

ENVIRONMENTAL ^[1]

ANALYSIS ^[2]

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What Is [_ _ _ _ _] ?

Bing

[1] **of the natural world:** relating to the natural world, especially to its conservation "environmental groups"

of your surroundings: relating to, or caused by, a person's or animal's surroundings "environmental hazards"

[2] **close examination:** the examination of something in detail in order to understand it better or draw conclusions from it

separation into components: the separation of something into its constituents in order to find out what it contains, to examine individual parts, or to study the structure of the whole

How do we adapt to our climate?

What Is a [Climate Zone] ?

- [1] **Climate Zone** : any of the eight principal zones, roughly demarcated by lines of latitude, into which the earth can be divided on the basis of climate



Sum Of Heating & Cooling Degree Days

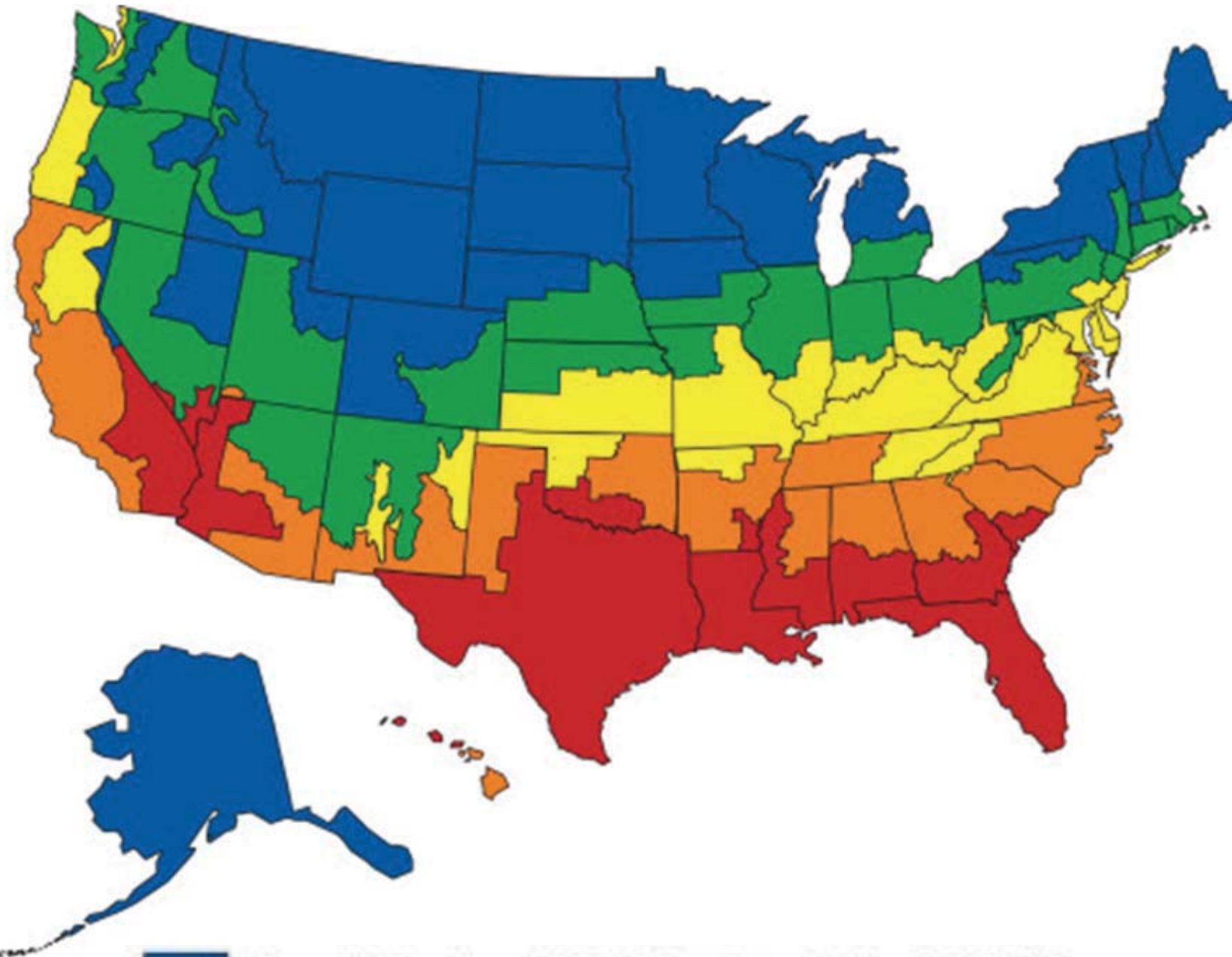
POTENTIAL DEMAND FOR ENERGY

EXPAND ▼

Month	Heating Degree Days	Cooling Degree Days
January	1009	0
February	763	0
March	552	1
April	255	18
May	90	114
June	3	272
July	0	394
August	3	346
September	40	157
October	238	27
November	544	1
December	886	0

temperate zone

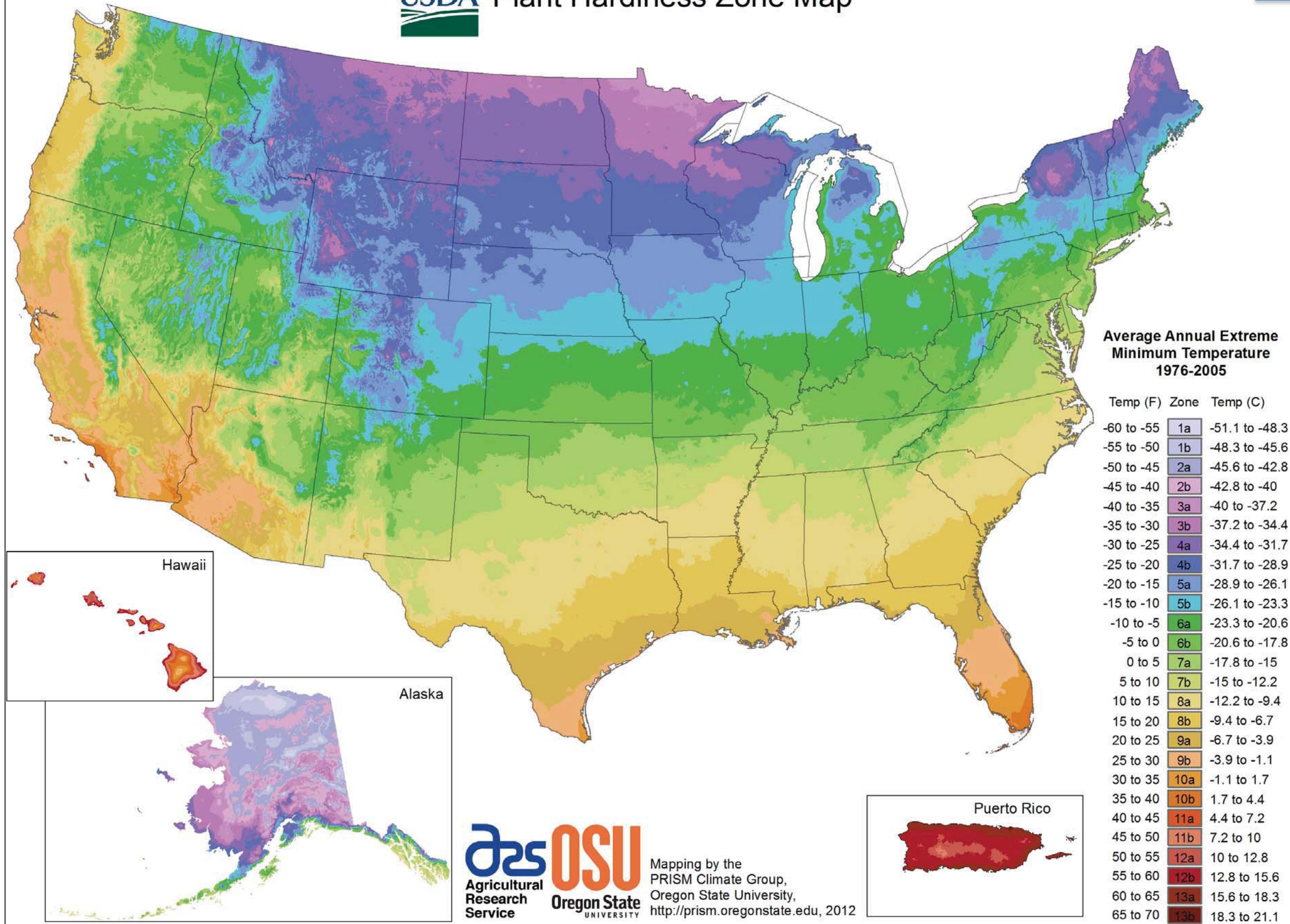
and characterized by having a climate that is warm in the summer, cold in the winter, and moderate in the spring and fall.



- Zone 1 is less than 2,000 CDD and greater than 7,000 HDD.
- Zone 2 is less than 2,000 CDD and 5,500-7,000 HDD.
- Zone 3 is less than 2,000 CDD and 4,000-5,499 HDD.
- Zone 4 is less than 2,000 CDD and less than 4,000 HDD.
- Zone 5 is 2,000 CDD or more and less than 4,000 HDD.

What Is a [Climate Zone] ?

USDA Plant Hardiness Zone Map



- Apples like *cool* and **humid** conditions
- They are not very sensitive to soil
- Slope should not exceed 10%.
- Southern facing slope warms up too fast
- Western facing slope tends to be thinner
- The recommended slope facing direction is east.

