

A Review of Benefits and Issues Associated with Natural Grass and Artificial Turf Rectangular Stadium Fields

Prepared by a Staff Work Group from Montgomery County Public Schools,
Montgomery County Department of Parks, Montgomery County Council,
Montgomery County Department of Environmental Protection, and
Montgomery County Department of Health and Human Services

September 15, 2011

Final Report

Appendix N

Part 4 of 4

All Comments Received on the Draft Report During the Public Comment Period
(April 13, 2011 through June 7, 2011)

Print - Close Window

Subject: Turf Fields Damascus
From: neilcindy50@comcast.net (neilcindy50@comcast.net)
To: Turf ReportResponse@yahoo.com;
Date: Tue, 31 May 2011 16:08:34

I would support turf fields in Montgomery County Public Schools and Damascus High School is in desperate need for a turf field to support the high school and youth athletics in Damascus.

Neil Mohardt

Print - Close Window

Subject: Turf fields yes
From: Mike Dwyer (mdwyer3@verizon.net)
To: Turf ReportResponse@yahoo.com;
Date: Tue, 31 May 2011 16:09:03

Turf fields are a great investment and will allow the county school system to recoup some of the costs with outside use without the wear and tear.

Mike Dwyer

Print - Close Window

Subject: No vote

From: Linda McQuiggan (lsmcquiggan@comcast.net)

To: Turf ReportResponse@yahoo.com;

Date: Tue, 31 May 2011 16:24:18

I do NOT support spending the money for turf fields especially when the a lot of the outdoor equipment at our schools are rusted and/or broken.

Linda McQuiggan

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Subject: Turf Fields Support
From: Liz Elliott (liz.elliott@verizon.net)
To: TurfReportResponse@yahoo.com;
Date: Tue, 31 May 2011 16:58:02

I support artificial turf fields in Montgomery County. I have two daughters who play soccer with the Damascus Soccer Association, and my eldest daughter broke her foot last fall at practice. She was running with no-one around her, hit a divet in the field, and broke a metatarsal. She was out the rest of the season.

I would greatly appreciate better playing fields for soccer,

Thank you,

Liz Elliott

liz.elliott@verizon.net

9031 Gue Road

Damascus, MD 20872

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ect:artificial turf in Damascus

From: Kranwinkel, Elisa O (Elisa_O_Kranwinkel@mcpsmd.org)

To: Turf ReportResponse@yahoo.com;

Date: Tue, 31 May 2011 17:12:19

"I support artificial turf fields in Montgomery County."

[Print](#) - [Close Window](#)

Subject: Artificial turf
From: Deborah or John Scott (damascusscotts@gmail.com)
To: Turf ReportResponse@yahoo.com;
Date: Tue, 31 May 2011 17:17:50

I support artificial turf fields in Montgomery County. We need all the fields we can get for rainy weekends so we don't miss so many soccer games during a season.

Print - Close Window

. Subject:turf
From: Lauren Echeverria (mrsech@msn.com)
To: Turf ReportResponse@yahoo.com;
Date: Tue, 31 May 2011 17:29:51

If turf fields would mean less rescheduling due to wet fields, then I'm all for it!

Print - Close Window

Subject: We support the artificial fields
From: Hills (hillslawncare@verizon.net)
To: TurfReportResponse@yahoo.com;
Date: Tue, 31 May 2011 17:43:37

Artificial fields would be great .The fields in north mont. are really bad !

Print - Close Window

Subject: Turf Fields in Damascus
From: bmac1936@aol.com (bmac1936@aol.com)
To: Turf ReportResponse@yahoo.com;
Date: Tue, 31 May 2011 17:48:21

I support artificial turf fields in Montgomery County and specifically Damascus.

Bernie Lauer
26718 Howard Chapel Dr.
Damascus, MD 20872
301.253.4831
bmac1936@aol.com

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Subject: Artificial Turf
From: Bernard Williams (bkwill1@verizon.net)
To: Turf ReportResponse@yahoo.com;
Date: Tue, 31 May 2011 20:01:35

I support artificial turf.

Sent from Bernard's iPhone

Print - Close Window

Subject: Turf Fields....

From: Baskot, Michael (Michael.Baskot@montgomerycountymd.gov)

To: Turf ReportResponse@yahoo.com;

Date: Tue, 31 May 2011 20:32:12

I support artificial turf fields in Montgomery County.

Thanks,
POIII Michael Baskot
Montgomery County Police
5th District Special Assignment Team
Cell# 240-876-3708

Print - Close Window

Subject:Damascus HS

From: Rob Hyman (rhyman13@yahoo.com)

To: Turf ReportResponse@yahoo.com;

Date: Tue, 31 May 2011 20:50:26

Print - Close Window

Subject: Artificial Turf field at Damascus High
From: Vince (vespev@gmail.com)
To: Turf ReportResponse@yahoo.com;
Date: Tue, 31 May 2011 21:00:10

Hi,

I believe that an artificial-turf field is right for for Damscus High, and be a great benefit to the local community - I would strongly support such a facility.

Regards,
Vince Vesper

Print - Close Window

Subject:turf fields

From: Iconman1@aol.com (Iconman1@aol.com)

To: Turf ReportResponse@yahoo.com;

Date: Tue, 31 May 2011 21:33:51

I support artificial turf fields in Montgomery County

Bill Pizzano

Good Counsel High School, Girl's Junior Varsity Soccer Coach

iconman1@aol.com

Print - Close Window

Subject: "I support artificial turf fields in Montgomery County."
From: Jonesste@comcast.net (Jonesste@comcast.net)
To: Turf ReportResponse@yahoo.com;
Date: Tue, 31 May 2011 23:40:17

"I support artificial turf fields in Montgomery County."

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Subject: I support artificial turf fields in Montgomery County
From: DaxbookPro3 (daxhoffman@mac.com)
To: Turf ReportResponse@yahoo.com;
Date: Wed, 01 Jun 2011 05:26:05

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Subject: Artificial Turf fields

From: Sam Hoffpauir (samhoffpauir@verizon.net)

To: Turf ReportResponse@yahoo.com;

Date: Wed, 01 Jun 2011 07:09:14

I fully support artificial turf fields primarily due to the overuse of the current natural turf fields.

Thanks,

Sam Hoffpauir

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Subject: Turf Field at Damascus High
From: Donna Murray (drjmurray@verizon.net)
To: Turf ReportResponse@yahoo.com;
Date: Wed, 01 Jun 2011 07:21:33

I support a turf field at Damascus High School. Our community is very supportive and active at our high school and a turf field would be very beneficial to our town and school.

Thank You,
Donna Murray

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Subject:[No Subject]
From: smurfette42@juno.com (smurfette42@juno.com)
To: Turf ReportResponse@yahoo.com;
Date: Wed, 01 Jun 2011 07:54:43

I am not in support for artificial turf at the damascus high school.. This would only be good for football. I am for artificial turf on other grounds where a wider variety , thus more community uses the fiels rather than just football.

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Subject: Turf field at DHS
From: Judy Fernandez (jfernandez@church-redeemer.org)
To: Turf ReportResponse@yahoo.com;
Date: Wed, 01 Jun 2011 08:38:08

We support a turf field at Damascus High School !

Judy Fernandez

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Subject: Gaithersburg High School Turf field
From: Lesley Estrada (lesley.estrada@southpaws.com)
To: Turf ReportResponse@yahoo.com;
Date: Wed, 01 Jun 2011 09:14:31

Dear Mr. [Name obscured],

As a parent of a Gaithersburg High School student, I am writing you in favor of a turf field for our school.

Our school has a great track and field program. Our athletes will bring great honor to our school and our community. We will be able to provide a student and parent who are able to watch their child playing the sport without the expense of the field. And it will be a great benefit to the community of Gaithersburg and Maryland. We will be able to have a safe and healthy environment for our students.

Our school has a great track and field program. Our athletes will bring great honor to our school and our community. We will be able to provide a student and parent who are able to watch their child playing the sport without the expense of the field. And it will be a great benefit to the community of Gaithersburg and Maryland. We will be able to have a safe and healthy environment for our students.

Sincerely,

Lesley Estrada

Parent of Alexander Martin Grade 11 at Gaithersburg High School, a member of the Board of Directors for the Board of Directors and a member of the community.

Lesley Alvarez-Estrada

Internal Medicine Department
Southpaws, Veterinary Specialists & Emergency Center
www.Southpaws.com

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Subject: Turf Field
From: fyellowlab@aol.com (fyellowlab@aol.com)
To: Turf ReportResponse@yahoo.com;
Date: Wed, 01 Jun 2011 09:23:31

I support turf fields in Damascus

Fernando Jaramillo

Print - Close Window

ect:Yes!

From: Karen J Shimp (shimpy4@verizon.net)

To: Turf ReportResponse@yahoo.com;

Date: Wed, 01 Jun 2011 11:10:31

I have two children who play soccer (rec league). They LOVE when the game is at the Soccerplex because the turf fields are so much easier to play on.

I know natural is best in some ways, but if we could get some fields in Upcounty converted to turf, it would make it easier to have more games the kids can really sink their cleats into.

Karen Shimp

301 792 3481

Print - Close Window

Subject:Re: Fw: Turf Fields in Damascus
From: hy38@georgetown.edu (hy38@georgetown.edu)
To: Turf ReportResponse@yahoo.com;
Date: Wed, 01 Jun 2011 11:36:16

I support artificial turf fields in Montgomery County

Print - Close Window

Subject: "I support artificial turf fields in Montgomery County."
From: Michael.Dillingham@gxs.com (Michael.Dillingham@gxs.com)
To: Turf ReportResponse@yahoo.com;
Cc: MRDI DILLINGHAM@COMCAST.NET;
Date: Wed, 01 Jun 2011 12:05:37

The Dillingham family at 8505 Goshen View Drive, Laytonsville, MD, 20882

"Support artificial turf fields in Montgomery County"

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Subject: Artificial Turf Fields
From: jjsblue9@aol.com (jjsblue9@aol.com)
To: Turf ReportResponse@yahoo.com;
Date: Wed, 01 Jun 2011 13:03:15

I've have live in Montgomery co. my whole life (47years). I have five sons who all play football, it is very disappointing to me when we live in one of the richest counties in the United States and all our surrounding counties seem to be installing or already have Artificial Turf fields at there Schools, but we do not.

I want to let you know, I adamantly support artificial turf fields for Montgomery County Schools!

**Thank you,
John Sheehan**

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Subject: I support artificial turf fields in Montgomery County
From: McDonald, Kathleen (LNG-HBE) (Kathleen.McDonald@lexisnexis.com)
To: Turf ReportResponse@yahoo.com;
Date: Wed, 01 Jun 2011 14:49:23

I support artificial turf fields in Montgomery County

Kathleen M. McDonald

LexisNexis Risk Solutions

Sr. Director, Employee and Community Affairs

Kathleen.McDonald@LexisNexis.com

O/M 240.364.4312

F 301.916.1145

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Subject:[No Subject]
From: Funk, James W (James_W_Funk@mcpsmd.org)
To: Turf ReportResponse@yahoo.com;
Date: Wed, 01 Jun 2011 15:26:34

We have turf grass at Blair. It has been a great addition to our school. I support the installation throughout the county. Montgomery county is behind neighboring counties in this respect.

Jim Funk
Business Administrator
Montgomery Blair High School

Phone (301) 649-2825
Fax (301) 649-2830

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Subject: I support artificial turf fields in Montgomery County
From: carlhay1@aol.com (carlhay1@aol.com)
To: Turf ReportResponse@yahoo.com;
Date: Wed, 01 Jun 2011 17:48:15

I support artificial turf fields in Montgomery County

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Subject: I support artificial turf fields in Montgomery County.
From: Evangelista Wu (woolala98@yahoo.com)
To: Turf ReportResponse@yahoo.com;
Date: Wed, 01 Jun 2011 20:45:09

I support artificial turf fields in Montgomery County.

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. Subject: support turf fields in montgomery county

From: gina ancarmo (gi5jav@gmail.com)

To: Turf ReportResponse@yahoo.com;

Date: Thu, 02 Jun 2011 07:43:23

I support artificial turf fields installed in montgomery county schools. On the long run they are more cost effective to operate and they provide more opportunities for kids to play different sports almost year round. Thanks,
Gina Ancarmo

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Subject:FW: health and safety concerns with artificial turf fields
From: Levchenko, Keith (Keith.Levchenko@montgomerycountymd.gov)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 10:16:03

I'm forwarding this email in case it didn't already go to the turf report response email.

Keith Levchenko

Senior Legislative Analyst
Montgomery County Council Staff
100 Maryland Avenue, 5th Floor
Rockville, MD 20850
(work) 240-777-7944
(fax) 240-777-7888
keith.levchenko@montgomerycountymd.gov

 Please consider the environment before printing this email.

-----Original Message-----

From: Lynette Scaffidi [mailto:lynette.scaffidi@comcast.net]

Sent: Tuesday, May 31, 2011 9:29 PM

To: 'Lynette Scaffidi'; county.council@verizon.net; BOE; Beil, Clark; Shofar, Steven; Levchenko, Keith; Berliner's Office, Councilmember; Riemer's Office, Councilmember; Floreen's Office, Councilmember; Navarro's Office, Councilmember

Subject: RE: health and safety concerns with artificial turf fields

Dear Council Members and Montgomery County Public Schools,

I wrote earlier this year with my concerns about the use of artificial turf. I am resending my thoughts in response to the report on artificial turf. I have had extensive experience using the Artificial Turf (AT) fields in Maryland and Northern Virginia. I personally play on AT, I coach both my daughters teams and my daughters play on AT. Though the years, I have witnessed or experienced a number of negative impacts using AT fields. The most immediate concern is the use of AT fields during hot days. I have had several experiences where the field has been so hot that the girls were hopping from foot to foot because their feet were on fire. The girls were in terrible pain. When they were subbed off the field, they would sprint to the shade canopy, rip off their cleats and pour water on their feet. In one league where this occurred, there was a league rule stating when a player is subbed off, the player is not permitted to sub back on the field for the remainder of the half. This forced the players to stay on the field beyond what was best for their health. These are highly competitive athletes that will push themselves beyond what their body can truly take. Beyond the issues of their feet burning, if we continue to allow the use of these AT fields during the hot months, there will be an athlete that will succumb to these extreme temperatures. We, as adults, need to be the voice of reason and take action prior to a crisis that forces us to take action. Regulations are necessary for these AT fields. There needs to be closure times during hot days and there needs to be regulations on how long a player can be exposed to these extreme temperatures. This cannot be left to the players and coaches – there needs to be well defined regulations that err on the conservative side.

In addition to the heat issues, as a parent of daughters that spend extensive amounts of time on AT fields, I have serious concerns about the long term effects of exposure to the carbon black carcinogen and other chemicals that are in the crumb rubber in the AT fields. They are breathing in the chemicals and bringing home the crumb rubber. It's in their socks, shoes and clothes. It is in my car, home entrance, their rooms and bathroom. They are constantly exposed to it since it is inadvertently brought home with them. How can we allow this type of exposure to our children – and others using these fields? Is a few more hours of playability that AT are supposed to provide worth the risk to our children and allowing them to be treated as guinea pigs? There are safer substitutes available in place of crumb rubber. Why would we build one more AT field that is padded with crumb rubber?

