SECTIONS 1 & 2

SITE & BUILDING SUMMARY

The following packet has been assembled for the benefit of the homeowner. Currently the residence of 4177 Park is inhabited by a retired couple (60-70 years old) with a son (20 years old) at college returning for the winter holiday season and summer months.

The first two sections include an analysis of the current regional climate data as well as local site micro climates. Included are climate charts, wind roses, sun path diagrams, drainage and micro-climate studies. The interpreted data was used to propose a modified design with climatic response as the primary design factor. Using the environment to aid in creating a comfortable living space is the goal of the design response. The proposed design was analyzed in a similar fashion to the current site along with a solar window analysis of outdoor living space. Furthermore the interior space was charted and diagrammed to help in the reorganization of programmatic space in order to respond to the climate data.

GENERAL CLIMATE DATA

Climate Data for Bridgeport Sikorsky Memorial

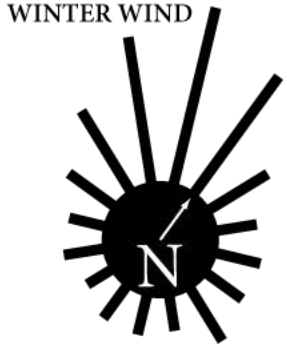
County: Fairfield
Latitude: 41°11' N
Longitude: 73°09' W
Elevation: 9 ft

Parameters	Month 1	2	3	4	5	6	7	8	9	10	11	12
Temperature (°F)												
Mean	29.7	31.6	39.1	48.8	59.0	68.1	74.2	73.2	65.8	55.0	45.4	35.3
Mean maximum	36.7	38.8	46.7	57.1	67.4	76.4	82.1	80.9	73.9	63.4	52.9	42.2
Mean minimum	22.7	24.3	31.3	40.4	50.6	59.7	66.2	65.5	57.8	46.6	38.0	28.4
Extreme maximum	65	67	84	91	97	96	100	96	93	86	78	76
Extreme minimum	-7	0	6	18	35	44	49	44	38	26	16	-4
Days												
Maximum > 90 °F	0	0	0	0	0	1	3	2	0	0	0	0
Maximum < 32 °F	10	7	1	0	0	0	0	0	0	0	0	4
Minimum < 32 °F	26	22	16	3	0	0	0	0	0	1	8	21
Minimum < 0 °F	0	0	0	0	0	0	0	0	0	0	0	0
Degree days (base 65 °F)												
Heating	1,087	937	798	481	199	30	2	4	64	310	580	913
Cooling	0	0	0	1	25	134	298	257	91	8	0	0
Precipitation (in)												
Mean	3.67	3.01	4.15	3.95	3.96	3.52	3.61	3.64	3.49	3.58	3.71	3.47
Mean snowfall	8.0	7.2	4.4	0.9	trace	0.0	trace	trace	0.0	trace	0.7	3.6
Days												
Precipitation³0.1 in	7	6	8	6	6	6	5	6	6	6	6	7
Precipitation³1.0 in	1	1	1	1	1	1	1	1	1	1	1	1
Snow depth ³1.0 in	11	8	3	0	0	0	0	0	0	0	1	4

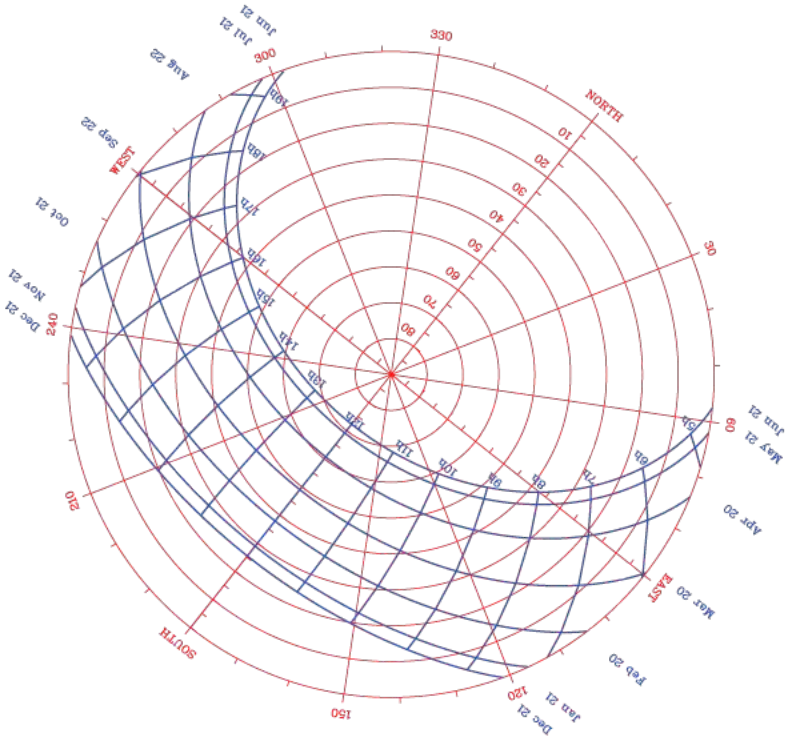
*Data Source: Weather America, 2001by Grey House Publishing

DESIGN PRIORITIES

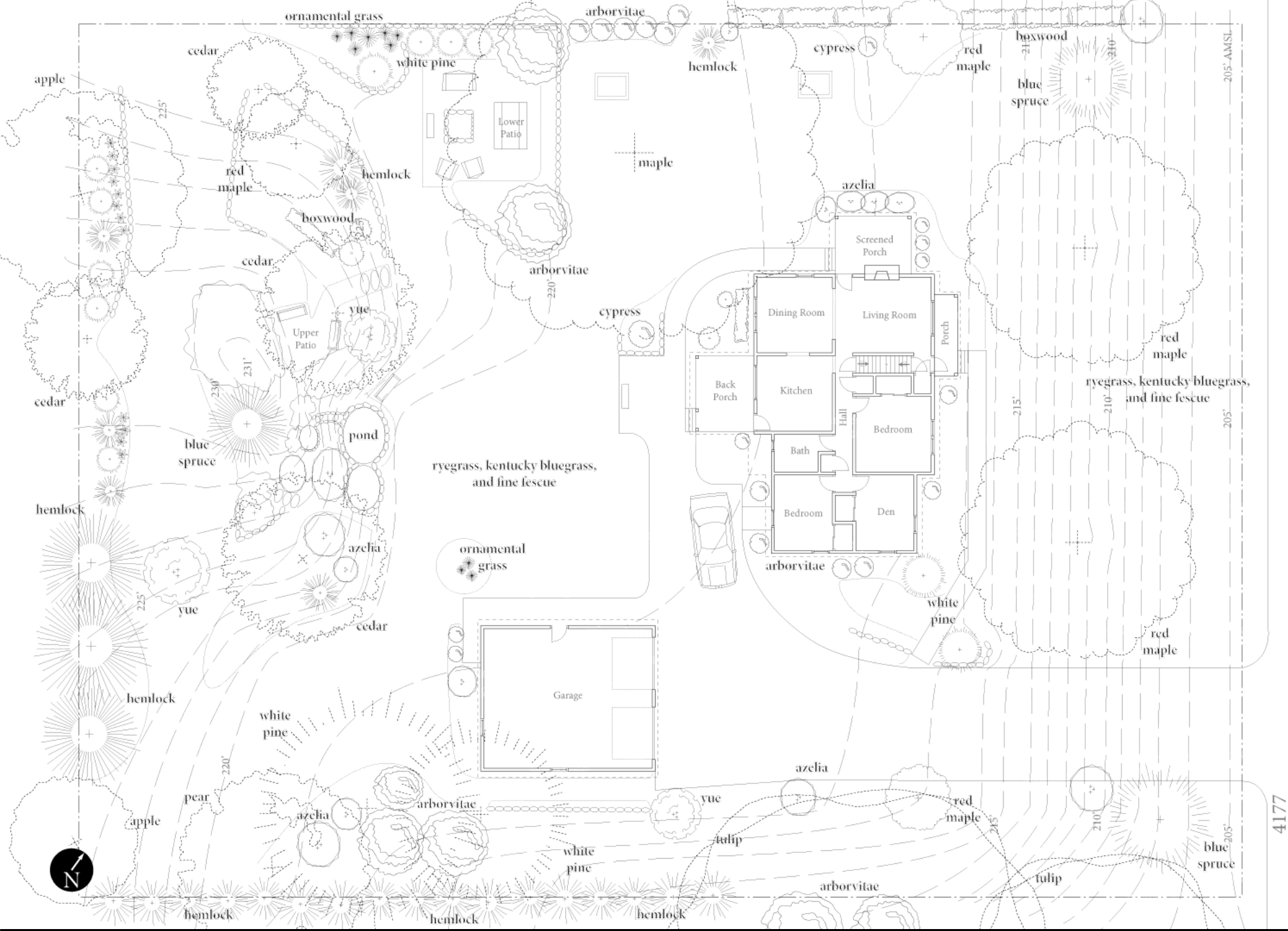
BASIC CLIMATE CONDITION % CONDITIONING PER YEAR BASED ON TEMPERATURE AND HUMIDITY ALONE	DESIGN PRIORITIES CLIMATIC LIABILITIES TEMP	WIND	MOISTURE	SUN	CLIMATIC ASSETS TEMP	WIND	MOISTURE	SUN	POTENTIAL CLIMATE CONDITION % CONDITIONING PER YEAR BASED ON SIMPLE BUILDING RESPONSES TO CLIMATE. AT LEAST:	% IMPROVED COMFORT AT LEAST
13% TOO HOT FOR COMFORT				4		5			0% TOO HOT FOR COMFORT	37%
75% TOO COOL FOR COMFORT	1	2						3	63% TOO COOL FOR COMFORT	



SUN PATH CHART



SITE.601	4177 Park Avenue, Fairfield, CT 06825 Lat. 41.14 Long. -73.26	CLIMATE DATA
	RYAN T RALSTON	Climate Data, Sun Path Chart, Wind Roses for the Current Site in Fairfield, CT



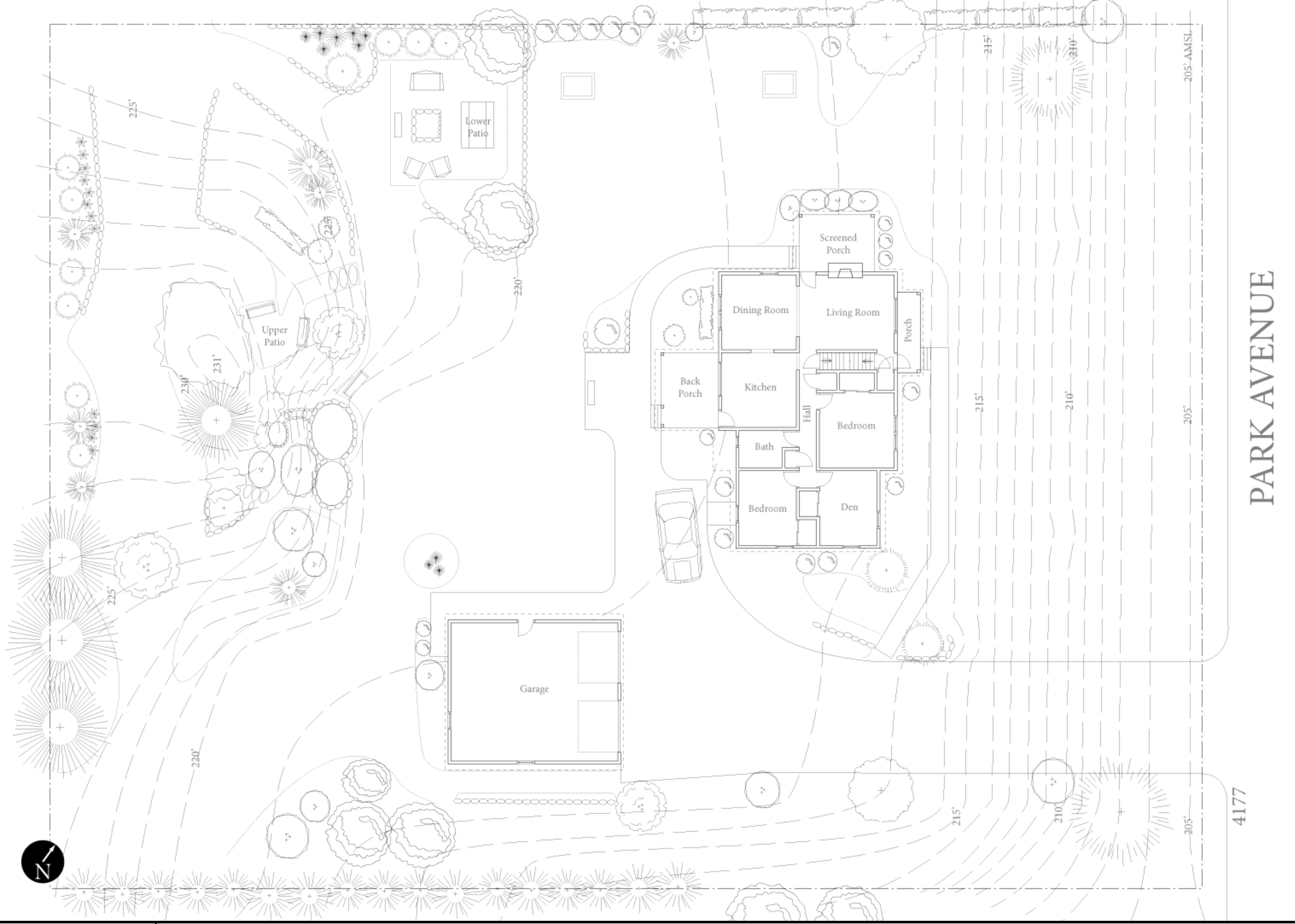
SITE.001

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

VEGETATION STUDY

RYAN T RALSTON

Current Site Plan with Canopy Trees, Shrubs & Ground Cover
SCALE: 3/64" = 1'-0"



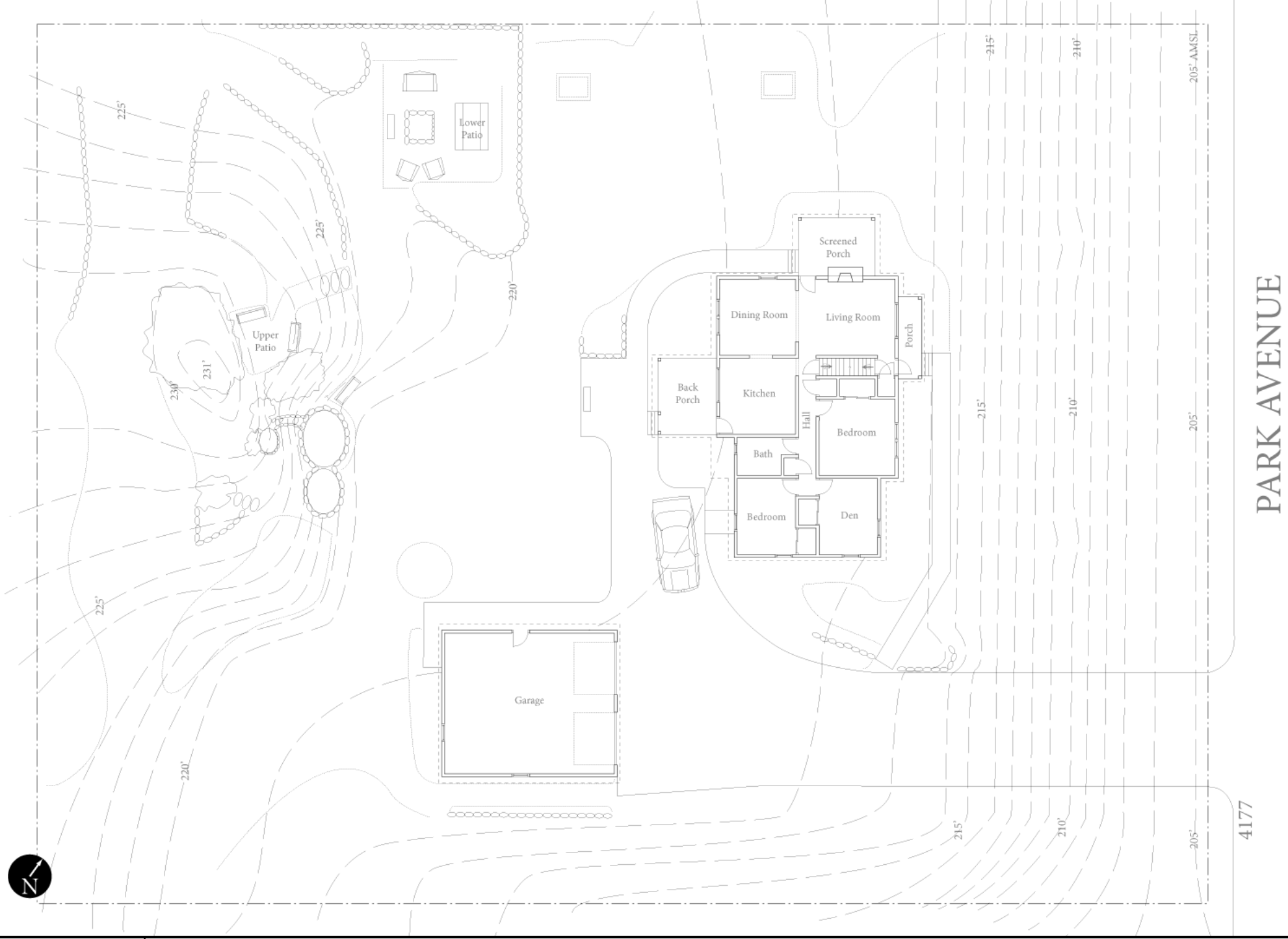
SITE.002

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

VEGETATION STUDY

RYAN T RALSTON

Current Site Plan with Shrubs & Ground Cover
SCALE: 3/64" = 1'-0"



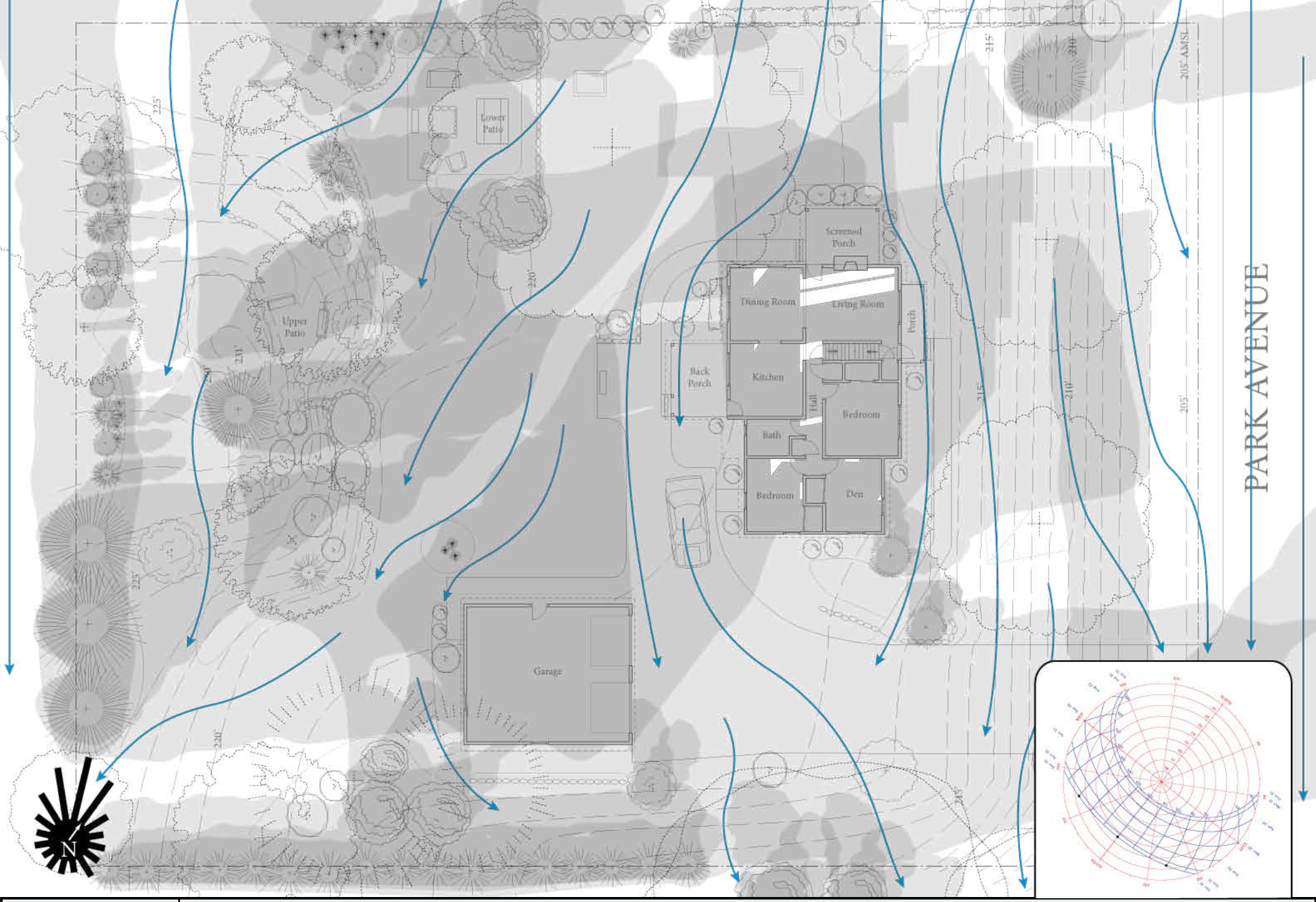
SITE.003

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

VEGETATION STUDY

RYAN T RALSTON

Current Site Plan with Ground Cover Only
SCALE: 3/64" = 1'-0"



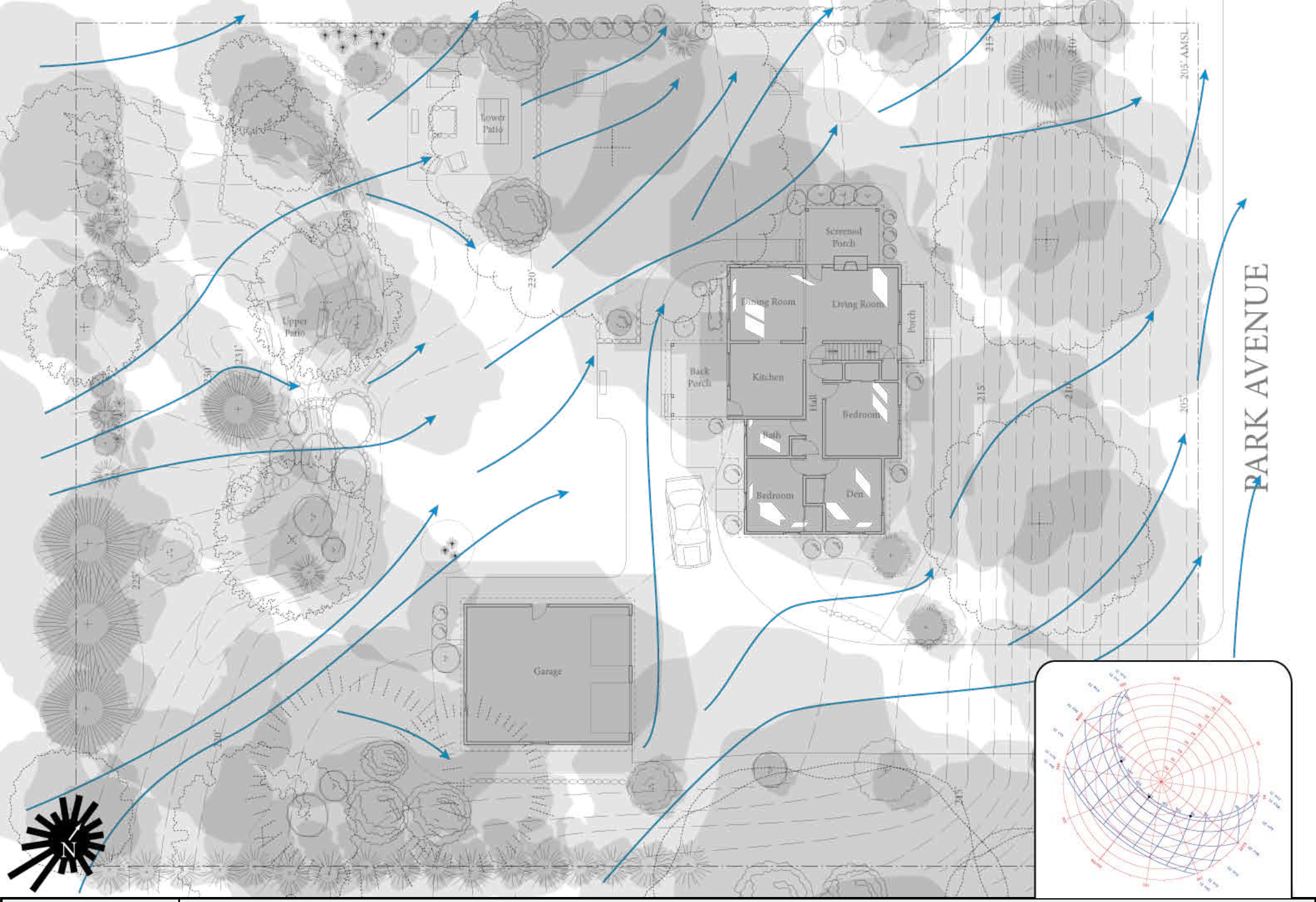
SITE.004

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

WINTER CLIMATE STUDY

RYAN T RALSTON

Current Site Plan with Winter Sun and Wind Patterns
SCALE: 3/64" = 1'-0"



