



MONTGOMERY COUNTY COUNCIL

Support HB 896 Montgomery County Councilmember Marc Elrich (At-large) March 1, 2013

I support this bill because it helps focus our precious Program Open Space Funds where they are most needed.

Using these funds for artificial turf fields does not make sense in the public health, environmental or fiscal arenas.

Artificial turf fields have been discussed repeatedly at the County Council and yet major, central questions have never been answered, and unbiased, scientific, peer-reviewed reports have been overlooked or ignored.

My staff and I have spent considerable time trying to understand the many considerations of using artificial turf, beginning with “What problem are we trying to solve with artificial turf?”

The answer is usually more even fields, more hours of use, fewer rain-outs, and lower maintenance costs.

All reasonable goals. But I’ve come to believe that artificial turf does not provide the best solution. Or even a good solution.

The environmental and public health trade-offs of using artificial turf have been troubling me for some time.

Peer-reviewed, scientific research has raised red flags about zinc and other contaminants leaching into surface and groundwater. Leaching of zinc rose to a serious level of concern because zinc levels in leachate exceeded safety levels meant to protect aquatic life. The “solution” suggested by these studies was that the zinc needed mitigation – a very expensive proposition and no fields that I know of are currently doing this.

Other studies have raised red flags about inhalation of microscopic, potentially carcinogenic particles from the tire crumb rubber that serves under the padding of the plastic blades. And other studies document the shocking heat on these fields. Montgomery County Schools have warnings about playing in temperatures exceeding 80 degrees, and above 90 they issue guidance that play between noon and 5 should be limited to an hour, with breaks every 20 minutes.

Studies find that the internal temperature of tire crumb in a field can exceed 130 degrees when the ambient outdoor temperature on a sunny day is about 80.

This is critical because the higher internal temperature leads to greater off-gassing of cancerous and other hazardous components of tire crumb. And this is where the known science gets iffy and assumptions about safety get questionable. Virtually all studies acknowledge the leaching and off-gassing of hazardous chemicals, but the oft-cited studies note that the levels of these chemicals are below safety thresholds. Even if they are correct, there is more to the story. As I find out, there is serious discussion among scientists about how to assess risk when the exposure is not to one chemical, but rather to 20 chemicals – as is the case with tire crumb. There are those who have taken the industry’s view. But there are other scientists who believe that a correct assessment of risks means that you have to group the chemicals by the target tissue and type of cancer or other deleterious effect they might have. So while one chemical does not rise above safety thresholds, the combination of chemicals may well exceed safe levels of exposure.

But more recently, the financial burden has begun to catch my attention too. These AT fields are expensive. In Montgomery County, the two most recent fields have cost \$1 million and \$1.2 million. Their warranties are for 8 years. Despite repeated questions, I still have no response about what happens after 8 years. I assume complete new fields are required, and our taxpayers will pay perhaps sooner than 8 years. Towson State University’s AT field was replaced in less than five years. One of our high school’s private partner in building the artificial turf field has gone bankrupt. Still no response on what liability we are left with.

The best grass fields are less than half the cost of an artificial turf fields. They last much longer than 8 years. And they’re grass – not plastic and ground-up tires. And we have experts in environmentally sustainable natural field grass management in Montgomery County, in Maryland and in nearby states.

Nevertheless virtually none of our grass fields are well-designed or well-maintained. We use the wrong grass breeds, do a cheap install and then wonder why rain is a problem. We could have sand-capped fields with correct grass seed and use environmentally friendly and successful practices (such as aeration and water-conservation). Experts know how to reduce or eliminate the need for pesticides and fertilizers and dramatically extend playability –both in number of hours and weather conditions.

One example: University of Maryland’s grass field was not usable following Hurricane Irene and a tropical depression that brought over 13 inches to the DC area in 4 days – they moved a rainy day match to a grass field at SoccerPlex, which was “ready for play.” Not all grass fields are the same – well designed, environmentally friendly fields can perform very well. (“Field of the Year,” SportsTurf, October 2012, p.39)

The more I learned, the more I began to believe that grass can meet our needs. Grass filters dirt and bacteria, absorbs carbon and reduces heat. Well-designed grass fields seldom need to be completely rebuilt or replaced. Maintenance of grass does cost more on an annual basis, but we can innovate. Perhaps we can explore the possibility of a maintenance fund.

I am trying to promote the best environmentally sustainable practices at new fields being planned in our County, and I would urge you to target our very limited natural resource funds to do the same.

I urge you to support this bill so that our precious public natural resource funds are put to their best possible use.

Thank you for your consideration of this issue.



