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17 Elm GP Inc.
Attention: Lyle Levine
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Toronto, Ontario M6E 2J4

HOSPITAL FLIGHT PATHS – PROJECT AT 15-17 ELM STREET, TORONTO

Ref: A. Hospital Heliport Zoning Regulations SOR/2017-291
B. Transport Canada - Canadian Aviation Regulations – Heliport Standards CARs 325
C. Partisans Drawings Project No.88 15-17 Elm Street dated July 19, 2022

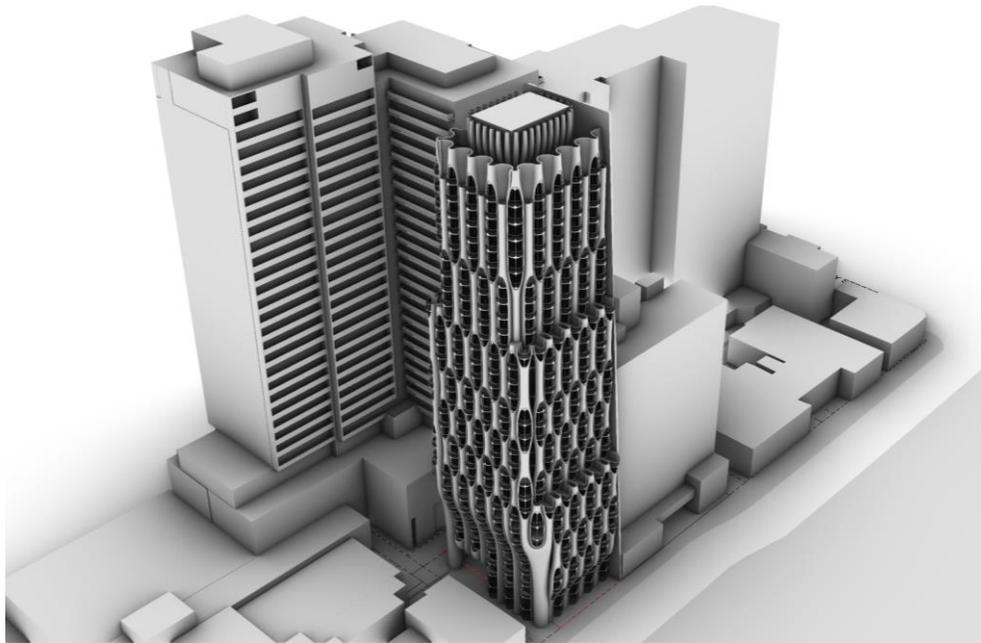
This is an analysis of a proposed high-rise building project at 15-17 Elm Street in Toronto, as related to the flight paths to Sick Kids and St. Michael's Hospitals, that are governed by the Toronto By-Law at reference A. These flight paths meet technical regulations specified at reference B.

As a consultant in aeronautical information services, in recent years I have provided services to numerous airports and to developers, with concerns for buildings, antennae, or wind turbines proposed in vicinity of aviation facilities. Most notably in Ontario, I have assisted the airports at Collingwood, Chatham-Kent, Toronto/Downsview, Kincardine, and Billy Bishop Toronto City. As well, I have provided advice to some 50 developers in Toronto regarding possible effects to the heliports atop St. Michael's Hospital (SMH) and the Hospital for Sick Children (HSC), and to the airports in the vicinity. The results were that some projects were found to have no detrimental effects to the airports, while others where there could be effects, building plans were altered or flight procedures were modified, to preserve accessibility to the airport. The purpose of my work was always to preserve safe and full access to airports, while permitting new structures to be erected as close and as high as the regulations permit.

