NSB 2011

BUILDING ENVELOPE COMMISSIONING EXTREME CLIMATES

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COMMISSIONING PHASES

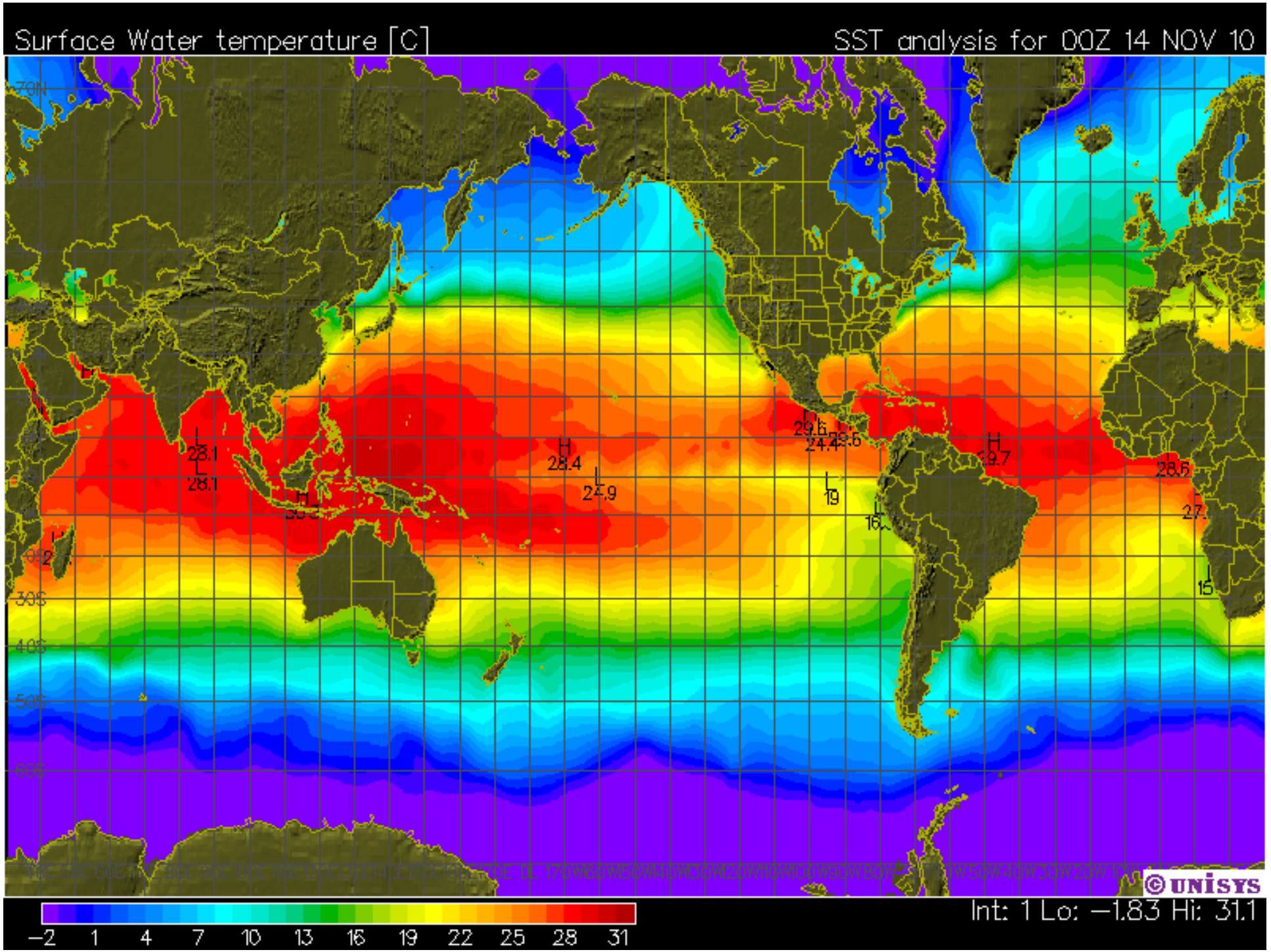
Pre-Design Phase

- Owner’s Project Requirements (OPR)
- Basis-of-Design (BOD)