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Artificial turf – unanswered questions

Montgomery County Councilmember Marc Elrich (At-large)

March 1, 2013

Artificial turf raises a number of unanswered questions regarding the environment (water quality, aquatic life, and heat islands), public health (chemical inhalation, ACL injuries and excessive heat), unresolved financial responsibility and actual usage patterns and needs.

What need are we trying to meet with artificial turf fields?

Increased use, decreased maintenance, reduced water use, reduced pesticides and fertilizers

What are the trade offs? Can we meet our goals with grass/natural turf?

Grass is important for the environment.

Grass is a natural filtration system; it filters rain as it runs into streams and waterways. Grass absorbs carbon dioxide, produces a cooling effect, filters rain and storm water.

High quality natural turf fields should be a goal. Montgomery County has someone knowledgeable on the topic.

Techniques and technology for high-quality, frequent use, low environmental impact grass fields is evolving and improving:

The high quality warm-season fields are used about 900 to 950 hours per year, and the cool-season fields support 700 to 750 hours of play. (The County's AT report said max 400-600 hours). "We prove everyday that the grass field will take more traffic than we ever thought. The more we evolve our ways, the more a grass field will be able to take," [Jerad] Minnick says. [Minnick is Sports Turf Manager for the Maryland Soccer Foundation, which houses the Soccerplex in Boyds] ("Field Care: New Ideas on Fall Renovations," Sports Field Management, October 2012

<http://www.sportsfieldmanagementmagazine.com/article-8665.aspx>)

Minnick explains that a correctly built sand-based field does well in the rain. "Following Hurricane Irene and a Tropical Depression that brought over 13 inches to DC in 4 days, the University of Maryland moved a rainy day match to SoccerPlex. The [grass] field at Maryland was unplayable but SoccerPlex Stadium was ready for play." ("Field of the Year," SportsTurf, October 2012, p.39

<http://read.dmtmag.com/i/86038/8>)

Minnick also authored an article explaining that "going 'green' is not a complex issue. It is a basic issue of conservation," eliminating unnecessary pesticide and fertilizer use and timing watering properly to conserve. He also reports that lawnmower technology is improving – hybrid mowers use

up to 40% less diesel fuel and are comparable in cost to conventional mowers. (Source: “Environmental Stewardship & your maintenance plan: Set an Example” by Jerad Minnick, Sports Turf, August 2012, p. 8-13 <http://read.dmtmag.com/i/77829/8>)

Environmental concerns of AT

What chemicals can be found in the synthetic turf crumb rubber?

The crumb rubber used in synthetic turf is mainly composed of recycled tires, which contain man-made and natural rubber. Based on the review of research studies and reports, certain chemicals have been identified in crumb rubber. These include small amounts of polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and heavy metals such as zinc, iron, manganese and lead. (Source: [NYC Dept. of Health and Mental Hygiene web page on AT](#))

Zinc. Testing of AT fields have shown zinc runoff at levels of concern. Zinc is poisonous to aquatic life forms such as daphnia, at the bottom of the food chain.

“Based on these results, DEP [Connecticut Department of Environmental Protection] concludes that **there is a potential risk to surface waters and aquatic organisms** associated with whole effluent and zinc toxicity of stormwater runoff from artificial turf fields...” (Source: Connecticut Department of Environmental Protection (DEP) Artificial Turf Stormwater Study, July 2010)

Polycyclic Aromatic Hydrocarbons (PAH)

AT fields contain toxic organics known as Polycyclic Aromatic Hydrocarbons (PAH) are linked to the high cancer rates among Anacostia fish species. DC and Montgomery have banned driveway coal tar sealants because of their PAH content.

“...Through the release of PAHs from stockpiled scrap tires, PAH emissions from pyrolysis of scrap tires or leaching of PAHs from recycled tire rubber material, **tires are a source of environmental pollution of PAHs throughout their entire lifecycle.**”

(Source: *Automobile Tires—A Potential Source of Highly Carcinogenic Dibenzopyrenes to the Environment*) <http://pubs.acs.org/doi/abs/10.1021/es204257d>

Health concerns of AT

Crumb rubber is inhalable. A recent study in New Jersey showed a “significant particulate cloud” is “likely”.

“...Add the fact that 22 players are on the field at one time in both football and soccer **and it is highly likely that a significant particulate cloud can be created on the field and may persist in light wind conditions and certainly on indoor fields for significant portions of the game.** For the present time, how widespread the presence of these high lead level fields is, is an unknown. At present the economic disincentive for schools or communities to measure the presence or absence of lead contamination appears to exceed any public concern for children’s safety.

