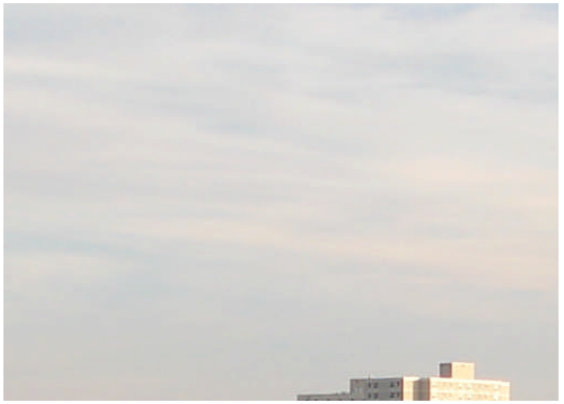
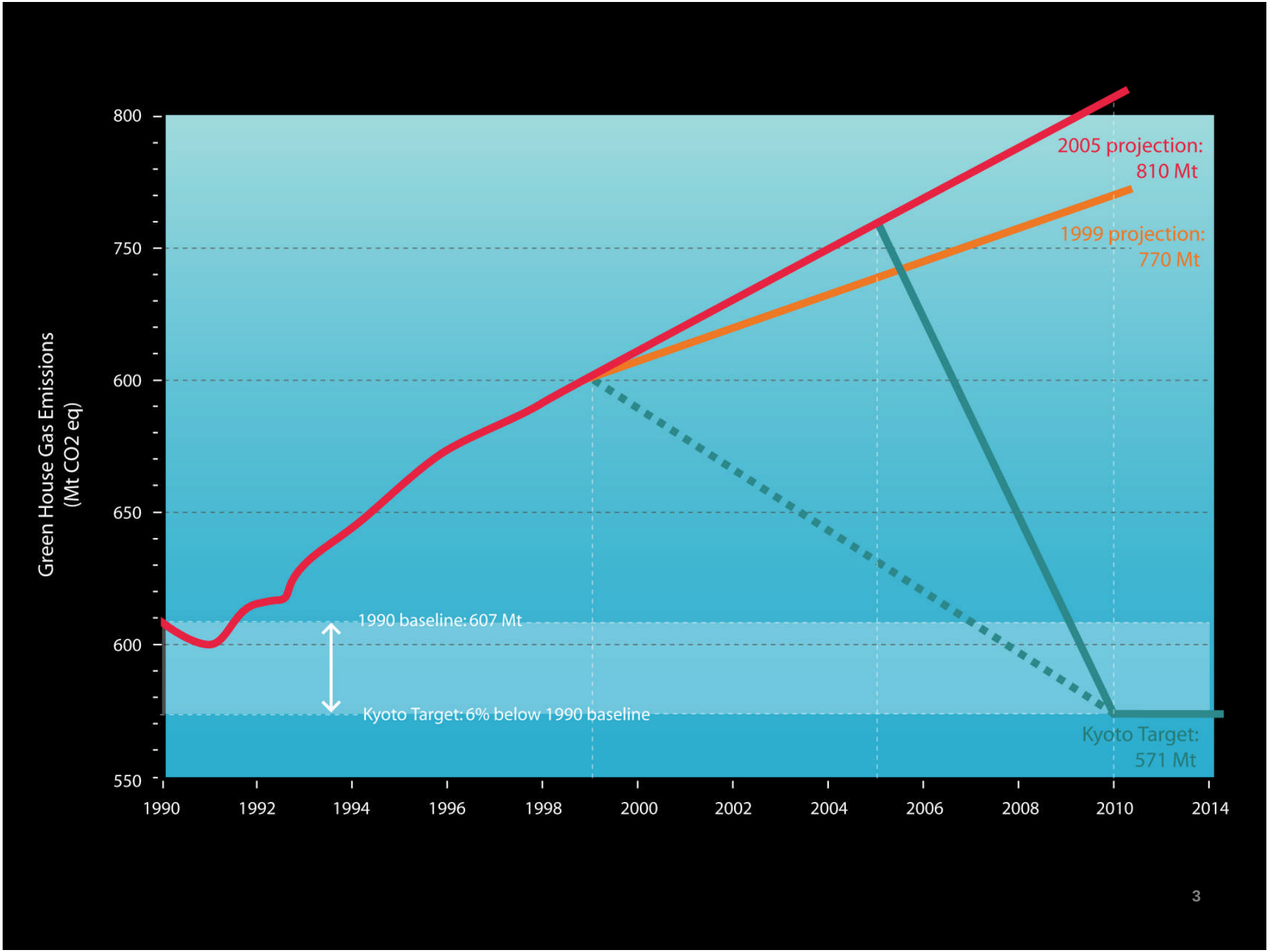
J.L. Richards & Associates Limited in association with Busby Perkins+Will Architects

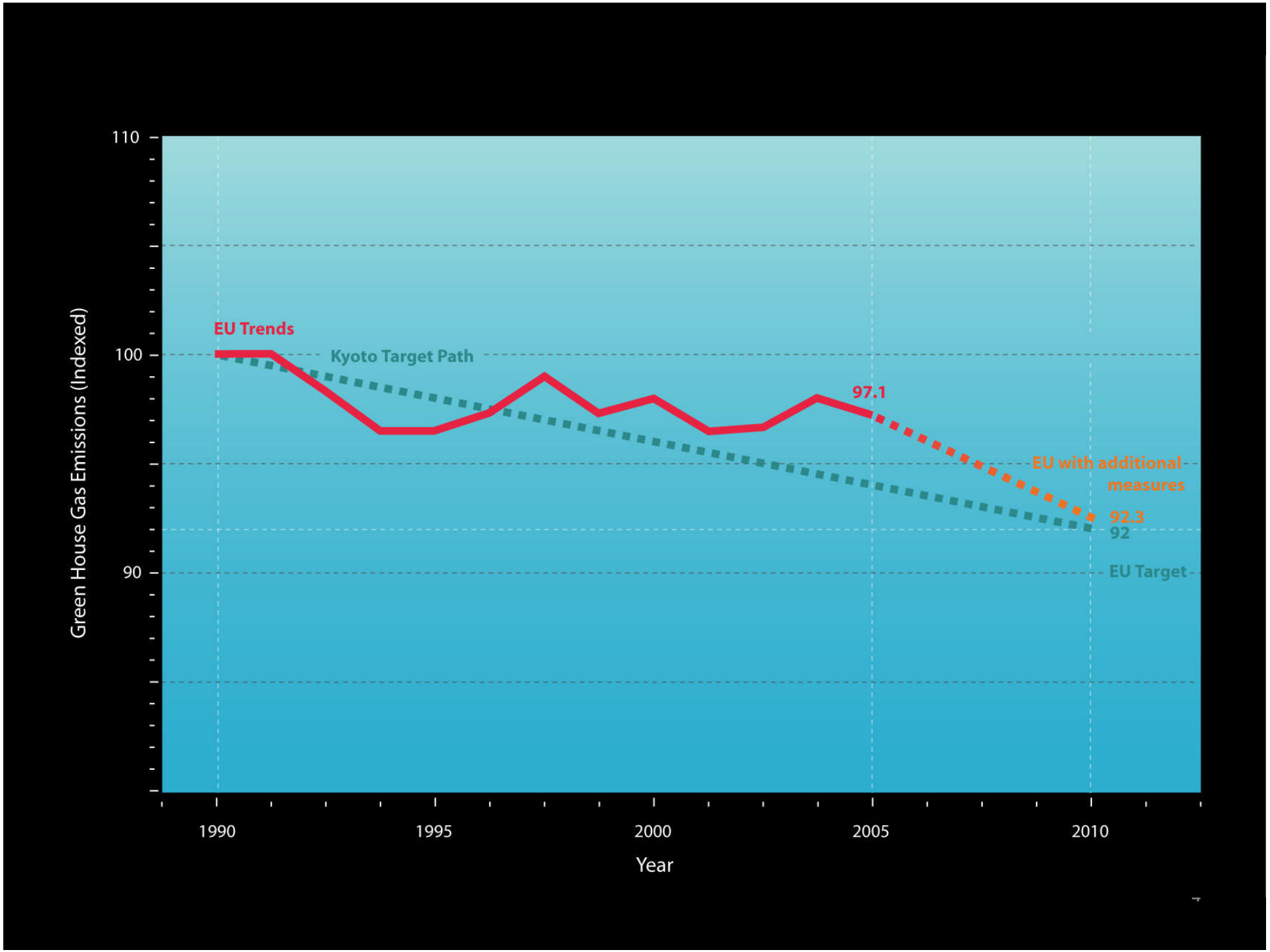


↖ Living with Lakes Centre

City of Greater Sudbury Mayor and Council
October 25, 2006

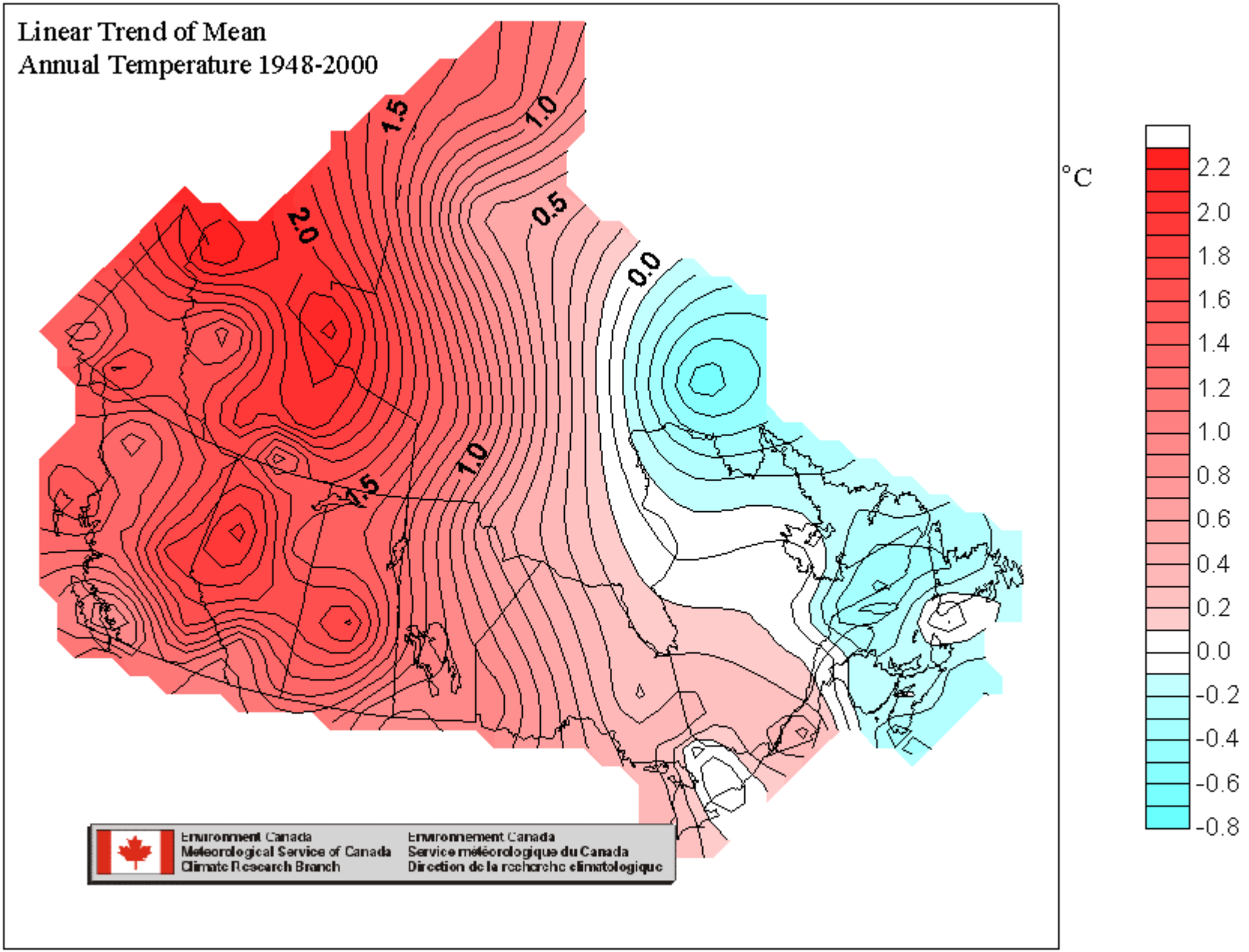
Climate Change in the Media


Green House Gas Emissions
(Mt CO2 eq)
800
750
600
650
600
550
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2014
2005 projection:
810 Mt
1999 projection:
770 Mt
1990 baseline: 607 Mt
Kyoto Target: 6% below 1990 baseline
Kyoto Target:
571 Mt