What Is a [Climate Zone] ?

Climate Zone 4 (Except Marine)

Ceiling R-value	38
Wood Frame Wall R-value	13
Mass Wall R-value ⁱ	5/10
Floor R-value	19
Basement Wall R-value ^c	10/13
Slab R-value ^d , Depth	10, 2 ft
Crawlspace Wall R-value ^c	10/13
Fenestration U-Factor ^b	0.35
Skylight U-Factor ^b	0.60
Glazed fenestration SHGC ^{b, e}	NR

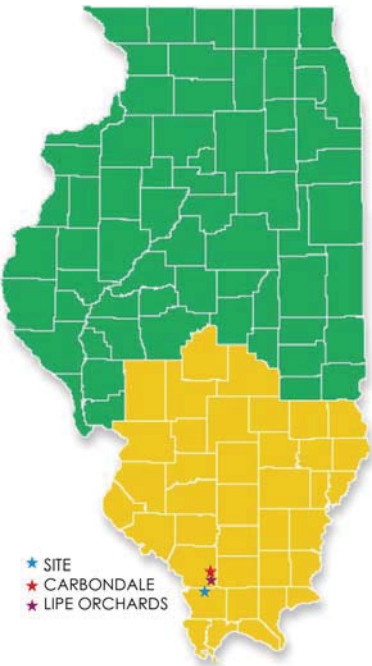
Climate Zone 5 & 4 Marine

Ceiling R-value	38
Wood Frame Wall R-value	20 or 13+5 ^h
Mass Wall R-value ⁱ	13/17
Floor R-value	30 ^g
Basement Wall R-value ^c	10/13
Slab R-value ^d , Depth	10, 2 ft
Crawlspace Wall R-value ^c	10/13
Fenestration U-Factor ^b	0.35
Skylight U-Factor ^b	0.60
Glazed fenestration SHGC ^{b, e}	NR

How do we adapt to our climate?

Southern Illinois (Yellow)

varies in climate from Northern Illinois. The charts illustrate differences in design and construction between the northern and southern regions.



- ★ SITE
- ★ CARBONDALE
- ★ LIPE ORCHARDS



The Shawnee Hills extend across southern Illinois and have elevations 500 to 900 feet higher than the surrounding terrain. This change in elevation is enough to increase annual precipitation by about 10 to 15 percent.

How do we design to endure seismic activity?

Structural materials

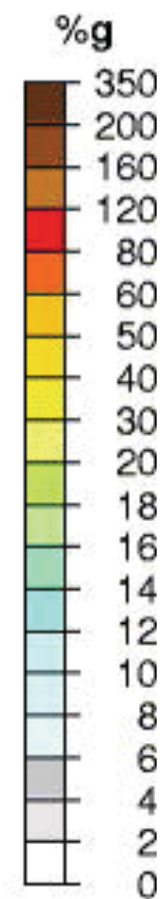
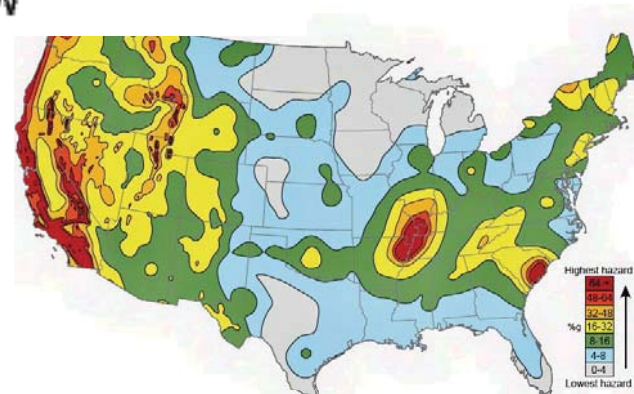
can contribute to stable, energy absorbent design and construction.

- Wood or timber frame
- Reinforced masonry walls
- Reinforced concrete walls
- Steel frame with masonry fill-in walls
- Steel frame, braced
- Steel frame, moment-resisting
- Pre-cast concrete frame

What Is [Seismic Activity] ?

[1] **seismic activity, a.k.a. earthquakes:** A sudden movement of the earth's crust caused by the release of stress accumulated along geologic faults or by volcanic activity.

The site is located in an active seismic zone located in close proximity to the New Madrid Fault.



What is the average rainfall?

Illinois [inches]

southern Illinois is influenced more by warmer, more humid air



Avg. Spring 1971-2000



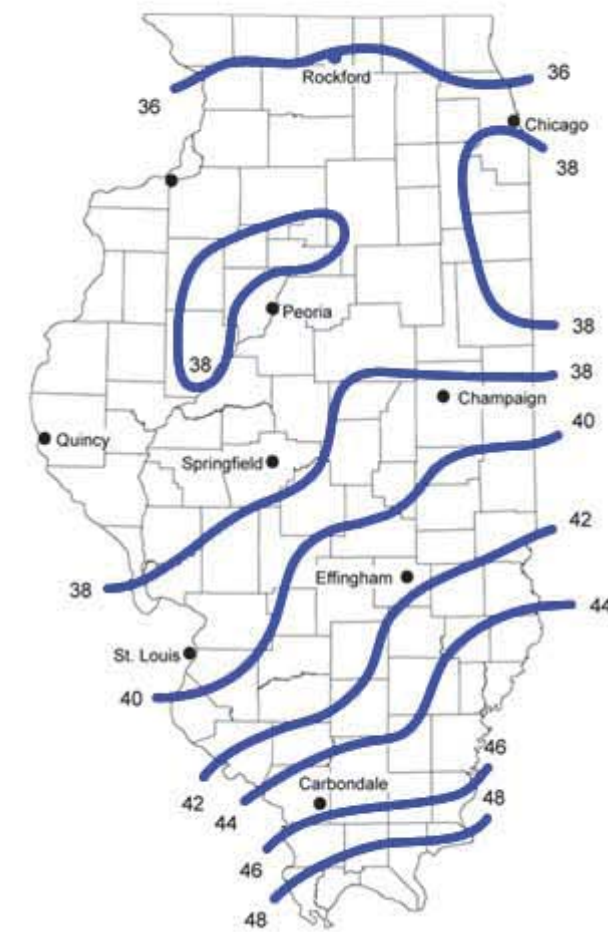
Avg. Summer 1971-2000



Avg. Fall 1971-2000



Avg. Winter 1971-2000



Avg. Annual 1971-2000

Historically, precipitation ranges from 10 – 14 inches quarterly. Annual accumulations average near 47 inches.

Accumulation

Most water is absorbed into the ground. Upon saturation the waters flow down the valleys and into the creek beds with an end goal of eventually returning to the Mississippi river delta; unless drought conditions occur.

What Is [Precipitation] ?

Bing

[1] **rain, snow, or hail:** rain, snow, or hail, all of which are formed by condensation of moisture in the atmosphere and fall to the ground

formation of rain, snow, or hail: the formation of rain, snow, or hail from moisture in the air

What is the average rainfall?

