Mariela Hernandez
ARCH 633
Assignment 01

In trying to get an understanding of Philadelphia's weather patterns, the study below depicts a sampling from the extreme temperatures for the hottest Summer and coldest Winter according to the epw report. The design approach would be to focus on the typical conditions but be mindful of the listed extreme conditions of each period.

LOCATION,Philadelphia International Ap,PA,USA,TMY3,724080
TYPICAL/EXTREME PERIODS:
Summer - Week Nearest Max Temperature For Period,Extreme,7/29,8/4
Summer - Week Nearest Average Temperature For Period,Typical,8/19,8/25
Winter - Week Nearest Min Temperature For Period,Extreme,1/15,1/21
Winter - Week Nearest Average Temperature For Period,Typical,2/12,2/18
Autumn - Week Nearest Average Temperature For Period,Typical,10/29,11/4
Spring - Week Nearest Average Temperature For Period,Typical,5/27,6/2

EXTREME PERIODS:

1986,7,29,1,0,-,24.4,22.8,91, 1986,7,29,2,0,-,24.4,22.8,91, 1986,7,29,3,0,-,25.0,22.8,88, 1986,7,29,4,0,-,24.4,22.8,91, 1986,7,29,5,0,-,24.4,22.8,91, 1986,7,29,6,0,-,25.0,23.3,91, 1986,7,29,7,0,-,26.1,23.3,85, 1986,7,29,8,0,-,26.7,23.3,82, 1986,7,29,9,0,-,27.8,23.9,79, 1986,7,29,10,0,-,30.0,23.9,70, 1986,7,29,11,0,-,30.6,23.9,68, 1986,7,29,12,0,-,32.8,21.7,52, 1986,7,29,13,0,-,32.8,21.7,52, 1986,7,29,14,0,-,32.8,21.7,52, 1986,7,29,15,0,-,33.3,20.0,46, 1986,7,29,16,0,-,30.6,20.0,53, 1986,7,29,17,0,-,30.0,18.9,51, 1986,7,29,18,0,-,28.3,20.6,63, 1986,7,29,19,0,-,27.2,21.7,72, 1986,7,29,20,0,-,25.0,21.7,82, 1986,7,29,21,0,-,23.9,21.1,85, 1986,7,29,22,0,-,23.3,19.4,79, 1986,7,29,23,0,-,23.3,20.6,85, 1986,7,29,24,0,-,22.8,21.1,90,	1976,1,15,1,0,-,-1.1,-10.0,51, 1976,1,15,2,0,-,-0.6,-9.4,51, 1976,1,15,3,0,-,-1.1,-9.4,54, 1976,1,15,4,0,-,-1.7,-9.4,56, 1976,1,15,5,0,-,-1.7,-8.9,58, 1976,1,15,6,0,-,-1.7,-8.9,58, 1976,1,15,7,0,-,-1.1,-9.4,54, 1976,1,15,8,0,-,-1.1,-9.4,54, 1976,1,15,9,0,-,-0.6,-10.6,47, 1976,1,15,10,0,-,0.6,-10.6,44, 1976,1,15,11,0,-,1.1,-11.1,40, 1976,1,15,12,0,-,1.7,-11.7,37, 1976,1,15,13,0,-,1.7,-12.2,35, 1976,1,15,14,0,-,1.7,-11.7,37, 1976,1,15,15,0,-,1.7,-12.2,35, 1976,1,15,16,0,-,0.6,-11.7,40, 1976,1,15,17,0,-,0.0,-11.7,42, 1976,1,15,18,0,-,-0.6,-10.6,47, 1976,1,15,19,0,-,0.0,-11.1,43, 1976,1,15,20,0,-,0.0,-11.1,43, 1976,1,15,21,0,-,-1.1,-9.4,54, 1976,1,15,22,0,-,-1.7,-8.3,61, 1976,1,15,23,0,-,-2.2,-8.3,63, 1976,1,15,24,0,-,-1.1,-8.3,58,
Summer Max. Temperature (Average): 75	Winter Max. Temperature (Average): 62

