TECHNICAL SUMMARY REPORT

Expanded Justification and Associated Technical Explanation of O. Reg. 10/24
Airspace Protections for the Hospital for Sick Children Heliport and
the St. Michael's Hospital Heliport

Response to "Request for an Amendment to Minister's Zoning Order, O. Reg. 10/24,
City of Toronto" Ero No. 025-0347 And Ero No. 025-0348

May 2, 2025

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TECHNICAL SUMMARY REPORT

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AIRPORT CONSULTANTS

SUBJECT	**EXPANDED JUSTIFICATION AND ASSOCIATED TECHNICAL EXPLANATION OF 0. REG. 10/24 AIRSPACE PROTECTIONS FOR THE HOSPITAL FOR SICK CHILDREN HELIPORT AND THE ST. MICHAEL'S HOSPITAL HELIPORT** **RESPONSE TO "REQUEST FOR AN AMENDMENT TO MINISTER'S ZONING ORDER, O.REG. 10/24, CITY OF TORONTO" ERO NO. 025-0347 AND ERO NO. 025-0348**
TO	Kyle Robinson, Chief Facilities Redevelopment & Sustainability Officer, Hospital for Sick Children Michael Keen, Vice President of Facilities and Planning, St. Michael's Hospital
FROM	Josh Horst, MAvnMgt, AvMP, Senior Manager, Planning & Advisory Practice Lead, Avia NG Dan Fox, MAvnMgt, AAP, Senior Regulatory and Compliance Specialist, Avia NG Janine Maurice, MAvnMgt, Senior Aviation Planner, Avia NG
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1. INTRODUCTION

This memorandum is prepared on behalf of the Hospital for Sick Children ("SickKids") and St. Michael's Hospital (the "Hospitals") in response to two ERO postings:

- **No. 025-0347** – in respect of a request from the Minister of Health to amend O. Reg. 10/24 to remove section 5 of the order that requires O. Reg. 10/24 to be revoked on May 30, 2025; and
- **No. 025-0348** – in respect of a request by the two Hospitals to amend O. Reg. 10/24 to incorporate a number of minor technical changes to Map Nos. 345 and 346 that form part of the regulation.

A separate submission has been filed on behalf of SickKids in response to ERO posting No. **025-0348** in respect of requests from landowners to make site-specific amendments to Map No. 345 in respect of 15-17 Elm Street and 595 Bay Street, 304-316 Yonge Street, and 14-80 Dundas Street West (Atrium on Bay).

The City of Toronto and much of Ontario rely on a critical network of specialized care hospitals to provide urgent medical care, including life saving surgeries. In downtown Toronto, the Hospital for Sick Children and St. Michael's Hospital are heavily relied upon, not only for the urgent care that they provide directly, but also for the emergency medevac air services that they support through use and maintenance of each hospital's rooftop heliports.

The heliports at the Hospital for Sick Children and St. Michael's Hospital are relied upon by not only the physicians and patients within these hospitals but also by the many surrounding hospitals that count on the heliports for emergency medical transport, including patient transfer and organ delivery. The need for these

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Hospitals, and the services that they provide, is without question essential and by extension so too are their heliports. This is why it is of such urgency that the airspace relied upon by ORNGE air ambulance service, to safely and efficiently access these heliports, be protected from encroaching high-rise development. If development in downtown Toronto were left unabated the result will be a permanent closure of these heliports, casting doubt on the ability of the government to provide the essential urgent care Torontonians and much of Ontario relies upon.

The future facing the use of these hospital heliports remains uncertain as pressures to enable greater vertical development in Toronto's downtown and surrounding neighbourhoods mount. It is not hyperbole to say that there may not be a tomorrow for these heliports unless the Minister of Municipal Affairs and Housing acts quickly to prevent the revocation of O. Reg. 10/24 and preserve what is necessary to give ORNGE air ambulance pilots the airspace that currently provides them with an acceptable obstacle environment within which to continue operating.

The Hospital for Sick Children and the St. Michael's Hospital heliports are operating with airspace protections granted by the Minister for Municipal Affairs and Housing (MMAH) under a Ministerial Zoning Order, or MZO (O. Reg. 10/24). The technical specifications and regulatory considerations upon which the characteristics of these flight path area protections were created, have been subject to significant review and inquiry with the Authorities having Jurisdiction, including Transport Canada, the City of Toronto and the Province of Ontario, along with ORNGE and the Hospitals. Each of these key stakeholders were consulted to allow for review of the airspace protections that ultimately resulted in O. Reg. 10/24. These consultations allowed for the conveyance of the justification and a supporting rationale for the enhanced airspace protections. Following these consultations, which were significant in duration and depth, the MMAH chose to act with an MZO that put in place these protections, thereby supporting the heliport operations and preserving the use of the heliports.

During discussions with Transport Canada, both on these airspace protections and through other interactions at H1 certified heliports in Canada, it is apparent that the Regulator would be supportive of greater protections than what these Hospitals have currently. The reality is that the Hospitals are operating in an already compromised urban environment where existing and recent development vertically encroaches into airspace that is valuable to the operation of medevac helicopters.

While the future may be uncertain, what is certain is that unless Ministerial Zoning Order (O. Reg.) 10/24 is renewed before May 30, 2025, the continued use of these heliports is but one development away from being found unusable by ORNGE on the basis of unacceptable risk to safety and regulatory compliance. As set out in further detail below, the historical protections afforded through By-Law 1432-2017 are not enough to preserve the continued use of these heliports, especially in light of the numerous developments that have been built or proposed to be built within centimetres of the limits of that protection, and given that rooftop heliports at hospitals in densely populated areas are among the most challenging of facilities that a helicopter pilot may encounter.

In cases where usable airspace is lost to development, adjacent and remaining airspace becomes even more critical to maintain free of obstacles. In April 2025, both Hospitals were in receipt communication from Peter Cunnington, Chief Aviation Officer at ORNGE to the Assistant Deputy Minister – Ministry of Health, Ms. Susan Picarello. In the letter to the Assistant Deputy Minister, Mr. Cunnington commended the efforts of the heliport operators, St. Michael's Hospital and SickKids, and the Government of Ontario, for preserving the airspace protections that are necessary to continue flight operations at these heliports. A copy of this letter has been included as **Attachment A.** In further support of continued, rigorous airspace protection, copies of additional letters from ORNGE are included for reference as **Attachments B and C.** These communications from ORNGE highlight the historical challenges faced from development pressures, and the real and lasting operational impacts that exist as a direct result of the inadequacy of the airspace protections put in place by By-law 1432-2017.

"The collaborative work from St. Michael's, SickKids, Ornge and the Government of Ontario resulted in an MZO that provides the necessary restrictions to preserve the remaining flight paths. All parties involved, led by the hospital heliport operators, ultimately sought and achieved a solution that preserves the continued use of St. Michael's and SickKids' hospital heliports by Ornge using the AW139. We continue to believe this is the best solution. – Peter Cunnington – Chief Aviation Officer - ORNGE – April 4, 2025.

2. BY-LAW 1432-2017 & ITS INADEQUACY

The operation of these heliports, particularly their capability to serve medevac flights operated by ORNGE, continues to be under threat due to surrounding land use changes, primarily high-rise condominium and office developments. These developments, if unabated, could impede the ability of ORNGE pilots to operate the Leonardo AgustaWestland AW139 helicopter along established flight paths, in accordance with aviation regulatory and aircraft performance requirements, leaving no other option for ORNGE but to withdraw direct medevac services from the SickKids' and St. Michael's Hospital heliports.

Figure 1 St. Michael's Hospital Heliport By-Law 1432-2017 Protections

Figure 2 The Hospital for Sick Children Heliport By-Law 1432-2017 Protections

The flight paths to and from these heliports have been used by ORNGE, and prior by Canadian Helicopters, for many years without the protections afforded by zoning regulations. During those years, the hospitals relied

upon historical use and good neighbour practices to preserve heliport use. However, as the push for densification downtown continued, and pressures to develop more vertically mounted, SickKids and St. Michael's Hospital started to witness a reduction in available airspace, leading executives at both Hospitals and ORNGE to question what could be done to ward off the threat that development was perceived to pose to the safe and continued use of these heliports.

This threat became real for both hospitals between 2010 and 2015 when St. Michael's Hospital was forced to make changes to its northeast flight path area due to proposed high-rise development. The settlement terms for one specific development led to the division of the northeastern flight path area into separate flight paths, creating distinct north and east flight paths in addition to the existing west flight path. These developments forced the alteration of flight path area characteristics including the flight path area surfaces, known as Obstacle Limitation Surfaces, as illustrated in **Figures 1 and 2**, reducing the available and flyable airspace for medevac operations.

A joint effort, led by St. Michael's Hospital and SickKids, to petition the authorities to move on putting in place protections of the valuable airspace around each heliport was launched following the impact to St. Michael's Hospital heliport and the threat of similar impacts to SickKids' heliport. Based on the characteristics of the Obstacle Limitation Surfaces, to which Transport Canada had certified the heliports, mapping was produced to define the horizontal and vertical limits of that protection ahead of its adoption in O. Reg. 114/16: Zoning Order – Protection of Public Health and Safety – Toronto Hospital Heliports issued by the Ministry of Municipal Affairs and Housing on May 3, 2016. Following a period covered by O. Reg. 114/16 and amended by O. Reg. 336/17 which effectively extended the sunset date to March 31, 2018, By-Law 1432-2017 was enacted by the City of Toronto to preserve the protection over the longer term.