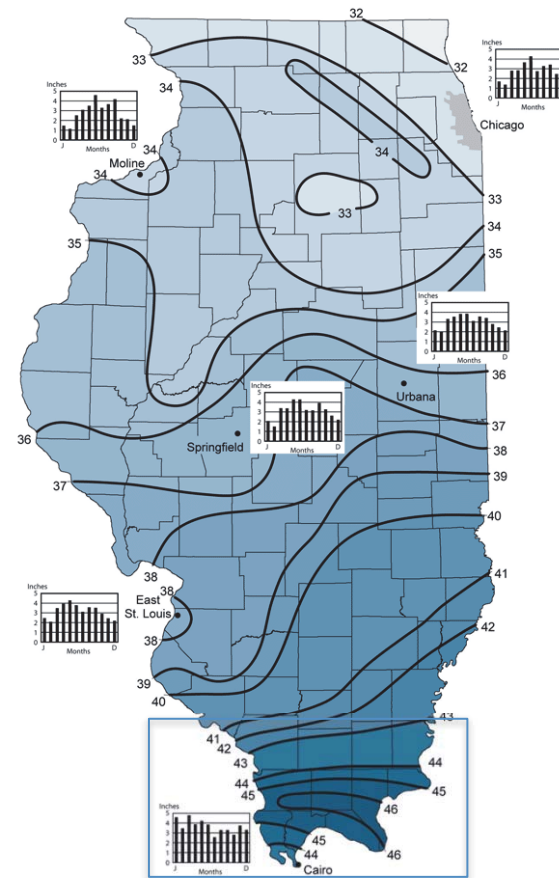


Precipitation

AVERAGE ANNUAL PRECIPITATION 48.3 INCHES

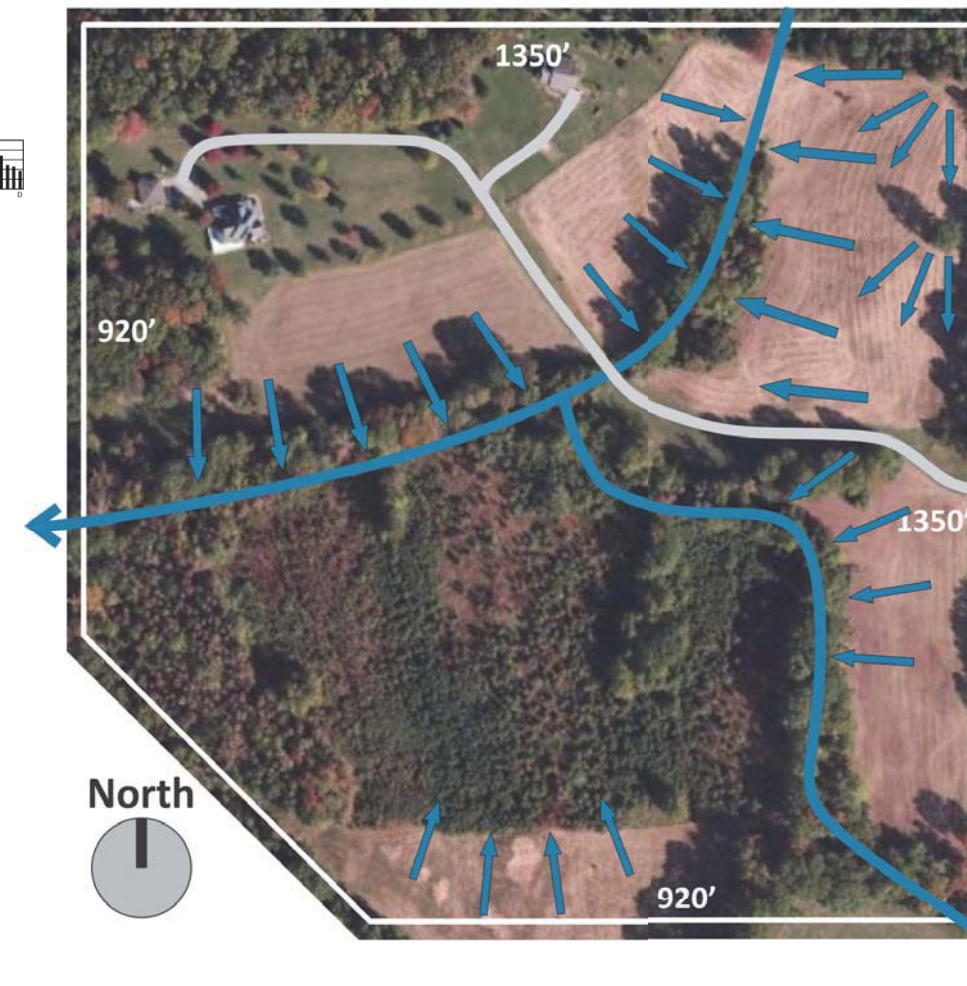
Monthly

	Average Precip
January	3.59 Inches
February	3.42 Inches
March	4.73 Inches
April	4.7 Inches
May	5.22 Inches
June	4.23 Inches
July	3.26 Inches
August	3.58 Inches
September	3.13 Inches
October	3.38 Inches
November	4.76 Inches
December	4.3 Inches



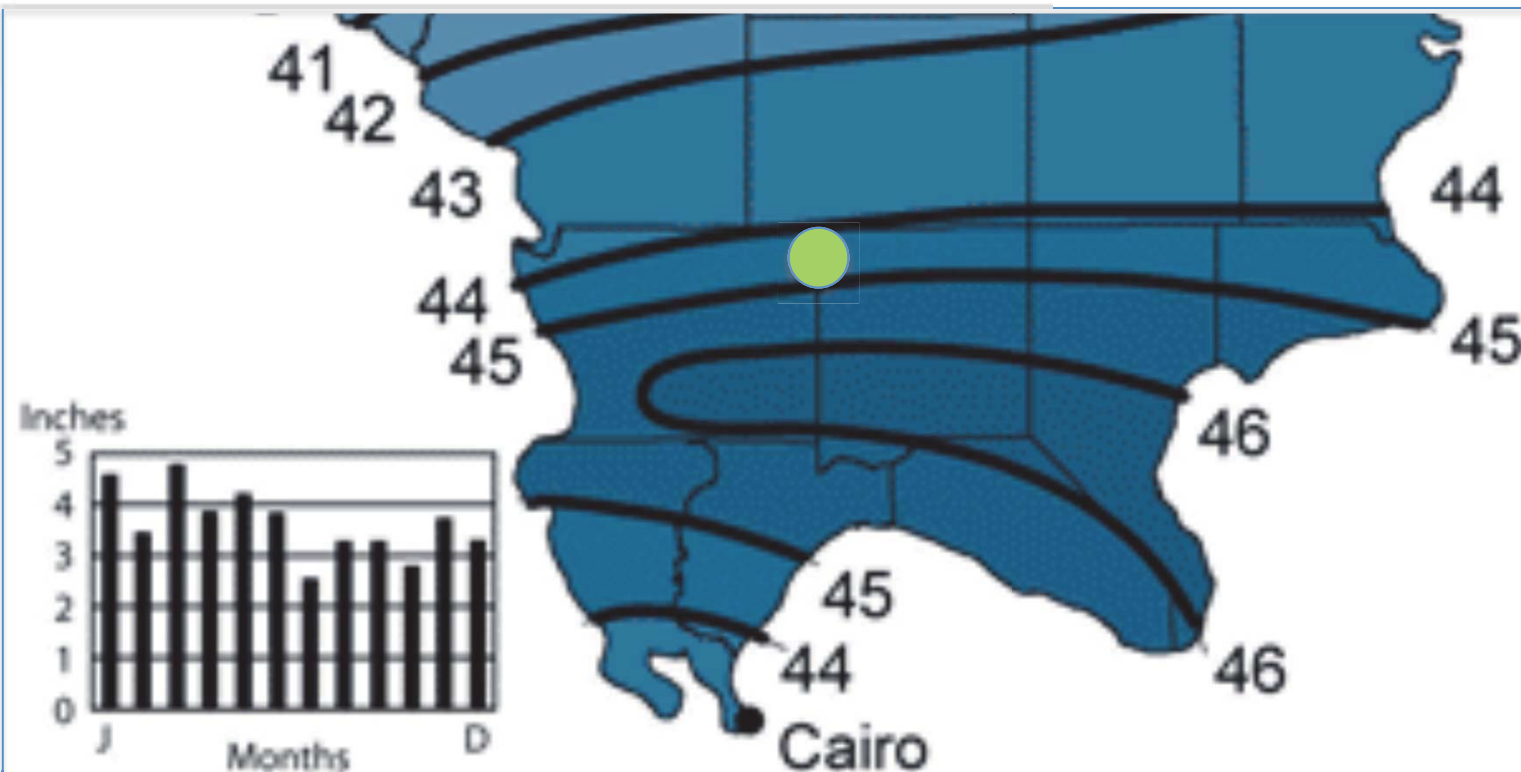
Watershed Patterns

Southern Illinois, USA (37.8°, -89.2°)



[1] **Water runs downhill;**
Blue arrows represent
how water tends to
flow in this rural
setting

**Creeks are the means
of egress;** the water
collects in small
creeks and flows out
from the site to the
south and west



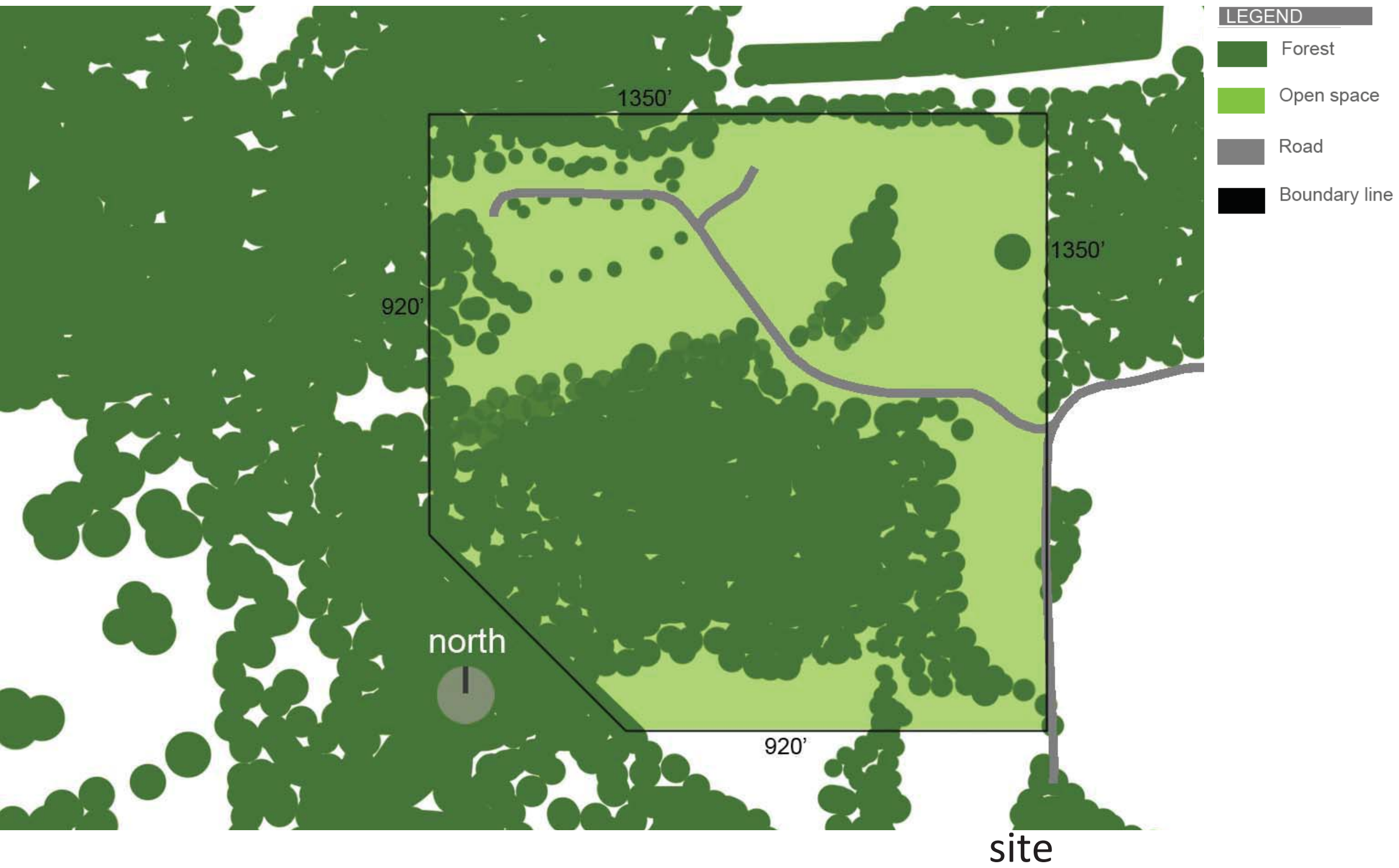
Drought

periods of extremely dry weather can potentially starve the area making it near impossible to grow crops or the replenish local water supplies. Poor accumulations during the growing months can render crops fruitless. As low as 2-3 inches per month

