Aeronautical Assessment

Construction Project around Kitchener/Waterloo Airport

Prepared for MHBC Planning, Urban Design & Landscape Architecture

April 25, 2024

INTRODUCTION

MHBC Planning, Urban Design & Landscape Architecture (MHBC) requested IDS North America Ltd. to conduct a review of potential aviation impacts on Kitchener/Waterloo Airport (CYKF) for the proposed projects development at 2980 King St. East, Kitchener, to determine what would be the highest building height at this location without having an impact on the published Instrument Flight Procedures. IDS North America Ltd. has been tasked to review this aspect only. MHBC is responsible to obtain all required building permits as required by the City, Regional Authorities, Transport Canada or Nav Canada as required.

In this review, we have used our tool Flight Procedures Design and Airspace Management (FPDAM) to evaluate the surfaces in comparison to what is currently published by Nav Canada in the Canada Air Pilot (CAP), and any known, new, or improved published Instrument Flight Procedures (IFP). The surfaces of the current and known planned Instrument Procedures were loaded to verify the potential impact on these. All heights in this analysis are expressed in feet above (mean) sea level (ASL), and distances in Nautical Miles (Nm).
The tower will be located at approximately 43.429099N, 080.432742W, and situated at 2980 King Street East, Kitchener, ON which is about 2.5 Nautical Miles from the threshold of CYKF Airport Runway 08.

The planned total height is 434.50 meters, or 1425.5 feet above sea level.