Since 2017, both hospital heliports, the St. Michael's Hospital Heliport and the SickKids' Heliport, and more specifically their respective flight path areas, have been afforded protection through By-Law 1432-2017. Unfortunately, while the protections put in place through By-Law 1432-2017 were consistent with federal regulation, the characteristics of the protections were insufficient to safeguard the continued use of the heliports.

Despite cautionary statements and the advice of subject matter experts provided during the development of By-Law 1432-2017, the rather simple but understandable approach inherent in By-Law 1432-2017 was to adopt the characteristic of the Obstacle Limitation Surfaces that Transport Canada had previously found acceptable for each heliport at the time of certification. The justification was that it met the requirements of the day and had not been found unacceptable thus far. Unfortunately, it was also around this same time that the aeronautics industry and Transport Canada started to come to terms with the requirements and contemporary understanding of what operating a helicopter at an 'H1' classified heliport, such as SickKids' and St. Michael's Hospital heliports, demanded for safety assurances under emergency One-Engine Inoperative (OEI) situations.

2.1 ONE-ENGINE INOPERATIVE SAFETY

Historical views as to the adequacy of By-Law 1432-2017 are now irrelevant given the current need to maintain obstacle clearance under One-Engine Inoperative (OEI) scenarios. The protections afforded under By-Law 1432-2017 mirrored the characteristics of the Obstacle Limitation Surfaces as were declared at the time and formed part of each heliport's certification documentation. Unfortunately, these protections did not

go far enough to protect for required OEI emergencies under what is termed 'Category A' operations, which are a requirement of 'H1' classified heliports in Canada per the Canadian Aviation Regulations (CARs) 305 and Standard 325.

Certified heliports, such as the SickKids' and St. Michael's Hospital heliports, which are located within built-up areas that lack suitable emergency landing areas, are required to certify with an 'H1' classification. Historically throughout Canada, the majority of 'H1' classified heliports were provided Obstacle Limitation Surfaces that conformed to the characteristics applicable to 'H2' classified heliports. The difference between 'H1' and 'H2' is that an H2 heliport, while also located within a built-up area, had one or more suitable emergency landing areas for use by the helicopters it was intended to serve.

Certified H1 heliports in Canada do not always have the luxury of suitable emergency landing areas and forcing a reliance on Category A performance, whereby the pilot upon encountering an OEI scenario must make a decision to either land on the heliport or continue to fly away. The option to land on the heliport may not always be permissible, such as on approach to landing or on departure when past the Take-off Decision Point (TDP), and because of this, the preservation of sufficient obstacle free airspace is critical to the preservation of heliport use.

The many similarities between H1 and H2, such as restricting use to multi-engine helicopters only, led to the prescriptive method of defining the Obstacle Limitation Surfaces applicable to H2 heliports also being applied to H1 heliports. This meant that for each identified flight path area, a compliant quadrilateral area of defined parameters of length, width, splay and slope(s) providing clearance over all obstacles within the defined extents of the flight path area was to be established with slopes similarly applied under both classifications, as shown diagrammatically in **Figure 3** below.

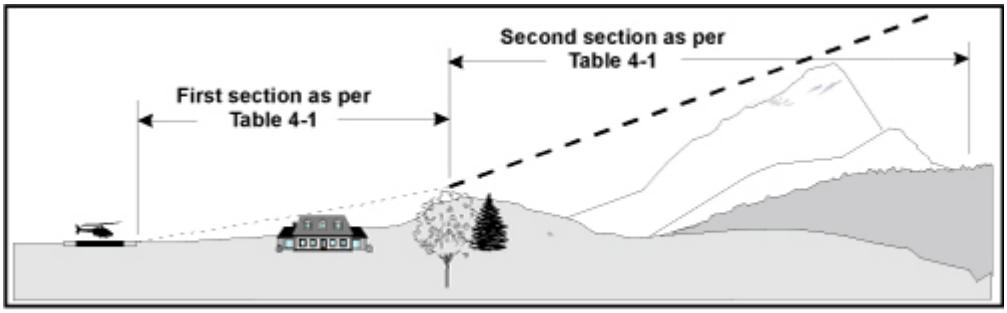

Figure 4-2. Approach and take-off surface for non-instrument heliport

Figure 3 Example Cross-Section of Obstacle Limitation Surface for H2 Heliport (Source: Transport Canada, CARs 325)

It was not until a renewed focus on Category A operations by industry and the regulator, did Transport Canada start to address the disparity found nationally in application of the H2 heliport standards for H1 heliports and specifically the characteristics of declared Obstacle Limitation Surfaces.

Over time the requirements applicable to H1 heliports have been clarified to require H1 heliports not to adopt the same Obstacle Limitation Surface characteristics of H2 heliports, but rather undertake an obstacle survey of defined parameters and circulate the critical obstacle data, in a prescribed format, to approved aircraft operators. This process would then allow the aircraft operator, pilots such as those employed by ORNGE, to

assess the obstacle environment against the requirements for OEI operation respecting Category A performance requirements.

This change, while highly technical, had significant implications, not only for SickKids' and St. Michael's Hospital heliports, but also for H1 classified heliport across the country. What this change in application of the standards boiled down to, was an acknowledgement and a growing understanding that heliport flight path protections based simply on a mirroring of the prescribed characteristics of the Obstacle Limitation Surfaces for an H2 heliport would not sufficiently limit the height of obstacles to preserve the requirements of Category A operations, namely sufficient clearance of obstacles under OEI scenarios. In other words, if obstacles were to be introduced up to the heights allowable under the characteristics of an H2 classification, having first and second section slopes of 8 and 16 percent respectively for both SickKids and St. Michael's Hospital heliports, the AW139 helicopter, as operated under Category A by ORNGE, would not be able to use the heliports as effectively, if at all.

Under the correct interpretation of the standards, the effective slopes required to preserve Category A operations under various conditions should instead be driven by a set of complex calculations taking into account design aircraft performance at varying operating weights, temperatures, wind velocities, and other factors, not least of which may also include consideration of a pilot's personal minimums (pilot's personal operating limitations). It is for these reasons that By-Law 1432-2017 is inadequate. The OEI performance of the AW139 helicopter, as operated by ORNGE, requires slopes that are shallower than what is prescribed in By-Law 1432-2017. As highlighted above, historical views as to the adequacy of By-Law 1432-2017 are now irrelevant given the current need to maintain obstacle clearance under One-Engine Inoperative scenarios.

2.2 EXISTING HELIPORT UTILITY IMPACTED

Following the implementation of By-Law 1432-2017, and the aviation industry having received further clarification from Transport Canada on the use and requirements of H1 heliports to adopt Obstacle Limitation Surface requirements differing from what is required of H2 heliports, SickKids' and St. Michael's Hospital took the appropriate steps to update the certification documentation applicable to each heliport and to include detailed obstacle surveys and charts presenting data on critical obstacles for reference by ORNGE pilots.

Armed with this obstacle data and supplemented by Notices to Airmen (NOTAMs) for temporary obstacles such as cranes, ORNGE determined that continued use of the eastern flight path for St. Michael's Hospital Heliport could no longer be relied upon for departures, and would no longer be used, due to high-rise development. Communication of this was provided by ORNGE to the Hospitals in March 2023 and brought about a renewed and urgent call for enhancements to the existing flight path protections. It was no longer about what subject matter experts, the hospitals, or ORNGE were saying could occur if nothing were done, but rather a matter of what was occurring and could continue to worsen if nothing was done to address the threat. Formal

"In previous meetings, Ornge, with the assistance of WSP, has demonstrated that current airspace protections are ***not sufficient*** *to ensure continued operations should development in proximity to helipads continue. Ornge introduced an AW139 performance assessment with the associated helipad facility requirements and voiced our concerns about our ability to continue to service the downtown Toronto helipads because of encroaching development." - Stephen Reynolds Director Flight Operations - ORNGE – Rotor Wing (A)*

communication from ORNGE to each of the Hospitals identified that there were restrictions on the ability of the AW139 to use the heliports given the location and height of buildings that had been recently constructed.

In late 2023, both Hospitals were in receipt of communication from ORNGE, included as **Attachments B and C** to this report, indicating that the obstacle environment in the immediate vicinity of the heliports had increased to a point where continued heliport utility was becoming a significant challenge. The eastern flight path for St. Michael's Hospital was deemed by ORNGE as no longer viable for departures given the development that had occurred. Use of the western flight path for SickKids was also temporarily disrupted by a crane that was not previously evaluated for compliance with By-Law 1432-2017. Without enhancements to the flight path protections provided through By-Law 1432-2017, it became evident that the utility of these heliports would continue to be eroded until such time as there would be no means of accessing either heliport by ORNGE.

2.3 ADDITIONAL PROTECTIONS NEEDED

The need for additional or "enhanced" flight path protections is largely based on the H1 classification of the heliport, Category A operations, and OEI scenarios with consideration of the performance of the AW139. These operations are the most restrictive type of operation for a helicopter operator. Category A requires that the helicopter be multi-engine and that in the event of a failure of one engine, there is sufficient performance with the remaining engine to safely reject the takeoff, complete a landing on the heliport or continue to flyaway on a recovery profile appropriate to the obstacle environment.