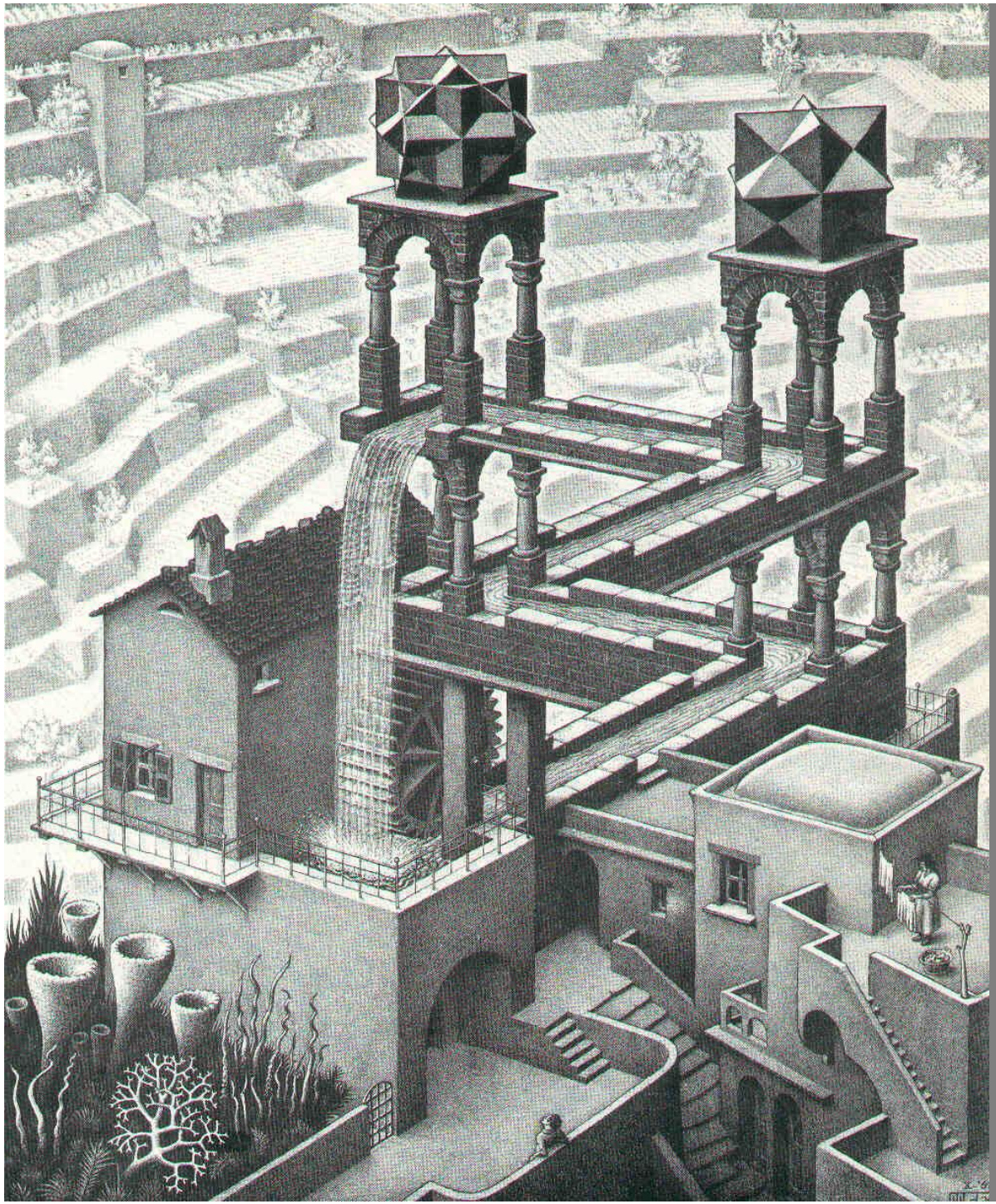
Design Pre-Construction Phase

Construction Phase

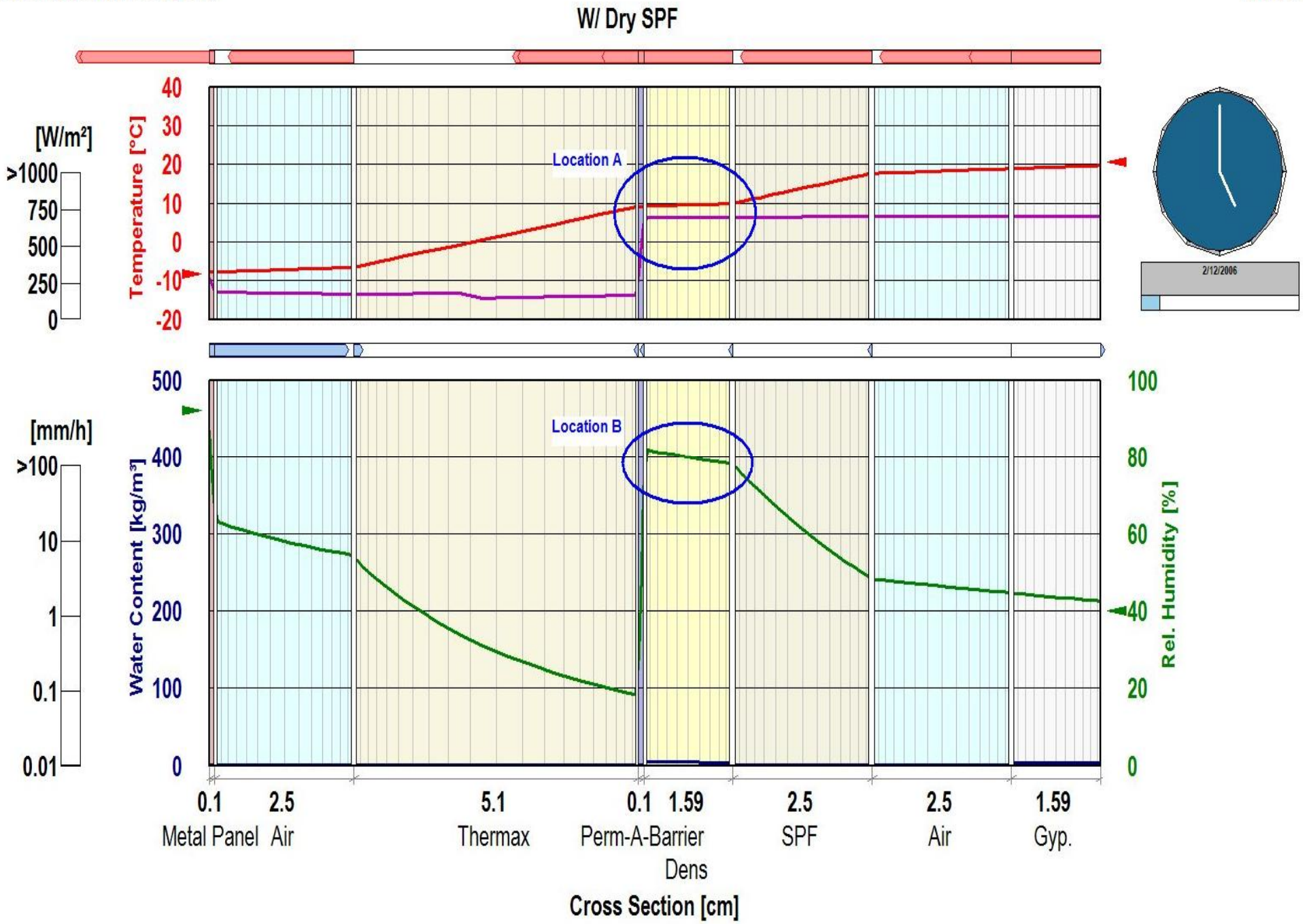
Hand-Over and Maintenance Plan

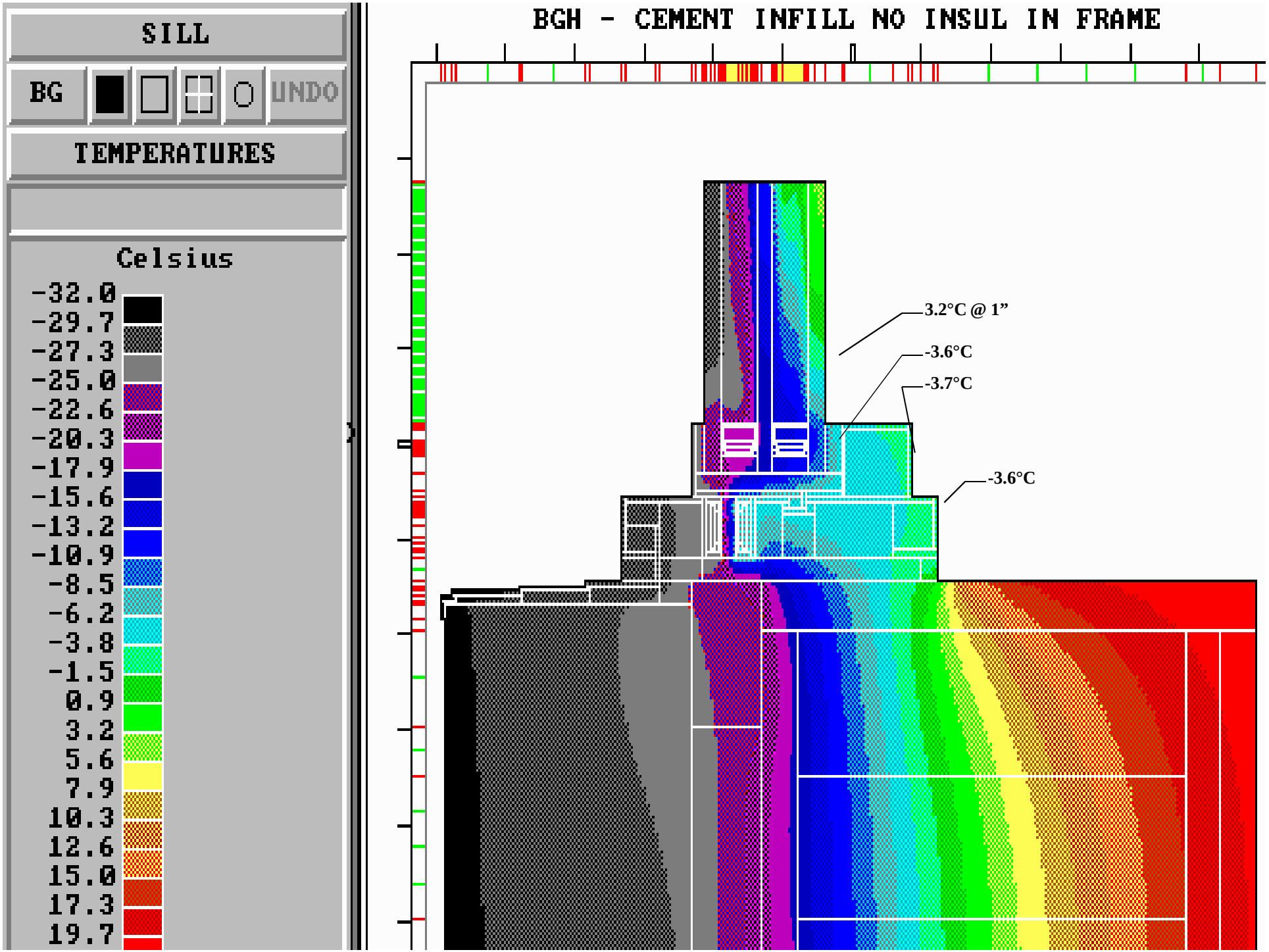

Surface Water temperature [C]
SST analysis for 00Z 14 NOV 10
28.1
28.1
28.4
24.9
29.6
24.4
29.7
28.6
27.
19
16
15
©UNISYS
Int: 1 Lo: −1.83 Hi: 31.1
−2 1 4 7 10 13 16 19 22 25 28 31


08/04/2003



Design


W/ Dry SPF
[W/m²]
>1000
750
500
250
0
Temperature [°C]
40
30
20
10
0
-10
-20
Location A
2/12/2006
[mm/h]
>100
10
1
0.1
0.01
Water Content [kg/m³]
500
400
300
200
100
0
Location B
Rel. Humidity [%]
100
80
60
40
20
0
0.1 Metal Panel
2.5 Air
5.1 Thermax
0.1 1.59 Perm-A-Barrier Dens
2.5 SPF
2.5 Air
1.59 Gyp.
Cross Section [cm]