Figure 1: Proposed Tower Location

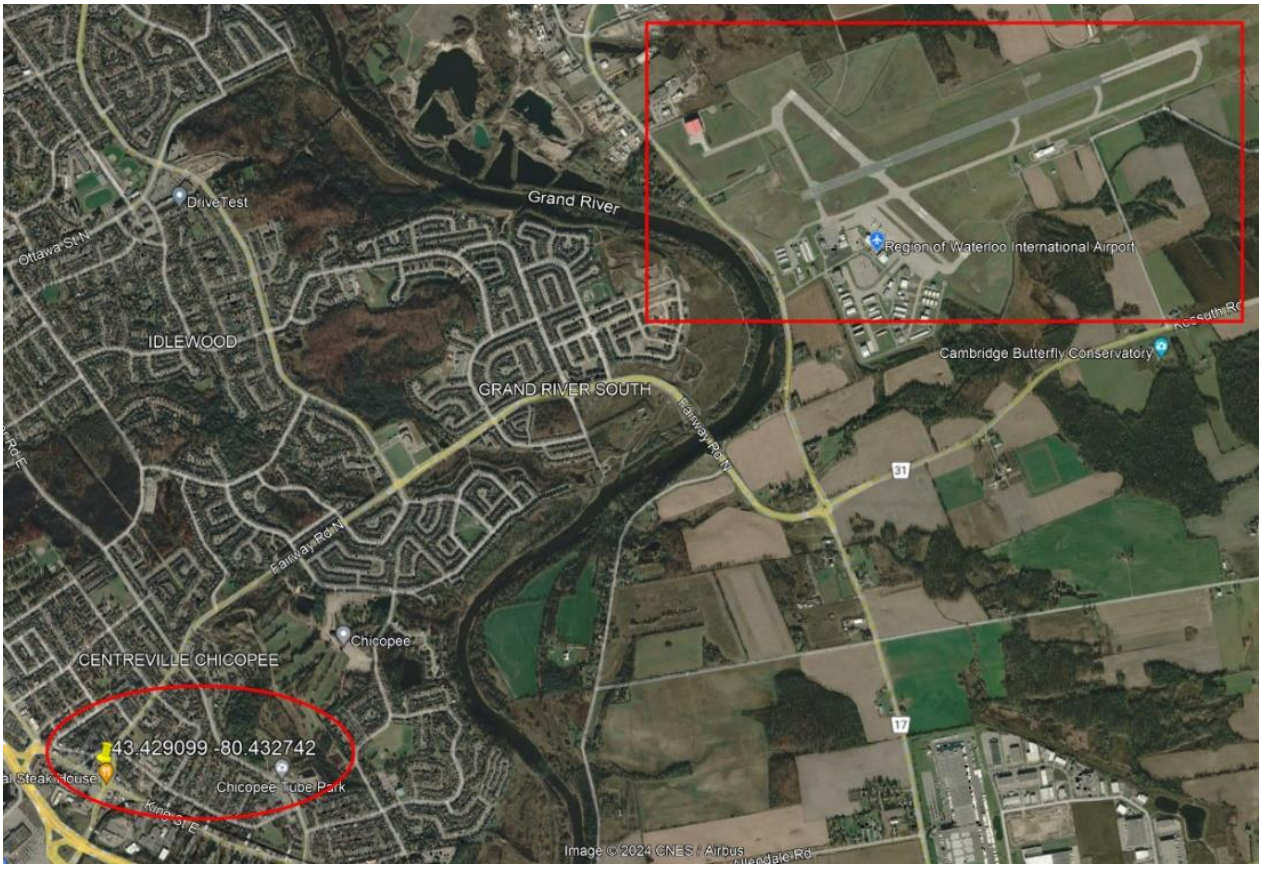

Figure 2: proposed Tower location in relation to the Airport

For simplicity, the assessment of the potential impact will consider the geographic coordinates of the four corners based on the view of the building currently visible at the proposed location.

Figure 3: Location of the four corners of the proposed building used for the analysis.

CYKF is currently serviced by various ILS, GNSS and Departure procedures as follows:

- ILS RWY 26
- RNAV (GNSS) Z RWY 26
- RNAV (RNP) Y RWY 26
- RNAV (GNSS) Z RWY 08
- RNAV (RNP) Y RWY 08
- RNAV (GNSS) RWY 14
- RNAV (GNSS) RWY 32
- Departures RWY 08, 14, 26 and 32

With the proposed construction site at approximately 2.54 nautical miles (4.7Km) from the threshold of runway 08, the approach procedures to RWY 08, Departures off RWY 26, and Missed Approach procedures RWY 26 are the most critical constraints for the analysis, as it falls outside the main protection surfaces for the other runways.

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The proposed location is completely outside the protection area for the LPV or ILS runway 08 approach and therefore will have no impact on this approach.