In accordance with CARs 305.19 and Standard 325.19, use of H1 heliport flight paths is in practice restricted to helicopters meeting the performance requirements of Category A operations. This means that helicopters using this classification of facility need to be capable of remaining at least 4.5 m (15 feet) above all obstacles within the approach/departure flight path areas per CARs Standard 325.29(3) when operating in accordance with the aircraft flight manual with one engine inoperative.

Over time, as these requirements became more understood within the aviation industry, the obstacle environment surrounding SickKids' and St. Michael's Hospital heliports has also been more closely examined. Vertical development has continued and while compliant with By-Law 1432-2017 restrictions, ORNGE has determined that there is no clear departure path to the east from St. Michael's heliport. Consequently, since March 2023, the eastern flight path from St. Michael's has been limited to arrivals only – placing a restriction on the use of the heliport that can be significant when winds demand that an eastern flight path be available.

In the development of enhanced flight path protections, the performance of the AW139 was carefully reviewed in consultation with ORNGE to establish profiles, such as those diagrammatically illustrated in **Figure 4**, that would protect for the vertical clearance requirements of H1 flight path use under varied, yet restricted, operational scenarios of temperature and weight whilst respecting Category A operational limitations per the AW139's Rotorcraft Flight Manual.

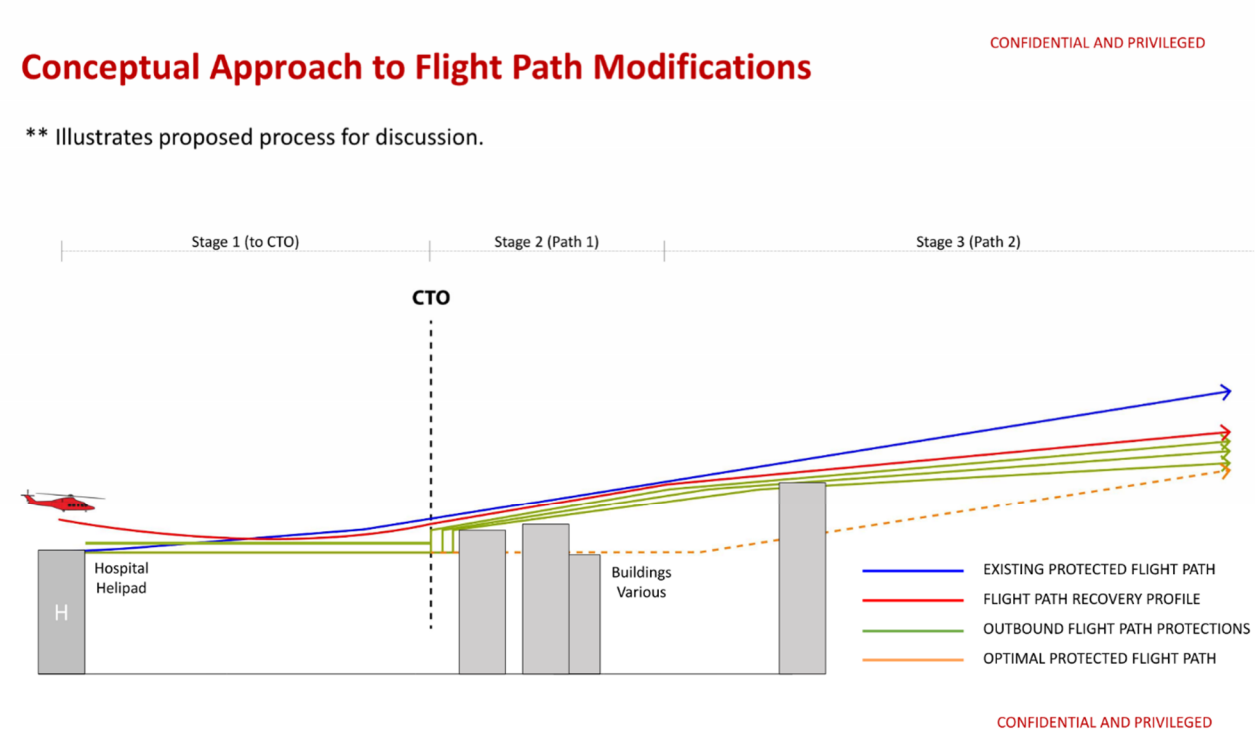

Figure 4 Conceptual Approach to Flight Path Modifications

The profiles, illustrated diagrammatically in **Figure 4** for educational purposes only, help to convey one particular aspect that needs to be considered in planning airspace and evaluating obstacles for clearance at a H1 heliport. A helicopter, such as the AW139, operated under Category A, will commonly need a significant area of obstacle free airspace ahead of the helicopter in the direction of departure in order to safely operate within parameters acceptable to the Regulator, Air Operator and Pilot-In-Command, as defined by regulation and the approved rotorcraft flight manual. The illustration shows an OEI recovery by a helicopter occurring from the critical point of ascent, corresponding to the Takeoff Decision Point (TDP), past which a Continued Take-off (CTO) must occur with sufficient aircraft performance maintained to clear all obstacles by at least 4.5 metres (15 feet) along the intended path of departure with one engine inoperative. This requirement to maintain obstacle clearances with OEI and the profiles that may be flown during recovery to a safe operating elevation are what drives the need for a reduced obstacle environment and places pressure on pilots to remain vigilant in planning for emergency situations.

Despite an increased obstacle environment and restrictions on operations, it has been observed that the ORNGE pilots are still able to find acceptable corridors above and between obstacles. With these accepted obstacle clearances established, flight path protection surfaces were prepared for each flight path area in a 3D modeling environment to evaluate and protect the airspace that remained available (i.e. not taken by existing or approved development). The result of these exercises is reflected in the set of zoning maps that have been separately circulated and now form part of O. Reg. 10/24.

If these additional protections, as currently in place, were to be removed, the developments proposed, such as 15-17 Elm Street, 595 Bay Street, 295 Jarvis Street, 98 Bond Street, 237 Victoria Street, and 412 Church Street, among others, would seek to develop to the maximum extent permissible under By-Law 1432-2017. If this was permitted, these developments would reduce the usability of the heliports in such a manner so as to preclude continued use by ORNGE. For example, the impact of 98 Bond Street would mean a closure of St. Michael's Hospital heliport's northern flight path, and the impact of 15-17 Elm Street or 595 Bay Street would result in the closure of SickKids' heliport's eastern flight path. In any case, even if one of these were to be developed, the impact would be felt by all hospitals that rely upon the continued use of these heliports.

3. CHARACTERISTICS OF O. REG. 10/24 FLIGHT PATH AREA PROTECTIONS

The flight path protections, as discussed previously and currently reflected in O. Reg. 10/24, are not ideal, but have been designed to make the best of a challenging and dense urban obstacle environment. In consultation with ORNGE, various operating parameters and scenarios were reviewed in context with the obstacle environments that they encounter at each hospital heliport in order to determine to what extent enhanced flight path area protections would be necessary. Based on the OEI performance of the AW139 under various operating parameters of takeoff weight and outside air temperatures ranging from -10°C to +40°C, it became evident that enhanced protections, designed to envelop the existing obstacle environment and restrict new development from encroaching into available and much needed airspace between high-rises, is not only recommended but necessary.

3.1 GENERAL CHARACTERISTICS

Each flight path area has been provided protections modified from a common starting point or "template" comprised of 3D surfaces that have been designed to underly the OEI recovery profile of a variety of helicopter types, and operated under varying operational parameters, but most critically the AW139.

The characteristics of these surfaces have been developed in direct response to the need for Obstacle Limitation Surfaces that remain navigable in accordance with CARs 305 and Standard 325.19(2)(a) which stipulates that consideration must be given to the performance requirements of helicopters that are expected to use the heliport, in this case the OEI performance of the AW139.

The flight path protections were based on scenarios built upon the approximate OEI flight path profiles of the AW139 following engine failure after take-off through to recovery and are generally based on the following conditions:

- Operating in CAT A with a restricted takeoff weight (up to 6,400 kg) based on 30°C, 35°C, and 40°C with zero wind and clean air intake; and
- TDP of 70 feet above existing helipad with the take-off surface at 530 feet (161m) ASL and a continued climb straight out at Vertical Take-off Safety Speed (VTOSS) (40 KIAS transitioning to 80 KIAS).

Where clearances over existing obstacles could not be obtained, scenarios of colder temperature, reduced takeoff weight, and alternative departure procedures were explored to determine appropriate protections. These additional scenarios for consideration included, but not necessarily limited to, the following:

- Colder temperatures down to -10°C;
- Use of alternative recovery profile (40 KIAS transitioning to 60 KIAS or 40 KIAS throughout);
- Reduced operating weights down to 6,000 kg;
- Use of backing procedure; and
- Balked landing performance was considered for protections in various scenarios.

