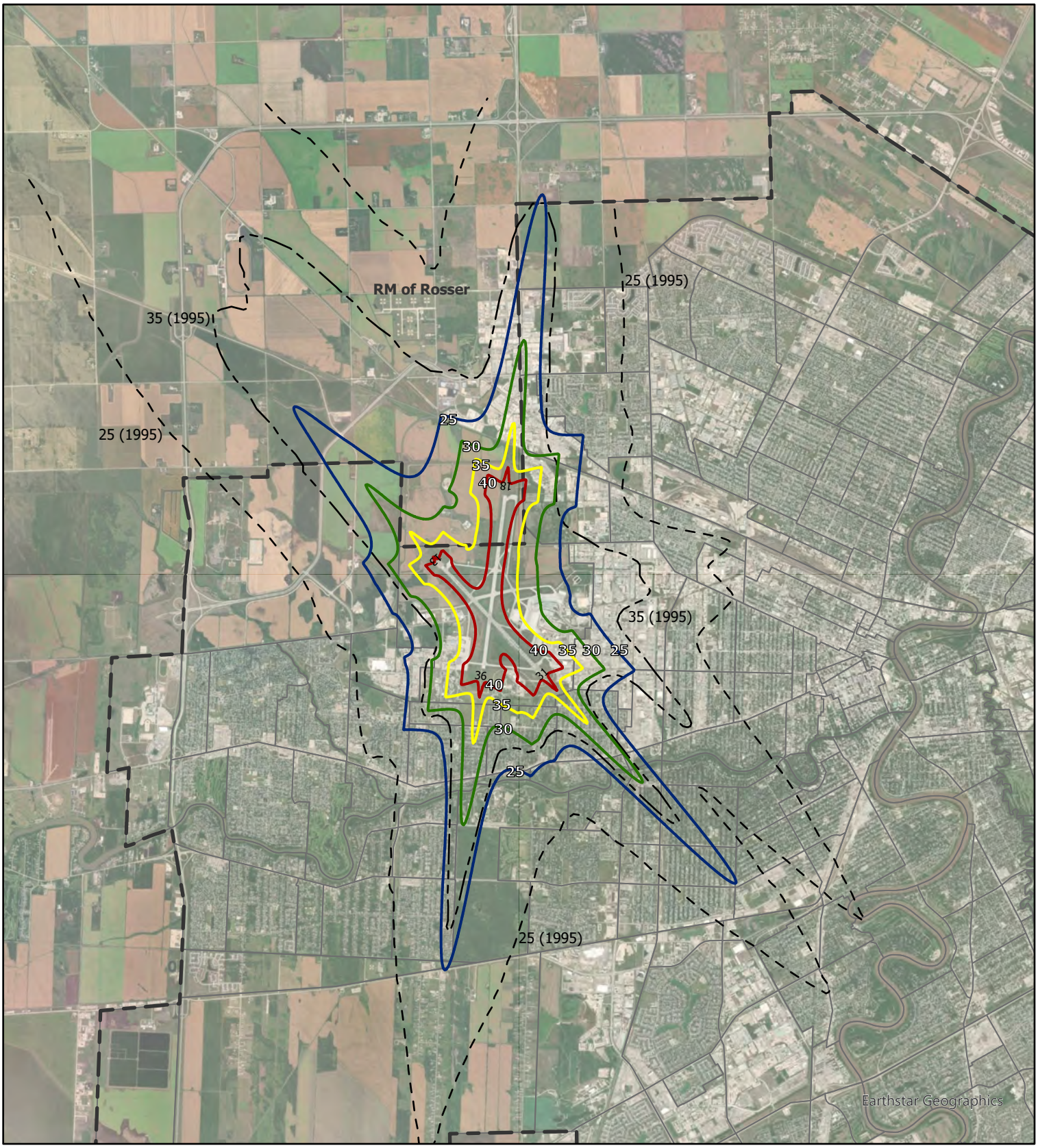
NEF30 — 1995 NEF35

NEF35 — City of Winnipeg Limits

NEF40

1 0.5 0 1 2 3 4 Kilometers

N



NOISE EXPOSURE FORECAST STUDY - WINNIPEG INTERNATIONAL AIRPORT

FIGURE 5.2 - 2033 CONTOURS

JULY 2021

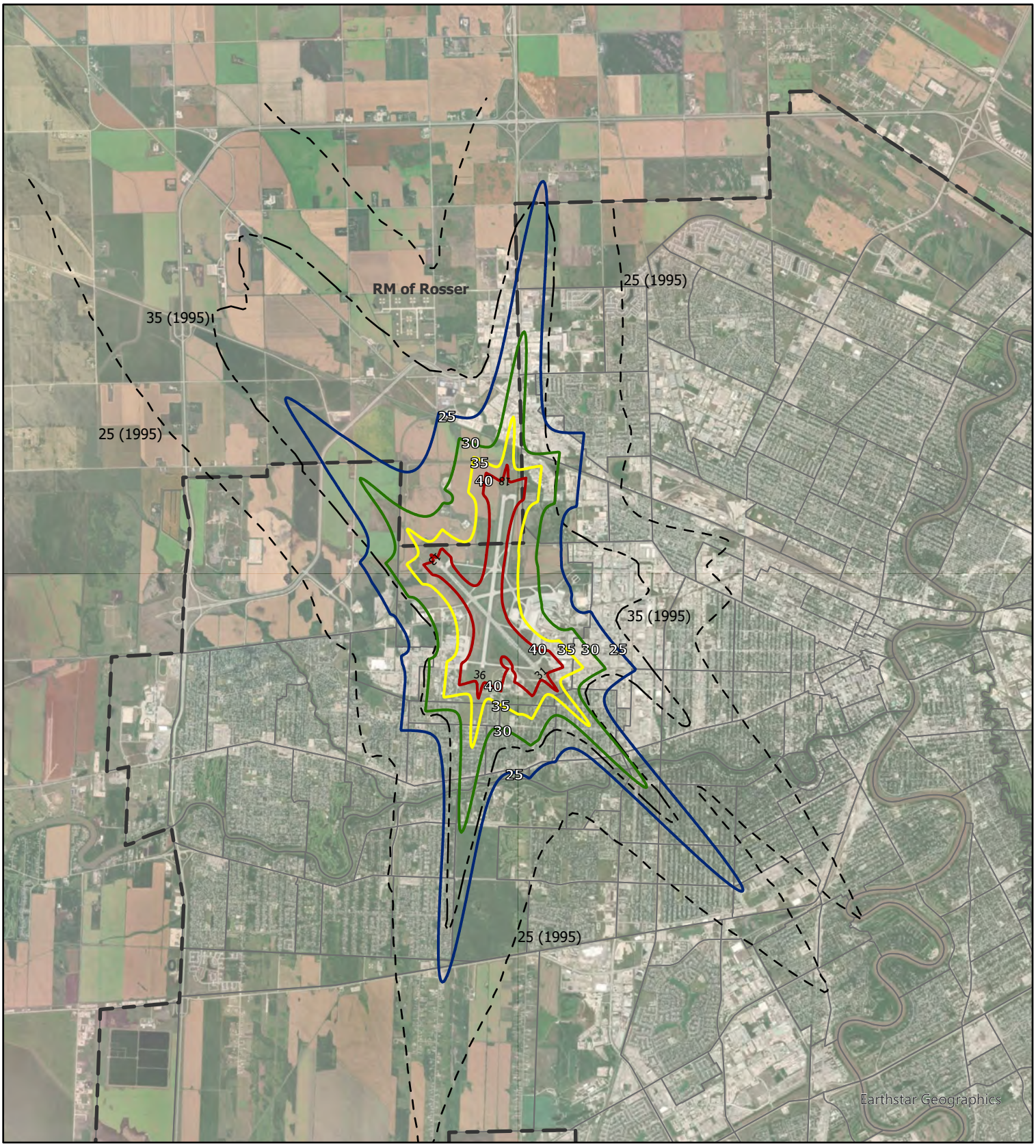
HM AERO AVIATION CONSULTING

Landmark Planning & Design Inc.

NEF25
NEF30
NEF35
NEF40
1995 NEF25
1995 NEF35
City of Winnipeg Limits

1 0.5 0 1 2 3 4 Kilometers

N



NOISE EXPOSURE FORECAST STUDY - WINNIPEG INTERNATIONAL AIRPORT

FIGURE 5.3 - 2050 CONTOURS

JULY 2021

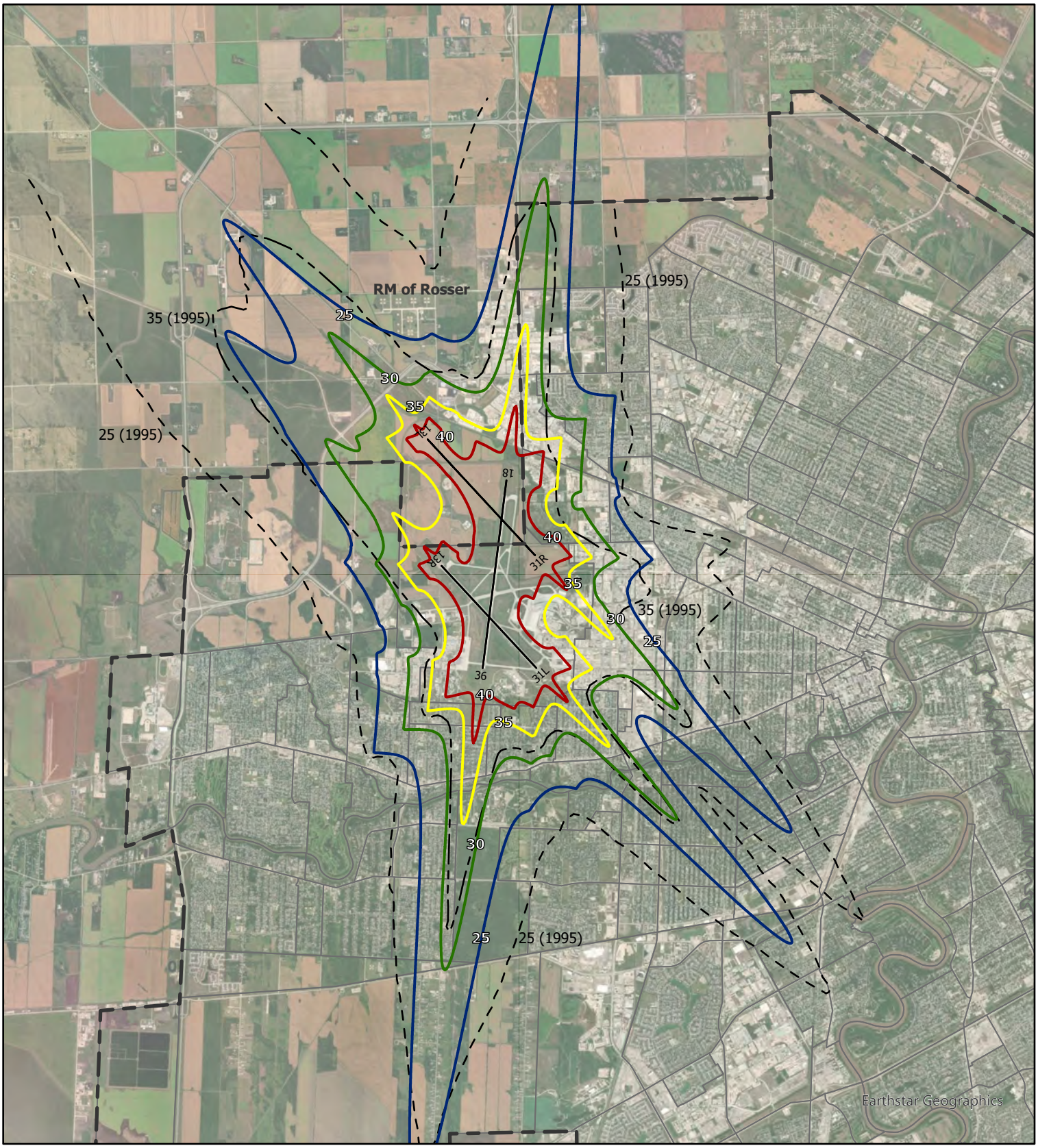
HM AERO AVIATION CONSULTING

Landmark Planning & Design Inc.

NEF25
NEF30
NEF35
NEF40
1995 NEF25
1995 NEF35
City of Winnipeg Limits

1 0.5 0 1 2 3 4 Kilometers

N



NOISE EXPOSURE FORECAST STUDY - WINNIPEG INTERNATIONAL AIRPORT

FIGURE 5.4 - ULTIMATE-TERM CONCEPTUAL CONTOURS

JULY 2021

HM AERO AVIATION CONSULTING

Landmark Planning & Design Inc.