AT fields are not closed due to rain. When there is a substantial rainfall, the turf fields get so filled with water that the entire field becomes a slip and slide. These conditions are not safe for the athletes. For the safety of the players, closure times should also be implemented for AT fields when there is considerable rainfall.

AT fields have been described as lasting years and years. I have seen 5 year old fields in Howard County showing signs of wear. The center area of the field where there is more activity during games, are dipping and creating puddles during rainy games. The seams on the field start to pull up creating tripping hazards for players.

The final issues at hand are the documented increase in ACL tears to the knees while playing on turf and the wear and tear to expensive cleats due to the plastic grass rubbing against the toe of the cleat. Cleats last one season when used on turf fields.

On a more personal note, my daughters attend Paint Branch High School. Paint Branch is scheduled to receive the next artificial turf field built at a MCPS. Once again, my children will be further exposed to the AT issues if Montgomery County continues to move forward with AT fields.

As a parent, I am hoping that all the negative issues and impact of AT fields will be seriously considered. It is my hope that we will return to having our children play on well constructed grass fields.

Thank you,

Lynette Scaffidi

14720 Claude Lane

Silver Spring, MD 20905

Lynette.Scaffidi@comcast.net

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Subject: I support artificial turf fields in Montgomery County, MD
From: Mills, Martin (martin.mills@ghill.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 10:58:52

I support artificial turf fields in Montgomery County , MD.

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Subject: I support turf fields in Montgomery County
From: Grimm, Donn (dwgrimm@bechtel.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 11:03:39

I specifically support the installation of a turf field at Damascus High School where sports run rampant from the earliest ages through high school for boys and girls.

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Subject: artificial turf
From: robyn@szotfamily.com (robyn@szotfamily.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 11:04:06

We absolutely support turf fields in Mont. Co., especially Damascus HS

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Subject: I support Turf Fields!!!!
From: Kelly S. Whetzel (kelly@singletonelectric.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 11:05:06

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Subject: Turf Fields
From: sue@woodsnest.com (sue@woodsnest.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 11:06:17

I support turf fields at Montgomery County Schools

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Subject: turf fields in montgomery county
From: Lori Slingsluff (slingsluff20882@yahoo.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 11:07:07

To Whom It May Concern--

I support turf fields in Montgomery County Public Schools!

Lori Slingsluff
301-717-5540

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ect:In Support

From: Tom&Chris Lansinger (tckle2000@yahoo.com)

To: Turf ReportResponse@yahoo.com;

Date: Thu, 02 Jun 2011 11:07:14

I personally support installation of artificial turf fields at Montgomery County high schools.

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Subject: In support of turf.
From: SL Howard (slh5648@gmail.com)
To: TurfReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 11:21:16

Having played football on all levels and on different grades of turf, I can appreciate playing on turf. It does eliminate the fun of playing in mud but that is OK. If what is installed is top of the line or close to it, I say go with it. Otherwise obtain a sod contract.

GO TURF!

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ect:[No Subject]
From: Kristin Baily (kristinbaily@yahoo.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 11:23:37

We fully support this plan! It will be great for the kids and the community!

Kristin Baily
Benefits Consultant
Baily & Associates
9504 Meadow Ridge Lane
Gaithersburg Md 20882
PH: 410-320-5992
FX: 240-668-5626
KristinBaily@yahoo.com

Print - Close Window

Subject:turf fields

From: Jayme Jaramillo (jjyellowlab@aol.com)

To: Turf ReportResponse@yahoo.com;

Date: Thu, 02 Jun 2011 11:35:01

'I support artificial turf fields in Montgomery County.

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ect:Artificial Turf Fields in Montgomery County
From: Kelly, Judy T. (Judy.Kelly@jhuapl.edu)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 11:49:59

I support artificial turf fields in Montgomery County.

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Subject: I support artificial turf fields in Montgomery County Maryland
From: Denis Dunathan (Denis.Dunathan@clarkbuildersgroup.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 12:17:09

I would love to see a turf field for all of our children to play. A turf field allows SO many more people to use the field, including our CHILDREN!!

Denis D. Dunathan

Sr. Project Executive
Clark Builders Group, LLC

12200 Tech Road #300

Silver Spring, MD 20904
301-680-3233 direct

240-330-7166 cell

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Subject: Montgomery County Turf Fields - Damascus
From: Kevin Hernandez (kevin.hernandez@yahoo.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 12:19:19

I support turf fields in Montgomery County. Howard County has beautiful facilities. We are behind on this!

Print - Close Window

Subject: Turf fields in montgomery county
From: Christine Hunt (cghunt1971@verizon.net)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 12:36:11

I approve the addition of turf fields in Montgomery County. This will be a great benefit to our community

Thank You,
Christine Hunt
Parent of a Damascus Sports Association Participant and Damascus High School Student

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Subject: artificial turf fields in Montgomery County.
From: John Pino (johngpino@gmail.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 13:02:29

I support artificial turf fields in Montgomery County.

John Pino

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Subject: Turf fields in Montgomery County
From: gnajaka@aol.com (gnajaka@aol.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 13:29:08

I support turf fields in Montgomery County.

Lynn Najaka

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ect:I support artificial turf fields in Montgomery
From: Sue Saponara (sue.saponara@yahoo.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 13:35:57

I support artificial turf fields in Montgomery County!!!

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Subject: Artificial turf fields in Montgomery county
From: Susan (billigfamily@verizon.net)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 13:47:16

I support having artificial turf fields in montgomery county schools! We need them!

Sent from my iPad

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COMMENTS OF ROCKVILLE YOUTH LACROSSE CLUB ON DRAFT "A REVIEW OF BENEFITS
Subject: AND ISSUES ASSOCIATED WITH NATURAL AND ARTIFICIAL TURF RECTANGULAR STADIUM
FIELDS"

From: tizolet@comcast.net (tizolet@comcast.net)

To: Turf ReportResponse@yahoo.com;

Cc: ry lcinc1@aol.com; rockvillelacrosse@gmail.com;

Date: Thu, 02 Jun 2011 14:09:00

To Whom it May Concern:

Please find attached the "COMMENTS OF ROCKVILLE YOUTH LACROSSE CLUB ON DRAFT 'A REVIEW OF BENEFITS AND ISSUES ASSOCIATED WITH NATURAL AND ARTIFICIAL TURF RECTANGULAR STADIUM FIELDS.'" If you should have any questions, please do not hesitate to contact us.

Theresa Zolet

Ray Megill

On Behalf of Rockville Youth Lacrosse Club and Dave Hafer, President of RYLC

COMMENTS OF ROCKVILLE YOUTH LACROSSE CLUB ON DRAFT "A REVIEW OF BENEFITS AND ISSUES ASSOCIATED WITH NATURAL AND ARTIFICIAL TURF RECTANGULAR STADIUM FIELDS"

On April 13, 2011, various Montgomery County, Maryland ("Montgomery County") agencies issued a draft for public comment of a report entitled "A Review of Benefits and Issues Associated with Natural and Artificial Turf Rectangular Stadium Fields." ("Report"). Rockville Youth Lacrosse Club ("RYLC") appreciates the opportunity to comment on this Report and hereby submits its comments as follows.

RYLC's USE OF MCPS NATURAL TURF FIELDS

For over seventeen years, RYLC has hosted youth boy's lacrosse teams in Montgomery County. During each spring, RYLC has used various Montgomery County Public School ("MCPS") natural turf fields for both practice and game play. Its primary field use has been at Frost Middle School ("Frost"). The three fields located at Frost have significant amounts of exposed dirt and rocks, and the grass that exists on these fields is in mounds instead of a smooth surface. These field conditions, i.e., the existence of exposed rocks, dirt and mounds of grass, are not safe for players and lead to injury. Throughout the years, RYLC, at its own expense, has placed grass seed on these fields in attempt to grow grass on these fields in order to make the surface more even. However, given the excessive use of these fields during the spring, there is no chance for grass to take root.

Furthermore, when it rains, these fields are often closed by Montgomery County /City of Rockville or deemed unplayable due to poor field conditions. During rain, if Montgomery County /City of Rockville does not specifically close these fields, then one must turn to the conditions of use found in the field permit. Specifically, the field use permits issued by Montgomery County CUPF include conditions of use as follows: "To protect the condition of the fields for the educational program, fields may not be used and activities must be cancelled when any one of the following conditions exists: (1) Director has cancelled use; (2) one-half inch or more of rain has fallen within the previous 24 hours; (3) water is standing on the field; (4) turf and mud can be displaced or dislodged from the ground; (5) ground cakes or clings to shoes; (6) steady rain is falling; (7) bare areas are muddy; (8) lightening is occurring." The permits further provide that "failure to adhere to any of the conditions of use will result in automatic denial of future use of school facilities. In addition, the user will be liable for payment of all costs to repair or restore a field because of the use."

Given the adverse condition of the Frost fields, and many of the other fields that RYLC uses, when it has rained, or it is raining, RYLC would be in violation of one or more of these conditions if it were to use these fields. In fact, during the spring of

2011, in which there was an abundant amount of rain, these fields were often unplayable resulting in numerous game and practice cancellations.

RYLC COMMENTS

RYLC applauds the Report's authors for taking such a thorough look at safety, environmental and other issues related to installation and use of artificial turf fields ("ATFs"). Lacrosse is the fastest growing sport in the United States of which Montgomery County has its fair share of participants. And this large and rapidly growing expansion of men's and women's lacrosse is being added to already strained natural turf field capacity in Montgomery County. There will come a time in the not too distant future when there is not enough natural turf field space in Montgomery County to match the demand for youth and high school-level lacrosse practice and game field space, in addition to accommodating the growth in other sports' need for the same fields. The addition of ATFs will go a long way in easing this constraint.

As clearly outlined in the Report, there are issues with ATFs. However, none of these issues rise to the level that would require ATFs not to be installed and used in Montgomery County. In fact, one could argue that the benefit of exercise, especially in light of the childhood obesity epidemic faced in the United States, far outweighs any yet-to-be proven significant and adverse health risk associated with ATFs. Indeed, the installation and use of ATFs would result in (1) increased playability and hours of use, (2) less injuries, and (3) the provision of consistent and safer playing surfaces. All of these benefits of ATFs would go along way in addressing RYLC's concerns with many of the practice and game fields that it currently uses. Furthermore, installation of more ATFs in Montgomery County would mean less use and less wear and tear on existing natural turf fields, thus allowing these existing fields to be more appropriately maintained.

In addition, while not directly addressed in the Report, RYLC urges the Report's authors to reconsider the criteria used in determining when ATFs will be allowed to be installed. While RYLC fully appreciates the equity issues involved with the installation of ATFs at MCPS high school stadiums, the issue of how money can be raised and equitably distributed across the MCPS high schools to install these fields must be reviewed. The chart on page 27 of the Report uses an initial capital cost figure to install ATFs of \$1.25 million per field. There are 25 MCPS high schools, three of which already have ATFs. Thus, using the Report's number of \$1.25 million/ATF, a total of \$27.5 M would need to be raised in order for ATFs to be installed at the remaining 22 schools. Given the desperate need for ATFs in Montgomery County by multiple sports organizations, and the ability to approach one vendor to work out a deal for installation and maintenance of all these fields, it is hard to believe that these funds cannot be raised across Montgomery County.

Again, RYLC appreciates the opportunity to submit these comments and looks forward to the final Report.

Sincerely,

DATED: June 3, 2011

[Print - Close Window](#)

Subject: Turf Fields
Whipp, David (David.Whipp@MerchantLink.com)
TurfReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 14:32:19

! Support artificial turf fields in Montgomery County.

David Whipp | Performance Improvement Specialist

Merchant Link

O 301 562 5028

david.whipp@merchantlink.com

<http://www.merchantlink.com>

For expert commentary on transaction security,

visit <http://www.merchantlinksecuritycents.com>

Learn more about Merchant Link at www.merchantlink.com.

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Print - Close Window

Subject:turf
From: Rich Checkan (rcheckan@verizon.net)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 14:33:16

Please consider adding turf fields in Upper Montgomery county. They are desperately needed!

Thanks,

Helen Checkan
23601 dixie ridge ct
Gaithersburg

Print - Close Window

Subject: turf fields

From: Lauren Cacopardo (laurencacopardo@yahoo.com)

To: Turf ReportResponse@yahoo.com;

Date: Thu, 02 Jun 2011 14:41:41

I support turf fields in Montgomery County Schools.
Lauren Niswander Cacopardo

Print - Close Window

Subject: I support artificial turf fields in Montgomery
From: Sarah Reynolds (sarahr213@gmail.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 15:17:48

I support artificial turf fields in Montgomery
County.

Print - Close Window

Subject: Say yes to the Artificial Turf
From: Elaine Jones (Elaine_Jones1@msn.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 15:43:52

I support artificial turf for Montgomery County School fields.

Elaine Jones
Mont. Co. Resident

Print - Close Window

Subject: I support artificial turf fields in Montgomery ,County
From: David Wilkerson (daveatdensity@gmail.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 15:53:36

I support artificial turf fields in Montgomery County.

Dave Wilkerson
9816 Log House Ct.
Gaithersburg, MD 20882

Print - Close Window

Subject: [No Subject]

From: jandlcompany@aol.com (jandlcompany@aol.com)

To: Turf ReportResponse@yahoo.com;

Date: Thu, 02 Jun 2011 16:07:44

'I support artificial turf fields in Montgomery County.'

The Lopez family

Print - Close Window

Subject: Turf fields
From: iji1017@verizon.net (iji1017@verizon.net)
To: Turf ReportResponse@[yahoo.com](mailto:ReportResponse@yahoo.com);
Date: Thu, 02 Jun 2011 17:43:40

To Whom It May Concern,

I wholeheartedly encourage Montgomery County to install artificial turf fields at all practical locations in the county.

Sincerely,
Ian Iacoviello

Print - Close Window

ect:[No Subject]

From: Robert Moran (bluesplayer1@verizon.net)

To: Turf ReportResponse@yahoo.com;

Date: Thu, 02 Jun 2011 17:59:06

Turf fields look nice and can take lots of abuse/ use in all weather, but the good old fashion real turf is better all we need in this county is to put funds towards upkeep –WATERING= and repairs at much less the cost plus it is better for the environment and welfare of the players. Have some synthetic fields but we need real grass fields that are properly maintained and more of them. The later choice will allow future generations the joy of playing on REAL GRASS...

Print - Close Window

Subject:artificial turf fields
From: Robin Kelly (robinbkelly@verizon.net)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 18:46:44

I feel it is long overdue that we have artificial turf fields in Montgomery County. All my children play sports and travel to the surrounding counties. I seems like we are the only county in the state without artificial turf fields. We pay for the use of the fields and yet, in bad weather we have to cancel our games but still have to pay for the use of the fields. As I mentioned, the surrounding counties use the fields year round, Football, Lacrosse and soccer keep the fields busy. All the locations have multiple fields and concession stands. The concession stands enable the sports associations to support their teams needs. We are supposed to be one of the richest counties in the country yet in the 21st century we do not have artificial turf fields.

best regards

Robin B. Kelly

Print - Close Window

Subject: Damascus High School Turf Field Input
From: Mike Bradshaw (mbrad@comcast.net)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 18:59:00

I am in favor of installing a turf field at Damascus High School. The field supports a myriad of sports throughout the year for both the high school and youth sports programs. The field is generally in terrible shape by mid fall due to the usage. Upgrading to turf would be a HUGE benefit to the Damascus community.