Conclusions While it is not possible to draw broad conclusions from this limited sample of fields the results suggest that there is a potential for inhalable lead to be present on turf fields that have significant amounts of lead present as detectable by surface wipes. *It also would appear likely from*

this sample that if the lead is present to any appreciable extent in the wipes it will likely be present in the breathing zone of players who are active o these fields, and that furthermore, these levels potentially exceed ambient EPA standards. Given that these are only occasional exposures this tends to reduce the risk of adverse health effects. However given that children 10 are particulate {sic- should be particularly} at risk for adverse developmental effects of lead, only a comprehensive mandated testing of fields can provide assurance that no health hazard on these fields exists from lead or other metals used in their construction and maintenance. (Source: An Evaluation of Potential Exposures to Lead and Other Metals as the Result of Aerosolized Particulate Matter from Artificial Turf Playing Fields Submitted to: Alan Stern, Dr.P.H. New Jersey Department of Environmental Protection Submitted by: Stuart L. Shalat, Sc.D. (July 14, 2011) <http://www.nj.gov/dep/dsr/publications/artificial-turf-report.pdf>)

Hazardous organic chemicals were found in rubber recycled tire playgrounds and pavers. “In this study, the presence of hazardous organic chemicals in surfaces containing recycled rubber tires is investigated.The analysis confirmed the presence of a large number of hazardous substances including PAHs, phthalates, antioxidants (e.g. BHT, phenols), benzothiazole and derivatives, among other chemicals. The study evidences the high content of toxic chemicals in these recycled materials. The concentration of PAHs in the commercial pavers was extremely high, reaching values up to 1%. In addition, SPME studies of the vapor phase above the samples confirm the volatilization of many of those organic compounds. **Uses of recycled rubber tires, especially those targeting play areas and other facilities for children, should be a matter of regulatory concern.**”

(Source: Hazardous organic chemicals in rubber recycled tire playgrounds and pavers Review Article; Chemosphere, 22 August 2012

<[Http://www.sciencedirect.com/science/article/pii/S0045653512009848](http://www.sciencedirect.com/science/article/pii/S0045653512009848)>; Maria Llompart, Lucia Sanchez-Prado, J. Pablo Lamas, Carmen Garcia-Jares, Enrique Roca, Thierry Dagnac)

Cancer risks from crumb rubber:

“Certified hydrogeologist Matthew Hagemann, C. Hg., the former Director of the U.S. Environmental Protection Agency’s West Coast Superfund Program, calculated that a child playing on SBR crumb rubber as few as 30 times per year (less than once per week) would experience a cancer risk of 19 per million – almost 20 times higher than the CEQA significance threshold of 1 per million, and approximately twice as high as the cancer risk experienced by someone living adjacent to the Chevron Richmond refinery.” (Source: Superior Court of the State of California, County of Sand Francisco, Case No. CPF-12 512566, filed Oct. 12, 2012, p. 4

http://www.synturf.org/images/2012.10.12.Beach_Chalet_Complaint_-_FINAL_endorsed.pdf)

“Dr. Phillip Landrigan, M.D., epidemiologist and Director of the Mount Sinai School of Medicine Children’s Environmental Health Center in New York submitted a letter to the City expressing his concerns that the major chemical components of crumb rubber, styrene and butadiene, are a neurotoxin and proven human carcinogen, respectively, and that the types of exposure risks have not been adequately studied.” (Source: Superior Court of the State of California, County of Sand Francisco, Case No. CPF-12 512566, filed Oct. 12, 2012, p. 4

http://www.synturf.org/images/2012.10.12.Beach_Chalet_Complaint_-_FINAL_endorsed.pdf)

Cumulative effects of exposures?

Even if artificial turf field chemical exposures are not significantly higher than other locations such as urban areas, the question remains whether it makes sense to add exposure to individuals, increasing their cumulative exposure.

Lead:

What happened to the request that the fields be tested for lead and be certified lead free? The packet includes no such information for the MCPS fields; it only includes a brochure from FieldTurf, and the Parks Department reports that their tests showed “acceptable levels of lead”. (ED Committee #2, Jan. 28, 2013, p.4

http://www6.montgomerycountymd.gov/content/council/pdf/agenda/cm/2013/130128/20130128_ED2.pdf) However, a follow-up e-mail from Mike Riley, Deputy Director of Parks, to Janis Sartucci explained that the tests were conducted in **2009** and **they only tested the turf fibers, not the crumb rubber infill.**

ACL injuries are more frequent on artificial turf fields according to two published studies and anecdotal evidence.