NEF25
NEF30
NEF35
NEF40
1995 NEF25
1995 NEF35
City of Winnipeg Limits

1 0.5 0 1 2 3 4 Kilometers

N

5.2 Land Use Analysis

The purpose of the land use analysis is to interpret the contours prepared as part of the 2021 NEF Study in the context of the AVPA Plan policies, and to present implications for both existing and planned land uses within Area I and Area II of the Plan.

The key objectives of the AVPA Plan are focused on protecting 24-hour airport operations, since the operation of the Winnipeg International Airport in this capacity represents a significant economic contributor to the City and the Province as a whole. It is reasonable to conclude that the success of the Airport is also inextricably tied to the success of both Winnipeg and the surrounding region.

Municipalities also look to other 'non-airport' economic drivers to be successful, which may or may not represent a potential conflict with airport operations in certain situations. Municipalities therefore must consider the balance among economic driver types, and between economic, social, and environmental considerations when making land use decisions. This analysis of the updated NEF contours presents an opportunity to re-examine this balance – maintaining Winnipeg International Airport's viability as a matter of paramount importance, while also carefully considering the viability of other economic drivers such as commercial and residential development and redevelopment which builds the tax-base, makes use of existing infrastructure, and contributes to overall city-building goals.

5.2.1 AVPA Original Boundaries (1995)

The AVPA Plan indicates that the current boundaries of the plan:

> *"…are related directly to Noise Exposure Forecast contours. The 25 NEF contour approximates the outer limit of the A.V.D.P. area. The NEF configuration reflects the ultimate traffic volume at Winnipeg International Airport and includes the potential for an additional runway to the northeast of the existing runway. Whenever possible, clear boundaries were chosen to avoid confusion. Major rights-of-way and individual property lines were selected in determining the location of the A.V.D.P. area. The Airport vicinity boundary will be reviewed and revised as necessary to reflect changes to the NEF contours."*

As outlined in Section 2.3.4 of this Report, the policies of the AVPA Plan serve primarily to regulate the establishment of new residential housing units[30] to reduce land use conflicts related to noise disturbances. While the Plan speaks to both single family and multi-family uses, the primary focus of the Plan is multi-family uses. Table 5-1 provides a comparison of the AVPA regulations concerning multi-family uses as they relate to federal guidelines.

[30] Generally speaking, the addition of further multi-family units is not permitted in Area I (i.e., within/above the 35NEF), however is permitted up to 35 units/acre in Area II (i.e., between the 25NEF and 35NEF contours), and may be permitted over 35 units/acre subject to a conditional use hearing.

One noteworthy difference between the federal guidelines, as articulated in TP1247 (see Section 2.1.1), and the AVPA regulations is that the federal guidelines do not recommend that new residential uses be established within / above the 30 NEF, while the AVPA currently allows residential uses subject to a conditional use public hearing and specific construction standards to mitigate noise impacts. The AVPA also differentiates among levels of density for new residential developments, whereas the federal guidelines are silent on the matter[31].

Table 5-1 – General Comparison of AVPA Regulations and TP1247

NEF Range	TP1247	AVPA
25 NEF – 30 NEF	Multi-family uses allowed	Multi-family uses limited to 35 units/acre, may be allowed over 35 units/acre through a conditional use application
30 NEF – 35 NEF	Multi-family uses not recommended*	
35 NEF – 40 NEF	No multi-family uses*	No multi-family uses
** As per TP1247, local authorities can allow residential development in the >30 NEF contours with conditions including a sound study and acoustic insulation*		

5.2.2 AVPA Original Boundary Selection

As indicated in the AVPA Plan, the Plan Area boundaries were selected using the NEF contours as guidance – however, the precise boundaries for the Plan Area were then selected in a manner *"to avoid confusion".* Figure 5-5 illustrates that the Area I boundaries appear to be closely based on the 35 NEF contour for the portion of lands located in the City of Winnipeg[32]. Figure 5-6 illustrates that the Area II boundaries appear to be loosely based on a combination of both the 25 NEF and 30 NEF contours, among other factors. There appears to be a general correlation between the 30 NEF contour and the southmost extents of Area II, and between the 25 NEF contour and the eastern and western extents of Area II.

It is worth noting that in some instances, the Area boundaries within the existing AVPA Plan are *more restrictive* than the respective contour lines alone would indicate, and in other cases Area boundaries are *less restrictive* than the contour lines alone would indicate. Accordingly, the results of this NEF contour analysis provide only a partial basis on which to recommend future amendments to the Plan Area extents and to the respective Area I and Area II boundaries. The land use policy review of this Report provides a further background that can inform any future amendments to the current policies of the AVPA Plan, including the future selection of appropriate regulatory boundaries.

[31] Some municipal plans, such as the Richmond OCP, restrict new development in higher contours to multi-family units due to the ability to build to a higher construction standard.
[32] While the NEF contours are shown in their entirety, the AVPA regulates land within the City of Winnipeg only.

Figure 5-5 – 1995 NEF Contours and AVPA Policy Areas

Blue line - 1995 25 NEF; Orange line - 1995 35 NEF
Orange fill - Area I Policy Area; Blue fill – Area II Policy Area

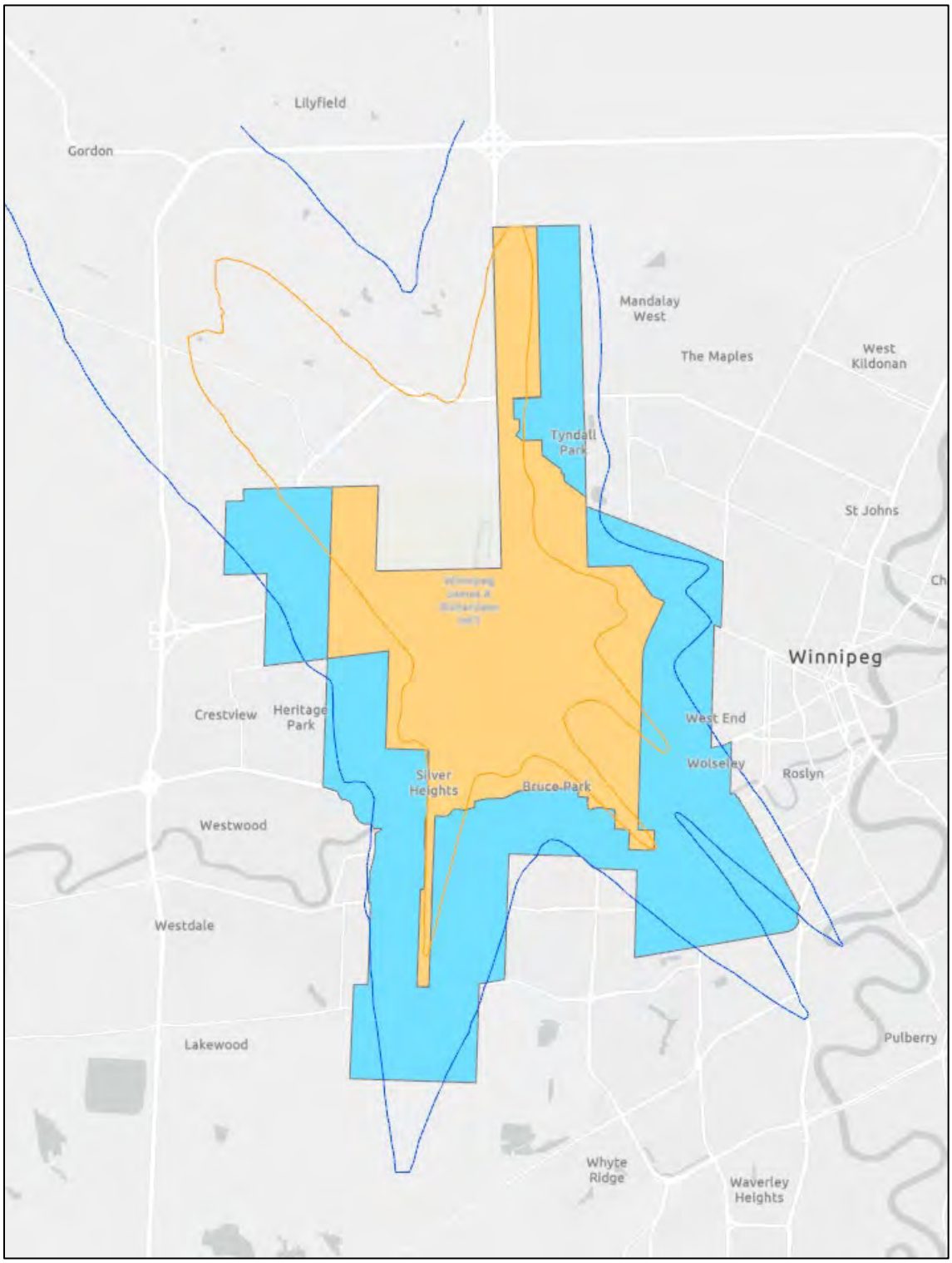
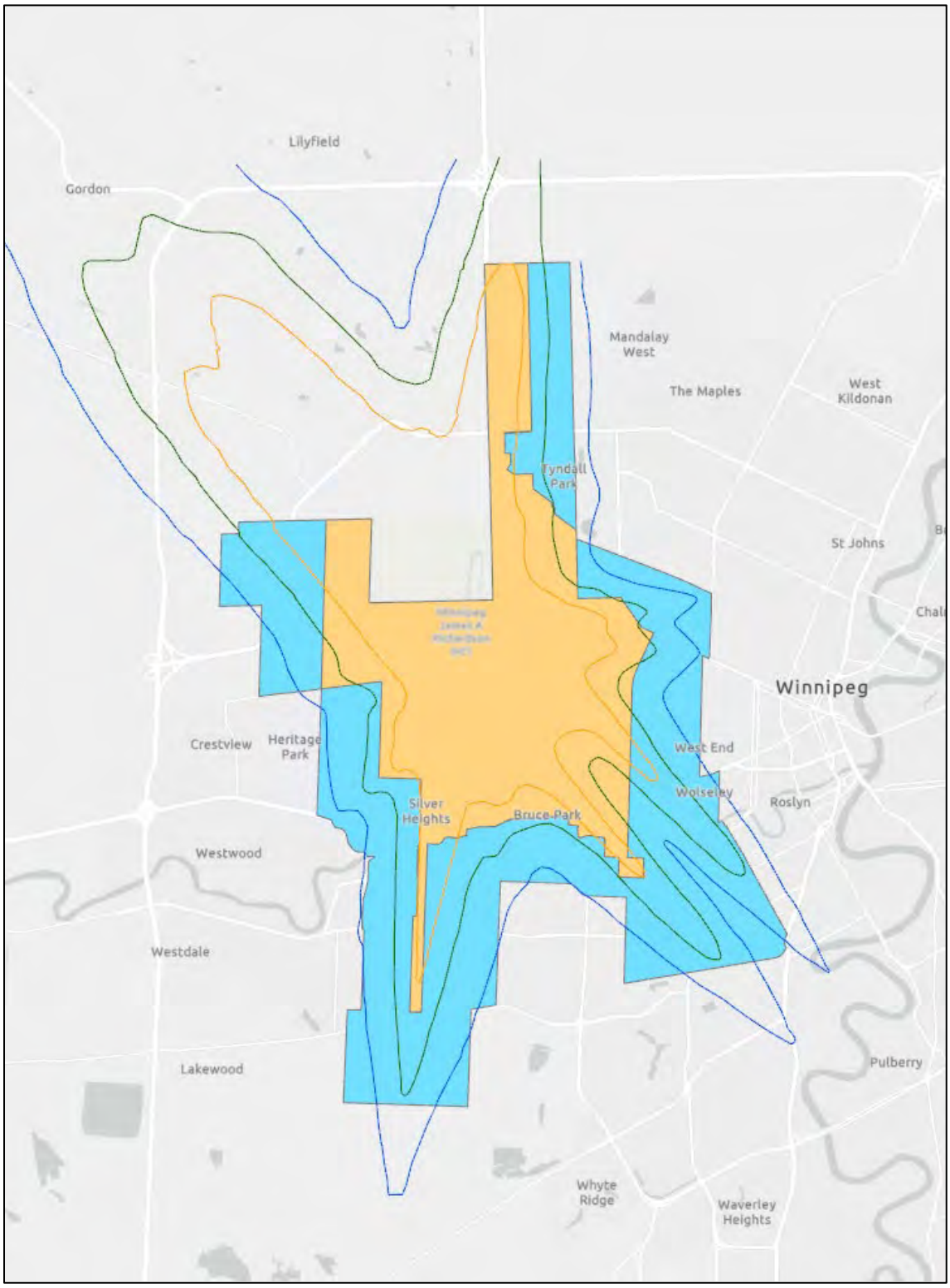


Figure 5-6 – 1995 NEF Contours and AVPA Policy Areas

Blue line - 1995 25 NEF; Green line – 1995 30 NEF; Orange line - 1995 35 NEF
Orange fill - Area I Policy Area; Blue fill – Area II Policy Area



5.2.3 AVPA Contour Analysis and Existing AVPA Boundaries

The scenarios prepared as part of the 2021 NEF Study demonstrate a significant reduction in baseline (2019), forecast (2033 and 2050), and 'ultimate-term' NEF conditions resulting from decreasing aircraft movements over the past 25 years and lower forecast aircraft movement activity. This Report will focus on the comparison of 1995 to the Ultimate-Term Contours. Analysis between the 1995, 2019, and 2050 NEF contours is included in Appendix A – Supplementary Land Use Analysis.

