**LAS VEGAS VALLEY WATER DISTRICT**
**BOARD OF DIRECTORS MEETING**
**JANUARY 16, 2024**
**MINUTES**

| | |
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| CALL TO ORDER | 9:00 a.m., Commission Chambers, Clark County Government Center, 500 South Grand Central Parkway, Las Vegas, Nevada |
| DIRECTORS PRESENT: | Marilyn Kirkpatrick, President<br>Jim Gibson, Vice President<br>Justin Jones<br>William McCurdy II<br>Ross Miller (entered on item #6)<br>Michael Naft<br>Tick Segerblom |
| STAFF PRESENT: | John Entsminger, Dave Johnson, Doa Ross, Greg Walch, Kevin Bethel |

*Unless otherwise indicated, all members present voted in the affirmative.*

**COMMENTS BY THE GENERAL PUBLIC**
*For full public comment, visit www.lvvwd.com/apps/agenda/lvvwd/index.cfml*

There were no members from the public wishing to speak.

**ITEM NO.**

1. **Approval of Agenda & Minutes**

FINAL ACTION: A motion was made by Vice President Gibson to approve the agenda and the minutes from the joint meeting of December 5, 2023. The motion was approved.

2. **Select a President and Vice President for calendar year 2024.**

FINAL ACTION: A motion was made by Director Jones to retain Marilyn Kirkpatrick as President and Jim Gibson as Vice President. The motion was approved.

**CONSENT AGENDA** **Items 3 – 5 are routine and can be taken in one motion unless a Director requests that an item be taken separately.**

3. **Approve and authorize the President to sign, in substantially the same form as attached hereto, an interlocal agreement between the City of Las Vegas and the District for installation of water facilities for the Historic Westside Education and Training Center Project.**
4. **Approve and authorize the General Manager to sign Change Order No. 6 to the contract with Byrd Underground, LLC, for the installation of new pipe in an increased amount not to exceed $130,365 and an extension of the completion dates by 222 calendar days.**
5. **Approve and authorize the General Manager to sign Change Order No. 7 to the contract with J.A. Tiberti Construction Company, Inc., to construct the 4125 Zone Pumping Station, extending the Substantial Completion date by 245 days and the Final Completion date by 301 calendar days.**

FINAL ACTION: A motion was made by Vice President Gibson to approve staff's recommendations. The motion was approved.

**BUSINESS AGENDA**

6. **Reject the bid from Menichino Construction LLC and award a contract for miscellaneous large backflow installations to Harber Company, Inc., dba Mountain Cascade of Nevada, in the amount of $1,489,750, authorize a change order contingency amount not to exceed $148,000, and authorize the General Manager to sign the construction contract.**

FINAL ACTION: A motion was made by Vice President Gibson to reject the bid and award a contract as noted on the agenda. The motion was approved.

## COMMENTS BY THE GENERAL PUBLIC

Daniel Braisted, Las Vegas, stated that he had heard that microscopic pieces of plastic have been found in Las Vegas' drinking water and requested water quality information.

Carol Reynolds, 2740 Mann St., spoke about the outrageous revenue that the District is earning due to rate increases and excessive use fees. She stated how her household is on a self-imposed water use schedule, in order to save water for her plants and garden. She stated how the excessive use fees are a financial burden, especially on retirees, and added her frustration with the District's poor customer service.

Diane Henry, 7525 Coley Ave., spoke on the hazards of artificial turf, stating that it contributes to the heat island effect, cannot be recycled, and contains hazardous and toxic materials. She stated that the Southern Nevada Water Authority's upcoming Board meeting has an item on its board meeting agenda to replace athletic fields at 46 different Clark County School District schools. She asked that before any more fields are replaced with artificial turf, an environmental and health study be conducted regarding its impact.

Pete Foley, 4512 Fernbrook Rd., called into question the District's marketing strategy, stating that it disrespects the truth and misleads consumers in an effort to manipulate behavior. He stated that the same level of water conservation cannot continue as population in Southern Nevada grows.

Tony Rico, Las Vegas, spoke about a recent zone change and a discussion he had with the Clark County Water Reclamation District (CCWRD) regarding laterals and service to specific properties near Decatur and Silverado Ranch Blvd. He requested more information about the District's septic conversion program and asked about the potential of working with CCWRD collaboratively.

Laura McSwain, 2727 Ashby Ave, stated that there needs to be standards on the installation of artificial turf in the valley. She requested that the item on the SNWA's upcoming board meeting agenda regarding the installation of artificial turf be tabled until the Board implements health and environmental standards. She stated that the rush to remove healthy elements from our environment is troubling. She provided a handout to the board, which can be found attached to these minutes.

Brian Peterson, 5135 Teepee Ln., spoke about a subdivision located at Kevin Way and Fisher Ave., on which he led a construction project. He stated that the District's policy of not allowing connections to properties with septic tanks was a financial hardship on the project and he is seeking reimbursement.

Lara Preister submitted public comment in advance of the meeting. Her comments are attached to these minutes.