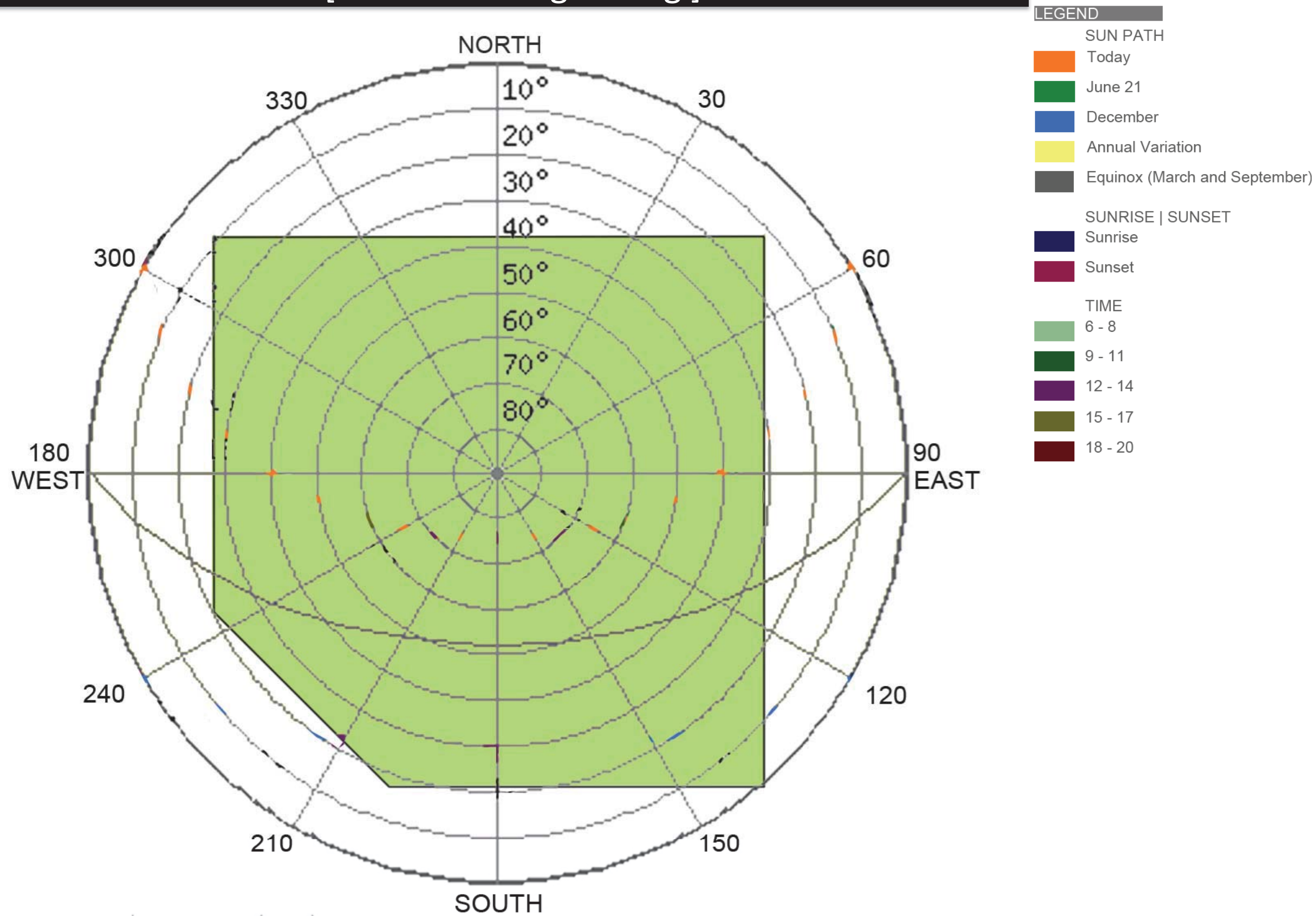
Drought can be fought by manipulating the water supply

- Use of retention ponds
- Irrigation systems
- Proper landscaping techniques

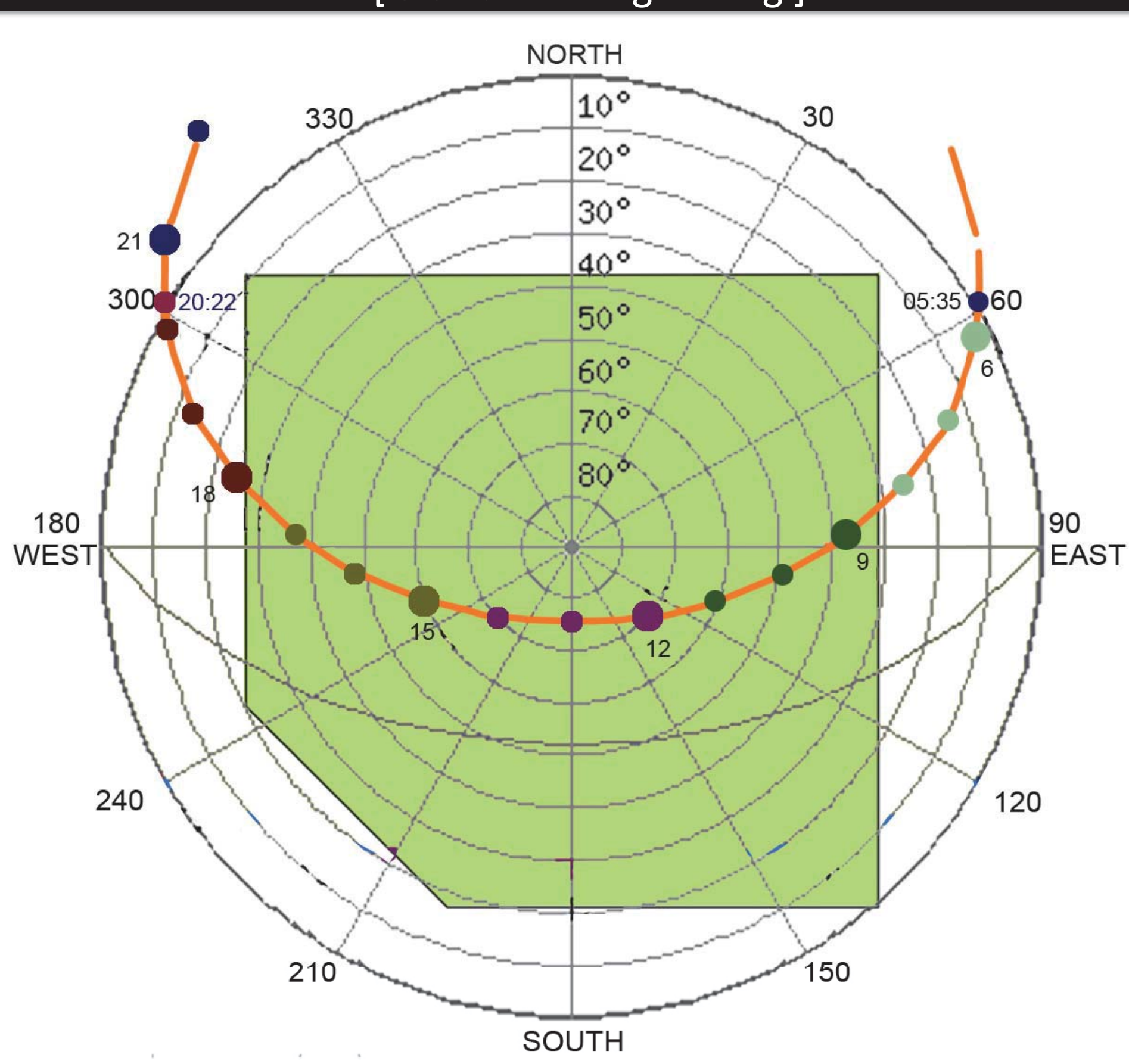
[Solar & Lighting]



