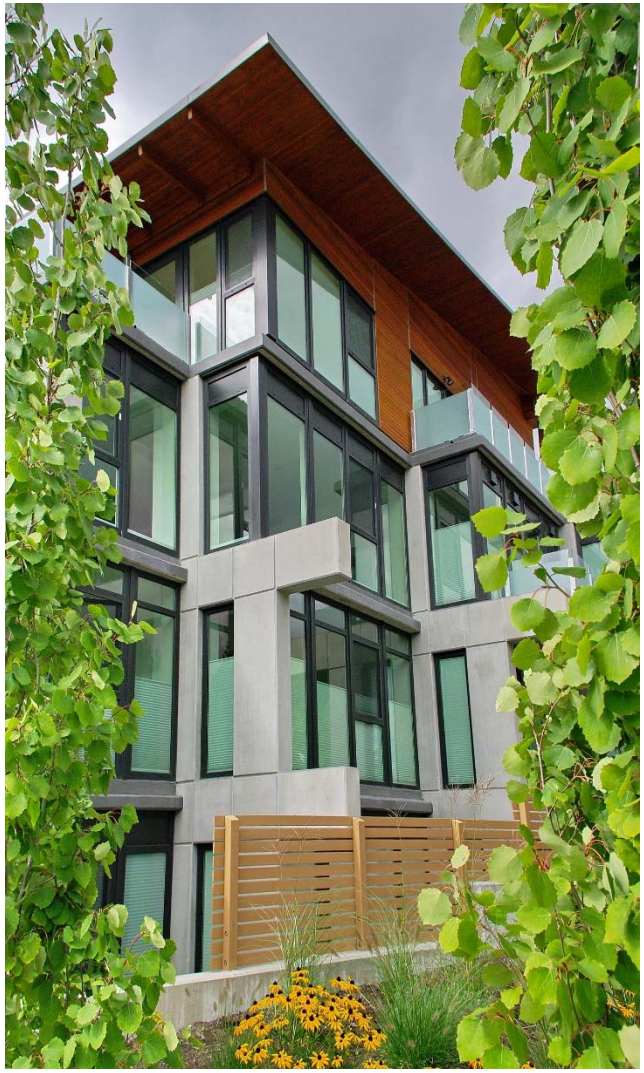
Specifying with the Canadian Supplement

BOABC FALL CONFERENCE
SEPTEMBER 24, 2014
PRESENTED BY AL JAUGELIS

RDH

Topics covered



1. Performance Grade review
2. Use and limitations of the Canadian Supplement
3. Four common mistakes specifiers make
4. Review & summary

1. Performance Grade review

9.7.4.2. General

1) Manufactured and pre-assembled windows, doors and skylights and their installation shall conform to

   a) **AAMA/WDMA/CSA 101/I.S.2/A440,** "**NAFS** – North American Fenestration Standard/Specification for Windows, Doors, and Skylights" (Harmonized Standard),

   b) **A440S1, "Canadian Supplement to** AAMA/WDMA/CSA 101/I.S.2/A440, **NAFS** – North American Fenestration Standard/Specification for Windows, Doors, and Skylights,"

5.10.2.2. Applicable Standards

1) Windows, doors and skylights shall conform to the requirements in

   a) **AAMA/WDMA/CSA 101/I.S.2/A440**, "**NAFS** – North American Fenestration Standard/Specification for Windows, Doors, and Skylights," and

   b) **CSA A440S1**, "**Canadian Supplement to** AAMA/WDMA/CSA 101/I.S.2/A440, **NAFS** – North American Fenestration Standard/Specification for Windows, Doors, and Skylights."

Continued . . .

NAFS in BCBC Part 5 (and Part 9)

2) Performance grades for windows, doors and skylights shall be selected according to the Canadian Supplement referenced in Clause (1)(b) so as to be appropriate for the conditions and geographic location in which the window, door or skylight will be installed.

What is "Performance Grade?"

= The American ABC rating for air-water-structural performance

Performance Grade – the American ABC rating

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Table 3
Canada (only) optional performance grades (PG)

(See Clauses 0.2.6.1, 4.3.2.2, 4.4.3.2–4.4.3.4, 5.3.3.1, 6.3

B-rating

C-rating

Performance class and optional performance grade (PG)				Design pressure (DP)		Structural test pressure (STP)		Water penetration resistance test pressure			
								R, LC, CW		AW	
R	LC	CW	AW	Pa	(psf)	Pa	(psf)	Pa	(psf)	Pa	(psf)
20	—	—	—	960	(20.00)	1 440	(30.00)	150	(3.00)	—	—
25	—	—	—	1 200	(25.00)	1 800	(37.50)	180	(3.75)	—	—
30	30	—	—	1 440	(30.00)	2 160	(45.00)	220	(4.50)	—	—
35	35	35	—	1 680	(35.00)	2 520	(52.50)	260	(5.25)	—	—
40	40	40	—	1 920	(40.00)	2 880	(60.00)	290	(6.00)	—	—
PG 45	45	45	45	2 160	(45.00)	3 240	(67.50)	330	(6.75)	440	(9.00)
50	50	50	50	2 400	(50.00)	3 600	(75.00)	360	(7.50)	480	(10.00)
55	55	55	55	2 640	(55.00)	3 960	(82.50)	400	(8.25)	530	(11.00)
60	60	60	60	2 880	(60.00)	4 320	(90.00)	440	(9.00)	580	(12.00)

A-rating – Air Leakage Test
(Pass/Fail)

Performance Grade – the American ABC rating

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Canada (only) optional performance grades (PG)
(See Clauses 0.2.6.1, 4.3.2.2, 4.4.3.2–4.4.3.4, 5.3.3.1, 6.3

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25	—	—	—	1 200	(25.00)	1 800	(37.50)	180	(3.75)	—	—
30	30	—	—	1 440	(30.00)	2 160	(45.00)	220	(4.50)	—	—
35	35	35	—	1 680	(35.00)	2 520	(52.50)	260	(5.25)	—	—
40	40	40	—	1 920	(40.00)	2 880	(60.00)	290	(6.00)	—	—
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A-rating – Air Leakage Test
(Pass/Fail)

What is different about
"Performance Grade"
in Canada?

= Specify Air & Water separately
from Design Pressure

Choose Performance Grade on basis of design pressure

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Table 3
Canada (only) optional performance grades (PG)

(See Clauses 0.2.6.1, 4.3.2.2, 4.4.3.2–4.4.3.4, 5.3.3.1, 5.3.4.2, and 5.3.4.3.)

Performance class and optional performance grade (PG)				Design pressure (DP)		Structural test pressure (STP)		Water penetration resistance test pressure			
								R, LC, CW		AW	
R	LC	CW	AW	Pa	(psf)	Pa	(psf)	Pa	(psf)	Pa	(psf)
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25	—	—	—	1 200	(25.00)	1 800	(37.50)	180	(3.75)	—	—
30	30	—	—	1 440	(30.00)	2 160	(45.00)	220	(4.50)	—	—
35	35	35	—	1 680	(35.00)	2 520	(52.50)	260	(5.25)	—	—
40	40	40	—	1 920	(40.00)	2 880	(60.00)	290	(6.00)	—	—
45	45	45	45	2 160	(45.00)	3 240	(67.50)	330	(6.75)	440	(9.00)
50	50	50	50	2 400	(50.00)	3 600	(75.00)	360	(7.50)	480	(10.00)
55	55	55	55	2 640	(55.00)	3 960	(82.50)	400	(8.25)	530	(11.00)
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Choose Performance Grade on basis of design pressure

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(See Clauses 0.2.6.1, 4.3.2.2, 4.4.3.2–4.4.3.4, 5.3.3.1, 5.3.4.2, and 5.3.4.3.)

Performance class and optional performance grade (PG)				Design pressure (DP)		Structural test pressure (STP)		Water penetration resistance test pressure			
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R	LC	CW	AW	Pa	(psf)	Pa	(psf)	Pa	(psf)	Pa	(psf)
20	—	—	—	960	(20.00)	1 440	(30.00)	150	(3.00)	—	—
25	—	—	—	1 200	(25.00)	1 800	(37.50)	180	(3.75)	—	—
PG 30	30	—	—	1 440	(30.00)	2 160	(45.00)	220	(4.50)	—	—
35	35	35	—	1 680	(35.00)	2 520	(52.50)	260	(5.25)	—	—
40	40	40	—	1 920	(40.00)	2 880	(60.00)	290	(6.00)	—	—
45	45	45	45	2 160	(45.00)	3 240	(67.50)	330	(6.75)	440	(9.00)
50	50	50	50	2 400	(50.00)	3 600	(75.00)	360	(7.50)	480	(10.00)
55	55	55	55	2 640	(55.00)	3 960	(82.50)	400	(8.25)	530	(11.00)
60	60	60	60	2 880	(60.00)	4 320	(90.00)	440	(9.00)	580	(12.00)

Specify: PG 30, Water test pressure 220 Pa

Choose Performance Grade on basis of design pressure

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Table 3
Canada (only) optional performance grades (PG)
(See Clauses 0.2.6.1, 4.3.2.2, 4.4.3.2–4.4.3.4, 5.3.3.1, 5.3.4.2, and 5.3.4.3.)

Performance class and optional performance grade (PG)				Design pressure (DP)		Structural test pressure (STP)		Water penetration resistance test pressure			
								R, LC, CW		AW	
R	LC	CW	AW	Pa	(psf)	Pa	(psf)	Pa	(psf)	Pa	(psf)
20	—	—	—	960	(20.00)	1 440	(30.00)	150	(3.00)	—	—
25	—	—	—	1 200	(25.00)	1 800	(37.50)	180	(3.75)	—	—
30	30	—	—	1 440	(30.00)	2 160	(45.00)	220	(4.50)	—	—
35	35	35	—	1 680	(35.00)	2 520	(52.50)	260	(5.25)	—	—
40	40	40	—	1 920	(40.00)	2 880	(60.00)	290	(6.00)	—	—
45	45	45	45	2 160	(45.00)	3 240	(67.50)	330	(6.75)	440	(9.00)
50	50	50	50	2 400	(50.00)	3 600	(75.00)	360	(7.50)	480	(10.00)
55	55	55	55	2 640	(55.00)	3 960	(82.50)	400	(8.25)	530	(11.00)
60	60	60	60	2 880	(60.00)	4 320	(90.00)	440	(9.00)	580	(12.00)

Choose Performance Grade on basis of design pressure

Table 3
Canada (only) optional performance grades (PG)
(See Clauses 0.2.6.1, 4.3.2.2, 4.4.3.2–4.4.3.4, 5.3.3.1, 5.3.4.2, and 5.3.4.3.)