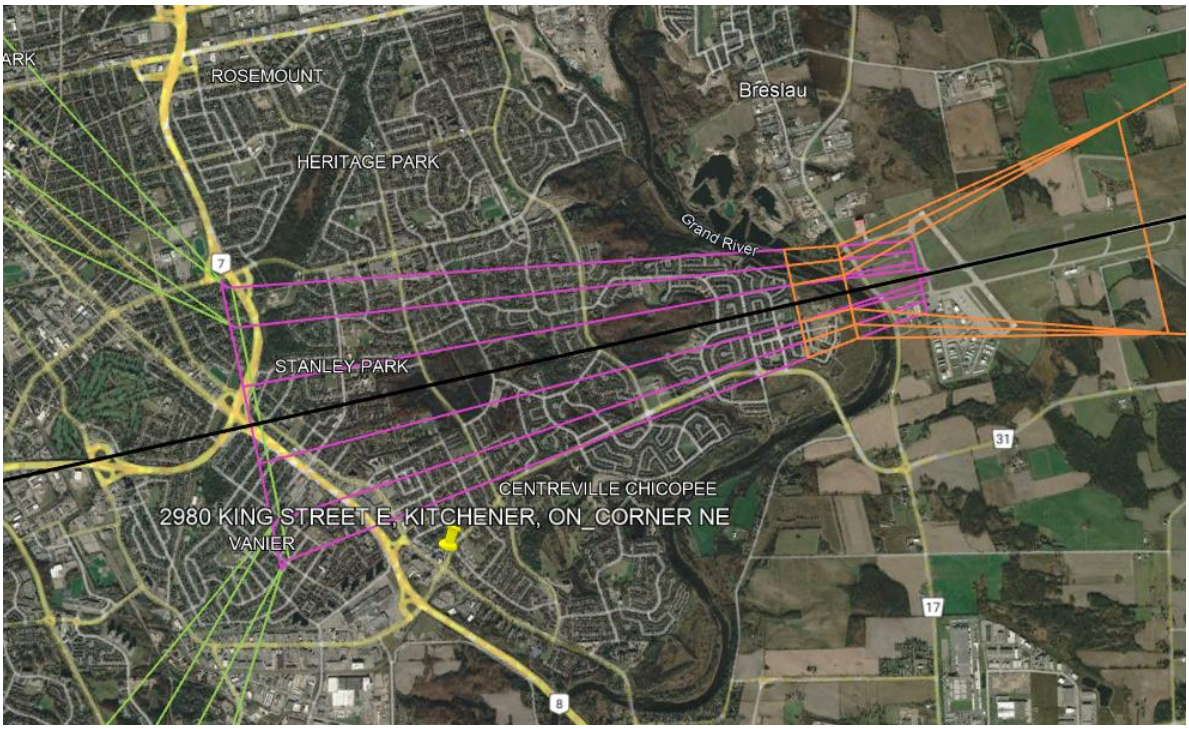

Figure 4: Location of the proposed building relative to the LPV Approach RWY08.

The proposed location does fall within the sloping protection area of the LNAV/VNAV approach to runway 08, but it does provide more then the minimum required obstacle clearance. The proposed building would have no impact on the LNAV/VNAV approach to runway 08 at CYKF.

Again, the proposed location does fall within the flat protection area of the LNAV approach to runway 08. The current Minimum Obstacle Clearance Altitude (MOCA) for the final segment between the Final Approach Fix and the Step-down fix is 1600' ASL. Considering a minimum obstacle clearance of 250', the building height would need to be limited to 1350'. Considering the current constant descent angle of 3.1 degree, this MOCA could be raised to 1620', allowing for a maximum building height of 1370' before having an impact on the approach.

