

**COMMONWEALTH OF MASSACHUSETTS
TRIAL DEPARTMENT**

ESSEX, SS

**LAND COURT
NO. 19 MISC 000187 (RBF)**

MICHAEL SILVERIO,

Plaintiff,

v.

TOWN OF NORTH ANDOVER, ET AL.,

Defendants.

SUPPLEMENTAL AFFIDAVIT OF THOMAS SCIACCA

I, Thomas Sciacca, a resident of the Town of Wayland, Massachusetts, do hereby depose and say:

1. I have reviewed the report/affidavit of Camilo Perez Arrau regarding the heat island effect of the proposed development at 425 Main Street, North Andover, Massachusetts (“recreation complex”), on the abutting properties. The purpose of my review of Mr. Arrau’s report/affidavit is to draw conclusions regarding the effect of the heat island effect of the project on 34 Hemlock Street. The Arrau report referenced in his affidavit is entitled “Surface temperature of synthetic and natural grass fields in North Andover Massachusetts (USA) as seen by the satellite Landsat 8 (August 19th, 2018 at 10:25am)” (“Report”).

2. First, it must be recognized that heat island effect is a solar heating phenomenon and therefore must be looked at in terms of the temperature rise over ambient, rather than absolute temperatures. If ambient temperature rises by a degree, then all the surface temperatures will rise by a degree as well.

3. Second, according to the Report, the satellite temperature measurement was taken at 10:25 AM, whereas the ambient used as a reference was the noontime temperature of 75°F. But weather underground historical records for the area report a 10:30 AM temperature of closer to 73°F. Given all the uncertainties in these measurements it is not reasonable to report it to a hundredth of a degree in any case. So the temperature rise over ambient should be regarded as 25°F.

4. Third, with regard to date and time, the closest of the measurements that I took as a part of my investigation of the heating of artificial turf fields was at Waltham

Veteran's Field on August 16, 2007, 11AM, Hazy sun; Ambient: 85°F; Turf: 128°F; Adjacent grass: 85°F; Asphalt: 120°F. All these measurements were taken within minutes of each other and with the same instrument, so this is apples and apples data. It shows a rise of 43 degrees over ambient. This is 73% higher than the reported satellite data.

5. Several differences in the measurement conditions can account for the variance. First, the Waltham data was taken 108 minutes before the solar noon (when the sun is highest, 12:48 PM DST at this longitude on these dates). The Arrau satellite data was taken 143 minutes prior to solar noon. This is a 32% difference.

6. Second, the satellite data was taken three days further away from the summer solstice, when the sun is highest, on August 19 rather than August 16. This is another 5% difference.

7. The two quantifiable factors (time of day and day of month) above can account for more than half the discrepancy between the two sets of measurements. The third major factor, which unfortunately cannot be quantified, is the cloud conditions. The hazy sun at the Waltham site is near ideal for solar input, whereas the satellite measurements were taken under conditions of scattered clouds. Exactly how scattered the clouds were, or whether one happened to be passing over the field at the time the satellite was taking the measurement, is unknown, but it has been established that momentary passing clouds will cause these fields to cool nearly instantaneously because of the minimal thermal mass on the surface of these fields. Therefore, cloud conditions could easily account for any remaining discrepancy between the two sets of data.

8. In my opinion, the satellite measurements and mine are entirely consistent in terms of predicting the likelihood of temperature variance between ambient air temperature and surface temperature of synthetic turf fields, as well as the effect of the phenomenon on cooling of homes that abut directly an artificial turf field.

9. Given that the recreation complex will have multiple artificial turf fields and apparently acres of impervious surfaces - playgrounds, courts, walkways, parking lots, building structures, storage units and other heat absorbing surfaces – the heat island effect of the project on the neighborhood would be considerable.

I declare under penalty of perjury that the foregoing is true and correct.

Signature: _____ Date: _____

Address: 31 Rolling Lane, Wayland, MA 01778