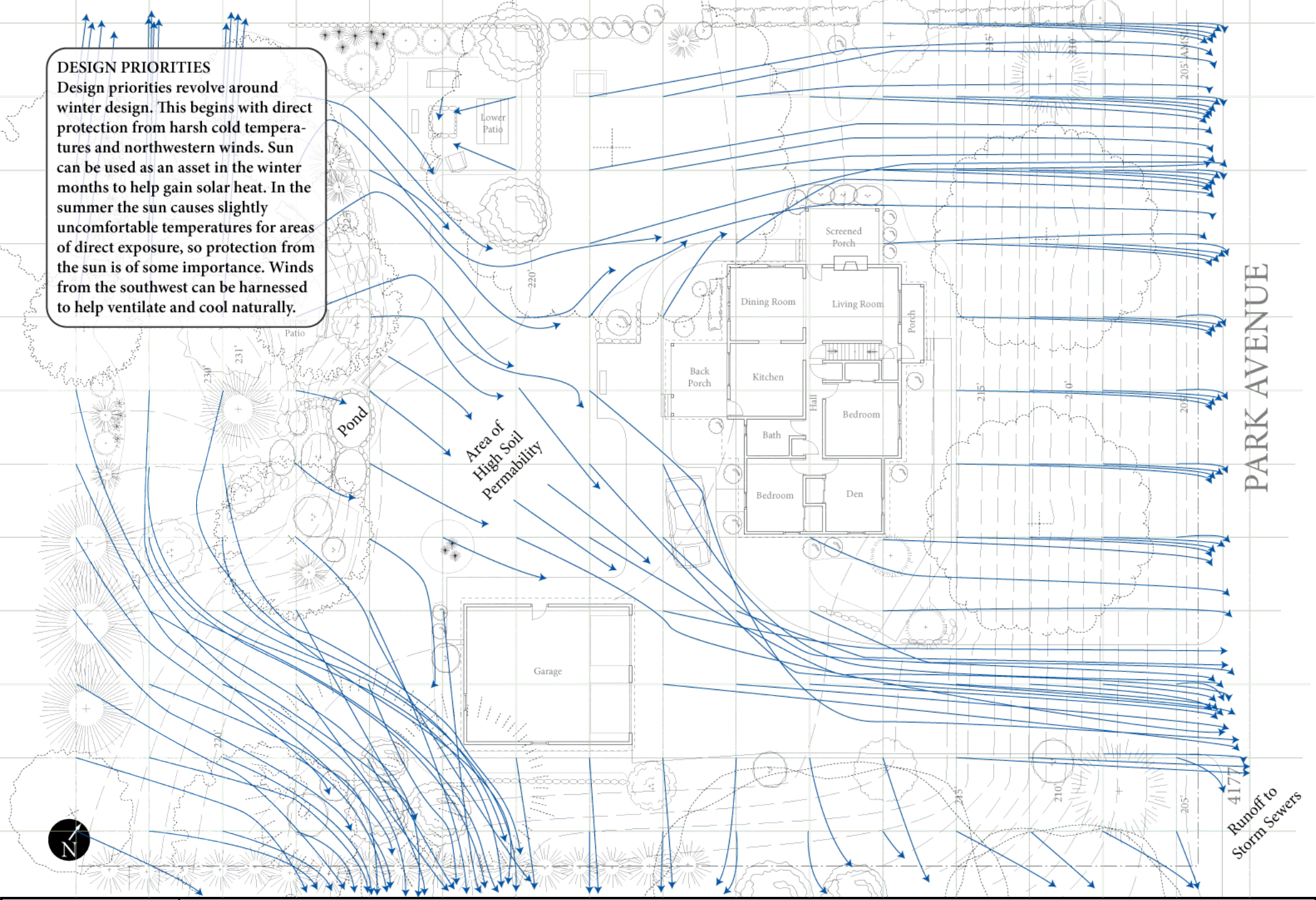
SITE.005

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

SUMMER CLIMATE STUDY

RYAN T RALSTON

Current Site Plan with Summer Sun and Wind Patterns
SCALE: 3/64" = 1'-0"



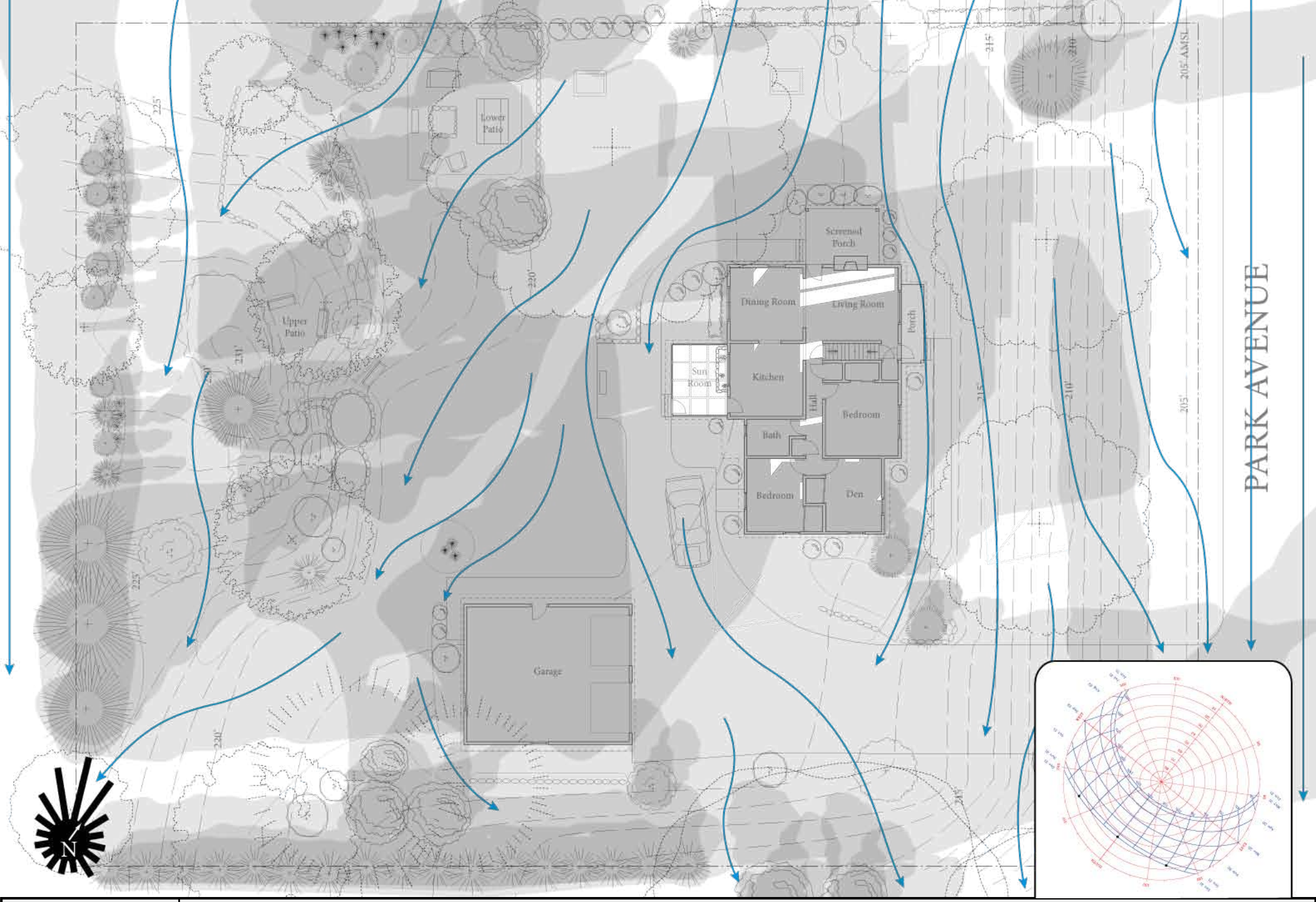
SITE.006

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

DRAINAGE STUDY

Current Site Plan with Drainage Patterns
SCALE: 3/64" =1'-0"



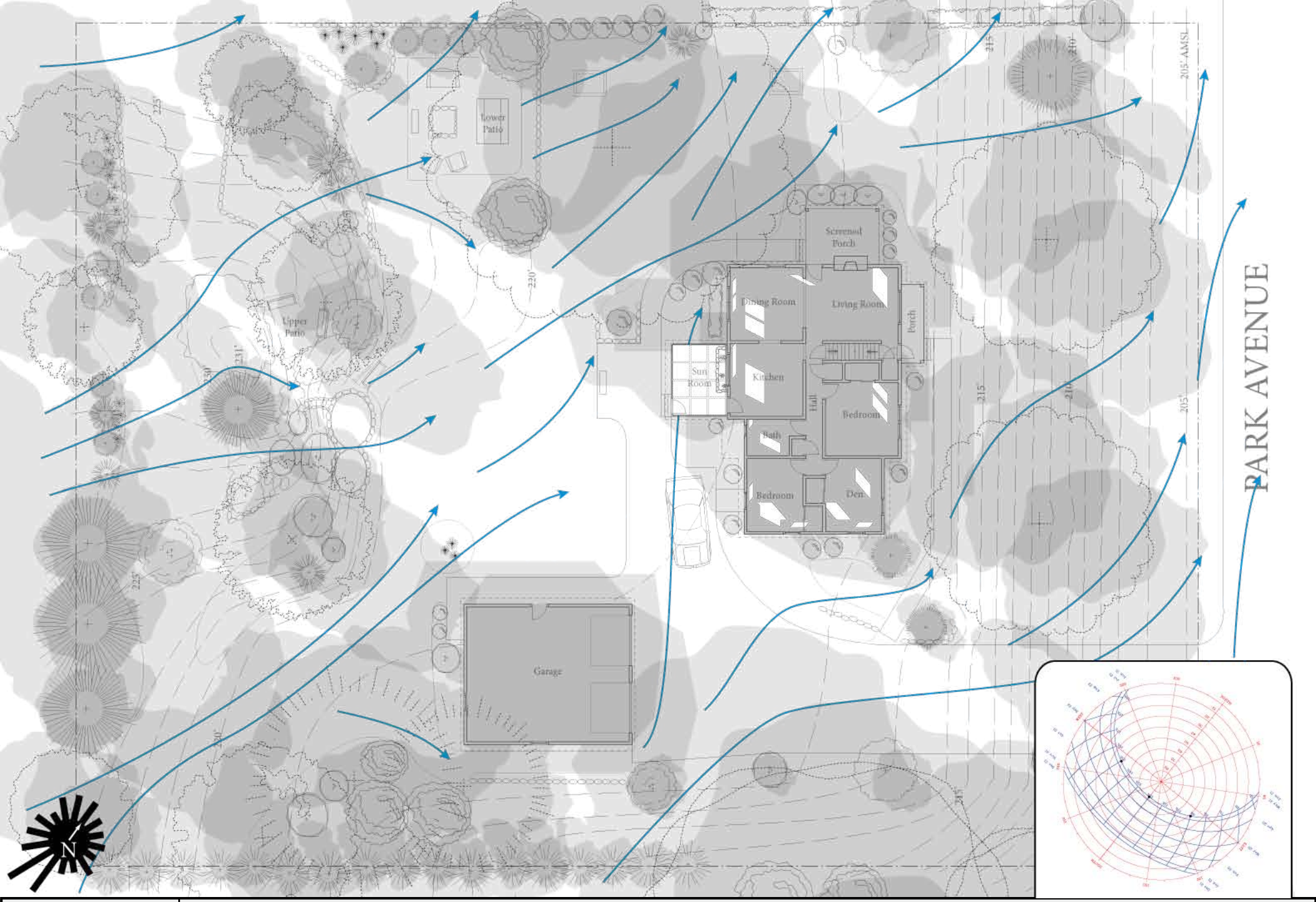
SITE.104

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

WINTER CLIMATE STUDY

Proposed Site Plan with Winter Sun and Wind Patterns
SCALE: 3/64" = 1'-0"



SITE.105

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

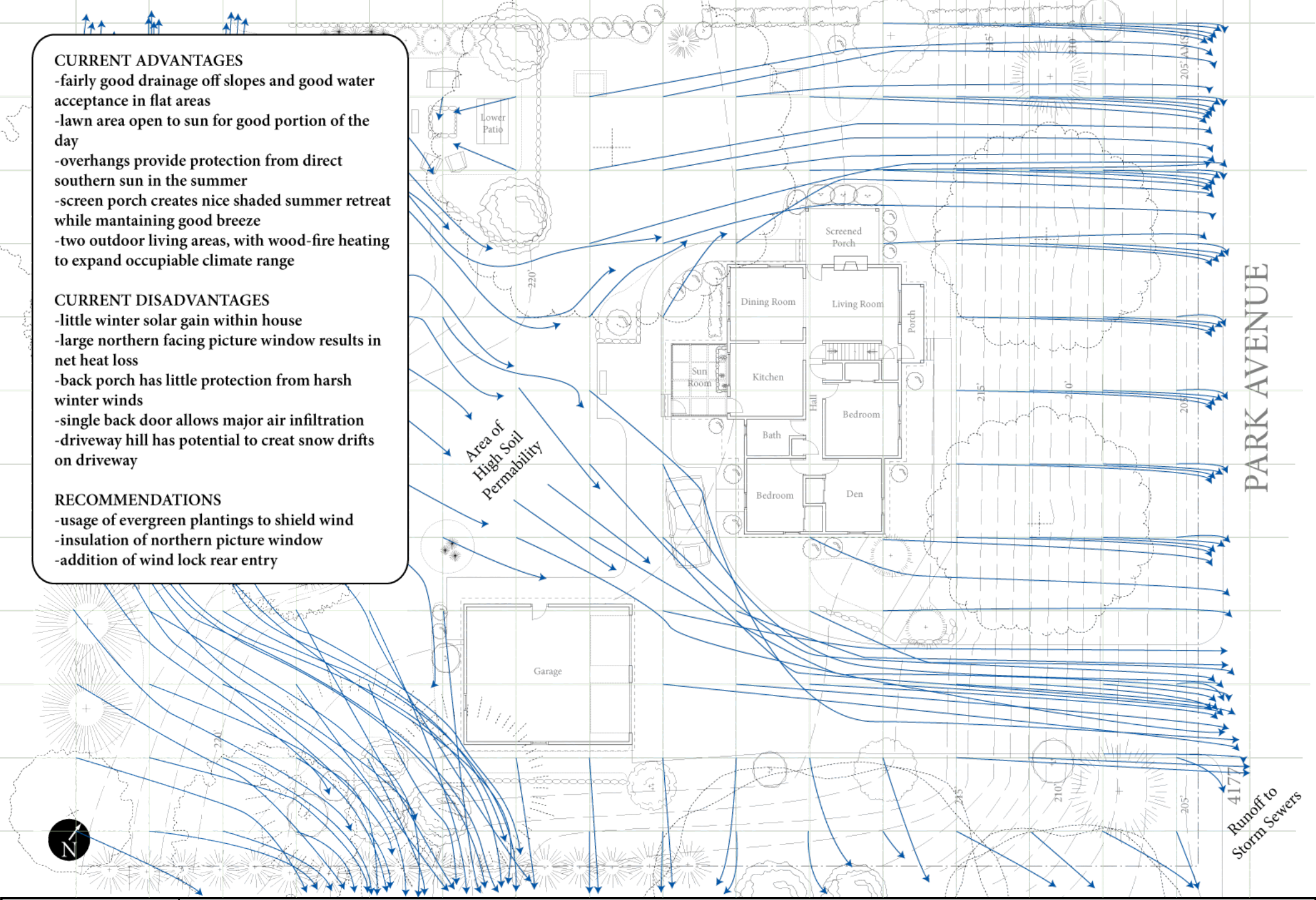
SUMMER CLIMATE STUDY

Proposed Site Plan with Summer Sun and Wind Patterns
SCALE: 3/64" = 1'-0"

CURRENT ADVANTAGES
-fairly good drainage off slopes and good water acceptance in flat areas
-lawn area open to sun for good portion of the day
-overhangs provide protection from direct southern sun in the summer
-screen porch creates nice shaded summer retreat while mantaining good breeze
-two outdoor living areas, with wood-fire heating to expand occupiable climate range

CURRENT DISADVANTAGES
-little winter solar gain within house
-large northern facing picture window results in net heat loss
-back porch has little protection from harsh winter winds
-single back door allows major air infiltration
-driveway hill has potential to creat snow drifts on driveway

RECOMMENDATIONS
-usage of evergreen plantings to shield wind
-insulation of northern picture window
-addition of wind lock rear entry



SITE.106

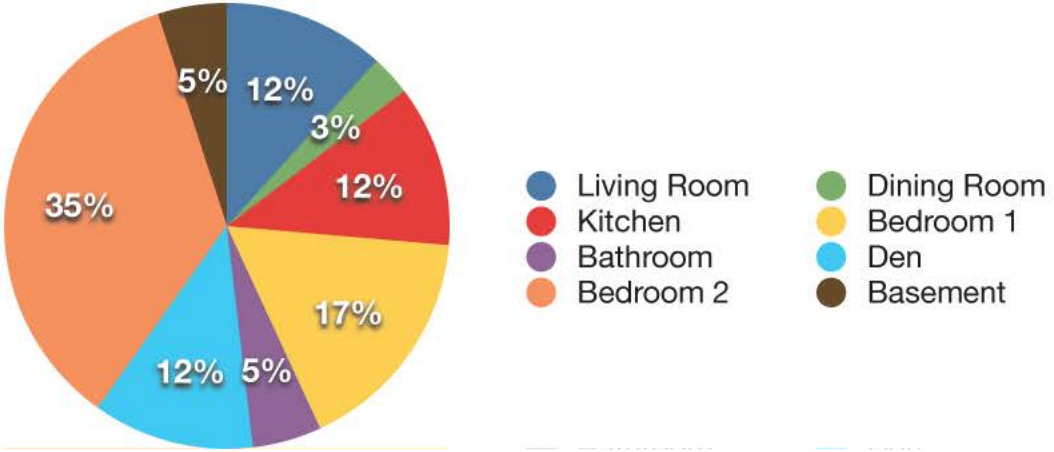
4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

DRAIN AGE STUDY

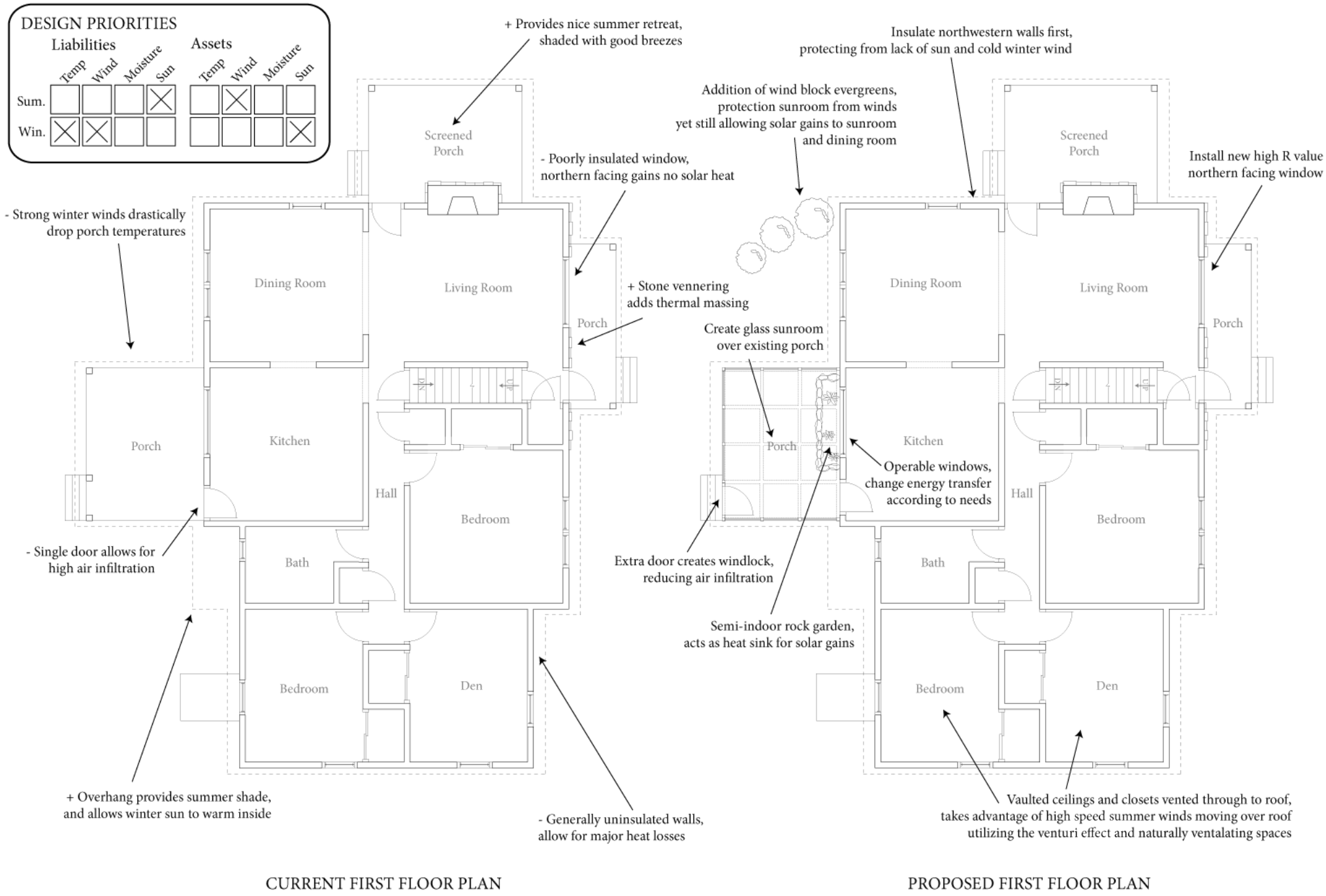
Proposed Site Plan with Drainage Patterns
SCALE: 3/64" =1'-0"

Percentage of Room Occupancy



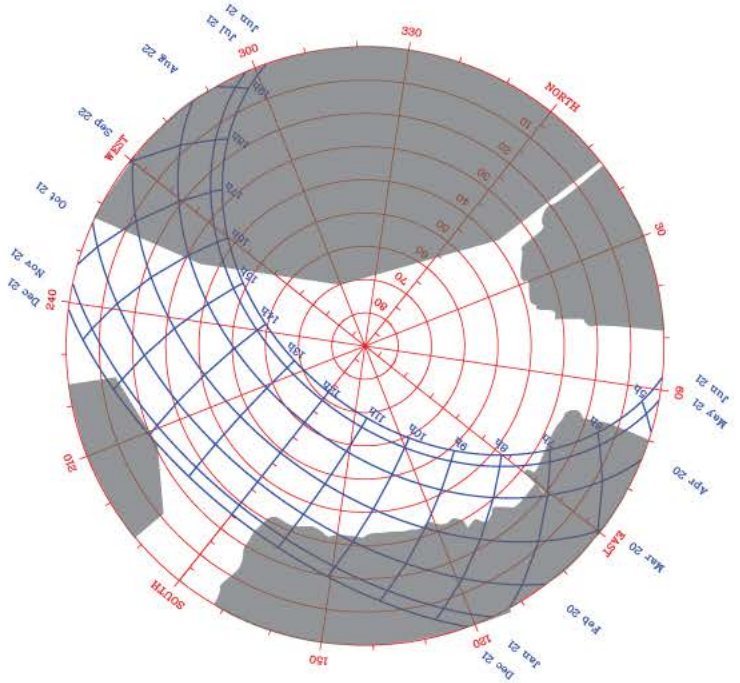
Analyzed Program Chart

Programatic Name	Square Footage	Living, Circulation, or Support	Time in Use (hrs/ week)	Number of Occupants	CLO (1-5)	MET (1-5)	Internal Loads (L,M,H)	Environmental Interests (view, access, etc)	Sun (L,M,H)	Wind (L,M,H)	N	NE	E	SE	S	SW	W	NW	Other Items of Interest
Living Room	169	Living	28	3	1	1	M	picture window, front door	L	H					X				fireplace
Dining Room	169	Living	7	3	1	2	L		M	H					X				
Kitchen	169	Living	28	3	1	3	H	picture window, back door	M	L					X				vent fan
Bedroom 1	169	Support	40	2	1	1	L		L	L				X					
Bathroom	60	Support	12	1	1	1	L		L	L	X	X							vent fan
Den	130	Living	28	2	1	2	M		M	L				X	X				ceiling fan
Bedroom 2	130	Living	84	2	1	2	M		H	L				X	X				reflective blinds
Basement	1200	Support	12	2	2	3	L	walk out stairs	N	N									dryer vent heater
Attic	1200	Support	0	1	1	1	N		L	M	X	X			X	X			vent fan
Back Porch	130	Living	21 or 6	1	1 or 3	1	N	covered, open three sides	H	H				X	X				
Screen Porch	130	Living	10 or 0	6	1 or 4	1	N	screened with blinds	L	H	X	X							
Lower Patio	144	Living	24 or 8	10	1 or 4	1	H	tree wind block	H	M									fire-pit
Upper Patio	100	Living	12 or 3	6	1 or 4	1	H	under cedar tree	L	M									chiminea