Performance class and optional performance grade (PG)				Design pressure (DP)		Structural test pressure (STP)		Water penetration resistance test pressure			
								R, LC, CW		AW	
R	LC	CW	AW	Pa	(psf)	Pa	(psf)	Pa	(psf)	Pa	(psf)
20	—	—	—	960	(20.00)	1 440	(30.00)	150	(3.00)	—	—
25	—	—	—	1 200	(25.00)	1 800	(37.50)	180	(3.75)	—	—
PG 30	30	—	—	1 440	(30.00)	2 160	(45.00)	220	(4.50)	—	—
35	35	35	—	1 680	(35.00)	2 520	(52.50)	260	(5.25)	—	—
40	40	40	—	1 920	(40.00)	2 880	(60.00)	290	(6.00)	—	—
45	45	45	45	2 160	(45.00)	3 240	(67.50)	330	(6.75)	440	(9.00)
50	50	50	50	2 400	(50.00)	3 600	(75.00)	360	(7.50)	480	(10.00)
55	55	55	55	2 640	(55.00)	3 960	(82.50)	400	(8.25)	530	(11.00)
60	60	60	60	2 880	(60.00)	4 320	(90.00)	440	(9.00)	580	(12.00)

Specify: PG 30, Water test pressure 290 Pa

Primary and Secondary Designators

Manufacturer name – series/model of product

Primary — Class CW – PG30: Size Tested 800 x 1500 mm

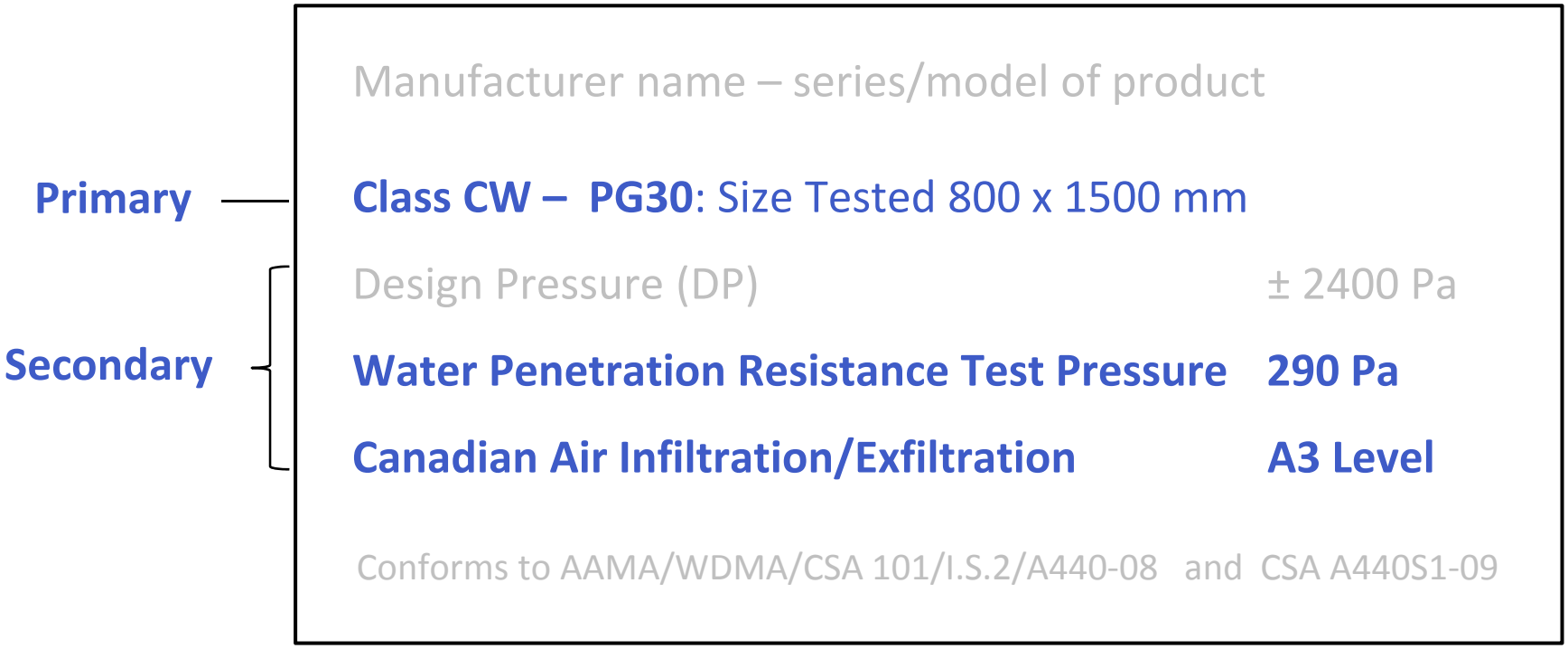
Secondary

Design Pressure (DP)	± 2400 Pa
Water Penetration Resistance Test Pressure	290 Pa
Canadian Air Infiltration/Exfiltration	A3 Level

Conforms to AAMA/WDMA/CSA 101/I.S.2/A440-08 and CSA A440S1-09

Primary and secondary designators allow Air, Water and Structural ratings to be specified and reported separately

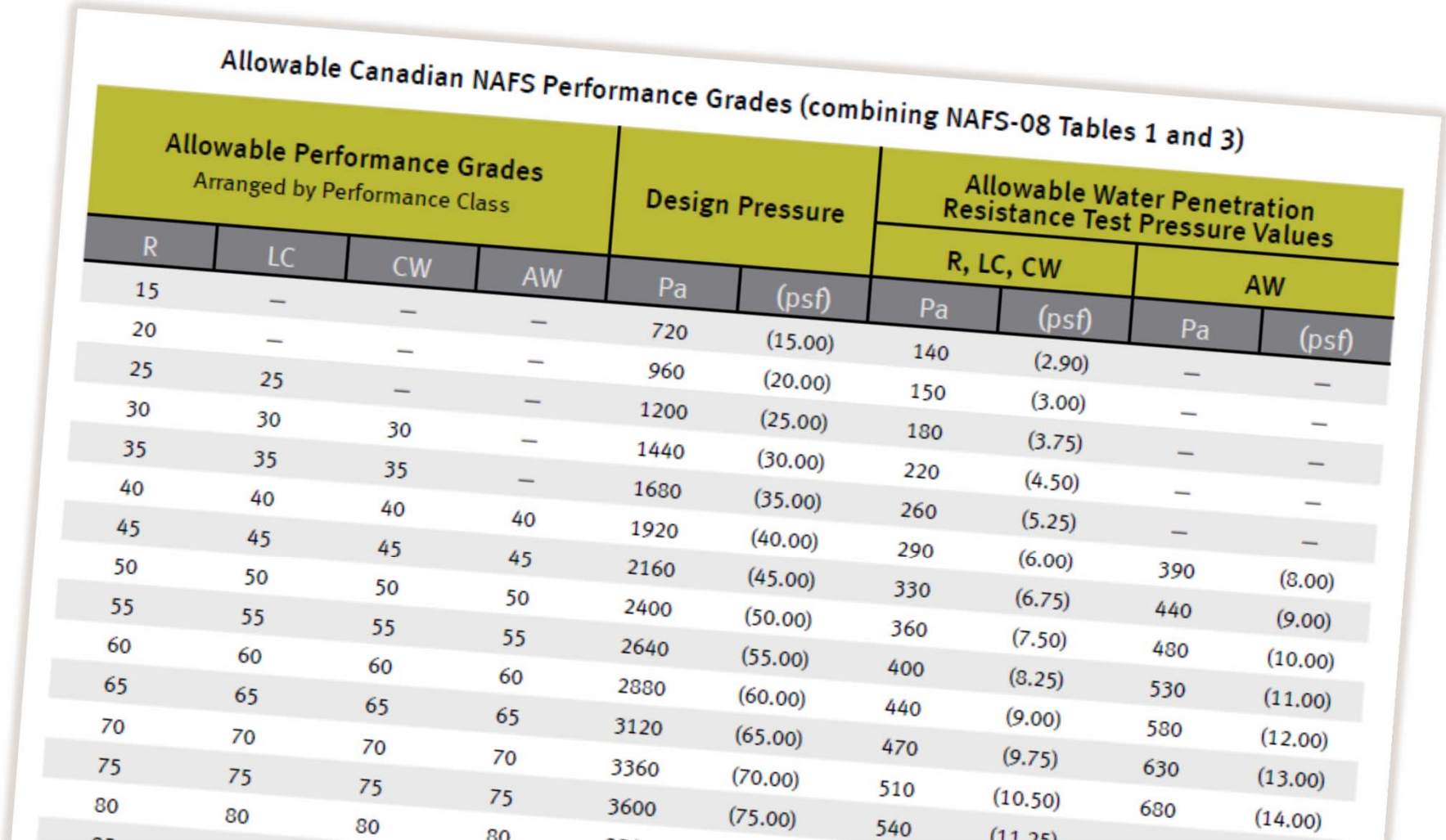
Primary and Secondary Designators



Primary and secondary designators allow Air, Water and Structural ratings to be specified and reported separately

Performance Grade

Useful resource:



Allowable Canadian NAFS Performance Grades (combining NAFS-08 Tables 1 and 3)

Allowable Performance Grades Arranged by Performance Class				Design Pressure		Allowable Water Penetration Resistance Test Pressure Values			
						R, LC, CW		AW	
R	LC	CW	AW	Pa	(psf)	Pa	(psf)	Pa	(psf)
15	—	—	—	720	(15.00)	140	(2.90)	—	—
20	—	—	—	960	(20.00)	150	(3.00)	—	—
25	25	—	—	1200	(25.00)	180	(3.75)	—	—
30	30	30	—	1440	(30.00)	220	(4.50)	—	—
35	35	35	—	1680	(35.00)	260	(5.25)	—	—
40	40	40	40	1920	(40.00)	290	(6.00)	390	(8.00)
45	45	45	45	2160	(45.00)	330	(6.75)	440	(9.00)
50	50	50	50	2400	(50.00)	360	(7.50)	480	(10.00)
55	55	55	55	2640	(55.00)	400	(8.25)	530	(11.00)
60	60	60	60	2880	(60.00)	440	(9.00)	580	(12.00)
65	65	65	65	3120	(65.00)	470	(9.75)	630	(13.00)
70	70	70	70	3360	(70.00)	510	(10.50)	680	(14.00)
75	75	75	75	3600	(75.00)	540	(11.25)		
80	80	80	80						

2. Use and Limitations of CSA A440S1-09, the Canadian Supplement to NAFS

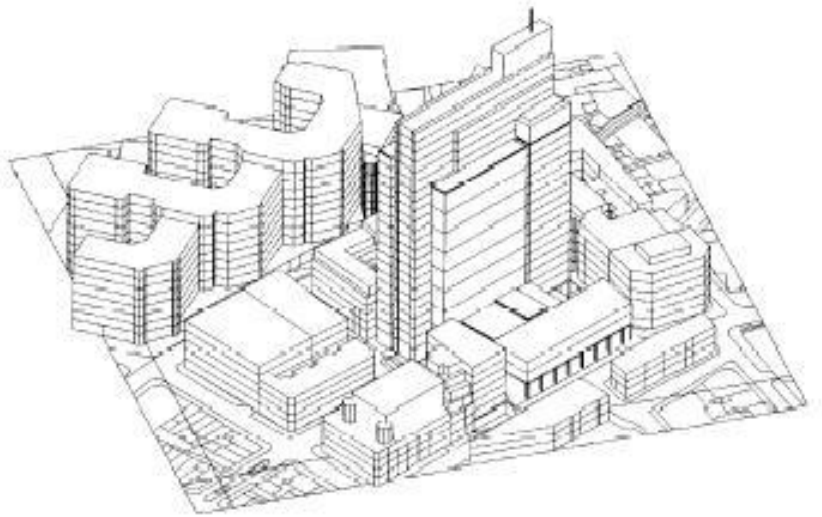
So, how do I determine what "Performance Grade" I need for a particular building?

