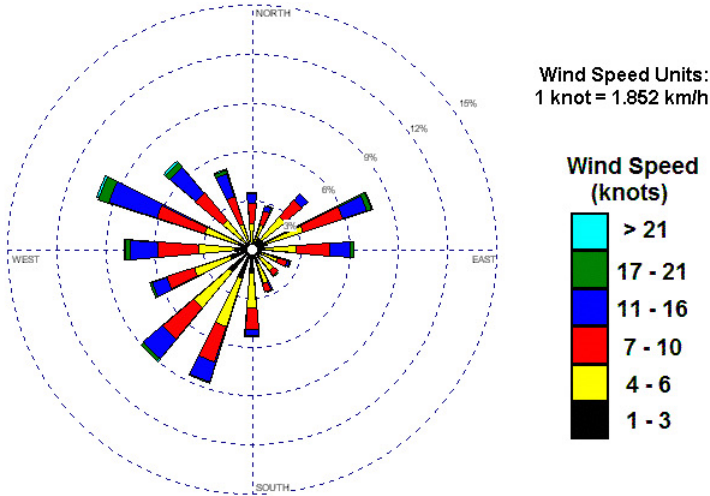
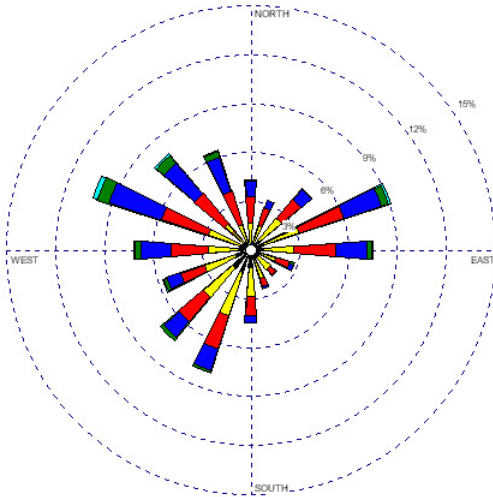


**OTTAWA
AIRPORT**

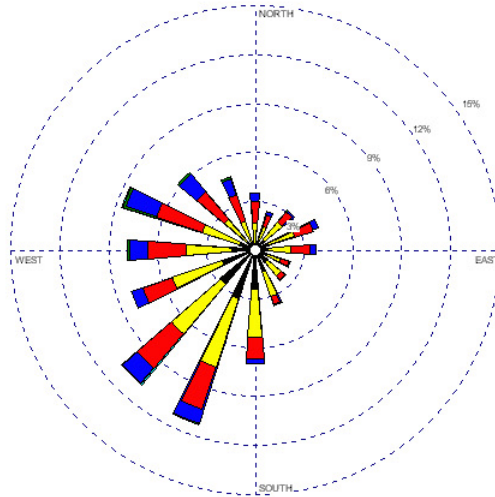


ANNUAL Windrose

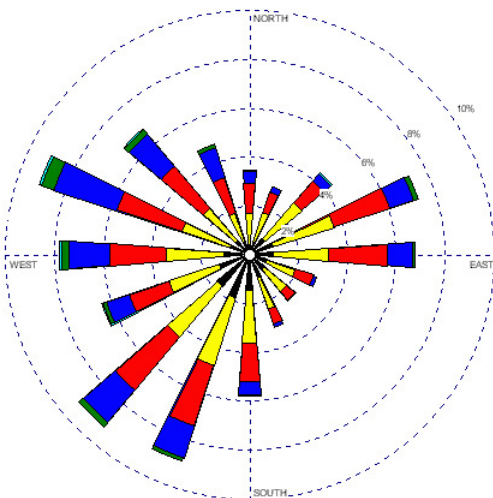
Based on data from 1971 - 2000



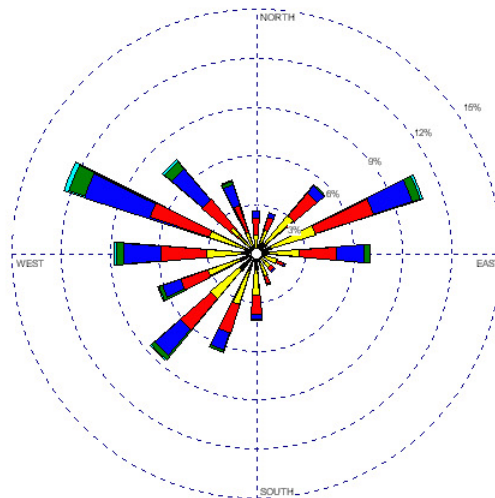
SPRING (Mar/Apr/May)