BLD.101	4177 Park Avenue, Fairfield, CT 06825 Lat. 41.14 Long. -73.26	INTERIOR PLANS
	RYAN T RALSTON	Current & Proposed Interior Floor Plans SCALE: 1/8" = 1'-0"

SOLAR WINDOW for proposed outdoor space



SITE.107	4177 Park Avenue, Fairfield, CT 06825 Lat. 41.14 Long. -73.26	SOLAR WINDOW
	RYAN T RALSTON	Solar Window for Proposed Outdoor Space SCALE: 3/64" = 1'-0"

CURRENT

PROPOSED

SITE.501

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

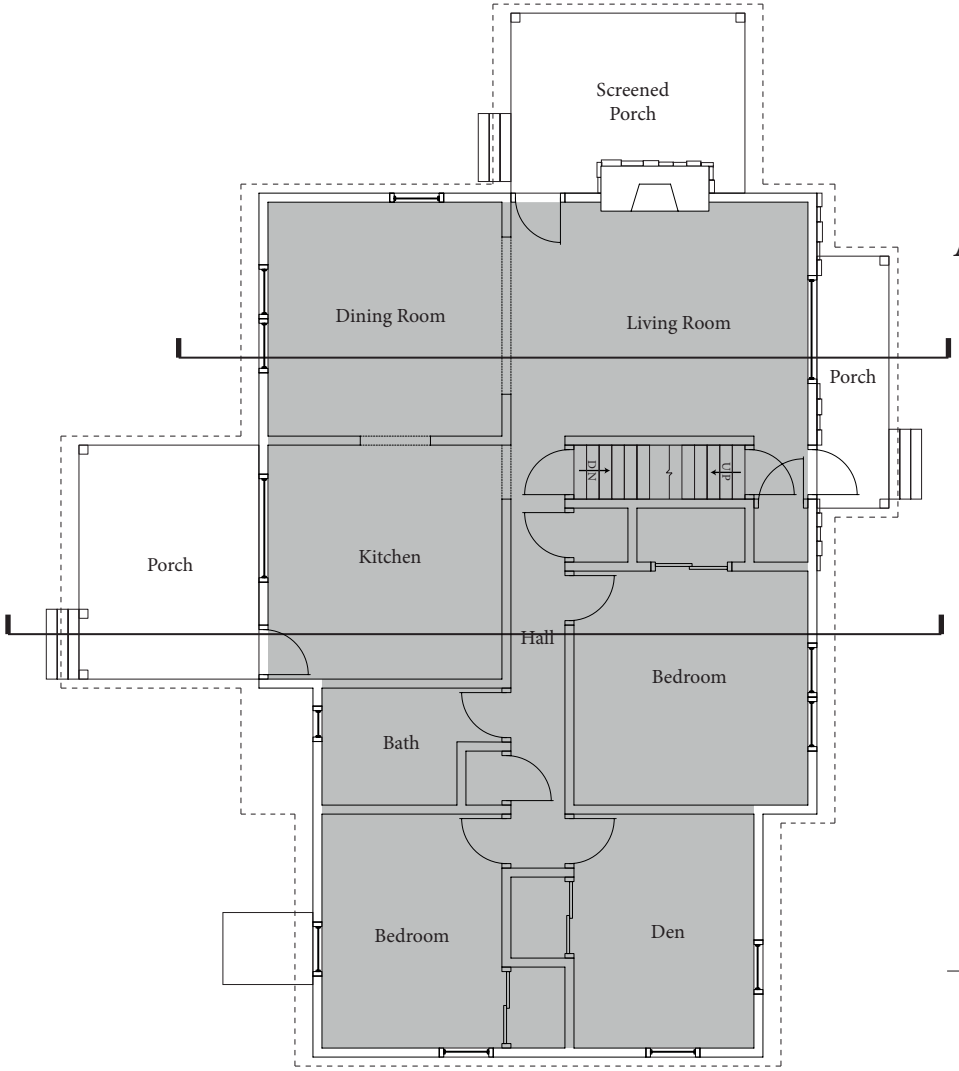
EXPERIENTIAL PERSPECTIVES

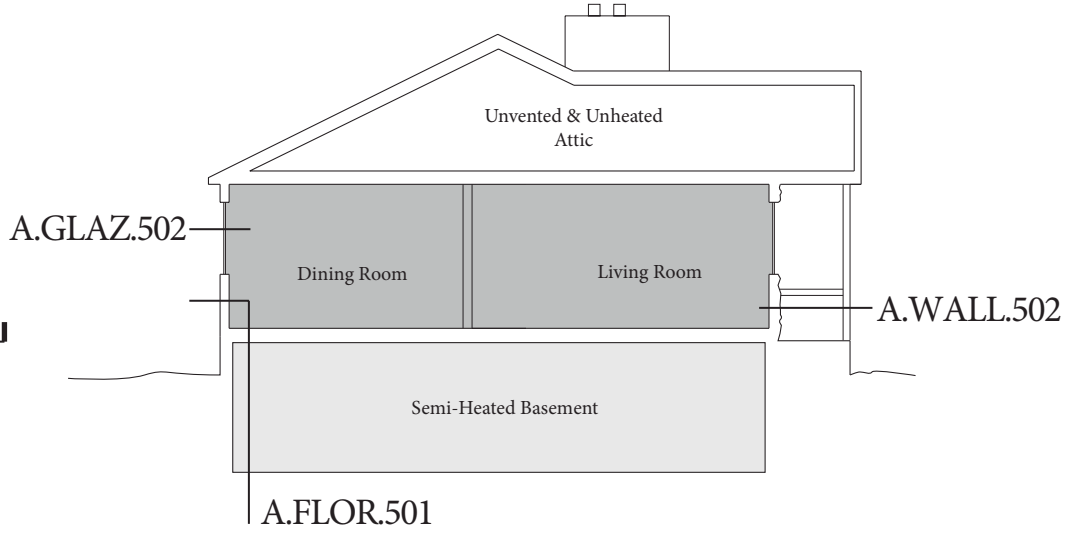
Hand Rendered Perspectives of Exterior of Current and Proposed Designs

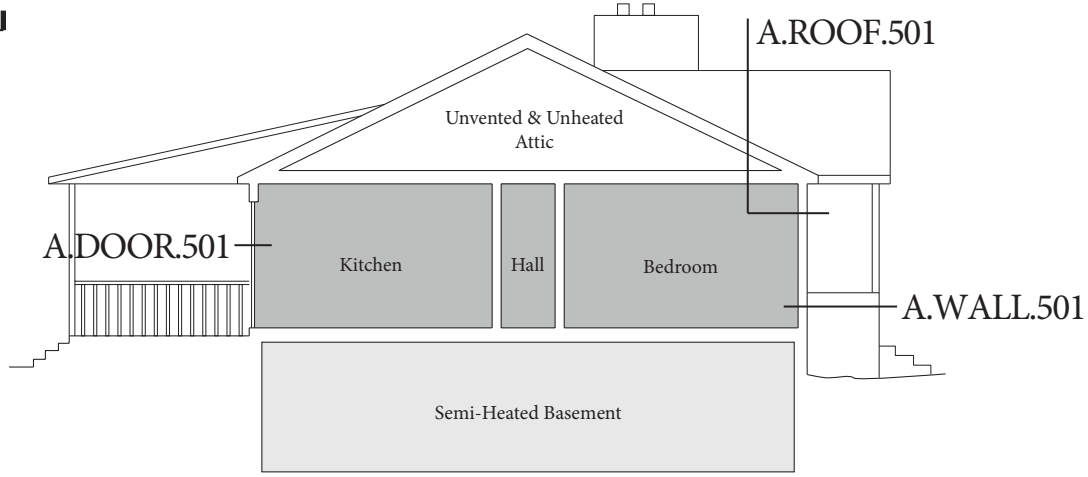
SECTION 3

HEAT LOSS CALCULATIONS

This section focuses on the calculation of heat loss through the building envelope. Included are details of each building component and the corresponding resistance factors. By calculating each component and adding them all together a resistance value and heat loss coefficient can be given to the entire house. With these calculations the annual heat loss can be calculated. The breakdown of individual components reveals the weakest links in the construction in terms of heat loss. This data will be used later to prioritize retrofitting actions and create savings schedules.







HTL.301

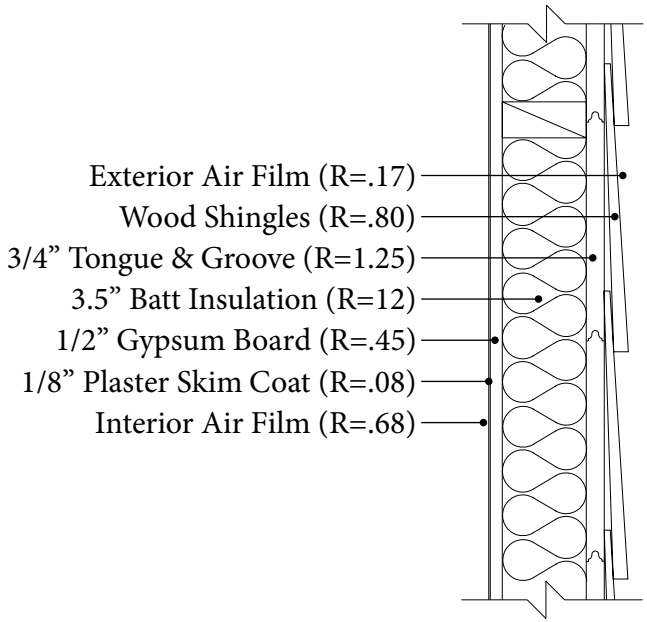
4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

HEATED ZONES

Plan & Section Locating Heated Zones within the Building
SCALE: 1/8" = 1'-0"

A.WALL.501



At Cavity (90%)			**At Stud (10%)**			
Material	**R-Value**		**Material**	**R-Value**		
Exterior Air Film	0.17		Exterior Air Film	0.17		
Cedar Wood Shingles	0.8		Cedar Wood Shingles	0.8		
.75” Tongue & Groove	0.93		.75” Tongue & Groove	0.93		
3.5” Batt Insulation	12		3.5” Wood Stud	4.37		
.5” Gypsum Board	0.45		.5” Gypsum Board	0.45		
.125” Plaster Skim Coat	0.08		.125” Plaster Skim Coat	0.08		
Interior Air Film	0.68		Interior Air Film	0.68		
	15.11			7.48		
Percentages	0.9			0.1		
	13.599			0.748	**14.35**	**R Value**
					0.07	**U Value**

WALL.501

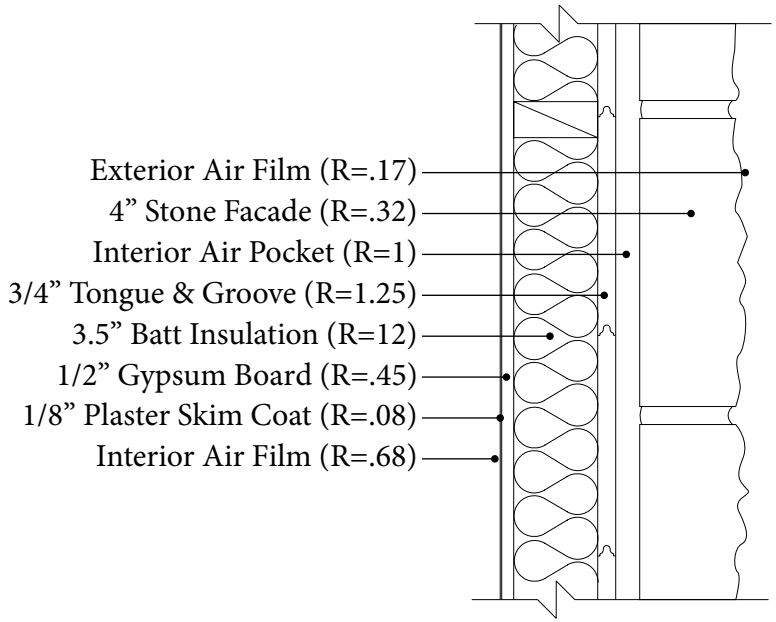
4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

WALL DETAIL

Wall Detail with Heat Loss Calculations
SCALE: 1-1/2” = 1’-0”

A.WALL.502



At Cavity (90%)			At Stud (10%)			
Material	**R-Value**		**Material**	**R-Value**		
Exterior Air Film	0.17		Exterior Air Film	0.17		
4” Stone Facade	0.32		4” Stone Facade	0.32		
Air Space	1		Air Space	1		
.75” Tongue & Groove	0.93		.75” Tongue & Groove	0.93		
3.5” Batt Insulation	12		3.5” Wood Stud	4.37		
.5” Gypsum Board	0.45		.5” Gypsum Board	0.45		
.125” Plaster Skim Coat	0.08		.125” Plaster Skim Coat	0.08		
Interior Air Film	0.68		Interior Air Film	0.68		
	15.63			8		
Percentages	0.9			0.1		
	14.067			0.8	**14.87**	**R Value**
					0.067	**U Value**

WALL.502

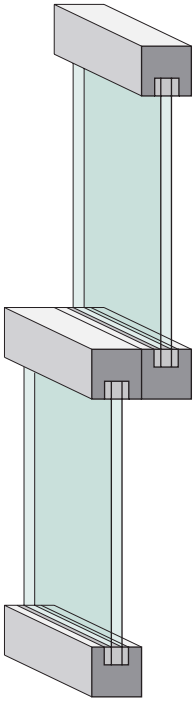
4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

WALL DETAIL

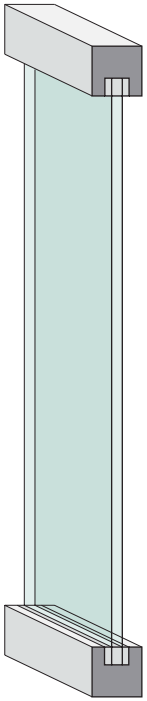
Wall Detail with Heat Loss Calculations
SCALE: 1-1/2” = 1’-0”

A.GLAZ.501



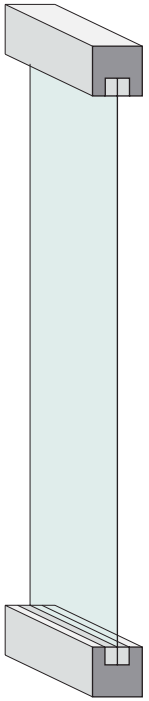
Material	R-Value	
Exterior Air Film	0.17	
Glass	0.15	
Air Pocket	1	
Glass	0.15	
Interior Air Film	0.68	
	2.15	**R Value**
	0.465	**U Value**

A.GLAZ.502



Material	R-Value	
Exterior Air Film	0.17	
Glass	0.15	
Air Pocket	1	
Glass	0.15	
Interior Air Film	0.68	
	2.15	**R Value**
	0.465	**U Value**

A.GLAZ.503



Material	R-Value	
Exterior Air Film	0.17	
Glass	0.15	
Interior Air Film	0.68	
	1	**R Value**
	1.000	**U Value**

GLAZ.50x

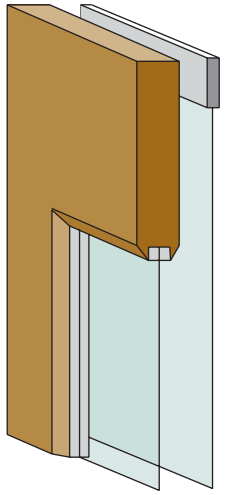
4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

WINDOW DETAILS

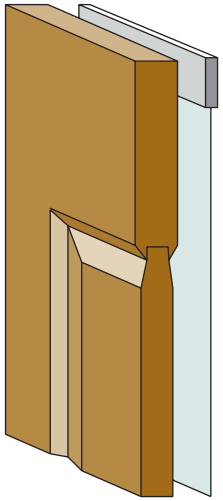
Window Details with Heat Loss Calculations

A.DOOR.501



Wood (80%)			Glass (20%)			
Material	**R-Value**		**Material**	**R-Value**		
Exterior Air Film	0.17		Exterior Air Film	0.17		
2.5” Wood	3.12		Glass	0.15		
Interior Air Film	0.68		Interior Air Film	0.68		
	3.97			1		
Percentages	0.8			0.2		
	3.176			0.2	3.376	
Plus Storm Door						
Exterior Air Film	0.17					
Glass	0.15					
Air Space	1					
Exterior Air Film	-0.17					
	1.15				1.15	
				Total R	**4.526**	**R Value**
					0.221	**U Value**

A.DOOR.502



Wood		
Material	**R-Value**	
Exterior Air Film	0.17	
2.5” Wood	3.12	
Interior Air Film	0.68	
	3.97	
Plus Storm Door		
Exterior Air Film	0.17	
Glass	0.15	
Air Space	1	
Exterior Air Film	-0.17	
	1.15	**R Value**
	0.870	**U Value**

DOOR.50x

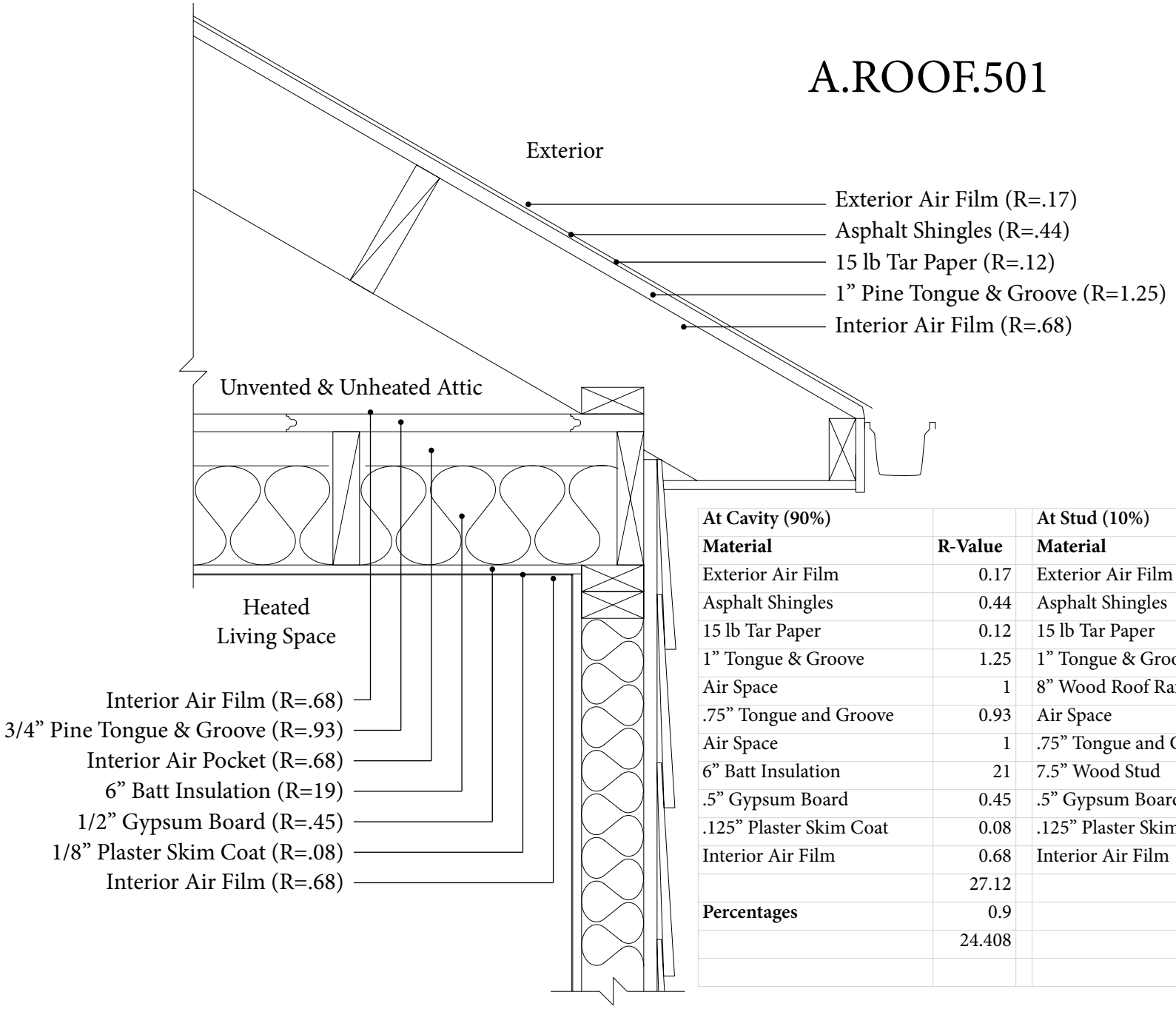
4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

DOOR DETAILS

Door Details with Heat Loss Calculations

A.ROOF.501



At Cavity (90%)			At Stud (10%)			
Material	**R-Value**		**Material**	**R-Value**		
Exterior Air Film	0.17		Exterior Air Film	0.17		
Asphalt Shingles	0.44		Asphalt Shingles	0.44		
15 lb Tar Paper	0.12		15 lb Tar Paper	0.12		
1” Tongue & Groove	1.25		1” Tongue & Groove	1.25		
Air Space	1		8” Wood Roof Rafter*	1.25		
.75” Tongue and Groove	0.93		Air Space	1		
Air Space	1		.75” Tongue and Groove	0.93		
6” Batt Insulation	21		7.5” Wood Stud	9.37		
.5” Gypsum Board	0.45		.5” Gypsum Board	0.45		
.125” Plaster Skim Coat	0.08		.125” Plaster Skim Coat	0.08		
Interior Air Film	0.68		Interior Air Film	0.68		
	27.12			15.74		
Percentages	0.9			0.1		
	24.408			1.574	**25.982**	**R Value**
					0.038	**U Value**

ROOF.501

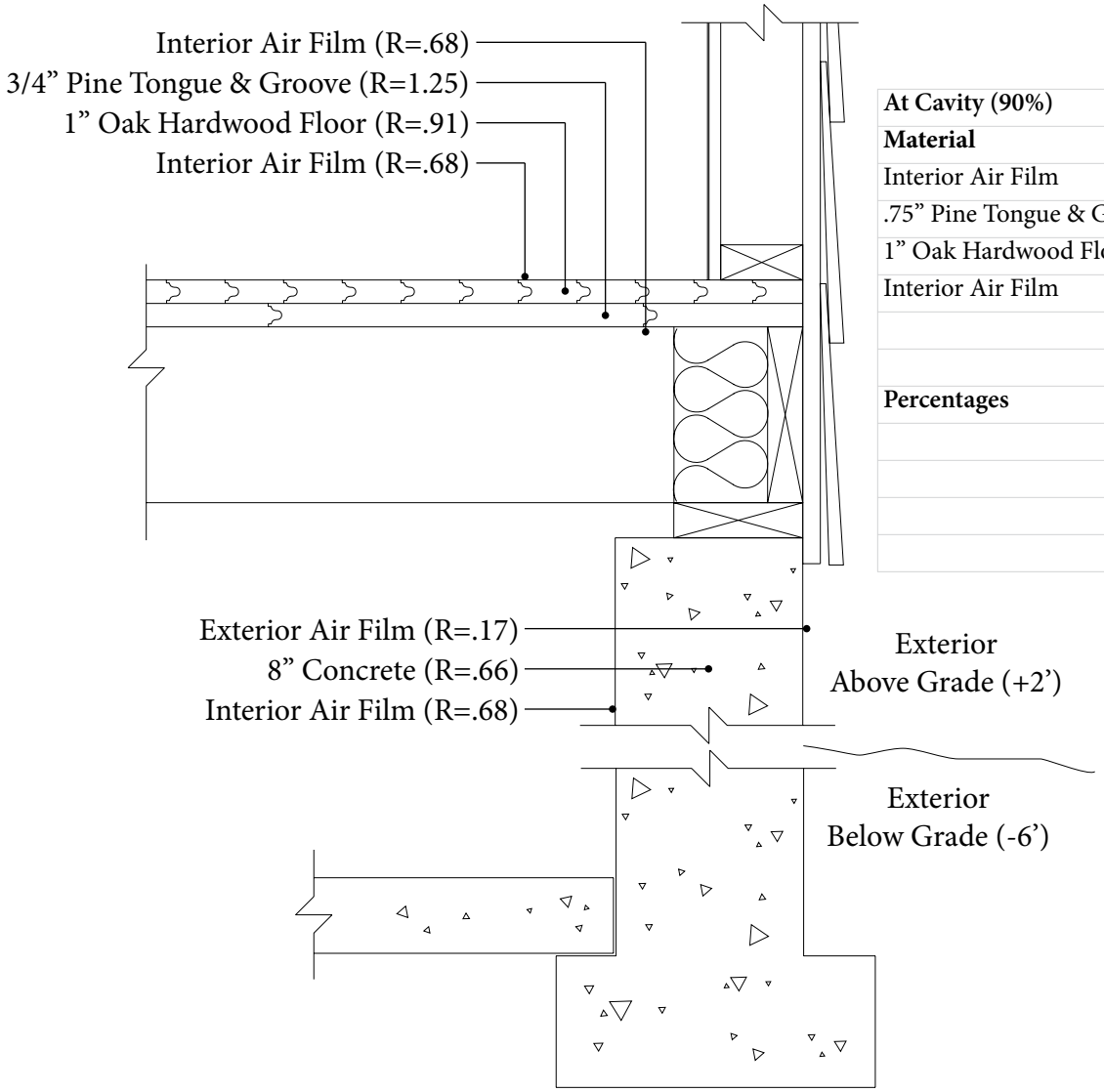
4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