SILL
BG
UNDO
TEMPERATURES
Celsius
-32.0
-29.7
-27.3
-25.0
-22.6
-20.3
-17.9
-15.6
-13.2
-10.9
-8.5
-6.2
-3.8
-1.5
0.9
3.2
5.6
7.9
10.3
12.6
15.0
17.3
19.7
BGH - CEMENT INFILL NO INSUL IN FRAME
3.2°C @ 1”
-3.6°C
-3.7°C
-3.6°C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Check all boxes that apply to specific project	BECx Check List	Performance	Multiplier	Acoustical	Air (energy)	Thermal (Energy)	Water	Condensation	Solar/Optical	Structural/Security	Durability	Fire	Score	Functional Performance Testing	Thermal	Acoustical	Water	Air
		Service life in excess of 75 years		Enhanced Commissioning Required										Water (Option A) and Air (Option A) FPT				
		Service life in excess of 35 years	3											Water and Air FPT				
		Beyond code minimum fire protection required	2											ASTM E 84 for all non-standard assemblies				
		Within 5 miles or 65 dBA or higher contour curve of airport	2											Acoustical FPT				
		Interior dBA levels less than 45	1											Acoustical FPT				
		Within 1000 ft of freeway, fire station, sports arena, racetrack	1											Acoustical FPT				
		Within 3000 ft of active railway, helicopter pad	1											Acoustical FPT				
		School, hospital, theater, mixed use residential/commercial	1											Acoustical FPT				
		Energy efficiency is of high importance cooling climate	1											Air and Solar FPT				
		Energy efficiency is of high importance heating climate	1											Air (Option A), Solar and Thermal FPT				
		Blast, forced entry or security performance required	2											All assemblies tested for blast and forced entry				
		Basic wind speed in excess of 100 mph	1											Min. 1 field roof uplift test required				
		No water intrusion permitted		Enhanced Commissioning Required										Water (Option A, Note 2) and Air FPT				
		No systemic water leaks	1											Water (Option A or B) and Air FPT				
		Leaks resolved within 6 months after construction	1											Water FPT				
		ΔT 30 degrees Celsius or greater	2											Thermal (Option A) FPT				
		ΔT between 10 and 30 degrees Celsius	1											Thermal FPT				
		LEED V3 2009 innovation point for Building Envelope Cx	1											Water and Air FPT				
		Building pressurization between +/- 10 Pa and 25 Pa	1											Water and Air FPT				
		Building pressurization +/- 25 Pa sustained loads		Enhanced Commissioning Required										Water (Option A) and Air (Option A) FPT				
		No time loss facility (e.g. data center)		Enhanced Commissioning Required										Water (Option A or B) and Air FPT				
		Functional performance layers are non-maintainable	3											Water and Air FPT				
		Interior Rh less than 55% greater than 27%	1											Air FPT				
		Interior Rh greater than 55%, cooling climate	1											Water and Air (Option A) FPT				
		Interior Rh greater than 55%, heating climate	1											Water, Thermal (Option A), Air (Option A) FPT				