ACL knee injuries are more likely on artificial turf than on natural turf according to a recent study published in the Journal of Sports Medicine. The study found that anterior cruciate ligament (ACL) injuries happened at a higher rate on the AT fields. **“College football players suffer knee injuries about 40 percent more often when playing on an artificial surface compared to when they’re playing on grass...”** (Source: “Incidence and Risk Factors for Injuries to the Anterior Cruciate Ligament in National Collegiate Athletic Association Football,” American Journal of Sports Medicine May 2012, vol. 40 and “Football knee injuries likelier on turf than grass,” by Kerry Grens, Reuters, April 30, 2012, <http://www.reuters.com/article/2012/04/30/us-football-knee-injuries-likelier-on-turf-idUSBRE83T0NH20120430>)

A previous study led by Dr. Elliott Hershman, Chairman of Orthopaedic Surgery at Lenox Hill Hospital in New York, NY, concluded that rate for ACL injuries and eversion ankle sprains are significantly higher in the NFL games played on Field Turf as compared to natural grass. **ACL sprains were 67 percent more common on FieldTurf than on natural grass.** Dr. Hershman was also the chairman of the NFL Injury and Safety Panel. (Source: “More Lower Extremity, Orthopaedic-Related Injuries Occur When Playing on FieldTurf,” March 12, 2010

<http://www.prnewswire.com/news-releases/more-lower-extremity-orthopaedic-related-injuries-occur-when-playing-on-fieldturf-87453472.html>)

Anecdotal evidence supports the scientific study. Since University of Maryland has installed its artificial turf field, five players were sidelined during the fall football season.

Heat: Artificial Turf can heat up much more than grass.

Tests by Brad Fresenburg, University of Missouri, shows that artificial turf temperatures can reach 173 degrees F on days with a high temperature of 98 degrees F. The temperatures at head height can hit 138 degrees F.

Exercise on these over-heated surfaces is associated with: heat exhaustion, heat stroke and extreme dehydration; burns and heat blisters, even blistering through shoes. (Source: “Artificial turf field heat

dangers require safeguards”, September 6, 2012, PEER, Public Employees for Environmental Responsibility)

“Direct temperature measurements conducted during site visits in NYC showed that synthetic turf fields can get up to 60° hotter than grass, with surface temperatures reaching 160°F on summer days. For example, on 6 July 2007, a day in which the atmospheric temperature was 78°F in the early afternoon, the temperature on a grass field that was receiving direct sunlight was 85°F while an adjacent synthetic turf field had heated to 140°F. ‘Exposures of ten minutes or longer to surface temperatures above 122°F can cause skin injuries, so this is a real concern,’ said Joel Forman, medical director of the Pediatric Environmental Health Specialty Unit at Mount Sinai School of Medicine, speaking at a 6 December 2007 symposium on the issue.” (Source: “Synthetic Turf: Health Debate Takes Root” by Luz Claudio, Environmental Health Perspectives 2008 March; 116(3): A116–A122. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2265067/>)

Warnings/Advice for Montgomery County’s fields

Both MCPS and Parks agree that there should be warnings, but the warnings are either unclear or not widely disseminated. According to the education committee packet:

“**Parks** responded that the following language was incorporated into the permit for parks artificial turf fields and posted on signs at each field:

"WARNING: This field can get very hot on warm, sunny days. If you experience symptoms of heat-related illness, such as dizziness, weakness, headache, vomiting, or muscle cramps, move to a shaded area. Drink water, rest, and seek medical attention if you do not feel better. In extreme temperatures, please cease all activities and get off of the artificial turf field. "

MCPS developed the following specific guidelines that are printed in its athletics handbook:

"Artificial surface fields generate greater heat than natural surface fields on warm and hot days. Anytime the outdoor temperature exceeds 80 degrees, coaches should exercise caution in conducting activities on artificial surface fields. When temperatures exceed 90 degrees, coaches may hold one regular morning or evening practice (before noon or after 5:00 pm); coaches must restrict practices between noon and 5:00 pm to one-hour, with water breaks every 20 minutes. Code red or code purple guidelines prevail, if applicable."

From CUPF:

Permits that include the language below are currently being issued for requests submitted during the December/January window for use of artificial turf fields beginning this spring.

- "If you experience symptoms of a heat related illness, take appropriate action. During periods of excessive heat, vacate the field and alert the CUPF Emergency Line (240-7772727) that you are leaving"
- Requests for refunds will be honored provided heat conditions forcing the cancellation are consistent with current weather conditions.

In addition, information advising artificial turf users about the conditions of use and the refund policy will be updated on our field webpage by the end of the month.