NAFS in BCBC Part 5 (and Part 9)

2) Performance grades for windows, doors and skylights shall be selected according to the Canadian Supplement referenced in Clause (1)(b) so as to be appropriate for the conditions and geographic location in which the window, door or skylight will be installed.

Performance Grade, Water Test Pressure

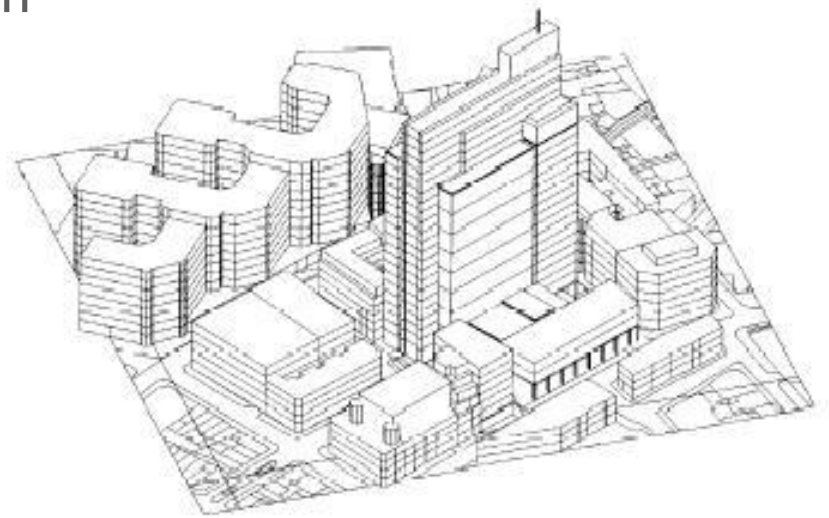
These properties determined using Canadian Supplement, based on the following input variables:



Performance Grade, Water Test Pressure

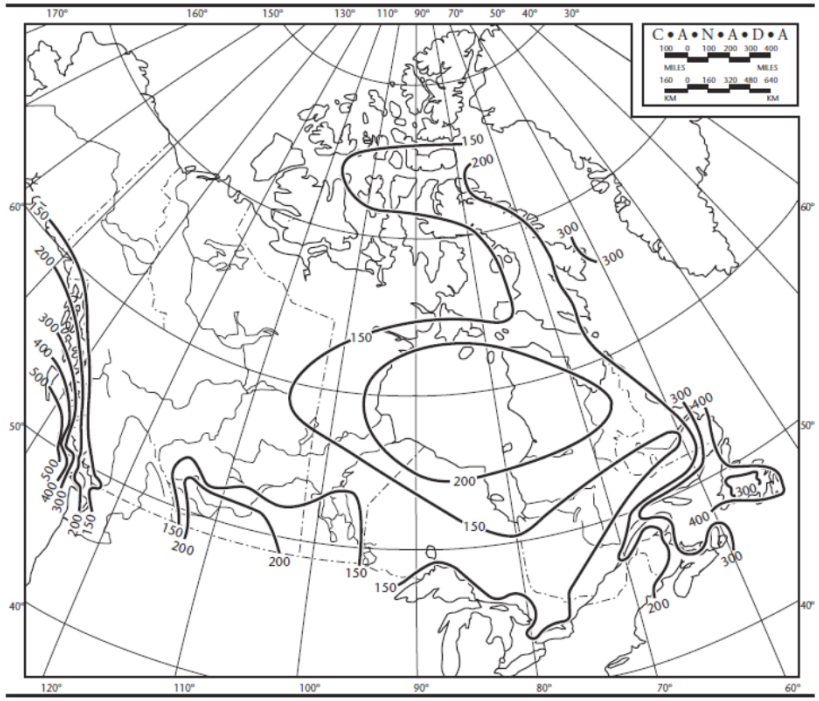
These properties determined using Canadian Supplement, based on the following input variables:

- Location
  - Code/Supplement has climate data for > 600 locations across Canada
- Fenestration height above grade
- Terrain: Rough, Open or in between



Why is location important?

→ Wind pressures and precipitation vary by location

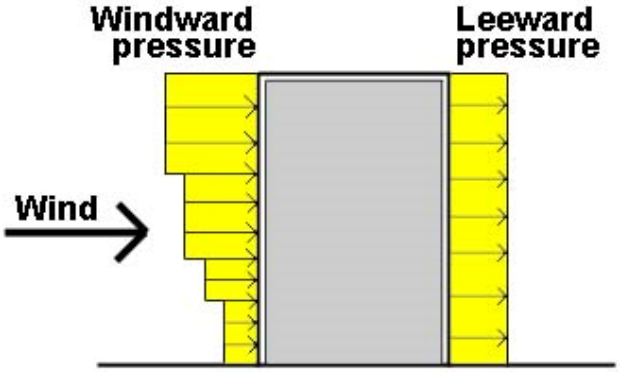


Notes:
(1) *Figure A.2 is taken from Environment Canada.*
(2) *See Notes (2) and (3) of Table A.1.*

Figure A.2
DRWP map (ten-year return period)

Why is height important?

- → Positive wind pressure increases with building height
- → Windows/doors on upper floors subject to higher wind pressures, higher driving rain wind pressures



Why is terrain important?

- → Buildings and trees moderate the effects of wind, reduce design wind pressure

- → Open terrain: FULL EXPOSURE to wind pressure
- → Rough terrain: SIGNIFICANT MODERATION of wind pressure

Terrain defined

→ Open vs. Rough terrain

Terrain definitions in Building Code	Terrain definition in Supplement
[Open] terrain is **level terrain with only scattered buildings, trees or other obstructions, open water or shorelines**. . .	Open terrain – level terrain with relatively few buildings, trees, or other obstructions ~~and relatively little open water or shoreline~~
[Rough] terrain is suburban, urban or wooded terrain extending upwind from the building uninterrupted for at least **1 km or 20 times the building height**, whichever is greater.	Rough terrain – suburban, urban, or wooded terrain that extends upwind from a building and that is uninterrupted for at least 1 km or *10 times* the building height, whichever is greater.

Terrain defined in Code: BCBC 4.1.7.1.(5)

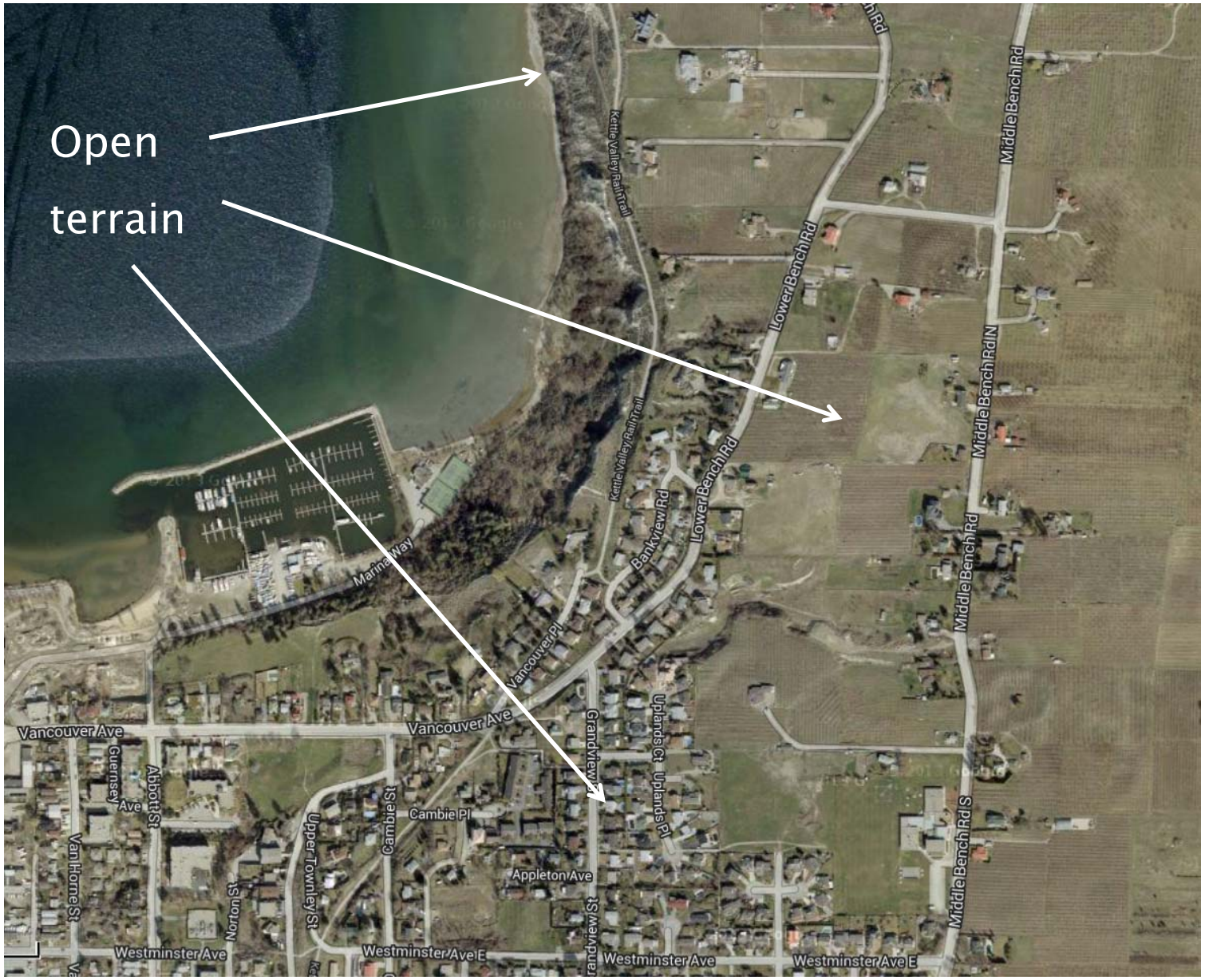
- **[Open] terrain** is level terrain with only scattered buildings, trees or other obstructions, open water or shorelines. . .