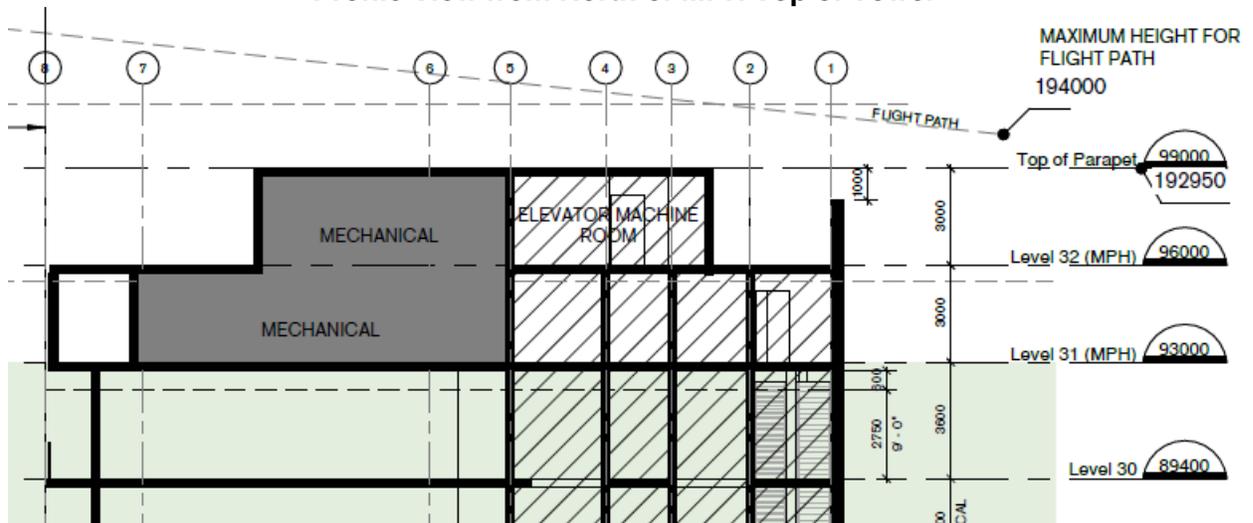
Planning Comments. The City of Toronto states "In order to confirm there are no issues with the flight path, provide an aeronautical assessment to confirm there are no intrusions. This assessment should include a qualitative analysis and confirmation that there are no maintenance or projection issues associated with the development and that construction methods have been considered. As such, the assessment must also review the draft bylaw and specifically any referenced projections".

Project at 15-17 Elm Street. The property at 15-17 Elm Street is located on the south side of Elm Street, and the eastern edge is 66m west of Yonge Street. The footprint is approximately 30m north-south by 27m wide, and grade has been declared as 93.95m above sea level (ASL). The 30-storey tower planned for the project shown below, centered on top by a Mechanical Penthouse (MPH) of 6.25m height that is 9.636m north-south by 14.24m wide. The height will be 99.0m above grade to the parapet of the MPH, for a total height of 192.95m or 633' ASL, as shown below second diagram. A solid wall on the western side, 1m below the MPH, will separate the building from the adjacent one. A plan view of the MPH roof is shown next page.

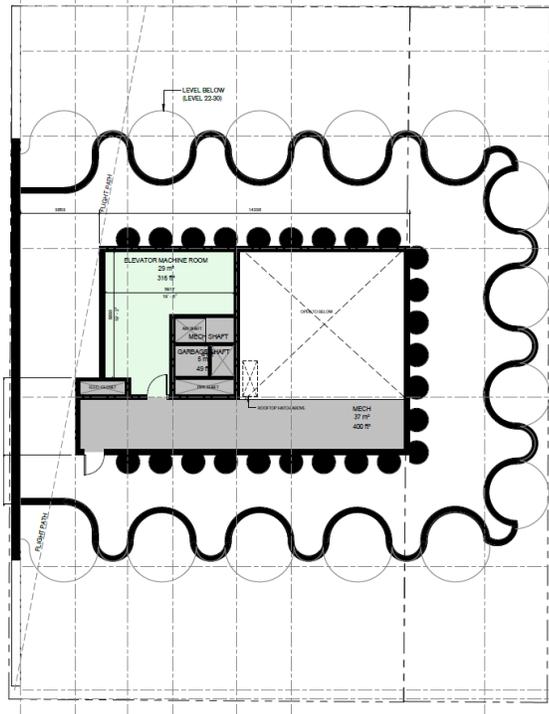
15-17 Elm Architectural Sketch View from Northeast



