Safe Healthy Playing Fields Inc.

www.safehealthyplayingfields.org

11 April 2023

Dear Stamford Board of Representatives:

As we are all well aware, climate change is a game changer. Synthetic turf can readily reach temperatures of 160^{0}F to 180^{0}F and have even reached well in excess of 200^{0}F, baking and compacting the underlying soil, killing all living organisms below it and negatively impacting natural filtration, cooling and carbon sequestration and oxygen production.

Athletes are increasingly impacted by heat related illness playing on synthetic surfaces. Deaths from heat stroke doubled from 2015 to 2017 when compared to the 5 preceding years. Football players are eleven times more likely to suffer a heat related illness playing on synthetic turf.

The off gassing of both methane and ethylene from synthetic turf creates heat islands significantly larger than the physical footprint of their plastic surface. Land based plastics produce 2 times more methane and 76 times more ethylene than those found in our waterways and oceans. There are ~60,912 blades of plastic grass/square yard. For a regulation 80k square foot field, that is in excess of ***1.624 trillion blades per field***- massive heat islands contributing to global warming- and that is only the playing fields.

To mitigate the greenhouse gas effects of synthetic turf, 3700 trees per 84,830.37ft² of plastic would be required. A 2017 Swedish total life cycle emissions study on a modeled 7881m2 synthetic field concluded GHG emissions would be 527 tons CO2e for a ten year period.

Synthetic turf is a petrochemical product requiring 685 gallons of petroleum based oil to manufacture 2K pounds of plastic; a regulation, 80K square foot field, contains **13,700 gallons of oil** in the backing and blades alone, exclusive of underlayment pads or used tire crumb poured between the plastic blades.

Chemicals in the plastic carpet leach out and allow runoff containing a toxic load of mixed proprietary chemicals, including pre- and polyfluoroakyl substances (PFAS). These chemicals are

negatively impacting biodiversity and can have a critical economic impact on the state's commercial fishing industry.

To date, 21 different PFAS chemicals have been found in synthetic turf. A partial list of PFAS found in synthetic turf carpet and components to date (from public records):

- PFOS
- PFOA
- 6:2 FTSA
- GenX
- D3-N-MeFOSAA
- D2-N-EtFOSAA
- PFPeA
- PFHxA
- PFHpA
- PFBS
- PFBA
- PFNA
- PFDA
- PFHxS
- PPF Acid
- R-EVE
- PTFE
- PVDF
- 13C2-4:2 FTS
- 12C2-6:2 FTS
- 13C2-8:2 FTS
- 8:2 FTOH

On 15 June 2022, the US EPA issued drinking water health advisories for four of the above PFAS: PFOA, PFOS, PFBA and GenX. Measured in parts per trillion due to their extreme toxicity, these advisories render no safe level of PFOA or PFOS. The US EPA intends to issue legally binding standards for PFOA and PFOS.

PFAS in Synthetic Turf on CA Prop. 65 List:

- Perfluorononanoic acid (PFNA)*** and its salts Dec 31, 2021
- Perfluorooctane sulfonate (PFOS)*** Nov 10, 2017
- Perfluorooctane sulfonic acid Dec 24, 2021
- (PFOS) and its salts and transformation and degradation precursors
- Perfluorooctanoic acid (PFOA)*** Feb 25, 2022
- Perfluorooctanoic acid (PFOA) Nov 10, 2017

https://oehha.ca.gov/media/downloads/proposition-65//p65chemicalslistsinglelisttable2021p.pdf

A notice was issued 26 March 2021 by the Developmental and Reproductive Toxicant Identification Committee (DARTIC) of the OEHHA's Science Advisory Board. These chemicals have been selected for review due to potential reproductive toxicity:

- Perfluorodecanoic acid (PFDA) and its salts***
- Perfluorohexanesulfonic acid (PFHxS) and its salts***
- Perfluorononanoic acid (PFNA) and its salts***
- Perfluoroundecanoic acid (PFUnDA) and its salts

***have been found in synthetic turf

https://oehha.ca.gov/media/downloads/crnr/dartchemicalsdatacall-innotice2021.pdf

On 14 March 2023, the US EPA issued the following:

- The US EPA intends to issue legally binding standards for PFOA and PFOS by late PFOA and PFOS: EPA is proposing to regulate PFOA and PFOS at a level they can be reliably measured at 4 parts per trillion.
- PFNA, PFHxS, PFBS, and GenX Chemicals: EPA is also proposing a regulation to limit any mixture containing one or more of PFNA, PFHxS, PFBS, and/or GenX Chemicals. For these PFAS, water systems would use an established approach called a hazard index calculation, defined in the proposed rule, to determine if the combined levels of these PFAS pose a potential risk.

While newer testing methods are available, any manufacturer of consumer products, including synthetic turf, claiming to be PFAS free should be able to produce independent third party testing results of less than 1ppm (parts per million) of total organic fluorine or total fluorine.

Recent research from the University of Stockholm indicates that **synthetic turf fields contain from 1 to 38 pounds of PFAS, per playing field.**

PFAS can cause reproductive (including a 47% decrease in fertility), developmental, liver, kidney, and immunological effects and tumors in laboratory animals. Human epidemiology studies show an increase in serum cholesterol levels, effects on infant birth weights, the immune system, cancer, and thyroid hormone disruption. Because they are bioaccumulative, PFAS exposure can impact multiple generations.

Plastics contain endocrine disrupting chemicals, such as PFAS, and chemicals used as plasticizers, flame retardants, colorants, UV stabilizers, biocides, heat stabilizers, antioxidants, lubricants, and foaming agents, catalysts, phthalates and more. Such chemicals can cause neurological and behavioral disorders, obesity, metabolic dysfunction, reproductive disorders and cancer.