Figure 5-7 illustrates the significant *reduction* in the geographic extents of the 25 NEF contour (as an example) between 1995 and the 2050 forecast conditions, as well as the subsequent *expansion* of the 25 NEF outward between 2050 and the Ultimate-Term conceptual scenario. Figure 5-8 similarly illustrates the significant *reduction* in the geographic extents of the 35 NEF contour between 1995 and the 2050 forecast conditions, as well as the subsequent *expansion* of the 35 NEF outward between 2050 and the Ultimate-Term conceptual scenario.

Figure 5-7 – 25 NEF Contour Changes (1995, 2050, and Ultimate-Term)

Blue line - 1995 25 NEF; Blue Dashed line – 2050 25 NEF; Red Dotted line – Ultimate-Term 25 NEF;
Blue fill – Current Area II Policy Area

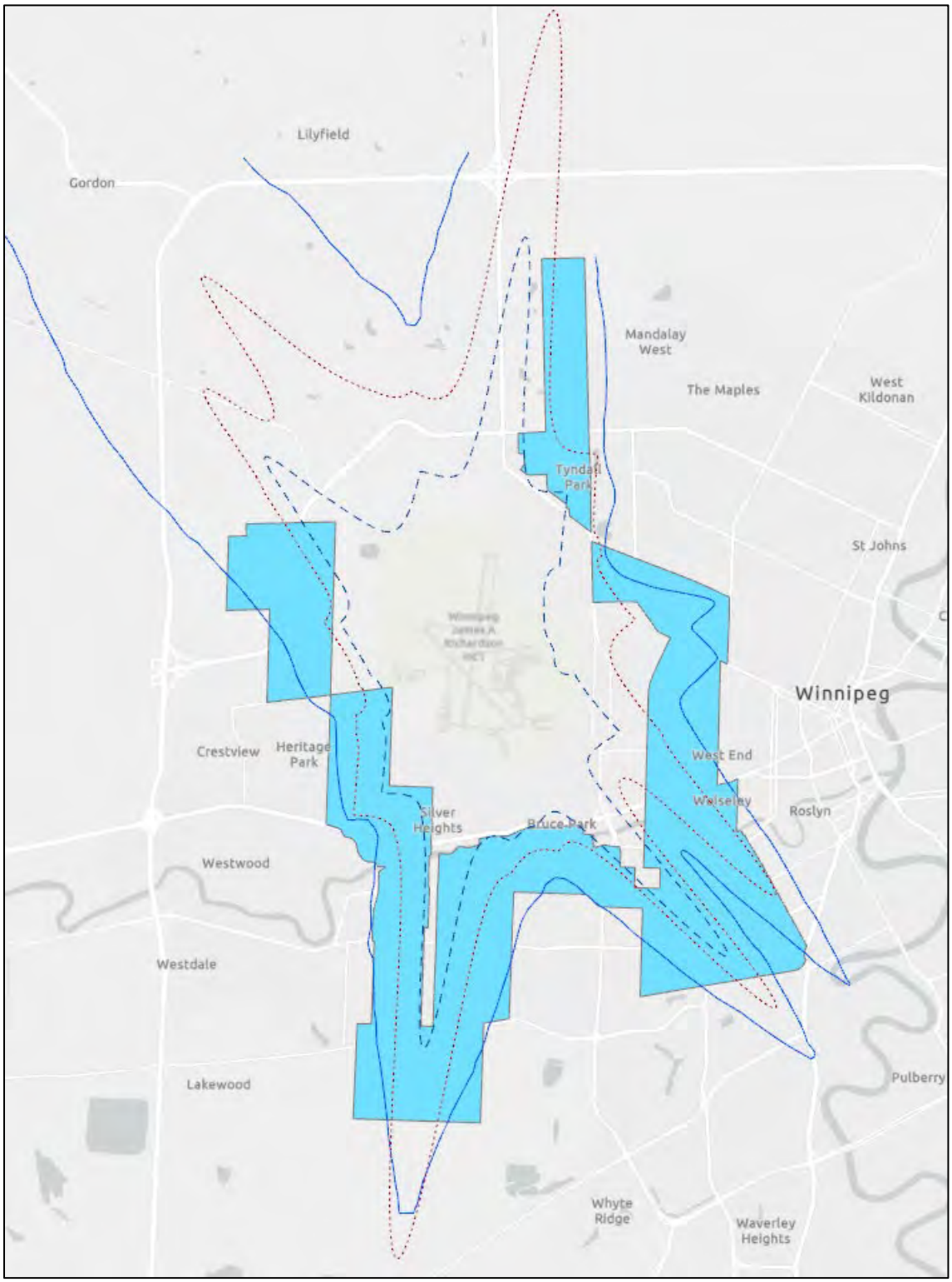
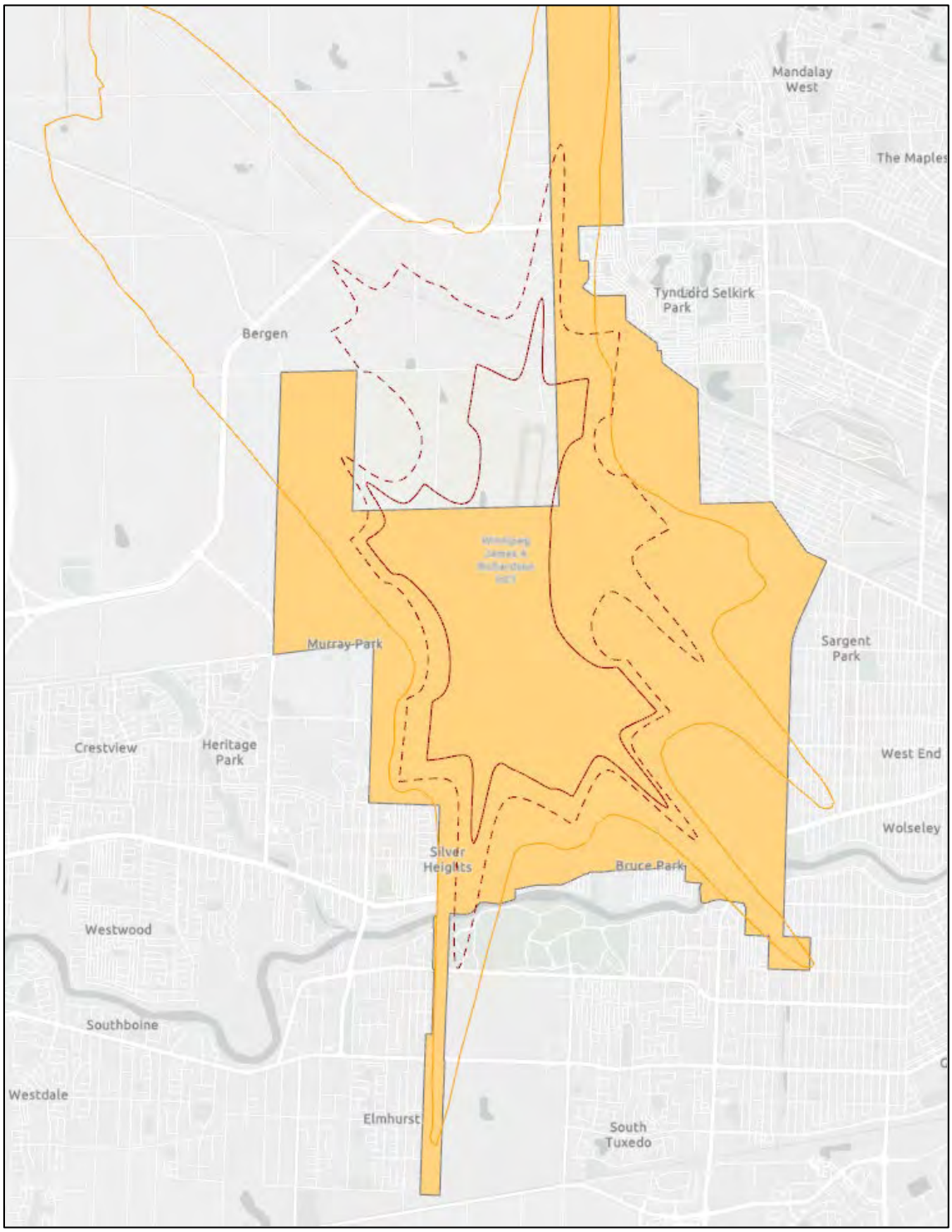


Figure 5-8 - 35 NEF Contour Changes (1995, 2050, and Ultimate-Term)

Orange line - 1995 25 NEF; Red line – 2050 35 NEF; Red Dashed line – Ultimate-Term 35 NEF;
Orange fill – Current Area I Policy Area



5.2.4 AVPA Boundary Adjustments

Future evaluation may consider adjusting the boundaries and / or policies of the AVPA Plan relevant to the boundaries. This section provides examples of boundary adjustments that could occur based on the contours of the 2021 NEF Study and the application of the current Area I and Area II criteria (i.e., 25-35 NEF for Area II and >35 NEF for Area I).

Current restrictions as outlined in the AVPA Plan do not allow for any new multi-family units to be constructed within / above the 35 NEF boundary. The substantial reduction in aircraft movements over the past 25 years means that the 'development restricted' areas are substantially reduced. Figure 5-9 illustrates how using the Ultimate-Term 35 NEF contour would reduce the geographic extent of the existing Area I boundary.

Figure 5-10 illustrates the sample boundary in closer detail while including the underlying zoning for each land parcel. Note that these boundaries are not official recommendations for future amendments to the AVPA Plan; they are intended to serve as an example of how various contours can be interpreted or converted into regulatory boundaries.

As previously noted, selection of the original (existing) Area I and Area II boundaries was based on a series of factors, where NEF contours formed the primary selection criteria. After establishing the 1995 contours, more identifiable (and often conservative) boundary lines were selected for use in the AVPA. Any subsequent amendment to the AVPA Plan could undertake a similar process for establishing a revised Area I and/or Area II Boundary based on updated NEF Contours. Figure 5-11 presents a sample boundary showing a revised Area I Boundary interpreted from Ultimate-Term 35 NEF Contour. Figure 5-12 presents a sample boundary where the Area I boundary is revised using the Ultimate-Term 35 NEF contour.

