Mike Mazza, ASLA
9/18/18
Planner I
Development Services
14700 Ravinia Avenue, Orland Park, IL 60462

RE: possibility for solar reflection at Rao Residence.

Dear Mr. Mazza,

Ailey Solar, project contractor, would like to provide assurance that solar reflection from the north, south and east array should not pose a glare problem.

In our experience, none of the solar arrays being planned for Dr. Rao's property should pose a solar reflection or glare risk to any of the neighbors, including the south facing array and the neighbors directly to the north or east . For additional assurance, we have included a number of additional items below:
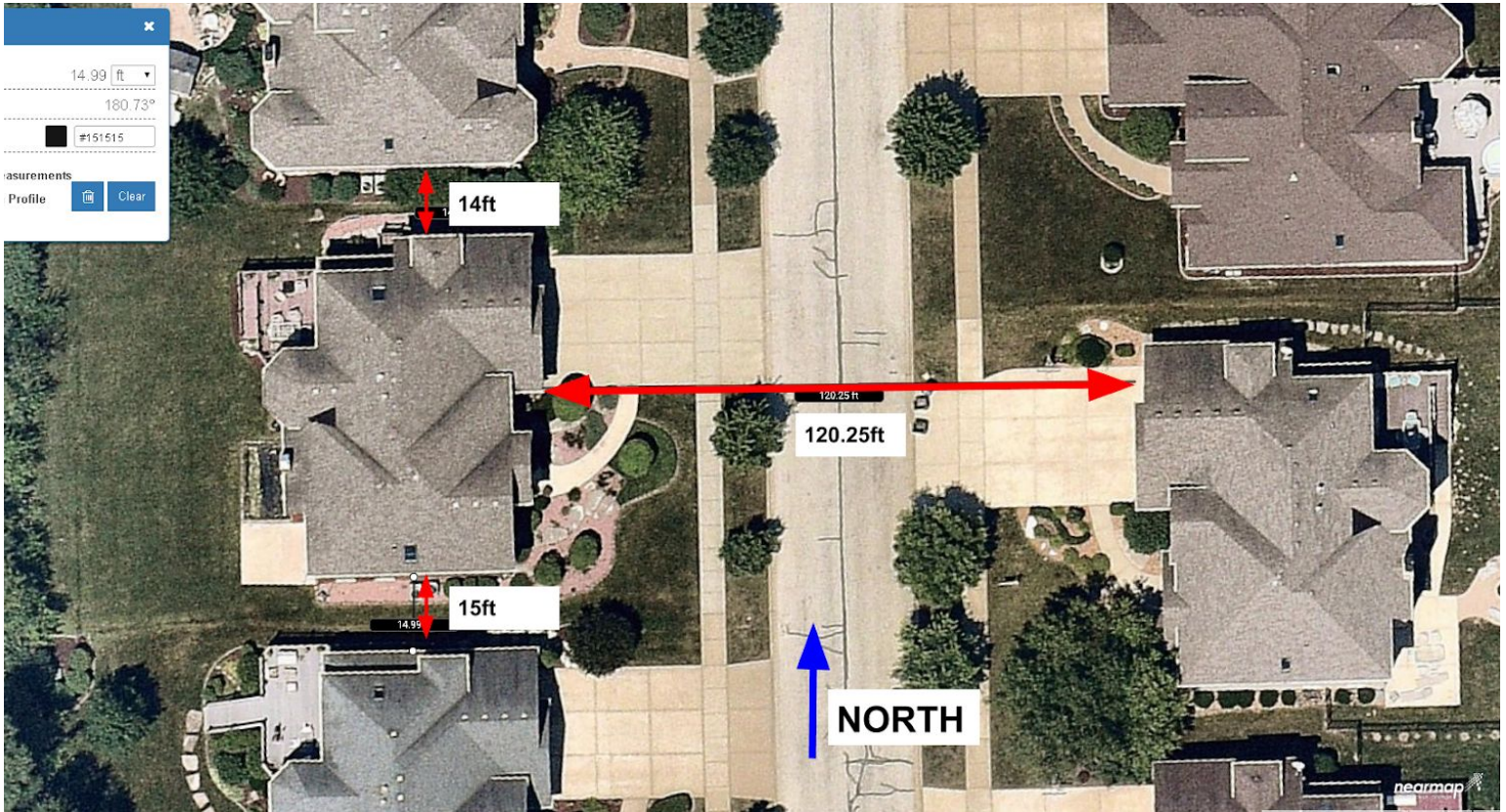
- A link to an industry article discuss solar reflection: http://solarprofessional.com/articles/design-installation/evaluating-glare-from-roof-mounted-pv-arrays#.WUgzcuvyuJC
- An aerial photo of the Rao's home and the properties surrounding it.
- A scale plan drawing showing the expected direction of reflected sunlight on the Summer Solstice (the highest point in the year the sun will appear).
- A scale plan drawing showing the expected direction of reflected sunlight on the Winter Solstice (the lowest point in the year the sun will appear).