Score total	


Archi
LIFT
E30
500 LBS MAX CAP


14/07/2003


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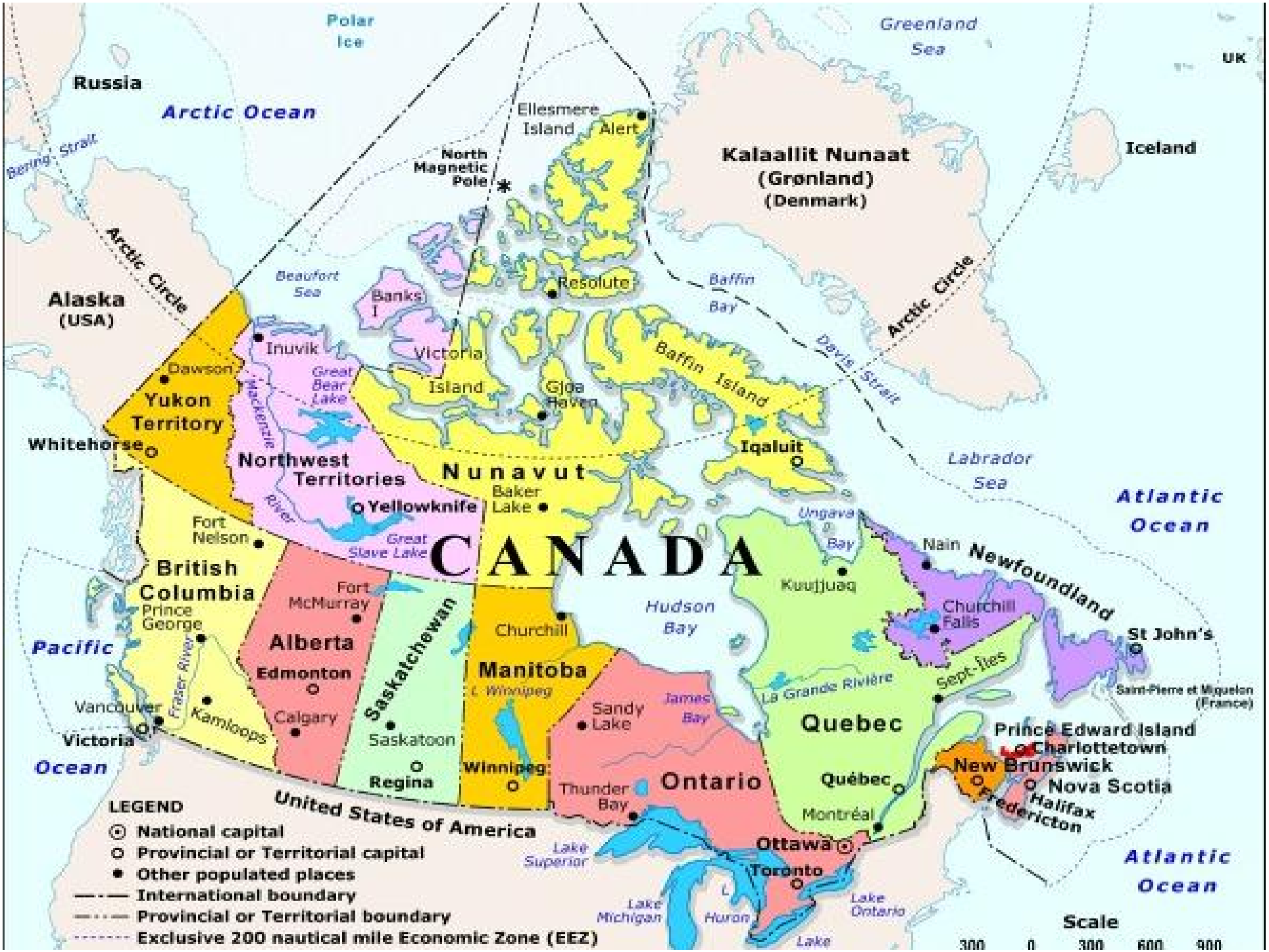
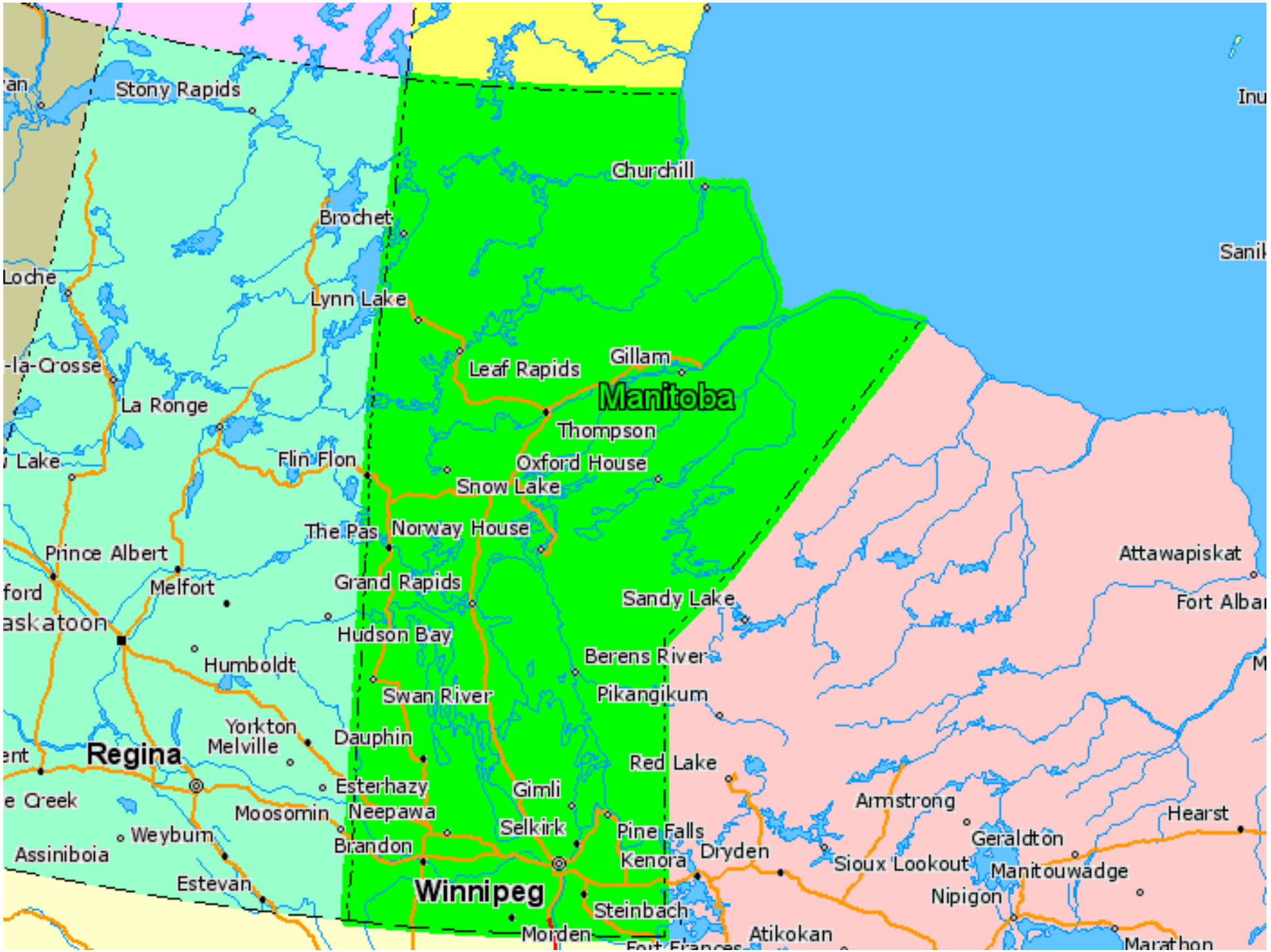
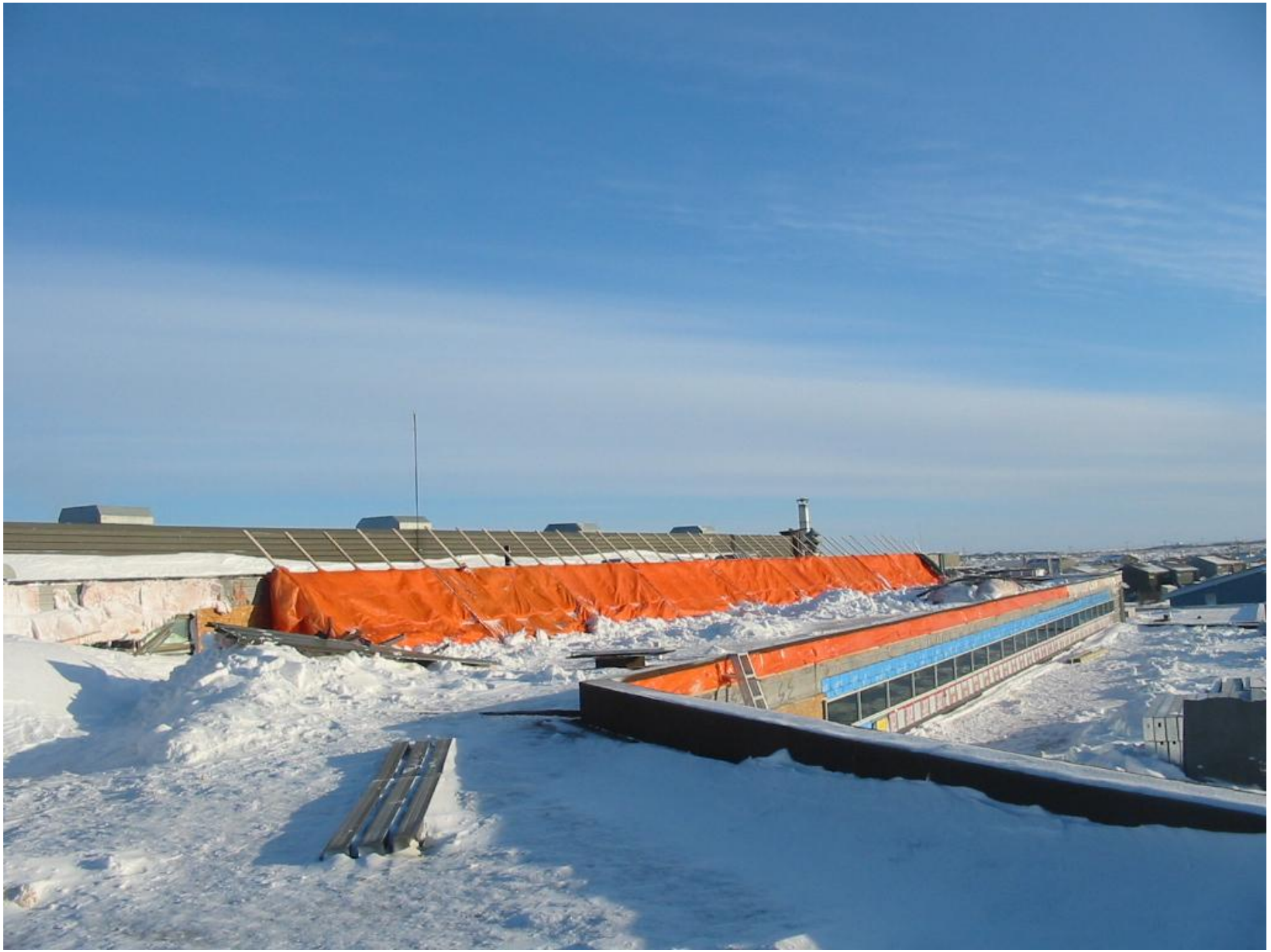