Sincerely,

Mike Bradshaw

(301) 821-3295

Print - Close Window

Subject: Turf Fields at High Schools in Montgomery county
From: Cindy (neilcindy50@comcast.net)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 21:23:22

I support turf fields at High Schools in Montgomery County. I think this county needs to invest money in youth sports. Many other counties in MD have turf fields for youth sports associations. Montgomery County needs to recognize how important sports are for children and invest some of their money in these kids!!!!

Damascus has a huge youth sports association, but not enough fields to play on. Its almost embarrassing to visit these amazing facilities in other counties and have them come here to play on the fields we have available . Shows that our county does not see the value of youth sports!!!!

Thanks
Cindy Mohardt
Sent on the Sprint® Now Network from my BlackBerry®

Print - Close Window

Subject: turf in Damascus
From: John Cacopardo (johncacopardo@yahoo.com)
To: Turf ReportResponse@yahoo.com;
Date: Thu, 02 Jun 2011 23:12:27

An upgrade from grass is long overdue.

Print - Close Window

Subject:[No Subject]
From: Christopher.CTR.Weaver@faa.gov (Christopher.CTR.Weaver@faa.gov)
To: Turf ReportResponse@yahoo.com;
Date: Fri, 03 Jun 2011 06:08:01

I support artificial turf fields in Montgomery County.

Chris Weaver
Information System Analyst
Lockheed Martin NISC III
Terminal Procedures Group
1305 East-West Highway, Room 2140
Silver Spring, MD 20910
Office: 301-427-4995
[Visit AeroNav Products Here](#)

Print - Close Window

Subject: Artificial Turf Fields
From: Joanna Wong (joanna_wong@verizon.net)
To: Turf ReportResponse@yahoo.com;
Date: Fri, 03 Jun 2011 06:15:47

Dear Turf Report Response,

As a parent of high schoolers, I have seen on many occasions players have running and ball handling issues on poorly maintained athletic grass fields. Therefore, I strongly support Artificial Turfs Fields in Montgomery County Schools.

Kindest Regards,
Joanna Wong

Print - Close Window

Subject: Turf Fields in Montgomery County
From: Peter Markot (pmarkot@yahoo.com)
To: Turf ReportResponse@yahoo.com;
Date: Fri, 03 Jun 2011 06:37:30

Dear Sir/Ma'am,

I fully support turf fields in Montgomery county. The Damascus soccer club continues to practice and play on old, not well-maintained fields. The student athlete deserve better. As a coach and a referee, I feel strongly that turf fields will only enhance the sport of soccer, promoting a safer surface to play on and allowing kids to enjoy the game to the fullest.

Sincerely,

Pete Markot

Print - Close Window

Subject: Turf Fields

From: Townsend, Dewey E. (townsend-dewey@zai.com)

To: Turf ReportResponse@yahoo.com;

Date: Fri, 03 Jun 2011 07:34:09

I absolutely support the installation of turf fields in the county schools. Especially at Damascus High School. The field is dangerous and overused!

David "Dewey" Townsend

Head Coach DSA Girls Lacrosse...2006 - present.

Print - Close Window

Subject: Yes!!

From: kimcreates@verizon.net (kimcreates@verizon.net)

To: Turf ReportResponse@yahoo.com;

Date: Fri, 03 Jun 2011 08:26:40

I support artificial turf fields in Montgomery County!!! For years we have been playing on beautiful artificial fields in Howard county with football and at the Maryland Soccerplex for soccer with less cancellations because of rain, no mud pits which could be potentially harmful, and less upkeep.

I absolutely support artificial turf fields on Damascus!!!!

Kimberly McCullagh

Sent from my iPhone

Print - Close Window

ect:[No Subject]

From: S. Chandlee (dsacougars@aol.com)

To: Turf ReportResponse@yahoo.com;

Date: Fri, 03 Jun 2011 09:00:04

'I support artificial turf fields in Montgomery County.'

Print - Close Window

Subject: CUPF's Statement in Support of Artificial Turf Fields

From: Gong, Ginny (Ginny.Gong@montgomerycountymd.gov)

To: TurfReportResponse@yahoo.com;

Joseph_Lavorgna@mcpsmd.org; James_Song@mcpsmd.org; Ginny.Gong@montgomerycountymd.gov;

Cc: Stephen.Beach@montgomerycountymd.gov; Mark.Geibig@montgomerycountymd.gov;

Robin_Confino@mcpsmd.org; William_Beattie@mcpsmd.org; Vivian.Yao@montgomerycountymd.gov;

Keith.Levchenko@montgomerycountymd.gov;

Date: Fri, 03 Jun 2011 10:14:00

Attached is CUPF's Statement in Support of Artificial Turf Fields in response to the Staff Work Group's report "A Review of Benefits and Issues Associated with Natural and Artificial Turf Rectangular Stadium Fields." Please let me know if you have any questions.

Ginny Gong, Director

Community Use of Public Facilities

From: Lavorgna, Joseph [mailto:Joseph_Lavorgna@mcpsmd.org]

Sent: Monday, May 16, 2011 11:29 AM

To: Anne Ambler ; Bayeshea, Comfort O; Beattie, William; Bell, Clark; Bowers, Larry; Bulson, Sean W.; Cascone, Judy; Confino, Robin; Montgomery County Council; Crispell, Bruce; Deanna Duff; Diana Conway ; Diane Cameron; Diane Cameron Audubon; Dianne Cameron ; Don Hauprich; Douerson, Theresa; Donna Pfeiffer; Eckenrode, Tina R; Gong, Ginny; Gould-Kostka, Jeanine L.; Hermann, Ursula A.; Higgins, Roy L.; Ikheloa, Roland (MCPS Chief of Staff); Jerad Minnick ; Jessell, Joyce; Jones, Dianne - School Plant Operations; Kathy Michels ; Levchenko, Keith; Kimball, LaVerne G; Kress, Don; Kristin Tribble; Lavorgna, Joseph; Liebes, Sherry; Locke, Dan; McConoughey, Deborah S; MCCPTA; McShane, John [mailto:John.McShane@fieldturf.com] ; Citizen, Mid-County; Riley, Mike; Mills, Brona t Saeyin; Paula Bienenfeld; Peang-Meth, Suzanne; Berliner's Office, Councilmember; Schmitz, Shelli A; Sheldon Fishman ; Shofar, Steven; Shour, Michael; Shuman Jr, Richard C; Skinner, Veronica; Song, James; Stetson, Frank H.; Steve Augustino; Buffone, Susan; Burkinslaw; Talley, Adrian B.; Tanner, Lynda M; Trish Heffelfinger; Wade, Patricia; Citzen, Bethesda; Amos, Susan L.; Belott, Patrick; Benz, Joan L.; Berry, Christopher S.; Cohen, Marc J; Collins, Christine H; Cudd, Kenneth N.; Dempsey, Lance; Dixon, Jeanette L. Dornier; Robert; Doody, Joseph J.; Doran, Michael J.; Evans, Leroy C.; Fahrner, Paul J.; Fernandez, James G.; Freda, Jonathan J; Fuggitti, Marco G.; Garran, Christopher S.; Goodwin, Alan S.; Green, Elizabeth K.; Gregory, William M. (Sherwood HS); Heimbach, Ross, Edward J.; Hilliard III, Harold J.; Johnson, Henry R.; Kelley, David S.; Koutsos, James P.; Lane, Ronald D.; Levine, Deena; Lockard, Karen L.; Lowndes, Kevin E.; McLeod, Nelson; Miller, Dale L.; Minus, Eric L.; Muggle, Debra K.; Munk, Debra S; Murphy, Scott W.; Podosuk, Heather A.; Ross, Edward J.; Ryan, Maura M.; Sacramo, Raymond F.; Schrader, Lisa J.; Spears, Reginald L.; Sullivan, Jeffrey K.; Tapley, James C.; Thorn, Suzette A.; Thompson, Christopher L.; Wetzel, Andrew R.; Williams, Darryl L.; Woodward, Jason D; Working, Carole A

Subject: Public Comment Period Extended to June 3

Please be aware that the public comment period for responses to the Staff Work Group's report "A Review of Benefits and Issues Associated with Natural and Artificial Turf Rectangular Stadium Fields" has been extended to the close of business on June 3, 2011. All responses should be sent to:

TurfReportResponse@yahoo.com

There continues to be some technical difficulties with the link to the report on the County Council website. Please access the report from the Council's home page.

<http://www.montgomerycountymd.gov/csltml.asp?url=/content/council/index.asp>

For your convenience a copy of the full report is attached to this email.

Thank you for your continued interest in this report.

Staff Work Group



COMMUNITY USE OF PUBLIC FACILITIES

Dilan Leggett
County Executive

Ginny Gong
Director

STATEMENT IN SUPPORT OF ARTIFICIAL TURF FIELDS

The Office of Community Use of Public Facilities (CUPF) wishes to express its support for increased artificial turf field installations and use in Montgomery County.

As we have consistently stated since the first artificial turf field was proposed, the overall demand (volume of use and requested use) for athletic fields in the County exceeds the existing supply. Simply put, field time is scarce in the County, especially in some areas, given the number of groups requesting field use. Each season sees an expansion in the number of leagues, teams and individuals seeking use of fields for recreational programs. In addition, schools have historically demonstrated an increasing need for use of both their own fields and nearby fields. It is precisely because field assets are limited and can't meet existing demands that some users have become increasingly frustrated with their inability to access fields of their choosing.

Historically, CUPF has not had access to book high school stadium fields. With the advent of artificial turf, however, CUPF is booking non-school users onto those fields as part of the agreements executed between MCPS and the partners with whom they are sharing costs of the fields, thus increasing the available pool of sites potentially available for local use.

Among other advantages CUPF has noticed at schools where artificial turf has been installed, is the decrease in a school's requests to use other nearby fields for practices. Historically, some high schools have relied on use of neighborhood fields for practice so that they could "save" their fields for actual games. Since artificial turf is more durable and permits use under conditions not possible with natural grass fields, schools are booking less time on local fields than historically was the case, thus freeing up use for other groups. Decreased use of local fields for this purpose helps to minimize wear and tear on these fields for other users so that community groups are now accessing those fields in better condition, since they are not as heavily used by high schools.

Related, since artificial turf fields are more durable, local groups have also been able to access time on some artificial turf fields when not in use by schools without extensive concerns about whether or not the field will then be in a state to support the school's own needs. Unlike grass fields, which require "rest periods," artificial turf fields can be scheduled extensively.

Moreover, unlike natural grass fields, artificial turf fields can be available during some periods of inclement weather and are more immediately usable after periods of rain. This becomes a significant factor during periods of heavy rainfall.

Increased installation of artificial turf fields will help with the high demand for field use in Montgomery County and could positively affect the condition of local fields.

Ginny Gong, Director
Community Use of Public Facilities



Print - Close Window

Subject: I support artificial turf fields in Montgomery County
From: Michele Terry (mterry@cootermangold.com)
To: Turf ReportResponse@yahoo.com;
Date: Fri, 03 Jun 2011 10:54:37

Michele M. Terry

Paralegal

1000 Wisconsin Avenue, NW

5301 Wisconsin Avenue, NW

Suite 500

Washington, DC 20015

(202)537-0700

Print - Close Window

Subject: We support Turf Fields in MC
From: Erica Petrolle (erica.petrolle@verizon.net)
To: Turf ReportResponse@yahoo.com;
Date: Fri, 03 Jun 2011 11:24:43

As Montgomery County residents, we fully support the installation of turf fields throughout the county. Player injury is rising every season, across every sport, due to the poor conditions of our natural fields that have more rocks and dirt than grass. There are not enough athletic fields to support the growing number of youth playing sports in our county and turf fields would facilitate more games. Our youth deserve better.

-Tony & Erica Petrolle
Damascus, MD

Print - Close Window

Subject: I support Turf Fields
From: Donny Johnson (donnjohn) (donnjohn@cisco.com)
To: Turf ReportResponse@yahoo.com;
Date: Fri, 03 Jun 2011 11:36:02

As a resident of Montgomery County for over 40 years I support Turf Fields for our High Schools. especially Damascus where the High School allows our Rec Football teams to use the school facilities since Montgomery County does NOT provide any facilities for the Rec Football teams in Damascus.

Donny Johnson

Print - Close Window

Subject: I support Artificial Turf for Montgomery County Schools
From: Katherine Shaheen (Katherine.Shaheen@jdsu.com)
To: Turf ReportResponse@yahoo.com;
Date: Fri, 03 Jun 2011 12:08:01

Best regards,

Kathy Shaheen

Inside Sales Support

(240) 404-2359 direct

(240) 404-1297 fax

katherine.shaheen@jdsu.com

Web: www.jdsu.com

Technical Assistance: 800-638-2049 ext 2300

Customer care: 800-638-2049 ext 2850 opt.2

Please feel free to pass on any feedback to my supervisor louis.mayer@jdsu.com



Print - Close Window

Subject: Artificial Turf Fields in Montgomery County
From: Sanjay Dharmadhikari (kunalsanjay@hotmail.com)
To: turfr eportresponse@yahoo.com;
Date: Fri, 03 Jun 2011 12:54:02

To Whosoever it may concern:

I support artificial turf fields in Montgomery County.

- Sanjay Dharmadhikari
23446 Tailor Shop Place
Clarksburg, MD 20871

Print - Close Window

Subject: support artificial turf

From: Tina Limber (tina.limber@gmail.com)

To: Turf ReportResponse@yahoo.com;

Date: Fri, 03 Jun 2011 13:04:30

Print - Close Window

Subject:Damascus High Turf Field
From: Tony Petrolle (tony@gaithersburgair.com)
To: Turf ReportResponse@yahoo.com;
Date: Fri, 03 Jun 2011 16:12:01

I am a member of the Damascus Sports Association and have two children involved in many activities organized by the DSA. I am in huge support of installing an artificial turf field at the Damascus High School.

Damascus is unique in that the community has a huge involvement of youth sports yet does not have adequate facilities to support the large programs in the community, as do many other parts of the county. While the Regional Park and many surrounding parks have numerous soccer and baseball fields, there is no home for the football program and the quickly growing lacrosse program. Utilizing Baker Middle and the Rec Center for practices is ok, but the fields are not equipped for games. In addition, the unbelievably high usage of the high school field during the fall for the high school sports is about all the grass can handle. When we add to it the DSA football program, the field is usually nothing but dirt and mud by mid September! I am aware the school has the field re-sodded each spring, which must cost a fortune. Also, the constant need to reschedule games due to rain is a major burden to the residents of the community involved in the football and lacrosse programs. It seems it would be in the interest of the community AND the county, both from a financial and community service perspective, to replace the grass field with a turf field.

I urge you to please highly consider making this replacement as soon as possible.

Thank you for the consideration.

Tony Petrolle

President

Gaithersburg A/C & Heating, Inc.