ROOF DETAIL

Roof Detail with Heat Loss Calculations
SCALE: 1-1/2” = 1’-0”

A.FLOR.501



At Cavity (90%)			At Stud (10%)			
Material	**R-Value**		**Material**	**R-Value**		
Interior Air Film	0.68		Interior Air Film	0.68		
.75” Pine Tongue & Groove	0.93		8” Wood Floor Joist*	1.25		
1” Oak Hardwood Flooring	1.25		.75” Pine Tongue & Groove	0.93		
Interior Air Film	0.68		1” Oak Hardwood Flooring	1.25		
			Interior Air Film	0.68		
	3.54			4.79		
Percentages	0.9			0.1		
	3.186			0.479	**3.665**	**R Value**
					0.273	**U Value**
					7.330	**Mod. R Value**
					0.136	**Mod. U Value**

FLOR.501

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

FLOOR DETAIL

Roof Detail with Heat Loss Calculations
SCALE: 1-1/2” = 1’-0”

BUILDING HEAT LOSS CALCULATIONS

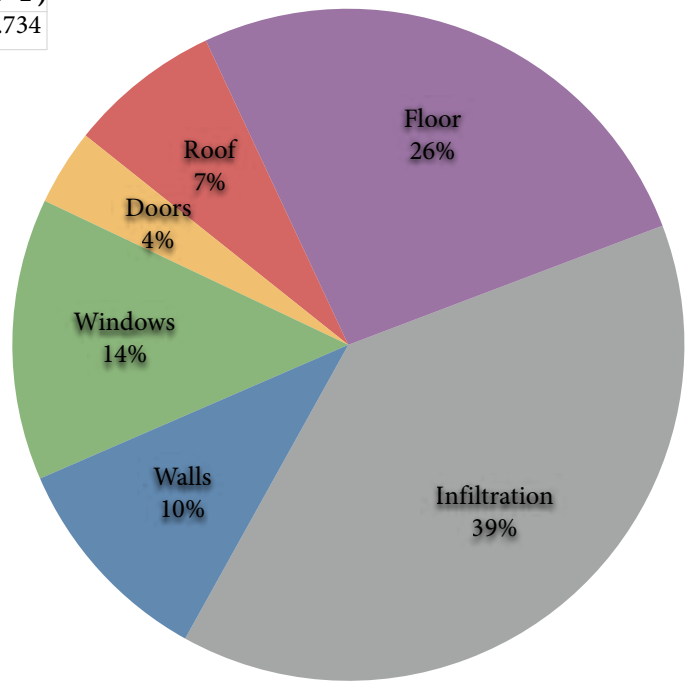
	Detail Number	U-Value	x	Total Area	=	Heat Loss Coefficient (btu/hr °F)
Walls	A.WALL.501	0.070	x	805	=	56.350
	A.WALL.502	0.067	x	134.5	=	9.012
Windows	A.GLAZ.501	0.465	x	120	=	55.800
	A.GLAZ.502	0.465	x	20	=	9.300
	A.GLAZ.503	1.000	x	20	=	20.000
Doors	A.DOOR.501	0.221	x	35	=	7.735
	A.DOOR.502	0.870	x	17.5	=	15.225
Roof	A.ROOF.501	0.038	x	1209	=	45.942
Floor	A.FLOR.501	0.136	x	1209	=	164.424
						383.788

	# of Air Changes	x	Heat Capacity of Air	x	Building Volume	=	Heat Loss Coefficient (btu/hr °F)
Infiltration	1.4	x	0.018	x	9672	=	243.734

Total UA of House (Details & Infiltration)	627.522

HEAT LOSS PERCENTAGES

	UA Heat Loss	Percentage
Walls	65.362	10.42%
Windows	85.100	13.56%
Doors	22.960	3.66%
Roof	45.942	7.32%
Floor	164.424	26.20%
Infiltration	243.734	38.84%
		100.00%



PEAK, ANNUAL & B.E.P. RATING

	Total UA	x	T (design indoor°F - design outdoor °F)	=	Peak Heat Loss (btu/hr)
Peak Heat Loss	627.522	x	65	=	40788.924

	Total UA	x	24 hrs	x	Annual Degree Days	=	Annual Heat Loss (mmbtu)
Annual Heat Loss	627.522	x	24	x	5405	=	81402141
							81.402

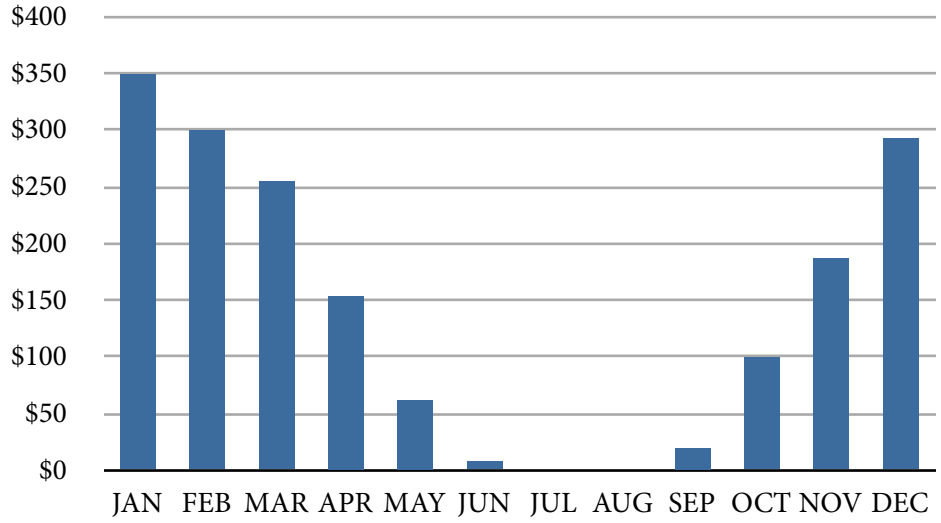
	Annual Loss	/	Heated Sq. Footage	=	Building Energy Performance Rating
BEP Rating	81.402	/	1209	=	0.067

SECTION 4

ENERGY LOAD CALCULATIONS

This section involves the calculation of total home energy loads. The ultimate goal is to identify the biggest costs in the energy load and later make attempts to reduce them. The load calculations include heating, cooling, domestic hot water, lighting, appliances, and automobiles. Attached at the end of this section are the total cost estimates along with actual costs for both oil and electric. The cost calculations verify that heat loss calculations were correct and help in supporting the cost of retrofits.

MONTHLY HEATING COST DISTRIBUTION



Calculation of Loads

Fuel Type = Oil

UA of House = 627.522 (btu/hr °F)

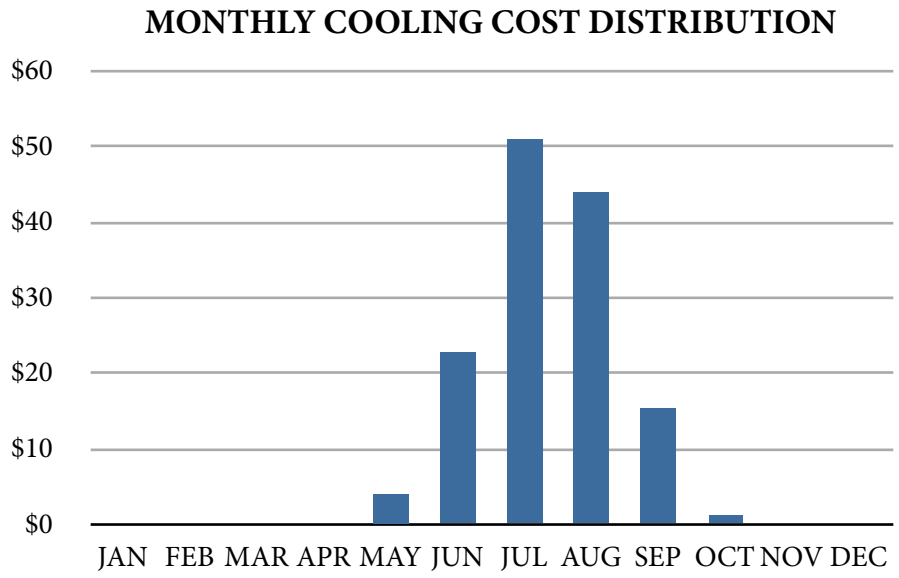
Building Load Coefficient
627.522 (btu/hr °F) x 24 (hrs/day) = 15060.528 (btu/day °F)

Monthly Heating Degree Days = (Varies by Month)
Degree Day Base = 65 °F

Heating System Efficiency = 85%

Average Cost of Oil
($2.55/gal) x (gal/.14mmbtu) = $18.21/mmbtu (or $.20/kwh)

	BLC = 24 UA/ DD		Mo, HDD (65*)		Htg. Load (mmbtu)		Sys. Effic.	Htg. System Demand		Cost/mmbtu		Total Heating Cost
Jan	15060.528	x	1087	=	16.371	/	0.85	19.260	x	$18.21	=	$350.72
Feb	15060.528	x	937	=	14.112	/	0.85	16.602	x	$18.21	=	$302.32
Mar	15060.528	x	798	=	12.018	/	0.85	14.139	x	$18.21	=	$257.47
Apr	15060.528	x	481	=	7.244	/	0.85	8.522	x	$18.21	=	$155.19
May	15060.528	x	199	=	2.997	/	0.85	3.526	x	$18.21	=	$64.21
Jun	15060.528	x	30	=	0.452	/	0.85	0.532	x	$18.21	=	$9.68
Jul	15060.528	x	2	=	0.030	/	0.85	0.035	x	$18.21	=	$0.65
Aug	15060.528	x	4	=	0.060	/	0.85	0.071	x	$18.21	=	$1.29
Sep	15060.528	x	64	=	0.964	/	0.85	1.134	x	$18.21	=	$20.65
Oct	15060.528	x	310	=	4.669	/	0.85	5.493	x	$18.21	=	$100.02
Nov	15060.528	x	580	=	8.735	/	0.85	10.277	x	$18.21	=	$187.14
Dec	15060.528	x	913	=	13.750	/	0.85	16.177	x	$18.21	=	$294.58
			5405		81.402			95.767				**$1,743.92**



Calculation of Loads

Monthly Cooling Degree Day = (Varies by Month)
Degree Day Base = 65 °F

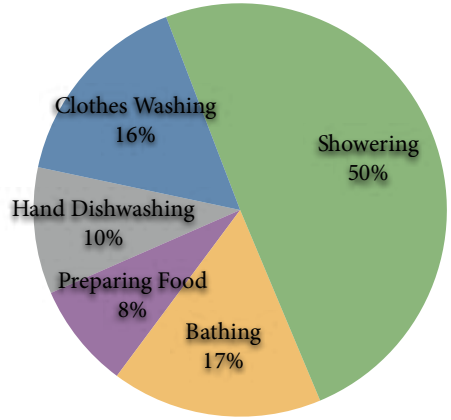
Equiptment SEER Rating = 14 (btu/wh)
Unit Capacity = 12000 (btu/h)

Monthly Cooling System Demand
12000 (btu/hr) / 14000 (btu/kwh) = .857 (kwh/CDD)

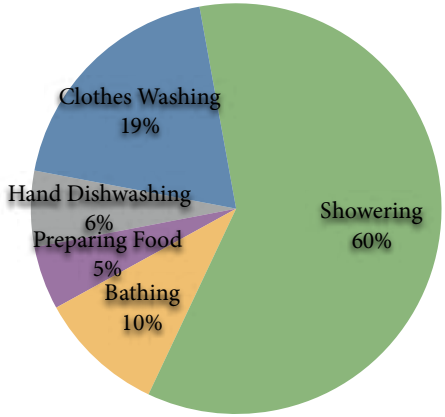
Average Electricity Cost = $0.20/kwh

	Monthly CDD		Cooling System Demand (kwh/CDD)		Monthly Cooling System Demand (kwh)		Elec. Cost/kwh		Total Cooling Cost
Jan	0	x	0.857	=	0.000	x	$0.20	=	$0.00
Feb	0	x	0.857	=	0.000	x	$0.20	=	$0.00
Mar	0	x	0.857	=	0.000	x	$0.20	=	$0.00
Apr	1	x	0.857	=	0.857	x	$0.20	=	$0.17
May	25	x	0.857	=	21.425	x	$0.20	=	$4.29
Jun	134	x	0.857	=	114.838	x	$0.20	=	$22.97
Jul	298	x	0.857	=	255.386	x	$0.20	=	$51.08
Aug	257	x	0.857	=	220.249	x	$0.20	=	$44.05
Sep	91	x	0.857	=	77.987	x	$0.20	=	$15.60
Oct	8	x	0.857	=	6.856	x	$0.20	=	$1.37
Nov	0	x	0.857	=	0.000	x	$0.20	=	$0.00
Dec	0	x	0.857	=	0.000	x	$0.20	=	$0.00
					697.598				**$139.52**

USAGE (2 OCCUPANTS)



USAGE (3 OCCUPANTS)



Calculation of Loads

Fuel Type = Electric

Monthly DHW Usage (3 Occupants) = 2004 gal/month
Monthly DHW Usage (2 Occupants) = 1212 gal/month

Monthly DHW Load
2004 (gallons/month) x .2 (kwh/gallon) = 400.8 (kwh/month)
1212 (gallons/month) x .2 (kwh/gallon) = 242.4 (kwh/month)

Average Electricity Cost = $0.20/kwh

USAGE (2 OCCUPANTS)

Activity	Gallons/Use		# of Times/Mo.		Total
Clothes Washing	32	x	6	=	192
Showering	20	x	30	=	600
Bathing	20	x	10	=	200
Auto Dishwashing	12	x	0	=	0
Preparing Food	5	x	20	=	100
Hand Dishwashing	4	x	30	=	120
					1212

USAGE (3 OCCUPANTS)

Activity	Gallons/Use		# of Times/Mo.		Total
Clothes Washing	32	x	12	=	384
Showering	20	x	60	=	1200
Bathing	20	x	10	=	200
Auto Dishwashing	12	x	0	=	0
Preparing Food	5	x	20	=	100
Hand Dishwashing	4	x	30	=	120
					2004

	DHW Load (kwh)		Cost/kwh		Total Domestic Hot Water Cost
Jan	242.4	x	$0.20	=	$48.48
Feb	242.4	x	$0.20	=	$48.48
Mar	242.4	x	$0.20	=	$48.48
Apr	242.4	x	$0.20	=	$48.48
May	400.8	x	$0.20	=	$80.16
Jun	400.8	x	$0.20	=	$80.16
Jul	400.8	x	$0.20	=	$80.16
Aug	400.8	x	$0.20	=	$80.16
Sep	242.4	x	$0.20	=	$48.48
Oct	242.4	x	$0.20	=	$48.48
Nov	242.4	x	$0.20	=	$48.48
Dec	400.8	x	$0.20	=	$80.16
	3700.8				**$740.16**

ENRG.603

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

DOMESTIC HOT WATER LOADS

Domestic Hot Water Energy Loads for Hot Water Holding Tank

Appliance	Quantity		Avg. Wattage		Avg. Hours/Month		Total (wh/mo)
Refrigerator	1	x	60	x	300	=	18000
Dryer	1	x	3000	x	6	=	18000
Washer	1	x	400	x	6	=	2400
Oven/Stove	1	x	1200	x	40	=	48000
Microwave	1	x	1000	x	25	=	25000
Computer	2	x	245	x	90	=	44100
Copier	1	x	50	x	5	=	250
Entertainment Center	2	x	200	x	120	=	48000
Small Appliances	6	x	100	x	5	=	3000
Full Time Small App.	3	x	200	x	720	=	432000
							638750
With 3rd Occupant							638.75
Computer	1	x	245	x	200	=	49000.00
Microwave	1	x	1000	x	2	=	2000.00
Washer	1	x	400	x	6	=	2400.00
Dryer	1	x	3000	x	6	=	18000.00
							710150.00
							710.15

	Monthly Appliance Load (kwh)		Elec. Cost/kwh		Total Appliance Cost
Jan	638.75	x	$0.20	=	$127.75
Feb	638.75	x	$0.20	=	$127.75
Mar	638.75	x	$0.20	=	$127.75
Apr	638.75	x	$0.20	=	$127.75
May	710.15	x	$0.20	=	$142.03
Jun	710.15	x	$0.20	=	$142.03
Jul	710.15	x	$0.20	=	$142.03
Aug	710.15	x	$0.20	=	$142.03
Sep	638.75	x	$0.20	=	$127.75
Oct	638.75	x	$0.20	=	$127.75
Nov	638.75	x	$0.20	=	$127.75
Dec	710.15	x	$0.20	=	$142.03
	8022.00				**$1,604.40**

Calculation of Loads

Monthly Appliance Electricity Usage = 505.3 (kwh/month)

Average Electricity Cost = $0.20/kwh

Notes on Appliance Loads

Oven & Stove

- used nearly everyday with combo of both stove top and broiler being used for dinner

Small Appliances

- Toaster
- Espresso Machine
- Coffee Maker
- Belgium Waffle Maker
- Blender
- Food Processor

Full Time Small Appliances

- 4 Camera HDD Security System Network
- Pond Waterfall and Fountain Pump System
- Household Network Server

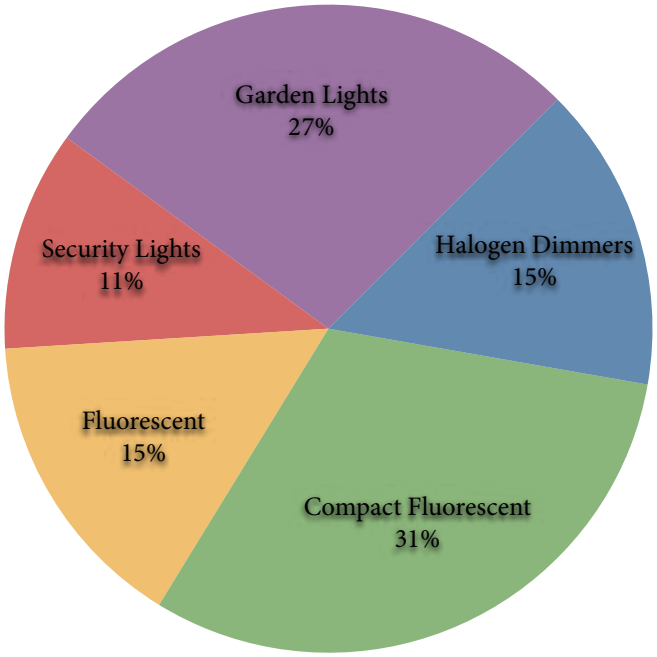
Light Type	Quantity		Avg. Lamp Wattage		Avg. Hrs. on per Month		Total (wh/mo)
Halogen Dimmers	12	x	30	x	40	=	14400
Compact Fluorescent	25	x	13	x	90	=	29250
Fluorescent	10	x	36	x	40	=	14400
Security Lights	8	x	65	x	20	=	10400
Garden Lights	36	x	3	x	240	=	25920
							94370
							94.37

Calculation of Loads

Monthly Lighting Load = 218.76 (kwh/month)

Average Electricity Cost = $0.20/kwh

LIGHTING USAGE DISTRIBUTION



Notes on Lighting Loads

- 100 watt bulbs in basement are used for extra brightness and heating value
- Security Lights are connected to motion sensors for on/off
- Garden Lights are connected to photometric sensor for on/off

	Monthly Lighting Load (kwh)		Elec. Cost/kwh		Total Lighting Cost
Jan	94.37	x	$0.20	=	$18.87
Feb	94.37	x	$0.20	=	$18.87
Mar	94.37	x	$0.20	=	$18.87
Apr	94.37	x	$0.20	=	$18.87
May	94.37	x	$0.20	=	$18.87
Jun	94.37	x	$0.20	=	$18.87
Jul	94.37	x	$0.20	=	$18.87
Aug	94.37	x	$0.20	=	$18.87
Sep	94.37	x	$0.20	=	$18.87
Oct	94.37	x	$0.20	=	$18.87
Nov	94.37	x	$0.20	=	$18.87
Dec	94.37	x	$0.20	=	$18.87
	1132.44				**$226.49**

ENRG.605

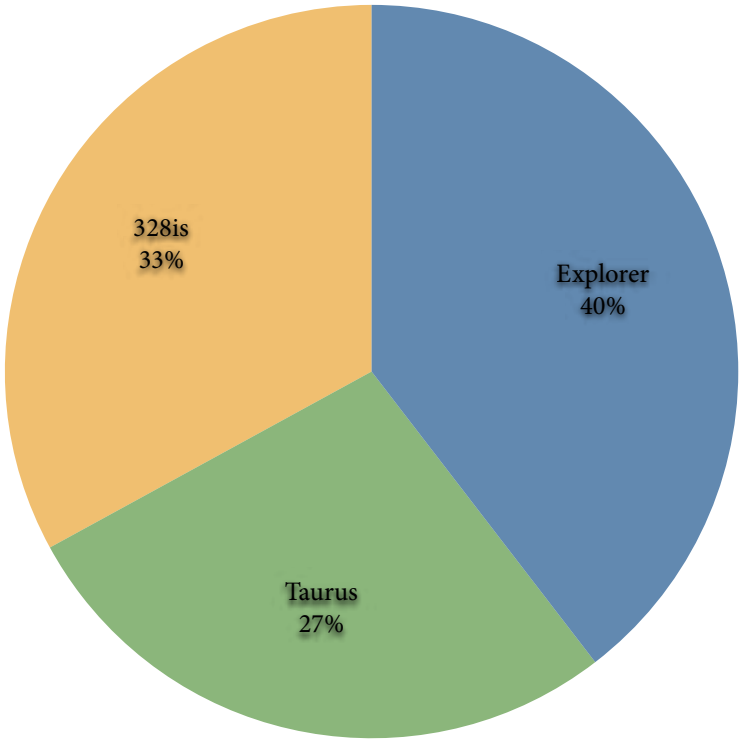
4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

LIGHTING LOADS

Energy Loads for All Indoor and Outdoor Lighting

CAR CONSUMPTION DISTRIBUTION



Calculation of Loads

Monthly Car Load = 151.87 (mmbtu)

Average Gasoline Cost = $2.50

Average Cost
2.50 ($/gal) / .125 (mmbtu/gal) = $20/mmbtu

	Energy Use (mmbtu)		Cost/mmbtu		Total Car Cost
Jan	12.639	x	$20.00	=	$252.78
Feb	12.639	x	$20.00	=	$252.78
Mar	12.639	x	$20.00	=	$252.78
Apr	12.639	x	$20.00	=	$252.78
May	12.639	x	$20.00	=	$252.78
Jun	12.639	x	$20.00	=	$252.78
Jul	12.639	x	$20.00	=	$252.78
Aug	12.639	x	$20.00	=	$252.78
Sep	12.639	x	$20.00	=	$252.78
Oct	12.639	x	$20.00	=	$252.78
Nov	12.639	x	$20.00	=	$252.78
Dec	12.639	x	$20.00	=	$252.78
	151.667				**$3,033.33**