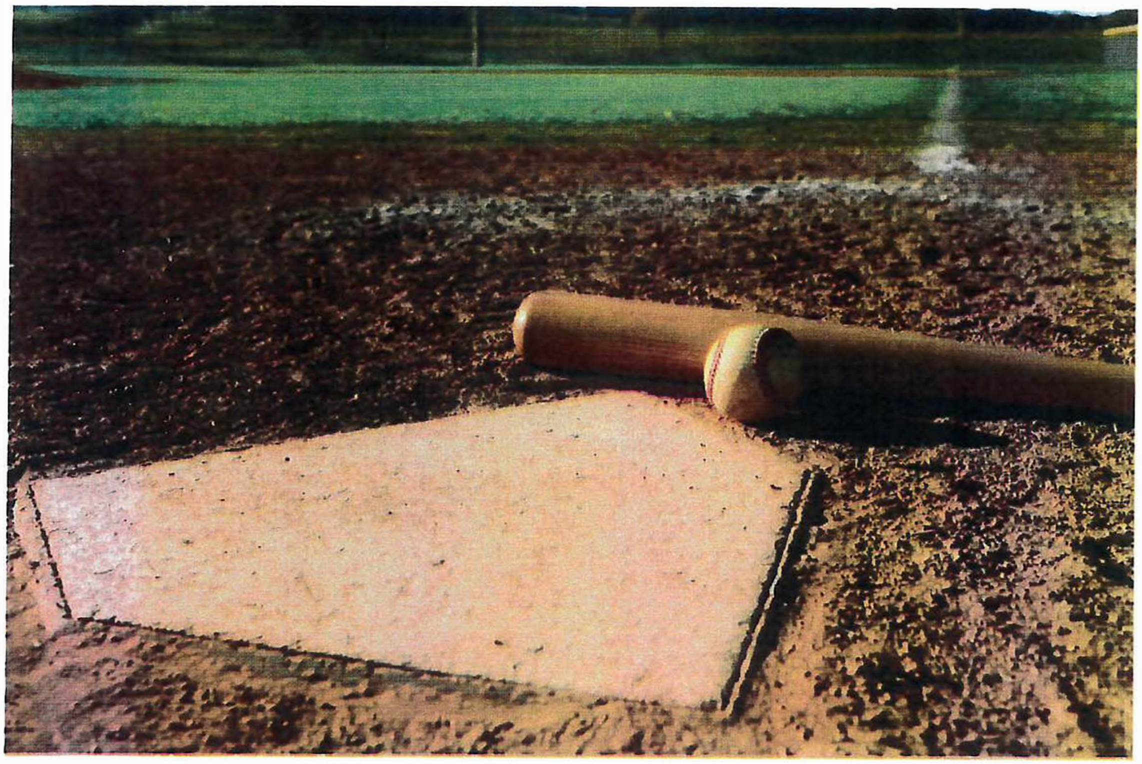
### Adjournment

There being no further business to come before the board, the meeting adjourned at 9:26 a.m.

**Copies of all original agenda items and minutes, including all attachments, are on file in the General Manager's office at the Las Vegas Valley Water District, 1001 South Valley View Boulevard, Las Vegas, Nevada.**

Letters to the Editor

# The Children's Environmental Health Center of the Icahn School of Medicine at Mount Sinai Strongly Discourages the Installation of Artificial Turf



Baseball and Bat at Home Plate
shutterstock/David Lee

By Sarah Evans, PhD, MPH

Published April 15, 2023 at 8:28 AM
Last Updated April 16, 2023 at 1:33 AM

To the Scotch Plains Town Council:

The Children's Environmental Health Center of the Icahn School of Medicine at Mount Sinai strongly discourages the installation of artificial turf playing surfaces and fields due to the uncertainties surrounding the safety of these products and the potential for dangerous heat and chemical exposures.

As pediatricians, epidemiologists, and laboratory scientists, recipients of numerous research grants from the National Institute of Health, and host to one of 10 nationally funded Pediatric Environmental Health Specialty Units, we receive frequent inquiries from communities regarding the wide-scale use of artificial turf surfaces on school grounds and in park properties. This led us to conduct a review of the risks and benefits of artificial playing surfaces, during which we found significant gaps in the evidence supporting the safety of artificial turf products. Our findings are summarized below and in our online resources accessible at https://sinaiexposomics.org/artificial-turf/ and https://www.healthyplayingsurfaces.org/ and via webinar on the Environmental Health Impacts of Synthetic Turf and Safer Alternatives.[1]

**Studies to assess the safety of artificial turf are ongoing and inconclusive.** The preponderance of existing data on artificial turf pertains to recycled tire infill, or "crumb rubber", which contains known carcinogens and neurotoxins. Concerns about the safety of recycled rubber playing surfaces have been raised by the federal government, based on a lack of comprehensive studies. In 2016, the United States Environmental Protection Agency (USEPA) announced the launch of an investigation into the safety of crumb rubber in partnership with the Centers for Disease Control and Prevention and the Consumer Product Safety Commission, stating "existing studies do not comprehensively evaluate the concerns about health risks from exposure to tire crumb".[2] In July 2019, USEPA published a portion of their findings from these studies, which confirmed the presence of chemicals linked to cancer, nervous system toxicity, and impaired reproductive development such as polycyclic aromatic hydrocarbons, benzene, lead, and phthalates.[3] The authors emphasize that the reported findings do not constitute a risk assessment and cannot be interpreted as evidence of safety.