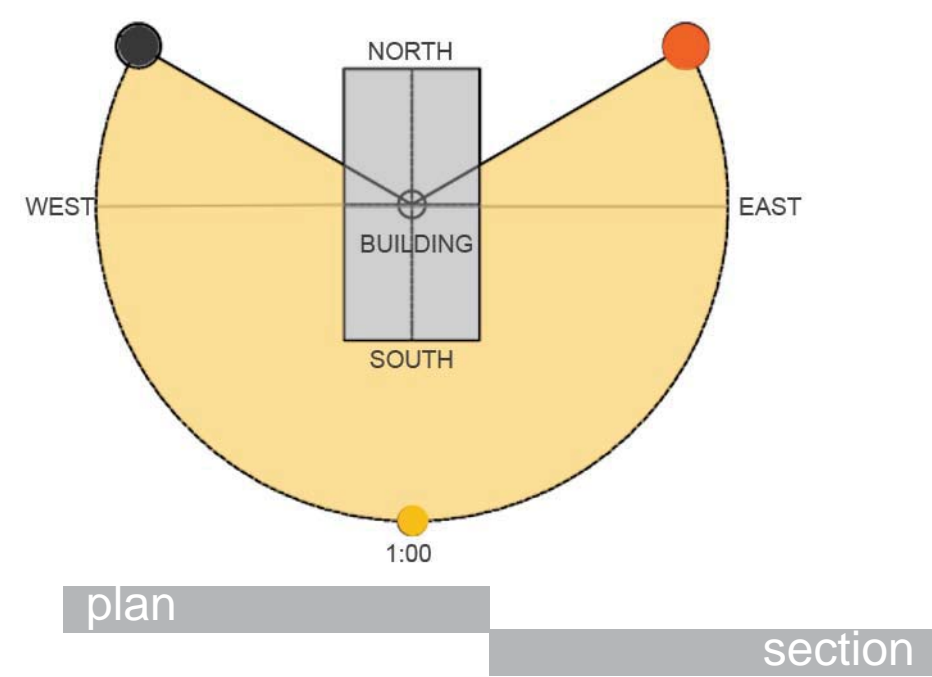
[Solar & Lighting]



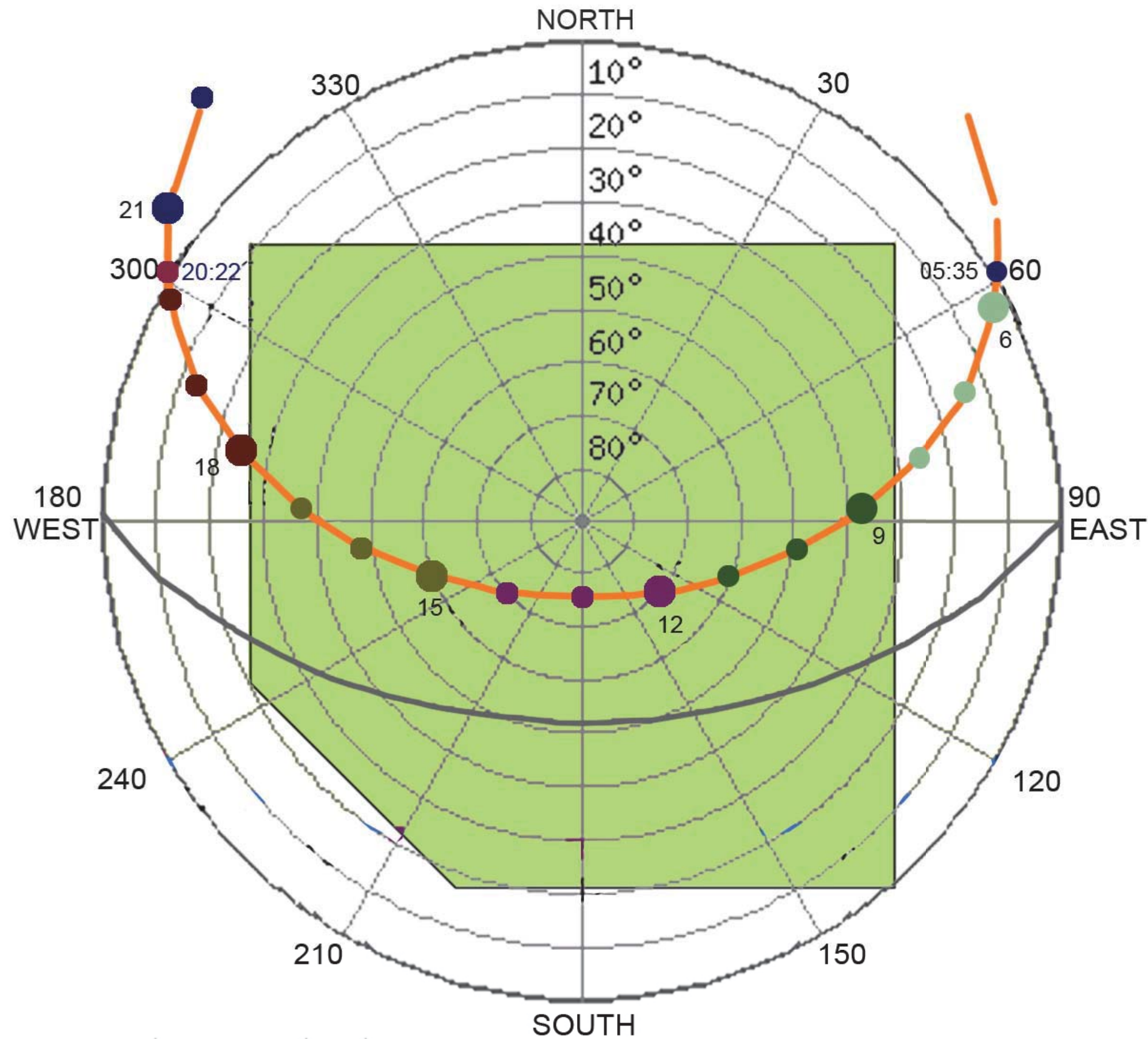
[Solar & Lighting]



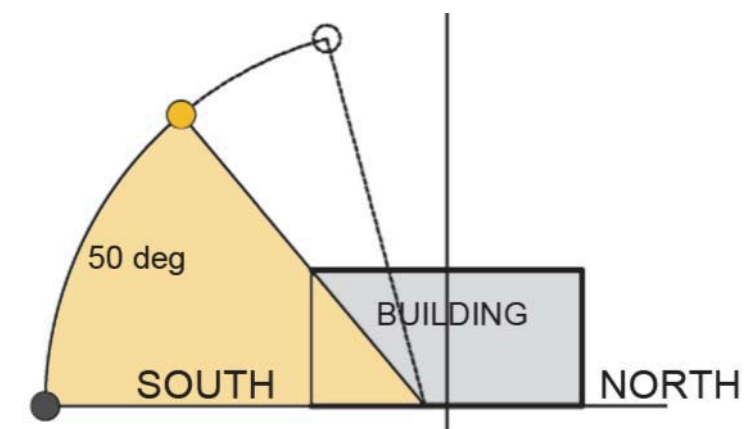
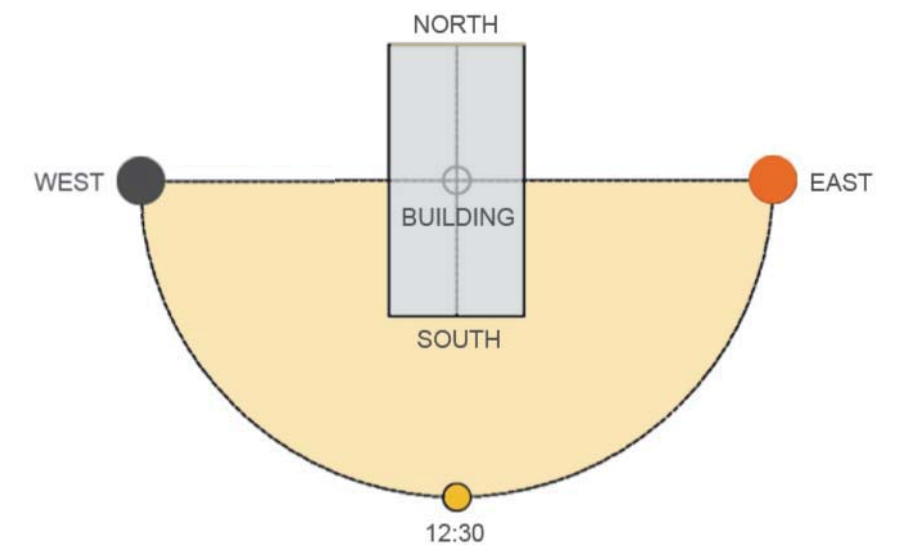
Building Orientation in summer