SUMMER (Jun/Jul/Aug)

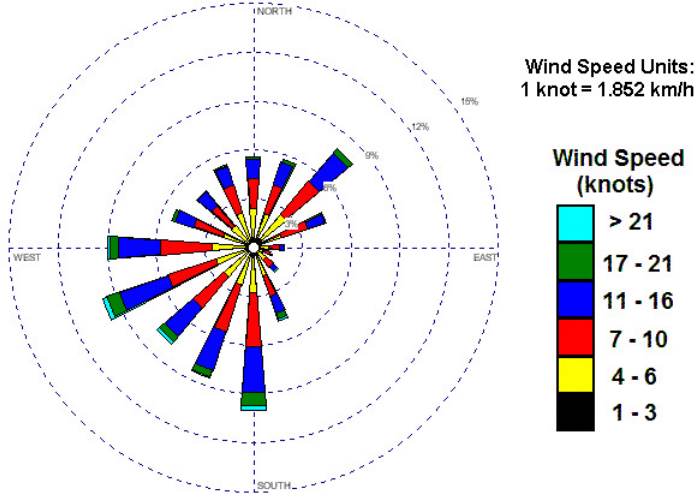


FALL (Sep/Oct/Nov)



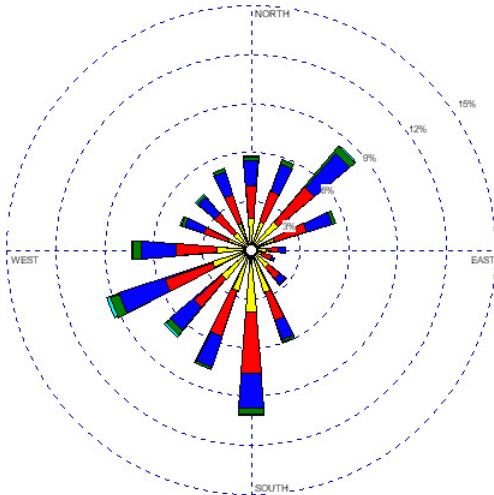
WINTER (Dec/Jan/Feb)

KINGSTON AIRPORT

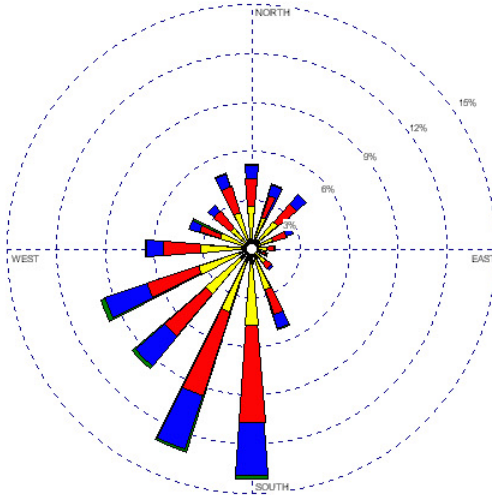


ANNUAL Windrose

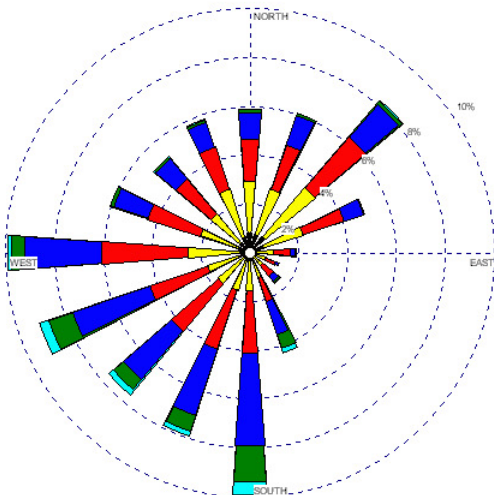
Based on Data from 1971 - 2000, 6AM - 11PM Local Time