Model	Miles/Year		Avg. MPG		Gallons		mmbtu/gal		Total mmbtu
Explorer	12000	/	25	=	480.00	x	0.125	=	60.00
Taurus	10000	/	30	=	333.33	x	0.125	=	41.67
328is	10000	/	25	=	400.00	x	0.125	=	50.00
					1213.33				151.67
									12.64

ENRG.606

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

AUTOMOBILE LOADS

Additional Calculation of Automobile Energy Usage

OIL	Heating	Estimated Total
Jan	$350.72	$350.72
Feb	$302.32	$302.32
Mar	$257.47	$257.47
Apr	$155.19	$155.19
May	$64.21	$64.21
Jun	$9.68	$9.68
Jul	$0.65	$0.65
Aug	$1.29	$1.29
Sep	$20.65	$20.65
Oct	$100.02	$100.02
Nov	$187.14	$187.14
Dec	$294.58	$294.58
TOTAL		**$1,743.92**

OIL	Actual Bills
Jan	$331.56
Feb	$364.15
Mar	$416.15
Apr	$0.00
May	$0.00
Jun	$0.00
Jul	$458.23
Aug	$0.00
Sep	$0.00
Oct	$0.00
Nov	$0.00
Dec	$243.58
TOTAL	**$1,813.67**

ELECTRIC	Cooling	Domestic Hot Water	Lighting	Appliance	Estimated Total
Jan	$0.00	$48.48	$18.87	$127.75	$195.10
Feb	$0.00	$48.48	$18.87	$127.75	$195.10
Mar	$0.00	$48.48	$18.87	$127.75	$195.10
Apr	$0.17	$48.48	$18.87	$127.75	$195.28
May	$4.29	$80.16	$18.87	$142.03	$245.35
Jun	$22.97	$80.16	$18.87	$142.03	$264.03
Jul	$51.08	$80.16	$18.87	$142.03	$292.14
Aug	$44.05	$80.16	$18.87	$142.03	$285.11
Sep	$15.60	$48.48	$18.87	$127.75	$210.70
Oct	$1.37	$48.48	$18.87	$127.75	$196.48
Nov	$0.00	$48.48	$18.87	$127.75	$195.10
Dec	$0.00	$80.16	$18.87	$142.03	$241.06
TOTAL					**$2,710.57**

ELECTRIC	Actual Bills
Jan	$230.11
Feb	$231.25
Mar	$168.43
Apr	$183.83
May	$196.12
Jun	$200.13
Jul	$260.32
Aug	$258.86
Sep	$287.82
Oct	$230.28
Nov	$228.32
Dec	$280.35
TOTAL	**$2,755.82**

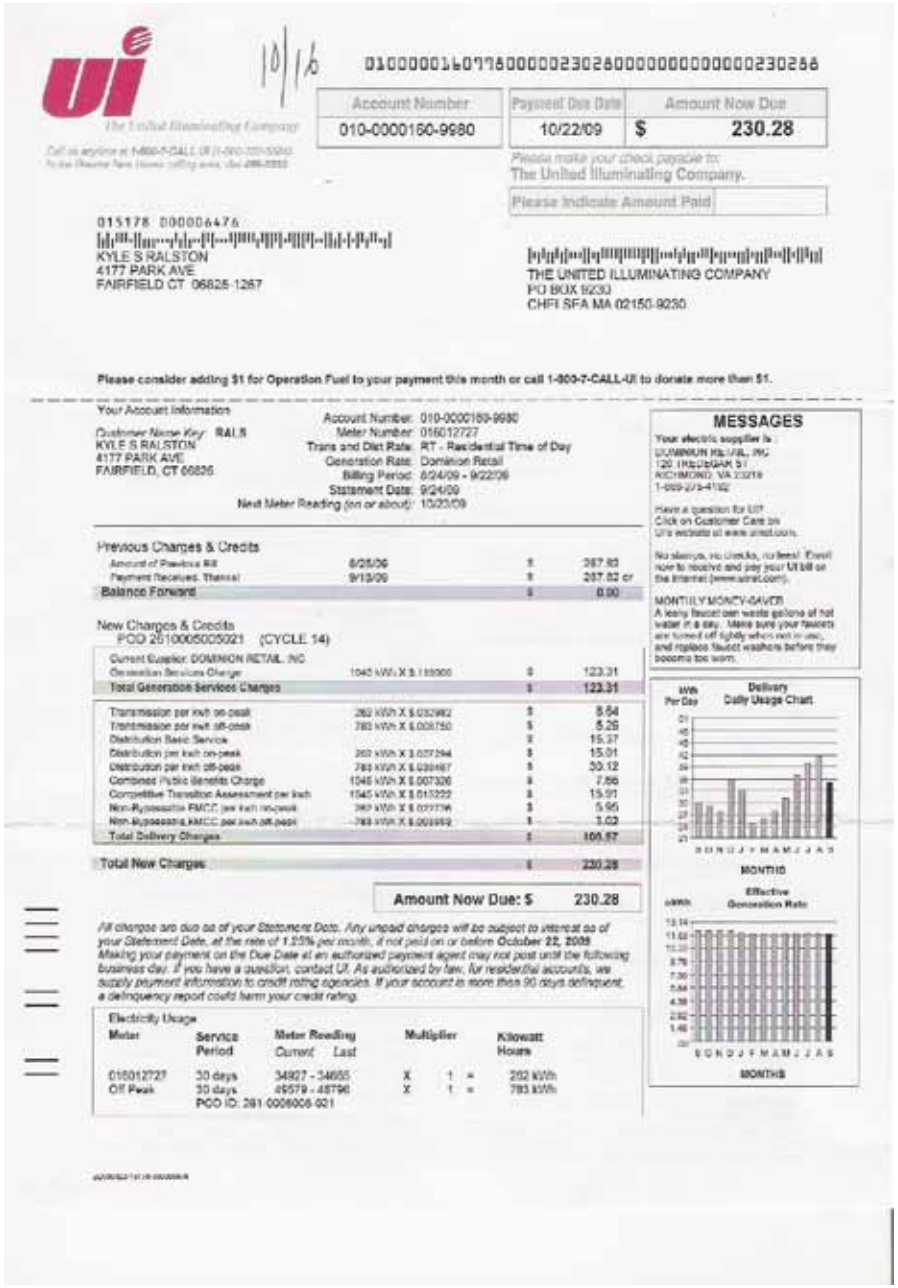
	ESTIMATED	REAL
OIL	**$1,743.92**	**$1,813.67**
ELECTRIC	**$2,710.57**	**$2,755.82**

ENRG.607

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

TOTAL COST ANALYSIS

RYAN T RALSTON



10/16

Account Number	Payment Due Date	Amount Now Due
010-0000160-9980	10/22/09	$ 230.28

Please make your check payable to:
The United Illuminating Company.

Please Indicate Amount Paid

015178 000006476
KYLE S RALSTON
4177 PARK AVE
FAIRFIELD CT 06825-1267

THE UNITED ILLUMINATING COMPANY
PO BOX 9230
CHFI SFA MA 02150-9230

Please consider adding $1 for Operation Fuel to your payment this month or call 1-800-7-CALL-UI to donate more than $1.

Your Account Information
Customer Name Key: RALS
KYLE S RALSTON
4177 PARK AVE
FAIRFIELD, CT 06825

Account Number: 010-0000160-9980
Meter Number: 016012727
Trans and Dist Rate: RT - Residential Time of Day
Generation Rate: Dominion Retail
Billing Period: 8/24/09 - 9/22/09
Statement Date: 9/24/09
Next Meter Reading (on or about): 10/23/09

MESSAGES
Your electric supplier is:
DOMINION RETAIL, INC.
120 TREDEGAR ST
RICHMOND, VA 23219
1-866-273-4182

Have a question for UI? Click on Customer Care on UI's website at www.uinet.com.

No stamps, no checks, no fees! Even now to receive and pay your UI bill on the Internet (www.uinet.com).

MONTHLY MONEY-SAVER
A leaky faucet can waste gallons of hot water in a day. Make sure your faucets are turned off tightly when not in use, and replace faucet washers before they become too worn.

Previous Charges & Credits

Amount of Previous Bill	8/25/09	$	287.82
Payment Received, Thanks!	9/13/09	$	287.82 cr
Balance Forward		$	0.00

New Charges & Credits
PCO 2610005005021 (CYCLE 14)

Current Supplier: DOMINION RETAIL INC			
Generation Services Charge	1045 kWh X $ 0.118000	$	123.31
Total Generation Services Charges		$	123.31
Transmission per kwh on-peak	262 kWh X $ 0.032982	$	8.64
Transmission per kwh off-peak	783 kWh X $ 0.006750	$	5.26
Distribution Basic Service		$	15.37
Distribution per kwh on-peak	262 kWh X $ 0.057294	$	15.01
Distribution per kwh off-peak	783 kWh X $ 0.038467	$	30.12
Combined Public Benefits Charge	1045 kWh X $ 0.007326	$	7.66
Competitive Transition Assessment per kwh	1045 kWh X $ 0.015222	$	15.91
Non-Bypassable FMCC per kwh on-peak	262 kWh X $ 0.022774	$	5.96
Non-Bypassable FMCC per kwh off-peak	783 kWh X $ 0.003859	$	3.03
Total Delivery Charges		$	106.57
Total New Charges		$	230.28

Amount Now Due: $ 230.28

All charges are due as of your Statement Date. Any unpaid charges will be subject to interest as of your Statement Date, at the rate of 1.25% per month, if not paid on or before October 22, 2009. Making your payment on the Due Date at an authorized payment agent may not post until the following business day. If you have a question, contact UI. As authorized by law, for residential accounts, we supply payment information to credit rating agencies. If your account is more than 90 days delinquent, a delinquency report could harm your credit rating.

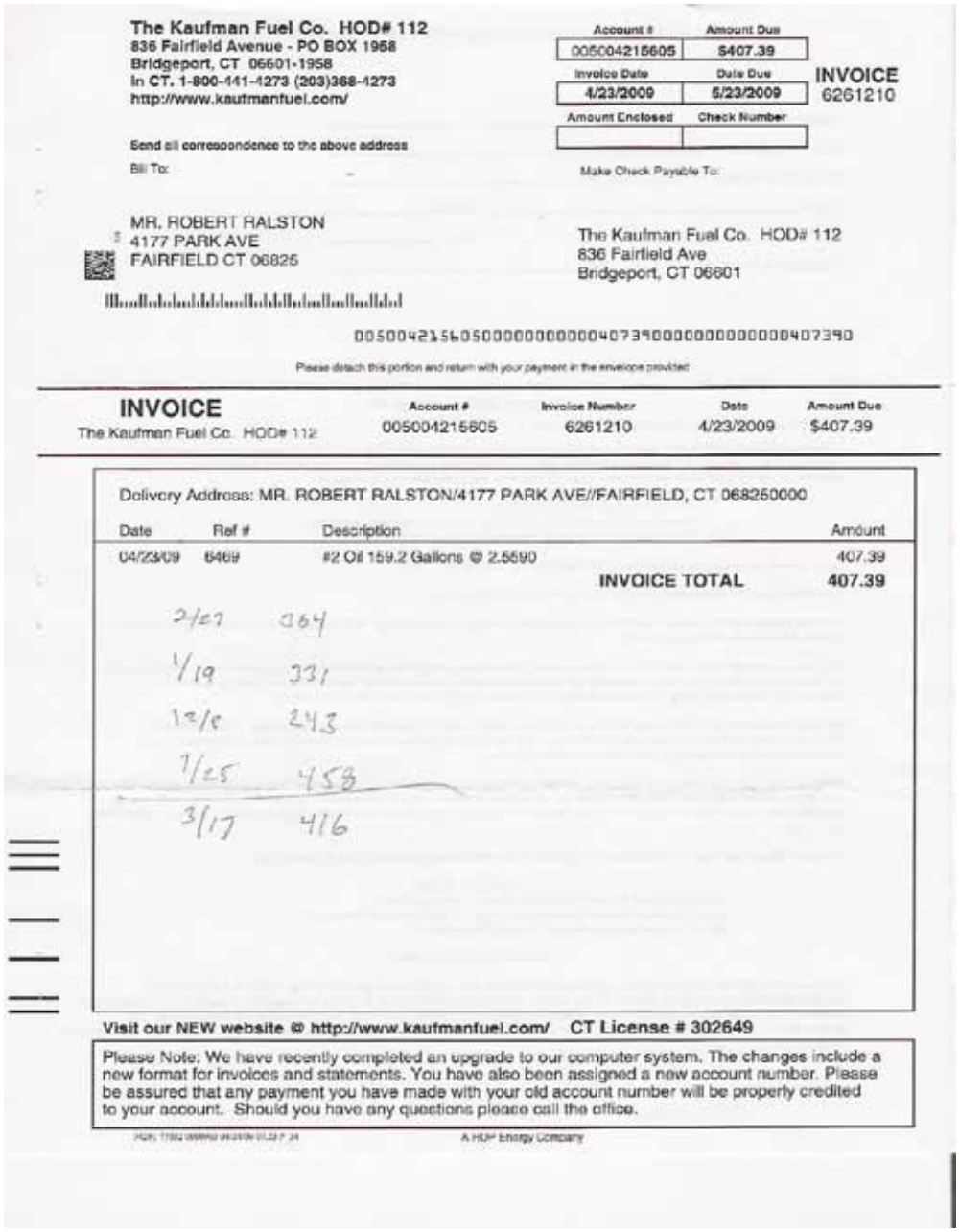
Delivery Daily Usage Chart
kWh Per Day
J F M A M J J A S O N D
MONTHS

Effective Generation Rate
¢/kWh
J F M A M J J A S O N D
MONTHS

Electricity Usage

Meter	Service Period	Meter Reading Current	Meter Reading Last	Multiplier	Kilowatt Hours
016012727	30 days	34927	34665	X 1 =	262 kWh
Off Peak	30 days	49579	48796	X 1 =	783 kWh

PCO ID: 261-0006006-021



The Kaufman Fuel Co. HOD# 112
836 Fairfield Avenue - PO BOX 1958
Bridgeport, CT 06601-1958
In CT. 1-800-441-4273 (203)368-4273
http://www.kaufmanfuel.com/

Account #	Amount Due
005004215605	$407.39
Invoice Date	Date Due
4/23/2009	5/23/2009
Amount Enclosed	Check Number

INVOICE 6261210

Send all correspondence to the above address

Bill To:

Make Check Payable To:

MR. ROBERT RALSTON
4177 PARK AVE
FAIRFIELD CT 06825

The Kaufman Fuel Co. HOD# 112
836 Fairfield Ave
Bridgeport, CT 06601

0050042156050000000000407390000000000000407390

Please detach this portion and return with your payment in the envelope provided

INVOICE
The Kaufman Fuel Co. HOD# 112

Account #	Invoice Number	Date	Amount Due
005004215605	6261210	4/23/2009	$407.39

Delivery Address: MR. ROBERT RALSTON/4177 PARK AVE//FAIRFIELD, CT 068250000

Date	Ref #	Description	Amount
04/23/09	6469	#2 Oil 159.2 Gallons @ 2.5590	407.39
		INVOICE TOTAL	407.39

2/27 364
1/19 331
12/8 243
7/25 458
3/17 416

Visit our NEW website @ http://www.kaufmanfuel.com/ CT License # 302649

Please Note: We have recently completed an upgrade to our computer system. The changes include a new format for invoices and statements. You have also been assigned a new account number. Please be assured that any payment you have made with your old account number will be properly credited to your account. Should you have any questions please call the office.

A HOP Energy Company

ENRG.608	4177 Park Avenue, Fairfield, CT 06825 Lat. 41.14 Long. -73.26	ACTUAL BILLS
	RYAN T RALSTON	Photocopies of the Actual Bills for Electricity and Oil

SECTION 5

ENERGY SAVING RETROFIT

This section recommends eight retrofits for the current house design. These are each explain in their entirety on initial cost, installation instructions, and savings/payback. The retrofits include floor insulation, night insulation, reduction of infiltration, window upgrades, cold water laundry, low flow shower head, set back thermostat and a garden light timer. These have been prioritized in the packet by general importance. Additionally a summary of all the retrofits is included to show the savings if all were done together. Certain products are eligible for tax credit through 2010 and the certification letters are also attached at the end of the section.

INITIAL COST (approx.)

R-30 Fiberglass Batt w/ Kraft (15”x6.5”x48”)

Pack of 11 (or 58.63 sq ft) x 21 @ $44.56 = $935.76

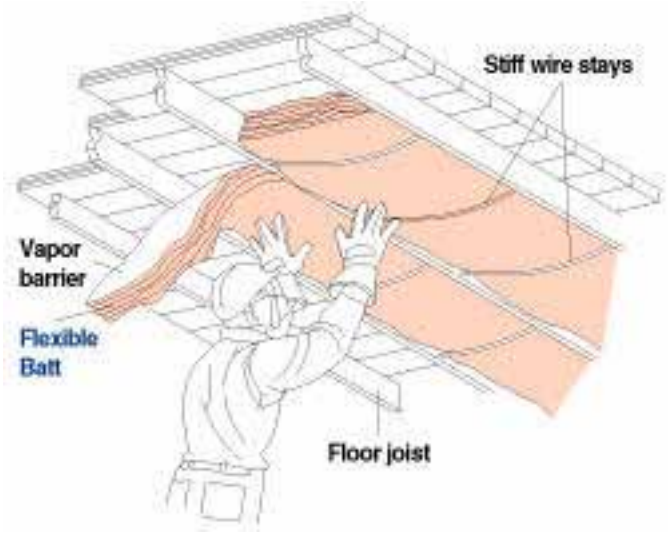
INSTALLATION

Wear safety glasses, gloves, and face mask when installing insulation.

Place batts in between floor joists as shown in the diagram.

Use wood or wire stays to keep the insulation in place.

When necessary, trim insulation to fit around electrical boxes, bracing, etc..



SAVINGS (original floor R=3.66, proposed floor R=30.67)

Original Floor Loss 164.424 btu/hr*F x 5405 HDD x 24hr = 21.329 mmbtu/yr

Proposed Floor Loss 19.344 btu/hr*F x 5405 HDD x 24hr = 2.509 mmbtu/yr

SAVINGS = 18.82 mmbtu/yr

$18.21/mmbtu x 18.82 mmbtu/yr = $342.71/yr YEARLY SAVINGS

$935.76/$342.71 = 2.73 YEAR PAYBACK

(or 33 Months)

TAX CREDIT

This product is eligible for a tax credit of 30% of initial cost up to $1500 until December 31, 2010.

$935.76 x .7 = $655.03 ($280.72 CREDIT)

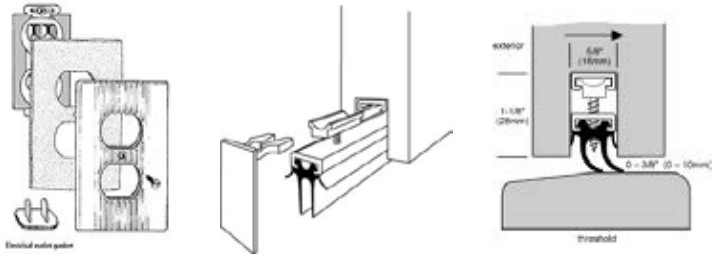
$655.03 / $342.71 = 1.91 YEAR PAYBACK

(or 23 Months)

RTF.601	4177 Park Avenue, Fairfield, CT 06825 Lat. 41.14 Long. -73.26	1. INSULATE FLOOR
	RYAN T RALSTON	Reduce Heat Loss through Floors by Adding Batt Insulation $342.71 YEARLY SAVINGS, ESTIMATED PAYBACK = 1.9 YEARS

INITIAL COST (approx.)

Door Threshold Sweep	x 3 @ $10.00	= $30.00
'Great Stuff' Insulating Foam*	x 3 @ $4.00	= $12.00
'Frost King' Vinyl Weather Seal (3/4"x3/16"x17')	x 10 @ $2.00	= $20.00
Outlet and Switch Plate Gaskets	x 36 @ $0.10	= $3.60
		= $65.60



Installation diagram for outlet gaskets and adjustable door sweep.

INSTALLATION

Door Threshold - Remove door from hinges. Cut slot in door bottom to match size of door sweep. Screw sweep track in slot and slide sweep assembly into track. Re-hang door on hinges and adjust sweep to diagram specifications.

Insulating Foam - Identify key air loss gap areas such as sill plate, vent fan runs, recessed lighting holes, outdoor hose pipes, sewage piping, etc. Hold can upside down and spray gaps approximately half full, foam will expand to fill the rest. Trim with utility knife.

Vinyl Weather Seal - Clean window sashes and tracks. Cut tape to length and stick to bottom and sides of window frame, taking care not to inhibit operation of the window.

Outlet Gaskets - Remove outlet and switch plate covers. Trim to fit, taking care to keep a sufficient air seal. Insert gasket and replace cover.

Rubber foam offers 2 additional years on warrenty, but cost is much higher for little additional value.

SAVINGS (assuming 30% infiltration reduction)

Original Infiltration Loss	243.734 btu/hr*F x 5405 HDD x 24hr	= 31.617 mmbtu/yr
Proposed Infiltration Loss	170.614 btu/hr*F x 5405 HDD x 24hr	= 22.132 mmbtu/yr
		SAVINGS = 9.485 mmbtu/yr

$18.21/mmbtu x 9.485 mmbtu/yr = $172.72/yr YEARLY SAVINGS

$65.60/$172.72 = .3798yr x 12mo/yr = 4.5 month payback

*NOTE - 'Great Stuff' offers a range of products for various applications. Use fireblock in heated & electrical spaces and large gap for holes >3".

RTF.602

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

2. REDUCE INFILTRATION

Reduce Infiltration Loss by Installing Outlet Gaskets, Door Sweeps, and Expanding Foam Insulation
$172.72 YEARLY SAVINGS, ESTIMATED PAYBACK = 4.5 MONTHS

INITIAL COST (approx.)

Frost King Giant Storm Window Kit x 1 @ $8.00 = $8.00
= $8.00

INSTALLATION

Stretch plastic sheet across the span of the window frame.
Tape edges with sheet taught as possible.
Be sure to leave at least 1/2 inch between sheet and window glass.
Heat sheet with hair dryer to remove wrinkling.

SAVINGS (original window R=1, proposed window R=2)

Original Window Loss 20 btu/hr*F x 5405 HDD x 24hr = 2.594 mmbtu/yr
Proposed Window Loss 10 btu/hr*F x 5405 HDD x 24hr = 1.297 mmbtu/yr
SAVINGS = 1.297 mmbtu/yr

$18.21/mmbtu x 1.297 mmbtu/yr = $23.61/yr YEARLY SAVINGS
$8/$23.61 = .338 YEAR PAYBACK
(or 4 Months)

INITIAL COST (approx.)

Double Glazed Picture Window (72"x48") x 1 @ $626.00 = $626.00
Installation Charges = $150.00
= $776.00

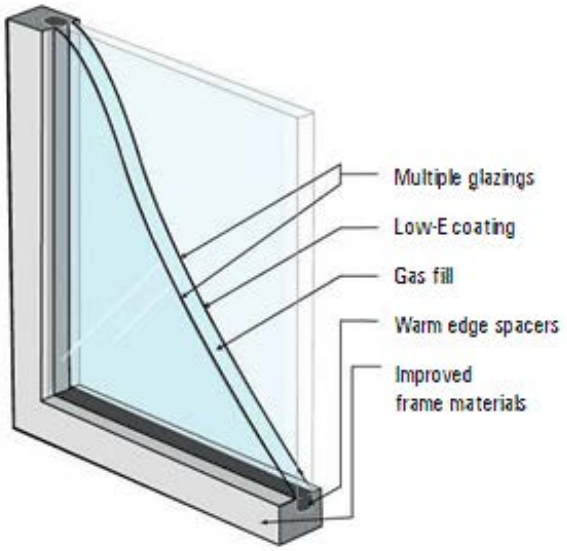
INSTALLATION

Professional installation recommended.

SAVINGS (original window R=1, proposed window R=2.15)

Original Window Loss 20 btu/hr*F x 5405 HDD x 24hr = 2.594 mmbtu/yr
Proposed Window Loss 9.3 btu/hr*F x 5405 HDD x 24hr = 1.206 mmbtu/yr
SAVINGS = 1.388 mmbtu/yr

$18.21/mmbtu x 1.388 mmbtu/yr = $25.27/yr YEARLY SAVINGS
$776/$25.27 = 30.70 YEAR PAYBACK
(this option is more permanent but has much longer payback period)



RTF.603

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

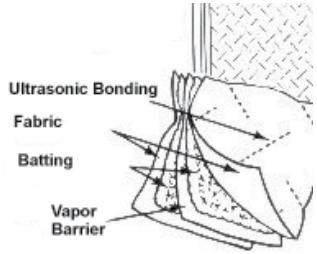
3. UPGRADE NORTH PICTURE WINDOW

RYAN T RALSTON

Reduce Loss through Northern Picture Window by Adding Storm Seal Plastic
$25.27 YEARLY SAVINGS, ESTIMATED PAYBACK = 4 MONTHS

INITIAL COST (approx.)