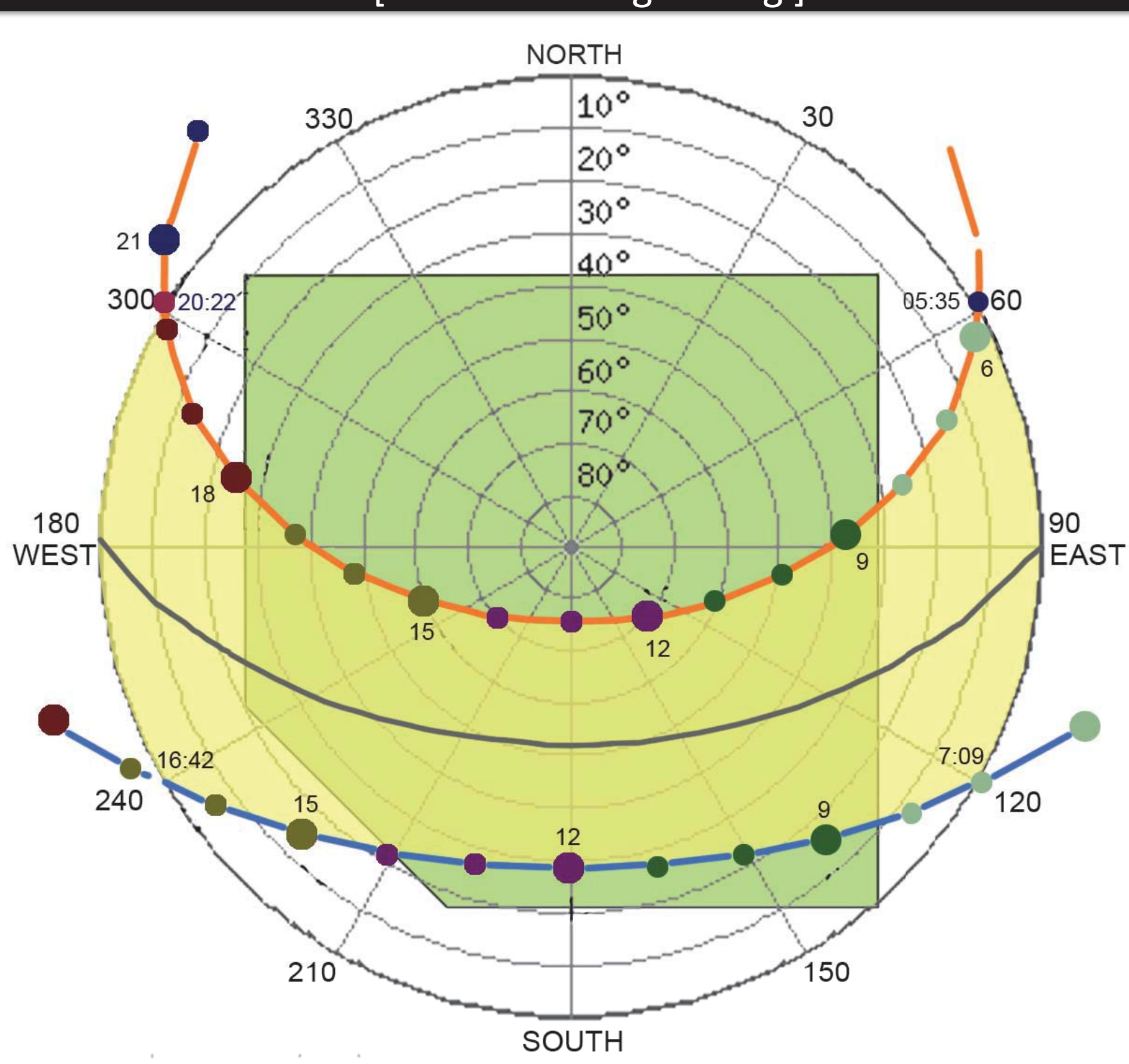
[Solar & Lighting]



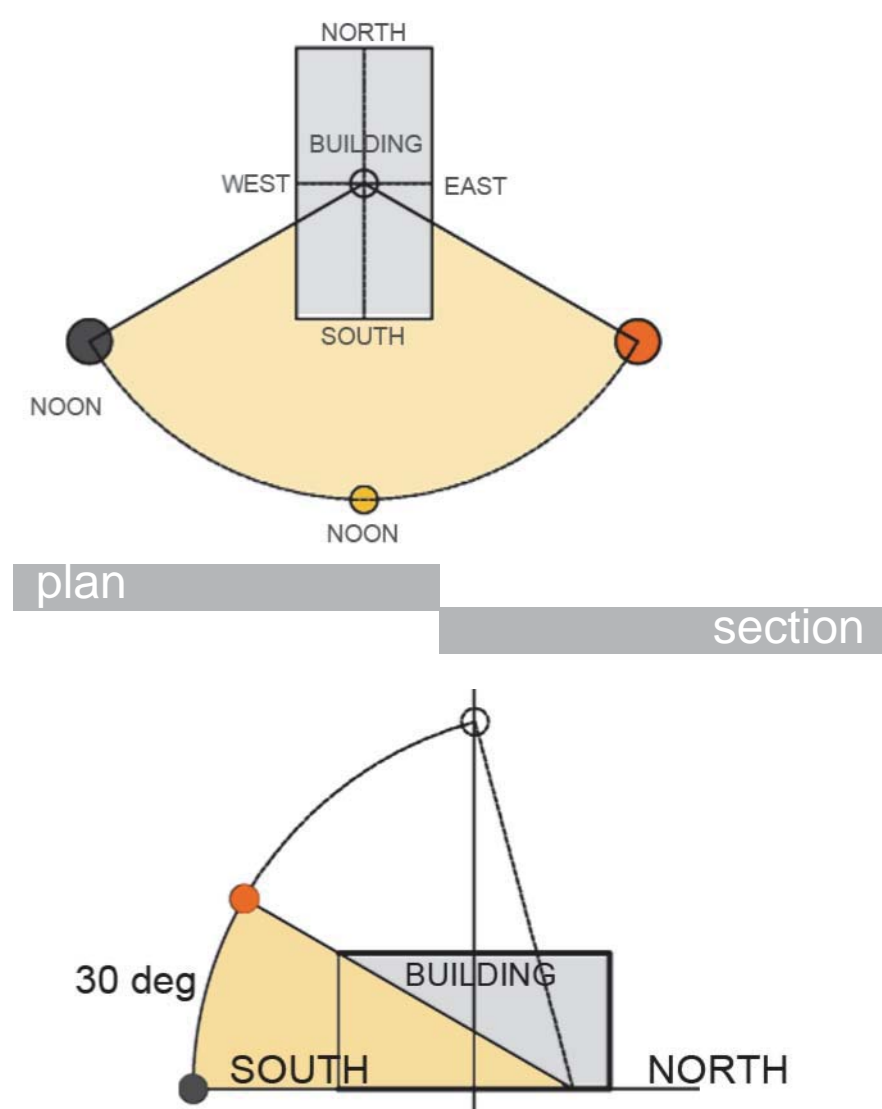
Building Orientation in fall | spring



[Solar & Lighting]



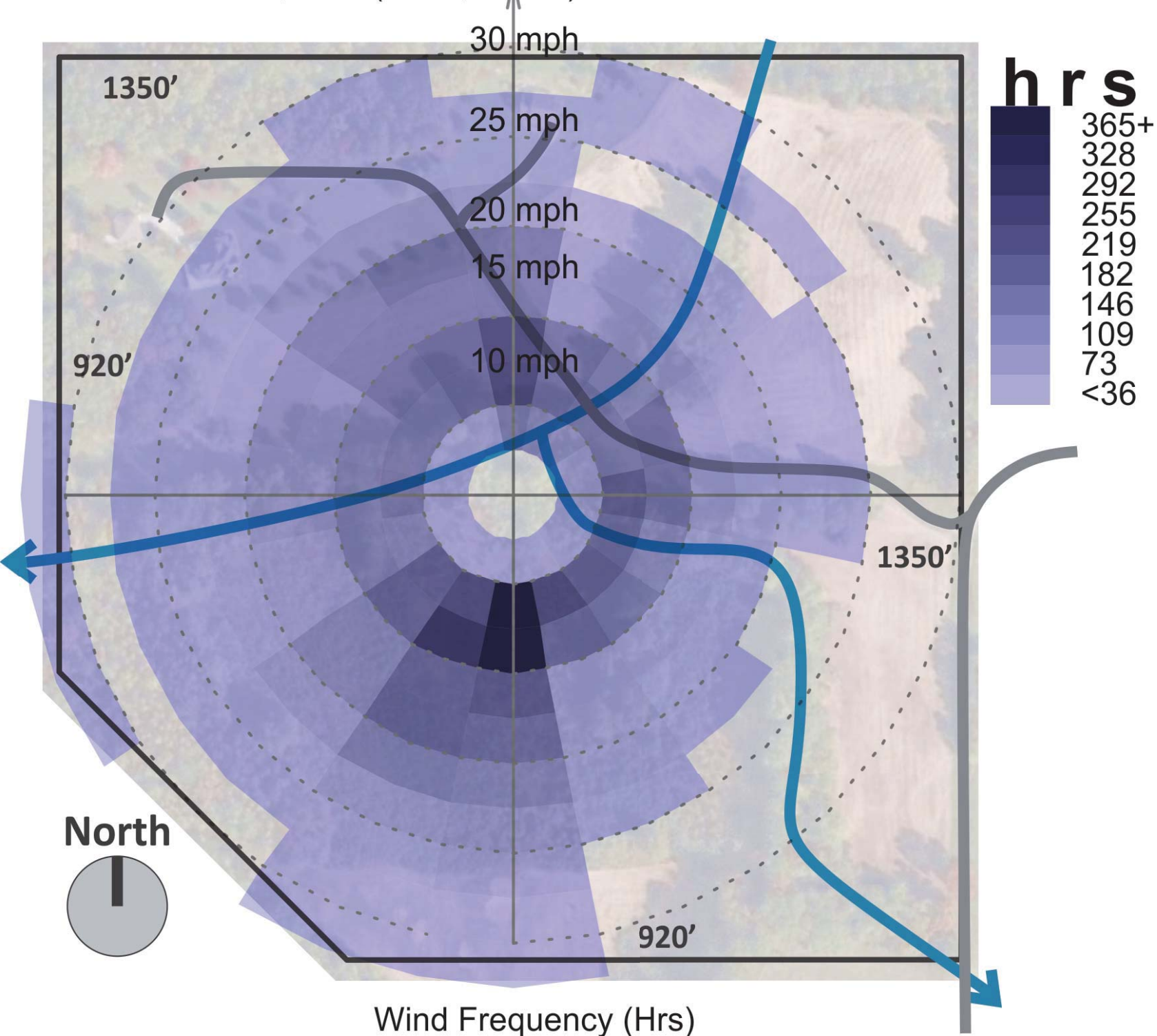
Building Orientation in winter



Where does the wind go?