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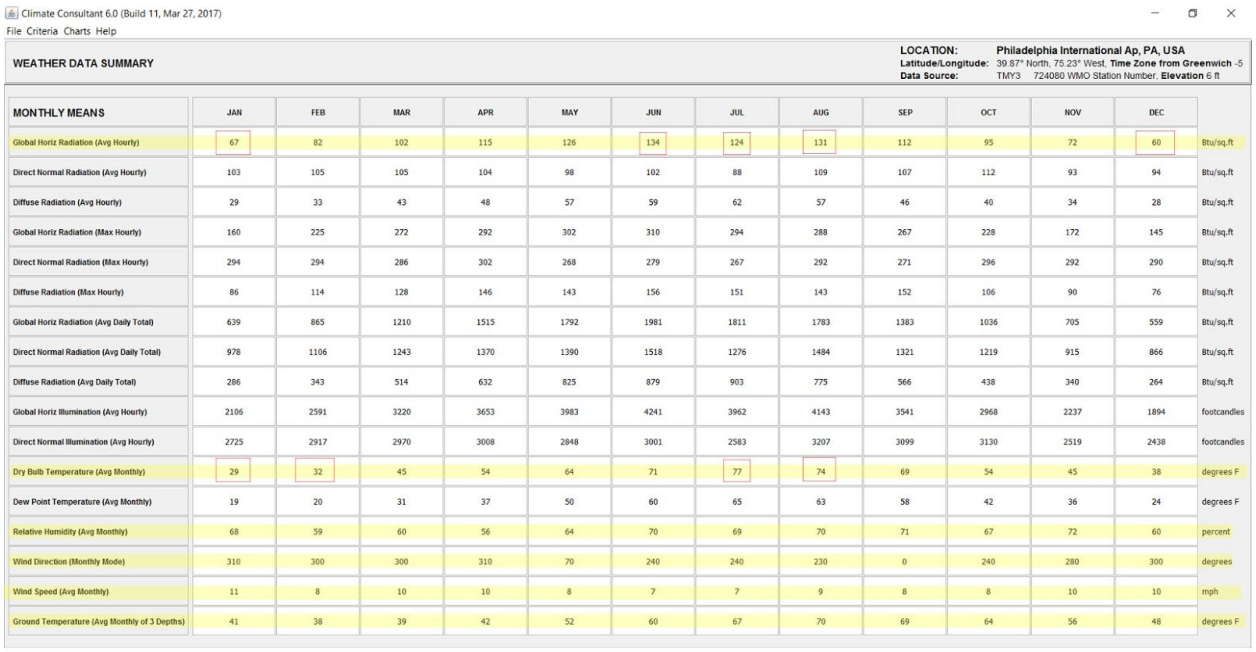
TYPICAL PERIODS:

1987,8,19,1,0,-,22.8,15.0,62, 1987,8,19,2,0,-,23.3,15.0,60, 1987,8,19,3,0,-,22.2,15.6,66, 1987,8,19,4,0,-,21.1,14.4,66, 1987,8,19,5,0,-,22.2,14.4,62, 1987,8,19,6,0,-,22.8,15.0,62, 1987,8,19,7,0,-,22.8,16.1,66, 1987,8,19,8,0,-,23.9,16.7,64, 1987,8,19,9,0,-,25.6,16.7,58, 1987,8,19,10,0,-,28.3,18.3,55, 1987,8,19,11,0,-,30.6,17.2,45, 1987,8,19,12,0,-,31.1,17.8,45, 1987,8,19,13,0,-,29.4,18.3,51, 1987,8,19,14,0,-,28.9,20.6,61, 1987,8,19,15,0,-,29.4,21.1,61, 1987,8,19,16,0,-,29.4,21.1,61, 1987,8,19,17,0,-,29.4,21.1,61, 1987,8,19,18,0,-,28.3,21.1,65, 1987,8,19,19,0,-,27.2,21.1,69, 1987,8,19,20,0,-,26.7,21.1,72, 1987,8,19,21,0,-,25.6,21.7,79, 1987,8,19,22,0,-,24.4,21.7,85, 1987,8,19,23,0,-,23.3,21.7,90, 1987,8,19,24,0,-,23.3,22.2,94,	1994,2,12,1,0,-,-3.9,-5.6,86, 1994,2,12,2,0,-,-3.3,-5.6,82, 1994,2,12,3,0,-,-3.3,-5.0,87, 1994,2,12,4,0,-,-2.8,-5.0,83, 1994,2,12,5,0,-,-2.2,-5.0,79, 1994,2,12,6,0,-,-2.2,-5.6,75, 1994,2,12,7,0,-,-2.2,-5.6,75, 1994,2,12,8,0,-,-1.7,-5.6,72, 1994,2,12,9,0,-,-1.7,-6.1,69, 1994,2,12,10,0,-,-1.1,-5.6,68, 1994,2,12,11,0,-,0.0,-5.6,62, 1994,2,12,12,0,-,0.0,-5.0,66, 1994,2,12,13,0,-,0.6,-5.0,63, 1994,2,12,14,0,-,0.0,-3.9,72, 1994,2,12,15,0,-,0.6,-3.3,73, 1994,2,12,16,0,-,0.0,-2.2,83, 1994,2,12,17,0,-,-0.6,-1.7,91, 1994,2,12,18,0,-,-0.6,-1.7,91, 1994,2,12,19,0,-,-1.1,-1.7,95, 1994,2,12,20,0,-,-1.1,-1.7,95, 1994,2,12,21,0,-,-1.1,-1.7,95, 1994,2,12,22,0,-,-0.6,-1.1,96, 1994,2,12,23,0,-,-0.6,-1.1,96, 1994,2,12,24,0,-,-0.6,-1.1,96,
Summer Typ. Temperature (Average): 65	Winter Typ. Temperature (Average): 81