Figure 5-9 – Ultimate-Term 35 NEF and Existing Area I Boundary

Red Line – Ultimate-Term 35 NEF;
Orange Fill – Area I Policy Area; Blue Fill – Area II Policy Area

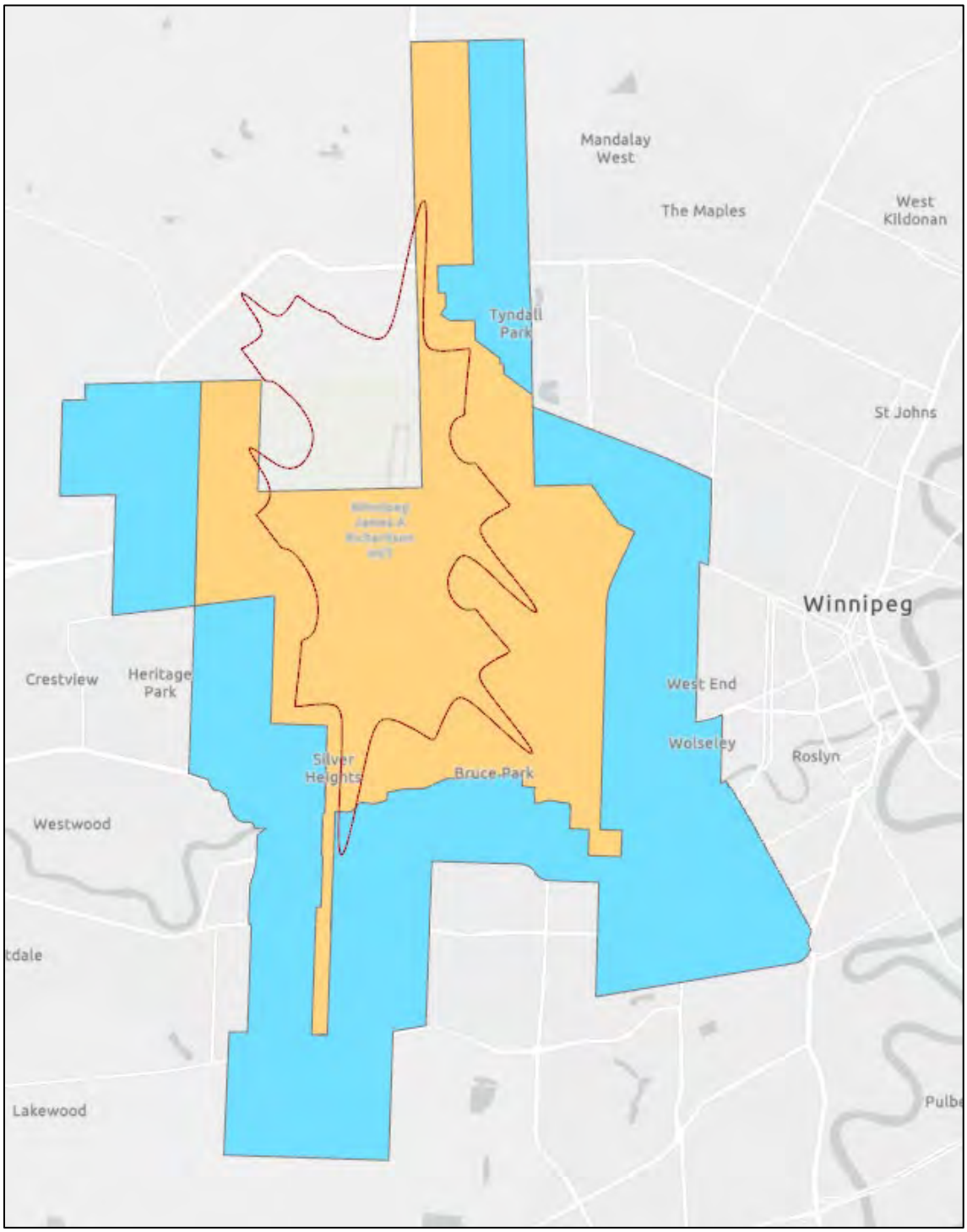


Figure 5-10 – Sample of Area I Boundary Revision Exercise

Red Line – Ultimate-Term 35 NEF; Grey Line – Existing Area I Boundary
Red Fill – Sample redrawn Area I Policy Area (Winnipeg)
Gold Fill – Sample redrawn Area I Policy Area (Rosser)

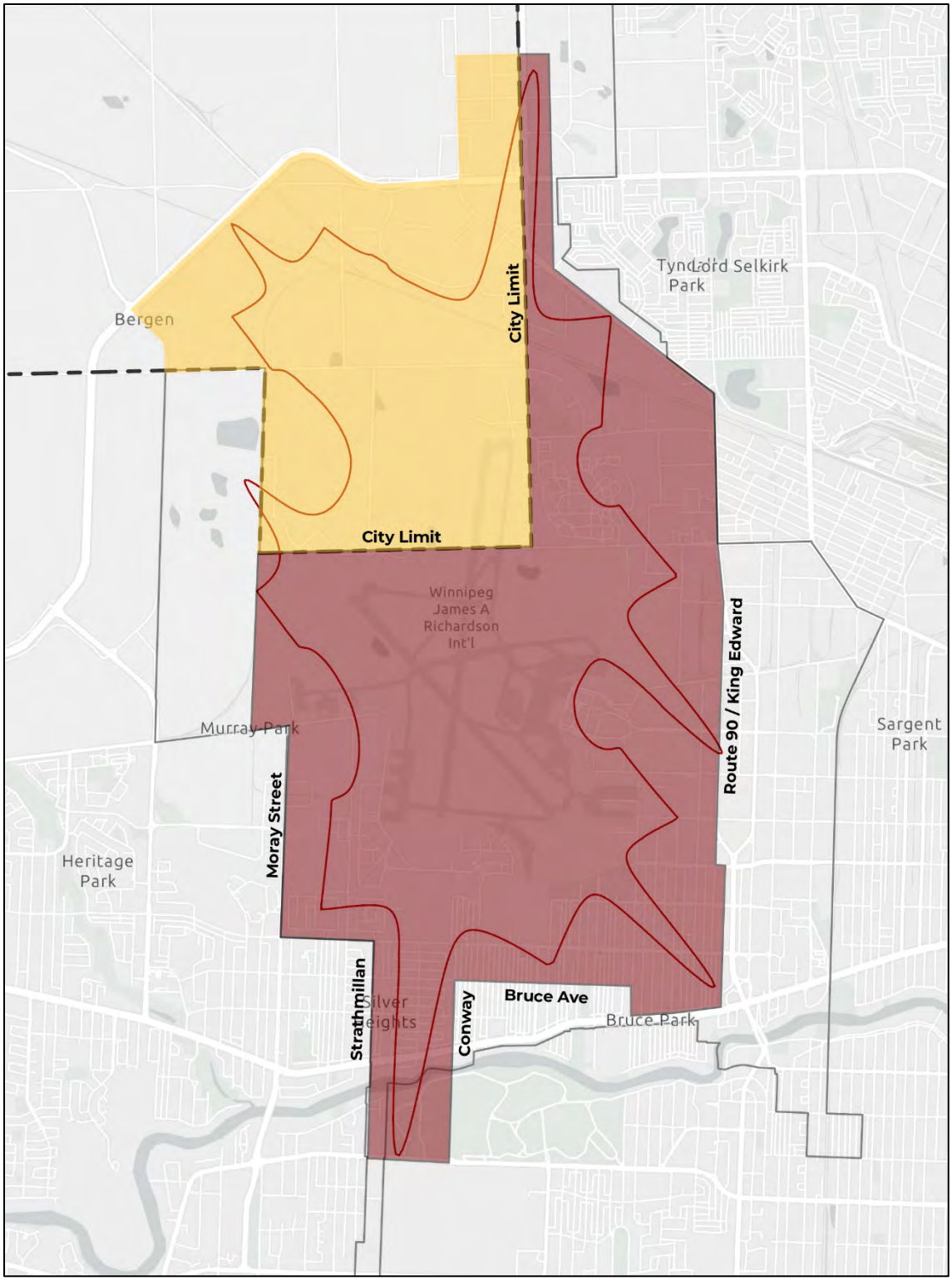


Figure 5-11 – Sample Boundary Selection Exercise – Revised Area I Boundary Interpreted from Ultimate-Term 35 NEF Contour

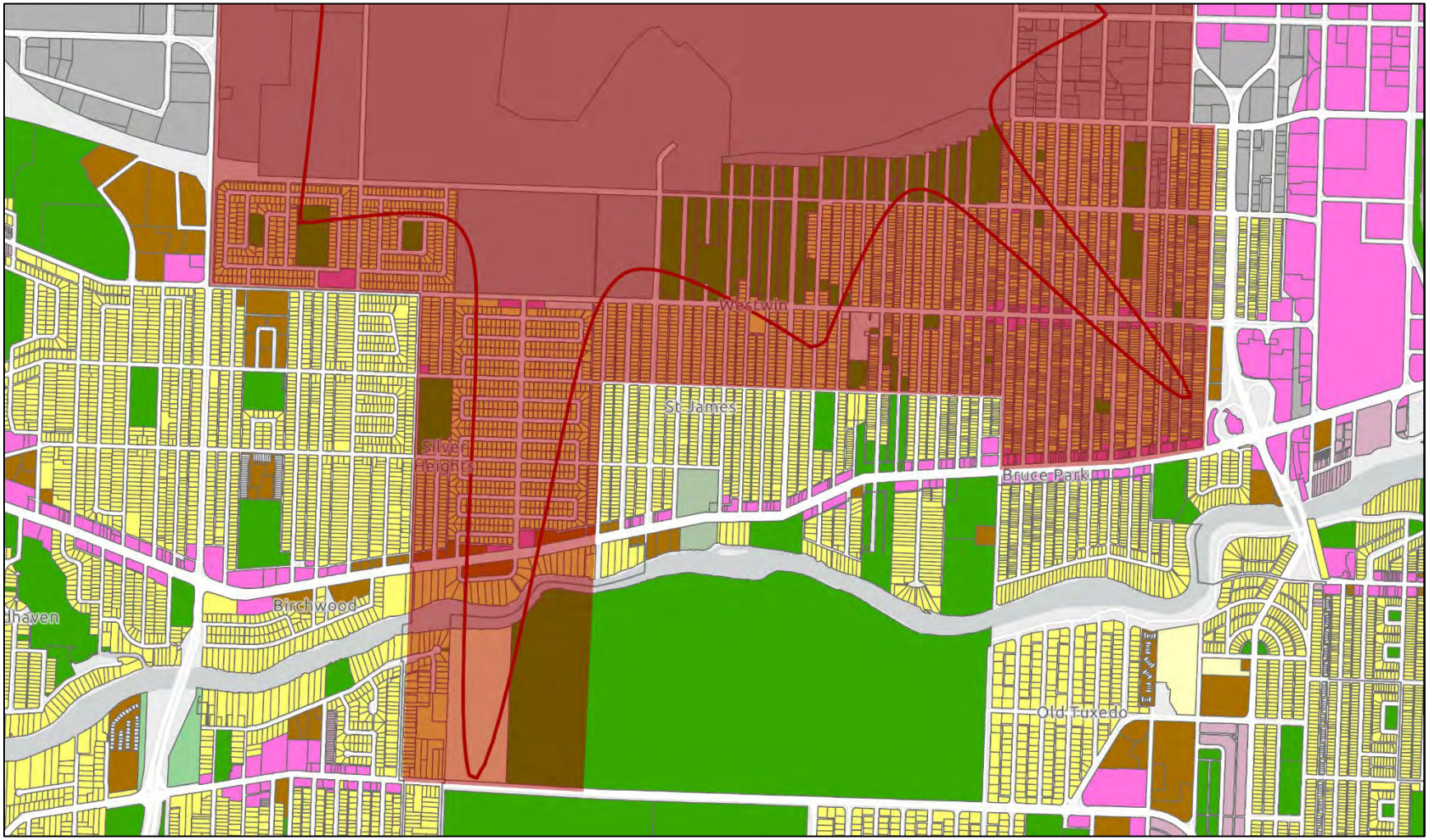
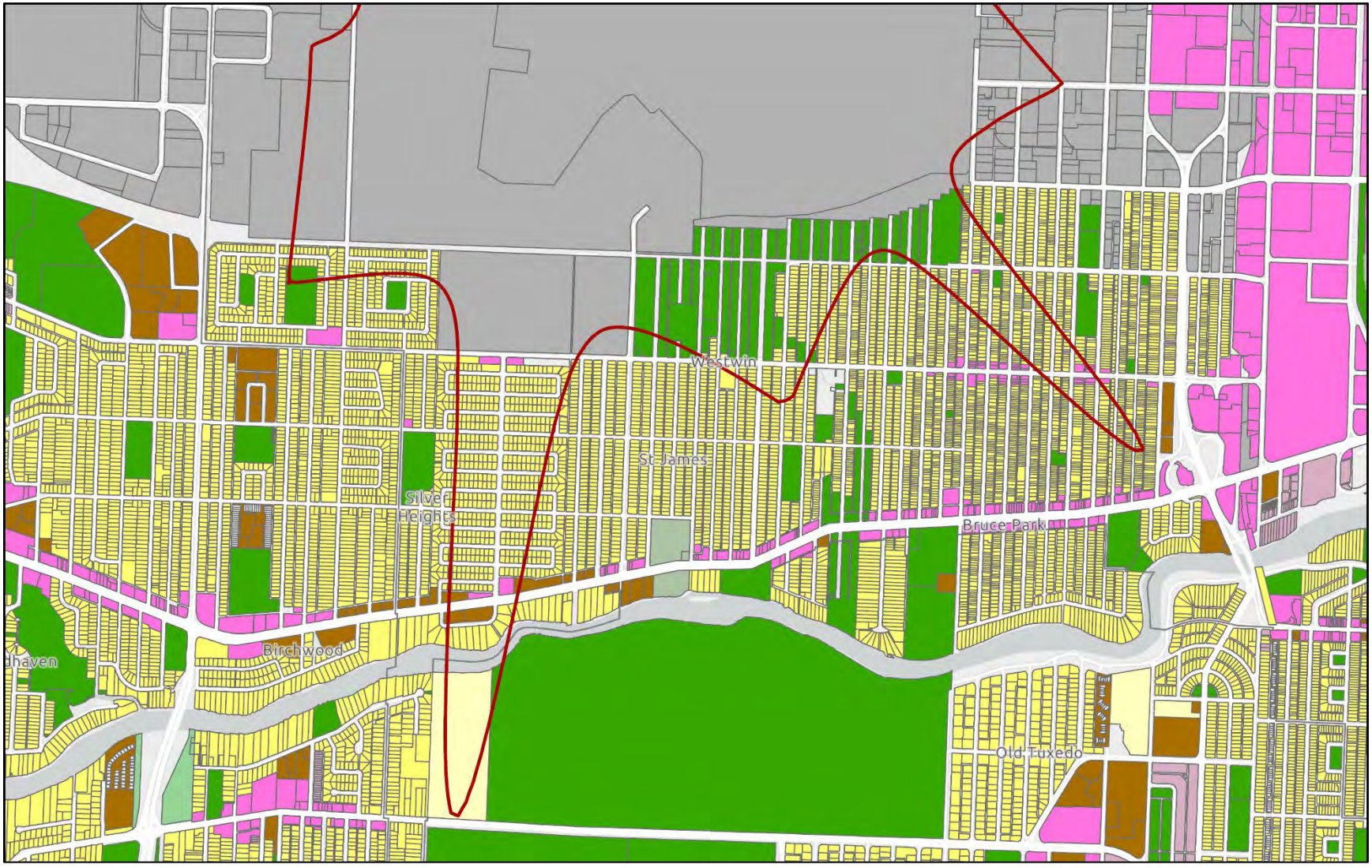