Please don't hesitate to contact me if you or any homeowners have any questions or concerns.
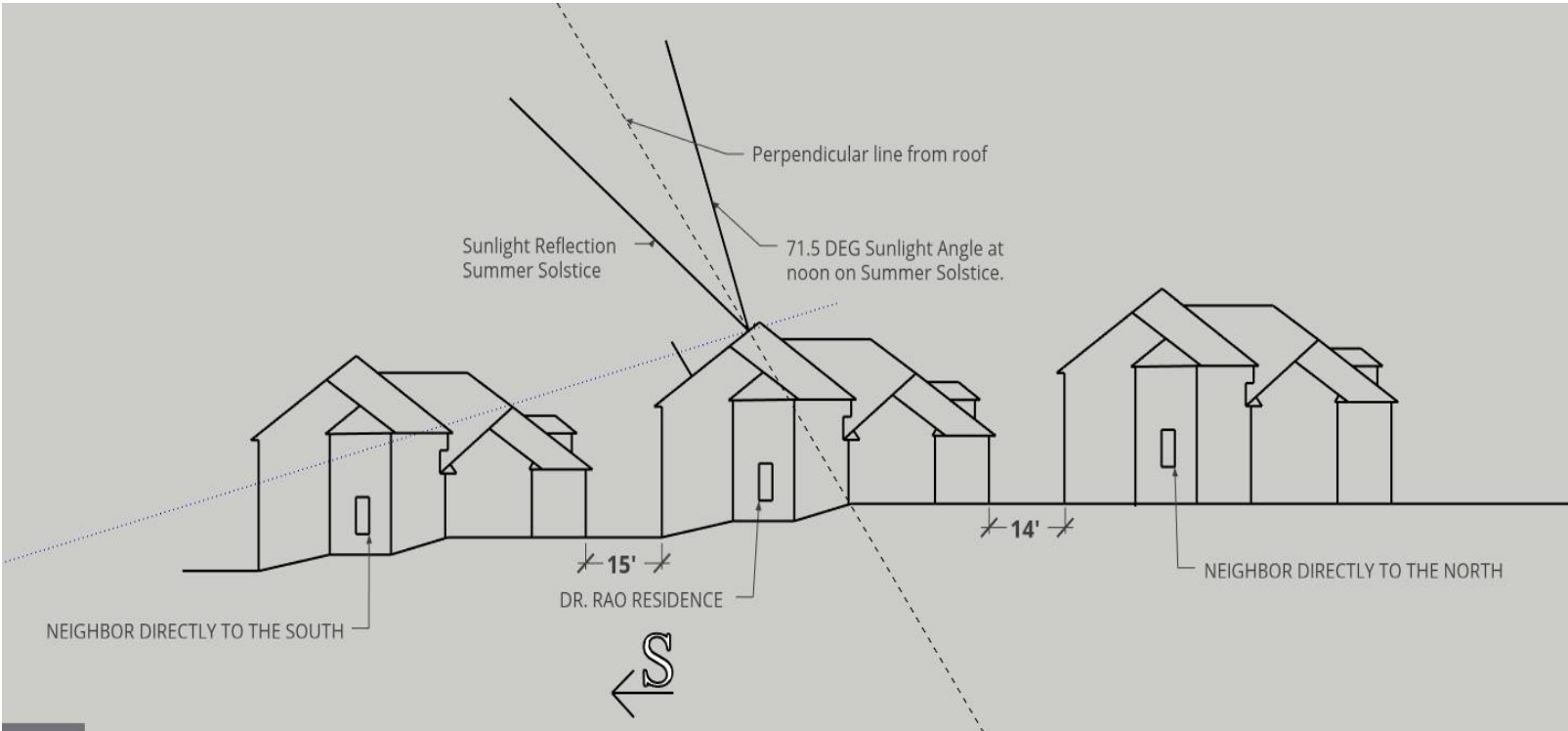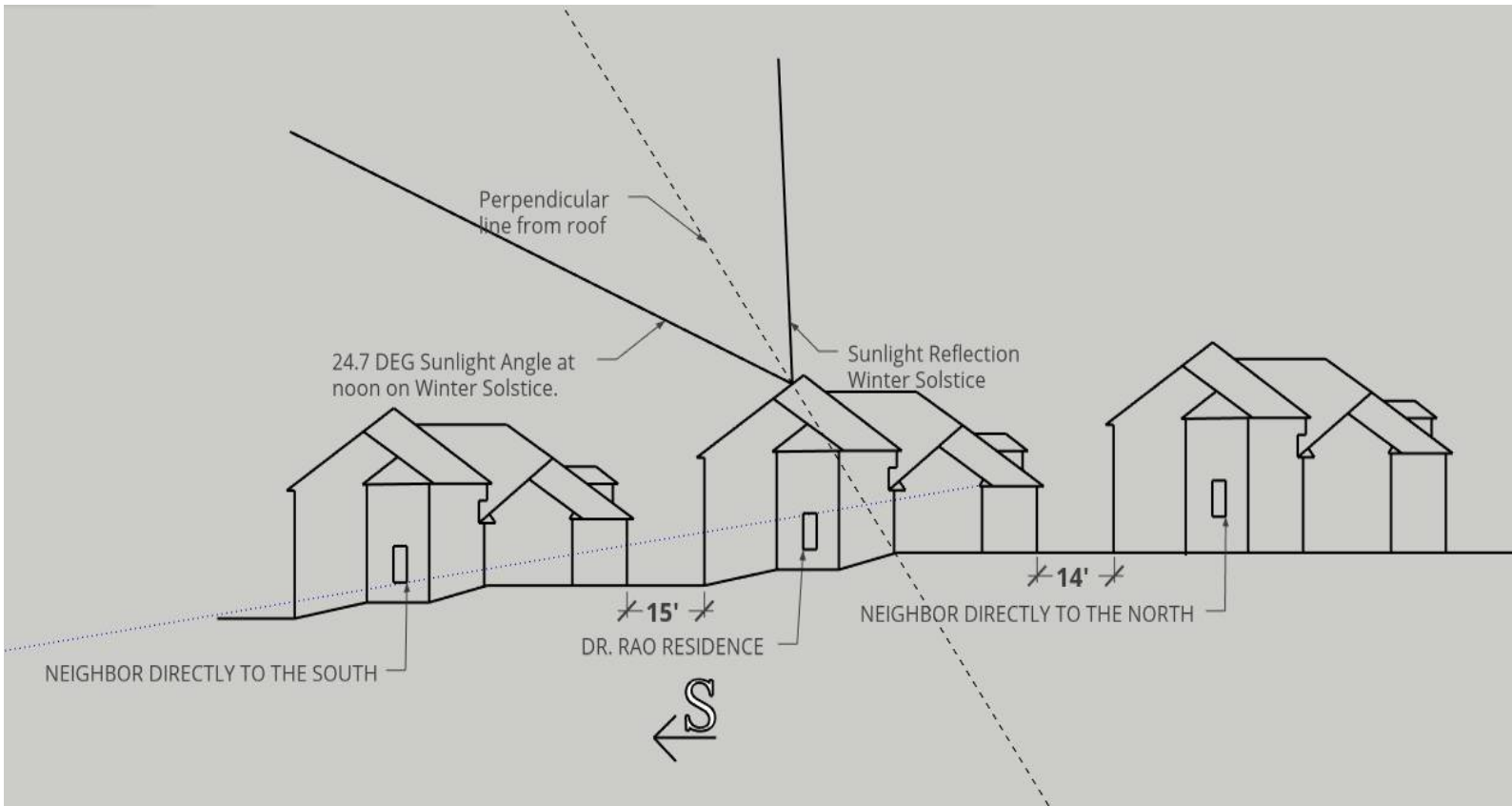