110
100
90
Green House Gas Emissions (Indexed)
EU Trends
Kyoto Target Path
97.1
EU with additional measures
92.3
92
EU Target
1990
1995
2000
2005
2010
Year

Overall Ranking of OECD Nations on 25 Environmental Indicators

1.	Switzerland	9.20	16.	Greece	13.38
2.	Mexico	10.72	17.	Norway	13.40
3.	Turkey	10.74	18.	Italy	14.01
4.	Austria	11.18	19.	Spain	14.25
5.	Netherlands	11.24	20.	Finland	14.32
6.	Germany	11.30	21.	Japan	14.67
7.	Korea	11.62	22.	Luxembourg	15.45
8.	Denmark	11.84	23.	France	15.56
9.	Hungary	12.07	24.	New Zealand	15.80
10.	Sweden	12.25	25.	Belgium	15.89
11.	Czech Rep.	12.32	26.	Iceland	16.52
12	Portugal	12.82	27.	Australia	20.58
13.	UK	13.19	**28.**	**Canada**	**21.87**
14.	Poland	13.25	29.	United States	22.14
15.	Ireland	13.31			


Linear Trend of Mean
Annual Temperature 1948-2000
2.0
1.5
1.0
0.5
0.0
1.5
1.0
Environment Canada
Meteorological Service of Canada
Climate Research Branch
Environnement Canada
Service météorologique du Canada
Direction de la recherche climatologique
°C
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
-0.8

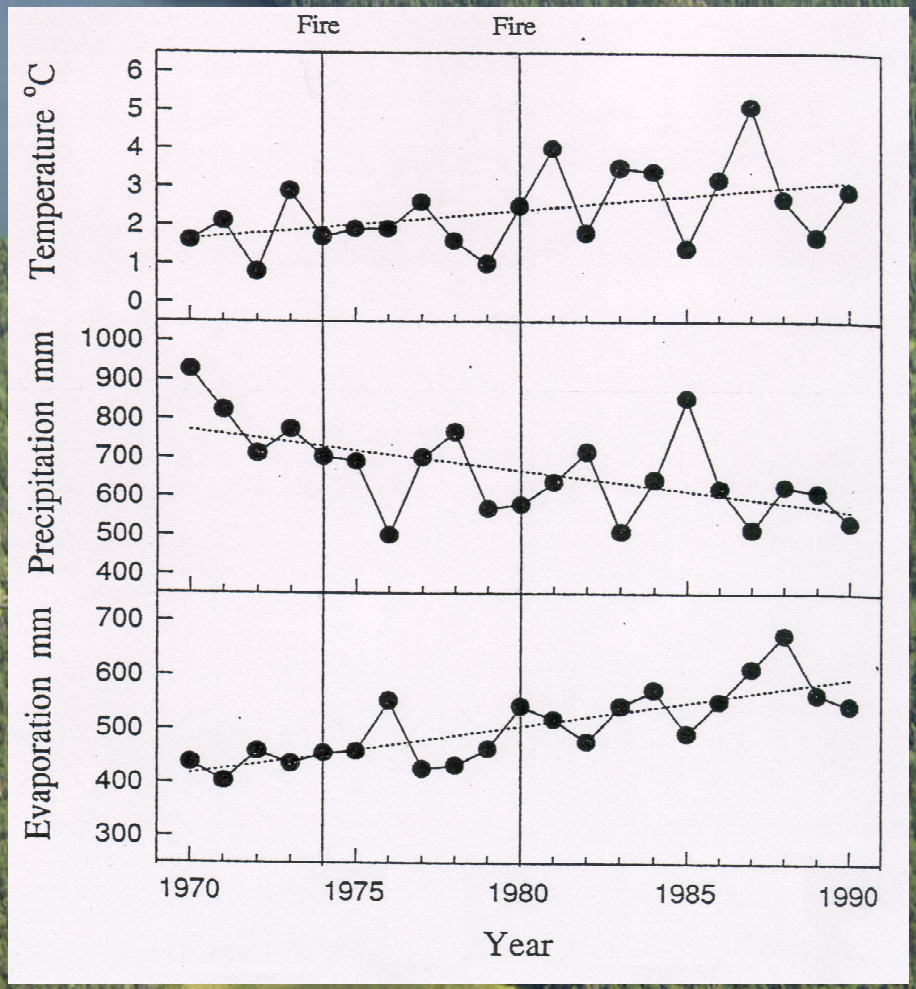
Experimental Lakes Area - North West Ontario

Increase of 1.4 degrees in average temperature led to 30% increase in evaporation between 1970 and 1990

Temp

Precip

Evap



Schindler et al

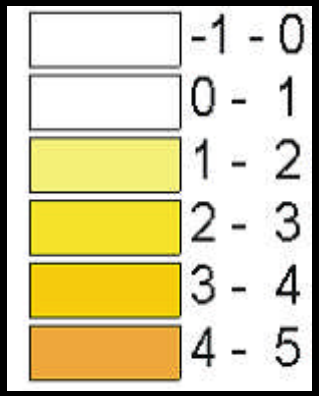
09/2006:
8.7 million hectares destroyed
Only 4.0 million to go in BC
Now found in Alberta and Saskatchewan
The cure: 3 weeks of minus 40C