The developed template surfaces start at a point 3 metres below the heliport Final Approach and Takeoff Area (FATO) elevation and then continue outward at a zero percent slope to a distance of not less than 625 metres before transitioning to an inclined plane that continues to rise at a slope of 12 percent to a distance of not less than 1,075 metres measured from the inner edge of the takeoff approach surface covering the extent that has historically been cited as the length of the flight path for SickKids and St. Michael's Hospital heliports.

The horizontal extents of these surfaces apply similar characteristics to the typical flight path area dimensions and Obstacle Limitation Surfaces as found in CARs Standard 325 Heliports. Built into both the vertical and horizontal extents of these surfaces, are minimal buffers to account for reasonable variability in aircraft and pilot performance, inaccuracies in data and variability in the encountered built forms of development. Combined, these template surfaces have served as a starting point to the establishing of O. Reg. 10/24 enhanced flight path area protections.

From this starting point, modifications to the template surfaces, after being applied to the existing flight path areas and with consideration to the historically protected areas in By-law 1432-2017, have been modified to reflect the realities of the obstacle environment. In several cases this has resulted in additional flight path area sections, or sub-sections, being added and incremental steps up where the existing obstacle environment presents an insurmountable obstacle environment. A combination of vertical steps and varied slopes have been identified in an effort to simplify the characteristics of the flight path area protections while enveloping the existing obstacle environment and maximising the airspace available for both normal operations and OEI recoveries with the objective to reduce the likelihood of further operational restrictions by preserving corridors between adjacent high-rise developments.

3.2 FLIGHT PATH PROTECTIONS FOR THE HOSPITAL FOR SICK CHILDREN HELIPORT

Continued use of SickKids Hospital Heliport is contingent on protection of two flight paths areas, including a western flight path area with centrelines of 255.845°T through 259.845°T, and an eastern flight path area with centrelines of 84.395°T through 93.039°T. Both flight paths areas are wider than those previously protected by By-law 1432-2017, and preserve additional airspace necessary to minimize the cumulative risk and effect of multiple new developments that would otherwise impede continued use by ORNGE.

For a full table of characteristics regarding the flight paths area protections for SickKids, refer to the O. Reg. 10/24 Map No. 345 enclosed for reference as **Attachment D**.

3.2.1 WESTERN FLIGHT PATH

Protection of the western flight path area is generally defined by two (2) sections; the first measuring 625 metres in length at 0% slope, and the second measuring 450 metres in length at 12% slope starting from the outer edge of the first section, providing total flight path area length of 1,075 metres. The western flight path serving SickKids is the least restricted operationally of all five flight paths that serve the two Hospitals. However, despite this, two (2) developments are known to intrude the flight path protections; 222 St. Patrick Street and 193 McCaul Street, which were built prior to the implementation of O. Reg. 10/24 and as such are considered to be legally non-conforming.

3.2.2 EASTERN FLIGHT PATH

Protection of the eastern flight path area is much more complex than the protections put in place for the west. This is due in part to the historical presence and use of a Point-In-Space FATO, whereby an arriving or departing helicopter would transition in a hover to/from a location overtop of Elm Street. While not used as such currently, the airspace is still required from an obstacle management perspective as it preserves clear sight lines for a balked landing as well as setbacks for confined area/backing type maneuvers.

The eastern flight path is divided into five (5) distinct sections. The first 0% slope section is shorter than the western flight path's first section, at 345 metres in length, with a step-up in elevation of 15.0 metres vertically at the end of the first section, reflecting the recovery profile at the end of CTO portion to transition into an initial climb segment in certain OEI scenarios. There are two (2) developments that intrude into the first section of this flight path protection, 20 Edward Street and 633 Bay Street. These intrusions pre-date the MZO and have a limiting effect on the utility of the heliport, specifically with operating restrictions in departures to the east. The second section of the flight path continues for 345 metres to 625 metres from the inner edge of the flight path at a constant slope of 12%. At the end of the second section of the flight path, the third section begins, for a distance of 450 metres at a constant slope of 5%. Two other sections have been included in the eastern flight path to provide an area carved out for previously approved developments and reflect an area preserved for development that is already significantly impacted, and beyond CTO. The fourth section has been maintained at a constant elevation with 0% slope at the height of the Eaton Centre tower. The fifth section of the eastern flight path reflects a slight reduction in height from the By-law 1432-2017 protections, bound by specific coordinates that reflect existing and pre-approved developments, and airspace that had been lost previously.

3.3 FLIGHT PATH PROTECTIONS THE ST. MICHAEL'S HOSPITAL HELIPORT

Continued use of St. Michael's Hospital Heliport is contingent on protections of three flight paths areas, including a western flight area with a centreline of 244.086°T, a northern flight path area with centrelines of 348.976°T through 352.976°T and an eastern flight path area with centrelines of 064.403°T through 086.189°T.

For a full table of characteristics regarding the flight path area protections for St. Michael's Hospital Heliport, refer to the O. Reg. 10/24 Map No. 346 enclosed for reference as **Attachment D**.

3.3.1 WESTERN FLIGHT PATH

Protection of the western flight path area is based on a single heading at 244.086°T and comprising of four (4) sections. The first section measures 625 metres at a 0% slope, where it meets the second section with a length of 450 metres and a rising slope of 12% slope, for a combined length of 1,075 metres. There are two (2) additional sections within the western flight path that reflect the historical obstacle environment, with the Sheraton Centre and an area shadowed behind that development, as the third and fourth sections. The third section's elevation is set slightly below the By-law 1432-2017 elevation for that area and is provided a 16% slope. The fourth section continues from the third section in an irregular shape to the outer edge of the flight path at a 5% slope.

3.3.2 NORTHERN FLIGHT PATH

Protection of the northern flight path area is based on preservation of a 4.0-degree fanned flight path area with centrelines of 348.976°T through 352.976°T. Protection consists three (3) distinct sections; the first with a length of 345 metres and a 0% slope, followed by the second with an elevation that steps-up by 15.0 metres vertically from the first with a length of 280 metres at a 12% slope, and the third with a length of 450 metres at a 5% slope, providing a total combined length of 1,075.0 metres. Two (2) towers are known to intrude the flight path area within the third section and are located at 7 Carlton Street and 70 Carlton Street. These reduce the amount of available space to recover from an OEI emergency.

3.3.3 EASTERN FLIGHT PATH

Protection of the eastern flight path area is the most complex of the flight paths addressed in the O. Reg. 10/24. This fanned flight path area is based on preservation of a 21.79-degree fanned flight path area with centrelines of 064.403°T through 086.189°T. Protection consists of seven (7) distinct sections of varying shapes and sizes. Use of the eastern flight path is highly restricted based on the obstacle environment. Protections have had to not only consider the existing heliport and its location, but also potential future heliport relocation as may be called for in future iterations of hospital redevelopment. The first section of the eastern flight path is 166.5 metres in length with a 0% slope. At the end of the first section, there is a 13.3-metre vertical step-up where the second section commences at a slope of 8% for 78.5 metres. The third section of the eastern flight path then continues for 100 metres at a 0% slope. At the end of the third section, there is another vertical step-up in elevation of 15 metres, where the fourth section then continues for 280 metres at a slope of 12%. The fifth section of the eastern flight path continues for a further 450.0 metres at a 5% slope. In the northern part of the eastern flight path, there are two (2) separate sections that commence as the sixth section at the end of the second section at a slope of 16% for 380.0 metres in length. At the end of the sixth section, a seventh section continues for 450.0 metres at a 5% slope. These sections reflect the airspace lost to obstacles on the northern portion of the protected flight path. The area remains required for existing approaches made into the wind as much as possible.

3.4 TECHNICAL AMENDMENTS FOLLOWING MZO IMPLEMENTATION

The initial submission of the mapping to the Minister for inclusion in the MZO, now included in O.Reg. 10/24 as Maps 345 and 346, require some minor technical amendments. These revisions have been reflected in working diagrams to which developments are assessed. At this time, during the request for removal of the expiry date in the MZO, it is prudent to make these minor amendments and thus update Maps 345 and 346.

The corrections to mapping address a number of typographical errors and inconsistencies that a discerning eye may observe between the elevations quoted for the sloped contours compared to the slopes/descriptions provided elsewhere for the same. Overall, the characteristics of the surfaces being protected remain intact and the original intent of the Maps remains unchanged. However, such inconsistencies could run the risk of increased confusion, particularly in portions of the sloped surfaces where the inconsistency between one label and another label for the same are different. Some details such as the choice of words in the characteristics table have changed slightly as well.

The following sub-sections provide a detailed description of the changes proposed to the maps that form part of O. Reg. 10-24. These changes have been reflected in the revised maps enclosed as **Attachment D**.

3.4.1 Applicable to both Map No. 345, and No. 346:

1. The word "Preliminary" in the Reference Point Information table was removed.
2. References points added to the "Inset" view.
3. In the characteristics table, the "Total Length" was changed to "Overall Length" which better aligns with language used in the CARs.
4. Titles changed to cite O. Reg. 10/24, avoiding confusion with other maps that continue to be in use.
5. Date has been changed to match the date of O. Reg. 10/24.
6. Issued as "amendment" number 1.
7. Flight path labels checked for consistency (ex. "take-off/approach surface" v. "approach/take-off surface")
8. General cleanup of label placement where it could be found difficult to read due to overlap with others.