Sincerely,

Dorian Breuer
Co-Owner
Ailey Solar

An aerial photo of the Dr. Rao home and the properties surrounding it.

14.99 ft

180.73°

#151515

asurements

Profile | Clear

14ft

120.25 ft

120.25ft

15ft

14.99

NORTH

nearmap

A scale plan drawing showing the expected direction of reflected sunlight on the Summer Solstice (the highest point in the year the sun will appear).

Perpendicular line from roof

Sunlight Reflection Summer Solstice

71.5 DEG Sunlight Angle at noon on Summer Solstice.

14'

NEIGHBOR DIRECTLY TO THE NORTH

15'

DR. RAO RESIDENCE

S

NEIGHBOR DIRECTLY TO THE SOUTH

A scale plan drawing showing the expected direction of reflected sunlight on the Winter Solstice (the lowest point in the year the sun will appear).

Perpendicular line from roof

24.7 DEG Sunlight Angle at noon on Winter Solstice.

Sunlight Reflection Winter Solstice

NEIGHBOR DIRECTLY TO THE SOUTH

15'

DR. RAO RESIDENCE

14'

NEIGHBOR DIRECTLY TO THE NORTH

S

[NOAA ESRL](#)

Solar Position Calculator

[Earth System](#)
[Research Lab](#)

Please note that this web page is the old version of the NOAA Solar Calculator. Back when this calculator was first created, we decided to use a non-standard definition of longitude and time zone, to make coordinate entry less awkward. So on this page, both longitude and time zone are defined as positive to the west, instead of the international standard of positive to the east of the Prime Meridian.