  = No protection from wind

- **[Rough] terrain** is suburban, urban or wooded terrain extending upwind from the building uninterrupted for at least **1 km or 20 times the building height**, whichever is greater.

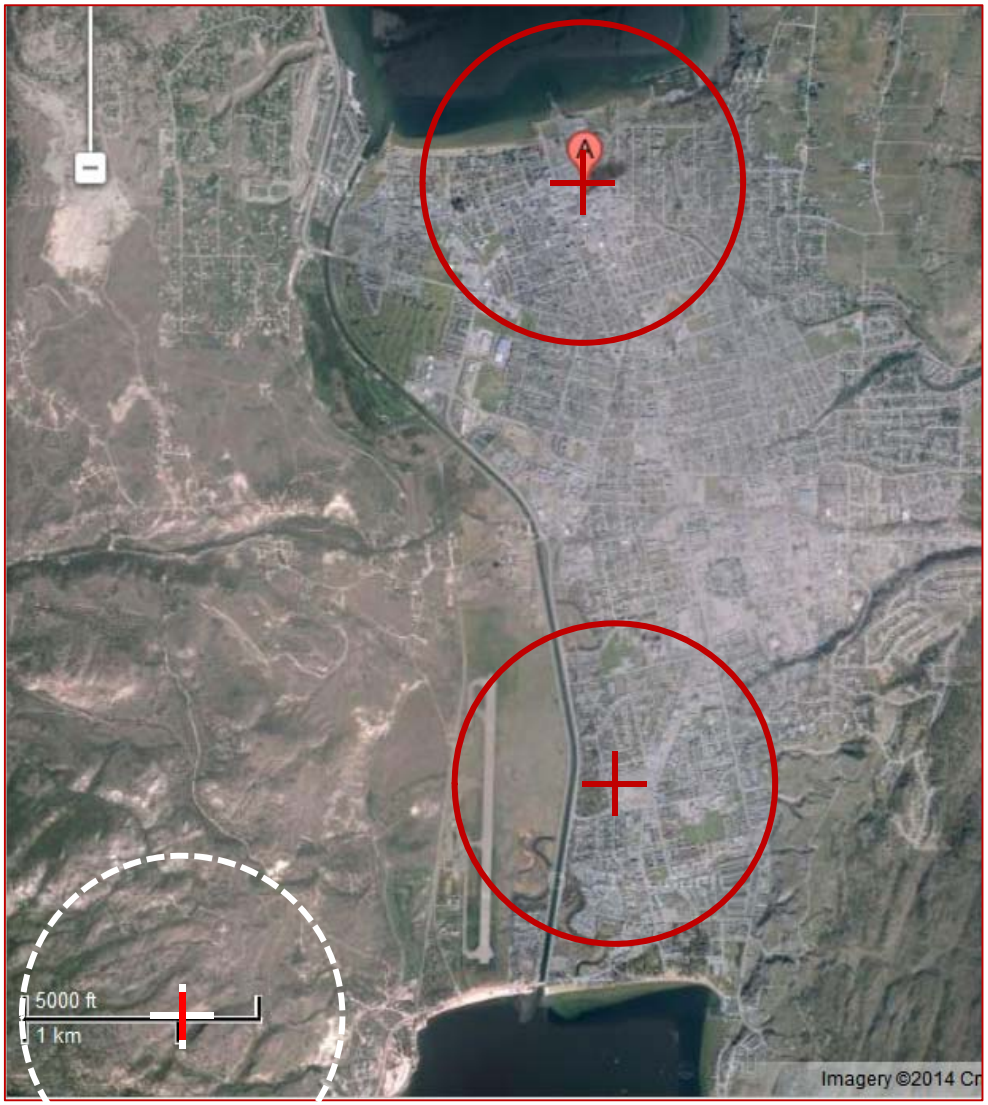
= Significant protection from wind, lower design pressure than rough terrain

Terrain definitions illustrated: Penticton, BC



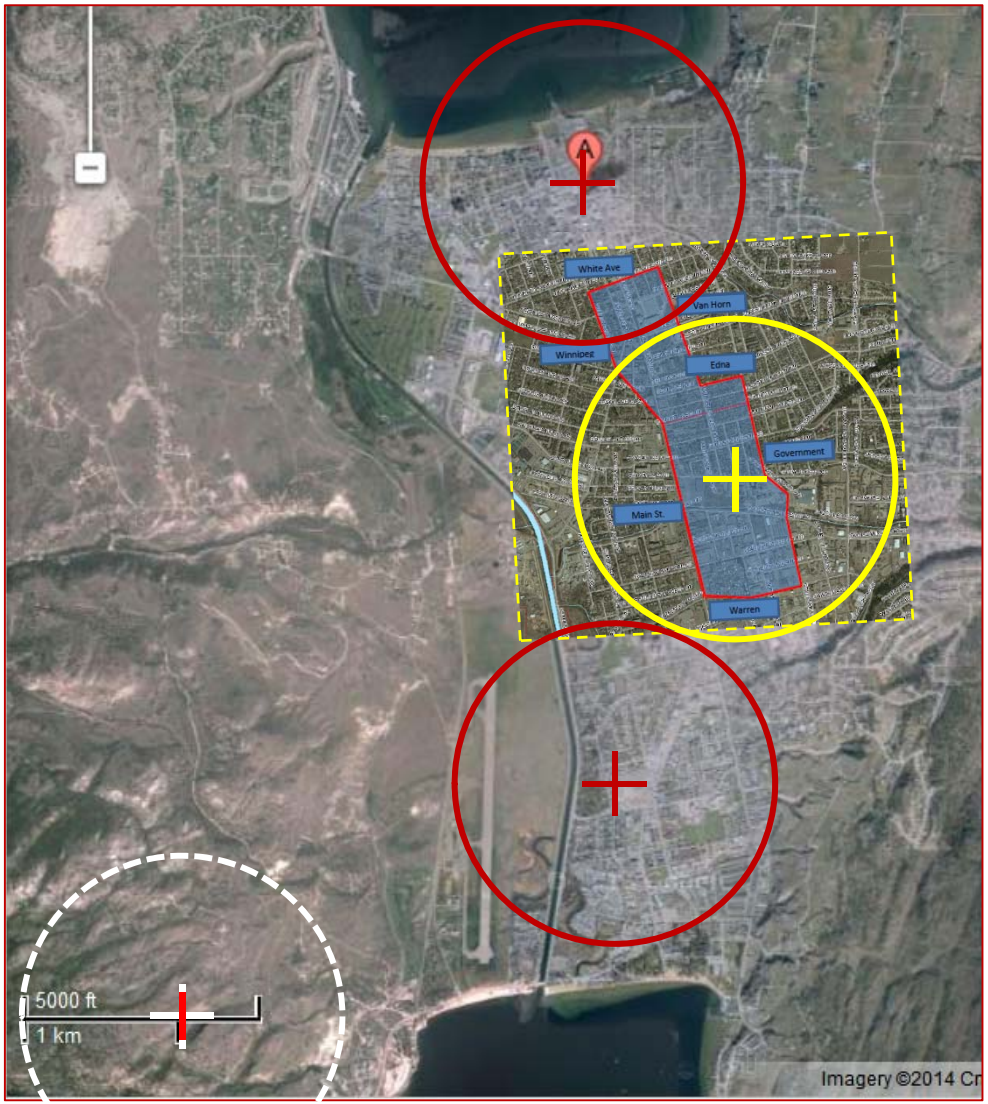
Terrain definitions illustrated: Penticton, BC

→ Is the building in the center of the circle in rough terrain?



Terrain definitions illustrated

- Is the building in the center of the circle in rough terrain?
- City of Penticton bulletin clarifies the extent of rough terrain



171 Main Street
Penticton, B.C. V2A 5A9
Phone: (250) 490-2501
Fax: (250) 490-2502
24Hr Inspection Line: (250) 490-2511
www.penticton.ca

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Non-Compliance

Windows, doors and skylights installed, after **Feb 28, 2014,** that do not show the required NAFS certification will be rejected and will be required to be replaced. Exception may apply if the unit is currently under testing evaluation and documentation can be provided

Boundary considered as Rough Terrain (1km buffer setbacks)

Locations along the lakeshore or steep grade (+1in10 slope) locations may require the review of a structural engineer.

Example

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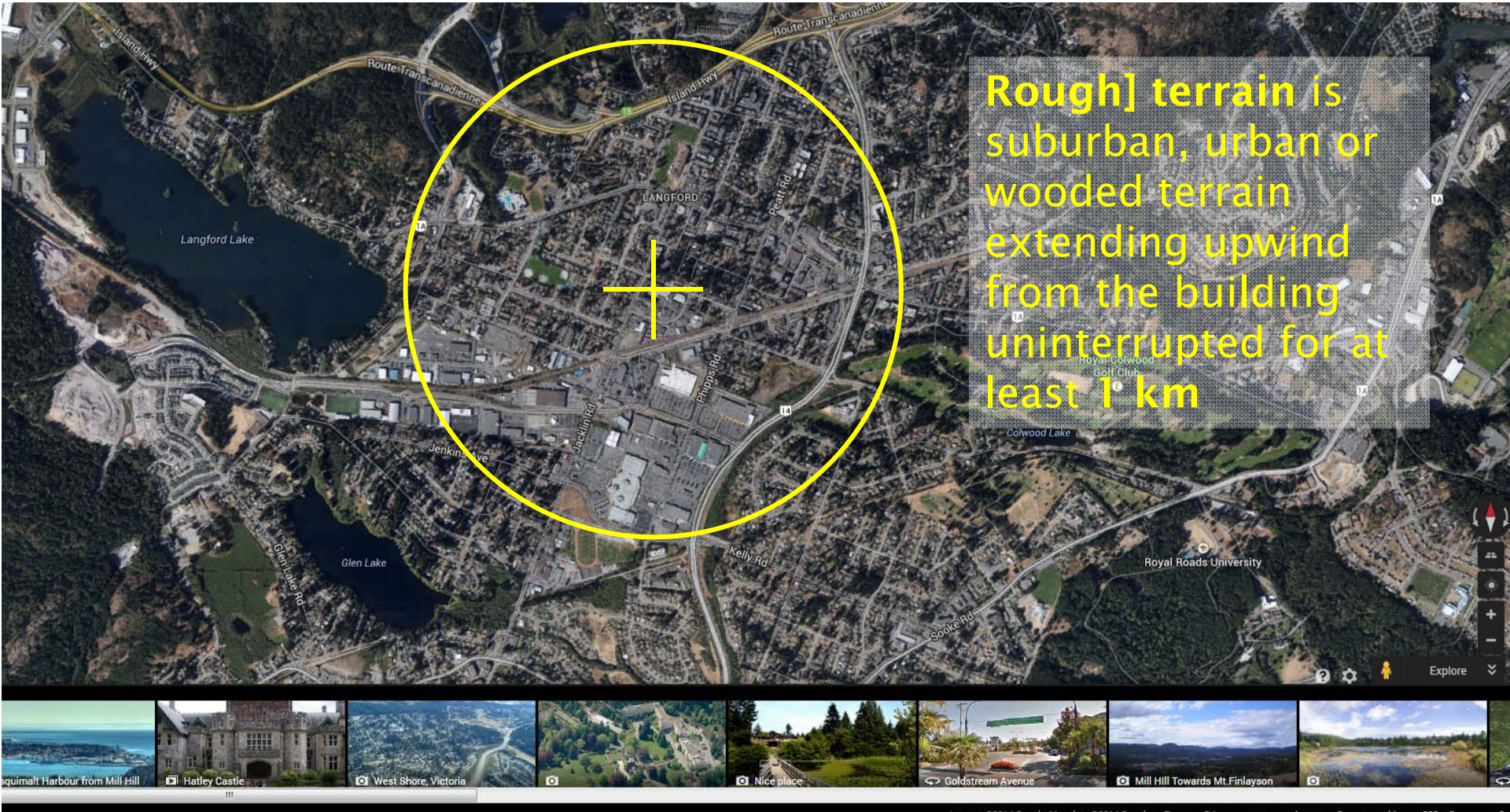
Mixed use multifamily building in Langford, BC