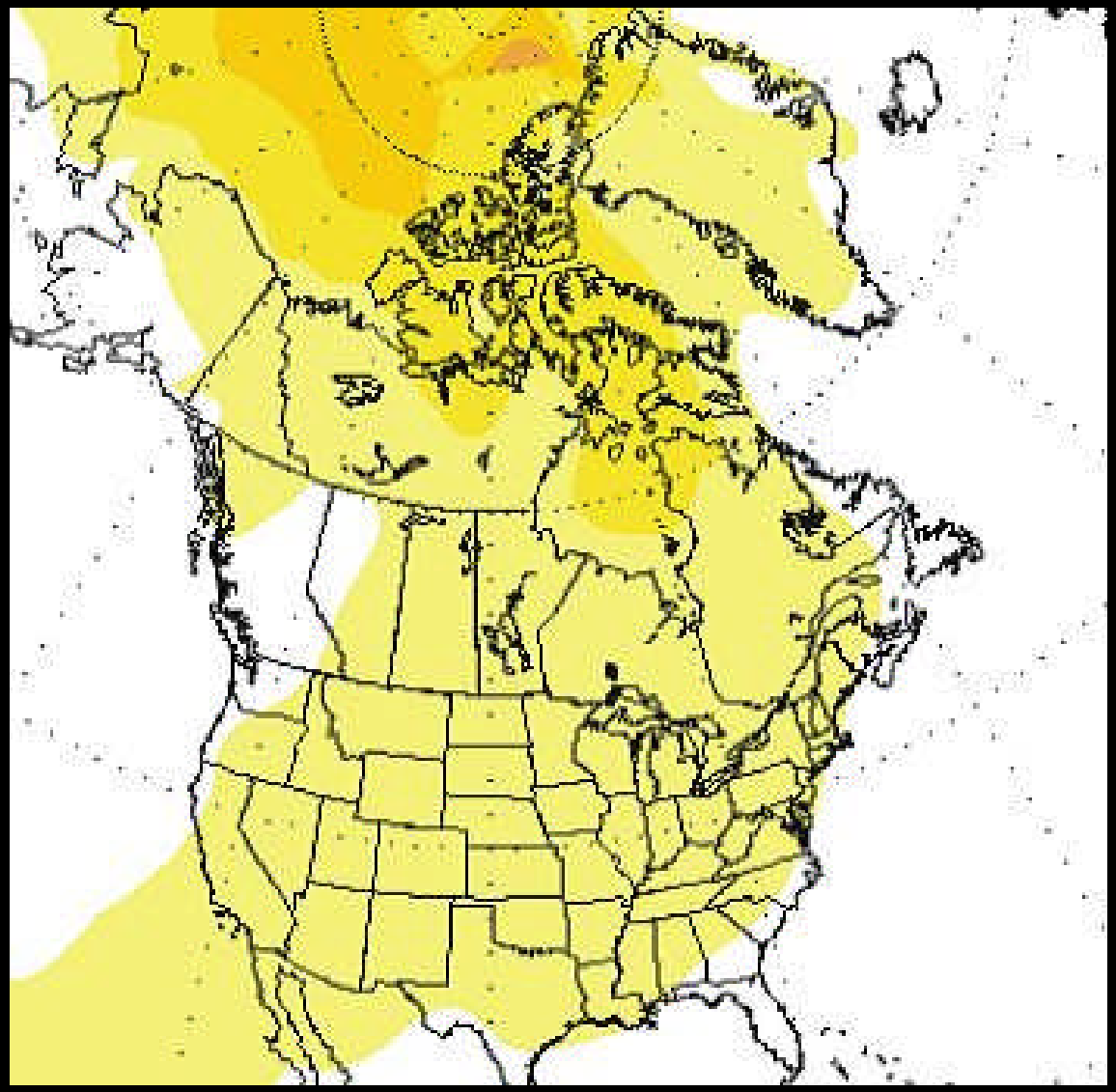
Mountain pine beetle

Long Term Temperature Changes

Average Temperature

2010-2030 with
respect to 19**75-1995**

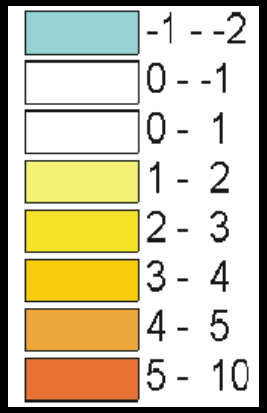




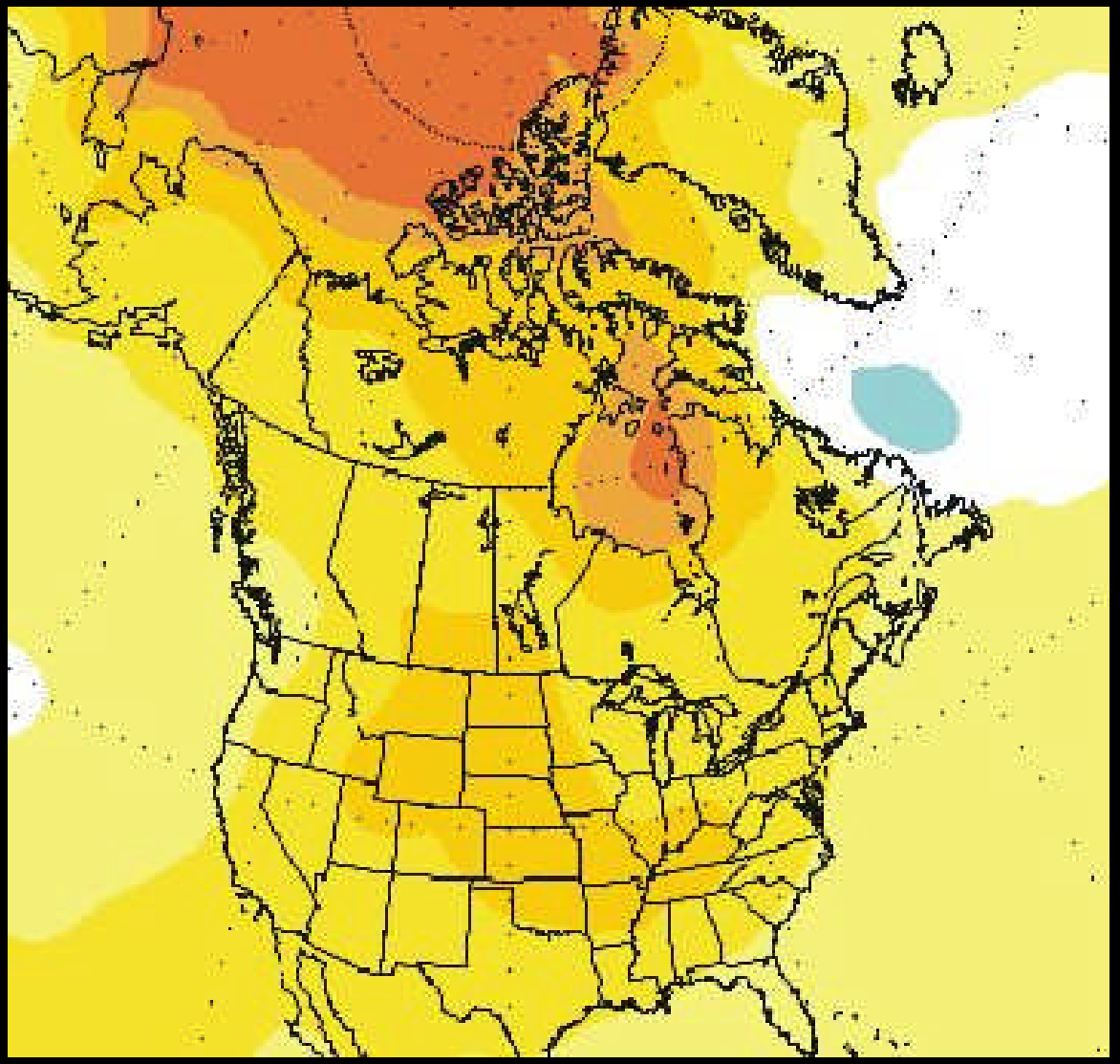
Long Term Temperature Changes

Average Temperature

2040-2060 with respect to **1975-1995**



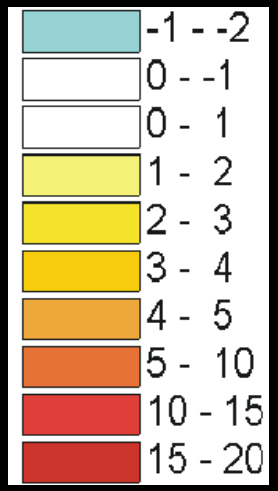
Sudbury to experience additional 2 to 4 degree average temp increase by 2050 esp. in fall/winter/spring (3-5 degrees)