3.4.2 Specific to the Hospital for Sick Children Map No. 345:

1. The label for Section 5 of the eastern flight path was changed to correctly match the start and end elevations cited directly on the surface.
2. Centimeter adjustments were made to a few reference points resulting in coordinate changes and changes to the bearing and distance labels.
3. New reference point E30 has been added to provide an additional point of documented reference along the centreline associated with the eastern flight path at its outer edge.
4. Within the Characteristics table, the length quoted for Section 5 of the Eastern Flight Path was corrected. An adjustment of 10cm (0.1m) was made to address a rounding error.
5. Within the Characteristics table, the longitudinal coordinate cited for the heliport centre was corrected. An adjustment of 1/1000th of a second was made to address a rounding error.
6. Within the characteristics table, the coordinate assigned to the origin of the eastern flight path as protected, is now included, whereas before it could only be found in the reference point information table.
7. In the title block the project number was changed to reflect the one currently in use for SickKids.

3.4.3 Specific to St. Michael's Hospital Map No. 346:

1. A grid north heading for the eastern flight path was corrected in the characteristics table – no physical change to the illustrated flight path.

2. Section 2 of the eastern flight path start elevation was changed from 171.2 to 171.3 metres ASL (a 10cm adjustment) in order to match the value that is obtained when applying 8% slope downwards from the top elevation. Consequently, the "North Elevation View" labels have changed.
3. In Section 7 of the eastern flight path and Section 4 of the western flight path, the contours and labels were corrected to match the slope identified for the surface. This means that some contours as shown were shifted and labels changed.
4. Addition of Section 5 to the western flight path, accounting for development that has been previously accepted for 260 Adelaide Street.

4. CONCLUSION: O. REG. 10/24 AND ITS NECESSITY

Rooftop heliports at hospitals in densely populated areas are among the most challenging of facilities that a helicopter pilot may encounter. The complexity of the urban obstacle environment, including proximity to high-rise development and construction activity, shifting wind and weather patterns, patches of obscured visibility, and mechanical air turbulence, when combined with a myriad of other distractions, place a significant amount of pressure and stress on pilots to perform while respecting the tremendous responsibility to operate their aircraft in a safe manner.

With the clear evidence that the protections afforded through By-law 1432-2017 are inadequate to protect continued use of the heliports by ORNGE, SickKids and St. Michael's Hospital requested that Avia NG evaluate the existing flight path protections to understand if more restrictive and refined flight path protections could be proposed. Through the iterative process described within **Section 2.3** of this report, and in consultation with the Hospitals, ORNGE, and Transport Canada, the flight paths were refined to identify new airspace obstacle height restrictions in the context of the existing obstacle environment.

In January 2024, the Minister of Municipal Affairs and Housing enacted O. Reg. 10/24 as an interim measure to prevent the permanent and irreversible closure of the Hospital's heliports that have become challenged by proposed high-rise development. The result was the development of a more restrictive set of flight path protections based on analysis that was supported by ORNGE and Transport Canada.

Through a combination of multiple flat and sloped sections, used to avoid existing and approved developments, the enhanced protection aims to secure as much of the needed airspace as possible to provide ORNGE with an operating environment that will remain as similar to what they operate in today as practicable. The enhanced protections have aimed to strike the right balance between accommodating previously approved developments while providing all available opportunity for ORNGE to continue utilizing the heliports, albeit with operation restrictions, and respecting the aviation regulations under which they must operate.

It should also be noted that the enhanced protections do not represent the ideal protections necessary for unrestricted operations, as would be sought for a new facility based on Transport Canada guidance. Instead, the protections conform to the realities of the existing obstacle environment and as such there remains a risk that despite our best efforts and the efforts of each Hospital, densification, development and further construction activity may eventually prove to be too much and result in ORNGE or Transport Canada concluding that the continued use of these hospital heliports is not advisable. However, this should not detract

from the immediate and urgent need to preserve what is possible of the valuable airspace used by ORNGE in the hope that the utility of these hospital heliports lasts well into the future.

In the case of SickKids and St. Michael's Hospital heliports, if the obstacle environment were to increase further, above the height constraints set by O. Reg. 10/24, the ability of ORNGE pilots to find the operating environment acceptable would be placed at risk and could therefore lead to a withdrawal of direct medevac air ambulance services at these Hospitals. Permitting even a single development to encroach above the protection surfaces could have far reaching and negative impacts to the level of care provided by SickKids and St. Michael's Hospital. The cumulative and disruptive effect that multiple high-rise developments, if permitted to intrude into the airspace protections afforded by O. Reg. 10/24, would be severe and should not be underestimated. Renewal of O. Reg. 10/24 is urgently requested as it appears to be the only measure suitable to putting in place the development restrictions necessary given the time available within which to act before the utility of SickKids and St. Michael's Hospital heliports is further reduced or lost completely.

Sincerely,

AVIA NG INC.

Joshua Horst, MAvnMgt, AvMP
Senior Manager, Planning and Advisory Practice Lead
Avia NG Inc.

Dan Fox, MAvnMgt, AAP
Senior Aviation Regulatory and Compliance Specialist
Avia NG Inc.

Janine Maurice, MAvnMgt,
Senior Aviation Planner
Avia NG Inc.

Enclosure:

- **Attachment A** – Letter to Assistant Deputy Minister, Ministry of Health, Emergency Health Servies Division from ORNGE dated April 4, 2025.
- **Attachment B** – Letter to SickKids Director Facilities from ORNGE dated June 22, 2023.
- **Attachment C** – Letter to St. Michael's Hospital from ORNGE dated March 31, 2023.
- **Attachment D** – Copies of O. Reg. 10/24 revised Map No. 345 and Map No. 346 including tables for SickKids and St. Michael's Hospital flight path area protections characteristics

Attachment A

Letter to Assistant Deputy Minister, Ministry of Health, Emergency Health Servies Division from ORNGE dated April 4, 2025.

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5310 Explorer Drive
Mississauga, Ontario
L4W 5H8, Canada

Head Office: 647.428.2005
Toll Free: 1.800.251.6943

April 4, 2025

Susan Picarello
Assistant Deputy Minister
Ministry of Health, Emergency Health Services Division
5700 Yonge Street, 6th Floor
Toronto, ON M2M 4K5

Dear Ms. Picarello,

Thank you and your team for providing Ornge with awareness of proposed amendments to the Minister's Zoning Order (MZO) related to downtown Toronto heliports. We appreciate the transparency and advance notice regarding requests that may impact our rotor wing operations. I am sending this letter to ensure clarity and consistency around our position with respect to urban encroachment in this area.

As a general comment, Ornge continues to support the MZO as currently written, as we believe this is the best approach to ensuring continuity of operations into these heliports. We are pleased to learn that progress is being made to removing the sunset clause and making the MZO permanent.

Our role as the aircraft operator is to ensure our pilots operate within the provided regulatory framework, to monitor for any new obstacles which may impede our ability to arrive and depart from the heliport, and to adjust our operations accordingly if necessary. The responsibility of the aerodrome and associated airspace is solely the responsibility of the aerodrome operator.

As we do not have regulatory authority regarding heliports, nor ownership of the downtown heliports in question, we are not in a position to review or endorse any amendments, proposals or alternative solutions with respect to the airspace.

The collaborative work from St. Michael's, SickKids, Ornge and the Government of Ontario resulted in an MZO that provides the necessary restrictions to preserve the remaining flight paths. All parties involved, led by the hospital heliport operators, ultimately sought and achieved a solution that preserves the continued use of St. Michael's and SickKids' hospital heliports by Ornge using the AW139. We continue to believe this is the best solution. (The attached appendix outlines the technical components and some of the steps that have been taken to achieve this outcome.)

Given our role as the aircraft operator, we feel it would be inappropriate for Ornge to offer commentary on individual amendments or changes, as this would require a detailed engineering analysis beyond the scope of our responsibility. Overall, however, it should be said that any change resulting in further encroachment on the airspace has the potential to negatively impact the service level supported by the continued use of these heliports, and moreover on public access to urgent and much needed patient care.

I hope this clarifies Ornge's position. Please feel to reach out to me if you have any further questions.

Sincerely,

Peter Cunnington
Chief Aviation Officer

cc: Linda Lalani, Senior Manager, Air Ambulance Oversight Unit, MOH
Dr. Homer Tien, President & CEO, Ornge

APPENDIX

Since 2017, both hospital heliports (CTM4 & CNW8), and specifically their defined flight paths, have been afforded protection through By-Law 1432-2017 that was put in place following delegation of authority to the City of Toronto through the applicable provisions of the Aeronautics Act and following a defined Federal-Provincial process. These protections mirrored the characteristics of the Obstacle Limitation Surfaces (OLS) as were declared at the time and formed part of heliport certification documentation.

Over time, with industry receiving clarification from Transport Canada on the use and applicability of this new heliport criteria, the characteristics of the OLS declared for St. Michael's Hospital and SickKids (as well as other H1 classified heliports throughout Canada) changed to adopt this criterion. Following this change, the appropriateness of the surfaces protected through By-Law 1432-2017 started to be further questioned.

New "OLS and H1 Survey" diagrams were produced following this change and with guidance provided by Transport Canada. The aim with these diagrams was to provide Ornge, as the primary user, with additional obstacle data that would allow for assessment of the obstacle environment to ascertain for themselves whether the required clearance from obstacles as prescribed in the regulation can be maintained during an arrival or departure following the failure of the critical engine.