Example

→ Fenestration Height above Grade: 15 m

Example

→ Terrain? Open?



Example

Building information:

- → Location: Langford municipality
- → Height of fenestration product: 15 m
- → Terrain: Open
- → What's your next step?
- → Pick a calculator?
  - → QAI
  - → Cascadia
  - → Fenestration Canada

http://qai.org/PerformanceCalc/

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QAI LABORATORIES

WINDOW AND DOOR PERFORMANCE GRADE CALCULATOR

Province	British Columbia
Geographical Location	Langford
Height of building	15
Terrain	Open / Rough
Product Class	R-Residential
Product Type	Operable

Air	Water	Structural
A2	360 Pa	1440 Pa

PG 30

Reset Submit

*Note - This calculator is to be used for reference only. The most up to date copy of the CSA A440 Canadian Supplement should be consulted. This calculator uses data from CSA A440S1-09 Update No. 1, published July 2013

http://qai.org/PerformanceCalc/

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QAI LABORATORIES

WINDOW AND DOOR PERFORMANCE GRADE CALCULATOR

Province	British Columbia
Geographical Location	Langford
Height of building	15 m
Terrain	Open / Rough
Product Class	R-Residential
Product Type	Operable

Air	Water	Structural	PG	20
A2	260 Pa	960 Pa		

Reset Submit

*Note - This calculator is to be used for reference only. The most up to date copy of the CSA A440 Canadian Supplement should be consulted. This calculator uses data from CSA A440S1-09 Update No. 1, published July 2013

http://www.cascadiawindows.com/nafs

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CASCADIA WINDOWS & DOORS

NAFS Calculator
R-Value / U-Value Calculator
Installation
Hardware Adjustments
Project Support
Quality Assurance
Testing & Ratings
Egress Minimums
Frequently Asked Questions
Suppliers
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NAFS and BCBC 9.36 Calculator

Window and Door Performance Grade & Water Test Pressure Selection for locations within British Columbia (excludes unit skylights)

AAMA / WDMA / CSA 101 / I.S.2 / A440-8 North American Fenestration Standard (NAFS)

Required Thermal Characteristics for Fenestration and Doors

BCBC 2012 - 9.36.2.7

The purpose of this online tool is to aid designers with generally understanding the intent of the 2009 Canadian Supplement to NAFS – 2008 and the maximum permitted overall thermal transmittance values for Part 9 fenestration and doors as part of the 2012 BCBC requirements for Energy Efficiency. It is not intended to be used in lieu of reading, understanding, and manually calculating the requirements for fenestration on any project. This calculator, and the accuracy of the resulting information, has not been reviewed, approved, or authorized by the publishers of any standard or any regulatory body

☑ I have read and understood this disclaimer. Activate the Calculator.

Climatic Data Set:	Updated July 2013 clim
Location:	Langford
Building Height (m):	15
Terrain:	Open
Class:	R

This calculator uses the A440S1-09 Canadian Supplement table method for determining allowable NAFS 08 Performance Grades, and provides two options for climatic data. You must select one climatic data option to continue:

1. 2009 climate data (orig. ref. in BCBC 2012), or
2. Updated July 2013 climate data.

http://www.cascadiawindows.com/nafs

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Supplement to NAFS – 2008 and the maximum permitted overall thermal transmittance values for Part 9 fenestration and doors as part of the 2012 BCBC requirements for Energy Efficiency. It is not intended to be used in lieu of reading, understanding, and manually calculating the requirements for fenestration on any project. This calculator, and the accuracy of the resulting information, has not been reviewed, approved, or authorized by the publishers of any standard or any regulatory body

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Climatic Data Set:	Updated July 2013 clim
Location:	Langford
Building Height (m):	15
Terrain:	Open
Class:	R

This calculator uses the A440S1-09 Canadian Supplement table method for determining allowable NAFS 08 Performance Grades, and provides two options for climatic data. You must select one climatic data option to continue:

1. 2009 climate data (orig. ref. in BCBC 2012), or
2. Updated July 2013 climate data.

Grade value.

Calculations

DRWP:	260	Pa
HWP:	400	Pa
Specified DRWP:	344	Pa
Specified HWP:	1220	Pa
Performance Grade:	30	
Water Test Pressure from specified DRWP:	360	Pa
Water Test Pressure from Performance Grade:	220	Pa

NAFS Results

Performance Grade (final): 30

Water Test Pressure (final): 360 Pa

BCBC 9.36

Maximum U-Value for Fenestration and Doors: 1.8 $W/(m^2 * K)$

http://codecalc.fenestrationcanada.ca/

RDH

fenestration canada

english | français

Building code fenestration performance calculator

for codes based on NBC 2010

calculations based on AAMA/WDMA/CSA 101/I.S. 2/A440-08 (NAFS-08) AND CSA A440S1-09 WITH UPDATE NO. 1 (CANADIAN SUPPLEMENT TO NAFS-08)

where

province: british columbia

city: langford

location

product height above ground to top of product: 15 metres

terrain type[A]: open / rough

performance requirements

minimum performance grade (PG)[B]	30	
minimum positive design pressure	1440	PA
minimum negative design pressure	1440	PA
minimum water penetration resistance test pressure	360	PA
minimum Canadian air infiltration/exfiltration[C]	A2	

project notes

Performance Grade check for 2871 Jacklin Road, Langford BC

September, 24, 2014

PRINT

fenestration canada

langford, bc

Building code fenestration performance calculator

for codes based on NBC 2010

product height
Above ground to top of product

15 metres

open Terrain type [A]

project notes

Performance Grade check for 2871 Jacklin Road, Langford BC September, 24, 2014

performance requirements

minimum performance grade (PG)[B]	30
minimum positive design pressure	1440 PA
minimum negative design pressure	1440 PA
minimum water penetration test pressure	360 PA
minimum Canadian air infiltration/exfiltration[C]	A2

Example

Building information:

→ Location: Langford municipality

→ Height of fenestration product: 15 m

→ Terrain: Open

→ Result?

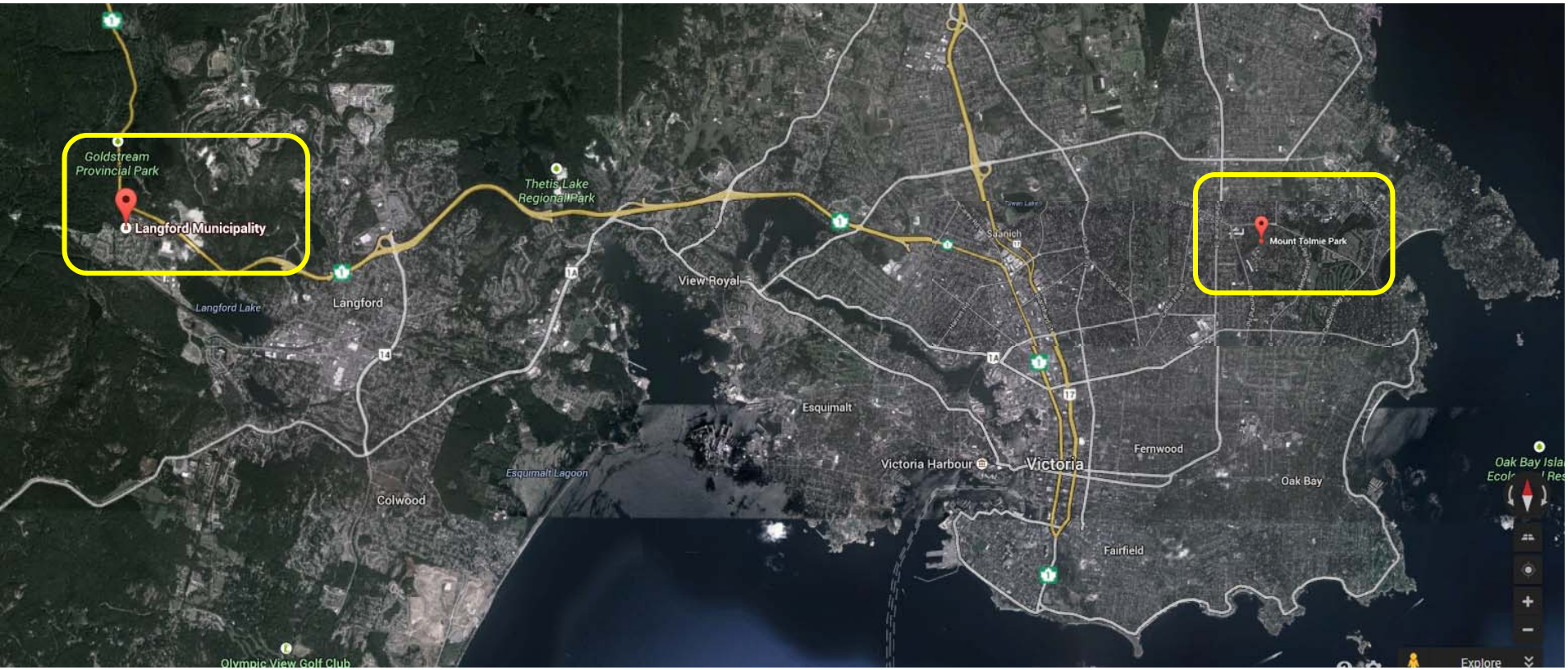
→ PG30, 360 Pa Water Test Pressure

Oops! Building inspector says:
Take out the windows.
Correct rating: PG45, 360.