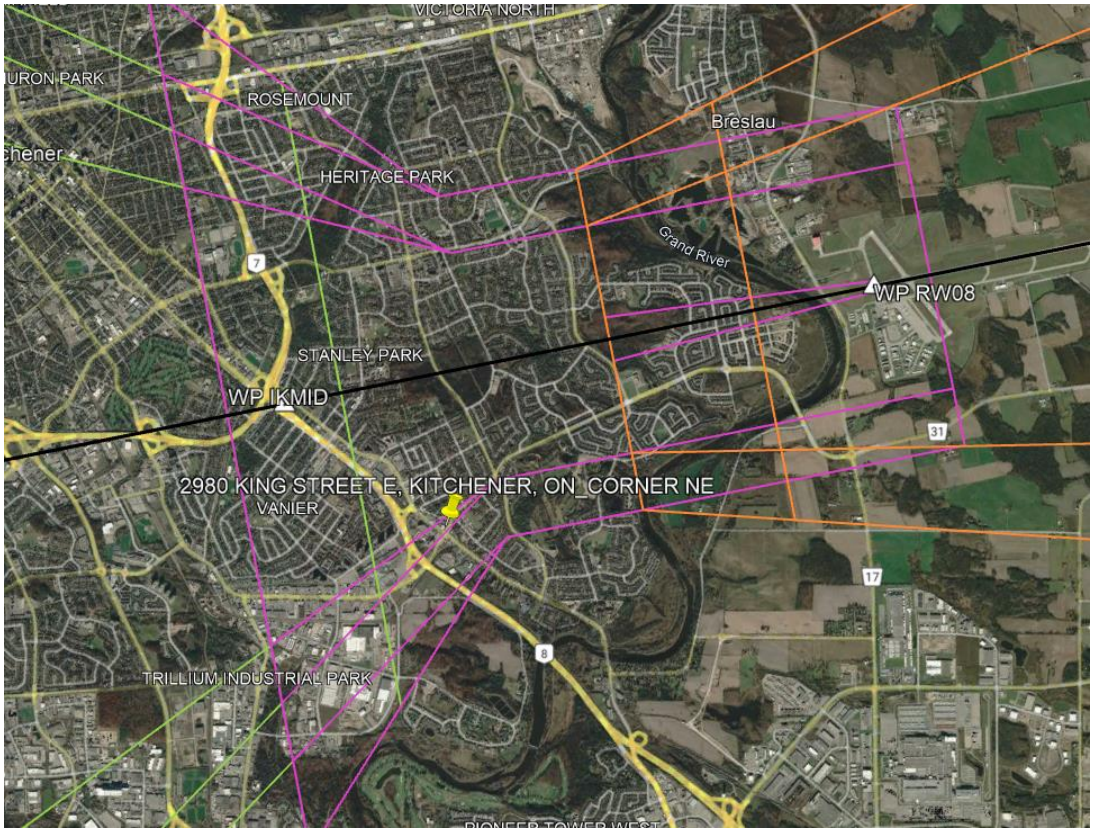

Figure 5: Location of the proposed Building relative to the LNAV / VNAV and LNAV approaches RWY08.

The proposed building location would also be within the intermediate segment of the RNP AR Rwy08 at CYKF, but it does provide more then the minimum required obstacle clearance. The proposed building would have no impact on the RNP AR approach to runway 08 at CYKF.

Looking at the Departures off runway 26 at CYKF, the proposed building would be located within the Zone 2 Left area of the departure assessment surface. Since a current restriction exist restricting any left turn on departure before reaching an altitude of 1600' ASL, the proposed building would not have any impact on the current departures at CYKF.

The proposed building would have no impact on the Missed Approaches runway 26 at CYKF.