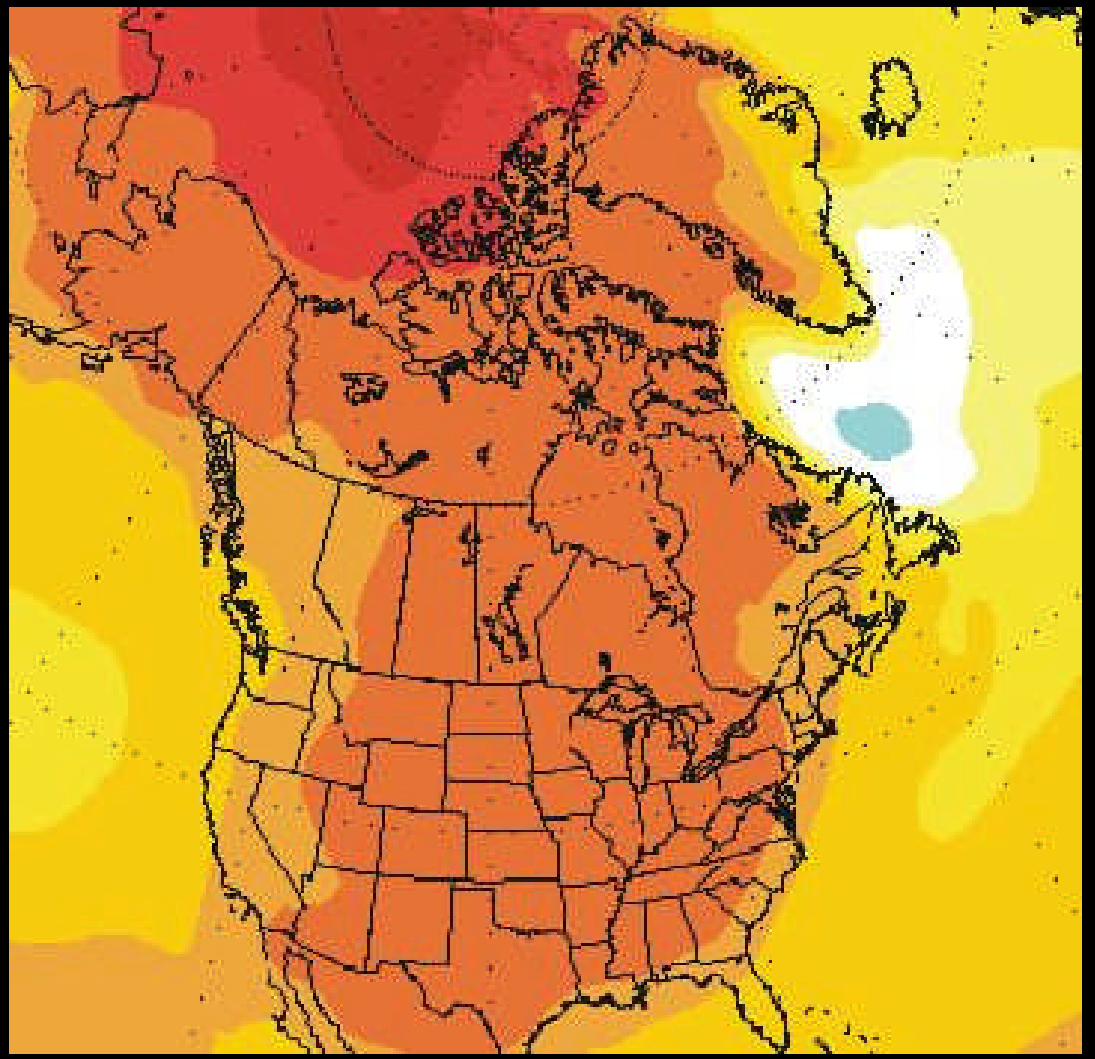


Long Term Temperature Changes

Average Temperature

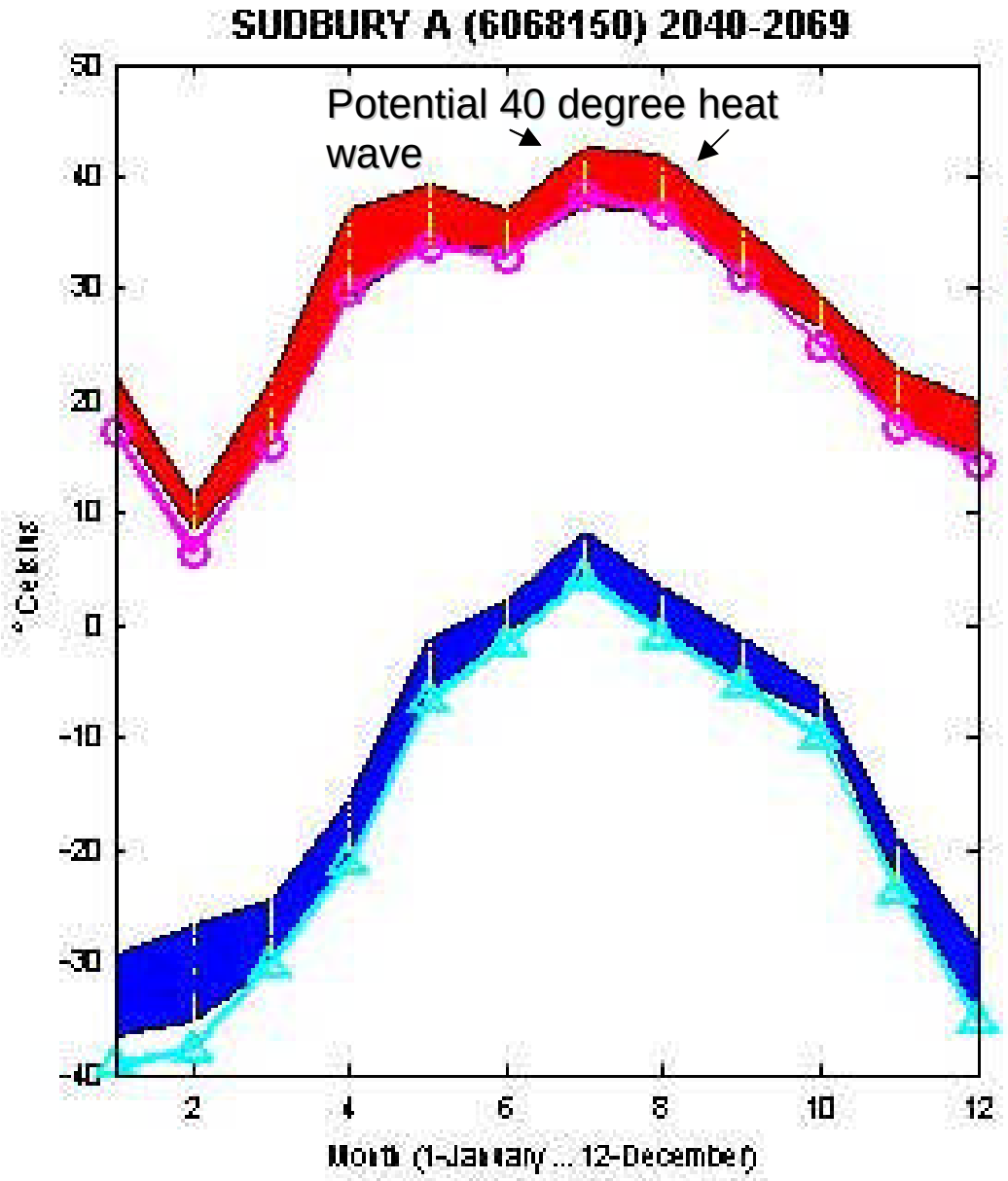
2080-2100 with respect to
1975-1995





OURANOS

Extreme Temperature Range



Small yellow dots in range are actual values within range from all experiments

Summer in 2055

Hot July / August days
3 weeks potential over 40 C

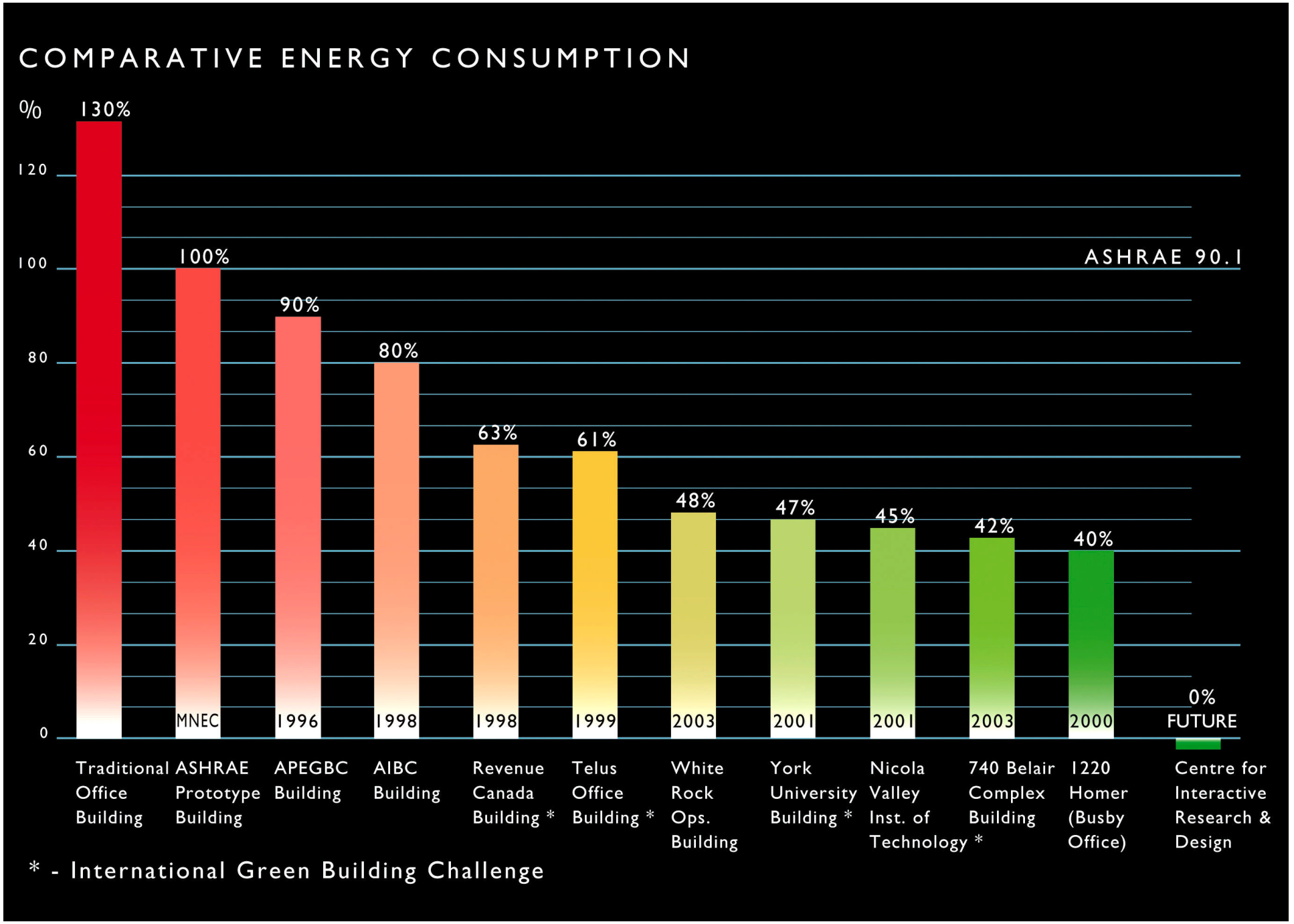
Winter in 2055

Coldest Jan days -30 C

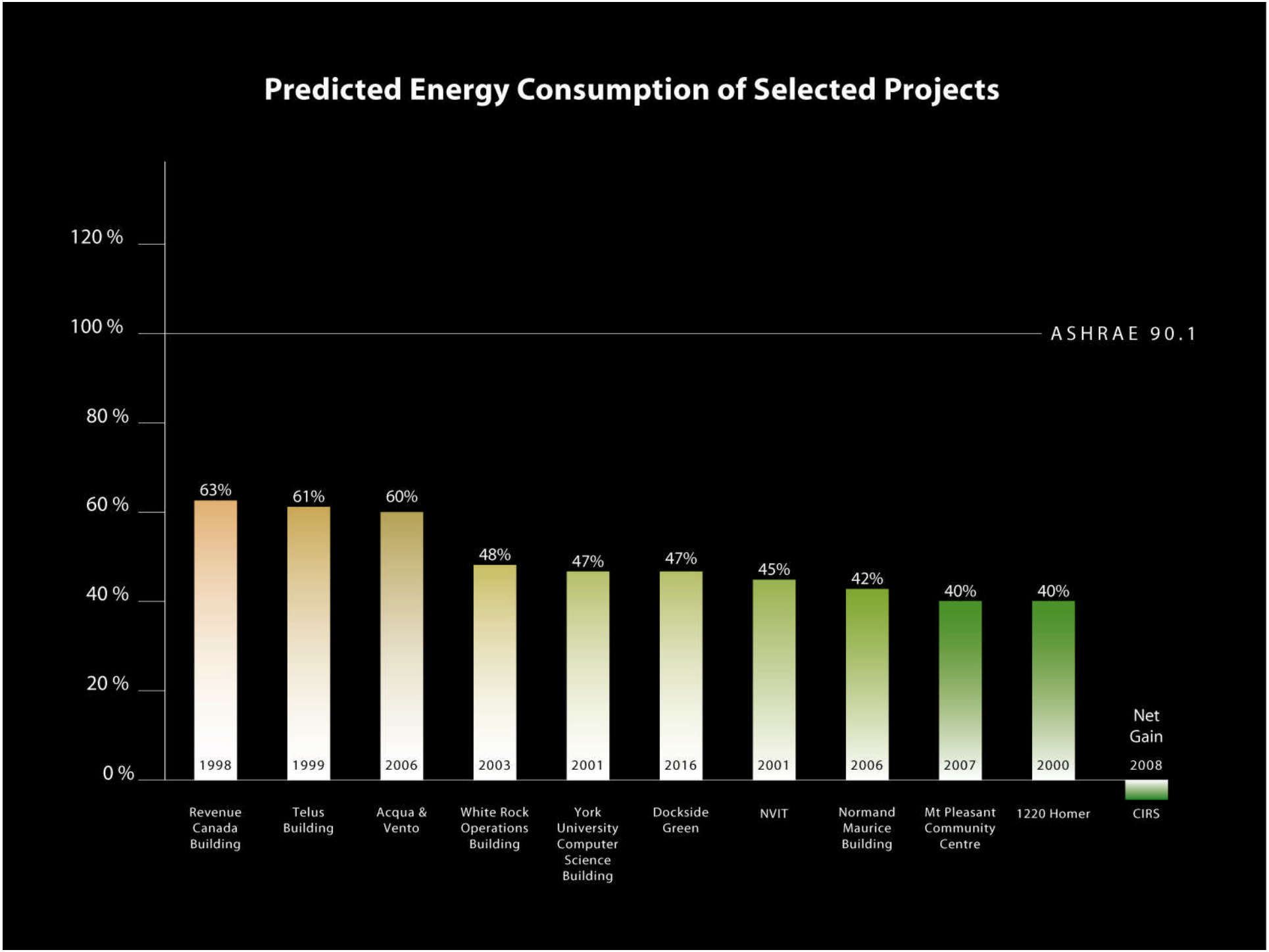
Canada's Role

Canadian Construction Industry:

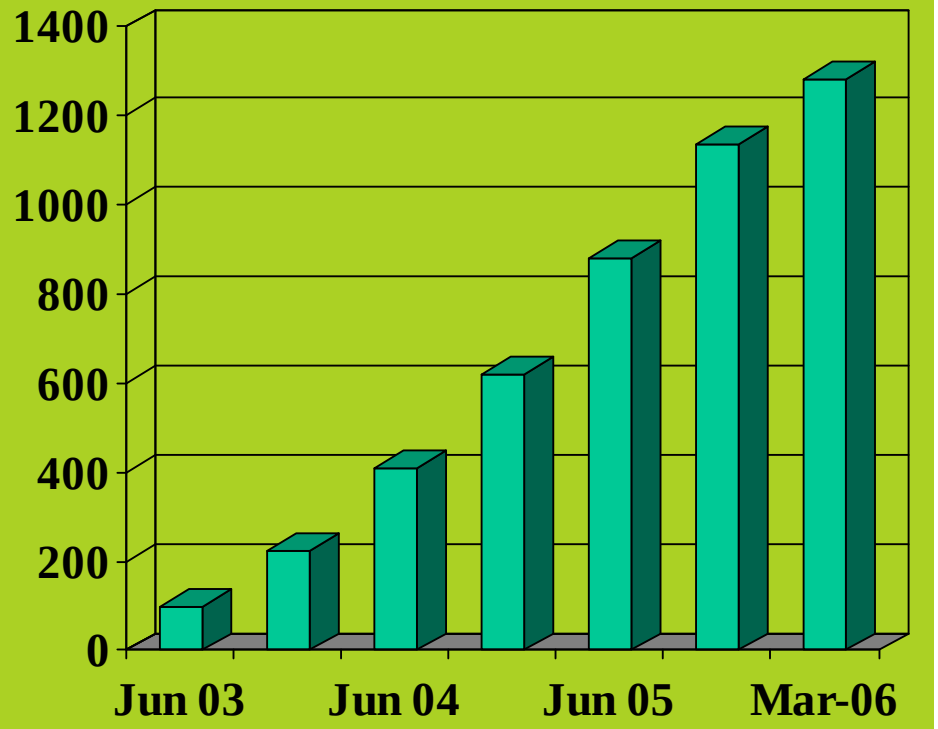
- Approximately 10 billion square metres of existing buildings
- Buildings contribute 10% of GHGs through operating energy
- Construction industry contributes 30% of GHGs indirectly through the production, transportation and waste of materials
- Cement production accounts for 8% of GHGs or 53 Mt (*1 tonne of cement = 1 tonne of CO_2*)
- Construction debris accounts for 30-40% of landfills
- Construction industry has potential to realize over 40% of Canadian GHG reductions to meet Kyoto targets.