What happened?

Example

→ Langford Municipality . . . Mount Tolmie climate data



Location, location, location

Lesson learned:

→ First, consult the Authority Having Jurisdiction in case they don't agree with the climate loads in the Supplement

4.1 Reference climate loads

Reference climate loads shall be in accordance with the values established by the authority having jurisdiction or, in the absence of such data, with the climatic values provided in Appendix C of the *National Building Code of Canada* (*NBCC*). See Table A.1 of this Supplement.

Abbotsford example

Climatic Data Set:	Updated July 2013 clim
Location:	Abbotsford
Building Height (m):	10 or below
Terrain:	Open
Class:	R

This calculator uses the A440S1-09 Canadian Supplement table method for determining allowable NAFS 08 Performance Grades, and provides two options for climatic data. You must select one climatic data option to continue:

1. 2009 climate data (orig. ref. in BCBC 2012), or
2. Updated July 2013 climate data.

Calculations

DRWP:	200	Pa
HWP:	440	Pa
Specified DRWP:	244	Pa
Specified HWP:	1270	Pa

NAFS Results

Performance Grade (final):	30
Water Test Pressure (final):	260 Pa

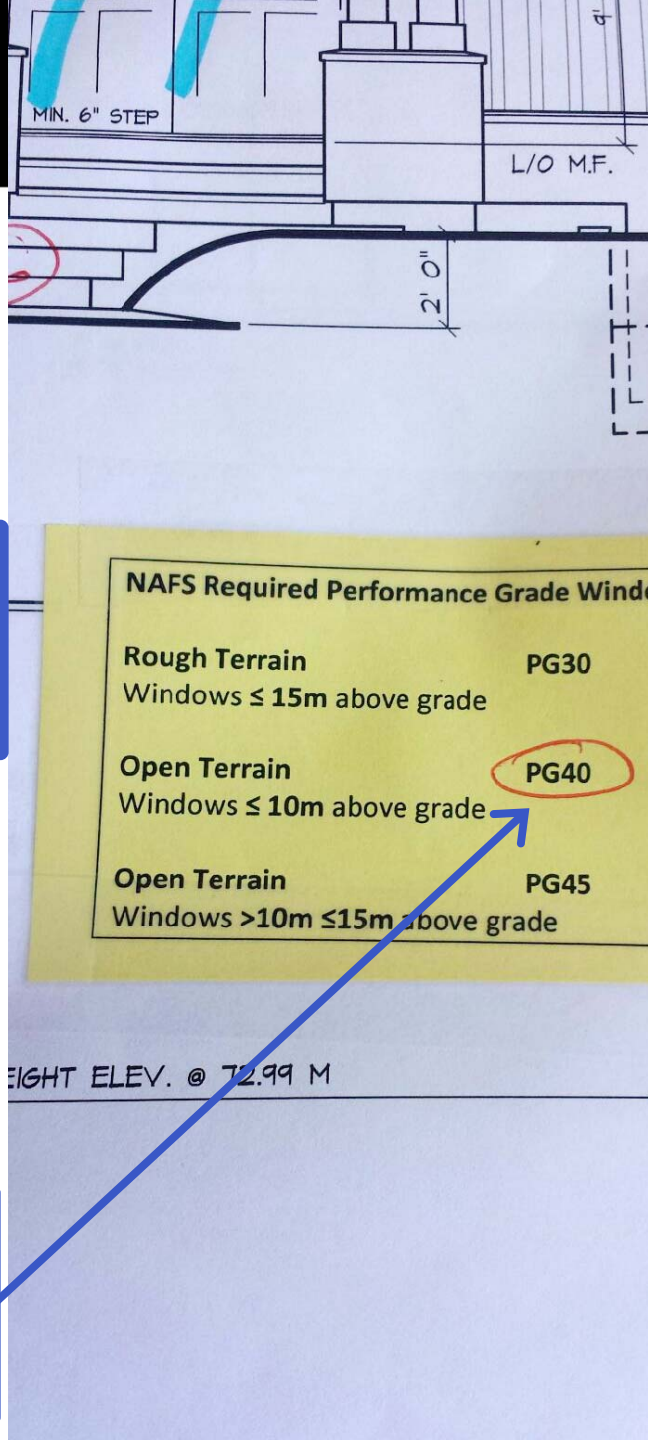
Climatic Data Set:	2009 climate data (orig
Location:	Abbotsford
Building Height (m):	10 or below
Terrain:	Open
Class:	R

Calculations

DRWP:	200	Pa
HWP:	620	Pa
Specified DRWP:	244	Pa
Specified HWP:	1830	Pa

NAFS Results

Performance Grade (final):	40
Water Test Pressure (final):	290 Pa



What else do we need to know about the Canadian Supplement?

Its Limitations . . .

1. Calculation precision

→ Supplement recognizes three ways to determine wind loads:

1. **Detailed engineering calculations** per Part 4 of Code – the most accurate
2. **Simplified formula** anyone can use – less accurate but more convenient

4.2.2 Calculation of specified wind load

Specified wind load (p) shall be calculated according to the structural requirements of the applicable building code or using the following equation:

$$p = I_w \, q \, C_e C_g C_p$$

1. Calculation precision

→ Supplement recognizes three ways to determine wind loads:

1. **Detailed engineering calculations** per Part 4 of Code – the most accurate
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4.2.2 Calculation of specified wind load

Specified wind load (p) shall be calculated according to the structural requirements of the applicable building code or using the following equation:

$$p = I_w \, q \, C_e C_g C_p$$

3. **Tables** based on the simplified formula – least accurate, most convenient

1. Calculation precision

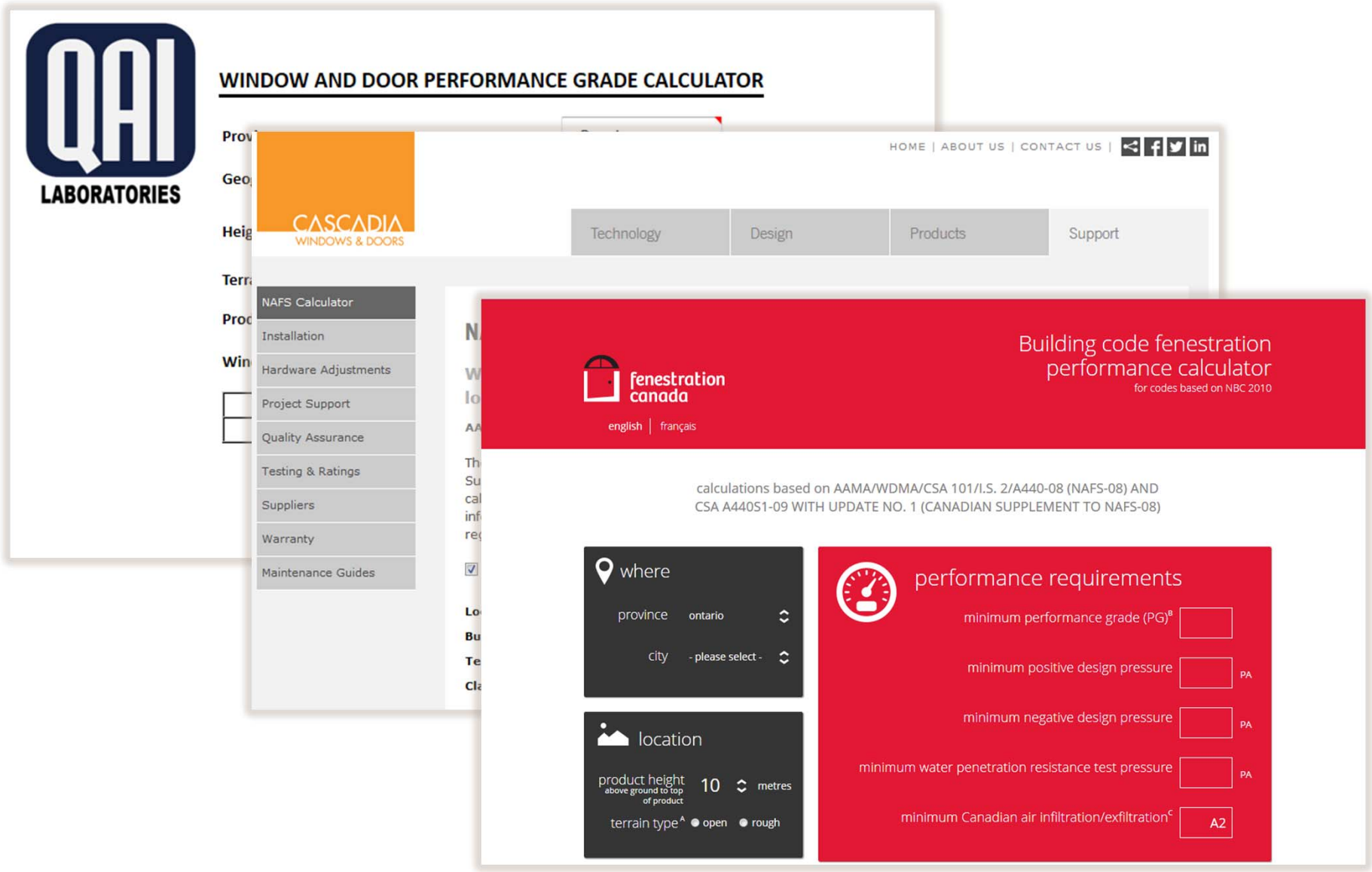
- → Formula method uses 1/50 HWP from Supplement table or Code
- → Table method often requires you to “round up” to the next highest column

Victoria 1/50 HWP = 0.57 kPa

Table 3
Specified wind load (p) for windows, doors, and positive loads on unit skylights — Open terrain
(See Clauses 4.2.2 and A.4.2.2 and Figure A.1.)