**Questions remain about the safety of alternatives to crumb rubber.** Extremely few studies have examined the composition and safety of alternative infills including those purported to be "natural". A 2016 USEPA report found research supporting the safety of alternative infills such as EPDM, TPE, and plant-based infills "lacking or limited". [4] Recent studies including one conducted by Mount Sinai and the Toxic Use Reduction Institute (TURI) found the presence of known carcinogens and neurotoxins including polycyclic aromatic hydrocarbons (PAHs), lead, zinc, and black carbon in almost all alternative infill materials examined.[5,6]

Adequate safety assessment requires biomonitoring to determine chemical exposures under realistic play conditions. Importantly, no studies have addressed children's exposure to chemicals from artificial turf surfaces via oral and dermal routes, the two most likely ways that turf chemicals enter the body during play. These studies are underway at USEPA; until findings are available and conclusively demonstrate the safety of artificial surfaces, we recommend a moratorium on the use of these materials where children play.

**Undisclosed chemicals of concern are present in plastic grass blades and turf pads and matting.** A recent study identified per- and poly-fluoroalkyl substances (PFAS, aka "Teflon chemicals"), a class of more than 5000 chemicals linked to numerous health problems including cancer, nervous system toxicity, immune dysfunction, thyroid, and cardiovascular disease in the plastic grass blades and backing used on artificial turf fields and in adjacent bodies of water.[7,8,9,10] PFAS are considered "forever chemicals" because they persist in the body and the environment and are widespread drinking water contaminants. These findings raise concerns about PFAS groundwater and environmental contamination from turf field run off and emphasize the need for further examination of exposures that may occur from turf components other than infill.

New Jersey has some of the most widespread PFAS contamination in the US, with an estimated more than 500,000 residents drinking contaminated tap water. [11] On March 14, 2023, USEPA proposed National Primary Drinking Water Regulations for six PFAS, dramatically lowering the recommended levels of PFOA and PFOS and citing scientific evidence of health impacts at drinking water levels close to zero.[12] These guidelines also include advisories for newer PFAS chemicals PFNA, GenX, PFBS, and PFHxS. The federal government has also taken steps to designate PFAS hazardous substances and to restrict their use in certain products.[13,14] To allow the installation of PFAS-containing surfaces would be extremely short-sighted as further restrictions and regulations on these chemicals are likely to come.

**Risk of heat injury is elevated on artificial turf.** On hot summer days, temperatures of over 160 degrees Fahrenheit have been recorded on recycled rubber play surfaces.[15] All artificial turf surfaces examined have been shown to have higher surface temperature and air temperature at head height compared with natural grass, regardless of infill type. [16] Vigorous play in these conditions conveys a very real risk of burns, dehydration, heat stress, or heat stroke. Children are less able to regulate their body temperature than adults, making them particularly susceptible to conditions of extreme heat.[17,18]

High temperatures and risk of heat illness lead to a loss of field usage even on hot days, which have become increasingly common due to climate change. Like asphalt, artificial turf fields contribute to the "heat island effect", in which communities close to the fields become hotter than surrounding areas.[19] Artificial turf contributes to the climate crisis throughout its lifecycle, requiring fossil fuels during production and emitting greenhouse gases during use and disposal.[20]

**Children are uniquely vulnerable to harmful exposures from artificial turf surfaces** because of their unique physiology and behaviors, rapidly developing organ systems, and immature detoxification mechanisms.[21] Children may be exposed to artificial turf chemicals through ingestion, inhalation, skin absorption, and open wounds or broken skin. Children and young athletes breathe faster than adults, putting them at greater risk for inhalation of chemicals that off-gas from turf fields. Small children put their hands and other objects in their mouths, increasing the risk of exposure via ingestion. In addition, youth have a higher surface area to body mass ratio, produce more body heat per unit mass, and sweat less than adults, all factors that increase susceptibility to heat injuries that have been observed on artificial turf fields.[14] Vulnerability to turf chemicals persists through the teen years as the reproductive and nervous systems continue to develop beyond the first two decades of life. Lastly, children have more future years of life over which chronic diseases linked to the chemicals in turf develop.

**Chemical hazards escape from artificial turf surfaces to the environment.** A number of the chemical components of artificial turf surfaces are soluble in water. When rain and snow fall on synthetic fields, these materials can leach from the surface to contaminate ground water and soil.[22] Recent studies find PFAS in wetlands adjacent to artificial turf suggesting that these chemicals may migrate from field components to contaminate the environment.[7] Runoff from turf fields also has the potential to release microplastics into the environment. Microplastic contamination is found in drinking water and wildlife throughout the globe and in human blood, lungs, and placenta.[23,24,25]

**Turf materials are transported home.** Over time, play surfaces break down into smaller pieces and fine particles that may be picked up on children's shoes, clothing, and skin. Infill and grass blades accumulate in shoes and stick to bodies of players, bringing these materials into cars and homes. Thus, exposure can continue for many hours beyond the time that a child spends in the play area. Daily outdoor play and physical activity are essential components of a healthy childhood. Safe play areas are an essential component of any school environment. While it is important to maximize safe play time, we caution against the use of materials which carry risks of chemical and heat exposure and have not been comprehensively tested for safety. For the reasons outlined above, the Children's Environmental Health Center recommends natural grass fields and playing surfaces as the safest option for areas where children play. For case studies that include data on cost, labor, and play time on organically managed natural grass athletic fields see https://www.turi.org/TURI_Publications/Case_Studies/Organic_Grass_Playing_Fields.