COMPARATIVE ENERGY CONSUMPTION
%
120
100
80
60
40
20
0
130%
100%
90%
80%
63%
61%
48%
47%
45%
42%
40%
0%
ASHRAE 90.1
MNEC
1996
1998
1998
1999
2003
2001
2001
2003
2000
FUTURE
Traditional Office Building
ASHRAE Prototype Building
APEGBC Building
AIBC Building
Revenue Canada Building *
Telus Office Building *
White Rock Ops. Building
York University Building *
Nicola Valley Inst. of Technology *
740 Belair Complex Building
1220 Homer (Busby Office)
Centre for Interactive Research & Design
* - International Green Building Challenge

Predicted Energy Consumption of Selected Projects



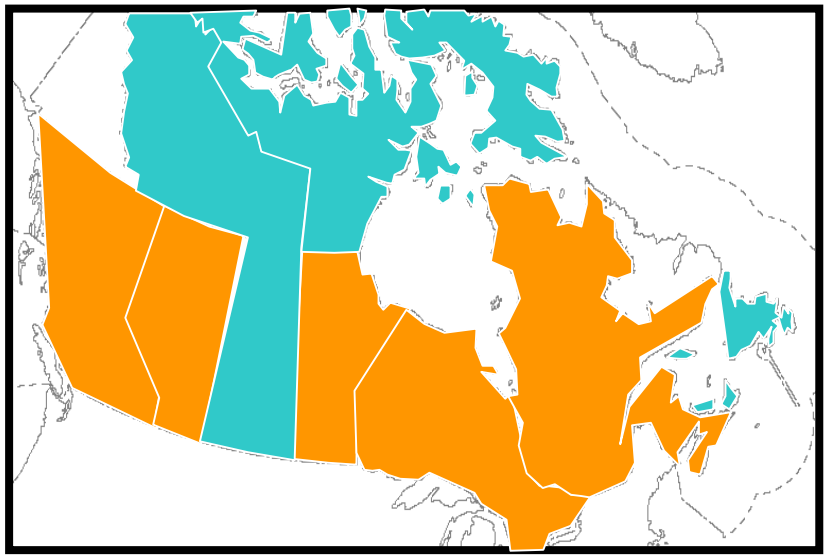
CaGBC Membership Growth



CaGBC, October 2006:

1,480 members

LEED® Canada-NC 1.0 Green Building Rating System™



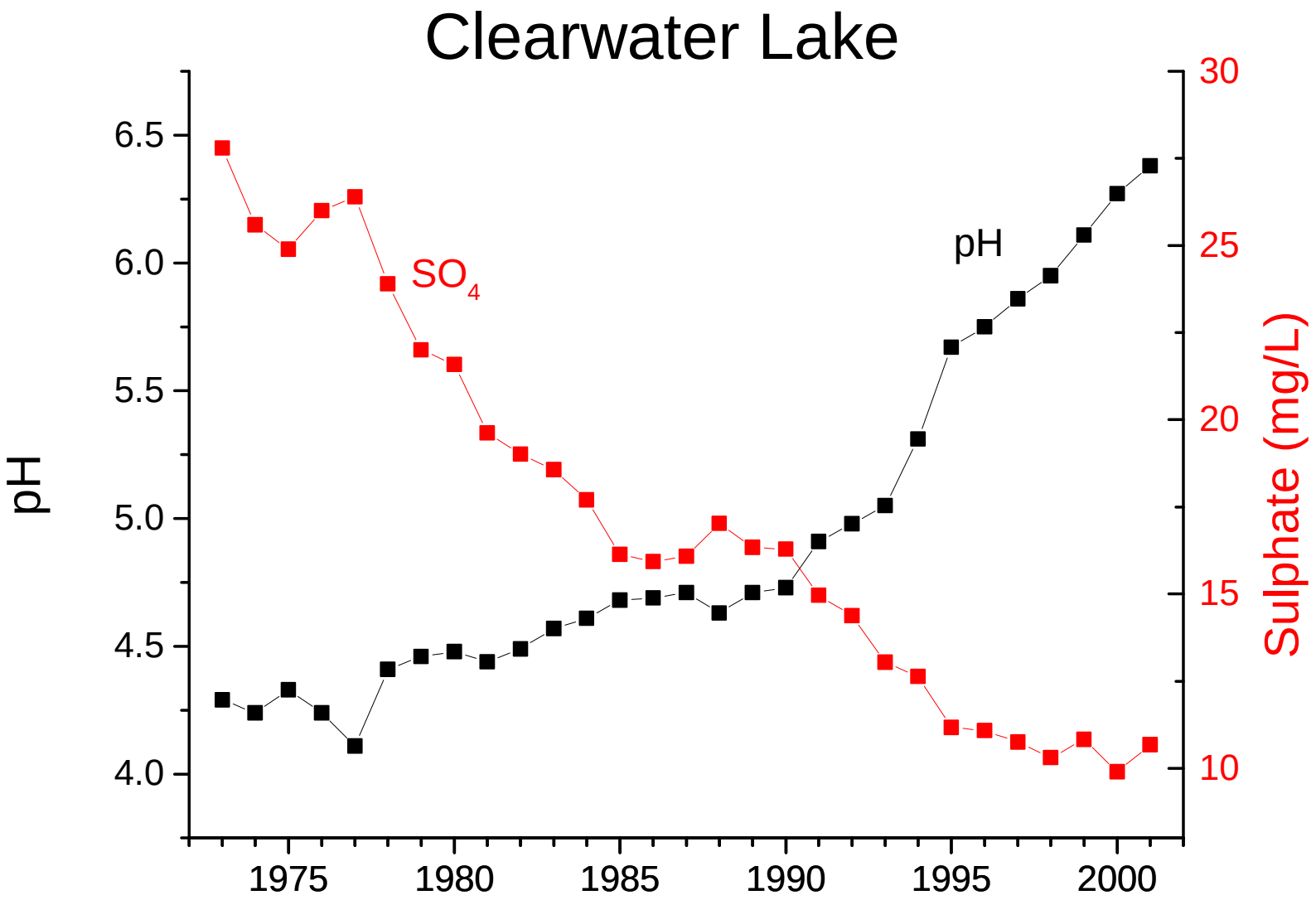
LEED® ACCREDITED PROFESSIONALS: (April '06)
Total: 2,800

LEED® REGISTERED PROJECTS:
(Aug '06)
Total: 277

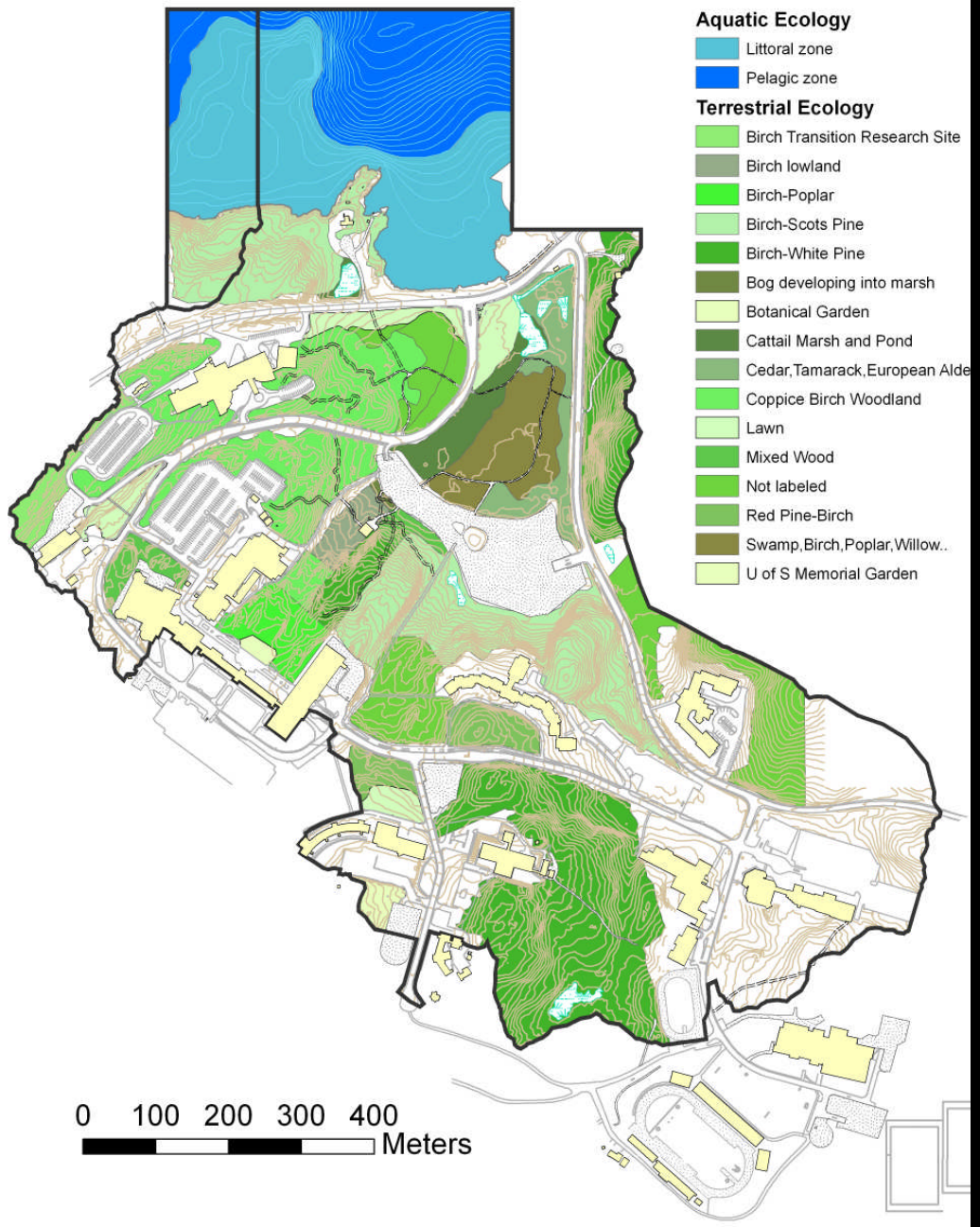
LEED® CERTIFIED PROJECTS:
(Aug '06)
Total: 47