Profile View from North of MPH Top of Tower

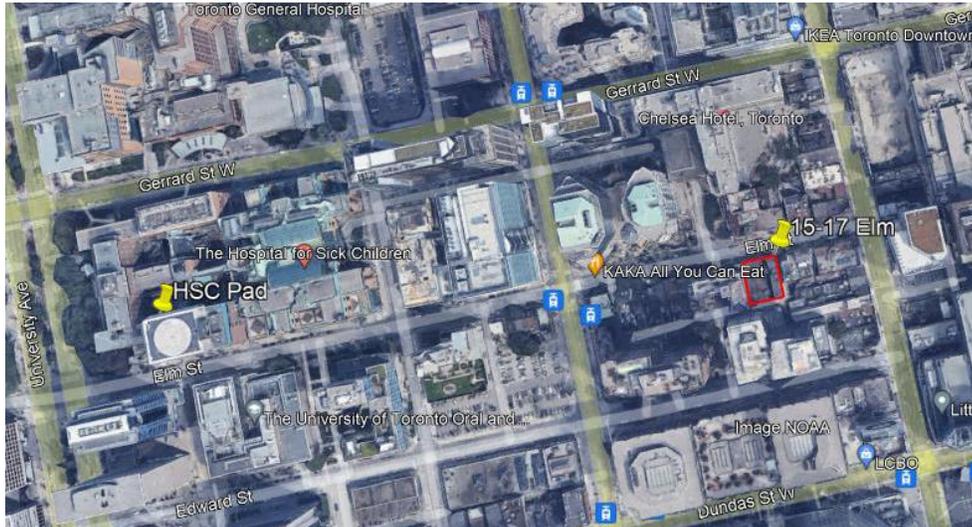


Plan View of Roof



SMH and HSC Helicopter Flight Paths. The flight paths that serve St. Mike’s Hospital and Sick Kids heliports are protected by Municipal Zoning, as per reference A and which are detailed in the Annex to this report. Obstacle Limitation Surfaces (OLS) of lateral and vertical dimensions are governed by Transport Canada regulations at Reference B, which cannot be penetrated by structures, cranes, persons, natural growth, or other objects. The project underlies the eastern flight path to Sick Kids Hospital, at 407.5m distance to centre of the helipad, shown below.

15-17 Elm in Red Relative to Sick Kids



Sick Kids. As illustrated below, the project at 15-17 Elm with MPH outlined below in red, underlies the eastern flight path to the Hospital for Sick Children at 407.5m from centre of the pad to northwest corner of the MPH. The OLS at that point closest to the heliport is calculated at 195m ASL ($152.2\text{m pad} + (245 \times 8\%) + (407.5\text{m} - 245\text{m} - 17.5) = 195\text{m}$). The southeast corner farthest away has the OLS at 199.5m ASL. With the MPH parapet at 192.95m ASL, there will be 2.05m vertical clearance.