Prevailing Winds

Southern Illinois, USA (37.8°, -89.2°)



Even though the direction changes depending on the season, most often the Winds flows from nearly due South. Avg. annual wnd speed is 7.4 mph

archinology

<http://www.archinology.com/design/>

Elements of Intelligent Design - Location, Location, Location

Tips for designing according to natural habitat and specific climatic conditions.

What Is [Wind] ?

Bing

[1] **moving air:** air moving across the surface of the planet or through the atmosphere at a speed fast enough to be noticed

air moved artificially: air that is being made to move by a device such as a fan

social or economic force: a force or movement bringing something such as change or destruction "the winds of change"

music **musical instruments:** a group of musical instruments that requires a flow of air to produce a sound, including both woodwind and brass instruments

direction of wind: the direction from which the wind blows (literary)

www.renewablesfirst.co.uk

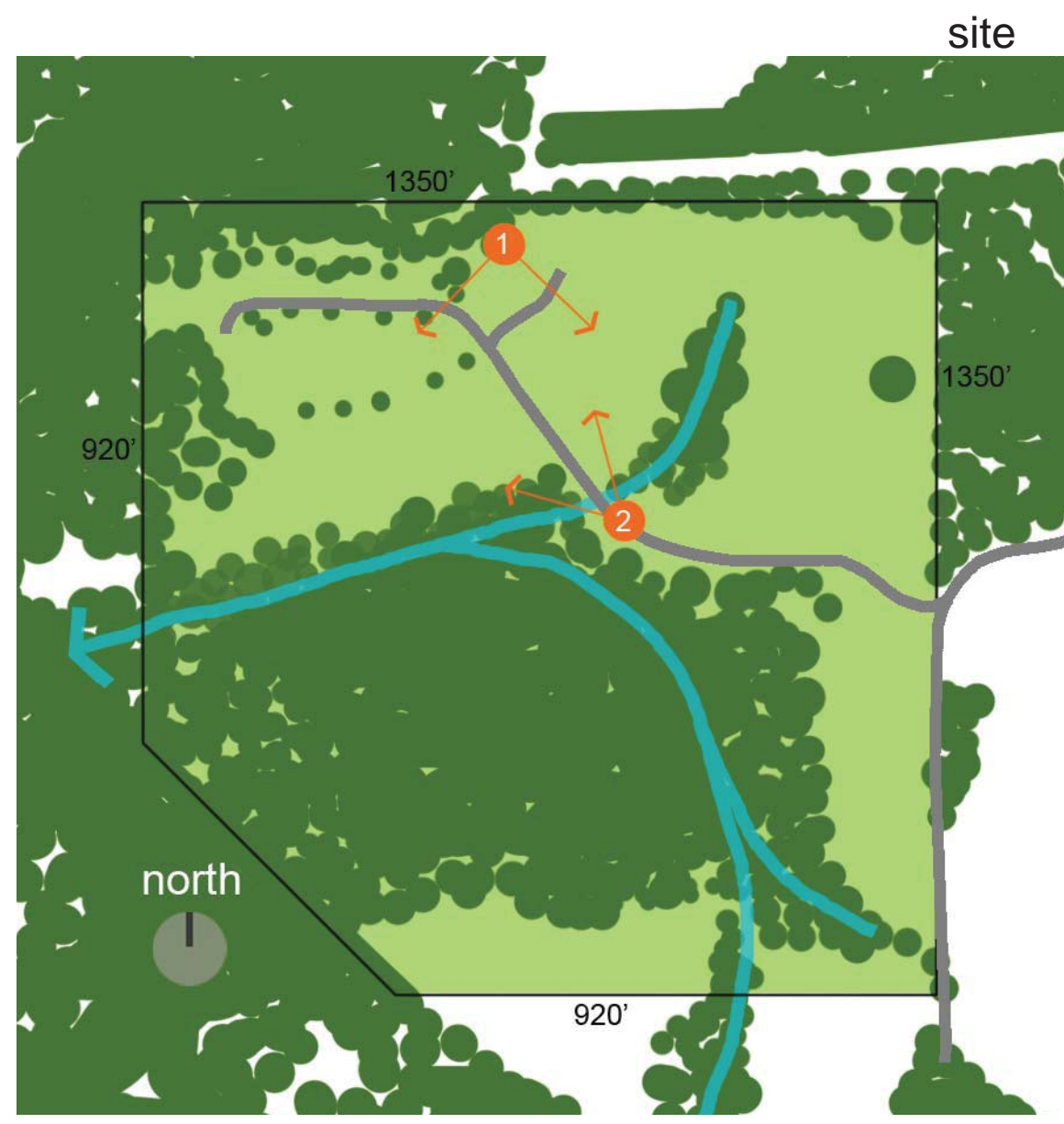


- 1**
view
- 2
- 3
- 4
- 5
- 6
- 7



- 1
- 2**
view
- 3
- 4
- 5
- 6
- 7

View Analysis



LEGEND

	Forest		Creek		Open space		Road		Boundary line
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- 1
- 2
- 3**
view
- 4
- 5
- 6
- 7



- 1
- 2
- 3
- 4**
view
- 5
- 6
- 7

View Analysis



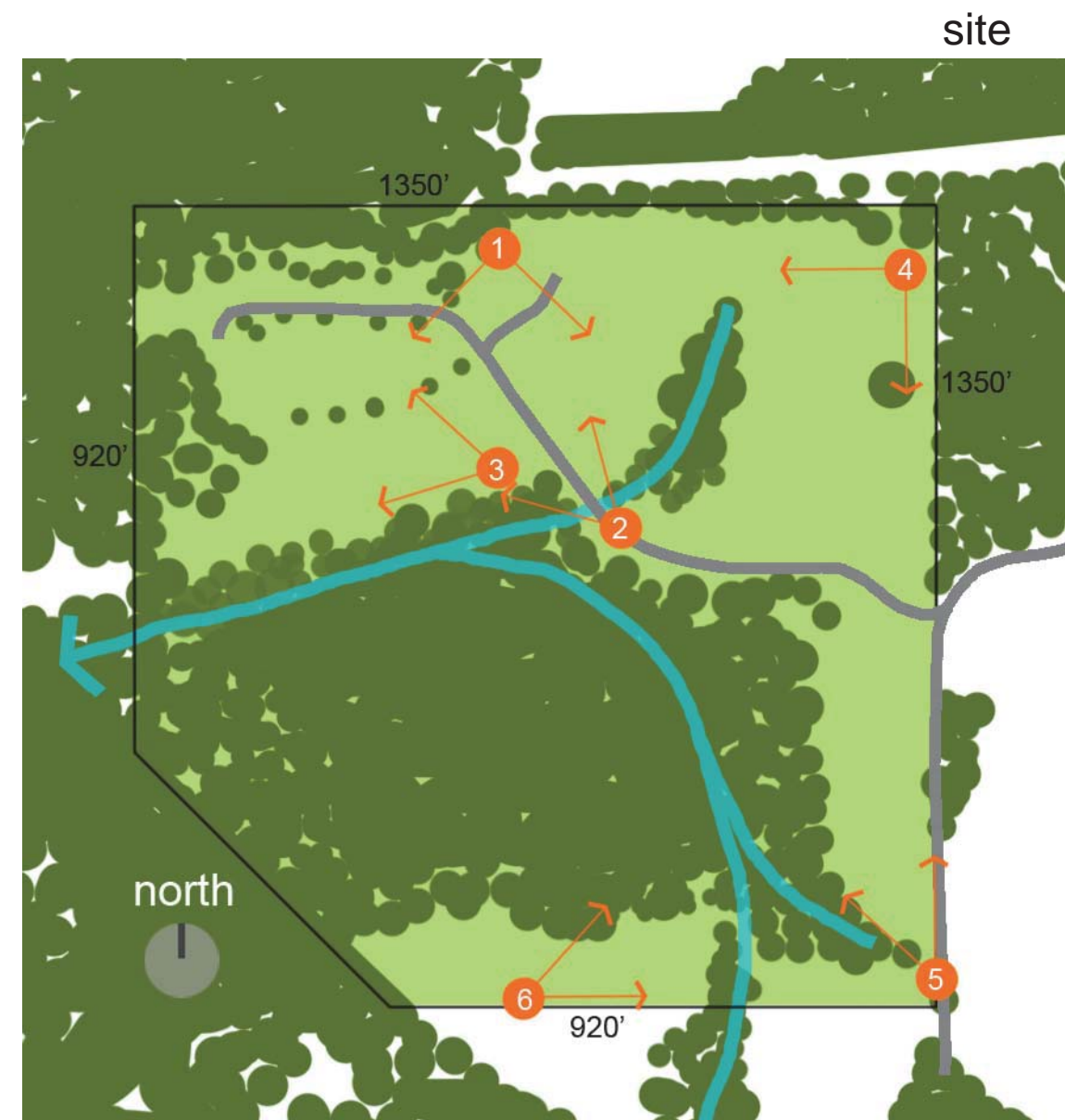


- 1
- 2
- 3
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view
- 6
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- 1
- 2
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view
- 7