301.926.3253 o

301.948.4113 f

email: tony@GaithersburgAir.com

web: GaithersburgAir.com



**GAITHERSBURG
AIR CONDITIONING
& HEATING, INC.**

Print - Close Window

Subject: Artificial turf draft report - comments

From: Elrich's Office, Councilmember (Councilmember.Elrich@montgomerycountymd.gov)

To: Turf ReportResponse@yahoo.com;

Cc: Councilmember.Berliner@montgomerycountymd.gov;

Date: Fri, 03 Jun 2011 16:45:43

I would like to make some requests and observations regarding the draft report that was submitted for public review. Previously, while the group was preparing the draft report, I sent a list of questions and concerns that I had wanted addressed. Below are further comments regarding some of those issues.

1. Natural turf – best environmental practices. It would be useful for the group to speak with knowledgeable individuals and/or organizations regarding best practices of organic care of natural turf. As you may know, organic care reduces (and sometimes eliminates) the use of fertilizers; it also reduces the amount of irrigation needed and may extend the playability hours for the field. I know the working group received an e-mail from Kathleen Michels, dated January 10, 2011 outlining some of the leaders in this field. Also, the resolution from Montgomery County Stormwater Partners Network on Sustainable Athletic Field Construction and Maintenance calls for a pilot project to install and maintain athletic fields in an organic matter. My staff had a detailed conversation with Kevin Mercer, athletic director at St. Mary's regarding St. Mary's maintenance and use of natural turf fields. We would be happy to provide you with those notes if that would be of use to your reviewing this issue. By not addressing this possibility as an alternative, the report missed an important piece of how Montgomery County might be a leader in the field of preserving green spaces (pervious surfaces) while also providing better playing fields for athletic teams. Consequently, it also did not make a full comparison on environmental impacts between natural grass and artificial turf fields.

2. Insufficient and inaccurate information regarding studies and reports mentioned in the draft report. I was dismayed to learn that potential conflicts of interest by report authors or sponsors are not identified in the report. For example, the report includes the Department of the Environment's review of existing studies; this review includes studies that receive their funding from tire manufacturers (Chemrisk 2008), FieldTurf (Moretto 2007) and a private engineering firm that designs and builds artificial turf fields (Bristol and McDermott 2008). Furthermore, the literature review neglects to note that the Artificial Turf report from Environment and Human Health (a non-profit "made up of doctors, public health professionals and policy experts committed to the reduction of environmental health risks to individuals" as described on their website) actually calls for a *moratorium* on any new fields until further research is undertaken. Additionally, it appears that many of the reports coming from public agencies do not conclude the absence of environmental risk; rather, they caution that their studies should not be considered conclusive. Some call for additional procedures, including the report from the San Francisco Department of the Environment, as detailed on pages 48 and 49 of the draft report.

3. Stormwater runoff. From the studies cited, it appears that this concern has not yet been sufficiently explored and various studies call for further testing. The draft report does not sufficiently address the 2010 findings from the Connecticut Department of Environmental Protection regarding the possibility of chemicals from artificial turf fields leaching into Westport's waters. (Westport News 8/10/10). Additionally, some of the procedures required for stormwater management of artificial turf that might mitigate the potential leaching need to be further detailed (including the costs and the most environmentally friendly processes). Diane Cameron of Stormwater Partners Network would be a useful contact.

4. Heat island effect. The impact of adding impervious surface around the County is not sufficiently addressed. While the extraordinary heat radiating off the artificial turf fields is certainly of concern, there is also another related but separate concern of adding yet more impervious surface to our county. If instead, the County chose to pilot an organic natural turf field using best practices, there could be less impervious surface and less heat radiated.

5. Use and availability calculations. More explanation is needed on how you calculate the total hours of usage. In particular, how do the fields get used between 8 am and 3 pm on weekdays (p.22)?

I appreciate your attention to these concerns.

Marc Elrich

Councilmember At-large

Received Between
Close of Business

June 3, 2011

and

June 7, 2011

Print - Close Window

Subject: I Support Artificial Turf in Montgomery Co.
From: robertjonezz@comcast.net (robertjonezz@comcast.net)
To: Turf ReportResponse@yahoo.com;
Date: Fri, 03 Jun 2011 20:26:03

Print - Close Window

Subject: Athletic Fields Comparison: References Apparently Ignored
 From: Anne Ambler (anambler@gmail.com)
 To: turfreportresponse@yahoo.com;
 county council@montgomerycountymd.gov; councilmember.riemer@montgomerycountymd.gov;
 councilmember.berliner@montgomerycountymd.gov; boe@mcpsmd.org;
 Cc: Councilmember.Floreen@montgomerycountymd.gov; kathleen.michels@verizon.net;
 Susan.Buffone@montgomerycountymd.gov;
 Date: Sat, 04 Jun 2011 12:25:48

Partial Comments on the draft "Review of Benefits and Issues Associated with Natural and Artificial Turf Rectangular Stadium Fields"

Over the course of the months during which the report was in progress, Dr. Michels sent Keith Levchenko of the work group quite a number of references to peer reviewed articles, as well as a few relevant news articles. It was very disappointing to find that as far as we can tell, these were ignored. These references provided--even to the untrained eye--reason to doubt the wisdom of replacing natural turf with plastic and pulverized used tires--from health, environmental, and fiscal perspectives.

Following are references sent via email (and cc-ed to me) under the dates on which they were sent. The list is probably not all-inclusive, but includes most. Some of the text that originally accompanied the references has been deleted in order to make the long list a bit more manageable.

Anne Ambler
 12505 Kuhl Road
 Silver Spring, MD 20902

Nov. 9, 2010

Arlington > News:
Synthetic-Turf Fields Starting to Come Due for Replacement
Arlington County Plastic Field replacement to cost \$835,000
 by SCOTT McCAFFREY, Staff Writer
 (Created: Wednesday, May 26, 2010 8:06 AM EDT)

As the county government expands its effort to build artificial-turf fields across Arlington, the time has come to reconstruct the very first such field built in Arlington.
 A synthetic-turf field at Gunston Middle School is slated to be replaced in the coming fiscal year, at a cost of about \$835,000, county officials said.
 "It was installed in 2002, and the useful life of a synthetic field is eight years - so it will be beyond due for replacement," county government spokesman Mary Curtius said. "All the county's fields are on an eight-year rotation for replacement - their useful lifespan, according to their manufacturer."

Dec. 4, 2010

See <http://www.ars.usda.gov/is/AR/archive/nov10/gardens1110.htm>

Excerpts below

Money for Sporty Topsoil

Morris says, “There is money for constructed-soil research for golf courses and college and professional-level playing fields, but not for sports fields at the high school, elementary school, or park levels—until now. The costs are lowered by using inexpensive byproducts available locally.”

From their past research, ARS scientists know that certain soils are unusable for ballparks and rain gardens because they tie up phosphorus, making it unavailable to plants. Therefore, ARS is working with the West Virginia Natural Resources Council and NRCS to develop a computer model that will help users choose which local soils are best for ballparks, soccer fields, rain gardens, and other uses. It will use the NRCS soil survey data, the first such use of this data.

Natural Turf vs. Artificial Turf

“Natural turf can get a bad name from overuse of poorly constructed fields,” Morris says, “but it is an inexpensive alternative to artificial turf. It can compete well when everything works. Natural turf has all the resiliency of artificial turf.” ...

Constructed soil is a much more sophisticated version of the home gardener’s method of improving the soil by blending in sand, topsoil, and organic amendments such as humus, composted manure, sewage sludge, or yard and garden clippings.

A good constructed soil goes way beyond these conventional recipes. Research and chemical analyses are used to determine what is needed to ensure that soil does not become compacted and has excellent drainage, water-holding capacity, and aeration properties, plus essential nutrients for robust plant growth. ...

Over the long term, Zobel envisions new turfgrass varieties, possibly perennial ryegrass and tall fescue, that will penetrate compacted soil and renovate fields without the need to till the compacted soil. “We have a lot of information from previous research on roots, soils, and microbes that we can draw on for the constructed-soil project,” Zobel says. He sees an eventual extension of the constructed-soils research and demonstration projects to homeowners and homebuilders for improving their lawns and rain gardens.

Dec. 22

Artificial turf tire crumb rubber infill

Two new issues here-

- 1) carbon black and its recent reclassification as first -a probable carcinogen (World Health Organization), second-evidence it may affect brain function and
- 2) nanoparticles in tires - both from carbon black and added as engineered carbon nanotubes - potential toxicity (and problem of detecting in the field)

Carbon Black is the main constituent of tires, has recently been classified as a probable carcinogen and is associated with Brain Damage in children:

<http://www.item.fraunhofer.de/en/press-media/latest-news/pm-carbonblack.jsp>

Fraunhofer Institute for Toxicology and Experimental Medicine

How dangerous are carbon nanoparticles?

Press Release 10.08.2010

Fraunhofer ITEM is participating in a research alliance on the health risks of carbon black

Carbon black is an industrial chemical that is manufactured in large quantities worldwide. It consists of smallest nanoparticles and is used, for example, in the manufacturing of automobile tires and plastic materials. A health risk from carbon black nanoparticles (CBNP)

cannot be ruled out, and the World Health Organization has classified these particles as possibly carcinogenic.

<http://aje.oxfordjournals.org/content/167/3/280.full>

Am. J. Epidemiol. (2008) 167 (3): 280-286.

<http://us.mg5.mail.yahoo.com/neo/launch?.rand=bofd22s71smca>

6/6/2011

Association of Black Carbon with Cognition among Children in a Prospective Birth Cohort Study

In summary, this is the first study to have found a consistent relation between exposure to black carbon and reduced cognitive functioning across a number of domains in urban, community-dwelling school-aged children. More studies are needed to explore the potentially neurotoxic effects of particulate matter, both to determine the possible impact on cognitive development among children and cognitive decline across the life cycle and to determine the potential contribution of air pollutants to the development and exacerbation of neurodegenerative diseases (i.e., Parkinson's disease, Alzheimer's disease).

<http://www.ncbi.nlm.nih.gov/pubmed/19928188>

J Nanosci Nanotechnol. 2009 Aug;9(8):5099-104.

"Particulate matter induced enhancement of inflammatory markers in the brains of apolipoprotein E knockout mice." Campbell A, Araujo JA, Li H, Sioutas C, Kleinman M.

Recently "As scientific information about the occupational health risks associated with specific nanomaterials accumulates and becomes more widely recognized as sound science, and as that scientific information serves as the basis of industry guidelines and voluntary standards, the hazard becomes more "recognized" from a legal perspective.

<http://www.cdc.gov/niosh/docs/2010-158/>

A Story of Impact: Oct. 2010: NIOSH Research Methods Demonstrate that Breathing Nanoparticles May Result in Damaging Health Effects

<http://www.bafu.admin.ch/dokumentation/umwelt/10649/10659/index.html?lang=en>

Synthetic nanoparticles can penetrate tissue and cells, and spread throughout the body - even to the brain.

Professor Peter Gehr of the University of Bern, an internationally renowned tissue specialist, is astonished that potential health risks are barely acknowledged outside the scientific world and government agencies.

<http://www.tahan.com/charlie/nanosociety/course201/nanos/BA.pdf>

Nanoparticles in tires keeping them strong

FROM SCIENCE MAGAZINE

<http://www.sciencemag.org/cgi/content/full/311/5761/622?ikey=2eB0nrqZwskKs&key>

Toxic Potential of Materials at the Nanolevel

Andre Nel,^{1,2*} Tian Xia,¹ Lutz Mädler,³ Ning Li¹

Nanomaterials are engineered structures with at least one dimension of 100 nanometers or less. Possible undesirable results of these capabilities are harmful interactions with biological systems and the environment, with the potential to generate toxicity.

The establishment of principles and test procedures to ensure safe manufacture and use of nanomaterials in the marketplace is urgently required and achievable.

http://wn.com/Nanoparticles_Linked_to_Deaths_at_Chinese_Factory

Nanoparticles manufactured in certain paints and tires led to deaths of 7 Chinese workers - when nanoparticles entered their lungs.

Below: More published reviews and some primary studies on brain damaging effects of particulates.

And to ameliorate the gloom - the last article gives hope from the natural world (which ironically we are doing away with when we pave acres with plastic and tire crumbs).

<http://www.ncbi.nlm.nih.gov/pubmed/12051555>

Toxicol Pathol. 2002 May-Jun;30(3):373-89.

Air pollution and brain damage.

Pollution and the brain: Destination brain: Inhaled pollutants may inflame more than the lungs

<http://us.mg5.mail.yahoo.com/neo/launch?.rand=bofd22s71smca>

6/6/2011

Read more @ http://www.sciencenews.org/view/feature/id/58906/title/Destination_brain

<http://www.scientificamerican.com/article.cfm?id=pollutions-toll-on-the-brain>

Pollution's Toll on the Brain

Breathing dirty air may have serious effects on cognition, in children and adults

November 11, 2009

<http://dukeandthedoctor.com/2010/01/air-pollution-may-damage-brain-heart/>

Air Pollution May Damage Brain, Heart

<http://www.sciencedaily.com/releases/2010/10/101021152401.htm>

Plants Play Larger Role Than Thought in Cleaning Up Air Pollution, Research Shows

ScienceDaily (Oct. 22, 2010)

"This complex metabolic process within plants has the side effect of cleansing our atmosphere."

Once they understood the extent to which plants absorb oVOCs, the research team fed the information into a computer model that simulates chemicals in the atmosphere worldwide.

The results indicated that, on a global level, plants are taking in 36 percent more oVOCs than had previously been accounted for in studies of atmospheric chemistry.

Additionally, since plants are directly removing the oVOCs, fewer of the compounds are evolving into aerosols.

"This really transforms our understanding of some fundamental processes taking place in our atmosphere," Karl says.

Jan. 20

<http://www.lenntech.com/aquatic/toxicity-response.htm>

If two or more poisons are present together in an effluent they may exert a combined effect to an organism, which be additive, antagonistic or synergistic.

An example of an additive interaction is the combined toxicity of zinc<<http://www.lenntech.com/Periodic-chart-elements/Zn-en.htm>> and cadmium<<http://www.lenntech.com/Periodic-chart-elements/Cd-en.htm>> to fish.

Calcium<<http://www.lenntech.com/Periodic-chart-elements/Ca-en.htm>> in antagonistic to

lead<<http://www.lenntech.com/Periodic-chart-elements/Pb-en.htm>>, zinc and

aluminium<<http://www.lenntech.com/Periodic-chart-elements/Al-en.htm>>. Copper<<http://www.lenntech.com/Periodic-chart-elements/Cu-en.htm>> is more than additive with chlorine, zinc, cadmium and

mercury<<http://www.lenntech.com/Periodic-chart-elements/Hg-en.htm>>, while its decreases the toxicity

of cyanide<<http://www.lenntech.com/aquatic/anions-cyanide.htm>>. The toxicity to the mayfly Baetis rhodani of phenol

and ammonia<<http://www.lenntech.com/aquatic/definitions.htm#ammonia>> at low concentrations is additive, but at higher concentrations the effect is more than additive.