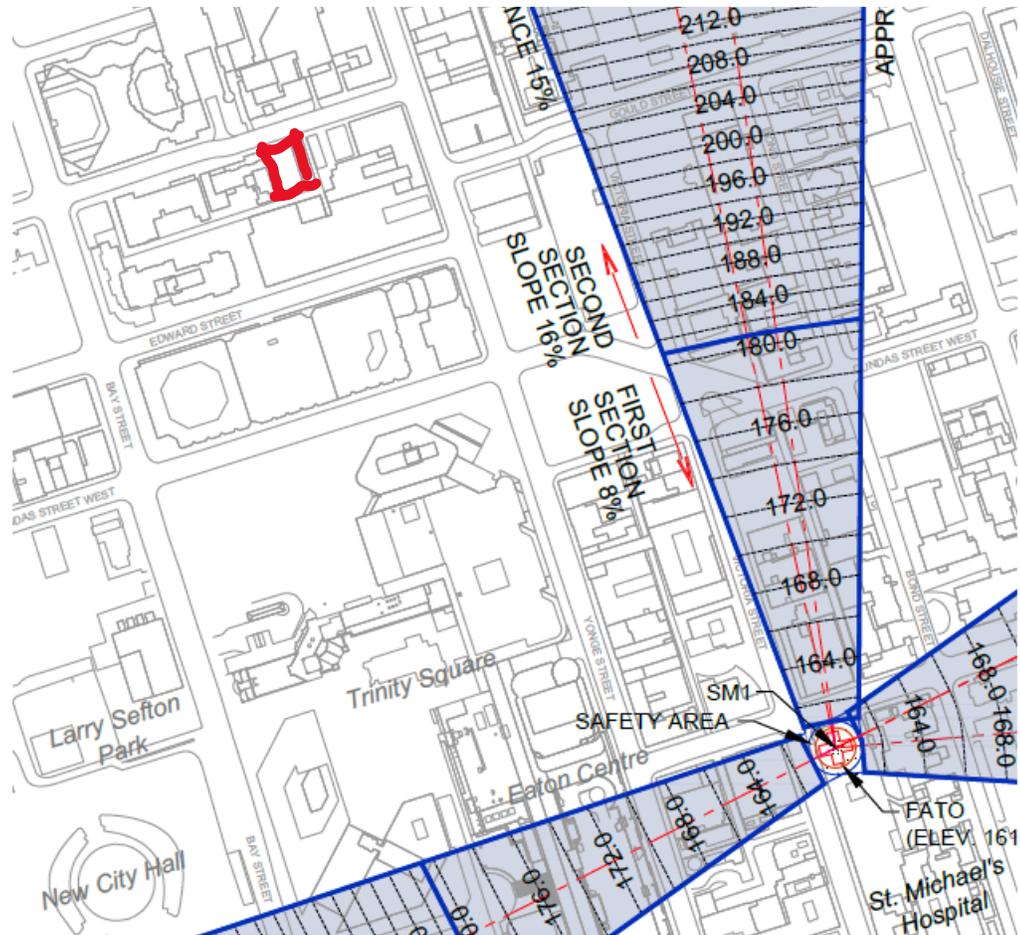
This meets the minimum clearance of 2-3m, established as the minimum vertical buffer to permit personnel and equipment for construction and maintenance. There will be insufficient vertical space to deploy a crane to construct the final floors and MPH. Mitigation may be to develop a detailed plan for manual construction of the uppermost structure.

Eastern OLS to Sick Kids Heliport with MPH in Red



St-Mike's. The diagram next page shows 15-17 Elm Street outlined in red, relative to the flight paths serving St. Michael's Hospital. The closest is the northern OLS, which is 160m east of the project and laterally clear. The western flight path OLS is 417m south of the property, and well clear laterally. These flight paths will not affect the project.

St. Mike's Flight Paths Relative to 15-17 Elm Street in Red



Crane Plan. A plan for crane(s) has not been developed, but with only 2m of vertical clearance with the current building plan, the crane will be a challenge. A flat crane will likely be required, and since it cannot penetrate the OLS, it must be limited to below the roof height. Manual construction techniques will be developed to build the uppermost structure and MPH.

Obstruction Lighting. To meet Transport Canada 621 standards, and due to the close proximity to the heliport, obstacle lighting may be needed on the tower and on the crane. Transport Canada may specify no lighting required because of shadowing by other adjacent lighted buildings. If determined they are required, CL864 red lights are recommended on the 4 roof corners, and on the tower and boom tip of the crane.

Conclusions. The current plan for the project at 15-17 Elm Street is for a 30-storey tower with the parapet of the MPH at 192.95m ASL. Hospital helicopter flight paths were examined:

- The project underlies the eastern flight path serving the Hospital for Sick Children. There is 2.05m clearance at the northwest corner of the MPH, the closest point to the helipad.
- The northern flight path to St. Mike's will be 160m east of the project, and the western flight path OLS is 417m south of the property, both well clear laterally.
- Crane plans will be a challenge, and manual techniques will be necessary to construct the uppermost structures.
- While not specified in the By-Law, it has become commonly accepted that 2-3m is the minimum vertical clearance that will allow for constructability and maintenance, without penetrating the OLS.