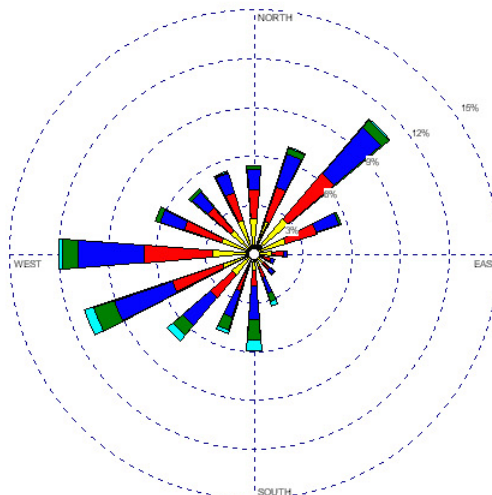
SPRING (Mar/Apr/May)



SUMMER (Jun/Jul/Aug)

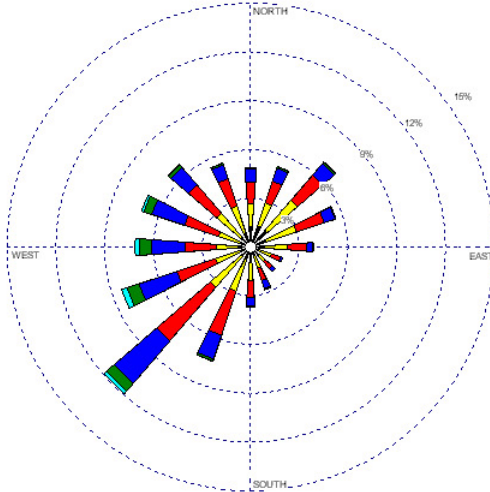


FALL (Sep/Oct/Nov)



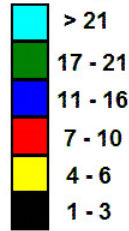
WINTER (Dec/Jan/Feb)

TRENTON AIRPORT



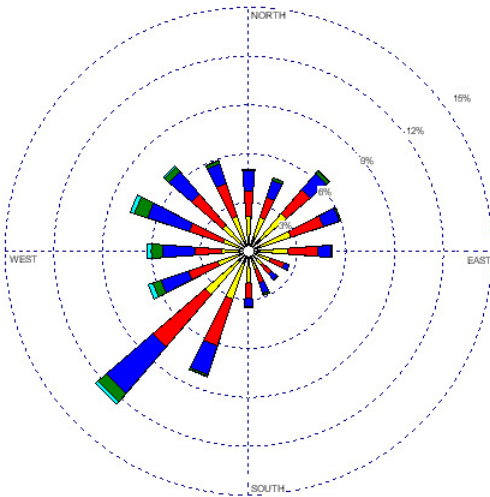
Wind Speed Units:
1 knot = 1.852 km/h

Wind Speed (knots)