Lenntech BV e-mail: info@lenntech.com<http://www.lenntech.com/feedback/feedback_uk.htm?ref_title=Toxicity%20to%20aquatic%20life>

Read more: <http://www.lenntech.com/aquatic/toxicity-response.htm#ixzz0vvonAUw3>

green roofs, zinc, MDE crumb Tire Disposal in Maryland and Montgomery County - relevance for artificial turf and its disposal

FYI- from Maryland- relevance for artificial turf fields as well with their 20,000-40, 000 tires worth of zinc leaching into the ground as well as stormsewers.

http://www.psla.umd.edu/faculty/lea-cox/Publications/3_Non%20Peer-Reviewed/SNA/Solano%20et%20al,%202009%20%20SNA%2054_166-170.pdf

"Potential zinc toxicity from crumb rubber in green roof applications, SNA Research Conference Vol. 54 2009

Container Grown Plant Production Section 166 Potential Adsorption of Zinc in Crumb Rubber-Amended Green Roof

<http://us.mg5.mail.yahoo.com/neo/launch?.rand=bofd22s71smca>

6/6/2011

Substrates"

S. Lorelly Solano¹, Andrew G. Ristvey², John D. Lea-Cox¹ and Steven M. Cohan¹

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Index Words: Urban, storm water, runoff, toxicity

Significance to Industry: Extensive green roof systems have numerous proven ecological and economic benefits including storm water management, energy conservation, mitigation of the urban heat island effect, and improvements in urban aesthetics. ... Most substrates presently used in extensive green roof systems consist primarily of heat-expanded shales, clays and slates, which sometimes represent a substantial load problem when retrofitting older buildings. Crumb rubber (CR), a recycled tire product, is a potential light-weight amendment that may reduce substrate loads, decreasing engineering costs for buildings (1) and may also improve the porosity and longevity of many green roof substrates. However, CR may release potentially toxic levels of zinc (Zn) for ornamental plants (6) and many other plant species under certain growing conditions. Soluble Zn also represents a pollutant for aquatic environments at relatively low concentrations. This study demonstrates the ability of the commercial green roof substrate (rooflite™, Skyland USA, Avondale, PA) to adsorb Zn released from CR amendments.

Jan 31

<http://muskogeephoenix.com/local/x135632056/Bond-issue-would-allow-MPS-to-resurface-football-field>

Bond issue would allow MPS to resurface football field

million bond issue in April — which includes \$1.3 million for resurfacing the field,....

Today, football players say the 10-year-old artificial turf is coming apart, leaving rubber pellets on the surface — and melting their cleats on hot days.

By Wendy Burton Phoenix Staff Writer The Muskogee Phoenix Sat Jan 29, 2011, 10:00 PM CST

Feb. 11

Zinc oxide is now officially classified as "Dangerous for the Environment" with the risk phrase "Very toxic to aquatic organisms,

Information from the plastics industry itself on zinc regulations which also pertain to artificial turf.

<http://www.plastemart.com/upload/Literature/Banning-harmful-chemicals-play-important-role-in%C2%AC-plastic-industry.asp>

HISTORY:

In 1993 the Dutch National Institute of Public Health and Environmental Protection (RIVM) presented an 'Integrated Criteria Document' for zinc, recommending for water a 'desirable' level of 9 µ/l and a maximum allowable concentration of 25 µ/l. In 1995, zinc and zinc derivatives were included in a priority list of rubber chemicals compiled by the Swedish Environmental Protection Agency, which should be replaced or used restrictively. In 1995, zinc and zinc oxide were placed on the second European list of priority substances in the EU Risk Assessment Programme. In June 2002 the German Standard DIN 18035-7 "Sports Grounds, Part 7" "Artificial Turf Areas" was published. According to this standard, two leaching tests are required for post-consumer tyre rubber granulates used as infill material for artificial turf and the following limits are set in leachates:

• 1 mg/l after leaching with deionized water (DIN 38414-4)

• 3 mg/l after leaching with water saturated with CO₂.

Between 1998 and 2004, draft Assessments were produced and responses put forward by the zinc chemical and rubber

industries.

Since 29 April 2004 (see Council Directive 2004/73/EC, relating to the classification, packaging and labelling of dangerous substances) zinc oxide is officially classified as "Dangerous for the Environment" with the risk phrase "toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment", and with the safety advice "This material and its container must be disposed of as hazardous waste" and "Avoid release to the environment. Refer to special safety instructions/safety data sheets". Rubber compounds containing more than 2.5 % in total of zinc chemicals or other chemicals classified as R50/63 (such as IPPD) are classified as "Toxic to aquatic organisms, may cause long-term effects in the aquatic environment".

Feb. 16

Tire Crumb infill: Carbon Black and Carbon nanotube Health Risks to Children Using Artificial Turf Fields

Carbon black, the main component of tires and tire crumb infill for artificial turf, has been implicated in cancers, heart disease, lung disease and brain damage . Carbon nanotubes are also added and may be as toxic as asbestos. Carbon black is added to rubber to make tires and consists of the smallest nanoparticles. For synthetic playing field infill carbon black is an unnecessary and potentially toxic additive to the rubber. In fact, the dark color contributes to the very high heat retention of the field . It is what makes children's shoes and legs black after playing on a field of tire crumb.

Read more: Research Alliance on the health risks of Carbon Black: "Prediction of human toxicological effects of carbon black nanoparticles" Fraunhofer Institute for Toxicology and Experimental Medicine

<http://www.item.fraunhofer.de/en/press-media/latest-news/pm-carbonblack.jsp>

Environmental health perspectives carbon black

[http://www.google.com/search?](http://www.google.com/search?q=Environmental+health+perspectives+carbon+black&sourceid=ie7&rls=com.microsoft:en-US&ie=utf8&oe=utf8&rlz=117GGIE_en)

[q=Environmental+health+perspectives+carbon+black&sourceid=ie7&rls=com.microsoft:en-US&ie=utf8&oe=utf8&rlz=117GGIE_en](http://www.google.com/search?q=Environmental+health+perspectives+carbon+black&sourceid=ie7&rls=com.microsoft:en-US&ie=utf8&oe=utf8&rlz=117GGIE_en)

Nanosafety consortium- carbon black toxicology articles

<http://www.nanosafetyconsortium.com/invivotoxbibliography.html>

<http://www.cdc.gov/niosh/docs/2010-158/>

A Story of Impact: Oct. 2010: NIOSH Research Methods Demonstrate that Breathing Nanoparticles May Result in Damaging Health Effects]

Entire study: <http://www.cdc.gov/niosh/docs/2010-158/pdfs/NanotechParticles.pdf>

DHHS (NIOSH) Publication Number 2010-158, October 2010

Summary: The study was conducted by The National Institute for Occupational Safety and Health, NIOSH, which researched health effects on workers who handle carbon nanotubes and are exposed to them, with the intent of designing protective safety procedures. Their study using mice found a) strong inflammatory effect and cell damage from exposures to carbon black nanotubes, b) concluded that long term effects such as cancer were possible, and c) more study was necessary to protect those humans exposed to the carbon nanoparticles.

CARBON BLACK Sample References:

Carbon Black and Cancer:

Cancer is the No. 2 killer of Americans and people in most industrialized countries, after heart disease. In May the President's Cancer Panel said Americans are being "bombarded" with cancer-causing chemicals and radiation... The American Cancer Society and three Federal agencies have recently named 19 chemicals as potential causes of cancer that need further investigation. Among these is carbon black, the main component of tires, which are ground up and placed on our playgrounds and sports fields. It is the stuff children are covered with after hitting the turf on the soccer field or falling on the playground. As cancer takes the number two killer spot behind heart disease, is it really wise to subject our children to yet another carcinogen while they are rapidly growing and absorbing the elements of their environment? (Reference: <http://www.reuters.com/article/idUSTRE66E5AS20100715?>)

[feedType=RSS&feedName=topNews >](#)

Carbon nanotubes are being added to tires, plastics etc to increase their strength. But there may be health effects.
<http://www.scientificamerican.com/article.cfm?id=carbon-nanotube-danger>

Study Says Carbon Nanotubes as Dangerous as Asbestos By Larry Greenemeier | Tuesday, May 20, 2008

New research shows that long, needle-thin carbon nanotubes could lead to lung cancer

Inhaling carbon nanotubes could be as harmful as breathing in asbestos, and its use should be regulated lest it lead to the same cancer and breathing problems that prompted a ban on the use of asbestos as insulation in buildings, according to a new study posted online today by [Nature Nanotechnology](#).

During the study, led by the Queen's Medical Research Institute at the University of Edinburgh/MRC Center for Inflammation Research (CIR) in Scotland, scientists observed that long, thin carbon nanotubes look and behave like asbestos fibers, which have been shown to cause mesothelioma, a deadly cancer of the membrane lining the body's internal organs (in particular the lungs) that can take 30 to 40 years to appear following exposure. Asbestos fibers are especially harmful, because they are small enough to penetrate deep into the lungs yet too long for the body's immune system to destroy. The researchers reached their conclusions after they exposed lab mice to needle-thin nanotubes: The inside lining of the animals' body cavities became inflamed and formed lesions

Carbon black and brain damage:

<http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info%3Adoi%2F10.1289%2Fehp.0901661>

"Nanoparticles Induce Changes of the Electrical Activity of Neuronal Networks on Microelectrode Array Neurochips"
 Gramowski et al, Environmental Health Perspectives, 118(10) Oct 2010

Conclusion: Carbon nanoparticles at very low particle concentrations are able to induce neurotoxic effects by disturbing the electrical activity of neuronal networks. The underlying mechanisms depend on the particle type with carbon black exerting its neurotoxic effects at concentrations below those needed to induce oxidative stress. In addition Carbon black, iron and titanium oxide nanoparticles entered into Glial cells and neurons .

HARVARD SCHOOL OF PUBLIC HEALTH STUDY published in American Journal of Epidemiology "Association of Black Carbon with Cognition among Children in a Prospective Birth Cohort Study"

< <http://aje.oxfordjournals.org/content/167/3/280.full> > [Am. J. Epidemiol.](#) (2008) 167 (3): 280-286.

While studies show that ultrafine and fine particles can be translocated from the lungs to the central nervous system, the possible neurodegenerative effect of air pollution remains largely unexplored. The authors examined the relation between black carbon, a marker for traffic particles, and cognition among 202 Boston, Massachusetts, children... In summary, this is the first study to have found a consistent relation between exposure to black carbon and reduced neurocognitive functioning across a number of domains in urban, community-dwelling school-aged children.

More studies are needed to explore the potentially neurotoxic effects of particulate matter, both to determine the possible impact on cognitive development among children and cognitive decline across the life cycle and to determine the potential contribution of air pollutants to the development and exacerbation of neurodegenerative diseases (i.e., Parkinson's disease, Alzheimer's disease).

<http://www.ncbi.nlm.nih.gov/pubmed/19928188>

[J Nanosci Nanotechnol.](#) 2009 Aug;9(8):5099-104.

Particulate matter induced enhancement of inflammatory markers in the brains of apolipoprotein E knockout mice.
 Campbell A, Araujo JA, Li H, Sioutas C, Kleinman M.

Carbon Black: Lung and Heart disease:

Carbon black causes Lung Inflammation:

Exposure to Six Different Ultrafine Carbon Particles Indicates a Surface Area Threshold Dose for Acute Lung Inflammation in Mice"

<http://ehp03.niehs.nih.gov/article/info%3Adoi%2F10.1289%2Fehp.8266>

<http://www.highbeam.com/doc/1G1-193915832.html>

<http://us.mg5.mail.yahoo.com/neo/launch?.rand=bofd22s71smca>

6/6/2011

Synergistic effect of co-exposure to carbon black and Fe (sub 2) O (sub 3) nanoparticles on oxidative stress in cultured lung epithelial cells.(Note – potential for Zinc in artificial turf to be synergistic with carbon black to cause toxicity)

Carbon Black in air pollution is most associated with heart and blood vessel inflammation

Air pollution has been linked to cardiovascular disease.

Increasingly carbon black is being fingered as the culprit:

[http://www.highbeam.com/doc/1G1-247037097.html?key=01-](http://www.highbeam.com/doc/1G1-247037097.html?key=01-42160D517E1A106E1309051F0F694B2E224E324D3417295C30420B61651B617F137019731B7B1D6B39)

[42160D517E1A106E1309051F0F694B2E224E324D3417295C30420B61651B617F137019731B7B1D6B39](http://www.highbeam.com/doc/1G1-247037097.html?key=01-42160D517E1A106E1309051F0F694B2E224E324D3417295C30420B61651B617F137019731B7B1D6B39)

Among 92 subjects with diabetes in the Boston area, O'Neill et al. (2005) found that exposure to ambient particulate matter was associated with reduced vascular reactivity and with elevated blood markers of vascular inflammation and injury (O'Neill et al. 2007). Black carbon exposure showed the strongest associations, which suggests that carbon-containing particulates..., were most important in causing vascular effects.

<http://ehp03.niehs.nih.gov/article/fetchArticle.action;jsessionid=F84883821A95A898EB63960E4423A911?articleURI=info%3Adoi%2F10.1289%2Fehp.0900591>

“Black Carbon Exposure, Oxidative Stress Genes, and Blood Pressure in a Repeated-Measures Study”

Mordukhovich et al. Environmental Health Perspectives, 117(11): Nov 2009 The investigators found an association between ambient carbon black concentration and blood pressure but not between other particulates and blood pressure.

<http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info%3Adoi%2F10.1289%2Fehp.0901440>

“Black Carbon Exposures, Blood Pressure, and Interactions with Single Nucleotide Polymorphisms in MicroRNA Processing Genes” Environ Health Perspect 118(7) 2010 ;

This study shows that genetic variations may mediate individual responses to the cardiotoxic effects of black carbon.

Carbon Black exposure may directly affect chromosomes to cause disease and aging:

<http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info%3Adoi%2F10.1289%2Fehp.0901831>

“Annual Ambient Black Carbon Associated with Shorter Telomeres in Elderly Men: Veterans Affairs Normative Aging Study”

Environ Health Perspect 118:1564-1570.

Conclusions: Telomere attrition, linked to biological aging, is associated with long-term exposures to airborne particles, particularly those rich in carbon black and may contribute to the cardiotoxic effects.

Increased exposure of individuals to carbon black particulates may cause problems above exposure in the ambient air.

<http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info%3Adoi%2F10.1289%2Fehp.5646>

"Personal PM2.5 Exposure and Markers of Oxidative Stress in Blood," *Environmental Health Perspectives* 111(2) Feb 2003

Mette Sørensen et al.

Personal exposure appears more closely related to these biomarkers potentially related to cardiovascular disease than is ambient PM2.5 background concentrations.

The studies explain a) carbon black is a probable carcinogen, b) exposure can cause cognitive dysfunction and deficit from breathing in particulate, c) carbon black nanoparticles can cause neuronal inflammation, and d) there is substantial scientific agreement that this subject needs to be studied thoroughly. It is very important to note that because the natural particles are at ultra fine and nano particle levels, there is no way of detecting the inhalation levels on a field without special detection protocols and equipment.

Bottom line carbon black is VERY bad news for children and adults alike. Concentrating it in artificial turf infill is an unprecedented experiment on humans. As such we really should have a research protocol in place for monitoring ^{long term} health effects on the increasing numbers of children using the fields on a regular basis. In absence of ^{te} epidemiological studies or data at nano levels, educators, community leaders and parents should exercise immediate precautions to avoid children's exposure to carbon black.