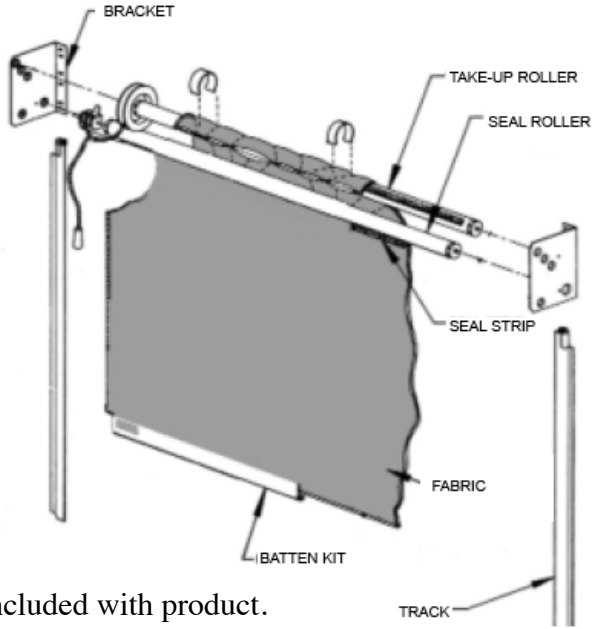
400 Series Window Quilt (36”x48”)	x 10 @ $180.00	= $1800.00
400 Series Window Quilt (72”x48”)	x 2 @ $360.00	= $720.00
Shipping Charges		= $390.00
		= $3000.00



INSTALLATION & OPERATION

Installation
Install side rails on window frame.
Fix mounting bracket above window.
Insert take up roller into bracket.
Insert seal roller into bracket.
Slide batten into side tracks.

Daily Operation
Close shades each night.
Open shades every morning.
Close shades for rooms not in use.



More detailed installation instructions included with product.

When drawn shades diffuse light, add R-value of 5.51, and provide a 35% reduction in exterior noise.

SAVINGS (original window R=2.15, R=1, proposed window R=4.35, R=3.20)

Original Window Loss 85.10 btu/hr*F x 5405 HDD x 24hr = 11.039 mmbtu/yr
Proposed Window Loss 38.44 btu/hr*F x 5405 HDD x 24hr = 4.986 mmbtu/yr
SAVINGS = 6.053 mmbtu/yr

$18.21/mmbtu x 6.053 mmbtu/yr = $110.22/yr YEARLY SAVINGS
$3000/$110.22 = 27.21 YEAR PAYBACK

TAX CREDIT

This product is eligible for a tax credit of 30% of initial cost up to $1500 until December 31, 2010.

$3000 x .7 = $2100 ($900 CREDIT)
$2100 / $110.22 = 19.05 YEAR PAYBACK

*Note - Calculations assume quilts closed for 40% of day.

RTF.604

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

4. NIGHT INSULATION

Reduce Nightly Heat Loss through Windows by Adding Operable Window Quilts
$110.22 YEARLY SAVINGS, ESTIMATED PAYBACK = 19 YEARS

INITIAL COST

7 Day Programmable Dual Setback Thermostat x 1 @ $0.00 = $0.00

= $0.00

(This product has already been purchased.)

INSTALLATION & SETUP

Installation

This product is already installed in the house.

Setup

Set temperature to 68 degrees for hours the house is occupied.

Set temperature to 63 degrees for hours occupants are sleeping and active in/out of house.

Time	Temperature
12am	63
1	63
2	63
3	63
4	63
5	63
6	68
7	68
8	63
9	63
10	63
11	63
12pm	63
1	63
2	63
3	63
4	63
5	68
6	68
7	68
8	68
9	63
10	63
11	63

HEAT LOSS AT 65 DEGREE BASE

	Total UA	x	24 hrs	x	Annual Degree Days	=	Annual Heat Loss (mmbtu)
Annual Heat Loss	627.522	x	24	x	5405	=	81402141
							81.402

HEAT LOSS AT 60 DEGREE BASE

	Total UA	x	24 hrs	x	Annual Degree Days	=	Annual Heat Loss (mmbtu)
Annual Heat Loss	627.522	x	24	x	4310	=	64910865
							64.911

HEAT LOSS WITH DUAL SET BACK (68 6-8am and 5-9pm, 63 8am-5pm and 9pm-6am)

Base 65	%	Loss	Base 60	%	Loss	Base 58	%	Loss	Annual Heat Loss (mmbtu)
83.706	0.25		64.911	0.75		58.058	0		
		20.927			48.683			0	69.610

SAVINGS

Original Heat Loss = 81.402 mmbtu/yr

Proposed Heat Loss = 69.610 mmbtu/yr

SAVINGS = 11.792 mmbtu/yr

$18.21/mmbtu x 11.792 mmbtu/yr = $214.73/yr YEARLY SAVINGS

Product already installed so there is no payback period!

RTF.605

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

5. SETBACK THERMOSTAT

Reduce Total Heating Degree Days by Lowering Interior Degree Base
IMMEDIATE $214.73 YEARLY SAVINGS

INITIAL COST

No initial cost. Switch detergents to similarly price Ultra Tide Cold Water.

INSTALLATION & USE

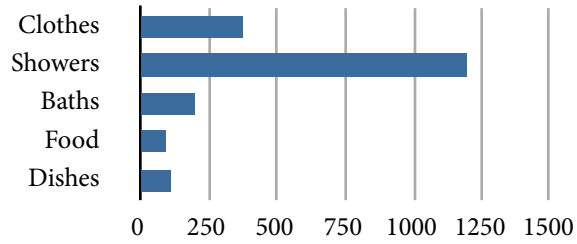
Begin using ‘cold water’ detergent.
Set washer setting to ‘cold water wash’.
Use ‘hot water wash’ only for the heaviest soiled loads.

SAVINGS

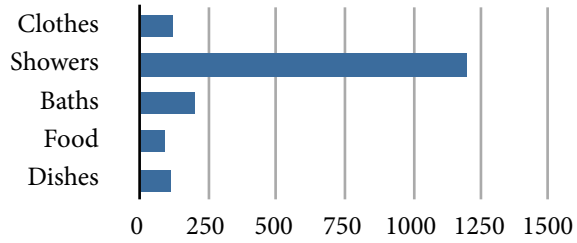
Original DHW Usage (depending on monthly occupancy)
192 or 384 gallons per month = 242.4 or 400.8 kwh
Proposed DHW Usage (depending on monthly occupancy)
64 or 128 gallons per month = 216.8 or 349.6 kwh

old cost - new cost = savings
$740.16 - $653.12 = $87.04 YEARLY SAVINGS
There is no cost so there is no payback period!

Monthly Usage - Current (gallons)



Monthly Usage w/ Cold Water Wash



*Note - Graphs based on 3 person occupancy, similar usage reductions can be observed for 2 person occupancy

	DHW Load (kwh)		Cost/kwh		Total Domestic Hot Water Cost
Jan	242.4	x	$0.20	=	$48.48
Feb	242.4	x	$0.20	=	$48.48
Mar	242.4	x	$0.20	=	$48.48
Apr	242.4	x	$0.20	=	$48.48
May	400.8	x	$0.20	=	$80.16
Jun	400.8	x	$0.20	=	$80.16
Jul	400.8	x	$0.20	=	$80.16
Aug	400.8	x	$0.20	=	$80.16
Sep	242.4	x	$0.20	=	$48.48
Oct	242.4	x	$0.20	=	$48.48
Nov	242.4	x	$0.20	=	$48.48
Dec	400.8	x	$0.20	=	$80.16
	3700.8				**$740.16**

	DHW Load (kwh)		Cost/kwh		Total Domestic Hot Water Cost
Jan	216.8	x	$0.20	=	$43.36
Feb	216.8	x	$0.20	=	$43.36
Mar	216.8	x	$0.20	=	$43.36
Apr	216.8	x	$0.20	=	$43.36
May	349.6	x	$0.20	=	$69.92
Jun	349.6	x	$0.20	=	$69.92
Jul	349.6	x	$0.20	=	$69.92
Aug	349.6	x	$0.20	=	$69.92
Sep	216.8	x	$0.20	=	$43.36
Oct	216.8	x	$0.20	=	$43.36
Nov	216.8	x	$0.20	=	$43.36
Dec	349.6	x	$0.20	=	$69.92
	3265.6				**$653.12**

RTF.606

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

6. COLD WATER LAUNDRY

Reduce Amount of Domestic Hot Water Used for Laundry by Switching to Cold Water Wash
IMMEDIATE $87.04 YEARLY SAVINGS

INITIAL COST (approx.)

Low Flow Shower Head (1.5 GPM) x 1 @ $28.50 = $28.50

= $28.50

INSTALLATION

Choose low flow shower head with <1.6 GPM flow rate, as well as a comfortable spray pattern and size.

Unscrew current shower head using pipe wrench.

Apply teflon tape to shower pipe.

Screw on new shower head, until snug.

SAVINGS

Original DHW Usage (depending on monthly occupancy)

600 or 1200 gallons per month = 120 or 240 kwh

Proposed DHW Usage (depending on monthly occupancy)

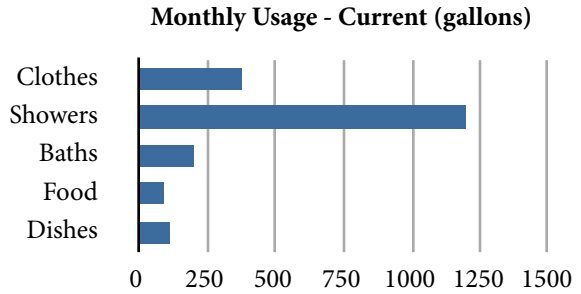
300 or 600 gallons per month = 60 or 120 kwh

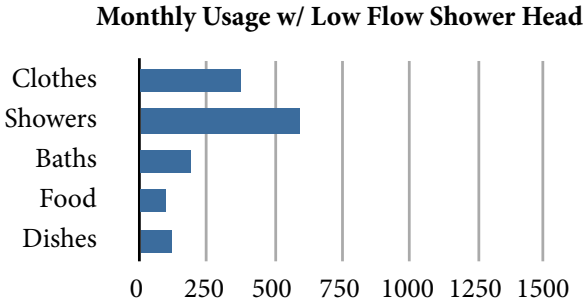
old cost - new cost = savings

$740.16 - $536.16 = $204.00 YEARLY SAVINGS

$28.50 / $204.00 = .13 YEAR PAYBACK

(or 1.5 Months)





*Note - Graphs based on 3 person occupancy, similar usage reductions can be observed for 2 person occupancy

	DHW Load (kwh)		Cost/kwh		Total Domestic Hot Water Cost
Jan	242.4	x	$0.20	=	$48.48
Feb	242.4	x	$0.20	=	$48.48
Mar	242.4	x	$0.20	=	$48.48
Apr	242.4	x	$0.20	=	$48.48
May	400.8	x	$0.20	=	$80.16
Jun	400.8	x	$0.20	=	$80.16
Jul	400.8	x	$0.20	=	$80.16
Aug	400.8	x	$0.20	=	$80.16
Sep	242.4	x	$0.20	=	$48.48
Oct	242.4	x	$0.20	=	$48.48
Nov	242.4	x	$0.20	=	$48.48
Dec	400.8	x	$0.20	=	$80.16
	3700.8				**$740.16**

	DHW Load (kwh)		Cost/kwh		Total Domestic Hot Water Cost
Jan	182.4	x	$0.20	=	$36.48
Feb	182.4	x	$0.20	=	$36.48
Mar	182.4	x	$0.20	=	$36.48
Apr	182.4	x	$0.20	=	$36.48
May	280.8	x	$0.20	=	$56.16
Jun	280.8	x	$0.20	=	$56.16
Jul	280.8	x	$0.20	=	$56.16
Aug	280.8	x	$0.20	=	$56.16
Sep	182.4	x	$0.20	=	$36.48
Oct	182.4	x	$0.20	=	$36.48
Nov	182.4	x	$0.20	=	$36.48
Dec	280.8	x	$0.20	=	$56.16
	2680.8				**$536.16**

RTF.607

4177 Park Avenue, Fairfield, CT 06825
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RYAN T RALSTON

7. LOW FLOW SHOWER HEAD

Reduce Amount of Domestic Hot Water Used for Showering by Installing a Low Flow Shower Head
$204.00 YEARLY SAVINGS, ESTIMATED PAYBACK = 1.5 MONTHS

INITIAL COST (approx.)

7 Day Programmable Power Station x 1 @ $34.99 = $34.99

= $34.99

INSTALLATION & SETUP

Installation

Plug unit into wall

Plug individual garden light sets into the unit.

Setup

Set power to be on for only 'dark' hours that occupants are awake.

Daytime power is off.

SAVINGS

Original Electric Load

240 hours per month = 25.92 kwh

Proposed Electric Load

150 hours per month = 16.20 kwh

$226.49 - $203.16 = $22.33 YEARLY SAVINGS

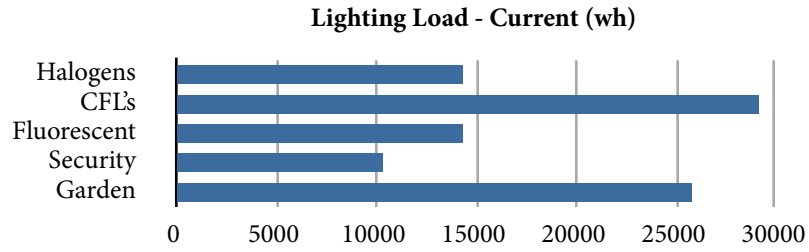
$34.99 / $22.33 = 1.56 YEAR PAYBACK

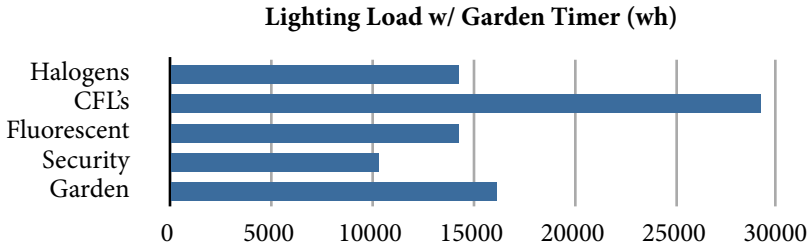
(or 19 Months)

Time	On/Off	Time	On/Off
12am	OFF	12pm	OFF
1	OFF	1	OFF
2	OFF	2	OFF
3	OFF	3	OFF
4	OFF	4	OFF
5	OFF	5	OFF
6	OFF	6	OFF
7	OFF	7	ON
8	OFF	8	ON
9	OFF	9	ON
10	OFF	10	ON
11	OFF	11	ON

Light Type	Quantity		Avg. Lamp Wattage		Avg. Hrs. on per Month		Total (wh/mo)
Halogen Dimmers	12	x	30	x	40	=	14400
Compact Fluorescent	25	x	13	x	90	=	29250
Fluorescent	10	x	36	x	40	=	14400
Security Lights	8	x	65	x	20	=	10400
Garden Lights	36	x	3	x	240	=	25920
							94370
							94.37

Light Type	Quantity		Avg. Lamp Wattage		Avg. Hrs. on per Month		Total (wh/mo)
Halogen Dimmers	12	x	30	x	40	=	14400
Compact Fluorescent	25	x	13	x	90	=	29250
Fluorescent	10	x	36	x	40	=	14400
Security Lights	8	x	65	x	20	=	10400
Garden Lights	36	x	3	x	150	=	16200
							84650
							84.65





RTF.608

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

8. RESET GARDEN LIGHT SCHEDULE

RYAN T RALSTON

Lower Electrical Load of Garden Lights by Creating New On/Off Schedule
$22.33 YEARLY SAVINGS, ESTIMATED PAYBACK = 19 MONTHS

WINDOW UPGRADE & NIGHT INSULATION

GLAZ.501

Current

Material	R-Value	
Exterior Air Film	0.17	
Glass	0.15	
Air Pocket	1	
Glass	0.15	
Interior Air Film	0.68	
	2.15	**R Value**
	0.465	**U Value**

with Night Insulation

Material	R-Value	
Exterior Air Film	0.17	
Glass	0.15	
Air Pocket	1	
Glass	0.15	
Interior Air Film	0.68	
Window Quilt	5.51	
	7.66	**R Value**
	0.131	**U Value**

GLAZ.502

Material	R-Value	
Exterior Air Film	0.17	
Glass	0.15	
Air Pocket	1	
Glass	0.15	
Interior Air Film	0.68	
	2.15	**R Value**
	0.465	**U Value**

Material	R-Value	
Exterior Air Film	0.17	
Glass	0.15	
Air Pocket	1	
Glass	0.15	
Interior Air Film	0.68	
Window Quilt	5.51	
	7.66	**R Value**
	0.131	**U Value**

GLAZ.503

Current

Material	R-Value	
Exterior Air Film	0.17	
Glass	0.15	
Interior Air Film	0.68	
	1	**R Value**
	1.000	**U Value**

with Upgraded Storm Kit

Material	R-Value	
Exterior Air Film	0.17	
Glass	0.15	
Air Pocket	1	
Glass	0.15	
Interior Air Film	0.68	
	2.15	**R Value**
	0.465	**U Value**

with Night Insulation

Material	R-Value	
Exterior Air Film	0.17	
Glass	0.15	
Window Quilt	5.51	
Interior Air Film	0.68	
	6.51	**R Value**
	0.154	**U Value**

with Storm Kit and Night Insulation

Material	R-Value	
Exterior Air Film	0.17	
Glass	0.15	
Air Pocket	1	
Glass	0.15	
Interior Air Film	0.68	
Window Quilt	5.51	
	7.66	**R Value**
	0.131	**U Value**

MODIFIED R and U VALUES

according to a 40% uasage rate for night insulation

	No Quilt	%		Quilt	%		R-Value	U Value
A.GLAZ.501	2.15	0.6		7.66	0.4			
			1.29			3.064	**4.354**	**0.230**
A.GLAZ.502	2.15	0.6		7.66	0.4			
			1.29			3.064	**4.354**	**0.230**
A.GLAZ.503	2.15	0.6		7.66	0.4			
			1.29			3.064	**4.354**	**0.230**

RTF.609

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WINDOW DETAIL CHARTS

RYAN T RALSTON

INFILTRATION

Current

	# of Air Changes	x	Heat Capacity of Air	x	Building Volume	=	Heat Loss Coefficient (btu/hr °F)
Infiltration	1.4	x	0.018	x	9672	=	243.734

Proposed

	# of Air Changes	x	Heat Capacity of Air	x	Building Volume	=	Heat Loss Coefficient (btu/hr °F)
Infiltration	0.98	x	0.018	x	9672	=	170.614

DETAIL BREAKDOWN

Current

	Detail Number	U-Value	x	Total Area	=	Heat Loss Coefficient (btu/hr °F)
Walls	A.WALL.501	0.070	x	805	=	56.350
	A.WALL.502	0.067	x	134.5	=	9.012
Windows	A.GLAZ.501	0.465	x	120	=	55.800
	A.GLAZ.502	0.465	x	20	=	9.300
	A.GLAZ.503	1.000	x	20	=	20.000
Doors	A.DOOR.501	0.221	x	35	=	7.735
	A.DOOR.502	0.870	x	17.5	=	15.225
Roof	A.ROOF.501	0.038	x	1209	=	45.942
Floor	A.FLOR.501	0.136	x	1209	=	164.424
						383.788

Proposed with Window Upgrade, Night Insulation, & Floor Insulation.

	Detail Number	U-Value	x	Total Area	=	Heat Loss Coefficient (btu/hr °F)
Walls	A.WALL.501	0.070	x	805	=	56.350
	A.WALL.502	0.067	x	134.5	=	9.012
Windows	A.GLAZ.501	0.230	x	120	=	27.600
	A.GLAZ.502	0.230	x	20	=	4.600
	A.GLAZ.503	0.230	x	20	=	4.600
Doors	A.DOOR.501	0.221	x	35	=	7.735
	A.DOOR.502	0.870	x	17.5	=	15.225
Roof	A.ROOF.501	0.038	x	1209	=	45.942
Floor	A.FLOR.501	0.016	x	1209	=	19.344
						190.408

HEAT LOSS COEFFICIENTS

Current

Total UA of House (Details & Infiltration)	627.522

Proposed

Total UA of House (Details & Infiltration)	361.022

RTF.610

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GENERAL HEAT LOSS CHARTS

RYAN T RALSTON

SETBACK THERMOSTAT HEAT LOSS before RETROFITS

65 Degree Base

	Total UA	x	24 hrs	x	Annual Degree Days	=	Annual Heat Loss (mmbtu)
Annual Heat Loss	627.522	x	24	x	5558	=	83706401
							83.706

60 Degree Base

	Total UA	x	24 hrs	x	Annual Degree Days	=	Annual Heat Loss (mmbtu)
Annual Heat Loss	627.522	x	24	x	4310	=	64910865
							64.911

58 Degree Base

	Total UA	x	24 hrs	x	Annual Degree Days	=	Annual Heat Loss (mmbtu)
Annual Heat Loss	627.522	x	24	x	3855	=	58058326
							58.058

Setback Weighted Annual Heat Loss

Base 65	%	Loss	Base 60	%	Loss	Base 58	%	Loss	Annual Heat Loss (mmbtu)
83.706	0.25		64.911	0.75		58.058	0		
		20.927			48.683			0	69.610

SETBACK THERMOSTAT HEAT LOSS after RETROFITS

65 Degree Base

	Total UA	x	24 hrs	x	Annual Degree Days	=	Annual Heat Loss (mmbtu)
Annual Heat Loss	361.022	x	24	x	5558	=	48157391
							48.157

60 Degree Base

	Total UA	x	24 hrs	x	Annual Degree Days	=	Annual Heat Loss (mmbtu)
Annual Heat Loss	361.022	x	24	x	4310	=	37344072
							37.344

58 Degree Base

	Total UA	x	24 hrs	x	Annual Degree Days	=	Annual Heat Loss (mmbtu)
Annual Heat Loss	361.022	x	24	x	3855	=	33401717
							33.402

Setback Weighted Annual Heat Loss

Base 65	%	Loss	Base 60	%	Loss	Base 58	%	Loss	Annual Heat Loss (mmbtu)
48.157	0.25		37.344	0.75		33.402	0		
		12.039			28.008			0	40.047

RTF.611

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SETBACK THERMOSTAT CHARTS

RYAN T RALSTON

ANNUAL HEAT LOSS

Current

	Total UA	x	24 hrs	x	Annual Degree Days	=	Annual Heat Loss (mmbtu)
Annual Heat Loss	627.522	x	24	x	5405	=	81402141
							81.402

Proposed

Base 65	%	Loss	Base 60	%	Loss	Base 58	%	Loss	Annual Heat Loss (mmbtu)
48.157	0.25		37.344	0.75		33.402	0		
		12.039			28.008			0	40.047

HEATING COST CALCULATIONS

Current

Htg. Load (mmbtu)		Sys. Effic.		Htg. System Demand		Cost/mmbtu		Total Heating Cost
81.402	/	0.85	=	95.767	x	$18.21	=	**$1,743.92**

Proposed

Htg. Load (mmbtu)		Sys. Effic.		Htg. System Demand		Cost/mmbtu		Total Heating Cost
40.047	/	0.85	=	47.114	x	$18.21	=	**$857.95**

HEATING SAVINGS CALCULATIONS

$1743.92 - $857.95 = $885.97 COMBINED YEARLY SAVINGS

RTF.612

4177 Park Avenue, Fairfield, CT 06825
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HEATING LOAD CHARTS

RYAN T RALSTON

MONTHLY USAGE before RETROFITS

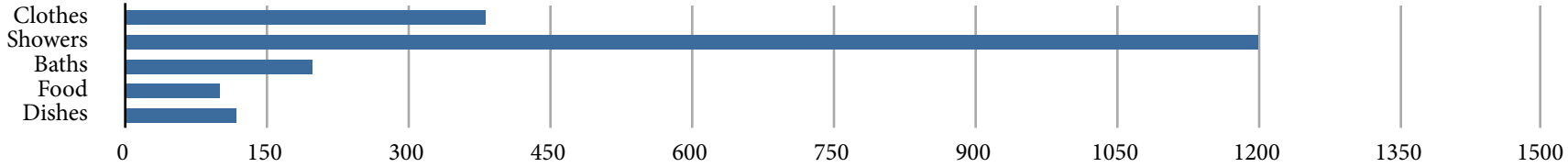
2 Occupants

Activity	Gallons/Use		# of Times/Mo.		Total
Clothes Washing	32	x	6	=	192
Showering	20	x	30	=	600
Bathing	20	x	10	=	200
Auto Dishwashing	12	x	0	=	0
Preparing Food	5	x	20	=	100
Hand Dishwashing	4	x	30	=	120
					1212