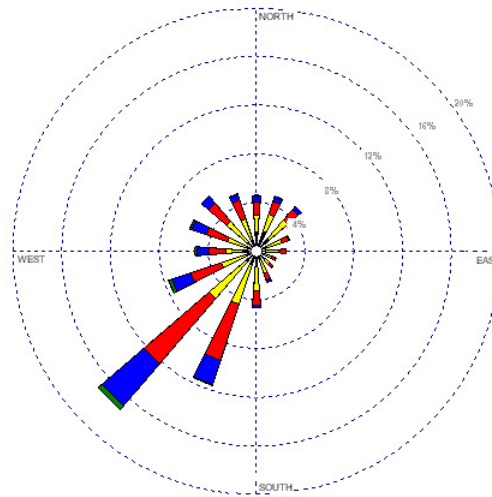


ANNUAL Windrose

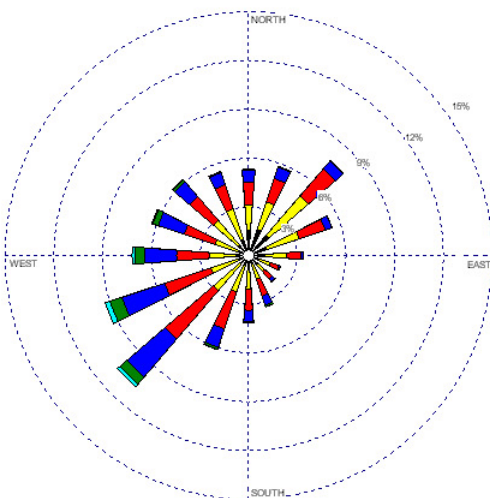
Based on data from 1971 - 2000



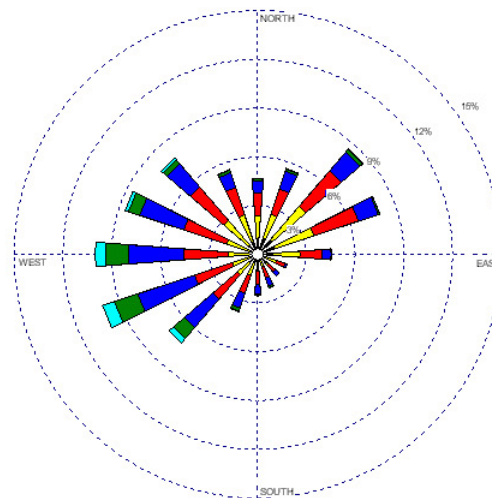
SPRING (Mar/Apr/May)



SUMMER (Jun/Jul/Aug)

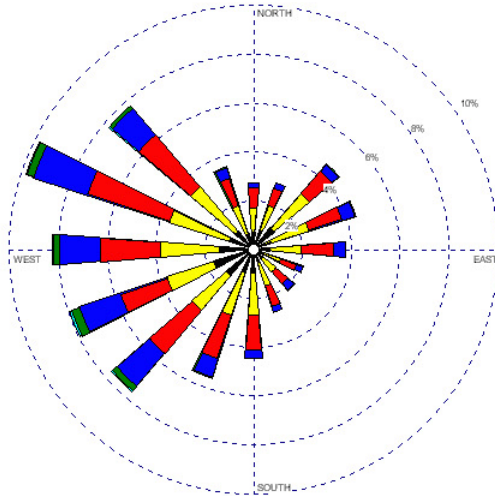


FALL (Sep/Oct/Nov)



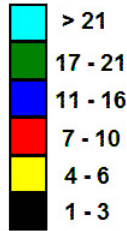
WINTER (Dec/Jan/Feb)