Sarah Evans, PhD, MPH
Assistant Professor
Children's Environmental Health Center
Department of Environmental Medicine and Public Health Icahn School of Medicine at Mount Sinai

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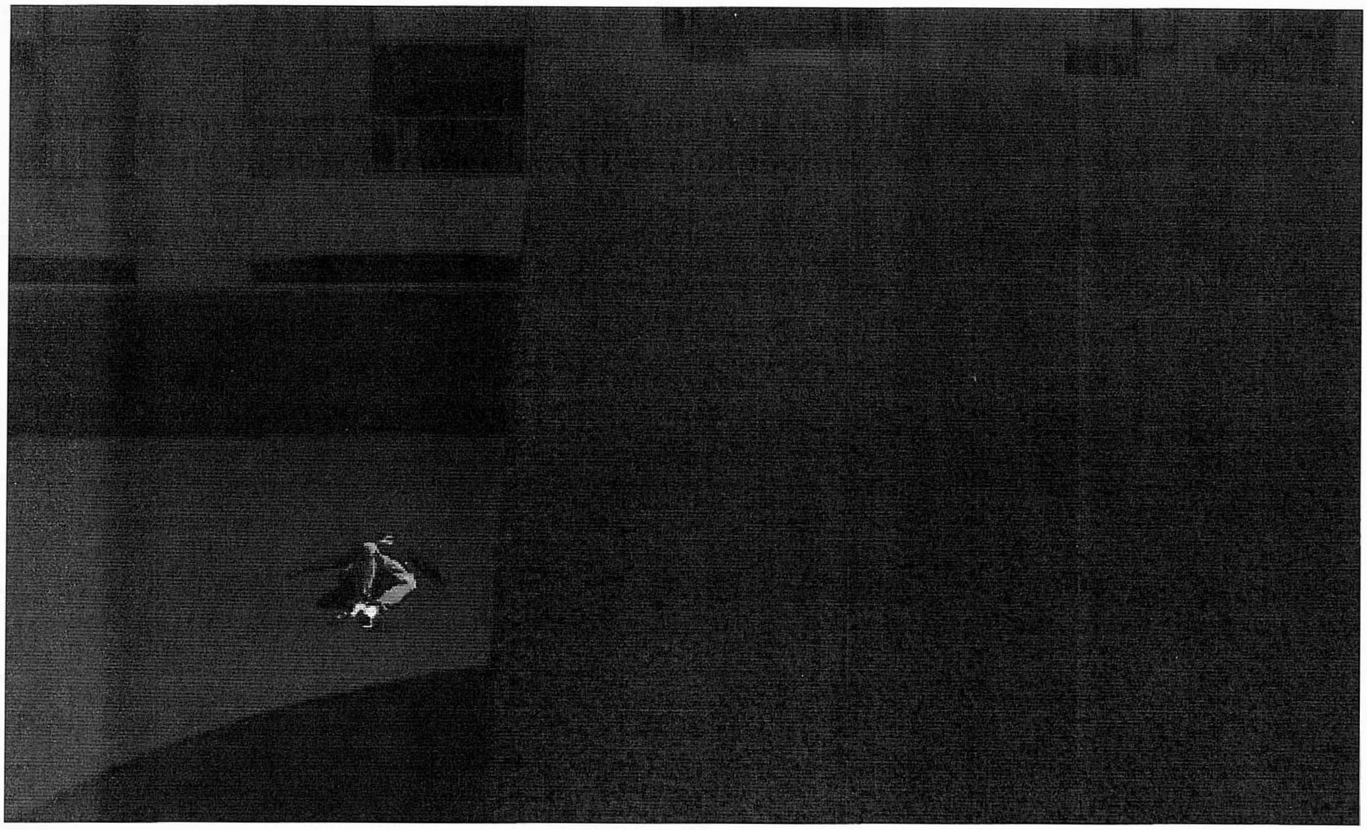
PFAS

This article is more than **1 year old**

# Boston bans artificial turf in parks due to toxic 'forever chemicals'

**The city joins a growing number across the US in limiting the use of artificial turf made with dangerous PFAS compounds**



Until recently, artificial turf was made with ground-up tires. Photograph: Justin Lane/EPA

**Tom Perkins**

Fri 30 Sep 2022 06.00 EDT

Boston's mayor, Michelle Wu, has ordered no new artificial turf to be installed in city parks, making Boston the largest municipality in a small but growing number around the nation to limit use of the product because it contains dangerous chemicals.

All artificial turf is made with toxic PFAS compounds and some is still produced with ground-up tires that can contain heavy metals, benzene, VOCs and other carcinogens that can present a health threat. The material also emits high levels of methane, a potent greenhouse gas, and sheds microplastics and other chemicals into waterways.

"We already know there are toxic chemicals in the products, so why would we continue to utilize them and have children roll around on them when we have a safe alternative, which is natural grass?" asked Sarah Evans, an environmental health professor for the Icahn School of Medicine at Mount Sinai.

Beyond chemical risks, the fields can act as heat islands that increase playing field temperatures to as much as 93C (200F), Evans noted. National Football League players are pressuring the league to ban artificial turf because of injuries, while the US national soccer teams will only play on natural grass for the same reason.

The federal government estimates 12,000 synthetic turf fields exist in the US, and at least 1,200 more are installed annually. Proponents say they are easier to maintain than grass fields and are not prone to "flooding", though they do also require significant maintenance. The product is also increasingly used on playgrounds or as alternatives to lawns in drought-plagued regions.