Carbon black and engineered nanoparticles in tires may cause problems in a variety of ways:

artificial synthetic nanoparticles can penetrate tissue and cells, and spread throughout the body - even to the brain.

Interview with Dr. Peter Gehr, internationally renowned researcher on the tissue effects of nanoparticles.

<http://www.bafu.admin.ch/dokumentation/umwelt/10649/10659/index.html?lang=en>

Summary: Synthetic nanoparticles can penetrate tissue and cells, and spread throughout the body - even to the brain.

Professor Peter Gehr of the University of Bern, an internationally renowned tissue specialist, is astonished that potential health risks are barely acknowledged outside the scientific world and government agencies.

American Association for the Advancement of Science, SCIENCE Journal: "Toxic Potential of Materials at the Nanolevel", Science 3 February 2006: Vol. 311 no. 5761 pp. 622-627 Authors: Andre Nel,^{1,2*} Tian Xia,¹ Lutz Mädler,³ Ning Li¹

<http://www.sciencemag.org/cgi/content/full/311/5761/622?ijkey=2eB0nrqZwskKs&key>

Engineered nanomaterials (NM) are already being used in sporting goods, tires.....It is possible that the release of nanotubes from an intended commercial use products such as car tires could become airborne.....Nanomaterials are engineered structures with at least one dimension of 100 nanometers or less. Possible undesirable results of these capabilities are harmful interactions with biological systems and the environment, with the potential to generate toxicity.

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Read more @ http://www.sciencenews.org/view/feature/id/58906/title/Destination_brain

<http://www.scientificamerican.com/article.cfm?id=pollutions-toll-on-the-brain>

Pollution's Toll on the Brain

Breathing dirty air may have serious effects on cognition, in children and adults

November 11, 2009

<http://dukeandthedoctor.com/2010/01/air-pollution-may-damage-brain-heart/>

Air Pollution May Damage Brain, Heart

Finally Some hope for us all?- at least when it comes to aerosols and VOCs- plants keep the VOCs from becoming particulate aerosols:

<http://www.sciencedaily.com/releases/2010/10/101021152401.htm>

Plants Play Larger Role Than Thought in Cleaning Up Air Pollution, NSF funded Research Shows

ScienceDaily (Oct. 22, 2010)

"This complex metabolic process within plants has the side effect of cleansing our atmosphere."

NANOPARTICLES and HUMAN HEALTH more in depth:

FYI - tires- nanoparticles and human health

<http://www.sciencemag.org/cgi/content/full/311/5761/622?ijkey=2eB0nrqZwskKs&key>

Science 3 February 2006:

Vol. 311. no. 5761, pp. 622 - 627

Review

"Toxic Potential of Materials at the Nanolevel"

<http://us.mg5.mail.yahoo.com/neo/launch?.rand=bofd22s71smca>

6/6/2011

Andre Nel,^{1,2*} Tian Xia,¹ Lutz Mädler,³ Ning Li¹

EXCERPTS: (see link for full article)

Engineered nanomaterials (NM) are already being used in sporting goods, tires,

It is possible that the release of nanotubes from an intended commercial use products such as car tires could become airborne.

The potential for nanoparticle translocation to the brain via olfactory nerve endings in the nose has recently been reported (38). The close proximity of the nasal olfactory mucosa to the olfactory bulb may facilitate neuronal uptake. Earlier studies showed that the olfactory nerve and olfactory bulb are indeed portals of entry into the primate brain by viral or metal nanoparticles instilled in the nose. ...

Moreover, some nanoparticles readily travel throughout the body, deposit in target organs, penetrate cell membranes, lodge in mitochondria, and may trigger injurious responses.

J Nanosci Nanotechnol. 2009 Aug;9(8):4996-5007. <http://www.ncbi.nlm.nih.gov/pubmed/19928180>

"Nanoparticles and the brain: cause for concern?"

Oberdörster G, Elder A, Rinderknecht A. , University of Rochester, Department of Environmental Medicine, 575 Elmwood Avenue, Rochester, NY 14642, USA.

Abstract
Engineered nanoparticles (NPs) are in the same size category as atmospheric ultrafine particles, < 100 nm. Per given volume, both have high numbers and surface areas compared to larger particles. The high proportion of surface atoms/molecules can give rise to a greater chemical as well as biological activity, for example the induction of reactive oxygen species in cell-free medium as well as in cells. When inhaled as singlet particles, NPs of different sizes deposit efficiently in all regions of the respiratory tract by diffusion. A major difference to larger size particles is the propensity of NPs to translocate across cell barriers from the portal of entry (e.g., the respiratory tract) to secondary organs and to enter cells by various mechanisms and associate with subcellular structures.

Feb. 21

For more information, see Luz Claudio's 2008 peer reviewed article (one of the few peer reviewed articles on the topic- all the rest are by consultants funded by those who stand to benefit). "Synthetic Turf: Health Debate Takes Root" at the link below with information on the history, health & environmental concerns, and alternatives:

<<http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info:doi/10.1289/ehp.116-a116>> >

Useful guide from the Sports Turf Managers Association (STMA) which includes maintenance needs for both types of fields. See the link for the full document: <http://www.stma.org/files/items/stma-mr-tab2-1416/docs/stma%20syntheticturfguidehi.pdf> , A Guide to Synthetic and Natural Turfgrass for Sports Fields Selection, Construction and Maintenance Considerations . Also see <<http://synturf.org/maintenancereplacement.html>> .

A Review by the Marine Resources Conservation Center noted the problems with zinc and aquatic toxicity in particular (see http://www.synturf.org/images/Crumb_Rubber_Final.pdf) shows the definite and extreme problems with zinc leaching from tires. Recently the toxic effect of zinc leachate was borne out by the research of student Claire Dworsky who with mentorship from a more experienced scientist, tested 110 water samples from natural and synthetic fields to determine contaminant levels in run-off:

<http://abclocal.go.com/kgo/story?section=news/local/san_francisco&id=7184835> See the results of Claire's research here: <<http://dig.abclocal.go.com/kgo/PDF/2009%20AGU%20Poster%20-%20Claire%20Dworsky-final>> >

Mar 25 and Apr 1

<http://ehp03.niehs.nih.gov/article/fetchArticle.action;jsessionid=329B79696CEF833977FD20963FAB63BF?articleURI=info%3Adoi%2F10.1289%2Fehp.1002239>

Ulirsch G, Gleason K, Gerstenberger S, Moffett DB, Pulliam G, et al. 118(10): Oct 2010
"Evaluating and Regulating Lead in Synthetic Turf." Environ Health Perspectives

Conclusions: Synthetic turf can deteriorate to form dust containing lead at levels that may pose a risk to children. Given elevated lead levels in turf and dust on recreational fields and in child care settings, it is imperative that a consistent, nationwide approach for sampling, assessment, and action be developed. In the absence of a standardized approach, we offer an interim approach to assess potential lead hazards when evaluating synthetic turf.

Print - Close Window

Subject: Turf Report Challenged
From: Peggy Dennis (hotyakker@gmail.com)
To: Turf ReportResponse@yahoo.com;
Date: Sat, 04 Jun 2011 15:33:51

Civic Federtaion is opposed to ATG fields and questions findings of Turf Report.



Serving the Public Interest Since 1925

11115 Fawcett Road
Potomac, MD 20854
Friday, June 03, 2011

Dear County Executive Leggett and Councilmembers:

The Montgomery County Civic Federation is opposed to using Artificial Turf Grass (ATG) for any County-owned facilities until such time as the medium has been used for comparable applications over at least a ten year period so that valid studies can be made on the long term financial costs, health and safety issues and environmental effects of its adoption and use.

The letter sent from the Western Montgomery County Citizens Advisory Committee was the work of one person, and not the Quality of Life Committee or the full CAB. The author did a very creditable job of analyzing the responses to the questions raised by the CAB. I maintain, however, that both the original "Review of Benefits and Issues Associated with Natural and Artificial Turf Rectangular Stadium Fields" and the follow-up letter responding to the questions of the CAB appear to have been crafted by one person; a person knowledgeable about the issues and well versed in ignoring or downplaying the negatives and exaggerating the positives. This issue is sufficiently complex that the working group should have been larger and composed of three subcommittees – one for each issue area – in insure a complete and objective analysis. There are so many studies and reports documenting the known problems with ATG fields, it is incomprehensible that they should be so easily dismissed.

My own son has played on ATG fields and has nothing good to say about them. The players criticize the fields as being too hot and creating worse injuries than those they experience when playing on natural grass fields. Case made. We're talking about the health and perhaps even the life, of children and adults playing on these fields in temperatures akin to those of a sauna, with particulates containing toxic chemicals rising into the air they breathe and coming home sticking to their legs and clothing.

From the cost perspective alone, I urge the Council and the Executive to task the Inspector General to do a comprehensive audit of the total financial costs of ATG fields – installation using best practices, fencing and security, maintenance (all aspects including but not limited to chemical cleaning, rolling and grooming), and environmentally responsible disposal of worn out materials – and a cost comparison with the total costs of natural grass fields. And because there are a number of companies that construct playing fields, it is unconscionable that an RFP not be opened to all companies that install playing fields – both natural turf grass and artificial. We must pose the question, why is the County determined to make this a "sole source contract"?

Sincerely,
Peggy Dennis, President
Montgomery Count Civic Federation

Print - Close Window

Subject: Turf Field at Dmas High
From: Strtcjenkins (strtcjenkins@aol.com)
To: Turf ReportResponse@yahoo.com;
Date: Mon, 06 Jun 2011 09:25:17

I totally support this idea!!

Jennifer Jenkins
Mary Kay Independent Beauty Consultant
www.marykay.com/jazzyjennifer
240-832-4983

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Subject: Support for Turf at the new Paint Branch
From: Kate Laudwein (katelaudwein@gmail.com)
To: Turf ReportResponse@yahoo.com;
Date: Mon, 06 Jun 2011 16:16:18

Hello, my name is Kate Laudwein and I am the JV girls lacrosse coach at Paint Branch High School. I simply want to respond in favor to the turf field report. I believe the young athletes at the new school would benefit greatly from having a turf field as opposed to a regular grass field. Thank you for all the information given out in the last couple of months.

Sincerely,
Kate Laudwein

katelaudwein@gmail.com

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Subject: problems with artificial turf - a coaches and players perspective
From: Lynette Scaffidi (lynette.scaffidi@comcast.net)
To: Turf ReportResponse@yahoo.com;
Cc: sy nturf.facts@gmail.com; BOE@mcpsmd.org; OCEMAIL@montgomerycountymd.gov; Jeanine.Gould-Kostka@montgomerycountymd.gov;
Date: Mon, 06 Jun 2011 20:51:06

Hi folks,

I wanted to share my letter to the council with you folks.

Dear Council Members and Montgomery County Public Schools,

I have had extensive experience using the Artificial Turf (AT) fields in Maryland and Northern Virginia. I personally play on AT, I coach both my daughters teams and my daughters play on AT. Though the years, I have witnessed or experienced a number of negative impacts using AT fields. The most immediate concern is the use of AT fields during hot days. I have had several experiences where the field has been so hot that the girls were hopping from foot to foot because their feet were on fire. The girls were in terrible pain. When they were subbed off the field, they would sprint to the shade canopy, rip off their cleats and pour water on their feet. In one league where this occurred, there was league rule stating when a player is subbed off, the player is not permitted to sub back on the field for the remainder of the half. This forced the players to stay on the field beyond what was best for their health. These are highly competitive athletes that will push themselves beyond what their body can truly take. Beyond the issues of their feet burning, if we continue to allow the use of these AT fields during the hot months, there will be an athlete that will succumb to these extreme temperatures. We, as adults, need to be the voice of reason and take action prior to a crisis that forces us to take action. Regulations are necessary for these AT fields. There needs to be closure times during hot days and there needs to be regulations on how long a player can be exposed to these extreme temperatures. This cannot be left to the players and coaches – there needs to be well defined regulations that err on the conservative side.

In addition to the heat issues, as a parent of daughters that spend extensive amounts of time on AT fields, I have serious concerns about the long term effects of exposure to the carbon black carcinogen and other chemicals that are in the crumb rubber in the AT fields. They are breathing in the chemicals and bringing home the crumb rubber. It's in their socks, shoes and clothes. It is in my car, home entrance, their rooms and bathroom. They are constantly exposed to it since it is inadvertently brought home with them. How can we allow this type of exposure to our children – and others using these fields? Is a few more hours of playability that AT are supposed to provide worth the risk to our children and allowing them to be treated as guinea pigs? There are safer substitutes available in place of crumb rubber. Why would we build one more AT field that is padded with crumb rubber?

AT fields are not closed due to rain. When there is a substantial rainfall, the turf fields get so filled with water that the entire field becomes a slip and slide. These conditions are not safe for the athletes. For the safety of the players, closure times should also be implemented for AT fields when there is considerable rainfall.

AT fields have been described as lasting years and years. I have seen 5 year old fields in Howard County showing signs of wear. The center area of the field where there is more activity during games, are dipping and creating puddles during rainy games. The seams on the field start to pull up creating tripping hazards for players.

The final issues at hand are the documented increase in ACL tears to the knees while playing on turf and the wear and tear to expensive cleats due to the plastic grass rubbing against the toe of the cleat. Cleats last one season when used on fields.

On a more personal note, my daughters attend Paint Branch High School. Paint Branch is scheduled to receive the next artificial turf field built at a MCPS. Once again, my children will be further exposed to the AT issues if Montgomery County continues to move forward with AT fields.

As a parent, I am hoping that all the negative issues and impact of AT fields will be seriously considered. It is my hope that we will return to having our children play on well constructed grass fields.

Thank you,
Lynette Scaffidi

14720 Claude Lane
Silver Spring, MD 20905
Lynette.Scaffidi@comcast.net

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Subject: Stormwater Partners' comments on the draft Artificial Turf Report

From: Diane Cameron (dianemcameron@verizon.net)

To: TurfReportResponse@yahoo.com;

Date: Tue, 07 Jun 2011 07:58:52

Dear Councilmember Berliner and the members of the Artificial Turf Staff Work Group,

The Montgomery County Stormwater Partners Network have a longstanding concern about the use of Artificial Turf fields in Montgomery County.

Our concern centers on the potential water quality impacts of the use of pulverized used tires (crumb rubber) in the artificial turf fields. Accordingly, in July 2010 we issued a resolution (attached), calling for no new installations of Artificial Turf fields in Montgomery County while well-maintained natural turf fields are installed and studied, and we also called for the study of leachate from Artificial Turf fields including the direct study and analysis of lead, zinc and phthalate levels.

In our review of the Artificial Turf report of the Montgomery County (*A Review of Benefits and Issues Associated with Natural and Artificial Turf Rectangular Stadium Fields*) dated April 2011, although useful information is contained, we have also found the following deficiencies:

- * Montgomery County Department of Environmental Protection staff were not able to supply additional information on the water quality and other environmental impacts of Artificial Turf fields, beyond their previous submission of literature reviews in the summer of 2010;

- * Insufficient information on the levels of zinc and Polynuclear Aromatic Hydrocarbons (PAHs) in Artificial Turf runoff were included in the draft staff report, even though crumb rubber, the preferred fill for Artificial Turf fields, typically contains both of these toxics;

- * The synergistic effect of multiple toxics leaching from Artificial Turf fields made with used tire materials, including for instance, between zinc and cadmium, needs further study. The synergistic effect of such metals and other toxics on ecosystems including soil microbial communities, needs to be studied in Montgomery County, analyzed, and factored into our decisions before any more AT fields are built.