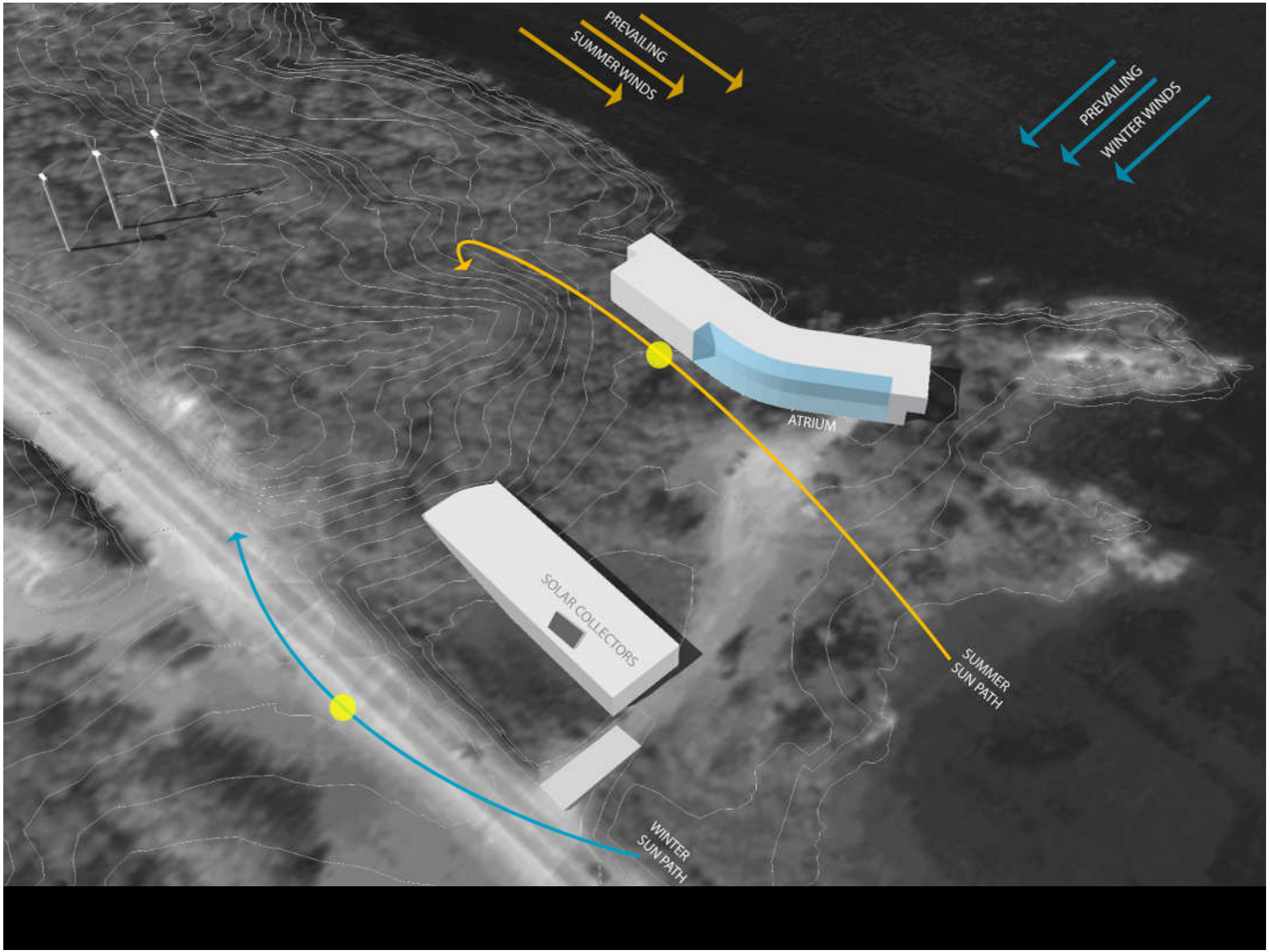
Canadian Projects: LEED Certifications

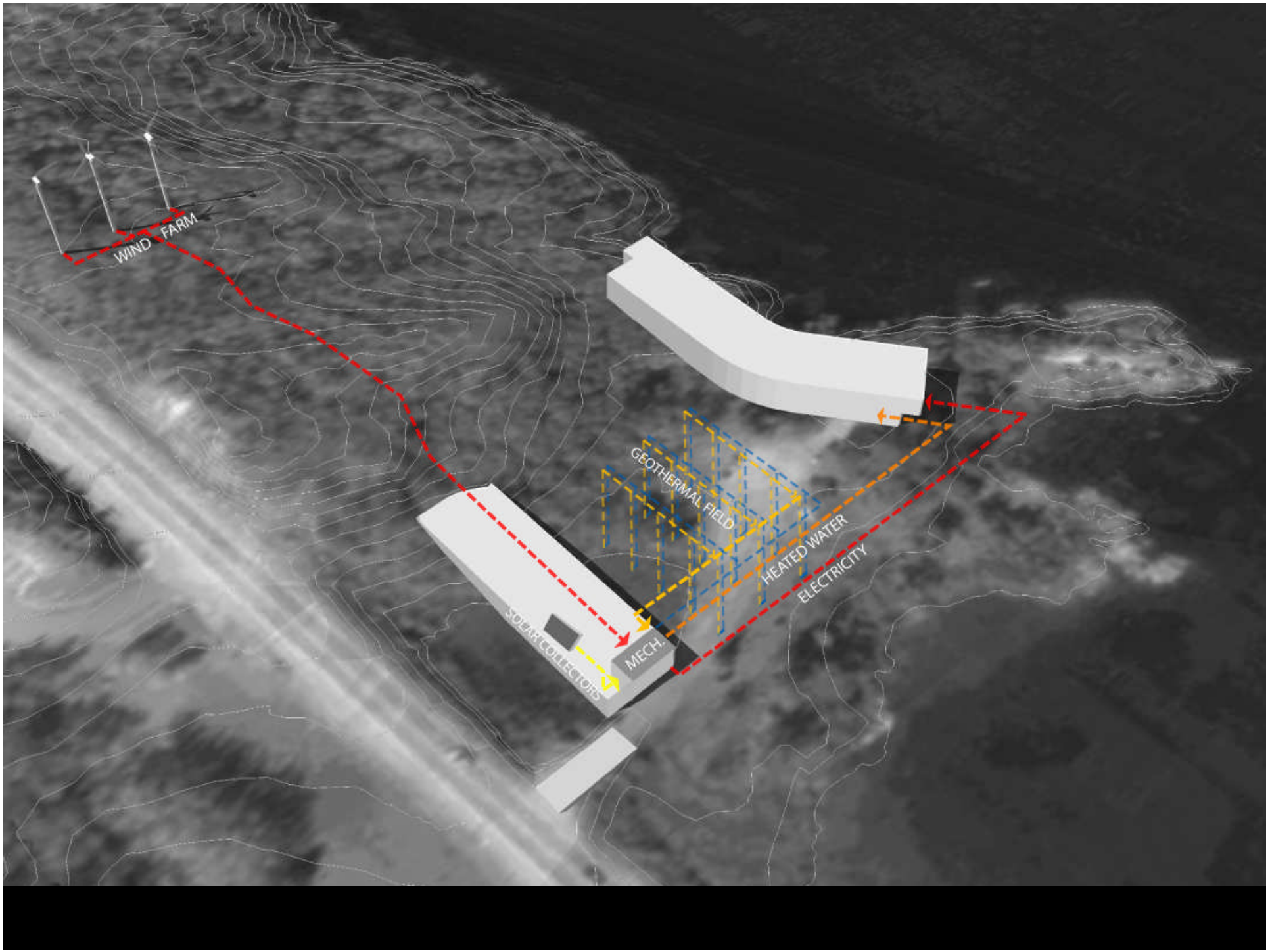
	Certified	Silver	Gold	Platinum	Total
LEED BC-NC	0	1	1	0	2
LEED Canada	4	4	7	0	15
LEED -NC (USGBC)	7	8	7	0	22
NEED-CI (USGBC)	3	2	3	0	8
Total	**14**	**15**	**18**	**0**	**47**

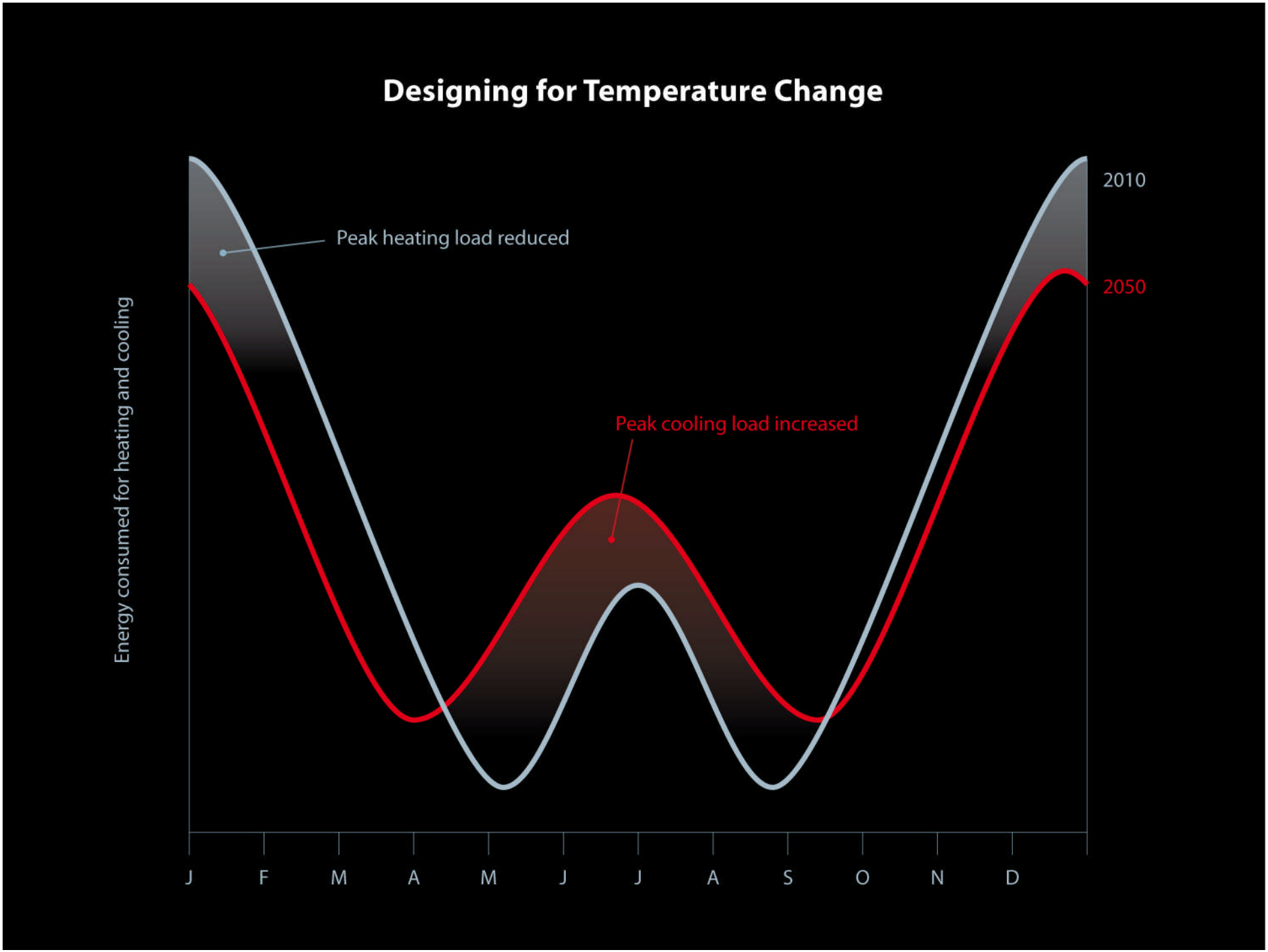

Clearwater Lake
pH
6.5
6.0
5.5
5.0
4.5
4.0
1975
1980
1985
1990
1995
2000
30
25
20
15
10
Sulphate (mg/L)
SO4
pH