Injuries on synthetic turf are a significant concern. Independent peer reviewed research shows significantly increased lower extremity injuries and concussions, particularly for children playing on synthetic turf.

> *"The available body of literature suggests a higher rate of foot and ankle injuries on artificial turf, both old-generation and new-generation turf, compared with natural grass. High-quality studies also suggest that the rates of knee injuries and hip injuries are similar between playing surfaces, although elite-level football athletes may be more*

predisposed to knee injuries on artificial turf compared with natural grass. ***Only a few articles in the literature reported a higher overall injury rate on natural grass compared with artificial turf, and all of these studies received financial support from the artificial turf industry.****"*
https://pubmed.ncbi.nlm.nih.gov/35593739/

Elite soccer players in the European Union will only play on natural grass. Seven US sites selected for the 2026 World Cup are required to replace synthetic fields with natural grass. The NFL Players association is calling for replacing synthetic fields with natural grass. The US Women's National soccer team sued for the same rights as the men's teams, including the right to play on natural grass surfaces.

Between 315,000 and 850,000 concussions every year occur among high school athletes and occur more frequently on synthetic turf . Five to twelve year olds are especially vulnerable both developmentally and biomechanically. Repeated concussions lead to increased risk of Chronic Traumatic Encephalopathy (CET). The Concussion Legacy Foundation reports that repetitive brain trauma is associated with CET and has been found in athletes as young as seventeen.

Many communities see plastic synthetic fields as a money-saver. The reality is with a cost of up to 4.3 times more than natural grass over the 8 years of a typical warranty, it's a very poor financial investment for those looking beyond the ribbon-cutting. Maintenance and replacement costs are often minimized. Disposal costs are frequently omitted altogether, and concerns about liability for many of the issues noted is an unsettled area of law. These massive petrochemical products should not be a taxpayer burden, even more so in Environmental and Social Justice communities that often lack cooling green space and are further subjected to heat islands created by impermeable surfaces such as synthetic turf. Exposure to the toxic chemicals in plastic play surfaces presents elevated health risks in communities where access to care is difficult. The added costs of maintenance, safety testing, annual replacement of lost infill and ultimately replacement and landfilling add to the burden. Illegal dumping and increased expense to the community can all have irreversible consequences.

Synthetic turf does not save water. Synthetic turf requires approximately 989 gallons of water to produce 1 square meter of turf - estimated to be the equivalent of watering a square meter of natural grass for 18 years. For a regulation sized field (80 thousand square feet), 7,353,160 gallons would be required for manufacturing alone. Water for cleaning pollution, bodily fluids, animal waste, mold, bacteria and more from plastic turf, often a condition of warranty, is also needed.

For sports, research shows the amount of water needed to reduce the surface temperature of synthetic turf for safe play is significantly greater than that required for irrigated Bermuda grass varieties over a 24 hour period in the same environment. Watering only cools the surface for 20 minutes before it returns to a dangerous temperature.

A report on water use on synthetic turf found that 2 water cannons spray water from the center of the field moving towards each end simultaneously was the most effective as one cannon only resulted in the first end drying before the second was sprayed. In September and October, 12,000 gallons of water were required each time the field needed to be cooled.

Synthetic turf is not recyclable.

"Advanced chemical recycling", the process by which mixed plastics of the turf carpet are subjected to high heat and additional chemicals in an oxygen limited environment in order to break the strong chemical bonds that make them resistant to degradation and threaten the earth's biosphere is not recycling.

Any proposed chemical process for recycling synthetic turf requires large energy inputs making a net positive energy balance infeasible. This is the case even when the resulting liquid or fluid obtained in the process is burned for energy (not recognized as recycling). The process is highly polluting. Polyethylene (most synthetic turf) results in formation of ethylene while decomposition of polypropylene (in some turf) breaks down into benzene, polycyclic aromatic hydrocarbons (PAHs), toluene and xylenes. All have negative impacts on humans and the environment and require high levels of regulation and management.

> *…chemical recycling is a public relations exercise by the petrochemical industry. The purpose is to dissuade regulators from capping plastics production."*
> Associated Press

> *"environmental groups say advanced recycling is a distraction from real solutions like producing and using less plastic."*
> Associated Press

> *"…plastics recycling doesn't work and never will. Chemical additives and colorants used to give plastic different properties mean that there are thousands of types. That's why they can't be mixed together and recycled in the conventional, mechanical way. Nor is there much of a market for recycled plastic, because virgin plastic is cheap."*
> Judith Enck, founder Beyond Plastics

The cost to landfill a regulation sized field (80k square feet) is variable, but we approximate it at $65,000. That's 400,000 pounds of infill and 40,000 pounds of plastic carpet. Most US fields

are 120k square feet, or larger. These plastic carpets are made by companies that manufacture household carpets. As with PFAS-containing household and commercial carpets, synthetic turf is rapidly headed toward regulation in California (pg 14). Two bills before the California legislature, one addressing heat and the other addressing PFAS are moving forward unopposed. Massachusetts has multiple bills addressing synthetic turf currently before its legislature and a Vermont bill just passed its senate unanimously. New York was the second state to ban PFAS in Carpet and the first to include synthetic turf. The cost to dispose of a used synthetic turf field is likely to increase dramatically when declared hazardous waste by regulation or law and should not be a taxpayer burden.

We respectfully ask that you not be swayed by those with a vested interest in profiting from sales and installation of plastic grass playing fields and invest in properly installed and maintained natural grass fields.

Respectfully submitted,

Diana Conway, President
Dianne Woelke MSN, Board Member
Safe Healthy Playing Fields, Inc.
https://www.safehealthyplayingfields.org
SHPFI is an all-volunteer nonprofit 501-c-3