**PETERBOROUGH
AIRPORT**



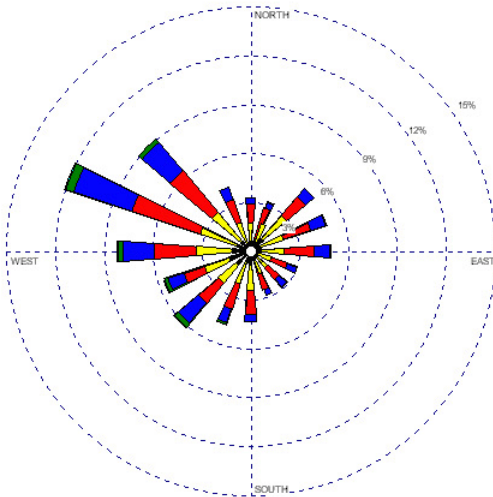
Wind Speed Units:
1 knot = 1.852 km/h

**Wind Speed
(knots)**

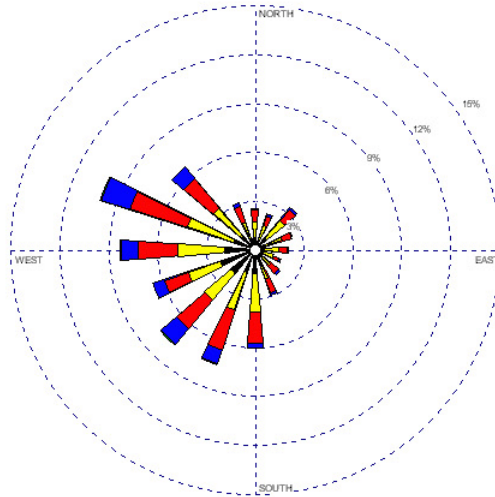


ANNUAL Windrose

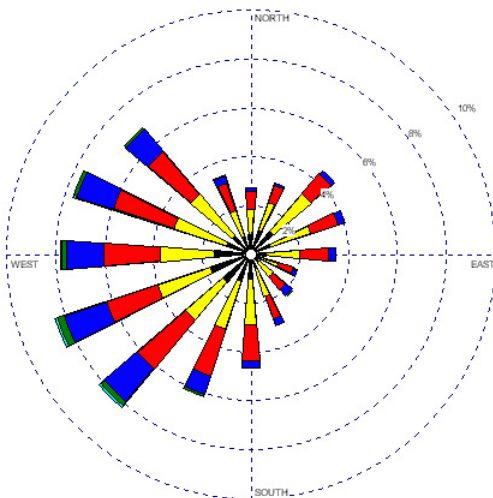
Based on Data from 1973 - 2000



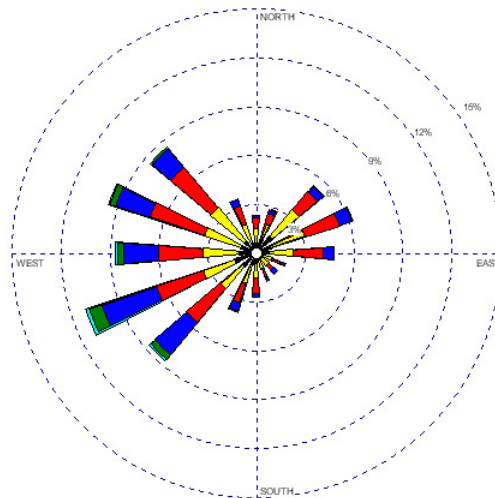
SPRING (Mar/Apr/May)



SUMMER (Jun/Jul/Aug)



FALL (Sep/Oct/Nov)



WINTER (Dec/Jan/Feb)



Atmospheric Hazards Web Site - Ontario

MSC - EC - GC

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WIND ROSES

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A wind rose is often used to summarize the characteristics of wind (wind climatology) found at a measurement location. It can display wind speed, direction and frequency information for any selected period of time and station for which wind measurements have been taken. The annual and seasonal wind roses presented on this website are based on observed wind data from the 30-year period, 1971-2000. For some stations, the data is only available for a shorter period of record than 1971-2000 (e.g. 1986-2000 for Toronto Buttonville Municipal Airport). The annual wind roses represent wind measurements taken over the available period, while seasonal wind roses depict data only from the respective seasons: Winter (December-February), Spring (March – May), Summer (June – August), and Fall (September – November).

Hourly measurements of average wind speed and direction, used in the generation of the wind roses, are measured at airport locations in Ontario and have been extracted from Environment Canada's National Climate Data Archive. The instrumented wind measurements are made by anemometers, which are typically at 10 m height above the ground surface at level, open sites, free from surrounding obstacles to the wind flow such as trees or buildings (although some exceptions from this standard may occur). In most cases, the hourly wind observations are taken 24 hours per day. However, there are some locations where the observing program is limited to a shorter period than 24 hours (e.g. 15 hours, primarily during the day, at Hamilton Airport).

The wind rose can be thought of as a compass, with north pointing upwards on a wind rose graphic. Each of the extending arms on the wind rose represents one of the 16 wind directions the wind is blowing FROM. Hence a wind from the north would be represented by an arm pointing towards the top of the wind rose. The full 360 degree range of direction is divided equally into the 16 compass points, meaning each of the compass points (e.g. N, NNE, NE, ENE, E, etc.) represents a 22.5 degree range. Consequently, a wind direction classified from the north (N) would represent winds recorded between 348.75 and 11.25 degrees, as measured from TRUE north.