- * The performance of the gravel layer required by DPS to be placed below Artificial Turf fields in removing pollutants, including but not limited to zinc and PAHs, and in protecting ground and surface waters from contamination, has not been studied.

- * Independent, unbiased sources of information on Artificial Turf field environmental and other impacts are not prevalent in the draft staff report; instead many crumb rubber industry studies are quoted and other studies are given partial citations that do not enable the reader to determine whether the source was industry-sponsored.

We also support the comments of Neighbors of Northwest Branch concerning this draft staff work group report on Artificial Turf fields.

In conclusion, we request that Montgomery County install no new Artificial Turf fields unless and until the water quality impacts, including toxics leachate levels and synergistic effects of toxic leachate mixtures, of such fields are fully studied and documented by independent researchers in Montgomery County, and are found to be within all applicable water quality standards and criteria at the point of discharge to either ground or surface waters.

Thank you for considering our views on this important matter,

Diane M. Cameron

co-chair, Montgomery County Stormwater Partners Network

**Montgomery County Stormwater Partners Network
Resolution on Sustainable Athletic Field Construction and Maintenance**

Whereas the **problem** that athletic field directors and managers seek to address is the poor condition of many of our rectangular grass fields and their degradation after extensive hours of play in all weather conditions;

Whereas typically such fields have been composed of sod laid on native clay soil and maintained with chemical fertilizers.

Whereas one **“solution”** being aggressively promoted, artificial turf, is a rug of plastic blades attached to a coated plastic mat and infilled with a couple of inches of pulverized used tires .

Whereas both the plastic rug and synthetic rubber infill pose documented water pollution problems and other environmental and public health hazards;

Whereas grass is the safer, healthier, environmentally beneficial, more cost-effective option preferred by professional and amateur athletes and coaches; and

Whereas grass provides oxygen, absorbs carbon dioxide, is sustainable and renewable;

Whereas grass fields can always be converted to artificial turf but artificial turf, with its parking lot-like base--tons of dirt removed and tons of rocks trucked in-- cannot be easily or cost effectively converted back to grass.

Whereas greater durability, drainage, and water pollution prevention can be achieved by installing a sand-cap grass field and maintaining it organically, as we know from the experience of others,¹ and irrigation as needed may be done with water collected in cisterns from stormwater run-off,

Be it therefore resolved that the Stormwater Partners asks Montgomery County Department of Parks, Montgomery County Public Schools, and other County land management agencies, to:

- **Pilot one or more grass fields using the best 21st century techniques for installation and organic maintenance that have been documented to work;**
- **Install no additional rubber and plastic fields while the natural grass fields are being fully piloted using best available practices, and thereafter only where grass cannot grow, e.g., indoors, in full shade, or a temporary surface on asphalt, and using safer, biodegradable alternatives to rubber infill.**

¹ Branford, CT, Alex Palluzzi, in 30 years' experience with athletic fields has perfected organic maintenance. E-mail correspondence. Also see http://zip06.theday.com/blogs/the_sound/archive/2008/11/20/hammer-time.aspx and <http://www.beyondpesticides.org/lawn/activist/BranfordCTpolicy.pdf> in *Shore Publishing*.

- **Compare full life cycle cost of organically-maintained natural turf fields versus artificial turf fields, to include disposal costs of artificial turf.**
- **Create financing mechanisms that include annual maintenance costs in the budget so as not to artificially select for expensive plastic fields.**
- **Include testing of field leachate and runoff discharges for zinc, phthalates, and lead.**
- **Publish on the County’s web site the results of the organic and artificial turf water pollution discharge tests and life cycle costing studies.**

Further Be It Known that:

Plastic artificial turf can become hot enough to burn players and to contribute to “heat island” effect,² while a grass field remains cooler than air because of transpiration;

Used tire crumbs are documented to contain carcinogens, mutagens, neurotoxins, liver, kidney, and endocrine disruptors, phthalates, and may contain the neurotoxin lead.³

Water beads up and rolls off the crumbs and plastic backing rather than percolating into the ground,⁴ creating a polluted runoff problem and potentially carrying toxins leached from the tire crumb and plastic into streams;

Zinc from the pulverized truck tires when discharged or leached from artificial turf fields is particularly harmful to plants and aquatic life;⁵

Antimicrobial rinses used to decontaminate the field and fabric softener to fluff up the blades (if used) are also potential contaminants in our waterways;

In as few as 8 years, artificial turf fields experiencing the heavy use intended will face disposal as hazardous waste at significant cost;⁶

Contact: Anne Ambler: a.ambler@grmnc.com or Kathy Michels: Kathleen.Michels@scorizon.net 7.1.2010

Additional resources:

www.athenasmi.org/projects/docs/UCC_project_ATHENA_technical_paper.pdf (report with methodology for determining that 1861 trees must be planted to offset the carbon footprint of one 9,000 sq. m artificial turf playing field.)

² Brigham Young University study, <http://aces.nmsu.edu/programs/turf/documents/brigham-young-study.pdf>.

³ See The Connecticut Agricultural Experiment Station, [Examination of Crumb Rubber Produced from Recycled Tires](#), August 2007.

⁴ Brigham Young University study, <http://aces.nmsu.edu/programs/turf/documents/brigham-young-study.pdf> and Penn State University, <http://www.cropsoil.psu.edu/mcnitt/infill8.cfm>, in Item No. 5.

⁵ Marine Resources Conservation Center, www.marine.org/images/Crumb_Rubber_infill.pdf; see also T.Kallqvist, Norwegian Institute for Water Research (NIVA), Environmental Risk Assessment of Artificial Turf Systems, December 2005, p. 6.

⁶ University of Arkansas, <http://turf.uark.edu/turfhelp/archives/021109.html>.

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Subject: Artificial Turf "report" lacks credibility
 From: Diana Conway (dconway@erols.com)
 To: Turf ReportResponse@yahoo.com; county.council@montgomerycountymd.gov;
 Cc: oemail@montgomerycountymd.gov; boe@mcpsmd.org; synturf.facts@gmail.com;
 Date: Tue, 07 Jun 2011 10:32:18

Dear County Council Members and Artificial Turf Working Group,

Thank you for extending the deadline for comment on the Artificial Turf report, and for your attention to the many health and environmental issues raised by AT. I am disappointed in --and upset by-- the working group report. I hope the County can take a more complete and thorough look at the issue.

The main shortcomings, described in greater detail below, are the failure to honestly consider the existing knowledge base for health and safety impacts for us and our environment, of putting children atop 120 tons of shredded tires with acres of plastic shag rug over a bed of rock, and the costs of replacing it every 5-8 years. No one (BOE, Park & Planning, or MoCo) has yet professed to be budgeting for the replacement costs... giving the appearance that this is about short-term thinking. At \$1 million per new field, that's expensive short-term thinking. The final failure is the decision to downplay existing examples of alternative methods of supplying playability without compromising children's health, or our environment, and without busting the budget.

The report States: "Specifically the committee requested the staff work group to further quantify the programming, environmental, cost-benefits, and other impacts of artificial turf vis-à-vis natural grass fields as part of its report" Conspicuously absent from this stated request is any direct mention of *health or safety* concerns although this was an important concern for users of the fields (mostly children) and , in fact the key part of the initial charge from the T&E committee.

The report concludes that a particular type of artificial turf – green plastic with granulated tire infill (directly on a drainage bed of rocks and pipes) which must be disposed of and replaced every 8 years, is safe, of no concern to health and cost effective. This conclusion is not supported by the admitted substantial uncertainties, large gaps in knowledge and data on known and possible hazards and in spite of documented examples and data to the contrary. In particular issues of exposure to high heat and the long term effects of exposure to known and potentially hazardous compounds from tire crumb and plastic, while touched upon, were not adequately reviewed or solutions addressed. Issues of environmental impact were also glossed over without consideration of all the available information and need for local studies on fields.

In fact, the conclusion of safety is at odds with internal and stated conclusions of the working group's own summary on health and safety: The report writers conclude in part: " In the absence of either an environmental impact assessment or a health impact assessment on the installation and use of artificial turf fields, the work group identified some of the areas of potential human risks that were raised during the compilation of information that forms this report. This is not a complete set of risks. A formal process would be required to identify and examine all the human health risks from all the artificial turf field materials under consideration. Such an analysis was beyond the scope and capacity of the Artificial Turf Work Group"

However, this is exactly the most important part of what the work group was asked to do . If tire crumb is such a complex and potentially hazardous material that even after 9 months of workgroup review, only some of the risks could be identified and addressed, perhaps tire crumb is not an appropriate material to be using in direct contact with children. Certainly the report writers cannot then turn around and conclude it is safe after they have explained they cannot so conclude.

The review of the available literature and expertise consulted is not detailed or comprehensive and reliance is made on a limited number of limited studies and reviews which generated limited data and are selectively interpreted to downplay issues with tire crumb artificial turf. Some of the major constituents of tires are not addressed at all – (in particular carbon black which is 30-60% of a tire by weight and is listed by national and international organizations as

a possible carcinogen and has also been linked to lung, heart and brain damage in animals and humans). Most are not published in the scientific peer-reviewed literature and some are directly linked to or even commissioned by entities with a direct interest in the use of tire crumb in particular or with financial or other association to industries involved (for example the California studies have as one specific goal the use of used tires, and the review by webmaster Rachel Simon is for the Mannex Corporation which has a multi-million dollar contract with the state of California to find and promote uses for used tires. There are other similar examples).

HEAT: One acute hazard to children that can be avoided by use of alternatives to plastic and mitigated somewhat by use of light colored plastic, is the high heat in direct sun. Artificial turf temperatures in the sun have been demonstrated over and over again to reach extremes no human being should ever be exposed to, much less children. The county should at the very least follow the advice of the synthetic turf council itself: Rick Doyle, president of the [synthetic turf] council said in a National Public Radio interview discussing New York City fields on a mid-80 degree day with artificial turf field temperatures in the mid-100s deg F: "I don't think anyone in our industry would suggest it's a good idea to play on a surface that's that hot.... It's more of a management issue," Doyle says. "Just as coaches have to reschedule games due to rain when they play on grass fields," he says, so too they need to reschedule or consider an alternative surface to play on when it's hot and sunny."*

FINANCIAL: Finally the financial conclusions are based on analyses using undocumented assumptions. In fact, without the revenue assumptions the analysis actually shows substantially higher cost for artificial turf over the life cycle of installation, maintenance and replacement as compared to even the highest level of natural turf.

DISPOSAL: Issues of disposal, and in particular sustainability given the 8 year cycle of landfill disposal of acres of plastic and 30,000 or so tires are also not adequately addressed for a county that espouses an environmental ethic. No field should be installed unless recycling of current or others nearby, can actually be demonstrated. Neither FieldTurf nor any other vendor has demonstrated ability to recycle routinely and cost-effectively. Those familiar with the plastics industry cast doubt on the feasibility or even ability to recycle this mixed material.

ALTERNATIVES: Aside from the deficiencies in analyses of the currently used fields themselves, quality alternatives to artificial turf and artificial turf infill are not thoroughly or adequately addressed but are instead summarily dismissed. (It is concerning that the list of those notified of this report and report comment extensions by Joe Lavorgna, includes the FieldTurf artificial turf salesman but does not appear to include other artificial turf vendors or vendors/growers/installers of natural turf, even those who have previously testified before the county council, limiting this source of additional input).

In conclusion: Given that the main purpose of school fields and to a slightly lesser degree Parks and recreation dept fields, is use by children, issues of health and safety should be front and center in any recommendations which should be based on a rigorous review of the available knowledge and knowledge gaps and attention to avoiding known and potential hazards, especially where good alternatives exist (which they do). Where concern remains, or uncertainty or lack of data exists, the county should err on the side of caution instead of perceived expediency. We look forward to a much improved report taking into account all these considerations.

Best regards,

Diana

Diana E. Conway

10600 River Road

Potomac, MD 20854

301-983-6124

dconway@erols.com

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Subject: Turf Field

From: Jensen, Casey R (Casey_R_Jensen@mcpsmd.org)

To: Turf ReportResponse@yahoo.com;

Cc: Heather_A_Podosek@mcpsmd.org;

Date: Tue, 07 Jun 2011 10:58:06

My name is Casey Jensen, JV Baseball Coach, born and raised in Burtonsville all of my life, 34. I just want to say that I am shocked and appalled that community members, or should I say some parent's that children are only going to PB for a few years, however the field can serve the community for the next 50 years. I think it is really petty that people are bringing up the argument of bacteria and other ailments, I hope the people who are complaining are COACHES, who actually put in a lot of hours each week and have experienced all the prep time go to waste when a few drops of rain fall and the kids can't play! Sometimes in Baseball when games keep getting canceled due to weather, the KIDS miss out on playing some games because the state says we only have a certain amount of time to make them up... is that fair to our kids? They are only in High School once!!!

I also love how a few parent's want to keep Public schools down, how do public schools compete with the Private Schools who have facilities that are much like college and then pros?? Tell me, SJC in D.C. has a turf BASEBALL, FOOTBALL, and LAX/Soccer fields that are all turf...so is the turf ok for the private schools, yet unsafe for the public. Last time I checked we have more STUDENT ATHLETES to serve. So does GC, and Gprep, how come they are allowed to have turf fields? Please explain, I would love to hear the explanation....is it because they less student's which means less of a chance to get parent's who just want to COMPLAIN about something that doesn't really even affect them???

I am really frustrated with this kind of debate in public schools, does anyone want to debate about the parent who sued the school system and had the law changed so kids are allowed to have cell phones in schools??? Because we all know, I mean Coaches and Teachers...I don't mean Parents who have never worked in a school before, that the cell phone rule is a Joke and all it does is cause more disruption and discipline issues in school...

Well so does bad weather and having poor athletic facilities, how are we suppose to convince athletes to come to our facilities when they can go to private schools and have a better experience?

If Paint Branch doesn't get a turf field I think it is TRAGIC, how come Blair can have one? What about WJ, what about RM...how come they can and we can't...tell me this!!!

Casey Jensen

High School Baseball Coach

High School Strength Coach Football

High School Strength Coach Swimming

High School Strength Coach Baseball

Certified Conditioning Specialist, NSPA

B.S. Kinesiology University of Maryland, College Park (May of 2000)

MCPS Physical Education/Health Teacher

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Subject: Friends of Sligo Creek concerns about artificial turf
 From: Bruce A Sidwell (basidwell@msn.com)
 To: councilmember.berliner@montgomerycountymd.gov; TurfReportResponse@yahoo.com;
 Cc: councilmember.ervin@montgomerycountymd.gov; county council@montgomerycountymd.gov;
 mwilpers@yahoo.com;
 Date: Tue, 07 Jun 2011 11:48:12

Dear County Councilmember Berliner and The Artificial Turf Staff Work Group;

The Board of the Friends of Sligo Creek appreciate the Council's interest in seeing that the benefits and risks of use of artificial turf sports fields be carefully considered before being adopted for wide use on public spaces. Unfortunately the recent draft report on the issue from the Artificial Turf Work Group fails to adequately address major questions about human safety, environmental injury, or even the comparative benefits of artificial turf fields.