Yours truly,



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Charles Cormier, has over 45 years aviation experience as a pilot in the Canadian Air Force, with Transport Canada, NAV CANADA, and private industry, with over 7000 hours flight time. He retired from the military in 1991 after active duty as a Sea King helicopter pilot in the Gulf War, attaining Lieutenant-Colonel rank. As an aeronautical information specialist formerly with NAV CANADA, MDA Aviation, and IDSNA, he has designed or conducted full quality review of over 2000 instrument flight procedures published in Canada, Myanmar, Ecuador and elsewhere. He has performed numerous flight checks, and can advise on aerodrome standards and automated weather observation systems (AWOS). As Chief Technical Director with IDS North America based in Montreal 2008-2011, he supervised 18 staff to redesign some 1000 instrument procedures per year with advanced computer design tools, under contract with NAV CANADA. Recently Cormier has assisted numerous building developers in Toronto to coordinate aviation constraints with hospital heliports and airports, and with wind turbine projects to resolve aeronautical conflicts. He currently maintains published flight procedures at 65+ airports across Canada. Twice elected a City Councillor in Dieppe, NB, 2001-2008. He is a Director of the Foundation of the Royal Military College Saint-Jean, and sat 5 years on the College Board of Governors.

Annex: Heliport Flight Path Regulations and Details of St. Michael's Hospital and Toronto Hospital for Sick Children Helicopter Flight Paths

ANNEX

Regulations for Heliport Arrival/Departure Protected Areas

The **Final Approach and Take-Off Area (FATO)** is a circle with diameter of 1.5 times the maximum length of helicopter allowed to use the facility, which in the case of St. Mike's is a diameter of 25m. A Safety Area is established by extending the FATO outwards a further 3m or 0.166 multiple, but is specified as 33.3m diameter. Normally, all Arrival/Departure paths to a heliport are centred on the FATO.

Federal and Municipal Zoning By-Laws safeguard against new obstacles being erected that may penetrate the Obstacle Limitation Surfaces (OLS) beneath these flight paths. New heliport certification standards were published in June 2007 by Transport Canada as **CARs 325**, describing three types of non-instrument heliports: H1, H2, or H3. The latter H2 and H3 require that an emergency landing area must be located within 625m of the helipad. Since there is none in the vicinity of St. Michael's, the most stringent classification of H1 has been applied, stipulating that only multi-engine helicopters are permitted and operating restrictions are required. The H1 can have more than one approach path, but they must diverge by at least 135°, which is the case. Each path is protected by Obstacle Limitation Surfaces (OLS) which are specified in CARs 325 Table 4-1 as follows:

1. The Inner Edge or origin of the sloping OLS is the width of the Safety Area
2. The Inner Edge origin is half-width distance from centre of FATO
3. The height of the Inner edge is that of the Helipad
4. The divergence from the edge is 15% from track bearing (for night operations). This splay is equivalent to 8.5° each side of the edge.
5. A First Section extends to 245m from Inner Edge rising at a slope of 8% (1:12.5)
6. A Second Section extends 830m further with a slope of 16% (1:6.25)

These Obstacle Limitation Surfaces are defined and protected by the Zoning Order issued by the Province of Ontario at Reference A and will be clarified.

St. Michael's Heliport

The entry for St. Mike's in the Canada Flight Supplement is depicted on next page. The facility is listed as the "Toronto (St. Michael's Hosp) ON (Heli)", with the coded location identifier as CTM4. It is annotated as "Certified" and PPR status, which stipulates that Prior Permission is Required before use. Published technical details are: pad elevation 529' (161.0m) ASL, 60'x 60' aluminum touchdown pad, 106' x 106' overall, and maximum helicopter length of 54.6' (a large helicopter). FATO diameter is 25m and the Safety Area is specified at 33.3m. The Heliport is a non-instrument category, is classified H1, and operated in day or night, only during Visual Meteorological Conditions (VFR).