Use of H1 heliport flight paths are in practice restricted to helicopters meeting the performance requirements of CAT A. This means that they need to be capable of remaining at least 4.5 m (15 feet) above all obstacles within the approach/departure area when operating in accordance with their aircraft flight manual with one engine inoperative (OEI).

As these requirements became more understood within industry, the obstacle environment surrounding the St. Michael's and SickKids' heliports has come under greater scrutiny. Eventually, as development continued to expand and rise in certain areas, although meeting the restrictions in place through By-Law 1432-2017, Ornge eventually saw no "clear" path for a departure towards the east from St. Mike's. Therefore, the eastern flight path from St. Michael's has been restricted in operation since March 2023 to arrivals only.

The collaborative work from St. Michael's, SickKids, Ornge and the Government of Ontario resulted in an MZO that provides the necessary restrictions to preserve the remaining flight paths.

Attachment B

Letter to SickKids Director Facilities from ORNGE dated June 22, 2013.

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5310 Explorer Drive
Mississauga, Ontario
L4W 5H8, Canada

Head Office: 647.428.2005
Toll Free: 1.800.251.6943

Delivered via email

June 22, 2023

Peter Sawras, P Eng.
Director Facilities Planning
Toronto Hospital for Sick Children
555 University Ave.
Toronto, Ontario M5G 1X8

Dear Mr. Sawras:

By-Law 1432-2017 and Encroachment on the Sick Kids Helipad

I am writing to provide an update on the impact of By-Law 1432-2017 and the encroachment of a new construction crane in close proximity to the Sick Kids Helipad.

In previous meetings, Ornge, with the assistance of WSP, has demonstrated that current airspace protections are not sufficient to ensure continued operations should development in proximity to helipads continue. Ornge introduced an AW139 performance assessment with the associated helipad facility requirements and voiced our concerns about our ability to continue to service the downtown Toronto helipads because of encroaching development.

A newly installed construction crane located west of the Sick Kids Helipad has now obstructed the flight path to the point where departures using the western flight path are no longer possible. This is due to the crane infringing on the airspace required for an emergency one-engine inoperative recovery should an engine failure occur on departure. Ornge has issued an internal communique to all Rotor Wing Pilots restricting departures from the Sick Kids Helipad using the western flight path (269° - 284°). Departures to the East may continue as well as arrivals from the West.

This restriction will affect operations to and from the helipad when the forecast or prevailing wind is from the West. Unfortunately, historical data indicates that the wind is from this direction approximately 55% of the year. Should these conditions be present Ornge helicopters will have to be diverted to an alternate destination. Weather forecasting should provide advance notice and any diversions will be coordinated by the Ornge Operational Control Center.

Ornge will continue to provide the best possible service to the Sick Kids helipad in accordance with regulatory and performance restrictions which ensure the safety of our flight crews, patients and the residents of downtown Toronto.

If you have any questions, please do not hesitate to contact me.

Sincerely,

Stephen Reynolds
Director Flight Operations – Rotor Wing (A)

Attachment C

Letter to St. Michael's Hospital from ORNGE dated March 31, 2023.

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5310 Explorer Drive
Mississauga, Ontario
L4W 5H8, Canada

Head Office: 647.428.2005
Toll Free: 1.800.251.6943

Delivered via email

March 31, 2023

Michael Keen
VP Facilities
Unity Health Toronto
30 Bond St.
Toronto, Ontario M5B 1W8

Dear Mr. Keen:

By-Law 1432-2017 and Encroachment on the SMH Helipad

I am writing to provide an update on the impact of By-Law 1432-2017 and the encroachment of new construction in close proximity to the SMH Helipad.

In previous meetings, Ornge, with the assistance of WSP, has demonstrated that current airspace protections are not sufficient to ensure continued operations should development in proximity to the helipad continue. Ornge introduced an AW139 performance assessment with the associated helipad facility requirements and voiced our concerns about our ability to continue to service the SMH Helipad because of encroaching development.

Continued development to the East and Southeast of the SMH Helipad has now reached the point where departures using the Eastern flight path are no longer possible due to the new construction infringing on the airspace required for emergency one-engine inoperative recovery should an engine failure occur on departure. Ornge has issued an internal communique to all Rotor Wing Pilots restricting departures from the SMH Helipad using the Eastern flight path (075° - 097°). Departures to the North and West may continue as well as arrivals from the East.

This restriction will affect operations to and from the helipad only when the forecast or prevailing wind is from the southeast (093° - 165°). Historical data indicates that the wind is from this southeast quadrant approximately 20% of the year. Should these conditions be present Ornge helicopters will have to be diverted to an alternate destination. Weather forecasting should provide advance notice and any diversions will be coordinated by the Ornge Operational Control Center.

Ornge will continue to provide the best possible service to the St. Mike's helipad in accordance with regulatory and performance restrictions which ensure the safety of our flight crews, patients and the residents of downtown Toronto.

If you have any questions, please don't hesitate to contact me.

Sincerely,

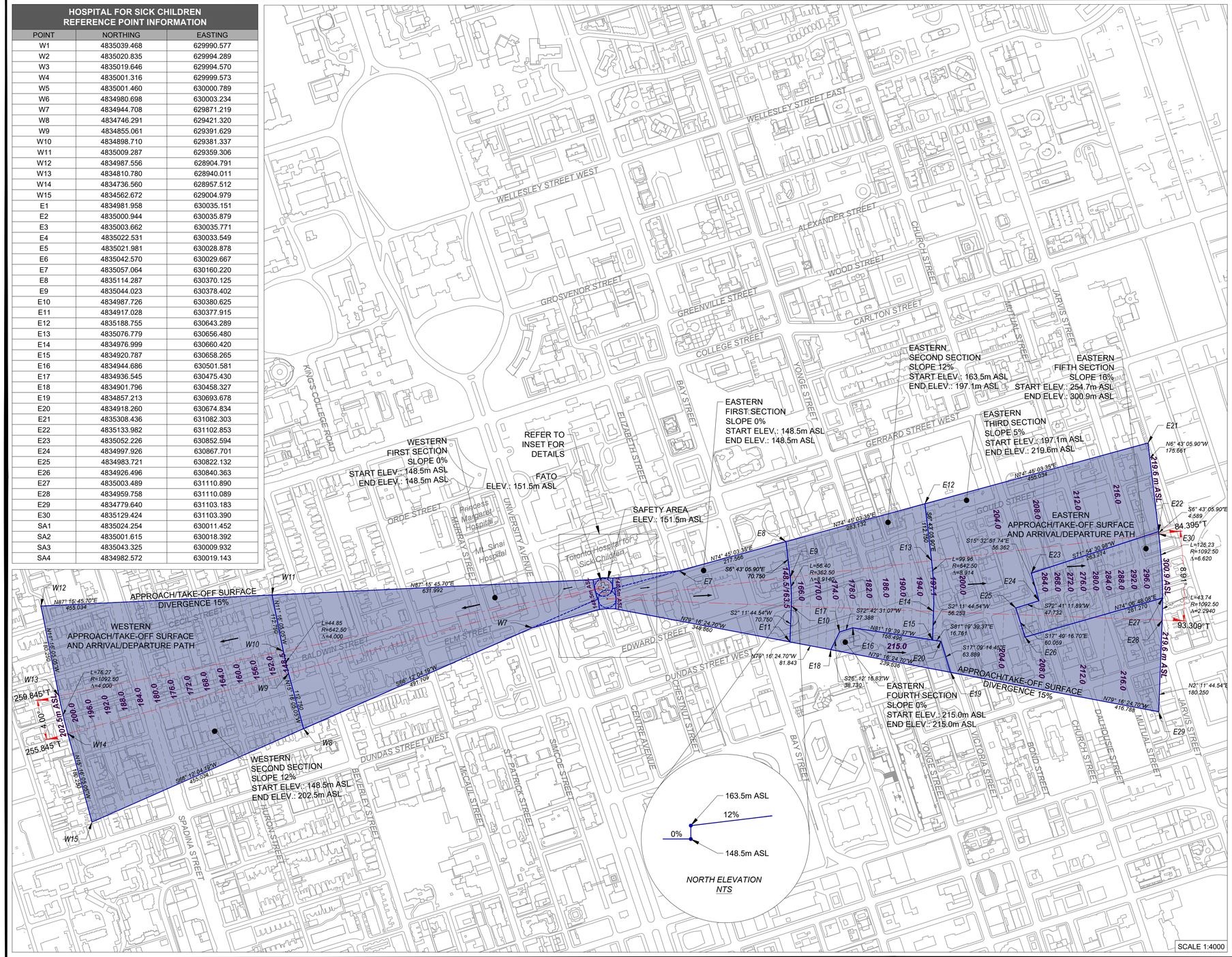
Peter Cunnington
Chief Operating Officer – Aviation (A)

Attachment D

Copies of O. Reg. 10/24 revised Map No. 345 and Map No. 346 including tables for SickKids and St. Michael's Hospital flight path area protections characteristics