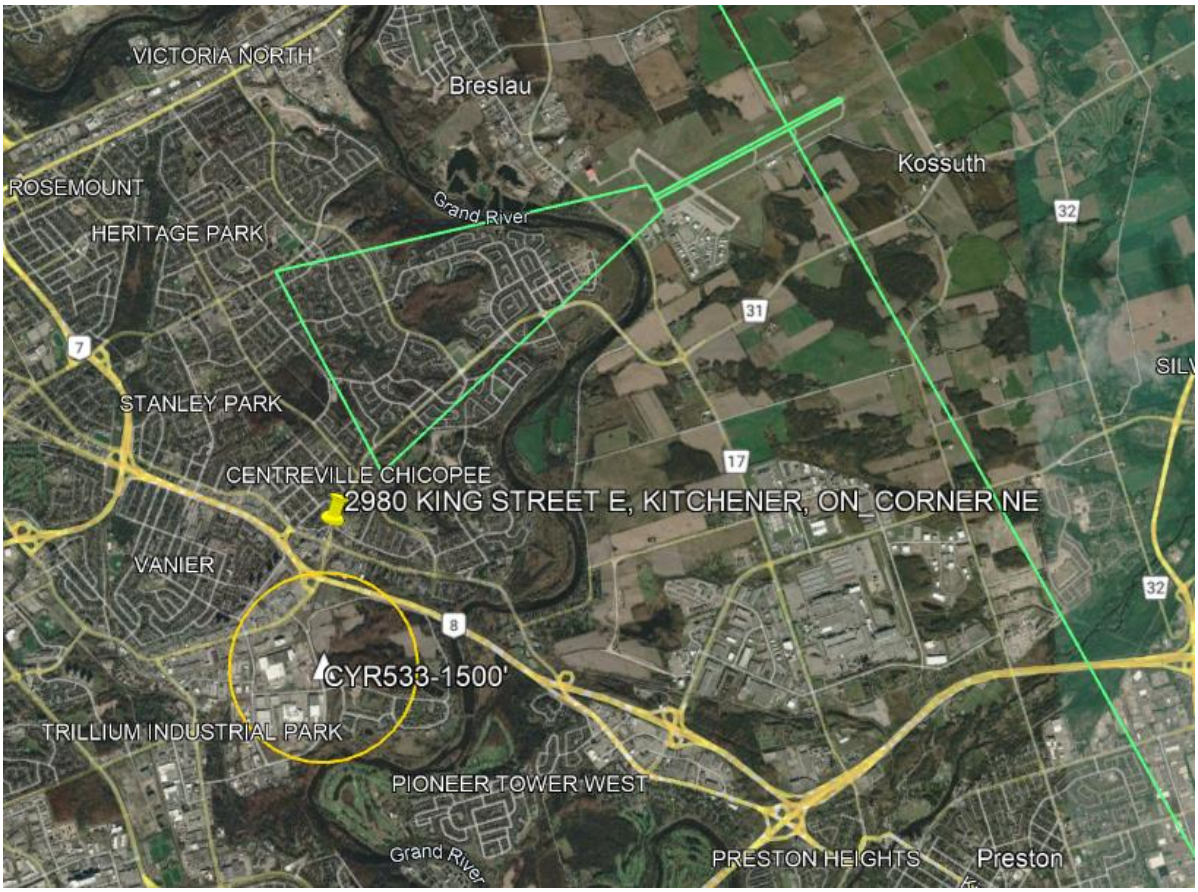

Figure 6 –Tower Location in relation to the Departure RWY26.

SUMMARY

The proposed building would have relevant impact on the LNAV Rwy08 only.

PROCEDURE	IMPACT	Height Limitation
RNAV Z RWY 08 LNAV Final	LNAV RWY 08	1370’
RNAV Z RWY 26 Missed Approach	No Impact	-
RNAV (RNP) Y RWY 08 Intermediate	No Impact	-
RNAV (RNP) Y RWY 26 Missed Approach	No Impact	-
ILS RWY 26	No Impact	-
DEP RWY08 Zone 3	No Impact	-
DEP RWY26 Zone 2 Left	No impact due to the current restriction No Left Turn below 1600’	-

Potential Mitigation

As per the above analysis, the proposed building as described by the proponent, would have an impact on the LNAV RWY 08 only.

This proposed building would have no impact on the LPVs, RNPs (completely outside the OES surfaces) or Departures at CYKF (already no left turns).

The currently published procedure would limit the building height to 1370', about 55' lower than anticipated. This could result in losing several floors and jeopardize the entire financial justification of the investment.

The identified impact on the LNAV is not on the approach minima, but only on the Step-down and Constant Descent Angle for the LNAV.

This can be easily mitigated; it would simply require having the LNAV Minimum Obstacle Clearance Altitude (MOCA) of 1680 Vs 1600 in the Final segment between IKMID and XOXAT SDWP (highlighted in Yellow in Figure 7 below. This step-down at XOXAT is only applicable to the LNAV.

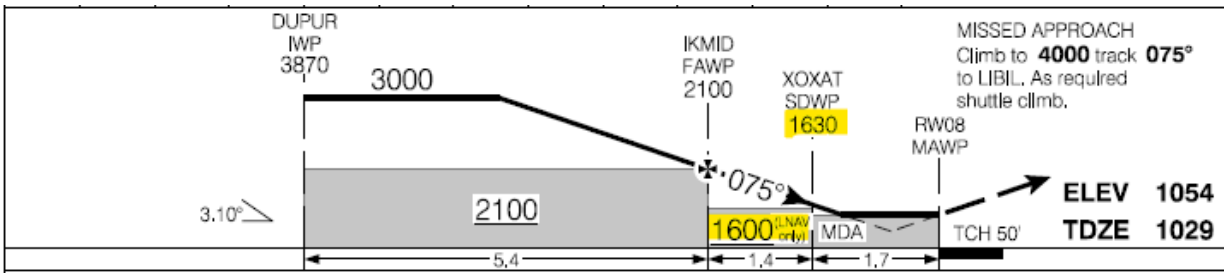

Figure 7 – Profile view of the current LNAV RWY 08 at CYKF

Raising the 1600' MOCA to 1680 would require the Constant Descent Angle to be re-calculated to remain at or above the 1680' at XOXAT vs 1630'. This would in the end require the LNAV to be published on a separate chart than the currently combined LPV; LNAV/VNAV and LNAV (RNAV GNSS Z RWY08). This LNAV would be named RNAV GNSS X RWY 08 and published on a separate page.

FYI, we can immediately raise the Step-Down MOCA to 1620 without any other changes to the LNAV, but this would allow only a building of 1370'. Raising it to 1680 as mentioned above can be easily mitigated as it only requires the LNAV to be published on a different chart since the CDA would be different than the current LPV and LNAV / VNAV for RWY 08.