The latest zoning order defines the current St. Michael's flight paths as western track of 254°, northern between to 359° to 003°, and the eastern as 075° to 097°. The western and eastern sector bearings were updated by a degree to reflect current magnetic variation. The flight paths are shown on the Canada Flight Supplement entry shown on the next page.

Specifications of St. Mike's Heliport in the Canada Flight Supplement (CFS)

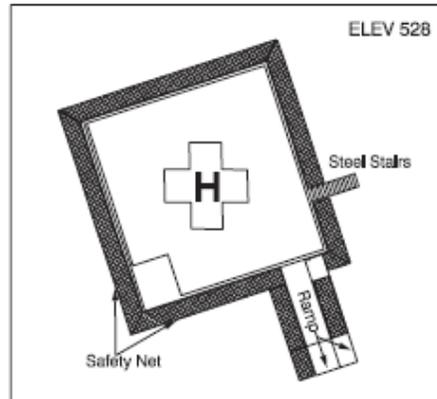
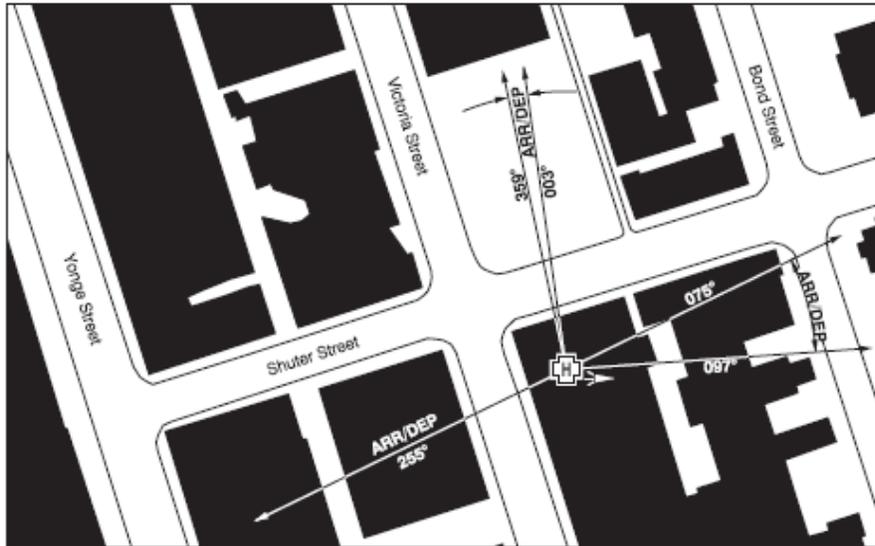
CANADA FLIGHT SUPPLEMENT / GPH 205

Effective 0901Z 20 June 2019 to 0901Z 15 August 2019

AERODROME/FACILITY DIRECTORY B1095

TORONTO (ST. MICHAEL'S HOSP) ON (Heli)

CTM4



| | |
|-----------|---|
| REF | N43 39 15 W79 22 42 Adj 11°W (2015) UTC-5(4) Elev 528' VTA A5000 |
| OPR | St.Michael's Hospital 416-864-5323 Cert PPR |
| FLT PLN | NOTAM FILE CYTZ |
| FIC | London 866-WXBRIEF (Toll free within Canada) or 866-541-4104 (Toll free within Canada & USA) |
| HELI DATA | FATO 82' x 82' non-supporting TLOF 60' x 60' rooftop Safety Area 109' x 109' non-supporting 16,000lbs Max heli overall length 54.7' |
| RCR | Opr |
| LIGHTING | RY(LO) Green FL(LO) |
| COMM | |
| TWR | Toronto 118.35 118.7 City 118.2 119.2 |
| A/G | Ambulance dispatch 129.275 |
| PRO | Arr/dep 255° and 359° to 003° and 075° to 097° fr heli, slope 8% (H1), day/night use. |
| CAUTION | Significant obst in vic. High rise condo NNW of heli. |