Data range from Climate Consultant:



Climate Consultant 6.0 (Build 11, Mar 27, 2017)

File Criteria Charts Help

WEATHER DATA SUMMARY

LOCATION: Philadelphia International Ap, PA, USA
Latitude/Longitude: 39.87° North, 75.23° West, **Time Zone from Greenwich** -5
Data Source: TMY3 724080 WMO Station Number, **Elevation** 6 ft

MONTHLY MEANS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
Global Horiz Radiation (Avg Hourly)	67	82	102	115	126	134	124	131	112	95	72	60	Btu/sq.ft
Direct Normal Radiation (Avg Hourly)	103	105	105	104	98	102	88	109	107	112	93	94	Btu/sq.ft
Diffuse Radiation (Avg Hourly)	29	33	43	48	57	59	62	57	46	40	34	28	Btu/sq.ft
Global Horiz Radiation (Max Hourly)	160	225	272	292	302	310	294	288	267	228	172	145	Btu/sq.ft
Direct Normal Radiation (Max Hourly)	294	294	286	302	268	279	267	292	271	296	292	290	Btu/sq.ft
Diffuse Radiation (Max Hourly)	86	114	128	146	143	156	151	143	152	106	90	76	Btu/sq.ft
Global Horiz Radiation (Avg Daily Total)	639	865	1210	1515	1792	1981	1811	1783	1383	1036	705	559	Btu/sq.ft
Direct Normal Radiation (Avg Daily Total)	978	1106	1243	1370	1390	1518	1276	1484	1321	1219	915	866	Btu/sq.ft
Diffuse Radiation (Avg Daily Total)	286	343	514	632	825	879	903	775	566	438	340	264	Btu/sq.ft
Global Horiz Illumination (Avg Hourly)	2106	2591	3220	3653	3983	4241	3962	4143	3541	2968	2237	1894	footcandles
Direct Normal Illumination (Avg Hourly)	2725	2917	2970	3008	2848	3001	2583	3207	3099	3130	2519	2438	footcandles
Dry Bulb Temperature (Avg Monthly)	29	32	45	54	64	71	77	74	69	54	45	38	degrees F
Dew Point Temperature (Avg Monthly)	19	20	31	37	50	60	65	63	58	42	36	24	degrees F
Relative Humidity (Avg Monthly)	68	59	60	56	64	70	69	70	71	67	72	60	percent
Wind Direction (Monthly Mode)	310	300	300	310	70	240	240	230	0	240	280	300	degrees
Wind Speed (Avg Monthly)	11	8	10	10	8	7	7	9	8	8	10	10	mph
Ground Temperature (Avg Monthly of 3 Depths)	41	38	39	42	52	60	67	70	69	64	56	48	degrees F

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Important passive design strategies for this location include:

1. Daylighting - to device a strategy to achieve indirect lighting throughout the year while minimizing the radiation intake during the peak summer months of June, July and August through orientation of openings and operable sun shading.
2. Material Selection - to select exterior conditions of darker colors and higher thermal mass as well as proper insulation to resist heat loss and prevent infiltration during low temperatures of the winter months.
3. Providing overhangs - to minimize the effect of the sun's direct radiation into the space. The depth of the projection should be strategically calculated to both prevent the sun during the summer and allow it to enter the space during the winter.