Concentric circles drawn from the centre of the wind rose represent the percent frequency of wind occurrences from each direction (see example below). The longer the arm for a specific direction, the more frequent the wind is from that direction. Note that summing the frequencies for all directional arms may not necessarily add to 100%, since "calm" periods (or periods with wind speeds under 1 knot) are not included. The difference between 100% and the sum of all the arm frequencies would represent the frequency of calms. The frequency of calm winds varies widely between stations.

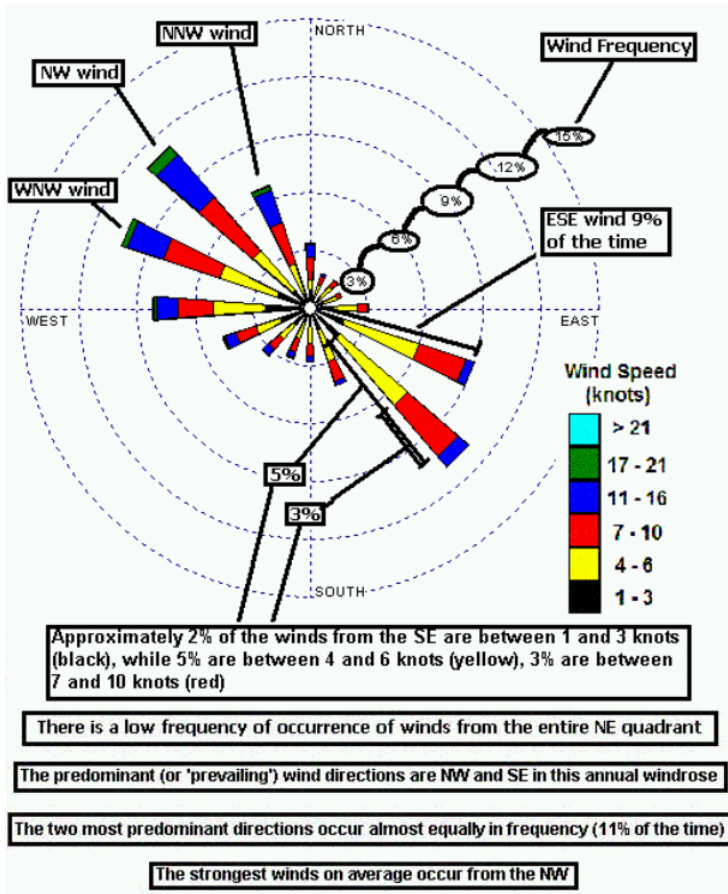
Also shown on the wind rose is an indication of the frequency of wind speeds within six specific speed categories, with wind speeds measured in knots. The six wind speed categories in knots are shown below, with their equivalent speeds in kilometers per hour and meters per second also provided:

Speed Category	Wind Speed (knots)	Wind Speed (km/h)	Wind Speed (m/s)
1 (black)	1 to < 4	1.8 to < 7.2	0.5 to < 2.0
2 (yellow)	4 to < 7	7.2 to < 12.6	2.0 to < 3.5
3 (red)	7 to < 11	12.6 to < 19.8	3.5 to < 5.5
4 (blue)	11 to < 17	19.8 to < 30.6	5.5 to < 8.5
5 (green)	17 to < 21	30.6 to < 40.6	8.5 to < 11.3
6 (light blue)	21 and over	40.6 and over	11.3 and over

As noted above, wind speeds under the lowest threshold (1 knot) are classified as "calm" and not included in the six categories.

The different colours of each section of the arm represent the wind speed frequency found within each speed category. For example, a longer 'red' section of the arm would indicate a more frequently occurring wind speed between 7 and 11 knots. The concentric circles can assist in interpreting the frequencies within each wind speed category. In the sample wind rose below, the concentric circles represent frequencies at 3%, 6%, 9%, 12% and 15% intervals for each wind speed category and direction. It should be noted that the percentage frequency values of the concentric circles can differ between wind roses. The frequencies are scaled to best fit the observed wind data frequencies.

A sample of an ANNUAL wind rose and some interpreted information is shown below. The interpretations are outlined in the boxes. In this example, the wind information is based on data from the observational period 1971-2000.



DOCUMENTATION PREPARED BY:

Meteorological Service of Canada-Ontario Region, August 2004.