Toronto Hospital for Sick Children (HSC) Heliport

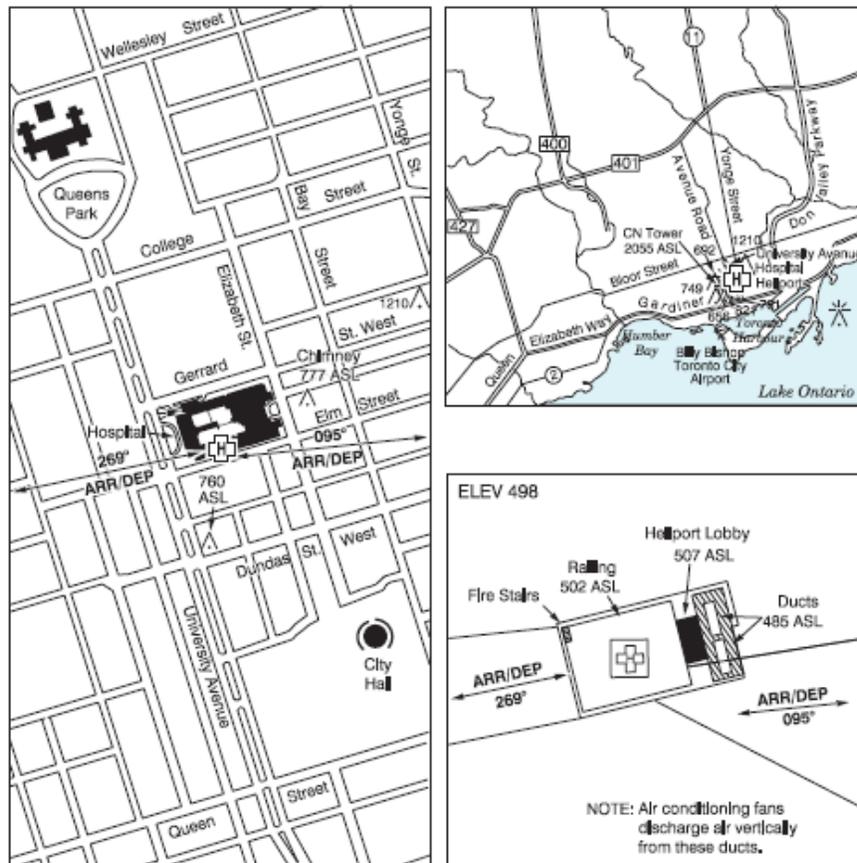
The entry in the Canada Flight Supplement for **HSC Heliport** is depicted below. It is listed as the "Toronto (Hosp for Sick Children) ON (Heli)", with the coded location identifier as CNW8. It is annotated as "Certified" and PPR status. Published technical details are: pad elevation 498' (151.5m) above sea level (ASL), pad diameter 86', maximum helicopter weight 33,000 lbs, and maximum helicopter length of 57.5' (a large helicopter). The heliport is a non-instrument category, classified H1, and operated in day or night, only during Visual Meteorological Conditions (VFR). FATO diameter is 26.25m and the Safety Area is specified at 35.0m.

There are two access routes to Sick Kids, called Arr/Dep paths, on bearings 269° (west) and 095° (east) from the heliport.

Specifications of Sick Kids Heliport in the Canada Flight Supplement (CFS)

TORONTO (HOSP FOR SICK CHILDREN) ON (Heli)

CNW8



| | |
|------------------|--|
| REF | N43 39 24 W79 23 15 11°W UTC-5(4) Elev 498' VTA A5000 |
| OPR | Hosp for Sick Children 416-813-7500 Cert PPR |
| FLT PLN | NOTAM FILE CYTZ |
| FIC | London 866-WXBRIEF (Toll free within Canada) or 866-541-4104 (Toll free within Canada & USA) |
| HELI DATA | Roof top 86' dia 33,000 lbs Max heli overall length 57.5' |
| LIGHTING | RY(LO) RF(FL) |