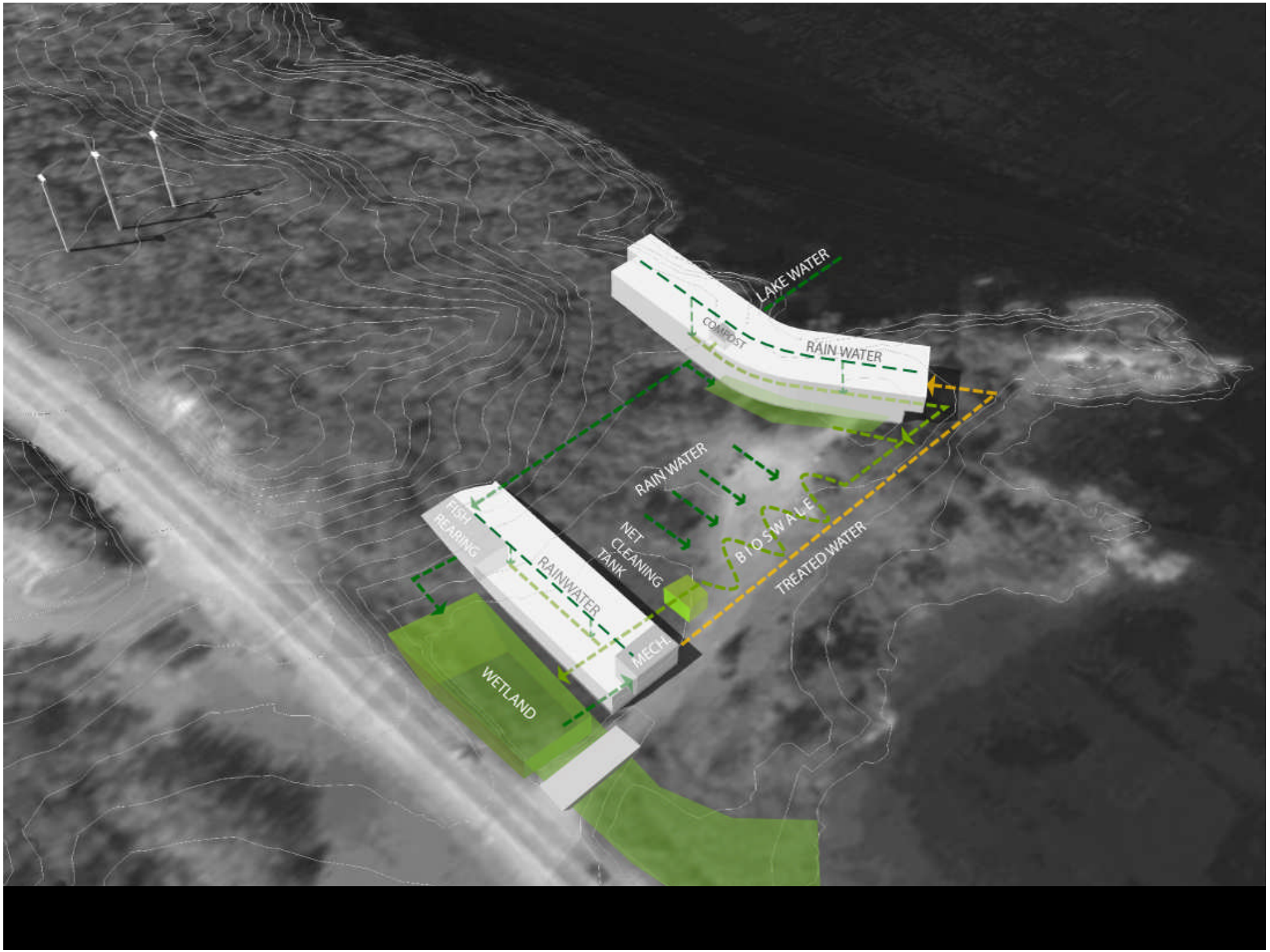

0 100 200 300 400
Meters

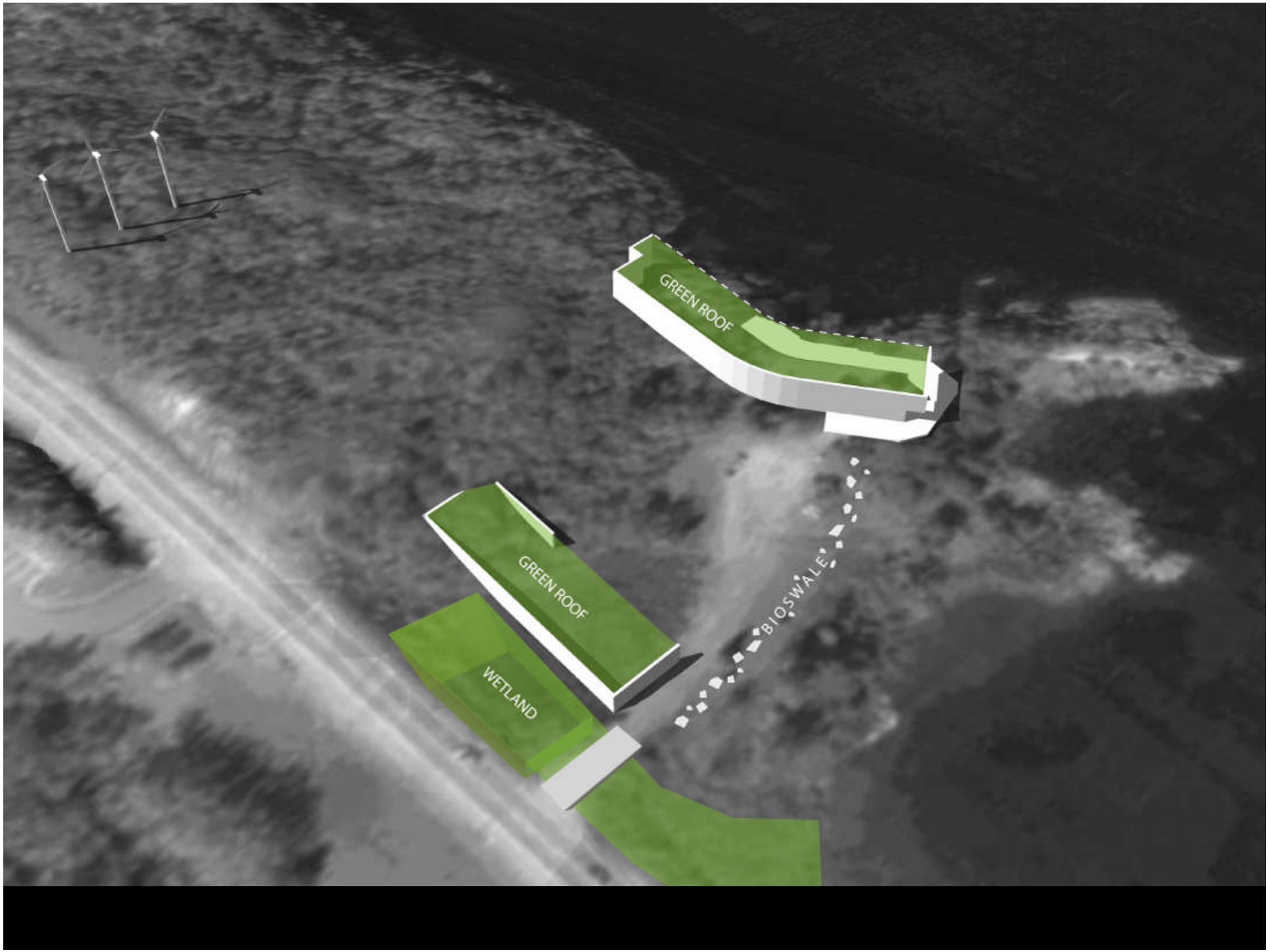

Aquatic Ecology
Littoral zone
Pelagic zone
Terrestrial Ecology
Birch Transition Research Site
Birch lowland
Birch-Poplar
Birch-Scots Pine
Birch-White Pine
Bog developing into marsh
Botanical Garden
Cattail Marsh and Pond
Cedar,Tamarack,European Alde
Coppice Birch Woodland
Lawn
Mixed Wood
Not labeled
Red Pine-Birch
Swamp,Birch,Poplar,Willow..
U of S Memorial Garden
0 100 200 300 400
Meters


PREVAILING
SUMMER WINDS
PREVAILING
WINTER WINDS
ATRIUM
SOLAR COLLECTORS
SUMMER
SUN PATH
WINTER
SUN PATH


WIND FARM
GEOTHERMAL FIELD
HEATED WATER
ELECTRICITY
SOLAR COLLECTORS
MECH.