CANADA
Polar Ice
Greenland Sea
UK
Russia
Arctic Ocean
Ellesmere Island
Alert
Iceland
Bering Strait
North Magnetic Pole
Kalaallit Nunaat (Grønland) (Denmark)
Arctic Circle
Alaska (USA)
Beaufort Sea
Banks I
Resolute
Baffin Bay
Inuvik
Victoria Island
Baffin Island
Davis Strait
Dawson
Great Bear Lake
Gjoa Haven
Yukon Territory
Mackenzie River
Iqaluit
Whitehorse
Northwest Territories
Nunavut
Labrador Sea
Atlantic Ocean
Baker Lake
Yellowknife
Ungava Bay
Fort Nelson
Great Slave Lake
Nain
Newfoundland
British Columbia
Kuujjuaq
Fort McMurray
Churchill
Hudson Bay
Churchill Falls
St John's
Prince George
Alberta
Saskatchewan
Manitoba
Pacific
Sept-Îles
Saint-Pierre et Miquelon (France)
Edmonton
L. Winnipeg
Sandy Lake
James Bay
La Grande Rivière
Vancouver
Fraser River
Kamloops
Calgary
Saskatoon
Quebec
Prince Edward Island
Charlottetown
Victoria
Ocean
Regina
Winnipeg
Thunder Bay
Ontario
Québec
New Brunswick
Nova Scotia
Halifax
Fredericton
Montréal
United States of America
Lake Superior
Ottawa
Toronto
Atlantic Ocean
Lake Michigan
Lake Huron
Lake Ontario
Lake
LEGEND
National capital
Provincial or Territorial capital
Other populated places
International boundary
Provincial or Territorial boundary
Exclusive 200 nautical mile Economic Zone (EEZ)
Scale
300 0 300 600 900