Figure 5-12 – Sample Boundary Selection Exercise – Revised Area I Boundary using Ultimate-Term 35 NEF Contour



5.2.5 Land Use Impact

This section provides statistics comparing the geographic extents of the past, current and forecasted NEF contours as they relate to existing land use (based on existing zoning categories). This information can be useful in assisting future decision-making with respect to any boundary adjustments or policy changes as they relate to the AVPA regulations. This section of the Report addresses quantitative data only. While certain trends related to the contours are described in this section, Section 5.2.6 provides an overview that combines data into more meaningful groups that relate closely to the current Areas I and II specifically. As described previously, the current AVPA Areas I and II include combinations of data – Area I effectively includes the 35-40 NEF and >40 NEF contours, while Area II includes the 25-30 NEF and 30-35 NEF contours.

The 2021 NEF Study included NEF contours for baseline activity in 2019; forecast activity in 2033 and 2050; and for the conceptual ultimate-term build-out of the Airport. The land use analysis of this Report has been carried out for the Ultimate-Term scenario[33]. Using these contours provides the most conservative approach when considering the risks of allowing for increased development rights and the potential impact to future Airport operations.

The following tables provide a comparison between the amount of land in each noted zoning category that is found within each NEF range, illustrating change over time when considering past and future scenarios. Table 5-4 provides data illustrating the amount of land by each zone that falls within, or would fall within, the NEF Contours in the Ultimate-Term scenario. Table 5-2 indicates that approximately 7,000 acres of land is currently under a development restriction that does not allow for the addition of residential units (i.e., Area I), while approximately 8,900 additional acres are restricted by conditional use approval and noise standards (i.e., Area II), which may or may not prevent the addition of new residential units on a case-by-case basis.

The data comparing 1995 with the NEF Contour scenarios tends to reflect what is evident in the contour graphics shown above: the amount of land impacted by the NEF contours in most zoning categories has reduced over time, a reflection of the overall reduction in aircraft movements over time. However, looking forward from 2019, the data indicates slight increases in the amount of land that falls within each contour area – a reflection of the forecast increase in aircraft movements over time. This pattern is evidenced in Figure 5-13, which shows the amount of land in each land use category decreasing from 1995 to 2019. However, after 2019, the chart illustrates that an increasing amount of land falls within the regulated areas – a result of the contours expanding in the future. For example, one can follow the amount of commercially zoned land that is restricted over time between 1995 and the Ultimate-Term. In 1995, Table 5-3 shows the amount of commercial land that is located within the 30-35 NEF contour (i.e., land that has some development restrictions applied) to be approximately 317 acres. In the Ultimate-Term (Table 5.4), the amount of commercially zoned land in the 30-35 NEF category decreases to 225 acres – representing 92 commercially zoned acres that now 'experience' a lower level of noise.

This trend is consistent when the same analysis is applied to the 35-40 NEF and >40 NEF contour ranges, which in combination represent the areas where no new multi-family development would be permitted based on the current AVPA regulations. Table 5-3 indicates that in 1995, there were a total of 215 commercially zoned acres in this restricted area. Table 5-4 shows that for the Ultimate-Term, that number decreases to 56 commercially zoned acres, of which only 4 acres are located above the 40 NEF contour.

[33] Analysis of the 2019 and 2050 scenarios is provided in Appendix A - Supplementary Land Use Analysis

Table 5-2 – Land Uses by Zone – Existing Area I and Area II

Zone	Area I		Area II		Total Regulated Parcels	Total Regulated Acres
	Parcels	Acres	Parcels	Acres		
Commercial	350	557.3	382	372.5		
Multiple Family	50	29.7	150	176.5		
Single Family	6,425	1,006.6	17,577	2,535.8		
Two Family	59	15.8	6,186	585.0		
Industrial	615	4,076.5	443	775.2		
Other	126	1,291.1	364	4,433.0		
TOTAL	**7,625**	**6,976.9**	**25,102**	**8,877.9**	**32,727**	**15854.9**

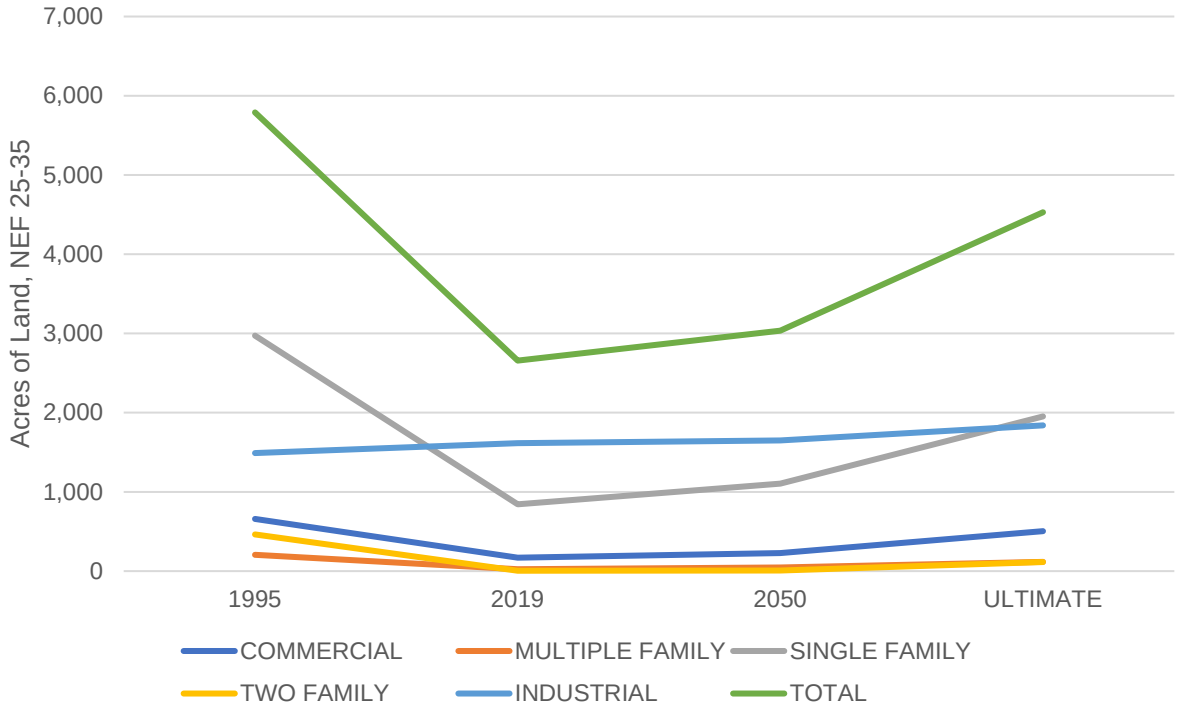
Table 5-3 – Land Uses by Zone – 1995 NEF Contours

1995	1995 25-30 NEF		1995 30-35 NEF		1995 35-40 NEF		1995 40+ NEF	
Zone	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres
Commercial	358	341.4	301	317.3	153	168.4	42	46.2
Multiple Family	199	130.1	94	75.7	22	20.1	3	2.0
Single Family	12,903	1,792.7	8,809	1,179.4	4,125	550.2	856	168.6
Two Family	3,634	347.1	1,247	115.9	9	0.9	2	0.1
Industrial	358	682.9	342	807.1	336	848.0	142	2,420.3
Other	372	3,013.8	209	1,542.4	73	701.6	52	431.9
TOTAL	17,824	6,308.0	11,002	4,037.9	4,718	2,289.1	1,097	3,069.2

Table 5-4 – Land Uses by Zone – Ultimate-Term NEF Contours

ULTIMATE	ULT 25-30NEF		ULT 30-35NEF		ULT 35-40NEF		ULT 40+NEF	
Zone	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres
Commercial	295	280.1	176	224.8	27	52.1	5	3.9
Multiple Family	86	86.6	29	30.1	4	3.3	0	0.0
Single Family	10,048	1,296.5	4,809	655.7	1,183	214.7	29	43.8
Two Family	1,045	105.3	139	10.1	2	0.1	0	0.0
Industrial	406	820.1	293	1,019.4	109	847.8	35	1,399.3
Other	307	2,161.9	87	816.0	50	120.9	12	28.0
TOTAL	12,187	4,750.5	5,533	2,756.1	1,375	1,238.9	81	1,474.9

Figure 5-13 – Land Areas by Zone – Changes Over Time, NEF 25-35



5.2.6 Contour Policy Changes and Related Land Use Impacts

This contour analysis and land use commentary may be used to update existing regulatory documents. Understanding how regulatory changes might affect the amount of land available for development opportunities is important. When considering changes to land use restrictions and policies, a primary focus will be on land that is currently zoned for commercial uses, as this is the land use category and zoning category that is most likely to be targeted for residential and mixed-use redevelopment. Employment lands (i.e., industrial zones) are strongly protected in *OurWinnipeg* and existing single-family lands generally have a limited potential for densification / redevelopment.

Table 5-5 illustrates that the amount of land fully restricted from new residential development (i.e., > 35 NEF) is reduced by approximately 2,600 acres when comparing the 1995 contours (5,358 acres) with the Ultimate-Term conceptual contours (2,714 acres) – this includes 159 acres of commercially zoned land and 19 acres of multi-family zoned land.

Table 5-5 – Land Uses by Zone – Changes from 1995 to Ultimate-Term (>35 NEF)

	Change (acres)	1995		Ultimate	
		>35 NEF		>35 NEF	
		Parcels	Acres	Parcels	Acres
COMMERCIAL	-158.6	195	214.6	32	56.0
MULTIPLE FAMILY	-18.8	25	22.1	4	3.3
SINGLE FAMILY	-460.4	4,981	718.8	1,212	258.4
TWO FAMILY	-0.9	11	1.0	2	0.1
INDUSTRIAL	-1,021.2	478	3,268.3	144	2,247.1
OTHER	-984.6	125	1,133.5	62	148.8
	-2,644.4	**5,815**	**5,358.3**	**1,456**	**2,713.9**

Table 5-6 illustrates the amount of land that would fall within / above the 30 NEF in both the 1995 and Ultimate-Term scenarios. The total amount of commercial land that is within this NEF category is reduced by approximately 250 acres.

Table 5-6 – Land Uses by Zone – Changes from 1995 to Ultimate-Term (>30 NEF)

	Change (acres)	1995		Ultimate	
		>30 NEF		>30 NEF	
		Parcels	Acres	Parcels	Acres
COMMERCIAL	-251.0	496	531.9	208	280.9
MULTIPLE FAMILY	-64.4	119	97.8	33	33.4
SINGLE FAMILY	-984.1	13,790	1,898.2	6,021	914.1
TWO FAMILY	-106.7	1,258	116.9	141	10.2
INDUSTRIAL	-808.9	820	4,075.4	437	3,266.5
OTHER	-1,711.1	334	2,675.9	149	964.8
	-3,926.2	**16,817**	**9,396.1**	**6,989**	**5,469.9**

Table 5-7 illustrates that when comparing the 1995 contours with the Ultimate-Term contours, the amount of land regulated with noise conditions (i.e., 25-35 NEF) decreases by 2,839 acres. This includes a reduction of 154 acres of commercially zoned land.