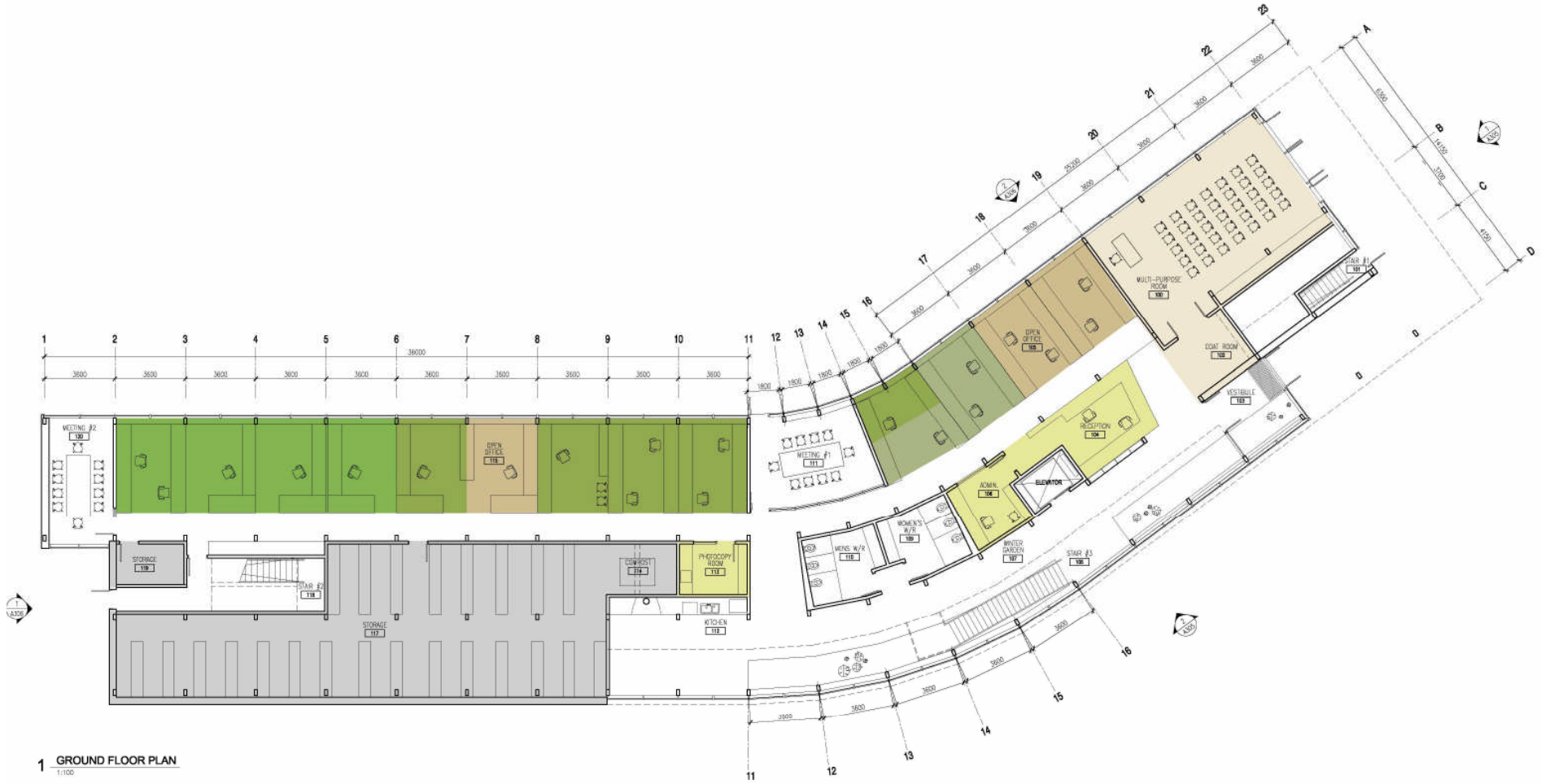

Designing for Temperature Change
Energy consumed for heating and cooling
Peak heating load reduced
Peak cooling load increased
2010
2050
J
F
M
A
M
J
J
A
S
O
N
D


LAKE WATER
COMPOST
RAIN WATER
RAIN WATER
FISH REARING
RAINWATER
NET CLEANING TANK
MECH
BIOSWALE
TREATED WATER
WETLAND

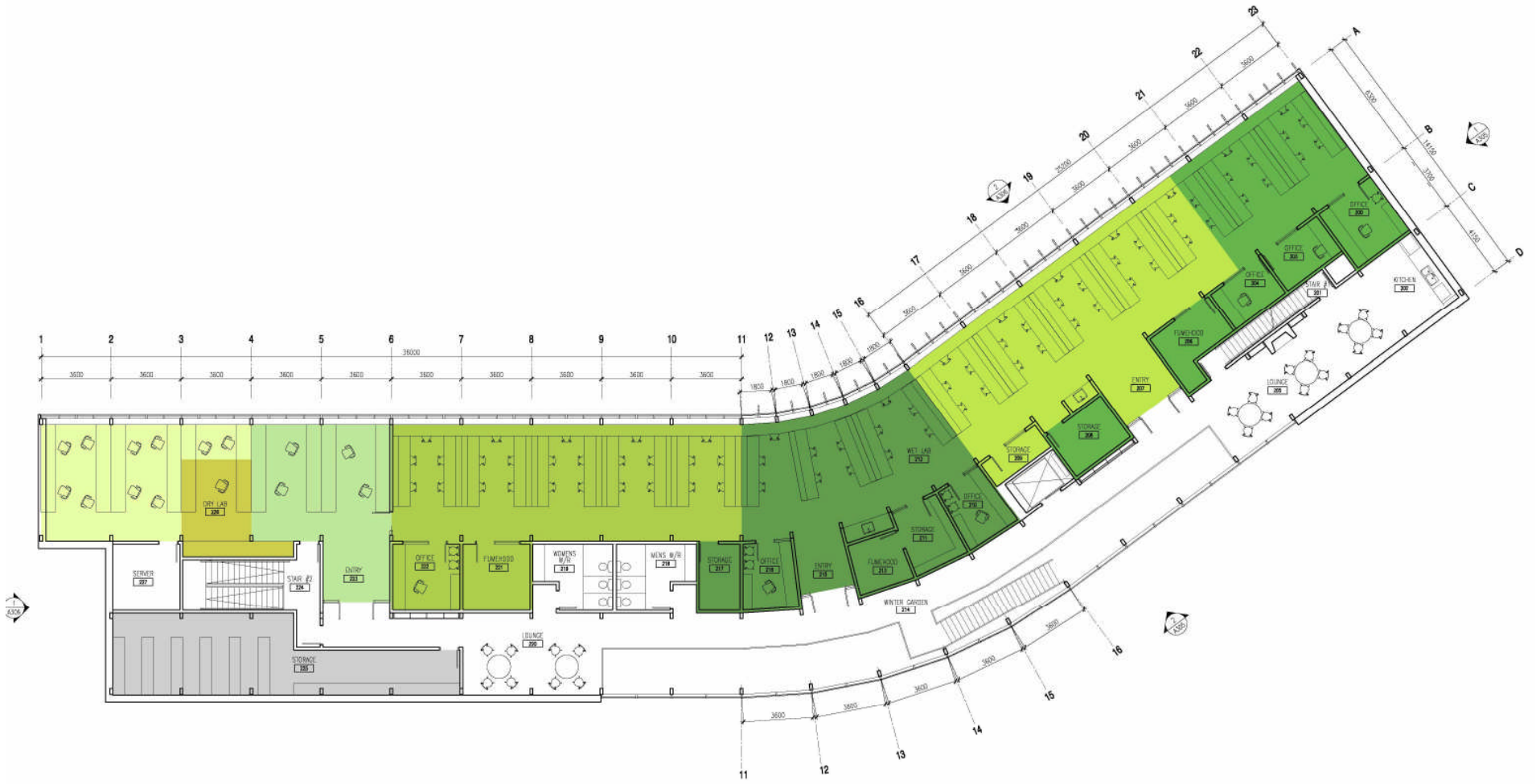

GREEN ROOF
GREEN ROOF
BIOSWALE
WETLAND

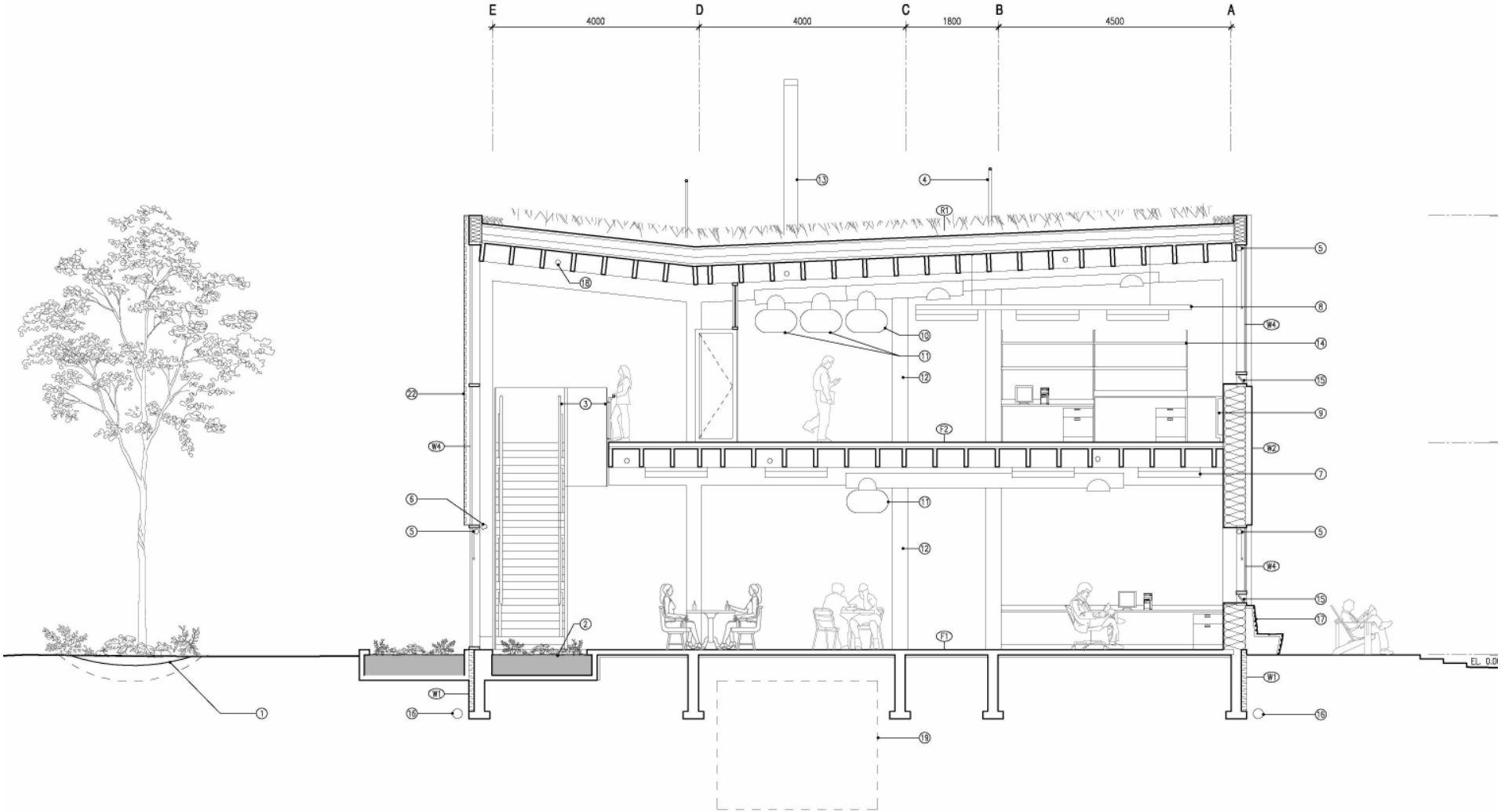
Living with Lakes Centre Sustainable Design Strategies

- Research in the building is a top priority
- Designed to attract and retain best staff and faculty
- Showcase rehabilitation strategies
- Education and outreach programs
- 70% below MNECB
- Geothermal source, radiant slabs
- 20% windpower
- All Surface water cleaned, returned to the lake
- Zero air and water pollution on the site with monitored proof
- Flexible design for future laboratory uses
- Composting toilets
- 100% daylighting
- Healthy air quality



1 GROUND FLOOR PLAN
1:100


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
A
B
C
D
36000
3600
1800
DRY LAB
326
SERVER
327
STAIR #2
324
ENTRY
323
OFFICE
322
FUMEHOOD
321
WOMENS W/R
319
MENS W/R
318
STORAGE
317
OFFICE
316
ENTRY
315
FUMEHOOD
313
WET LAB
312
STORAGE
311
OFFICE
310
STORAGE
309
STORAGE
308
ENTRY
307
FUMEHOOD
306
OFFICE
304
OFFICE
303
OFFICE
302
STAIR #1
301
KITCHEN
300
LOUNGE
299
WINTER GARDEN
314
LOUNGE
298
STORAGE
325
A306
SECOND FLOOR PLAN


E
4000
D
4000
C
1800
B
4500
A
R1
F1
F2
W1
W2
W4
EL. 0.00