In anticipation of the increase in A1CPS artificial turf fields, CUPF will create bi-lingual signs and work with MCPS on installation. These signs will be posted by April 1, 2013 in preparation for the summer season. Advisory signs are already posted on some Parks artificial turf fields.”

(Source: Memo, Committee #1, Nov. 8, 2012, p.5

http://www6.montgomerycountymd.gov/content/council/pdf/agenda/cm/2013/130128/20130128_ED2.pdf)

Heat Island Effect

The extreme heat “is not only a hazard for users, but also can contribute to the ‘heat island effect,’ in which cities become hotter than surrounding areas because of heat absorbed by dark man-made surfaces such as roofs and asphalt.” (Source: “Synthetic Turf: Health Debate Takes Root” by Luz Claudio, Environmental Health Perspectives 2008 March; 116(3): A116–A122.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2265067/>)

“Columbia University climate researcher Stuart Gaffin analyzed thermal images generated from NASA satellite maps of New York City. He wanted to figure out how urban trees may help cool down neighborhoods. When Gaffin noticed a bunch of hot spots on the maps, he assumed they were rooftops. But he wanted to know for certain. ‘So we picked five or six really hot locations in the Bronx and went to visit them, and two turned out to be turf fields’ says Gaffin.” (Source: “High Temps On Turf Fields Spark Safety Concerns”, NPR, by [Allison Aubrey](#), August 07, 2008,

<http://www.npr.org/templates/story/story.php?storyId=93364750>)

From many site visits to both black roofs and synthetic turf fields, Gaffin has concluded that the fields rival black roofs in their elevated surface temperatures. (Source: “Synthetic Turf: Health Debate Takes Root” by Luz Claudio, Environmental Health Perspectives 2008 March; 116(3): A116–A122.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2265067/>)

According to the NPR report, the New York City Parks Department decided to move away from using recycled-tire rubber in new turf fields because of the concerns over the extreme heat and heat island effect. (Source: “High Temps On Turf Fields Spark Safety Concerns”, NPR, by [Allison Aubrey](#), August 07, 2008, <http://www.npr.org/templates/story/story.php?storyId=93364750>)

Unanswered financial questions

Who pays for the replacement fields? Each AT replacement field will cost about \$700,000. Despite sending that question to Education Committee staff in advance of the Committee meeting, it was not addressed. Fields last about 8 years although it’s possible they need replacement sooner. Towson State University replaced its FieldTurf field at Johnny Unitas stadium in less than 5 years with another FieldTurf field. Towson paid for the new field as well as the old. “FieldTurf Installed At Towson University's Historic Johnny Unitas Stadium,” July 11, 2007, <http://globenewswire.com/news-release/2007/07/11/362455/122737/en/FieldTurf-Installed-At-Towson-University-s-Historic-Johnny-Unitas-Stadium.html> and “Towson University to play on FieldTurf Revolution; Unitas Stadium, home of the Tigers, gets surface upgrade for start of 2012 season <http://www.fieldturf.com/en/artificial-turf/artificial-turf-news/towson-university-to-play-on-fieldturf-revolution>)

Disinformation is a disservice:

Memo from Joshua Starr to County Executive Ike Leggett stated that the concern that “there are harmful effects if [crumb rubber] is swallowed.” This issue was researched jointly by staff from Montgomery County Public Schools (MCPS), the Maryland-National Capital Park and Planning Commission, the County Council and the Montgomery County Recreation Department and determined that there was no data to support this concern.” (November 13, 2012)

To the contrary, studies do raise concern. One recent study shows that the absorption of lead from ingesting tire crumb increases as the size of the pellets decreases.

(www.ncbi.nlm.nih.gov/pmc/articles/PMC3278598/). Another study completed in September 2009 (included in the AT report!) shows lead is likely absorbed into the body if ingested.

AT fields do require maintenance.

“No matter what anyone says, these fields need maintenance routinely.” (This includes grooming, trash and debris removal, removal of chewing gum, weed removal, heap-filter vacuum cleaning.) (Source: “The Basics of maintaining synthetic turf.” By Jim Cornelius, CSFM, SportsTurf, October 2012, pp. 14-16, <http://read.dmtmag.com/i/86038/8>) NOTE: Their company seems to provide natural turf services, perhaps exclusively.

FieldTurf recommends the following cleaning products to “ensure compliance with FieldTurf’s industry-best third-party insured warranty”;

- a powerful industrial cleaner and conditioner used for removal of grease and oil, mold and mildew, and can be used as a deodorizer.
- Static Conditioner - control of electrical static buildup on artificial grass surfaces.
- Gum Remover - a solvent formulated for removing gum, tar, and adhesives.

<http://www.fieldturf.com/artificial-turf-maintenance/>