We maintain this page as a courtesy to those people who, for whatever reason, prefer the old calculator. For the rest of you, we encourage you to instead [click here to try the updated version of NOAA's Solar Calculator](#)

City:		Deg:	Min:	Sec:	**Time Zone**	
Chicago, IL ▼	**Lat**: North=+ South=-	41	51	0	**Offset to UTC** (MST=+7):	**Daylight Saving Time**:
[Click here for help finding your lat/long coordinates](#)	**Long**: East=- West=+	87	39	0	6	No ▼

Note: To manually enter latitude/longitude, select **Enter Lat/Long ->** from the City pulldown box, and enter the values in the text boxes to the right.

Month:	Day:	Year (e.g. 2000):	Time: (hh:mm:ss)			
June ▼	21	2017	12 : 00 : 00	○ AM	○ PM	● 24hr

[Calculate Solar Position]

Equation of Time (minutes):	**Solar Declination** (degrees):	Solar **Azimuth**:	Solar **Elevation**:	cosine of solar **zenith angle**
-1.9	23.43	185.43	71.52	0.9484
Azimuth is measured in degrees clockwise from north. Elevation is measured in degrees up from the horizon. Az & El both report *dark* after [astronomical twilight](#).				

Directions:

1. Select a location from the City pulldown menu, <u>OR</u> select "Enter Lat/Long ->" from the pulldown menu, and manually enter the latitude, longitude and time zone information in the appropriate text boxes. For this calculator, latitude is positive to the NORTH, and longitude is positive to the WEST of the prime meridian.

   Latitude and Longitude can be in deg/min/sec, or decimal degrees entered in the "Deg:" field. (If you enter decimal degrees in the degrees field, please clear the minutes and seconds fields, or they will be added in.) If you select a city from the pulldown menu, the latitude, longitude and time zone fields will be filled in by the program. If you want to input latitude, longitude or time zone manually, <u>be sure to select "Enter Lat/Long -->" from the City pulldown box, or your numbers will be overwritten</u> by the selected city's location.

2. You can enter a different time zone for a location by selecting "Enter Lat/Long -->" in the City pulldown box. Otherwise the time zone associated with the selected city's Local Standard Time will be automatically entered. Selecting "Yes" in the Daylight Saving field will cause the solar position calculation to assume the current time has been adjusted forward one hour from standard time. If you are uncertain of the time zone for a location, refer to our [Time Zone Table](#).

3. The program retrieves the current date and time from your computer, and fills in these values in the date/time fields. To perform calculations for a different date, simply select the month in the pulldown box, and enter the day and four digit year in the appropriate input boxes. Time of day for the calculation can be changed in the same way.

4. Hit the "Calculate Solar Position" button. Once the calculations are complete, you may use your browser's "Print" function to obtain a hardcopy of the results. Results are given in the following units: Equation of Time in minutes of time; Solar Declination in degrees, with positive to the north; Azimuth in degrees clockwise from north; Elevation in degrees up from the horizon; Cosine of Solar Zenith Angle is unitless.

5. Note that for latitudes greater than 72° north or less than 72° south, accuracy may be lower due in part to the effects of [atmospheric refraction](#).

[Sunrise/Sunset Calculator](#)   [Time Zone Table](#)
[Calculation Details](#)   [Solar Calculator Glossary](#)
[Solar Calculator Links](#)   [Back to SRRB Homepage](#)

by [Chris Cornwall](#), Aaron Horiuchi and Chris Lehman
Last Updated on 06/19/2017 15:13:42.

[NOAA ESRL](#)
Solar Position Calculator

[Earth System Research Lab](#)

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City:		Deg:	Min:	Sec:	[Time Zone](#)	
Chicago, IL ▼	[Lat](#): North=+ South=-	41	51	0	**Offset to [UTC](#) (MST=+7):**	[Daylight Saving Time](#):
[Click here for help finding your lat/long coordinates](#)	[Long](#): East=- West=+	87	39	0	6	No ▼
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Month:	Day:	Year (e.g. 2000):	Time: (hh:mm:ss)					
December ▼	21	2017	12	: 00	: 00	○ AM	○ PM	● 24hr

Calculate Solar Position

[Equation of Time](#) (minutes):	[Solar Declination](#) (degrees):	Solar [Azimuth](#):	Solar [Elevation](#):	cosine of solar [zenith angle](#)
1.68	-23.44	182.79	24.69	0.4178
Azimuth is measured in degrees clockwise from north. Elevation is measured in degrees up from the horizon. Az & El both report *dark* **after [astronomical twilight](#).**				

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by [Chris Cornwall](#), Aaron Horiuchi and Chris Lehman
Last Updated on 06/19/2017 14:52:58.