Stony Rapids
Churchill
Brochet
Lynn Lake
Leaf Rapids
Gillam
Manitoba
Thompson
Oxford House
Snow Lake
Flin Flon
La Ronge
The Pas
Norway House
Prince Albert
Melfort
Grand Rapids
Sandy Lake
Attawapiskat
Hudson Bay
Humboldt
Berens River
Swan River
Pikangikum
Yorkton
Melville
Dauphin
Regina
Red Lake
Esterhazy
Gimli
Armstrong
Hearst
Moosomin
Neepawa
Selkirk
Pine Falls
Weyburn
Brandon
Dryden
Kenora
Geraldton
Sioux Lookout
Assiniboia
Manitouwadge
Estevan
Winnipeg
Nipigon
Steinbach
Morden
Atikokan


16/07/2003




GRACE

SYNOPSIS:

- There are several disconnects between the Owner’s needs and the final built results, and the process is corrupted at several points
- New materials and concepts outpace labor knowledge and skill
- Researchers are completely disconnected from the delivery process; modeling is based on perfect world conditions, not reality
- The trades have little knowledge, interest, or understanding of the building science

SYNOPSIS:

- Commissioning is the discipline that spans the process from Owner’s needs to the final built results, and provides phase continuity currently missing within the industry
- In North America, Building Envelope Commissioning is required by standards and Government Agencies
- In the case of extreme climates the commissioning process is modified to respond to the limitations of materials, labor, and the context of the specific environment to obtain the desired building performance and life expectancy