View Analysis



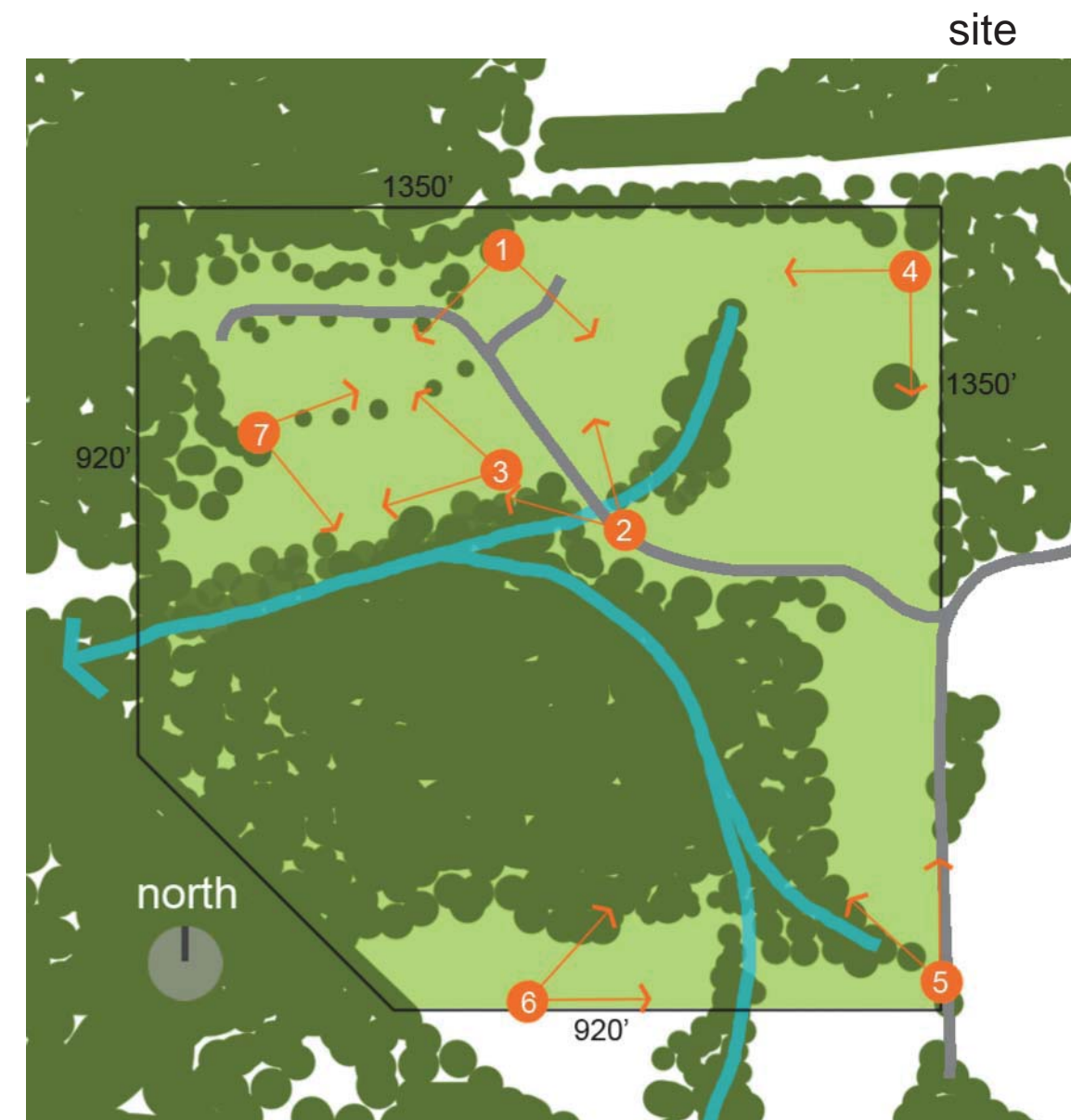
- LEGEND
- Forest
 - Creek
 - Open space
 - Road
 - Boundary line



1 2 3 4 5 6 **7**
view



View Analysis



LEGEND

Forest Creek Open space Road Boundary line

How do we **control** infestation?

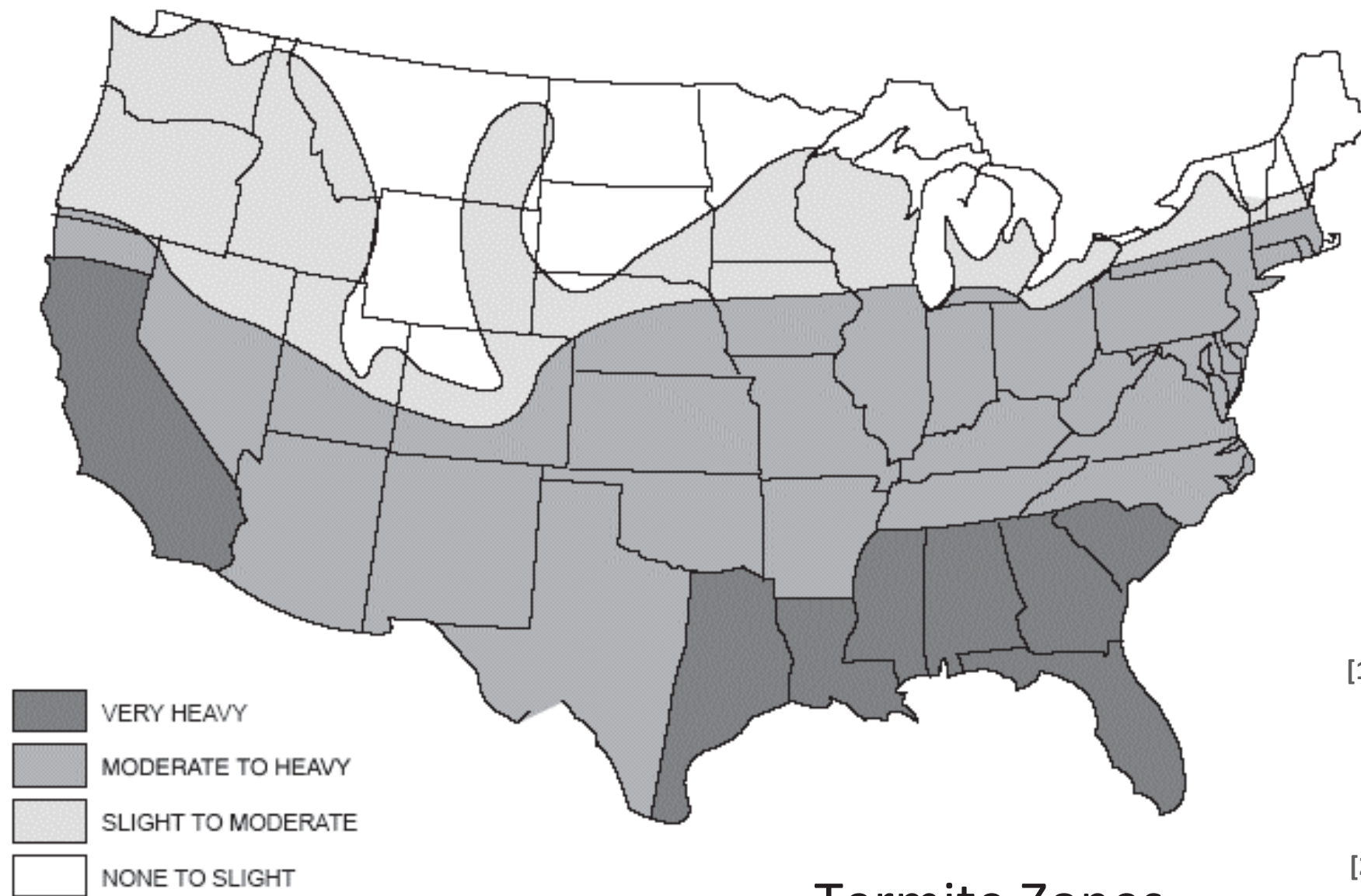
- Water Management
- Tolerant/Resistant Varieties
- Soils and Nutrition
- Pesticides
- Sanitation
- Pheromones

What are [Pests] ?

[1] an insect or other small animal that harms or destroys garden plants, trees, etc.

an epidemic disease or pestilence

[2] any organism that damages crops, injures or irritates livestock or man, or reduces the fertility of land



Termite Zones



pesticide

a chemical preparation for destroying plant, fungal, or animal pests.

ANALYSIS^[2]

ENVIRONMENTAL^[1]

What Are the [SOURCES]?

WEBSITES:

- <http://www.dictionary.reference.com>
- <http://www.urbanext.illinois.edu/bugreview/veg.cfm>
- http://www.entomology.trec.wsu.edu/VPJ_Lab/downloads/ShawnSteffan/2004HomeOrchardPestManagementGuide.pdf
- [http:// www.gaisma.com/](http://www.gaisma.com/)
- <http://www.hometacts.com/weather/illinois/Union-County/Jonesboro.html>
- http://www.isws.illinois.edu/wsp/climate/ClimatologyToday_precipmap1.asp
- <http://www.encyclopediarkansas.net/encyclopedia/entry-detail.aspx?entryID=2219>
- <http://www.thefreedictionary.com/earthquake>
- http://www.wbdg.org/resources/seismic_design.php
- http://www.crh.noaa.gov/images/dvn/downloads/Clim_IL_01.pdf
- <http://www.energycode.pnl.gov/EnergyCodeRegs/?state=illinois#zone4Header>
- <http://www.usna.usda.gov/Hardzone/ushzmap.html>
- <http://www.rootsofpeace.org/documents/Apple%20Production%20Manual.pdf>
- <http://www.dictionary.reference.com>
- <http://www.sevengroup.com>
- <http://www.hometacts.com/weather/illinois/Union-County/Jonesboro.html>