But in recent years, municipalities have begun limiting their use via bans or moratoriums, including at least four in Massachusetts before Boston, two in California's Bay Area and several in Connecticut.

In a statement to the Guardian, a spokesperson for Wu said: "The city has a preference for grass playing surfaces wherever possible and will not be installing playing surfaces with PFAS chemicals moving forward."

Elsewhere, battles over proposed artificial fields are playing out. In Martha's Vineyard, the school district is suing the city for prohibiting an artificial field from being installed because of concerns that it would contaminate an aquifer from which the town draws its drinking water. Meanwhile, voters in Malden, just north of Boston, may settle a heated debate over a proposed artificial field.

In Portsmouth, New Hampshire, city officials thought they had ordered a PFAS-free artificial turf field, but later testing revealed that it contained high levels of the chemicals. A state-level proposal to ban artificial turf recently failed in Massachusetts, and public health advocates and legislators in another state are planning to propose a ban on the material, though they declined to say on the record which state until the proposal is introduced.

Artificial turf is made with several layers including plastic grass blades, plastic backing that holds the blades in place and infill that weighs down the turf and helps blades stand upright. Until recently, infill was always made with recycled rubber tires called crumb rubber. However, independent and Environmental Protection Agency testing found the material contains high levels of dangerous chemicals.

"It seems kind of nonsensical to put ground-up tires in a field where children are playing," said Kyla Bennett, a former EPA official and director of science policy at Public Employees for Environmental Responsibility (Peer).

Some companies have begun using cork as infill, but industry has said the grass blades and backing cannot be made without PFAS.

PFAS, or per- and polyfluoroalkyl substances, are a class of about 12,000 chemicals often used to make products resist water, stain and heat. They are called "forever chemicals" because they don't naturally break down, and are linked to cancer, liver problems, thyroid issues, birth defects, kidney disease, decreased immunity and other serious health problems.

PFAS can be absorbed through the skin, inhaled, ingested or get in open wounds as they break off from the plastic blades, and children are considered more vulnerable to exposure because they are smaller and their bodies are still developing.

Some manufacturers have claimed the amount of PFAS used in artificial turf isn't high enough to be dangerous, or that they use "safe" PFAS. "Independent research has shown time and time again that synthetic turf systems provide many community benefits and continue to meet and exceed regulatory standards for human health, safety and performance," the Synthetic Turf Council, an industry trade group, said in a statement to the Guardian.

But no studies have been completed on how PFAS or other chemicals move from artificial turf to children, so the industry doesn't know if it's safe, Evans said. Moreover, the fields are another of myriad potential daily exposures to PFAS in consumer products, food and water, Evans said.

Public health advocates note all PFAS studied have been found to accumulate in the environment and be toxic to humans, and, once in the environment, "safe" compounds used in manufacturing break down into unsafe chemicals.

Testing of multiple artificial fields has found the presence of highly toxic PFAS compounds like 6:2 FTOH and PFOS. The EPA recently revised its health advisory for PFOS to state that effectively no level of exposure in drinking water is safe.

"It's only a matter of time before [artificial turf] is banned," Bennett said. "In a few years we're going to be asking, 'How on Earth did we ever allow this to happen?'"

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# Technical Memorandum

To: Martha Sapp, Director, Green Acres Program
Cecile Murphy, Program Specialist, Green Acres; Local and Nonprofit Assistance

Through: Nicholas A. Procopio, Ph.D., Director, Division of Science and Research

From: Sandra Goodrow, Ph.D., Research Scientist I, Division of Science and Research

Date: February 8th, 2023

Subject: PFAS in Artificial Turf

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There is growing concern about sources of PFAS to the environment as reports have shown widespread levels of PFAS in soils, surface water, and groundwater at levels that could impact human health. It is with this in mind that the Division of Science and Research has reviewed current literature and related reports that may provide some information on the potential contribution of PFAS to the environment from the placement of artificial turf (AT). Initial considerations for this inquiry into the PFAS content of artificial turf are focused on the site where the turf field is placed for a period of use, but future considerations on the contribution of PFAS to the environment from the artificial turf should include both the initial manufacturing process of the AT (including petrochemicals used and contaminants released from manufacturing facility) and the method of waste management (including potential contribution of PFAS from the degradation of the AT in the final waste stream).

This memo follows an earlier memo on the human health impacts, specifically heat exposure, and stormwater management concerns related to artificial turf, provided by DSR to the program on June 23, 2022.

This memo will address only the PFAS that are contained in and potentially leached from the AT while in its place of use, it will include a review of what is currently known about PFAS in the components of the AT- the plastic backing, the blades, and the infill. At this point in time, it is only possible to provide a preliminary assessment of PFAS in AT since the available analytical data and formal studies are limited. A full evaluation is also bounded by limitations in the analytical techniques necessary to quantify all PFAS. In addition, it is not appropriate to generalize about all AT, as variability in manufacturing processes and materials would likely impact PFAS content and leachability.

# Public Comment received for 1/16/24 LVVWD Board of Directors Meeting

The Manufacturing Processes

PFAS have been reported as being widely used to aid the molding and extrusion of plastic, such as is used in the manufacturing of artificial turf (Kulikov, 2005). Patent literature includes the use of polytetrafluoroethylene (PTFE) and fluoroelastomers as production processing aids as well as being used after treatment for polyethylene blades (Lambert, 2008). Patents related to artificial turf filling shows where PTFE and polyvinylidene fluoride (PVDF) are used as a coating treatment (Reddick, 2012) and a binding matrix (Wu, 2020). The filling material has also been reported to include fire retardants composed of unspecified organofluorine chemicals (Wu, 2020). Since PFAS are included in the chemical makeup of fluoropolymers that are added as polymer processing aids to improve plastic extrusion, there is also the potential of leaving a low-level fluoropolymer residual on the product following processing.