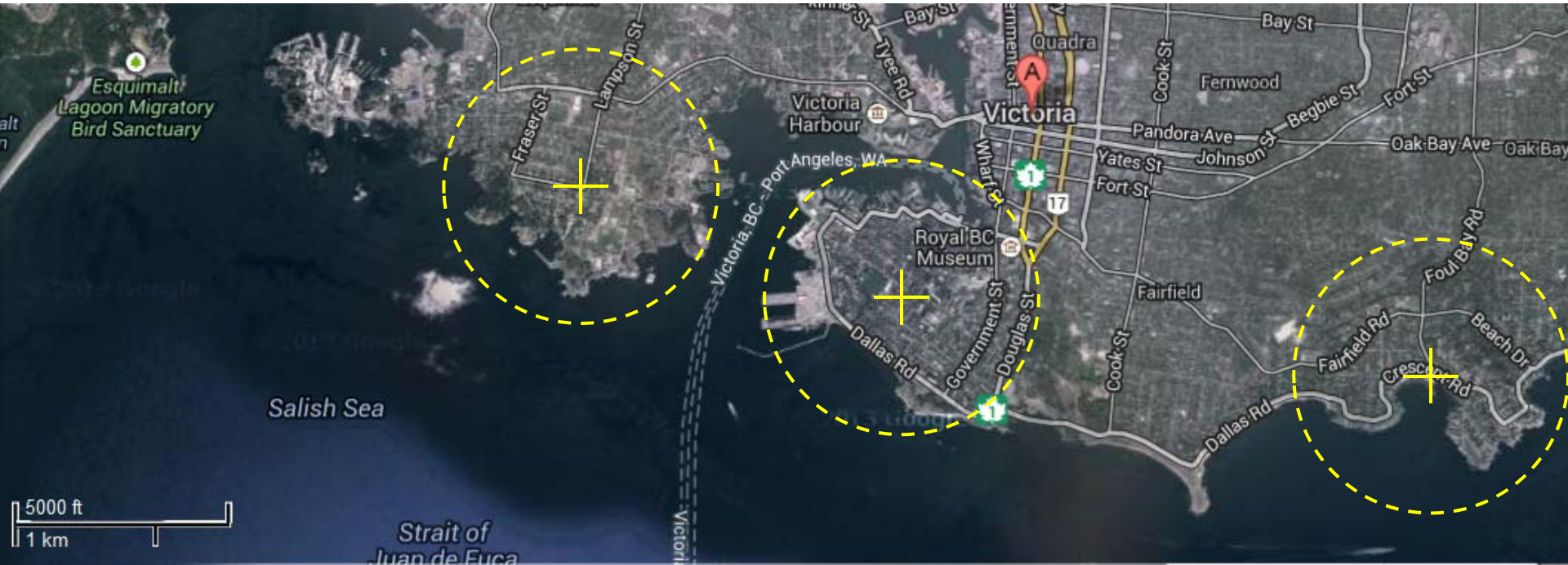
	p, kPa																					
	1/50 Hourly wind pressure, kPa																					
Height, m	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25
10	0.56	0.70	0.84	0.98	1.13	1.27	1.41	1.55	1.69	1.83	1.97	2.11	2.25	2.39	2.53	2.67	2.81	2.95	3.09	3.23	3.38	3.52
15	0.61	0.76	0.92	1.07	1.22	1.37	1.53	1.68	1.83	1.98	2.14	2.29	2.44	2.59	2.75	2.90	3.05	3.20	3.36	3.51	3.66	3.81
20	0.65	0.81	0.97	1.13	1.29	1.45	1.62	1.78	1.94	2.10	2.26	2.42	2.58	2.75	2.91	3.07	3.23	3.39	3.55	3.72	3.88	4.04
25	0.68	0.84	1.01	1.18	1.35	1.52	1.69	1.86	2.03	2.20	2.36	2.53	2.70	2.87	3.04	3.21	3.38	3.55	3.72	3.88	4.05	4.22
30	0.70	0.88	1.05	1.23	1.40	1.58	1.75	1.93	2.10	2.28	2.45	2.63	2.80	2.98	3.15	3.33	3.50	3.68	3.85	4.03	4.20	4.38
35	0.72	0.90	1.08	1.26	1.45	1.63	1.81	1.99	2.17	2.35	2.53	2.71	2.89	3.07	3.25	3.43	3.61	3.79	3.97	4.16	4.34	4.52
40	0.74	0.93	1.11	1.30	1.48	1.67	1.86	2.04	2.23	2.41	2.60	2.78	2.97	3.15	3.34	3.53	3.71	3.90	4.08	4.27	4.45	4.64

Online calculators compared



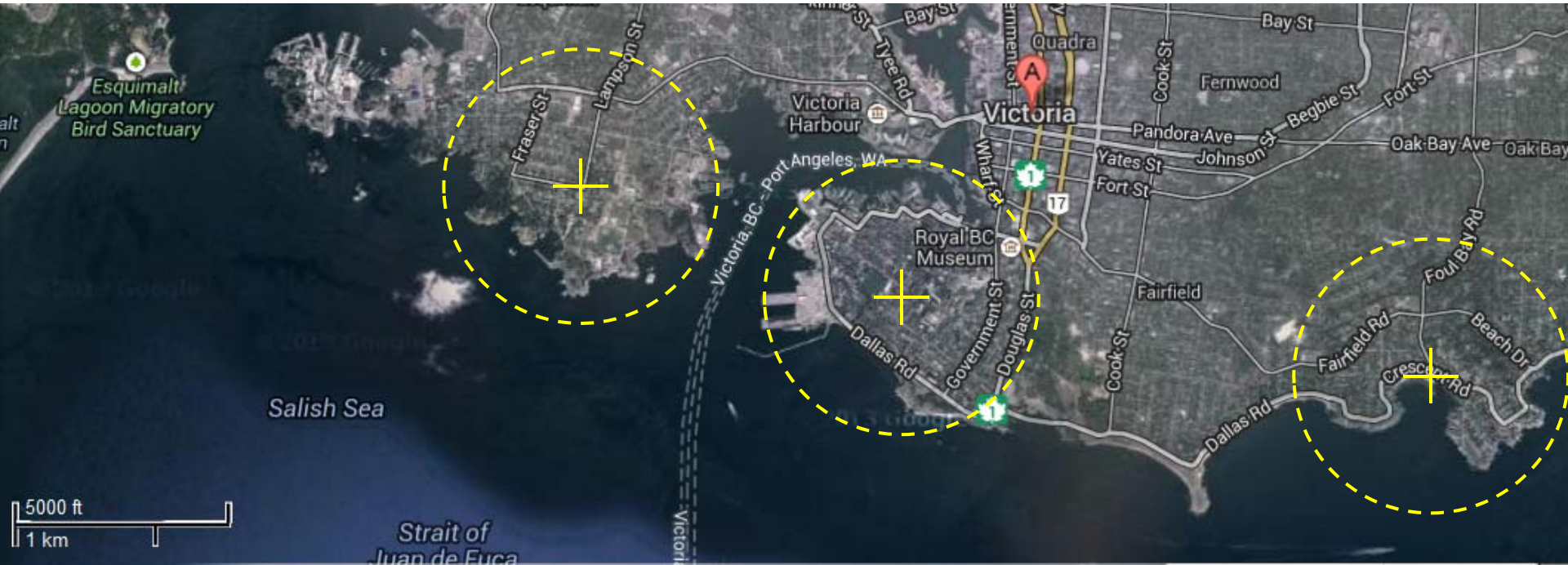
Online calculators compared

Calculator	Supplement Data	Calc Method	Victoria, BC Open Terrain
QAI			
Cascadia			
Fenestration Canada			



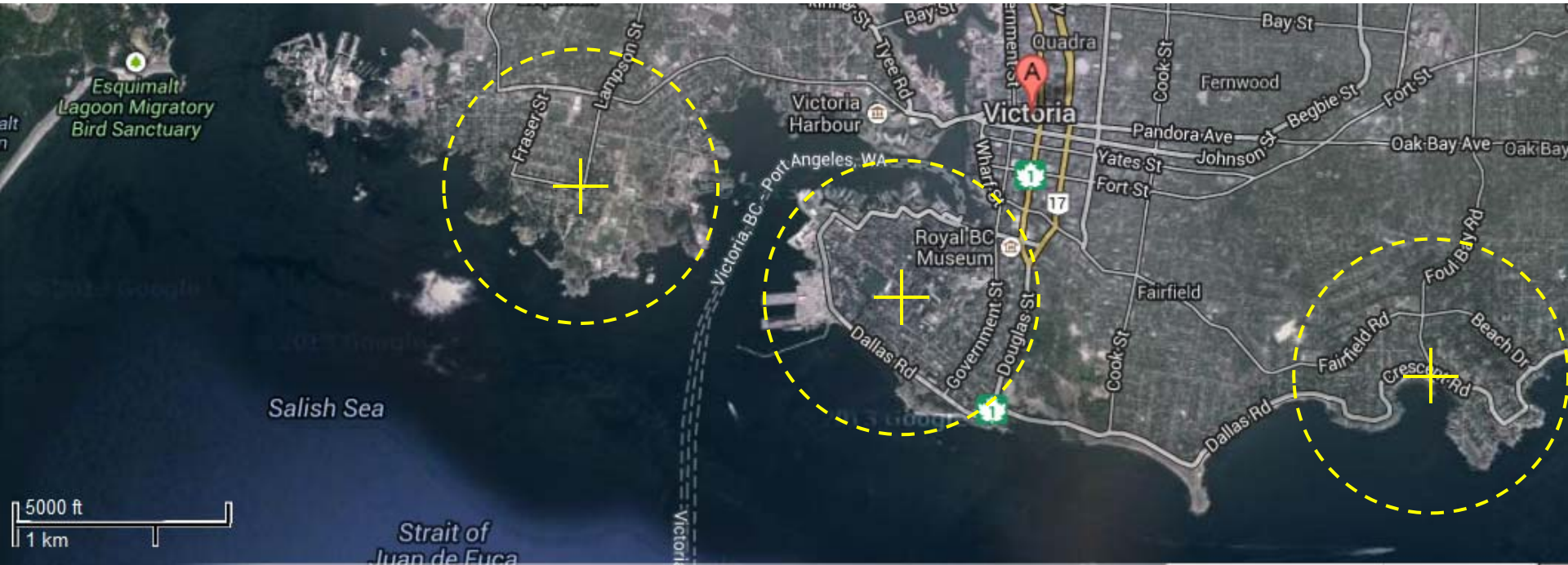
Online calculators compared

Calculator	Supplement Data	Calc Method	Victoria, BC Open Terrain
QAI	2013	Formula	35
Cascadia			
Fenestration Canada			