HOSPITAL FOR SICK CHILDREN REFERENCE POINT INFORMATION

POINT	NORTHING	EASTING
W1	4835039.468	629990.577
W2	4835020.835	629994.289
W3	4835019.646	629994.570
W4	4835001.316	629999.573
W5	4835001.460	630000.789
W6	4834980.698	630003.234
W7	4834944.708	629871.219
W8	4834746.291	629421.320
W9	4834855.061	629391.629
W10	4834898.710	629381.337
W11	4835009.287	629359.306
W12	4834987.556	628904.791
W13	4834810.780	628940.011
W14	4834736.560	628957.512
W15	4834562.672	629004.979
E1	4834981.958	630035.151
E2	4835000.944	630035.879
E3	4835003.662	630035.771
E4	4835022.531	630033.549
E5	4835021.981	630028.878
E6	4835042.570	630029.667
E7	4835057.064	630160.220
E8	4835114.287	630370.125
E9	4835044.023	630378.402
E10	4834987.726	630380.625
E11	4834917.028	630377.915
E12	4835188.755	630643.289
E13	4835076.779	630656.480
E14	4834976.999	630660.420
E15	4834920.787	630658.265
E16	4834944.686	630501.581
E17	4834936.545	630475.430
E18	4834901.796	630458.327
E19	4834857.213	630693.678
E20	4834918.260	630674.834
E21	4835308.436	631082.303
E22	4835133.982	631102.853
E23	4835052.226	630852.594
E24	4834997.926	630867.701
E25	4834983.721	630822.132
E26	4834926.496	630840.363
E27	4835003.489	631110.890
E28	4834959.758	631110.089
E29	4834779.640	631103.183
E30	4835129.424	631103.390
SA1	4835024.254	630011.452
SA2	4835001.615	630018.392
SA3	4835043.325	630009.932
SA4	4834982.572	630019.143

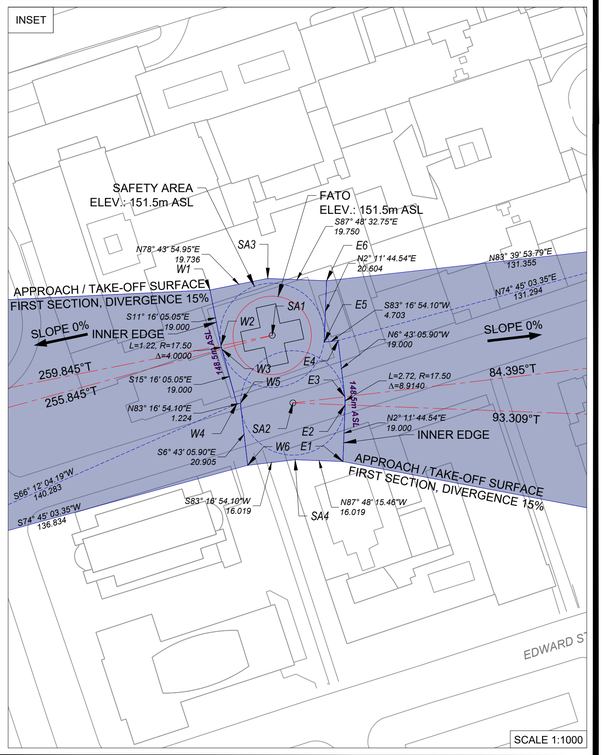


HOSPITAL FOR SICK CHILDREN HELIPORT (CNW8)

HELIPORT CLASSIFICATION		
H1	DAY/NIGHT	VFR
HELIPORT PHYSICAL CHARACTERISTICS		
FATO WIDTH	26.25m	
ELEVATION	151.5m ASL	

FLIGHT PATH PROTECTIONS

DATA	EASTERN ARR/DEP PATH	WESTERN ARR/DEP PATH
GEOMETRIC CENTRE	POINT-IN-SPACE	STANDARD
SAFETY AREA WIDTH	35.0m	
INNER EDGE ELEVATION	148.5m ASL	148.5m ASL
FLIGHT PATH ORIGIN LOCATION (WGS84)		
NORTHING	4835001.615	4835024.254
EASTING	630018.392	630011.452
LATITUDE	N43° 39' 23.9276"	N43° 39' 24.6655"
LONGITUDE	W79° 23' 15.2861"	W79° 23' 15.5761"
FLIGHT PATH BEARINGS (FROM)		
GRID NORTH	83.282° TO 92.196°	254.732° TO 258.732°
TRUE NORTH	84.395° TO 93.309°	255.845° TO 259.845°
OBSTACLE LIMITATION SURFACES - APPROACH/TAKE-OFF SURFACE		
DIVERGENCE	15%	15%
FIRST SECTION LENGTH	345.0m	625.0m
FIRST SECTION SLOPE	0%	0%
SECOND SECTION LENGTH	280.0m	450.0m
SECOND SECTION SLOPE	12% [1:8.33]	12% [1:8.33]
THIRD SECTION LENGTH	450.0m	N/A
THIRD SECTION SLOPE	5% [1:20]	N/A
FOURTH SECTION LENGTH	236.9m	N/A
FOURTH SECTION SLOPE	0%	N/A
FIFTH SECTION LENGTH	288.6m	N/A
FIFTH SECTION SLOPE	16% [1:6.25]	N/A
OVERALL LENGTH	1075.0m	1075.0m



Legend
OBSTACLE LIMITATION SURFACE (OLS)
OLS ELEVATION CONTOUR (m ASL)
FLIGHT PATH PROJECTED CENTRELINE
162.0

Notes
1. COORDINATES COMPUTED FROM SURVEY DATED MARCH 16th, 2016.
2. COORDINATES UNLESS OTHERWISE SPECIFIED ARE IN WGS84 (ITRF 2008) UTM Z17 AND ELEVATIONS IN REFERENCE TO CGVD2013.
3. GEOID HEIGHT COMPUTED AS -37.184 METRES RELATIVE TO WGS84.
4. AVIA NG INC. DO NOT TAKE RESPONSIBILITY FOR THE ACCURACY OF UNDERLYING CADASTRAL DATA.
5. UNDERLYING CADASTRAL DATA SUBJECT TO CHANGE.

Scale
Scale 1:4000
50 0 25 50 100 200 300 METRES
200 0 100 200 500 1000 FEET
SCALE BASED ON SHEET SIZE 22" X 34"

SickKids
THE HOSPITAL FOR SICK CHILDREN
Client: THE HOSPITAL FOR SICK CHILDREN

AVIA • NG
AIRPORT CONSULTANTS
Consultant: AVIA NG INC.