The manufacturing of newer artificial turf often incorporates the use of recycled materials. This may serve some purpose, but it also could serve to incorporate the older, long-chain PFAS into newer AT materials. Infill made of recycled materials could potentially contain contaminants originally found in automotive foam, acrylic coated sand, and shredded automotive tires. This variation in recycled materials, and potential ranges in contaminant concentrations, also introduce uncertainty.

PFAS Analytical Methods and Artificial Turf

There are thousands of PFAS in circulation today, but only a small subset of PFAS can be accurately quantified by existing analytical methods. The methods to characterize certain PFAS in water have been well established, but generally can only identify and quantify anywhere from eighteen (USEPA, 2020) to seventy-five (Eurofins, 2023) PFAS. The limited number of PFAS is driven by the availability of validated reference standards for the individual chemical compound, and a method that is proven to be able to quantify that chemical compound. The analytical methods to evaluate PFAS in solids are still evolving and using the results from these analyses require an understanding of the processes.

Four types of analyses were used to evaluate AT in a paper from Stockholm University by Lauria et al., 2022. The four methods used included total fluorine (TF), extractable organic fluorine (EOF), target PFAS analysis, and total oxidizable precursor assay (TOPA). The analytical method used to measure TF allows for some measure of the potential for the upper limit of PFAS that may be present in a sample. The EOF could be used as a surrogate for the concentration of PFAS as an organic compound that could be a portion of the TF. Target PFAS analysis uses reference standards and validated methods to quantify a small number of PFAS and is used to evaluate compliance with regulatory standards for PFAS including PFOA, PFOS, and PFNA. The total oxidizable precursor assay (TOPA) creates conditions that oxidize chemical compounds known as precursors to their final form of being a perfluoroalkyl acid (PFAA). PFAAs are a subgroup of PFAS that are the most recalcitrant due to the strong fluorine-carbon bonds and have been often found to be among the most toxic and bioaccumulative of PFAS.

A lack of detection in most analytical methods does not mean that the product is PFAS free. Non-detection using methods such as TF and TOPA can provide some assurance that presence of PFAS or PFAAs, respectively, is unlikely. A result of non-detect using the EOF could be used as an indicator that the fluorine detected by the TF method is unlikely to be PFAS.

PFAS Data Reported in Artificial Turf

In July of 2019, the US EPA, in cooperation with ATSDR, DHHS, and the CDC, published the first of two volumes evaluating the chemical content of recycled tire crumb in the fill of the synthetic turf field (US EPA, 2019). The characterization of PFAS in this fill was not included in the discussion. In October of 2019, an article published in the Intercept (Lerner, 2019), concerned that the EPA report did not evaluate PFAS in the infill, or evaluate the blades and backing of the artificial turf, reported on results of analysis performed by non-profits in the United States. The group, Public Employees for Environmental Responsibility (PEER), collected two samples from a new sports field being installed in Massachusetts. The samples were sent to two labs- one lab appeared to perform a target analysis that found detectable levels of 6:2 FTSA, a six-carbon sulfonic acid, at 300 ppt, and the other lab, the Ecology Center, performed a total fluorine analysis on the blades of the grass to show presence in the fibers, at a concentration of 44-255 ppm (44,000,000 – 255,000,000 ppt). An additional sample was collected from the older discarded turf field, placed nearby since it was removed in 2017, and was found to contain PFOS at 190 ppt. PFOS is a known toxic PFAS that has been phased out since the early 2000's, but is widely found due to previous use and persistence in the environment. Nearby surface water also contained levels of PFAS, leading to a supposition that the artificial turf may have contributed PFAS to the adjacent environment.

In another small study reported out of the University of Connecticut, an undergraduate group performed a Senior Design Project where they exposed samples of AT to conditions intended to mimic some level of acid rain and UV light exposure. They then sent the leachate for target analysis that quantified 18 PFAS, and they did recover a detectable amount of PFHpA, albeit below the reporting limits of 0.2 ppt and 0.25 ppt. (UConn, 2021) The samples they tested were from a new turf sample collected directly from a manufacturer. The results of this limited study are reported only in an aural presentation provided on the website, so a true evaluation of methods used to create the leachate is not possible. Similar results depicting artificial turf as having negligible PFAS leaching was reported from a consultant report requested by the Martha's Vineyard Commission. While results appear to suggest negligible PFAS leaching, the report does not assess lifetime leaching from the total mass of artificial turf to be placed (Tetra Tech, 2021).