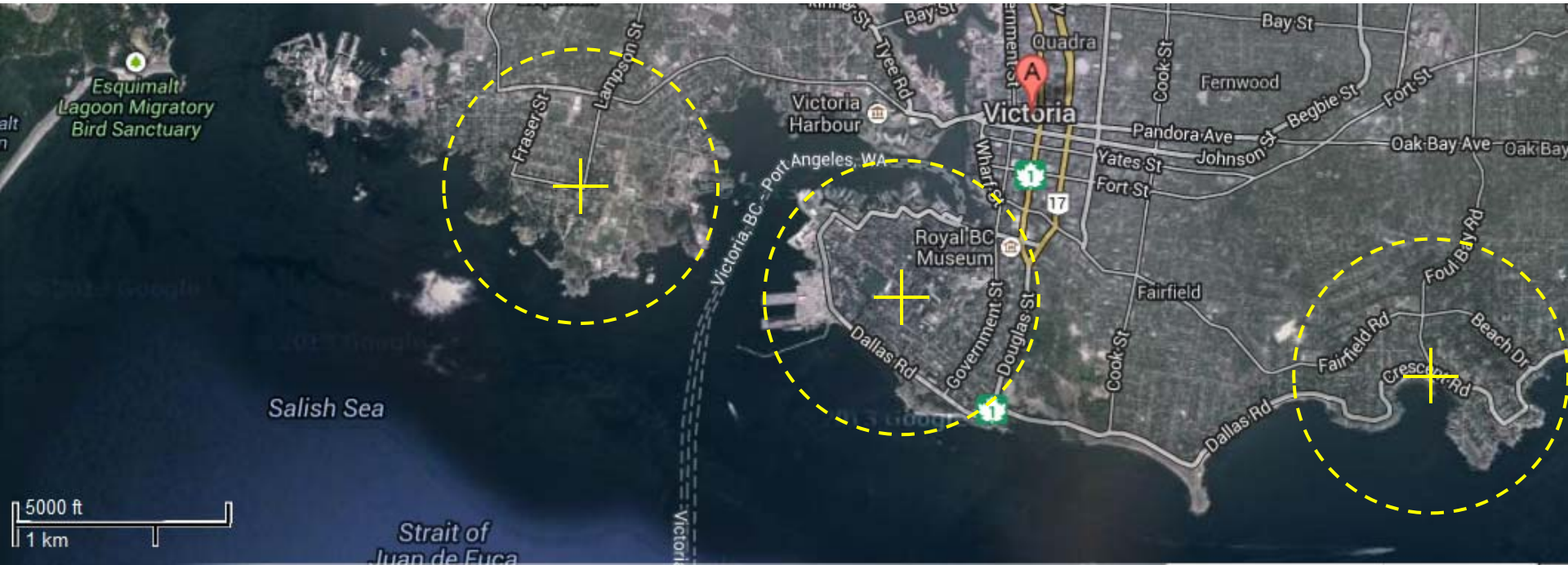
Online calculators compared

Calculator	Supplement Data	Calc Method	Victoria, BC Open Terrain
QAI	2013	Formula	35
Cascadia	2009 or 2013	Table	40
Fenestration Canada			



Online calculators compared

Calculator	Supplement Data	Calc Method	Victoria, BC Open Terrain
QAI	2013	Formula	35
Cascadia	2009 or 2013	Table	40
Fenestration Canada	2013	Table	40



Online calculators compared

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Allowable Canadian NAFS Performance Grades (combining NAFS-08 Tables 1 and 3)

Allowable Performance Grades Arranged by Performance Class				Design Pressure		Allowable Water Penetration Resistance Test Pressure Values			
						R, LC, CW		AW	
R	LC	CW	AW	Pa	(psf)	Pa	(psf)	Pa	(psf)
					.00)	140	(2.90)	—	—
					.00)	150	(3.00)	—	—
					.00)	180	(3.75)	—	—
30	30	30		1440	(30.00)	220	(4.50)	—	—
35	35	35		1680	(35.00)	260	(5.25)	—	—
40	40	40	40	1920	(40.00)	290	(6.00)	390	(8.00)
45	45	45	45	2160	(45.00)	330	(6.75)	440	(9.00)
					.00)	360	(7.50)	480	(10.00)
					.00)	400	(8.25)	530	(11.00)
					.00)	440	(9.00)	580	(12.00)
65	65	65	65	3120	(65.00)	470	(9.75)	630	(13.00)
70	70	70	70	3360	(70.00)	510	(10.50)	680	(14.00)
75	75	75	75	3600	(75.00)	540	(11.25)	730	(15.00)
80	80	80	80	3840	(80.00)	580	(12.00)	730	(15.00)
85	85	85	85	4080	(85.00)	620	(12.75)	730	(15.00)

Victoria Open (Formula method) = 1600 Pa

1600

1690

Victoria Open (Table method) = 1690 Pa

Calculation precision—summary

- Depending on which simplified method is chosen, in a small number of cases the answers will differ . . . this can have a significant difference when it results in a 5 psf jump in Performance Grade
- In the Victoria, example, PG40 would exclude use of most sliding sash products

2. Terrain definitions

→ Apply only to clear-cut **open** or **rough** terrain

→ Building officials are not engineers, and are not in a position to make open/rough judgement calls

→ In BC, most building jurisdictions are declaring themselves to be open terrain. No argument.

3. Simplified method limitations

→ Apply **only** to **level** ground = slope of 10% or less

→ Does NOT APPLY to buildings on:

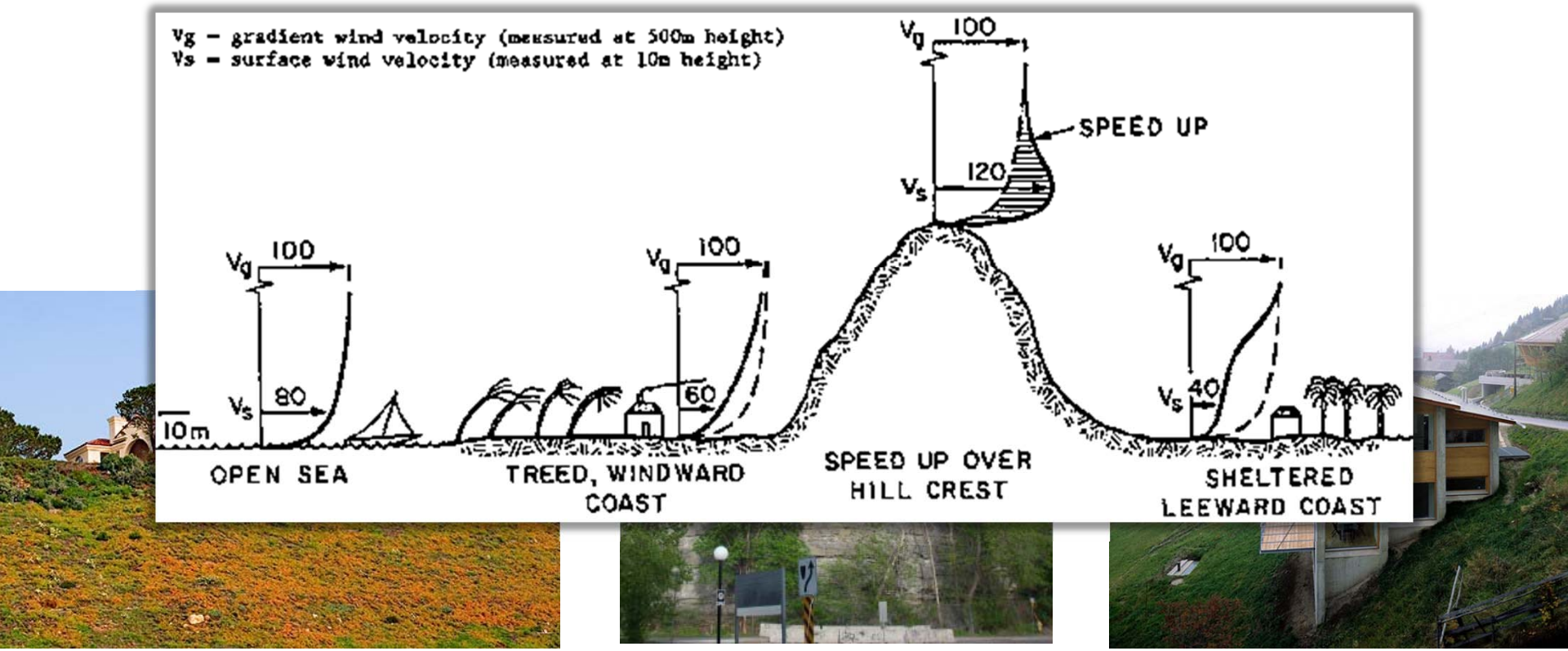
Hills

Escarpments

Steep slopes

⇢ For these conditions wind loads must be determined using Part 4 of Building Code (engineering)

3. Simplified method limitations



- For these conditions wind loads must be determined using Part 4 of Building Code (engineering)

4. Simplified method vs. Part 4 calcs

- → Supplement's simplified methods "easy to use" but provide conservative (= safe) (= higher) design pressures
- → Fenestration engineers will likely determine lower design pressures for many buildings
  - → More detailed calcs
  - → Consider building shape

Conclusion

Use and Limitations of Canadian Supplement

- → Code directs us to use it
- → Building officials have first say over climate data
- → Terrain determinations can be challenging
- → Simplified method to determine wind/water loads:
  - → Limited to level ground (not to buildings on hills, escarpments, or steeper slopes ground)
  - → May give different answers to the same question
  - → May lead to different (more conservative) values than Part 4 engineering

3. Review and summary

American Performance Grade:

- PG30

Canadian Performance Grade:

- PG30
- Water test pressure 290 Pa
- Air Infiltration/Exfiltration: A3

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Canadian Supplement takes guesswork out of "B" and "C" ratings

Based on objective criteria, more detailed than A440-00 UG

Online calculators simplify the process, but you still need to know Supplement's limitations,
and
need to Know what you're doing

Check with AHJ before assuming which climate data to use . . .

Code, Supplement and Supplement version

RDH

Supplement's simplified methods apply to level terrain . . .

Not to steep slopes, hills, or escarpments

Supplement can give you more than one design pressure . . .

. . . or Performance Grade . . .

and may be higher than DP from a competent engineer

RDH

Terrain definitions look simple, but require judgment in application . . .

* AHJ may decide for you on Part 9 buildings *

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Using NAFS and the Canadian Supplement is not as straightforward as we would like . . .

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for more information

. . .

Visit the
NAFS in Canada Blog

NAFS in Canada

FACTS AND OPINIONS ON THE USE OF THE NORTH AMERICAN FENESTRATION STANDARD IN CANADA

Menu

FEATURED POST

What you Need to Know about NAFS in Canada

NAFS, the North American Fenestration Standard, changes how we test and specify fenestration performance in Canada, affecting manufacturers, building officials, and design professionals. NAFS applies to a wide range of products, including side hinged doors. Intended to harmonize Canadian and U.S. performance testing requirements for windows, doors and skylights, significant differences remain, and NAFS in Canada is very different from NAFS in the U.S.A.

What is NAFS?

NAFS-08, the 2008 version of the North American Fenestration Standard, is now an enforceable code requirement in most of Canada for windows, doors and skylights.

Why NAFS in Canada?

NAFS is new to Canada, and Canadian NAFS testing, labelling, and compliance issues differ significantly from those in the US.

Why this blog?

SEARCH NAFS IN CANADA

the many issues related to NAFS compliance in Canada.

Recent

Discussion + Questions

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