GRID NORTH
N W E S

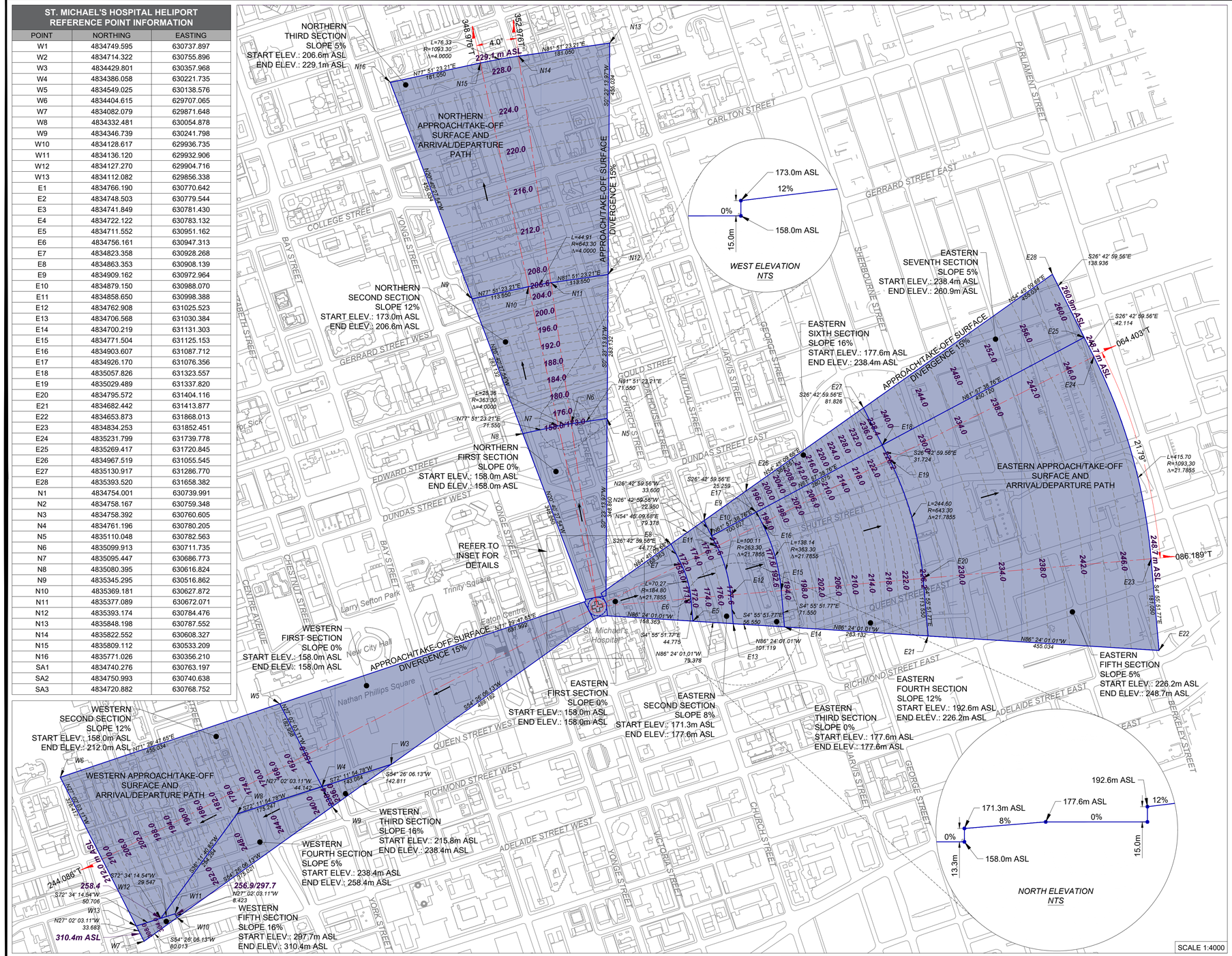
Location: TORONTO, ONTARIO

Title:
HOSPITAL FOR SICK CHILDREN HELIPORT
ENHANCED FLIGHT PATH PROTECTIONS
O. REG. 10/24 WITH METES AND BOUNDS

Date:	JAN 22, 2025	Avia NG Project No.:	22-0118-00
Amendment No.:	1	Map No.:	345

ST. MICHAEL'S HOSPITAL HELIPORT REFERENCE POINT INFORMATION

POINT	NORTHING	EASTING
W1	4834749.595	630737.897
W2	4834714.322	630755.896
W3	4834429.801	630357.968
W4	4834386.058	630221.735
W5	4834549.025	630138.576
W6	4834404.615	629707.065
W7	4834082.079	629871.648
W8	4834332.481	630054.878
W9	4834346.739	630241.798
W10	4834128.617	629936.735
W11	4834136.120	629932.906
W12	4834127.270	629904.716
W13	4834112.082	629856.338
E1	4834766.190	630770.642
E2	4834748.503	630779.544
E3	4834741.849	630781.430
E4	4834722.122	630783.132
E5	4834711.552	630951.162
E6	4834756.161	630947.313
E7	4834823.358	630928.268
E8	4834863.353	630908.139
E9	4834909.162	630972.964
E10	4834879.150	630988.070
E11	4834858.650	630998.388
E12	4834762.908	631025.523
E13	4834706.568	631030.384
E14	4834700.219	631131.303
E15	4834771.504	631125.153
E16	4834903.607	631087.712
E17	4834926.170	631076.356
E18	4835057.826	631323.557
E19	4835029.489	631337.820
E20	4834795.572	631404.116
E21	4834682.442	631413.877
E22	4834653.873	631868.013
E23	4834834.253	631852.451
E24	4835231.799	631739.778
E25	4835269.417	631720.845
E26	4834967.519	631055.545
E27	4835130.917	631286.770
E28	4835393.520	631658.382
N1	4834754.001	630739.991
N2	4834758.167	630759.348
N3	4834758.392	630760.605
N4	4834761.196	630780.205
N5	4835110.048	630782.563
N6	4835099.913	630711.735
N7	4835095.447	630686.773
N8	4835080.395	630616.824
N9	4835345.295	630516.862
N10	4835369.181	630627.872
N11	4835377.089	630672.071
N12	4835393.174	630784.476
N13	4835848.198	630787.552
N14	4835822.552	630608.327
N15	4835809.112	630533.209
N16	4835771.026	630356.210
SA1	4834740.276	630763.197
SA2	4834750.993	630740.638
SA3	4834720.882	630768.752

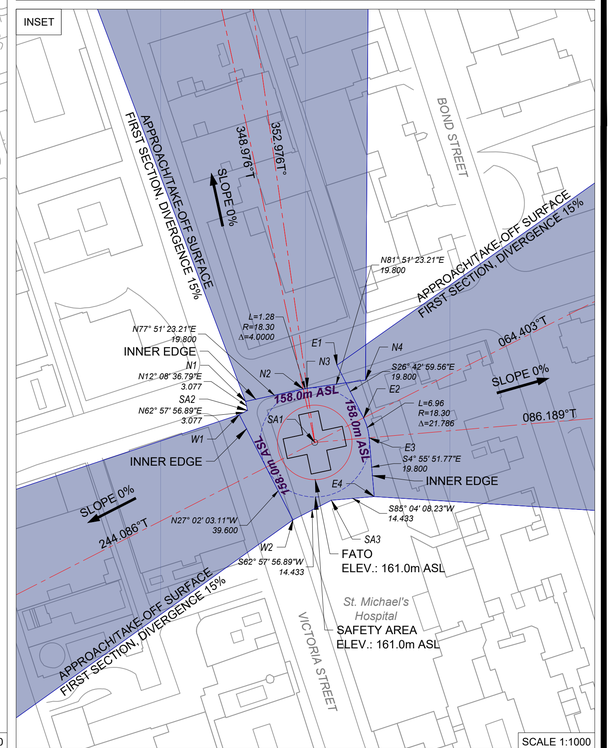


ST. MICHAEL'S HOSPITAL HELIPORT (CTM4)

HELIPORT CLASSIFICATION			
H1	DAY/NIGHT	VFR	
HELIPORT PHYSICAL CHARACTERISTICS			
FATO WIDTH	25.0m		
ELEVATION	161.0m ASL		

FLIGHT PATH PROTECTIONS

DATA	EASTERN ARR/DEP PATH	NORTHERN ARR/DEP PATH	WESTERN ARR/DEP PATH
GEOMETRIC CENTRE	STANDARD	STANDARD	STANDARD
SAFETY AREA WIDTH		36.6m	
INNER EDGE ELEVATION	158.0m ASL	158.0m ASL	158.0m ASL
FLIGHT PATH ORIGIN LOCATION (WGS84)			
NORTHING		4834740.276	
EASTING		630763.197	
LATITUDE		N43° 39' 14.9895"	
LONGITUDE		W79° 22' 42.27501"	
FLIGHT PATH BEARINGS (FROM)			
GRID NORTH	63.283° TO 85.069°	347.856° TO 351.856°	242.966°
TRUE NORTH	64.403° TO 86.189°	348.976° TO 352.976°	244.086°
OBSTACLE LIMITATION SURFACES - APPROACH/TAKE-OFF SURFACE			
DIVERGENCE	15%	15%	15%
FIRST SECTION LENGTH	166.5m	345.0m	625.0m
FIRST SECTION SLOPE	0%	0%	0%
SECOND SECTION LENGTH	78.5m	280.0m	450.0m
SECOND SECTION SLOPE	8% [1:12.5]	12% [1:8.333]	12% [1:8.333]
THIRD SECTION LENGTH	100.0m	450.0m	141.2m
THIRD SECTION SLOPE	0%	5% [1:20]	16% [1:6.25]
FOURTH SECTION LENGTH	280.0m	N/A	400.0m
FOURTH SECTION SLOPE	12% [1:8.333]	N/A	5% [1:20]
FIFTH SECTION LENGTH	450.0m	N/A	79.1m
FIFTH SECTION SLOPE	5% [1:20]	N/A	16% [1:6.25]
SIXTH SECTION LENGTH	380.0m	N/A	N/A
SIXTH SECTION SLOPE	16% [1:6.25]	N/A	N/A
SEVENTH SECTION LENGTH	450.0m	N/A	N/A
SEVENTH SECTION SLOPE	5% [1:20]	N/A	N/A
OVERALL LENGTH	1075.0m	1075.0m	1075.0m



Legend
- OBSTACLE LIMITATION SURFACE (OLS)
- OLS ELEVATION CONTOUR (m ASL) — 162.0
- FLIGHT PATH PROJECTED CENTRELINE

Notes
1. COORDINATES COMPUTED FROM SURVEY DATED MARCH 16th, 2016.
2. COORDINATES UNLESS OTHERWISE SPECIFIED ARE IN WGS84 (ITRF 2008) UTM Z17 AND ELEVATIONS IN REFERENCE TO CGVD2013.
3. GEOID HEIGHT COMPUTED AS -37.184 METRES RELATIVE TO WGS84.
4. AVIA NG INC. DO NOT TAKE RESPONSIBILITY FOR THE ACCURACY OF UNDERLYING CADASTRAL DATA.
5. UNDERLYING CADASTRAL DATA SUBJECT TO CHANGE.

Scale
Scale 1:4000

50 0 25 50 100 200 300 METRES
200 0 100 200 500 1000 FEET

SCALE BASED ON SHEET SIZE 22" X 34"

ST. MICHAEL'S UNITY HEALTH TORONTO

Client: UNITY HEALTH TORONTO / ST. MICHAEL'S HOSPITAL

AVIA • NG AIRPORT CONSULTANTS

Consultant: AVIA NG INC.

GRID NORTH

Location: TORONTO, ONTARIO

Title: **ST. MICHAEL'S HOSPITAL HELIPORT ENHANCED FLIGHT PATH PROTECTIONS O. REG. 10/24 WITH METES AND BOUNDS**

Date:	JAN 22, 2025	Avia NG Project No.:	22-0039-00
Amendment No.:	1	Map No.:	346