Table 5-7 – Land Uses by Zone – Changes from 1995 to Ultimate-Term (25-35 NEF)

	Change (acres)	1995		Ultimate	
		25-35 NEF		25-35 NEF	
		Parcels	Acres	Parcels	Acres
COMMERCIAL	-153.7	659	658.7	471	505.0
MULTIPLE FAMILY	-89.1	293	205.8	115	116.7
SINGLE FAMILY	-1,020.0	21,712	2,972.1	14,857	1,952.2
TWO FAMILY	-347.7	4,881	463.0	1,184	115.4
INDUSTRIAL	349.5	700	1,490.0	699	1,839.5
OTHER	-1,578.3	581	4,556.2	394	2,977.9
	-2,839.3	**28,826**	**10,345.9**	**17,720**	**7,506.6**

Table 5-8 provides a scenario for consideration in future boundary reviews by comparing the existing Area I land that does not permit residential redevelopment with the >30 NEF lands in the Ultimate-Term scenario. If the 30 NEF contour were used to restrict (i.e., not permit) residential redevelopment rather than continuing to use the 35 NEF contour as is currently the case, it would open approximately 280 acres of commercial land to residential and mixed-use redevelopment potential.

Table 5-8 – Land Uses by Zone – Comparing Area I with Ultimate-Term >30 NEF

	Change (acres)	Area I		Ultimate	
		Approx. >35 NEF		>30 NEF	
		Parcels	Acres	Parcels	Acres
COMMERCIAL	-276.5	350	557.3	208	280.9
MULTIPLE FAMILY	3.7	50	29.7	33	33.4
SINGLE FAMILY	-92.5	6,425	1,006.6	6,021	914.1
TWO FAMILY	-5.6	59	15.8	141	10.2
INDUSTRIAL	-810.0	615	4,076.5	437	3,266.5
OTHER	-326.3	126	1,291.1	149	964.8
	-1,507.0	**7,625**	**6,976.9**	**6,989**	**5,469.9**

5.2.7 Land Use Implications Summary

The land use analysis in this Report makes use of the Ultimate-Term NEF contours for discussion purposes. Using the Ultimate-Term NEF contours represents the most conservative approach to revising the AVPA boundaries, since the Ultimate-Term scenario includes a future third runway and represents the highest projected volume of traffic the Airport could accommodate.

Data indicates that the NEF contours have reduced in size since 1995 – they cover less geographic area than they used to. Looking forward, the 2050 and Ultimate-Term NEF projections indicate that the NEF contour lines, while being modestly larger in area than they are today (2019), will still be smaller in size when compared to the 1995 contours.

The reduction in NEF contours means that, if the boundaries of the AVPA were changed to reflect the Ultimate-Term NEF contours, without changing any of the policies associated with the AVPA Plan, more land would be available for redevelopment. In 1995, the amount of land included in areas above the 25 NEF contour totalled 15,704 acres, whereas in the Ultimate-Term scenario, the total land area above the 25 NEF would be 10,220 acres – meaning that 5,484 acres would no longer be regulated by the AVPA. Earlier sections of this Report begin to quantify more precisely the extent of land area that is made available as a result of the reduced NEF contour area, on a zoning category basis.

The amount of land that is restricted from new residential development (i.e., above the 35 NEF) in the Ultimate-Term scenario is dramatically reduced when compared to the 1995 NEF contours. For example, in 1995 there was approximately 215 acres of commercially zoned land above the 35 NEF, whereas in the Ultimate-Term scenario there is only 56 acres – a net increase of 159 acres of land that could be developed or redeveloped for residential or mixed use purposes.

Using the Ultimate-Term NEF contours as new AVPA boundaries (i.e., the most conservative approach) would result in new residential or mixed use development being permitted (subject to appropriate zoning and noise protection regulations) in significant redevelopment areas including: the Polo Park commercial area, most of the Portage Avenue ‘strip’ in the vicinity of the AVPA, and much of Ness Avenue in the vicinity of the AVPA.

6 PLANNING RECOMMENDATIONS

Based on the findings of this Report, there are several potential amendments to federal, provincial, and municipal guidelines and regulations. This Section outlines the recommended updates and amendments at each level of government, according to the documents reviewed in Section 2 of this Report.

Any amendments or additional regulations at the Provincial level would necessitate subsequent amendments at the municipal level. As such, whether Manitoba pursues more detailed regulations for land use in the vicinity of Winnipeg International Airport will dictate the nature of required municipal amendments.

6.1 Recommended Federal Amendments

At the federal level of the planning hierarchy, the project team's primary recommendation is that planners and decision-makers at the provincial and municipal levels should familiarize themselves with the specifics of *TP1247 – Land Use in the Vicinity of Aerodromes*, the *Winnipeg International Airport Zoning Regulations*, Transport Canada's Aeronautical Assessment Process, and NAV CANADA's Land Use Program. By ensuring planners are articulate and knowledgeable in matters of airport land use compatibility, these individuals can communicate this information to development proponents to assist in the early identification of potential issues.

6.1.1 TP1247 – Land Use in the Vicinity of Aerodromes

The guidelines and recommendations of TP1247's eight subject matter areas, as described in Section 2.1.1, are implemented through:

- The Winnipeg International Airport Zoning Regulations, with respect to development heights and bird hazards;
- NAV CANADA's Land Use Program, for the assessment of impacts to the air navigation system;
- Transport Canada's Aeronautical Assessment Process; and
- Provincial and municipal plans and by-laws for matters of Airport noise and other compatibility considerations.

As the provincial and municipal plans and by-laws identified in Sections 2.2 and 2.3, respectively, are reviewed and updated, it is recommended that a holistic analysis of TP1247 be undertaken for each document to ensure that matters of airport land use compatibility are addressed where appropriate. TP1247 can be used to inform and support the development of policies that can be implemented by planners and decision-makers, considering the unique needs of Winnipeg International Airport and other aeronautical facilities (e.g., Winnipeg Health Sciences Centre heliport, St. Andrews Airport) in the region.

6.1.2 Winnipeg International Airport Zoning Regulations (SOR/81-708)

As noted in Section 2.1.2, the *Winnipeg International Airport Zoning Regulations* define Approach and Transitional Surfaces for five runways. Since the enactment of the Airport Zoning Regulations in 1981:

- Runway 07-25 has been permanently decommissioned; and
- Runway 18R-36L was not constructed and has not been identified in the 2033 Airport Master Plan or the Transport Canada-approved Land Use Plan.

These changes negate the need for the Approach and Transitional Surfaces associated with both facilities. An amendment to the *Winnipeg International Airport Zoning Regulations* could be considered to rationalize the Regulations with the current and planned airfield, and to create more permissive height restrictions in areas to the north and east of the airport previously affected by the Runway 25 and Runway 18R Approach and Transitional Surfaces. This recommendation will require involvement by the WAA and Transport Canada through the federal government's formal Airport Zoning Regulation amendment process.

6.2 Recommended Provincial Amendments

The existing Manitoba provincial planning framework for airports and development in the vicinity of airports consists primarily of high-level policies located within the *Provincial Planning Regulation*. As noted in Section 2.2.1, the PPR provide policy direction to inform planning in Manitoba and speaks generally to protecting the integrity of airport operations, including the 24-hour operations of Winnipeg International Airport.

As noted in Section 3 of this Report, there are varying levels of policy direction regarding airports in other provinces. For example:

- The Province of Ontario, through the *Provincial Policy Statement*, issues guidelines and regulations regarding land use planning in the vicinity of airports and protecting against aircraft noise in the construction of new residential uses; and
- The *Calgary International Airport Vicinity Protection Area Regulation* is an Alberta provincial regulation, rather than a municipal by-law.

A fundamental consideration of future planning is whether Manitoba pursues more detailed land use regulations at the provincial level. The *City of Winnipeg Charter* makes provision for the Province to establish policies for the use of real property and for development in the AVPA. This Report considers the opportunity for airport-related regulations to be implemented at the provincial level which could include adopting NEF contours within the regulations and setting a minimum regulatory land use standard to be reflected by local municipalities in their plans (similar to the PPR). Establishing provincial regulations in this regard should include engagement with relevant stakeholders and public consultation.

If the above-noted approach is not pursued, the current Manitoba provincial regulations would still function in their current state if the existing AVPA Plan was amended to contain updated NEF Contours and/or replaced with similar land use regulations. To provide greater clarity, the following amendments to existing provincial regulations and guidelines could be considered.

6.2.1 Provincial Planning Regulation (81/2011)

Given that Winnipeg International Airport is the primary commercial international airport in Manitoba, the current level of regulation by the Province may be sufficient. This can be contrasted with Ontario, where there are multiple full-service airports offering domestic and international service which may justify the previously noted provincial level policy directions. Conversely, given that the NEF contours of Winnipeg International Airport fall within the City of Winnipeg, the RM of Rosser, and the Centreport Canada Inland Port Special Planning Area, a greater level of provincial planning regulation may constitute a reasonable approach.

Potential amendments or areas for consideration with respect to the *Provincial Planning Regulation* could include:

- As established in 269(1) of the *City of Winnipeg Charter*, include more detailed policy language to protect the integrity and operation of airports. This could include the incorporation of NEF contours and referring to *TP1247 – Land Use in the Vicinity of Aerodromes*;
- Provide base planning requirements for airport land use compatibility, such as restricting residential development in the NEF 35 contour or greater and requiring a sound study for new noise-sensitive developments within the 25 NEF contour or greater. The specific details of these could be determined at the local level; and
- Require periodic updates of the NEF contours within a secondary plan on a set basis, similar to the requirement for updates to Development Plans.

Other provinces (e.g., Ontario) provide greater guidance for the local implementation of planning with respect to noise and airport-related policies. For example, Section 1.6.9.2 of the *Provincial Policy Statement* prohibits new residential development and other sensitive land uses above the NEF/NEP 30 contour, except for redevelopment and infilling.

6.2.2 Inland Port Special Planning Area Regulation (48/2016)

The existing Regulation restricts new residential land uses and provides policy direction related to the development of potentially noise-sensitive non-residential land uses. To provide greater clarity and direction, potential amendments or areas for consideration could include:

- Including Winnipeg International Airport's NEF contours as a policy or reference map;
- Speaking specifically to the regulation of noise-sensitive land uses within the Inland Port; and
- Providing noise insulation criteria for potentially noise-sensitive uses, including lodgings, accommodations, and offices.

6.2.3 Manitoba Real Property Act (C.C.S.M. c. R30)

Section 4.2 of this Report identified that the ability to place notes on title regarding aircraft noise may be limited in Manitoba. As such, areas for consideration may include:

- Undertaking a detailed legal analysis of the *Real Property Act* and associated regulations to identify provisions that limit the use of caveats on title for aircraft noise; and
- Making amendments, as required, to facilitate the use of caveats on title.

When the necessary amendments are made to the *Real Property Act*, mechanisms to implement legal notifications on title could include distinct caveats, development agreements, zoning agreements, and development schemes.

6.3 Recommended Municipal Amendments

Presently, regulations pertaining to airport land use compatibility in Manitoba are substantially determined at the local / municipal level, with some regulations and guidelines provided at the federal and provincial levels. While the Province could provide a more detailed regulatory framework as discussed in Section 6.2 of this Report, it is anticipated that an updated AVPA Plan or a replacement document would likely be adopted at the municipal level.

If NEF contours and land use regulations relating to development in the vicinity of Winnipeg International Airport are adopted at the provincial level, amendments to municipal documents will be required to reflect these regulations, as local plans must be generally consistent with the PPR. If provincial regulations are not adopted or amended in a manner which precipitates local-level amendments, the AVPA Plan is due for a review, and at minimum should be updated with NEF contours that reflect current conditions and future projections.

Outside of potential regulation at the provincial level, it is also worth noting that planning for the Winnipeg International Airport could be completed effectively at the regional level through collaboration between the Winnipeg Airports Authority, City of Winnipeg, RM of Rosser, CentrePort Canada, and Winnipeg Metropolitan Region.

Key principles of any potential amendments to these regulations should include:

- Ensuring that polices are straightforward in their interpretation and implementation;
- Including components to ensure public awareness of airport-related regulations and potential impacts of aircraft noise;
- Undertaking required legal analysis to ensure underlying provincial regulations (such as the *Real Property Act*) are amended as required to facilitate new policy directions and technical requirements;
- Completing detailed engineering analysis to ensure all technical components of future regulations, such as updates to the *Acoustics Insulation By-law*, are grounded in best practice and are technically feasible;
- Considering the consolidation of land use regulations, noise insultation requirements and other supplementary mitigation measures into a single document for ease of use and implementation; and
- Undertaking a thorough stakeholder and public engagement process.