In 2022, researchers from Stockholm University, designed a study to evaluate PFAS in a representative sample of the blades, infill, and backing of AT (Lauria, 2022). As discussed previously, this study, used all four methods including total fluorine (TF), extractable organic fluorine (EOF), target PFAS analysis, and total oxidizable precursor assay (TOPA). This study collected fifty-one samples of artificial turf, and separated them into backing, filling, and blades for analysis. Total fluorine was detected in 100% of samples, with concentrations ranging from 16-313 ppm (16,000,000- 313,000,000 ppt) in backing, 12-310 ppm (12,000,000-310,000,000 ppt) in filling, and 24-661 ppm (24,000,000-661,000,000 ppt) in blades. Analysis using EOF and target analysis showed detectable levels of PFAS in 42% of samples, albeit at levels more than an order of magnitude lower. The lower boundary of the EOF results were below the limit of detection, while the upper boundaries were 145 ppb (145,000 ppt), 179 ppb (179,000 ppt), and 192 ppb (192,000 ppt) for backing, filling, and blades, respectively. Tests using extraction with water only did not show detectable levels in the water. The target analysis results were summed and reported in ng F/g (ppb) and ranged from non-detect to 0.63 ppb (630,000 ppt) in backing, and non-detect to 0.15 ppb (150,000 ppt) in filling. Targeted analytes were not detected in the blades. Results of the TOPA indicated negligible PFAA formation in all three sample types. PFOS and PFOA were detected in five of the fields evaluated, ranging from 84-118 ppt PFOS, and 47-96 ppt of PFOA.

The results of the Lauria study suggest that PFAS is contained within the artificial turf (100% detection in total fluorine). The levels of TF are similar to the samples collected and sent to the Ecology lab by PEER. These results quantifying the TF within the product suggests PFAS are present within the matrix of the artificial turf. The addition of the EOF provides further information on what portion of the TF might be organic in nature, and more likely to be under the PFAS family. The results of the targeted methods identify known PFAS to also be present. Less than 42% of all samples had detectable levels of EOF and targeted PFAS. The results of the EOF were more than one order of magnitude lower indicating that most PFAS in AT is not extractable[1].

Review of Results

The extraction process used in the EOF method is intended to maximize the partitioning of the organic fluorine for analysis. The Stockholm study also included a small subset of samples extracted only by water and found no detectable fluorine. Neither method could be considered fully representative of the impact of environmental conditions experienced over a long period of time and therefore, conclusions regarding leachability cannot definitively be made based on these results, but these results could suggest that leachability is low.

Additional tests with conditions replicating all environmental impacts experienced by the area where the artificial turf is applied, including exposure to ultraviolet light and acidic precipitation, would be necessary to provide a more accurate assessment.

Notably, the Lauria study showed that PFAS concentrations were higher in the newer fields that used recycled materials such as ethylene propylene diene monomer rubber (EPDM) or styrene-butadiene rubber (SBR) when compared to the concentrations in the older fields. This finding should be considered when evaluating various options to procure, but also to guide future manufacturing guidance that could reduce resource consumption while reducing contaminant concentrations present in the product.

The Lauria study out of Stockholm is a well-defined study and confirms that PFAS are present in artificial turf material and can be significant components. However, the identification of what type of PFAS is present remains largely unknown and is not likely to be of similar make up across different manufactured turfs. In addition, this Stockholm study, as well as the smaller, less rigorous studies from PEER and UConn, suggest that any PFAS contained in the turf appears unable to migrate from the material. This may be in fact true, or it may be an artifact of the testing process which may not accurately represent all environmental conditions that impact the turf (including exposure to UV light) over time.

Conclusion

While the Stockholm study compiled a larger representative sample, it is unclear if this sample is representative of the types of AT available in the United States. If the samples are representative of AT placed in the U.S., the study appears to suggest that low levels of PFAS may be released from the product and the larger portion of PFAS detected is within the structure of the material. However, the lack of analytical methods that identify and quantify all potential PFAS limits the ability to make absolute conclusions that PFAS release is not a problem.

Manufacturers of artificial turf claim environmental benefits based on the elimination of the need for watering, mowing, and pesticides. However, the 2019 EPA report indicates the crumb rubber can contain many chemical compounds such as cadmium, chromium, and arsenic, although they do not characterize the infill for PFAS, and they do not assign risk to the chemical compounds detected. These concerns continue to be investigated and

[1] *"Extractable" is terminology used to define laboratory methods that are intended to separate the analyte from the surrounding material for analysis. Laboratory methods used for extraction to provide "total" analyte concentration are generally more aggressive than conditions experienced through aging or weathering of a material. If an analyte is not extractable, there may be an assumption that it would not leach under typical environmental conditions. This assumption might be accurate, but true leachability would need to be determined under a different experimental design and is not fully assessed with extractability alone.*

are further discussed in a recent paper by Murphy, et al., 2022, "Health impacts of artificial turf: Toxicity studies, challenges, and future directions" from two investigators out of NJIT.

Recommendations

There is limited data available to make a conclusion about the release of PFAS from AT during its period of active use. The available data shows PFAS as being a component of the material, but the types of PFAS that are present and the potential to have those chemicals released to the environment has not been established.

Given the uncertainties, it is advisable to create a plan to evaluate all available options. Although there appears to be some benefits to using AT, a full assessment of optional alternatives should be performed and endpoints such as toxic releases and carbon footprints should appropriately be compared to evaluate the full impact to environmental and human health. These evaluations should include not only the time where the AT is in active use, it should also include an evaluation of the resources used and contaminants, including PFAS, released during the manufacturing process and the end-of-life recycling/waste management process.