3 Occupants

Activity	Gallons/Use		# of Times/Mo.		Total
Clothes Washing	32	x	12	=	384
Showering	20	x	60	=	1200
Bathing	20	x	10	=	200
Auto Dishwashing	12	x	0	=	0
Preparing Food	5	x	20	=	100
Hand Dishwashing	4	x	30	=	120
					2004

Monthly Usage - Current (gallons)



MONTHLY USAGE after RETROFITS

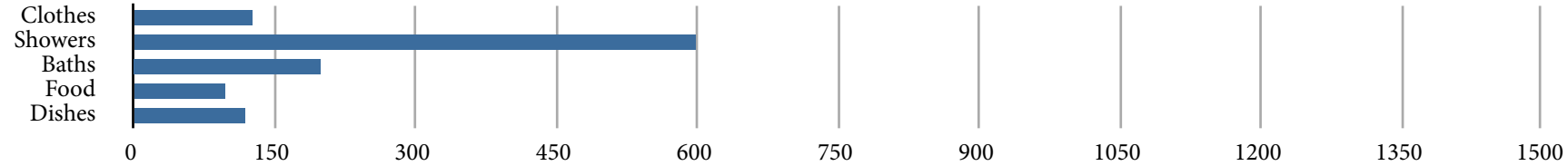
2 Occupants

Activity	Gallons/Use		# of Times/Mo.		Total
Clothes Washing	32	x	**2**	=	**64**
Showering	**10**	x	30	=	**300**
Bathing	20	x	10	=	200
Auto Dishwashing	12	x	0	=	0
Preparing Food	5	x	20	=	100
Hand Dishwashing	4	x	30	=	120
					784

3 Occupants

Activity	Gallons/Use		# of Times/Mo.		Total
Clothes Washing	32	x	**4**	=	**128**
Showering	**10**	x	60	=	**600**
Bathing	20	x	10	=	200
Auto Dishwashing	12	x	0	=	0
Preparing Food	5	x	20	=	100
Hand Dishwashing	4	x	30	=	120
					1148

Monthly Usage w/ Retrofits



RTF.613

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DOMESTIC HOT WATER USAGE CHARTS

RYAN T RALSTON

COST CONVERSIONS

Current

	Gallons/Mo.		kwh/gallon		
3 Occupants	2004	x	0.2	=	400.8
2 Occupants	1212	x	0.2	=	242.4

Proposed

	Gallons/Mo.		kwh/gallon		
3 Occupants	1148	x	0.2	=	229.6
2 Occupants	784	x	0.2	=	156.8

TOTAL COST CALCULATIONS

Current

	DHW Load (kwh)		Cost/kwh		Total Domestic Hot Water Cost
Jan	242.4	x	$0.20	=	$48.48
Feb	242.4	x	$0.20	=	$48.48
Mar	242.4	x	$0.20	=	$48.48
Apr	242.4	x	$0.20	=	$48.48
May	400.8	x	$0.20	=	$80.16
Jun	400.8	x	$0.20	=	$80.16
Jul	400.8	x	$0.20	=	$80.16
Aug	400.8	x	$0.20	=	$80.16
Sep	242.4	x	$0.20	=	$48.48
Oct	242.4	x	$0.20	=	$48.48
Nov	242.4	x	$0.20	=	$48.48
Dec	400.8	x	$0.20	=	$80.16
	3700.8				**$740.16**

Proposed

	DHW Load (kwh)		Cost/kwh		Total Domestic Hot Water Cost
Jan	156.8	x	$0.20	=	$31.36
Feb	156.8	x	$0.20	=	$31.36
Mar	156.8	x	$0.20	=	$31.36
Apr	156.8	x	$0.20	=	$31.36
May	229.6	x	$0.20	=	$45.92
Jun	229.6	x	$0.20	=	$45.92
Jul	229.6	x	$0.20	=	$45.92
Aug	229.6	x	$0.20	=	$45.92
Sep	156.8	x	$0.20	=	$31.36
Oct	156.8	x	$0.20	=	$31.36
Nov	156.8	x	$0.20	=	$31.36
Dec	229.6	x	$0.20	=	$45.92
	2245.6				**$449.12**

DOMESTIC HOT WATER SAVINGS CALCULATIONS

$740.16 - $449.12 = $291.04 COMBINED YEARLY SAVINGS

RTF.614

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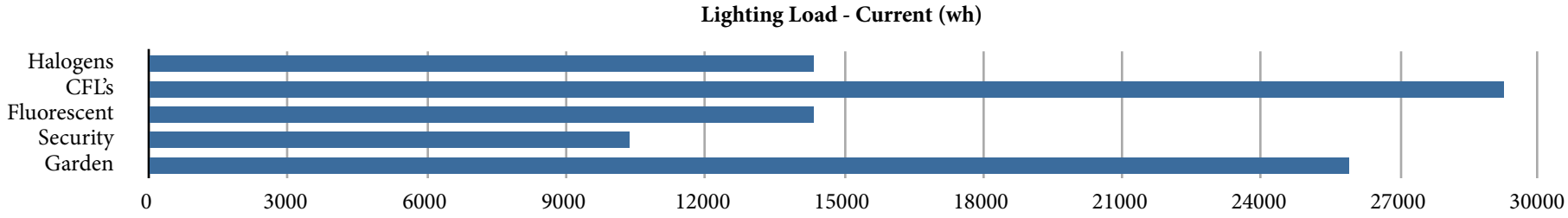
DOMESTIC HOT WATER LOAD CHARTS

RYAN T RALSTON

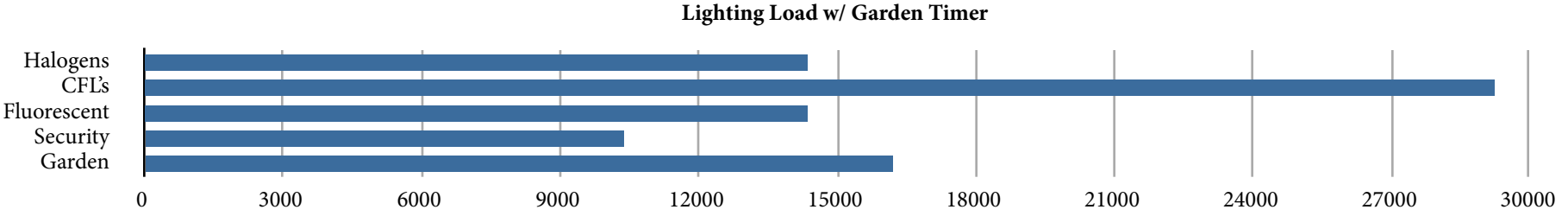
MONTHLY ELECTRIC USAGE before RETROFITS

Light Type	Quantity		Avg. Lamp Wattage		Avg. Hrs. on per Month		Total (wh/mo)
Halogen Dimmers	12	x	30	x	40	=	14400
Compact Fluorescent	25	x	13	x	90	=	29250
Fluorescent	10	x	36	x	40	=	14400
Security Lights	8	x	65	x	20	=	10400
Garden Lights	36	x	3	x	240	=	25920
							94370
							94.37



MONTHLY ELECTRIC USAGE before RETROFITS

Light Type	Quantity		Avg. Lamp Wattage		Avg. Hrs. on per Month		Total (wh/mo)
Halogen Dimmers	12	x	30	x	40	=	14400
Compact Fluorescent	25	x	13	x	90	=	29250
Fluorescent	10	x	36	x	40	=	14400
Security Lights	8	x	65	x	20	=	10400
Garden Lights	36	x	3	x	**150**	=	**16200**
							84650
							84.65



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ELECTRIC USAGE CHARTS

RYAN T RALSTON

TOTAL COST CALCULATIONS

Current

	Monthly Lighting Load (kwh)		Elec. Cost/kwh		Total Lighting Cost
Jan	94.37	x	$0.20	=	$18.87
Feb	94.37	x	$0.20	=	$18.87
Mar	94.37	x	$0.20	=	$18.87
Apr	94.37	x	$0.20	=	$18.87
May	94.37	x	$0.20	=	$18.87
Jun	94.37	x	$0.20	=	$18.87
Jul	94.37	x	$0.20	=	$18.87
Aug	94.37	x	$0.20	=	$18.87
Sep	94.37	x	$0.20	=	$18.87
Oct	94.37	x	$0.20	=	$18.87
Nov	94.37	x	$0.20	=	$18.87
Dec	94.37	x	$0.20	=	$18.87
	1132.44				**$226.49**

Proposed

	Monthly Lighting Load (kwh)		Elec. Cost/kwh		Total Lighting Cost
Jan	84.65	x	$0.20	=	$16.93
Feb	84.65	x	$0.20	=	$16.93
Mar	84.65	x	$0.20	=	$16.93
Apr	84.65	x	$0.20	=	$16.93
May	84.65	x	$0.20	=	$16.93
Jun	84.65	x	$0.20	=	$16.93
Jul	84.65	x	$0.20	=	$16.93
Aug	84.65	x	$0.20	=	$16.93
Sep	84.65	x	$0.20	=	$16.93
Oct	84.65	x	$0.20	=	$16.93
Nov	84.65	x	$0.20	=	$16.93
Dec	84.65	x	$0.20	=	$16.93
	1015.80				**$203.16**

ELECTRIC SAVINGS CALCULATIONS

$226.49 - $203.16 = 23.33 COMBINED YEARLY SAVINGS

RTF.616

4177 Park Avenue, Fairfield, CT 06825
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ELECTRIC LOAD CHARTS

RYAN T RALSTON

Window Quilt®
Comfort and Savings

22 Browne Court #105 Brattleboro, VT 05301
Voice: 802.246.4500
Fax: 802.246.4505
www.windowquilt.com

May 11, 2009

Manufacturer's Certification Statement
American Recovery and Reinvestment Act of 2009

Window Quilt® manufactures only energy saving movable window insulation. All products currently offered, specifically our Model 100 and Model 400 movable shades and Model 200 Panel Quilts qualify in all 50 states and climate zones for the Residential Energy Tax Credit as an "Eligible Building Envelope Component".

The tax credit is a direct reduction of taxes owed rather than a deductable expense. It is in effect for the years 2009 and 2010.

Consumers should be aware of the following information:

- Credit is 30% of product cost, not including installation.
- Maximum credit is $1,500.
- Principal purpose must be to reduce heat loss or gain.
- Decorative accessories, such as valances are not eligible for the credit.
- Installation must be completed by 12/31/2010.
- Credit is claimed on IRS Form 5695 when taxes are filed.
- Taxpayer must retain receipt and this certification letter.

Under penalties of perjury, I declare that I have examined this certification statement, and to the best of my knowledge and belief, the facts are true, correct and complete.

Lawrence Digney
President, WQ Inc.

Manufacturer's Certification Statement
Pertaining to American Recovery and Reinvestment Tax Act of 2009

Dow Building Solutions, a market facing business of The Dow Chemical Company,1605 Joseph Drive, 200 Larkin Center, Midland, Michigan 48674 certifies that the following insulation materials (or systems) qualify as Eligible Building Envelope Components under § 25C of the Internal Revenue Code ('IRC') and IRS Notice 2006-26:

BLUECOR™ Insulation
DOW High Performance Underlayment
DOW High Performance Underlayment - LF
DOW Protection Board III Insulation
FROTH-PAK™ Foam Insulation kit
FROTH-PAK™ Foam Sealant kit
GREAT STUFF™ Gaps & Cracks Insulating Foam Sealant
GREAT STUFF™ Big Gap Filler Insulating Foam Sealant
GREAT STUFF™ Window & Door Insulating Foam Sealant
GREAT STUFF™ Fireblock Insulating Foam Sealant
GREAT STUFF PRO™ Gaps & Cracks Insulating Foam Sealant
GREAT STUFF PRO™ Window & Door Insulating Foam Sealant
SafeTouch™ Fiberglass-Free Insulation
STYROFOAM™ DURAMATE™ Plus Insulation
STYROFOAM™ PERIMATE™ Insulation
STYROFOAM™ Residential Sheathing Insulation
STYROFOAM™ Residing Board Insulation
STYROFOAM™ SCOREBOARD™ Insulation
STYROFOAM SIS™ Brand Structural Insulated Sheathing Insulation
STYROFOAM™ STUCCOMATE™ Insulation
WEATHERMATE™ Sill Seal Foam Gasket
STYROFOAM™ Spray Polyurethane Foam Insulation
STYROFOAM™ Square Edge Insulation
STYROFOAM™ Tongue & Groove Insulation
STYROFOAM™ UTILITYFIT™ Insulation
STYROFOAM™ WALLMATE™ Insulation
WEATHERMATE™ Housewrap
WEATHERMATE™ Plus Housewrap
Super TUFF-R™ Polyisocyanurate Insulation
THERMAX™ Sheathing
THERMAX™ White Finish Insulation
TUFF-R™ Polyisocyanurate Insulation

Consult your tax advisor to determine how to apply for potential income tax credits.

Under penalties of perjury, I declare that I have examined this certification statement, and to the best of my knowledge and belief, the facts are true, correct, and complete.

Scott Young
Global Portfolio Director- Energy Efficiency

The Dow Chemical Company
Dow Building Solutions, 200 Larkin Center, Midland, MI 48674
www.dowbuildingsolutions.com or www.greatstuff.dow.com
For Technical Information: 1-866-583-BLUE (2583) For Sales Information: 1-800-232-2436

NOTICE: No freedom from any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use and for ensuring that Customer's workplace and disposal practices are in compliance with applicable laws and other government enactments. Dow assumes no obligation or liability for the information in this document. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.
CAUTION: STYROFOAM™ Brand insulation products are combustible. Protect from high heat sources. A protective or thermal barrier may be required as specified in the appropriate building code. For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583), or contact your local building inspector. In an emergency, call 1-989-636-4400.
COMBUSTIBLE; THERMAX and Dow polyisocyanurate products are combustible and shall only be used as specified by the local building code with respect to flame spread classification and to the use of a suitable barrier. For more information, consult MSDS and/or call Dow at 1-866-583-BLUE (2583). In an emergency, call 1-989-636-4400.
GREAT STUFF PRO™ and GREAT STUFF™ sealants and adhesives contain isocyanurate and a flammable blowing agent. Read the label and Material Safety Data sheet carefully. Eliminate all sources of ignition before use. Wear gloves, and safety glasses or goggles. Provide adequate ventilation or wear proper respiratory protection. Contents under pressure.
FROTH-PAK™ Polyurethane Spray Foam contains isocyanate, hydrofluorocarbon blowing agent and polyol. Read the instructions and Material Safety Data Sheets carefully before use. Wear protective clothing, gloves, goggles or safety glasses, and proper respiratory protection. Supplied air or an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter may be required to maintain exposure levels below ACGIH, OSHA, WEEL or other applicable limits. Provide adequate ventilation. Contents under pressure.
WARNING: Rigid foam does not constitute a working walkable surface or qualify as a fall protection product.

®™ Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow

179-07341

[redacted]

Manufacturer's Certification Statement

Pertaining to the

American Recovery and Reinvestment Act of 2009

This Certification Statement* applies to exterior windows and doors and provides verification that certain Thermwell Product (Frost King) items meet the eligibility performance criteria for tax credits identified in the American Recovery and Reinvestment Act of 2009.

Manufacturer:

Thermwell Products Co., Inc.
420 Rt. 17 South
Mahwah, New Jersey 07430

Products identified as "Eligible Building Envelope Components" are listed in the Stimulus Tax Credit area of our website at www.frostking.com. Please consult the most recent revision of these product lists. All products that meet the eligibility requirements are marked with an "X" on the product list. **
To demonstrate eligibility for the credit, save your receipts and this Certification document, and comply with all applicable IRS requirements. Please consult IRS rules for additional forms and a complete description of Tax Credit requirements.

Thermwell Products expressly disclaims any responsibility or liability regarding the homeowner's ability to obtain tax credits. Always consult your tax advisor.
*** This certificate is provided as a convenience to the purchaser. It is not a complete description of the requirements to obtain the Tax Credit, and is not a substitute for professional tax advice.**
**** Thermwell Products strives to provide timely and accurate information via its website. Thermwell Products expressly disclaims liability for any typographical or other errors appearing on its website.**

Under penalties of perjury, I declare that I have examined this certification statement, and to the best of my knowledge and belief, the facts are true, correct and complete.

Jimmy Gerstein

Thermwell Products Co., Inc.

Mahwah, New Jersey 07430

OWENS CORNING®
INNOVATIONS FOR LIVING®

MANUFACTURER'S CERTIFICATION STATEMENT
FOR THE AMERICAN REINVESTMENT & RECOVERY ACT OF 2009

Owens Corning Insulating Systems, LLC certifies that the following Owens Corning insulation materials and systems are "*Eligible Building Envelope Components*" that qualify for the Federal Tax Credit for existing homes which is allowed under Section 1121 of the American Reinvestment & Recovery Act of 2009:

PINK FIBERGLAS™ Thermal Insulation	*FOAMULAR® Rigid Foam Insulation Products*
FIBERGLAS™ Loosefill Insulation	*FIBERGLAS™ Air Handling Products*
Insulation Accessory Products	*Basement Finishing System™*
Window Products	*Roofing Products*

Under penalties of perjury, I declare that I have examined this certification statement, and to the best of my knowledge and belief, the facts are true, correct and complete.

Tom Quigley
Vice President & General Manager, Residential Insulation
Owens Corning Insulating Systems, LLC

Homeowner's Records
The following product has been installed in the home below, which is the primary residence of the following taxpayer:

Taxpayer Name: _____

Social Security Number: _____

Primary Residence: _____

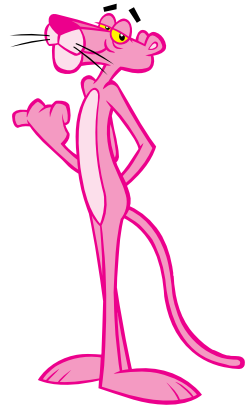
_____

Product: _____

Price Paid for Product: $_____

Date of Purchase: _____

Date of Installation at Primary Residence: _____
(Must be after December 31, 2008, and before January 1, 2011.)



RTF.618

4177 Park Avenue, Fairfield, CT 06825
Lat. 41.14 Long. -73.26

RYAN T RALSTON

TAX CREDITS

Certification Letters from Suppliers Verifying Eligibility for Tax Credit

SECTION 6

SOLAR REDESIGN

The final section of this packet involves a major redesign proposal for the current home. This process begins with sun tempering calculations and then moves forward to explain options for passive solar heating design. And ends with a complete design proposal for a passive solar heating system. The proposed design for this application involves a green sun space with lap pool and water basin for thermal storage of solar gains. The solar savings factor for the proposed design would be 37%.

SUN TEMPERING CALCULATIONS

$$[UA_h + U_g A_g + U_{sw} (A_{tw} - A_g)] (t_i - t_o) = I_s A_g$$

UA_h - UA of Entire House (except South Wall)	UA_h - 322.294
U_g - U of South Facing Glass	U_g - .230
A_g - Area of South Facing Glass	A_g - UNKNOWN
U_{sw} - U of South Wall Construction	U_{sw} - .079
A_{tw} - Area of South Wall (including glass)	A_{tw} - 360
t_i - Indoor Temperature Desired	t_i - 65
t_o - Outdoor Temperature (January at noon)	t_o - 30
I_s - Solar Transmission of Glass	I_s - 187.858

$$[322.294 + .230 (A_g) + .079 (360 - A_g)] (65 - 30) = 187.858\ A_g$$

$$[322.294 + .230A_g + 28.44 - .079A_g] (35) = 187.858A_g$$

$$[350.734 + .151A_g] (35) = 187.858A_g$$

$$12275.690 + 5.285A_g = 187.858A_g$$

$$12275.690 = 182.573A_g$$

$$A_g = 67.237 \text{ sq. ft.}$$

SUN TEMPERING

The above calculation results with the maximum area of southern facing glass that can be used without risk of an overheated living space. Currently the home has 68 square feet of south facing glass, which is right at the limit. However the picture window located at the back porch is covered and therefore does not receive full sun throughout the day. In order to take advantage of this, it is advised that the back porch roof be replaced with an operable shade. This would allow for solar heat to enter the house in the winter and shading against the solar gains in the summer. This sun tempering solution would greatly lower the daytime heating loads for winter while as avoiding the risks of an overheated living space.

INITIAL SYSTEM SELECTION

A sunspace system will flood the house with natural light as well as providing a small amount of additional of living space. The system stores solar gains in water storage tanks and with night insulation redistributes stored heat throughout the night. Additionally the night insulating shades can be used to control excess solar gains in the summer.

Optimal Choice - SSB2 (a 30/90 attached greenhouse), SSF = 37% with LCR = 25 and A_{sg} = 309.402 ft^2
includes opaque side walls, night insulation and thermal water mass equal to (.5ft^3/ft^2)

CHARTS & FORMULAS

Annual Passive Heat Performance - Hartford, CT

	LCR=	100	70	50	40	30	25	20	15
SSA1		13	16	19	21	25	27	30	34
SSB1		11	13	15	17	20	22	25	28
SSB2		14	18	24	27	33	**37**	43	50
SSB3		10	11	14	15	17	19	21	23
SSC1		6	8	11	13	15	17	20	23
SSC2		8	12	17	21	26	30	35	42
SSE1		10	13	16	18	21	23	26	29
SSE2		13	18	24	29	35	40	45	53
SSE3		11	13	15	17	19	21	23	26

Solar Savings Fraction
SSF_{goal} = 40%

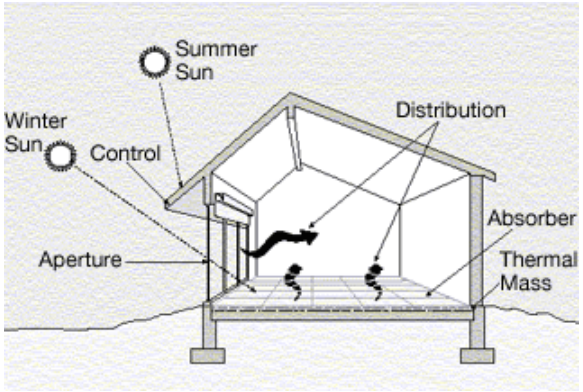
Load Collector Ratio
$LCR = (24UA_{neg.sw}) / A_{sg}$
$LCR = (24(322.294)) / A_{sg}$

A_{sg} = 515.670 when LCR = 15
A_{sg} = 386.752 when LCR = 20
A_{sg} = 309.402 when LCR = 25
A_{sg} = 257.835 when LCR = 30
A_{sg} = 193.376 when LCR = 40
A_{sg} = 154.701 when LCR = 50
A_{sg} = 110.500 when LCR = 70
A_{sg} = 96.688 when LCR = 80

Characteristics of Sun Space Passive Solar Systems

	Type	Tilt	Common Wall	End Walls	Night Insulation
SSA1	Attached	50	Masonry	Opaque	No
SSB1	Attached	90-30	Masonry	Opaque	No
SSB2	**Attached**	**90-30**	**Masonry**	**Opaque**	**Yes**
SSB3	Attached	90-30	Masonry	Glazed	No
SSC1	Semi-Enclosed	90	Masonry	Common	No
SSC2	Semi-Enclosed	90	Masonry	Common	Yes
SSE1	Semi-Enclosed	90-30	Masonry	Common	No
SSE2	Semi-Enclosed	90-30	Masonry	Common	Yes
SSE3	Semi-Enclosed	90-30	Insulated	Common	No

Five Factors of Passive Solar Heating



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PASSIVE SOLAR SYSTEM SELECTION

Charts and Data Used to Make Selection of a Passive Solar System Type

INITIAL SELECTION FORMULAS

Solar Savings Fraction
$SSF_{goal} = 40\%$

Load Collector Ratio
$LCR = (24UA_{neg.sw}) / A_{sg}$
$LCR = (24(322.294)) / A_{sg}$

$A_{sg} = 515.670$ when $LCR = 15$
$A_{sg} = 386.752$ when $LCR = 20$
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$A_{sg} = 110.500$ when $LCR = 70$
$A_{sg} = 96.688$ when $LCR = 80$

DESIGN CALCULATIONS

Required Glazing Area
Calculated $A_{sg} = 309.402\ ft^2$
Designed $A_{sg} = 299.000\ ft^2$

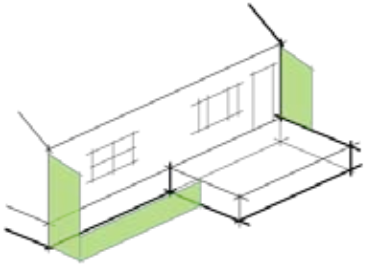
Glazing Requiring Thermal Collection Mass