6.3.1 OurWinnipeg Plan (67/2010) and OurWinnipeg Complete Communities Direction Strategy (68/2010)

The *OurWinnipeg Plan* does not reference specific policies from the AVPA Plan, only referencing the document as an implementation tool. In its current state, the policies within *OurWinnipeg* would not require amendment if the AVPA Plan was amended to include updated NEF contours and refined development policies. As noted in Section 2.3.1 of this Report, the mapping of the *OurWinnipeg Plan* does include the current Area I and Area II boundary delineation, as well as the delineation of the Airport Area; accordingly, a mapping amendment would be required.

Section 3 of this Report identified that certain municipalities include airport land use restrictions within their development plan/community plan. This approach could be considered in Winnipeg. However, given that a review process of the *OurWinnipeg Plan* and *Complete Communities Direction Strategy* is nearing completion at the time of this Report's preparation, this would seem an unlikely approach.

Potential amendments or areas for consideration in the *OurWinnipeg Plan* could include:

- A mapping amendment to reflect new Area I and Area II boundaries based on updated NEF contours, as well as any potential changes to the Airport Area; and
- The consideration of including more detailed policies from the AVPA Plan in the *OurWinnipeg Plan* instead of within a separate secondary plan.

6.3.2 Winnipeg Transportation Master Plan (October 2011)

The *Transportation Master Plan* largely focuses on ground transportation. Policy direction within the *Transportation Master Plan* will not be contradicted if amendments are made to the AVPA Plan; accordingly, no amendments to the *Transportation Master Plan* are recommended.

6.3.3 Winnipeg Airport Vicinity Development Plan (as amended)

The AVPA Plan is the key document to shape land use planning in the Airport Area. If regulations for the AVPA are implemented at the provincial level as considered in Section 6.2, the AVPA Plan would ultimately require amendment to reflect said regulations. Greater detail could be pursued at the local level to reflect the needs of the City of Winnipeg.

If no provincial regulations are established, at a minimum, the AVPA Plan's NEF contours should be updated based on the Province's selection of a scenario from the 2021 NEF Study. In its current state, the AVPA Plan reads as an action plan of which most goals have been fulfilled and some are no longer relevant. Thus, the AVPA Plan could be updated with new actions and goals and/or simplified and written as a land use secondary plan with planning objectives and policies.

Any amendment process for the AVPA Plan should include:

- A public and stakeholder engagement exercise; and
- A detailed planning exercise to determine the new boundaries of Areas I and II, or an alternate approach to land use delineation.

In the current AVPA Plan, Supporting Direction 2 for the "Airport Area" (Section 09) speaks to the potential for limited residential development "where appropriate" and the Plan was amended to remove the provision for limited residential along Portage Avenue. This is an ongoing debate. Quieter aircraft and technological advancements in building materials could allow for residential construction to be feasibly explored in formerly restricted areas. Using NEF contours as a base, at the local level a variety of technical and supplementary non-technical considerations could be employed to inform decision making.[34]

Based on the review contained in this Report, the recommended planning approach for amending the AVPA Plan would be as follows:

- Consider consolidating all elements of the Plan (e.g., the acoustics by-law, zoning requirements, etc.) within a single secondary plan by-law for the ease of use and interpretation;
- Maintain the current AVPA policy framework and the Area I and Area II structure;
- Update the policy maps to reflect the new NEF contours;
- Redraw the boundaries of Areas I and II to harmonize with new NEF contours;

[34] Kelley, Thomas (1997). *Amendment to Part IV (Aircraft Noise) of Transport Canada's Guidelines. https://jcaa.caa-aca.ca/index.php/jcaa/article/view/1068* Accessed: December 6th, 2020.

- Consider using the 30 NEF contour rather than the 35 NEF contour to restrict all new residential development to reflect the reduced geographic footprint of the new NEF contours;[35]
- Include simpler policy rules for noise attenuation for Area 2. For example, a detailed policy direction concerning sound insulation and the requirement for an engineered sound study as a condition of building permit; and
- Incorporate legal notification elements (dependent on required provincial amendments) to require notices to be placed on title and for developers/purchasers to enter into agreements related to noise warnings.

Other elements to consider may include:

- Including mechanisms to allow for new residential and mixed-use development within Regional Mixed-Use Centres (e.g., Polo Park) and along Regional Mixed-Use Centres (e.g., Portage Avenue) as defined in the *OurWinnipeg Plan* and the *Complete Communities Direction Strategy*; and
- Requiring notification on real-estate and marketing materials for properties and projects within the Airport Area which may be impacted by aircraft noise (e.g., placing signage on sites, brochures for real estate and leasing agents, and easily accessible data on real estate databases).

6.3.4 Airport Vicinity Acoustics Insultation By-law No. 6419-94

The current *Airport Vicinity Acoustics Insulation By-law* appears to be relatively complicated in its use and interpretation, and according to the review in this Report, may be based on an outdated model[36]. Setting an interior noise limit in decibels to be achieved for new noise-sensitive construction could prove more straightforward and easier to implement, while also mirroring existing City of Winnipeg standards. This would be similar to what is required in the City of Richmond (Section 3.1). Any proposed policies and requirements should be straightforward and rely on professional engineering analysis.

Potential amendments or areas for consideration could include:

- Consult engineering expertise to update or replace the existing by-law. Acoustic insulation components could be included within an updated AVPA Plan or in a separate by-law; and
- Acoustic insulation/building standards could include the following elements:
    - Based on engineering expertise, establish an interior decibel limit for all habitable rooms, or separate decibel limits for bedrooms, other rooms, and outdoor areas;
    - Require a noise study prepared by a qualified engineering consultant demonstrating that the proposed structure will meet the established decibel limit(s) as part of the building permit process for proposals within the AVPA Plan Area;
    - Include mechanisms to ensure all buildings are built to approved specifications;

[35] As noted in Section 2.1.1 of this report, such an approach would be consistent with the TP 1247.
[36] National Research Council Archives (1998). *Insulating Buildings Against Aircraft Noise: A Review* https://nrc-publications.canada.ca/eng/view/ft/?id=6ccfb301-e1ed-44ae-b83a-36d33b2676fb. Accessed December 17, 2020.

- Include requirements for heating/cooling and ventilation systems; and
- Provide construction and design guidelines or standards for public and private outdoor spaces, including private balconies, terraces, and outdoor amenity spaces.

The City of Winnipeg already uses a decibel-based approach for road and traffic noise. In the *Motor Vehicle Noise Policies and Guidelines* (1984) a "design noise level" of 65 decibels is established as a sound level limit for outdoor residential areas adjacent to a transportation facility. Thus, the recommended approach has precedent in the local context.

6.3.5 Zoning By-law No. 200/2006 and Airport Vicinity Protection Area PDO

The Winnipeg *Zoning By-law* may require a variety of amendments depending on how the AVPA Plan is amended, as discussed in Section 6.3.3. Potential required amendments could include:

- Updating the Area I, Area II, and NEF contour PDO maps;
- Revising the regulations within the PDO to reflect new development regulations; and / or
- Removing the PDO completely and consolidating all regulations within the AVPA Plan or Development Plan.

6.3.6 Airport Area West Secondary Plan (By-law No. 8097/2002)

The *Airport Area West Secondary Plan*, and the proposed replacement in draft form, regulate industrial land use and restrict new residential development. As such, these documents would not likely require any updates as a result of future amendments to the AVPA Plan.

6.3.7 South Interlake Planning District Development Plan (No. 310)

The *South Interlake Planning District Development Plan* does not currently contain policies specific to the Winnipeg International Airport or NEF contours within its policy and reference maps, despite the contours extending into the RM of Rosser.

In its current form, any amendments to the AVPA Plan or other City of Winnipeg regulations would not directly impact the *South Interlake Planning District Development Plan*. However, should the Province amend its regulations to include more directed or stringent airport regulations, the South Interlake Planning District would be required to come into conformity. Amendments to provincial regulations or the *South Interlake Planning District Development Plan* should be considered to ensure no future re-designations are made to allow for residential development within the NEF contours, and to ensure adequate policies exist should such a re-designation be considered in the future.

If no amendments are made to provincial regulations, potential required amendments for the Development Plan could include:

- Including the Winnipeg International Airport NEF contours within the Development Plan as either policy or reference mapping; and
- Developing policies to prevent the future re-designation of lands within the NEF contours for residential development.

7 CONCLUSIONS

The important role that Winnipeg International Airport plays in the local and provincial economy, as well as serving as a vital link for the movement of people and goods, cannot be understated. The protection of Winnipeg International Airport's 24/7 operations is a recurring theme amongst provincial and municipal planning documents, including the *Provincial Planning Regulation*, which informs planning at the highest level in Manitoba, and the *OurWinnipeg Plan*, which serves as the City's development plan. Thus, any amendments to the AVPA Plan or the introduction of provincial regulations regarding airport land use compatibility must take great care to ensure there are no long-term negative impacts on the operations of Winnipeg International Airport.

The existing AVPA Plan has taken a somewhat restrictive approach to residential land use in the Airport Area. However, the AVPA Plan also provides clarity and is relatively easy to understand. The Province of Manitoba could contemplate adopting more detailed regulations to inform local-level planning. This could include incorporating NEF contours into provincial regulations and creating development provisions based on those contours. Based on the jurisdictional review contained within this Report, it can be concluded that in Canada land use restrictions in some form are widely used in the vicinity of airports. However, there are other planning tools available to mitigate potential land use conflicts.

The AVPA Plan calls for periodic reviews. This has largely not occurred in the decades since the Plan was first developed. At minimum, new NEF contours and associated mapping amendments should be considered, as well as necessary amendments made to the PDO and the Acoustics Insulation By-law. As noted in Section 2.3.4, the AVPA Plan reads as an action plan, the contents of which have largely been accomplished or are no longer relevant. Thus, a larger planning exercise that updates the AVPA Plan, or replaces it, could be considered. Any such amendment(s) would need to reflect higher-order regulations at the provincial level.

Regardless of the approach taken, the policy language of both the *OurWinnipeg Plan* and *Complete Communities Direction Strategy* emphasizes collaboration with impacted municipalities, the Winnipeg Airports Authority, and relevant stakeholders in periodic reviews of the AVPA Plan. A collaborative approach which incorporates technical reviews and best-practices from other jurisdictions would be the most productive. Any exercise to review, update, or replace the AVPA Plan should be grounded in consultation with all impacted parties.

8 LIST OF REGULATIONS AND GUIDELINES REVIEWED

Document	Hierarchy Level	Effect
TP1247 – Land Use in the Vicinity of Aerodromes	Federal	Guidelines – Non-Binding
Winnipeg International Airport Zoning Regulations	Federal	Law – Binding
Transport Canada Aeronautical Assessment Process	Federal	Standards – Binding
NAV CANADA Land Use Submission Process	Federal	Standards – Binding
Provincial Planning Regulation	Provincial	Regulation - Binding
Inland Port Special Planning Area Regulation	Provincial	Regulation - Binding
City of Winnipeg Charter (S.M. 2002)	Provincial	Regulation - Binding
OurWinnipeg Plan (67/2010)	Municipal	Standards – Binding
OurWinnipeg Complete Communities Direction Strategy (68/2010)	Municipal	Standards – Binding
Winnipeg Transportation Master Plan	Municipal	Regulation - Binding
Airport Vicinity Development Plan By-law 6378/94	Municipal	Regulation - Binding
Airport Vicinity Acoustics Insultation By-law No. 6419-94	Municipal	Regulation - Binding
City of Winnipeg Zoning By-law No. 200/2006	Municipal	Standards – Binding
Airport Vicinity Protection Area Planned Development Overlay 1 (AVPA PDO)	Municipal	Standards – Binding
Airport Area West Secondary Plan (By-law No. 8097/2002)	Municipal	Regulation - Binding
South Interlake Planning District Development Plan (No. 310)	Municipal	Regulation - Binding
The City of Richmond Official Community Plan (By-law 9000)	Municipal	Regulation - Binding
The City of Mississauga Official Plan	Municipal	Regulation – Binding
Calgary International Airport Vicinity Protection Area Regulation (177/2009)	Provincial	Regulation – Binding

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Appendix A - Supplementary Land Use Analysis

Section 5 of this Report focused on the Ultimate-Term NEF scenario. The following appendices include supplementary land use information related to the 2019 and 2050 NEF contour scenarios. Figure A-1 illustrates the reduction in the geographic extents of the 25 NEF contours between 1995 and 2019.