PFAS released in the plastic manufacturing process through wastewater discharges and stack emissions have been one of the largest sources to the environment, having an impact on both humans and natural resources. Due to the limited studies investigating the specific issue of leaching from AT, it is not entirely possible to assess levels of PFAS that may enter the environment during the relatively short use as an artificial turf product. The release of PFAS during the manufacturing of this material together with the release of PFAS during the decomposition in a landfill (or when discarded on a lot not far from the original use location, as occurred in the Massachusetts scenario) should also be considered. Although there is some advocacy for recycling this material at end-of-life, there are currently no known facilities that will perform this process for artificial turf (Horsley Witten, 2020).

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By Treven Pyles (staff/)
Posted on July 27th, 2023


*As environmentally-persistent contaminants, removing PFAS from drinking water requires expensive technological and infrastructural improvements whose annual national costs have been conservatively estimated to exceed $3.2 billion. However, these projections don't include the exorbitant costs of removing PFAS from wastewater.*

Wastewater is water which has been used for domestic, commercial, and industrial purposes, also known as "raw wastewater" or "raw sewage." Like many other toxic hazards, **PFAS accumulate in wastewater from numerous sources**, including the use of everyday products containing the compounds, commercial and industrial processes, and runoff from landfills and compost sites.

However, **the majority of US water treatment plants were designed to remove dangerous pathogens and solids**, not synthetic 'forever chemicals.' As a result, a large part of the PFAS that aren't eliminated during the treatment process end up being discharged in receiving public waters or lingering on as persistent contaminants in sewer sludge.



Removing PFAS from wastewater would require **significant infrastructural upgrades** to existing water treatment facilities to accommodate costly technologies such as:

# The excessive costs of removing PFAS from wastewater

## Participate in the PFAS water contamination with our experienced attorneys' help

With over 30 years of experience helping toxic exposure victims, Environmental Litigation Group's skilled legal specialists can **help local communities and public water systems obtain the compensation** required to address urgent PFAS remediation.

The eligible parties who participate in the lawsuit have the chance to **obtain a portion of 3M's historic settlement** (/nrwa/) to cover the unaffordable expenses of testing, treating, and removing PFAS from wastewater. If you're unsure whether you qualify, don't hesitate to **get in touch with us and request a free case evaluation**.

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- Foam Fractionation
- Ion Exchange Resins
- Super Critical Water Oxidation
- Pyrolysis with Thermal Oxidation

Although national estimates on the costs of PFAS wastewater treatment are scarce, a recent report from the Minnesota Pollution Control Agency (https://www.pca.state.mn.us/sites/default/files/c-pfc1-26.pdf) provides a sobering view of the **unaffordable expenses needed to address 'forever chemicals' at the state level** - notably, Minnesota's waterways have been polluted with PFAS **for over 50 years by the 3M chemical company**.

- **Over a period of 20 years**, the projected cost of removing PFAS from Minnesota's wastewater and biosolids would range between **$14 billion - $28 billion**.
- While PFAS have a market price of **$50 - $1,000/pound**, treatment and removal costs per pound of PFAS range between **$2.7 million - 18 million**.
- Wastewater facilities with a reduced capacity would incur per-pound treatment costs **up to six times higher than larger ones**.
- Novel short-chain PFAS variants are **harder and up to 70 percent more expensive to eliminate** than the legacy long-chain types they were meant to replace.

Due to economies of scale, the financial impact on water treatment plants serving small and rural communities would be disproportionately higher than treatment facilities in large urban centers, **the costs of which would end up being primarily shouldered by local taxpayers**. Fortunately, the **Bipartisan Infrastructure Law has allocated $5 billion** to address and remediate PFAS contamination in vulnerable frontline communities.

In 2020, **the National Rural Water Association (NRWA) filed a class-action lawsuit against major PFAS manufacturers** on behalf of water systems around the country for polluting national waterways. In June 2023, DuPont, Chemours, and Corteva chose to settle the case for **$1.185 billion**, followed shortly by a similar agreement from 3M, who settled matters for **$12.5 billion**, payable over a period of 13 years.

# Public Comment received for 1/16/24 LVVWD Board of Directors Meeting

| | |
|---|---|
| **From:** | Lara Preister |
| **To:** | &PublicComment |
| **Subject:** | {External} Back charged for 18 months |
| **Date:** | Sunday, January 14, 2024 7:06:15 PM |

Some people who received this message don't often get email from larapreister@gmail.com. Learn why this is important

Hello there,

I am emailing to speak my mind and hopefully get some fair recourse regarding being back charged for 18 months for my water bill.

I got a phone call that said I was required to pay an astronomical amount of $1800. I find the possibility of charging me based on what I likely used is terribly unfair. Of course, you can look at yours, previous and charge accordingly, but that's not to say that it was a fair amount this year. I had a water leak last year and paid a lot for that. I shouldn't have to pay for that again this year when it didn't happen.

Also asking for backpay because your equipment failed is unreasonable. One couldn't sell on a retail register that accidentally charged the wrong amount for hamburgers, and expect all of the customers who got a discount, unknowingly, to pay it back.

I understand the water was utilized, but it's not my responsibility to keep up LVVWD equipment. I expressed my concern with this on the phone and the representative said of course, that they have thousands of homes that they are offering services to. Yes you do. LVVWD is a giant corporation and therefore need to have some sort of checks and balances for its own equipment, this is not the customers responsibility.

I trust this email will be read at the meeting at 9 AM on Tuesday and I'll hear back regarding some sort of efforts to offer fair treatment to your clients who've been asked to pay such an astronomical amount for LVVWD mistake, not our own.

Thanks very much,

Lara Preister
678-592-5890