Sunspace Vertical	26 x 6.5 = 169 ft²		
Sunspace Tilted	26 x 5.0 = 130 ft²		
subtotal		= 299 ft²	(accounts for greenhouse glazing)
Other South Glass	12 x 3 = 36 ft²		
subtotal		= 335 ft²	(accounts for bedroom and bathroom glazing)
Sun Tempering		= -80 ft²	(accounts for direct gains)
total		= 255 ft²	

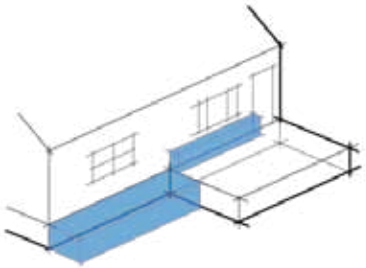
Thermal Collection Mass (.5ft³ water per ft² of glazing)
Calculated Thermal Collector Volume
$255\ (ft^{2)} \times .5\ (ft^3/ft^2) = 127.5\ ft^3$
Designed Thermal Collector Volume
$(4'x13'x2') + (1'x2'x10') = 124\ ft^3$

PASSIVE SOLAR COLLECTOR CONSTRUCTION DIAGRAM

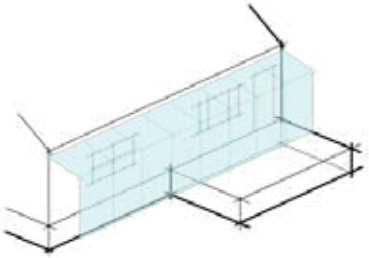
Insulated Side Walls



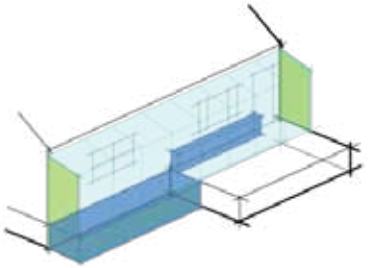
Thermal Storage Massing



Solar Glazing

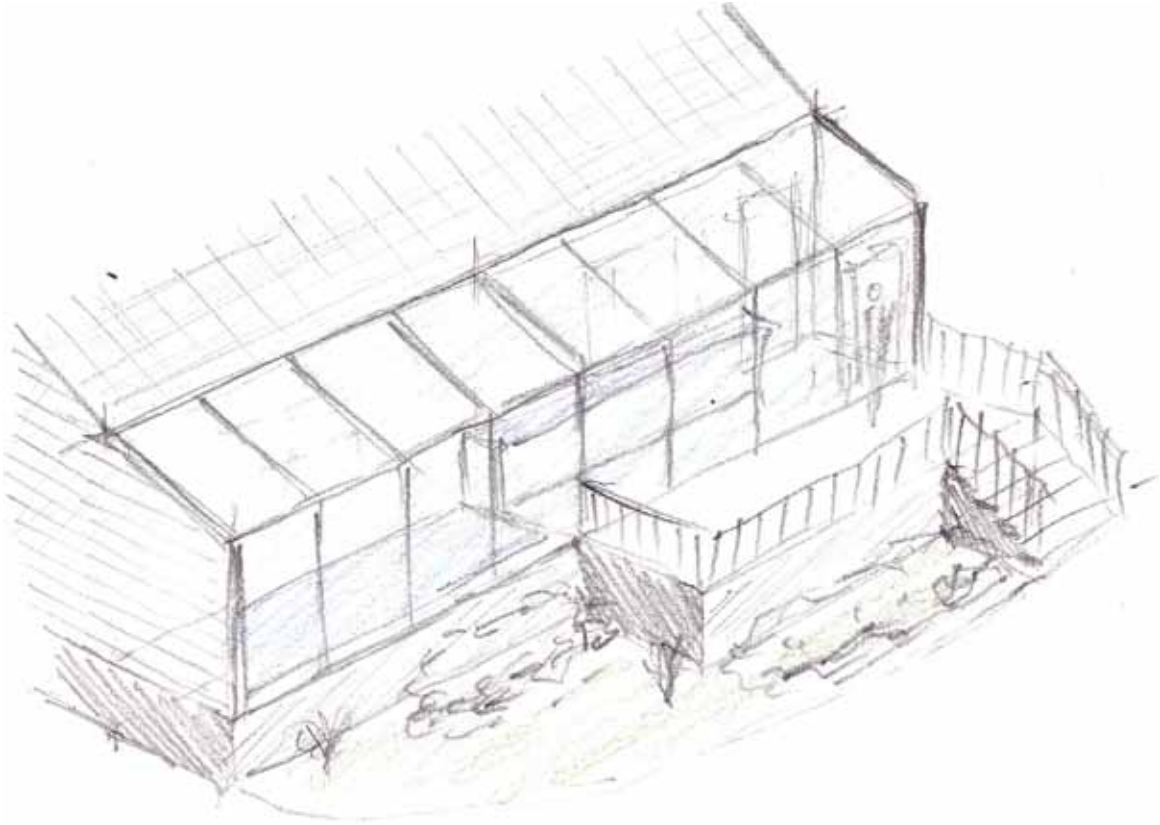


Combined



ADDITIONAL NOTES

The sun space is designed primarily as a solar heating solution. However, in addition the space provides space for indoor planting, a small water basin that recirculates with the larger lap pool at the lower level. The space is connected through the current windows to allow control of the heat transfer according to season and daily solar gains. Additionally night insulating window quilts are provided for every window. The shades double as solar shading devices in the summer to help protect against overheating. The sun space leaves part of the current porch intact as an uncovered outdoor space.



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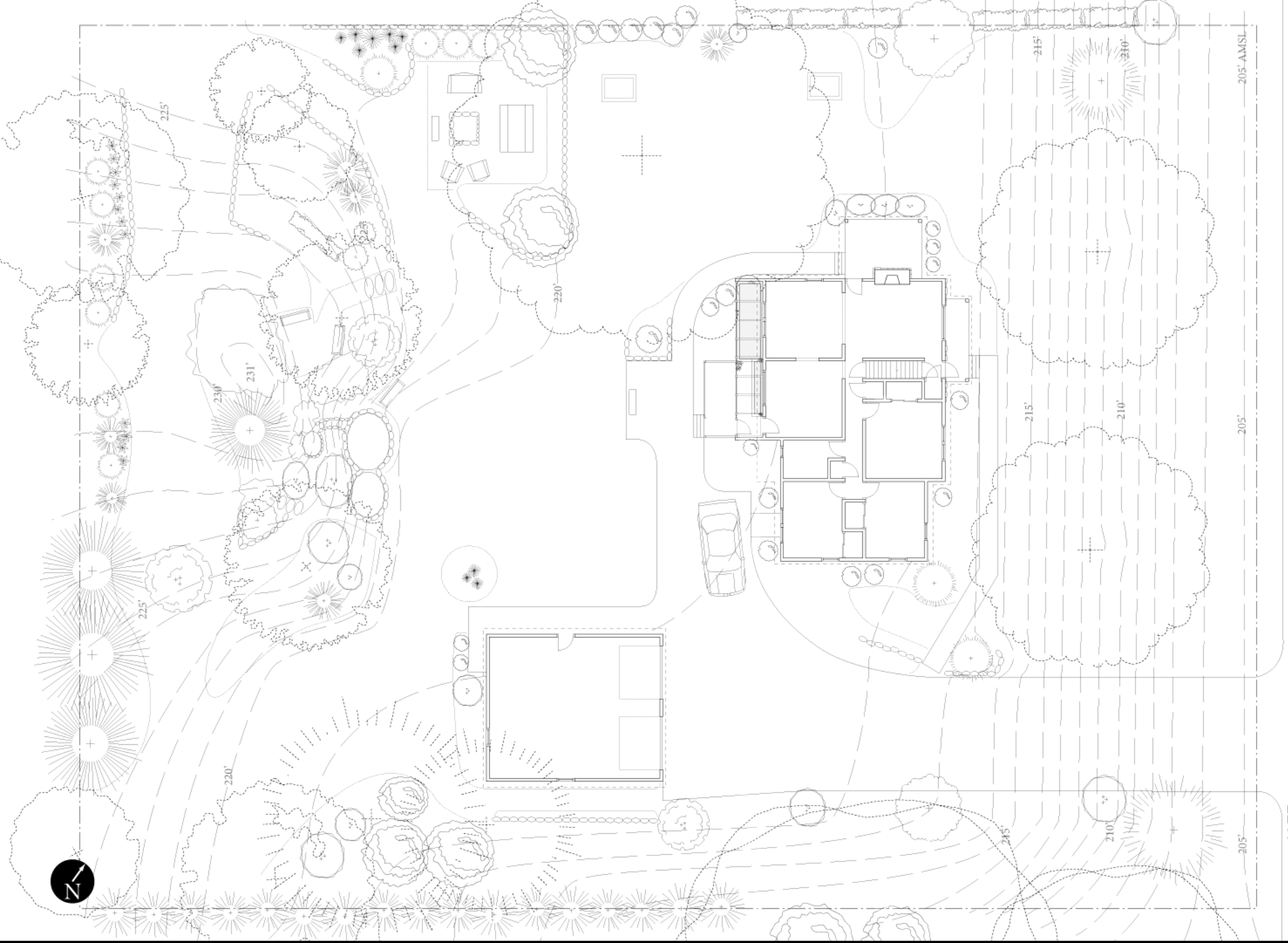
DESIGN OVERVIEW

An Overview of the Design of the Sun Space



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PASSIVE SOLAR SITE PLAN

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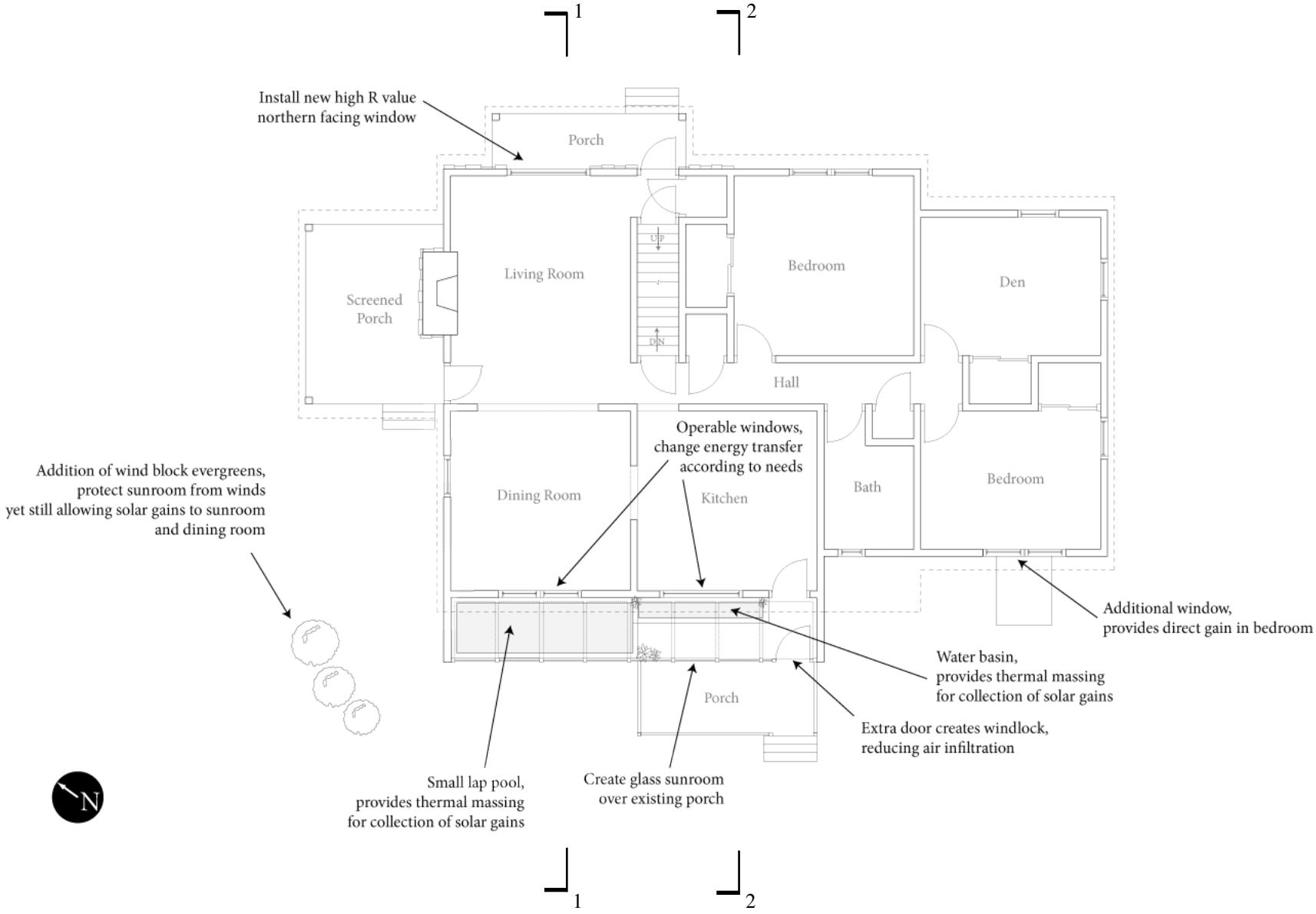
Site Plan with Proposed Passive Solar Design
SCALE: 3/64" = 1'-0"

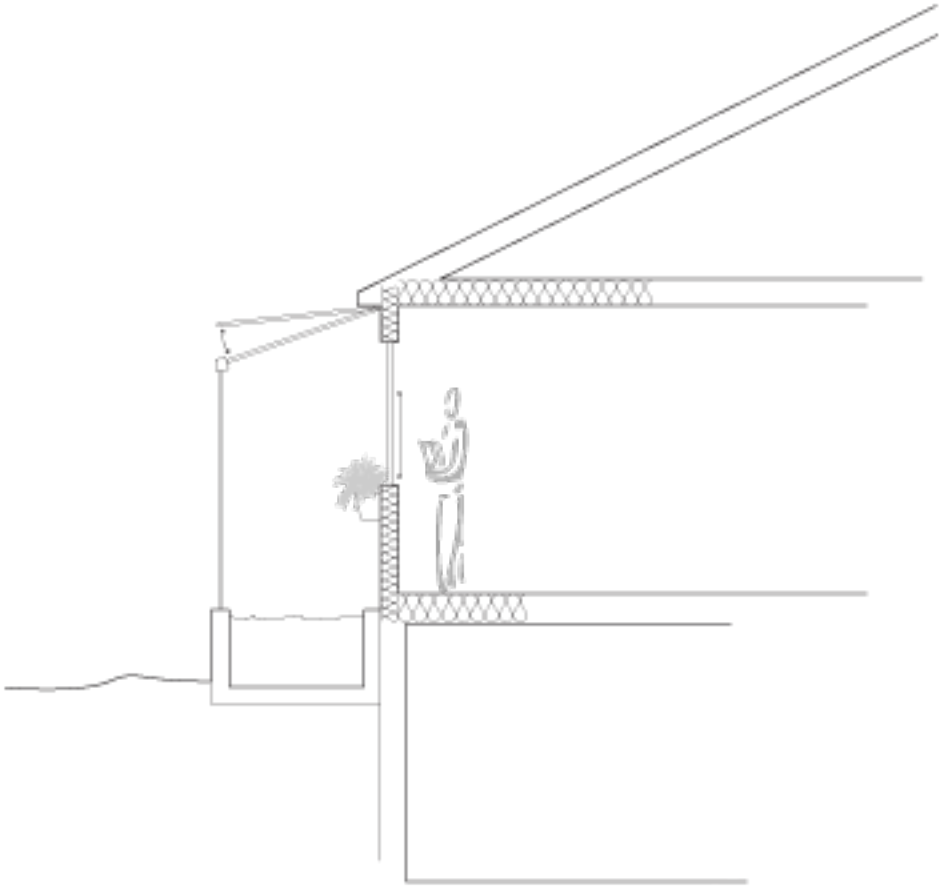
PROPOSED FLOOR PLAN



SRD.401	4177 Park Avenue, Fairfield, CT 06825 Lat. 41.14 Long. -73.26	PASSIVE SOLAR SYSTEM FLOOR PLAN
	RYAN T RALSTON	Floor Plan of the Proposed Passive Solar System SCALE: 1/8” = 1’-0”

PROPOSED SECTIONS

1.



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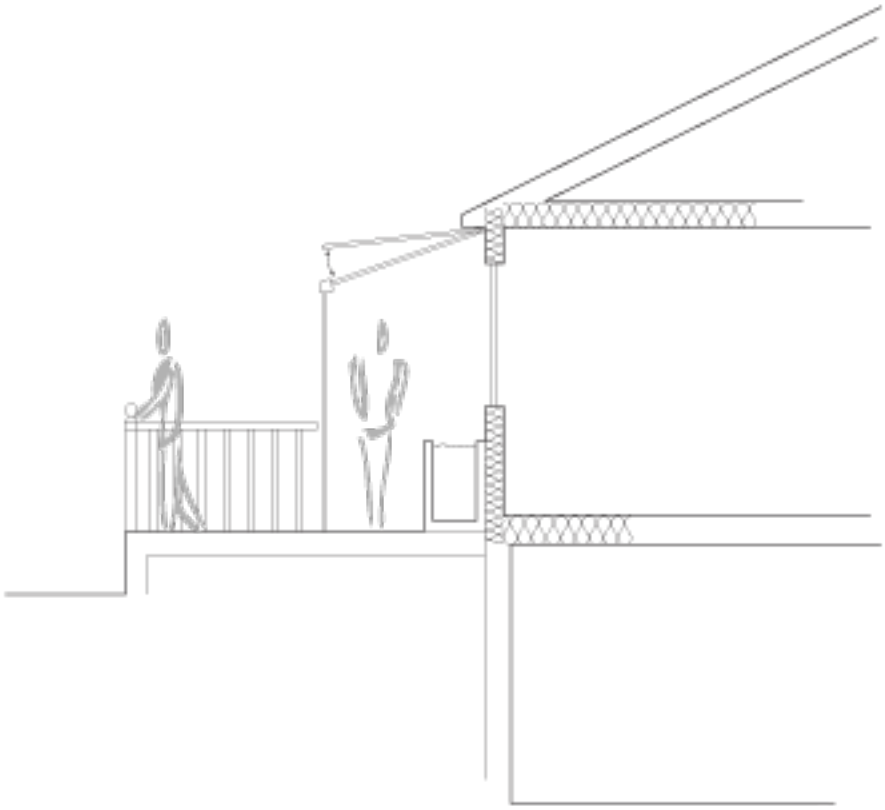

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PASSIVE SOLAR SYSTEM SECTIONS

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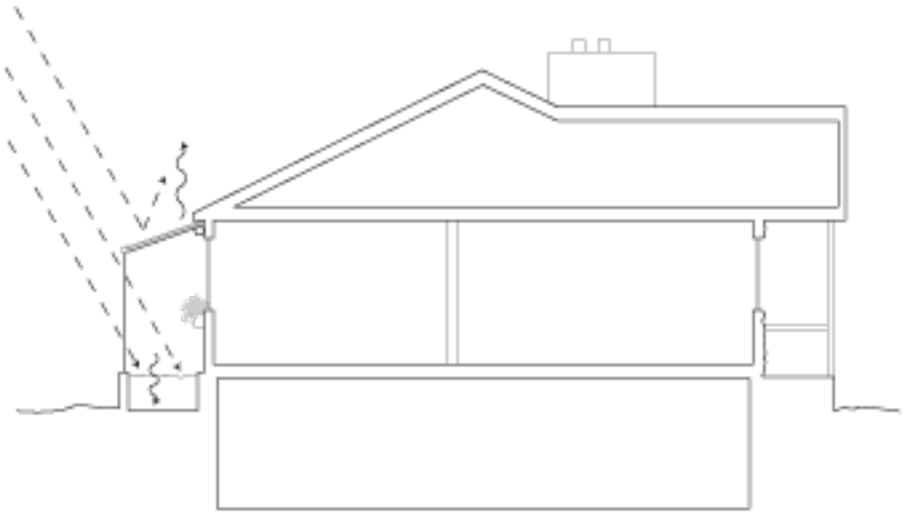
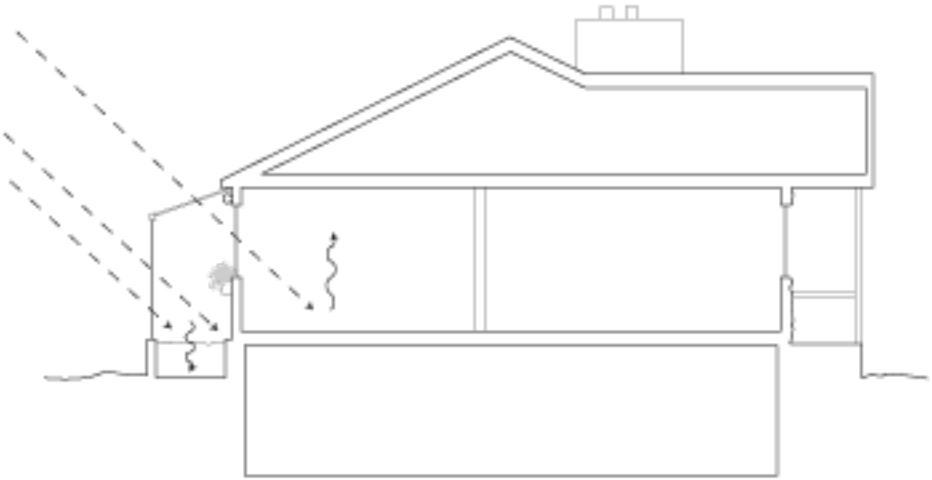
Section of the Proposed Passive Solar System
SCALE: 1/4" = 1'-0"

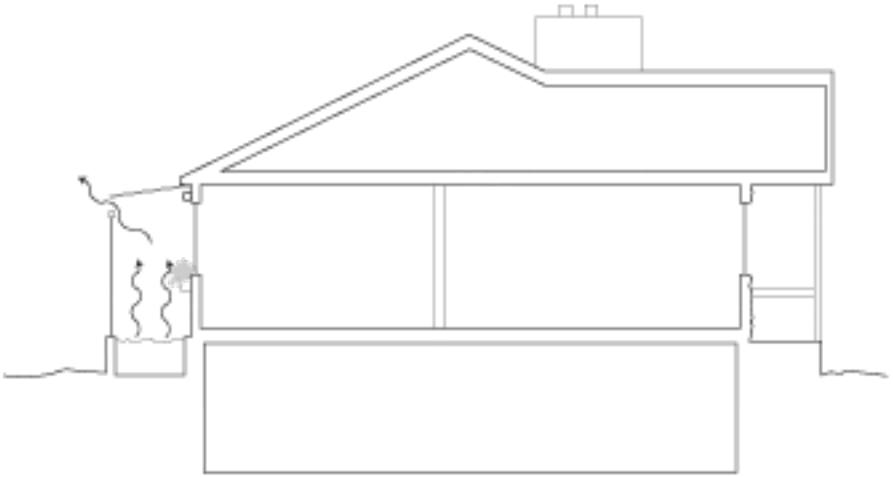
SUMMER DAY - shades half drawn, windows closed



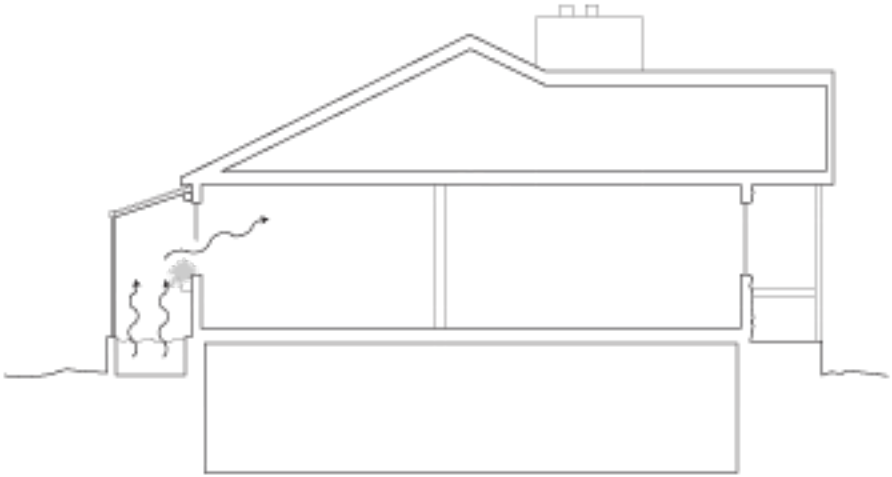
WINTER DAY - windows closed, shades up



SUMMER NIGHT - greenhouse open, windows shut



WINTER NIGHT - windows open, night insulation closed



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MODE DIAGRAMS

2 Season, Day/Night Mode Diagrams of the Passive Solar System
SCALE: 1/8" = 1'-0"