Figure A-1 – 25 NEF Contour Changes (1995 to 2019)

Blue Dashed Line – 1995 25 NEF; Blue Line – 2019 25 NEF
Orange Fill - Area I Policy Area; Blue Fill – Area II Policy Area

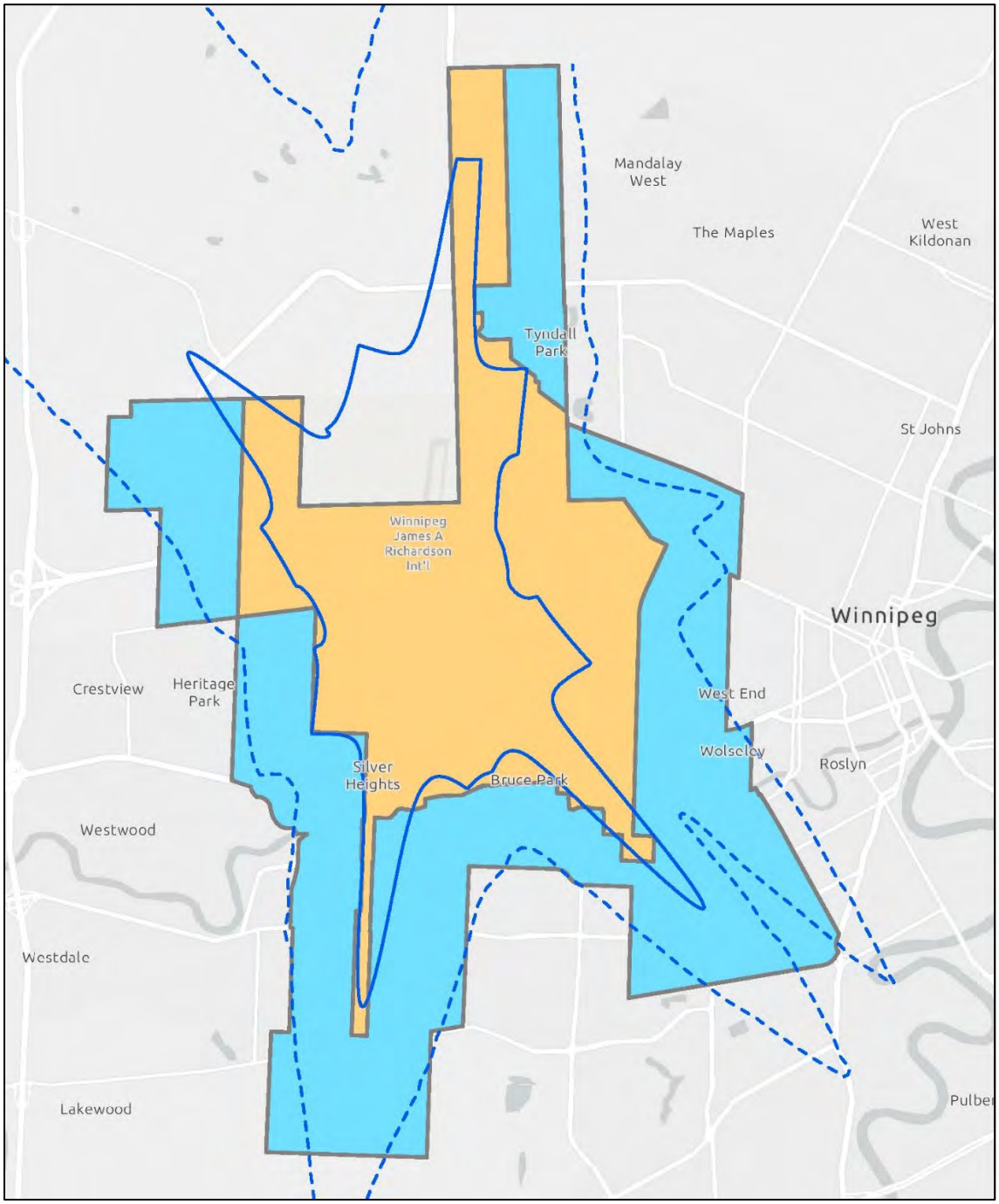

Figure A-2 provides an example of the reduction in the geographic extents of the 35 NEF contour between 1995 and 2019 in the context of the Area I policy boundary.

Figure A-2 – 35 NEF Contour Changes (1995 to 2019)

Orange Dashed Line - 1995 35 NEF; Orange Line – 2019 35 NEF
Orange Fill - Area I Policy Area; Blue Fill – Area II Policy Area

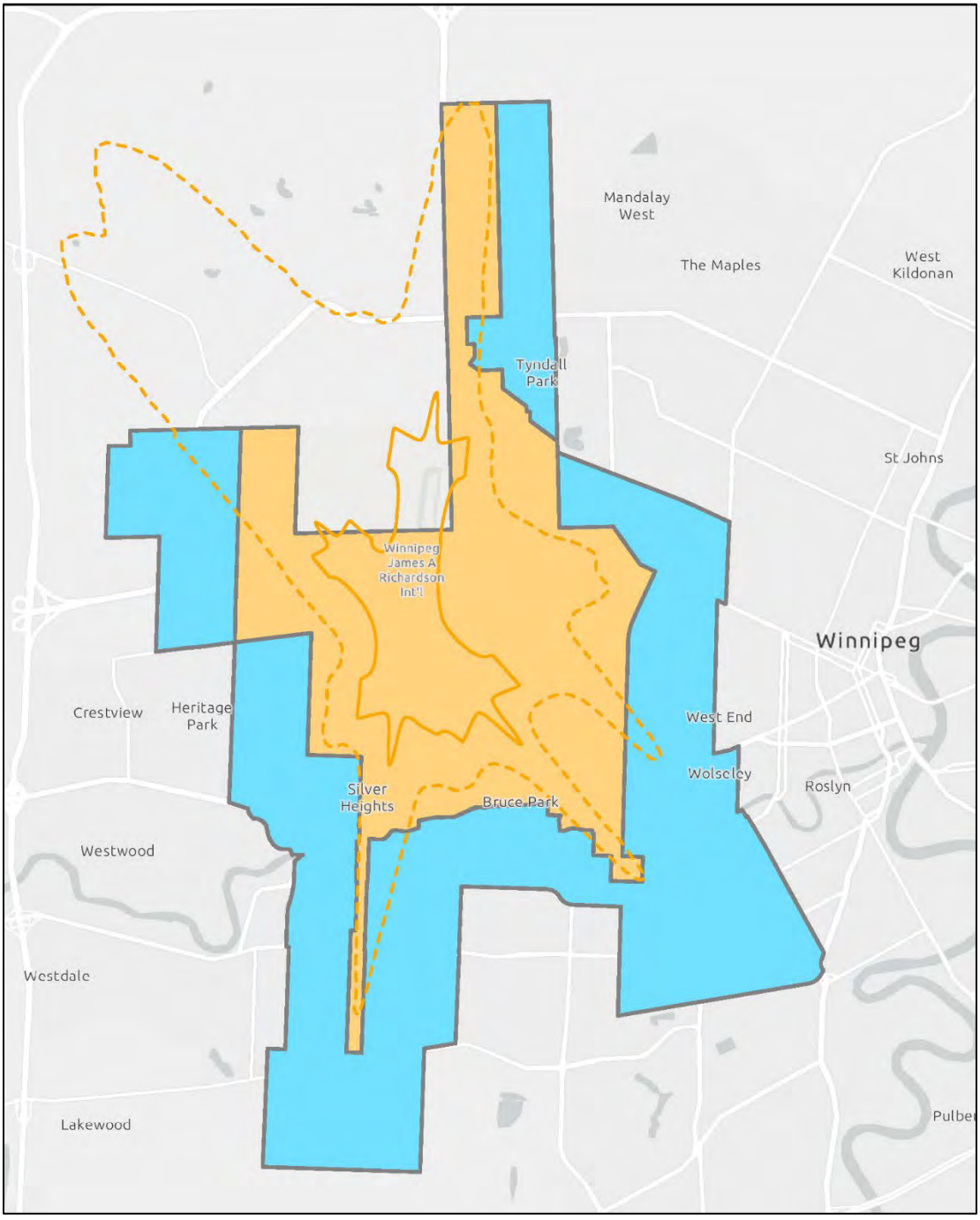

Table A-1 and Table A-2 provide data illustrating the amount of land by each zone that falls within, or would fall within, the NEF Contours in the 2019 and 2050 NEF Contour scenarios.

Table A-1 – Land Uses by Zone – 2019 NEF Contours

2019	2019 25-30 NEF		2019 30-35 NEF		2019 35-40 NEF		2019 40+ NEF	
Zone	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres
Commercial	144	159.8	31	9.8	2	0.5	0	0.0
Multiple Family	40	19.0	9	5.0	0	0.0	0	0.0
Single Family	4,859	652.1	1,443	191.2	65	6.3	0	0.0
Two Family	32	4.6	2	0.1	0	0.0	0	0.0
Industrial	173	892.3	76	723.2	17	719.7	2	506.7
Other	74	636.9	47	109.7	15	41.9	0	0.0
TOTAL	5,322	2,364.7	1,608	1,039.1	99	768.4	2	506.7

Table A-2 – Land Uses by Zone – 2050 NEF Contours

2050	2050 25-30NEF		2050 30-35NEF		2050 >35NEF		2050 40+NEF	
Zone	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres
Commercial	189	191.0	60	37.4	3	0.8	0	0.0
Multiple Family	58	36.7	12	8.7	0	0.0	0	0.0
Single Family	6,032	819.6	2,099	283.6	239	27.1	0	0.0
Two Family	69	7.9	4	0.1	0	0.0	0	0.0
Industrial	226	904.3	108	745.8	32	756.0	4	687.9
Other	93	940.6	56	186.5	21	66.3	2	0.8
TOTAL	6,667	2,900.0	2,339	1,262.2	295	850.2	6	688.7

Table A-3, Table A-4, Table A-5, and Table A-6 provide land use statistics comparing the 1995 Contours to the 2050 forecast contour scenario.

Table A-3 – Land Uses by Zone – Changes from 1995 to 2050 (>35 NEF)

	Change (acres)	1995		2050	
		>35 NEF		>35 NEF	
		Parcels	Acres	Parcels	Acres
COMMERCIAL	-213.8	195	214.6	3	0.8
MULTIPLE FAMILY	-22.1	25	22.1	0	0.0
SINGLE FAMILY	-691.7	4,981	718.8	239	27.1
TWO FAMILY	-1.0	11	1.0	0	0.0
INDUSTRIAL	-1,824.3	478	3,268.3	36	1,443.9
OTHER	-1,066.3	125	1,133.5	23	67.1
	-3,819.3	**5,815**	**5,358.3**	**301**	**1,539.0**

Table A-4 – Land Uses by Zone – Changes from 1995 to 2050 (>30 NEF)

	Change (acres)	1995		2050	
		>30 NEF		>30 NEF	
		Parcels	Acres	Parcels	Acres
COMMERCIAL	-493.6	496	531.9	63	38.2
MULTIPLE FAMILY	-89.2	119	97.8	12	8.7
SINGLE FAMILY	-1,587.5	13,790	1,898.2	2,338	310.8
TWO FAMILY	-116.8	1,258	116.9	4	0.1
INDUSTRIAL	-1,885.6	820	4,075.4	144	2,189.7
OTHER	-2,422.3	334	2,675.9	79	253.6
	-6,595.0	**16,817**	**9,396.1**	**2,640**	**2,801.1**

Table A-5 – Land Uses by Zone – Changes from 1995 to 2050 (25-35 NEF)

	Change (acres)	1995		2050	
		25-35 NEF		25-35 NEF	
		Parcels	Acres	Parcels	Acres
COMMERCIAL	-430.2	659	658.7	249	228.5
MULTIPLE FAMILY	-160.4	293	205.8	70	45.4
SINGLE FAMILY	-1,869.0	21,712	2,972.1	8,131	1,103.2
TWO FAMILY	-455.0	4,881	463.0	73	8.0
INDUSTRIAL	160.1	700	1,490.0	334	1,650.1
OTHER	-3,429.2	581	4,556.2	149	1,127.1
	-6,183.7	**28,826**	**10,345.9**	**9,006**	**4,162.2**

Table A-6 – Land Uses by Zone – Comparing Area I with 2050 >30 NEF

	Change (acres)	Area I		2050	
		Approx. >35 NEF		>30 NEF	
		Parcels	Acres	Parcels	Acres
COMMERCIAL	-519.1	350	557.3	63	38.2
MULTIPLE FAMILY	-21.0	50	29.7	12	8.7
SINGLE FAMILY	-695.8	6,425	1,006.6	2,338	310.8
TWO FAMILY	-15.6	59	15.8	4	0.1
INDUSTRIAL	-1,886.8	615	4,076.5	144	2,189.7
OTHER	-1,037.5	126	1,291.1	79	253.6
	-4,175.8	**7,625**	**6,976.9**	**2,640**	**2,801.1**