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 Environment Canada's World Wide Web Site.

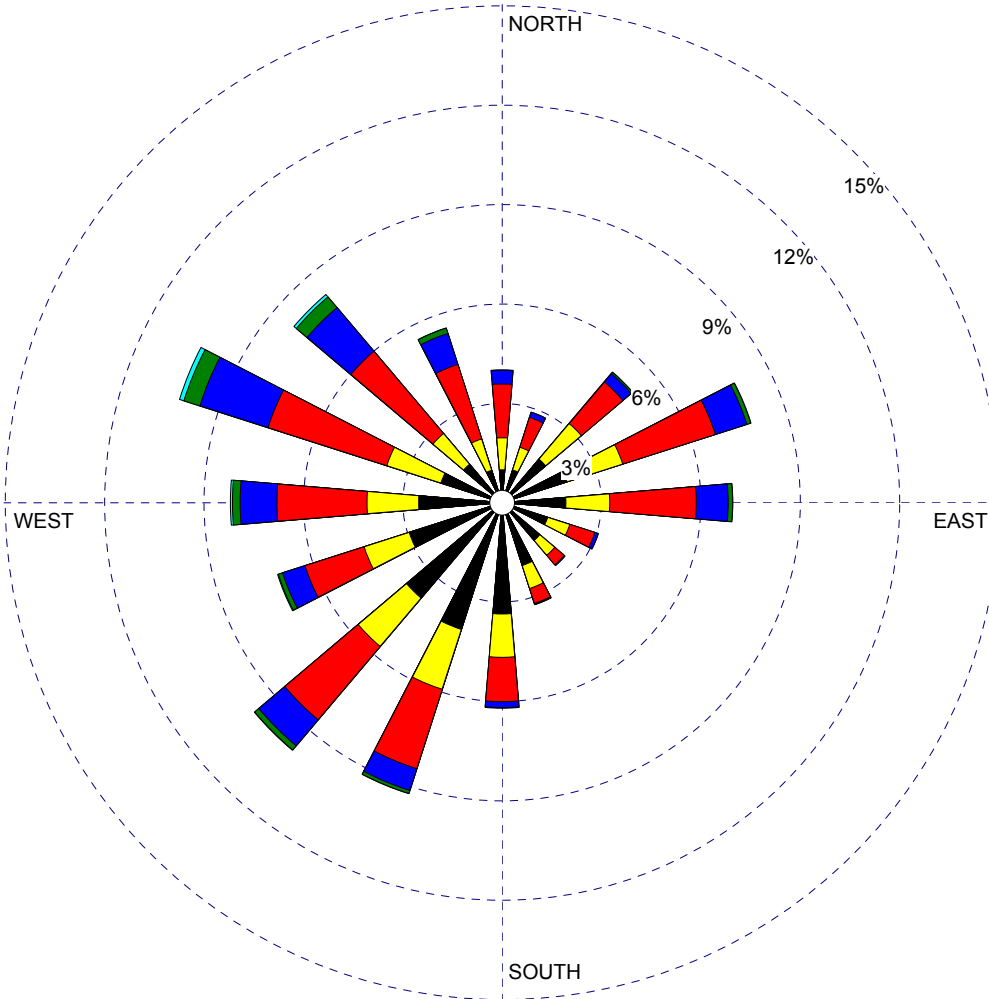


WIND ROSE PLOT:

**MOE Eastern Region (Ottawa, Peterborough, Belleville) Annual Windrose
Station #61060 - Ottawa, ON**

DISPLAY:

**Wind Speed
Direction (blowing from)**



WIND SPEED
(m/s)

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

Calms: 0.00%

COMMENTS:

1996-2000 Hourly
Data Availability: 99.06%

DATA PERIOD:

**1996-2002
Jan 1 - Dec 31
00:00 - 23:00**

COMPANY NAME:

XCG Consultants Ltd.

MODELER:

DYC

CALM WINDS:

0.00%

TOTAL COUNT:

54347 hrs.

AVG. WIND SPEED:

3.33 m/s

DATE:

4/24/2009

PROJECT NO.:

1-664-17-03