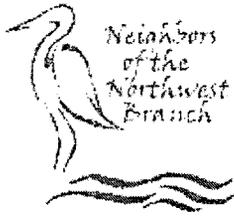
We strongly recommend that no new artificial turf fields with tire crumb be installed until safety and environmental concerns are fully addressed and alternatives fully considered. We recommend further that the Workgroup report and its follow up not be the final guidance for the county parks, schools and recreation departments, but part of an on-going discussion.

We support the attached letters previously submitted from the Neighbors of Northwest Branch and Western Montgomery County Citizen's Advisory Board. They both conclude that the current draft from the Working Group is inadequate to address major risk or benefit concerns. However, we would like to add several comments:

- 1) It is not possible to assess environmental impact or safety without knowledge of each component of the carpet and infill. We ask that the full composition of the materials making up an artificial turf field and the material safety data sheets on each component be included as part of the report. Because of the complexity of the tire crumb infill material now being used in Montgomery County, the presence of toxic compounds, and the wide variability from batch to batch, full disclosure of ingredients is essential to inform testing needs and use decisions.
- 2) We are concerned that the study in San Francisco CA strongly relied on by the Working Group to understand potential leaching was done under very different environmental conditions than exist in this area. Heat extremes, soil acidity, humidity, snowfall, amount of rainfall and it's acidity, are all greater in our area. Independent studies under our conditions need to be done. This is especially important for zinc due to its known toxicity to aquatic and soil micro-organisms important to a healthy ecosystem.
- 3) The draft report does not adequately describe the drainage system of the Blair HS field. Water on the field does not pass through a sand or other bio-filtration system before being dumped in Sligo Creek. It is simply sent through pipes under and around the field that then flow through stormwater drains leading to Sligo Creek. Thus there is no attempt at actual filtering or detoxification of run-off from the Blair field. Note that it is not known if a sand or other form of filtration would actually remove zinc from run-off to keep it out of groundwater or surface water.

Thank you for your continuing interest in protecting our children and the environment.

Sincerely,
 Bruce Sidwell (Board of the Friends of Sligo Creek)



*of the Anacostia
River*

**P.O. Box 4314
Silver Spring, MD
20914-4314**

Jim Fary
President

Suzanne Donohue
Secretary

Larry Hush
Treasurer

James Graham

Elaine Lamirande

Alfred Piparato

Carlye Piparato

Glenn Welch

Tiffany Wright

+++++

Edward Murtagh
Liaison, Friends of
Sligo Creek

Anne Ambler
Outreach Chair

www.neighborsnw.org

May 13, 2011

Dear Chairman Berliner and members of the Transportation, Infrastructure, Energy and Environment Committee:

Thank you for requesting a comparison of the health, environmental, and fiscal impacts of natural versus artificial turf athletic playing fields in Montgomery County. I am writing at the direction of the Board of Directors of the Neighbors of the Northwest Branch, a citizen-based nonprofit watershed protection group dedicated to restoring the health of the Northwest Branch. Because we are a citizen group, however, our interest extends beyond runoff into the Northwest Branch. We are also concerned for the health of our children who play on the athletic fields Montgomery County and for the wise use of our tax dollars. These comments have been approved by our Board of Directors.

The background section of the report in which the numbers and types of fields in the county are listed is helpful. However, the remainder of the report does not seem to us to be the fair comparison you requested. The report appears to be written from the point of view of justifying artificial turf. We strongly urge that you not rely on the recommendations of this report for your decisions about how to spend scarce county revenues on athletic fields because the report leaves too many questions unaddressed and unanswered.

The Health and Environmental Impacts sections are sadly inadequate. The absence of active participation on the part of the departments of Health and Human Services (DHHS) and Environmental Protection may have contributed to this deficiency.¹ However, members of the public did send the work group published study reports on health and environmental impacts of the materials used in synthetic fields, none of which appear to have been considered.

Below are some of the many important questions yet unaddressed and unanswered.

¹ In its statement submitted for this report, DHHS indicated that a meta-analysis by an entity with proven topic expertise and track record "would be the recommended approach by DHHS to determine the level of health risk posed by each material type," whereas this report was "limited to ... materials...easily accessible to the group" (p. 30).

On health comparison:

- **What are the impacts on the brain, nervous system, and lungs of breathing nanoparticles and nanotubes from the carbon black that constitutes from 30 to 68% of tires by weight?** None of the studies cited in this report addressed carbon black, which is linked to brain and lung damage. (See appended studies page.) The natural nanoparticles comprising carbon black are so small they can pass through to the brain. In addition, engineered nanotubes now added to strengthen tires may act in the body like the asbestos fibers they resemble. Pulverizing tires makes the nanoparticles all the more accessible, as indicated by the black that often coats players. Children, whose bodies are rapidly forming from the materials they take in, are already exposed to vehicle exhaust and tire dust. Playing on tire crumbs adds to their exposure. Further, no study has yet examined personal (as opposed to ambient) exposure to ultrafine particles on these fields.
- **What are the interactive health effects of ingesting/inhaling the soup of contaminants, which include known carcinogens, endocrine disruptors, metals, and volatile organic compounds?** The cited studies address only some of the many toxins and address them individually, not in combination. As explained by the President's Cancer Panel, chemicals may be even more dangerous together than separately.² If the safety of these combinations is not known, why would we expose our children to them?
- **Since Field Turf itself does not know what is in its fields--it is suing its manufacturer over defective plastic of unknown composition right now--how can we be sure that the fields it has installed do not contain lead or other toxins in the plastic blades?**³ No Material Safety Data Sheets are even included in the report, despite a request by a group of citizens. These are essential for any product to which children are exposed.
- **Is it reasonable to expect that coaches, expecting to field their team regardless of the weather—the major selling point for artificial turf—will voluntarily cancel because the field is very hot?** Experience has shown they do not.⁴ The report cites temperature as high as 200 degrees on a Brigham Young University synthetic field (p. 37); we have measured 160 degrees on the Blair field with air temperature in the 80s. Even putting guidelines into the permit (p. 40) regarding extreme heat on the fields may not protect the players from heat-related illness or death, or the county from lawsuits.⁵

² President's Cancer Panel, *2008-2009 Annual Report*, p. 2.

http://deainfo.nci.nih.gov/advisory/pcp/annualReports/pcp08-09rpt/PCP_Report_08-09_508.pdf

³ "The suit alleges defects in products that for the most part were supplied to FieldTurf by a company, Mattex Leisure Industries (Dubai), during several years before TenCate acquired certain assets of the Mattex business in early 2007." Reuters, Hugin Press release, April 4, 2011. <http://finance.bnet.com/bnet/news/read?GUID=18067975>.

⁴ "How long until someone dies of heatstroke on a synthetic turf field?" by Chris Hummer, 8/31/2010. <http://www.potomacsoccerwire.com/news/5322/12633>.

⁵ Rick Doyle, President of the Synthetic Turf Council, recommends: "Just as coaches have to reschedule games due to rain when they play on grass fields, so too they need to reschedule or consider an alternative surface to play on when it's hot and sunny." <http://www.npr.org/templates/story/story.php?storyId=93364750>.

On environmental comparison:

- **Where are the environmental benefits of grass on healthy soil shown?** These include oxygen production, cooling, and water infiltration. These benefits are most certainly part of the equation. On the other side of the scale are two-acre plots that have no life and *increase the heat island effect* we are trying so hard to decrease. The validity of the argument that the additional heat is relatively small (p. 45) decreases as the number of synthetic turf fields increases.
- **Why was the runoff from our existing fields not tested for zinc,** present at high concentration in tires, shown to readily leach out, and widely recognized as toxic to soil organisms, plants, and aquatic life? The cost figure of between one and four thousand dollars seems excessively high for simply testing leachate from our installed fields. A simple test such as the one designed by grade schooler Claire Dworsky (see references) could be used. Results would be applicable only to the fields tested, but that is what we need. Dilution is not the solution to pollution because wherever the zinc goes, in soil or water, it can accumulate and cause damage.
- **Why mention TMDLs?** The statement (p. 43) that artificial turf should not affect TMDLs is irrelevant since we have no TMDL for zinc at this time. Europe, however, does have standards for zinc in tire crumb used for athletic fields. (See references below.)
- **When the county is encouraging conservation landscaping on private land**—replacing lawn with native ground covers, shrubs, and trees, reducing or eliminating synthetic fertilizer, herbicides, and pesticides—it is ironic that the highly successful and heavily used organically maintained athletic fields in Branford, CT, and at St. Mary’s College in southern Maryland are summarily dismissed for want of hourly usage logs. We question whether looking only at “stadium” fields, which are fenced as defined in this report, is appropriate. High use unfenced fields such as in Branford and at St. Mary’s College could perform even better if usage were as tightly controlled as it is here.

On cost comparison:

- **Will Field Turf apply a *third* carpet to the original base,** or will the base need to be renovated before a warranty will be issued? Such renovation to the underlying rocks, which we understand is the industry standard, would raise the 20-year cost considerably (cost tables, pp. 27-28).
- **Why are only positive aspects of sand base fields listed, and only negative attributes of native soil fields?** Could this be so that the “good” grass alternative can be more easily shot down on account of price? Why was an amended soil field not considered? From consultation with organic turf grass growers, an amended native soil field aerated 5 or 6 times annually and renewed with compost is more durable and less expensive than a sand base field.

- **Based on costs elsewhere and expert consultation, we believe the cost estimates for maintenance of synthetic turf are too low and those for natural turf are too high.** We also question the number of billable hours for synthetic turf fields on which the cost comparison is built and request inclusion in the report of hourly documentation of use and revenue obtained from the existing artificial turf fields. With these data in hand, experts in field installation and management can effectively evaluate the assumptions.

In conclusion, we find that the draft “Review of Benefits and Issues Associated with Natural and Artificial Turf Rectangular Stadium Field,” while certainly representing quite of bit of work, does not provide the comparison information you need and requested in order to make a fully informed decision about whether to install more artificial fields or good natural grass fields.

We ask that our comments be made part of the public record and expect to submit additional comments as the process unfolds.

Sincerely,



Anne Ambler, Outreach Chair

cc: TurfReportResponse@yahoo.com

Selected References Relevant to the Health and Environment Questions Posed by the Neighbors of the Northwest Branch

On Carbon Black, Nanoparticles, and Nanotubes:

Carbon Black (CB) is a manufactured form of soot used as filler in rubber compounds, primarily in automobile tires. **Nanoparticles in tires may take the form of natural or engineered nanoparticles.** The largest potential source of natural nanoparticles in tires is carbon black. Carbon black is one of the two main components of tires and tire crumb infill (30-68% by weight according to manufacturers) for artificial turf. Engineered nanoparticles vary by type, but it is known that carbon nanotubes are also being added to tires.

- Carbon Black has been listed by The American Cancer Society and three Federal agencies as a potential cause of cancer that needs further investigation.
<http://www.reuters.com/article/idUSTRE66E5AS20100715?feedType=RSS&feedName=topNews>

- Various studies reported in Environmental Health Perspectives on carbon black and nanoparticles can be found at http://www.google.com/search?q=Environmental+health+perspectives+carbon+black&sourceid=ie7&rls=com.microsoft:en-US&ie=utf8&oe=utf8&rlz=117GGIE_en
- Nanosafety consortium- carbon black toxicology articles <http://www.nanosafetyconsortium.com/invivotoxbibliography.html>

Carbon Black and the Brain

- “Association of Black Carbon with Cognition among Children in a Prospective Birth Cohort Study,” Am. J. Epidemiol. (2008) 167 (3): 280-286. HARVARD SCHOOL OF PUBLIC HEALTH <http://aje.oxfordjournals.org/content/167/3/280.full>

"While studies show that ultrafine and fine particles can be translocated from the lungs to the central nervous system, the possible neurodegenerative effect of air pollution remains largely unexplored. The authors examined the relation between black carbon, a marker for traffic particles, and cognition among 202 Boston, Massachusetts, children... In summary, this is the first study to have found a consistent relation between exposure to black carbon and reduced neurocognitive functioning across a number of domains in urban, community-dwelling school-aged children. More studies are needed to explore the potentially neurotoxic effects of particulate matter, both to determine the possible impact on cognitive development among children and cognitive decline across the life cycle and to determine the potential contribution of air pollutants to the development and exacerbation of neurodegenerative diseases (i.e., Parkinson's disease, Alzheimer's disease)."

- “Destination Brain: Inhaled Pollutants May Inflamm More than the Lungs,” Janet Raloff, Science News 177(11):16-20 (22 May 2010). Work in both dogs and humans: <http://onlinelibrary.wiley.com/doi/10.1002/scin.5591771120/abstract> <http://dukeandthedoctor.com/2010/01/air-pollution-may-damage-brain-heart/>

Carbon Black and Lungs

- Final Report: Comparison of the Carcinogenicity of Diesel Exhaust and Carbon Black in Rat Lungs, EPA Grant Number: R828112C068I http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/2339/report/F .

EPA Summary: "The results of this carefully conducted study demonstrate that prolonged exposure to diesel engine exhaust and carbon black particles produces nearly identical carcinogenic and noncarcinogenic effects in this strain of rats. No significant differences were noted between the two exposure materials in the resulting incidence, number, or types of lung tumors. These results may be considered surprising because, compared with diesel soot, the carbon black particles were relatively free of mutagenic organic compounds. Both exposures

caused injury to lung tissue, including inflammation, cell proliferation, and fibrosis. These lesions progressed in number and size as the dose of particles increased. At both exposure concentrations, diesel soot and carbon black accumulated in the rat lungs and, after three months of exposure, normal particle clearance mechanisms were impaired."

Carbon Black, Chromosomes, and Aging

- "Annual Ambient Black Carbon Associated with Shorter Telomeres in Elderly Men: Veterans Affairs Normative Aging Study," Environ Health Perspectives 118:1564-1570. <http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info%3Adoi%2F10.1289%2Fehp.0901831>

"Conclusions: Telomere attrition, linked to biological aging, is associated with long-term exposures to airborne particles, particularly those rich in carbon black and may contribute to the cardiotoxic effects."

Nanoparticles and Engineered Nanotubes

- "Study Says Carbon Nanotubes as Dangerous as Asbestos: New research shows that long, needle-thin carbon nanotubes [now added to tires to increase strength] could lead to lung cancer," By Larry Greenemeier | Tuesday, May 20, 2008, <http://www.scientificamerican.com/article.cfm?id=carbon-nanotube-danger>

"Inhaling carbon nanotubes could be as harmful as breathing in asbestos, and its use should be regulated lest it lead to the same cancer and breathing problems that prompted a ban on the use of asbestos as insulation in buildings, according a study in Nature Nanotechnology.

During the study, led by the Queen's Medical Research Institute at the University of Edinburgh/MRC Center for Inflammation Research (CIR) in Scotland, scientists observed that long, thin carbon nanotubes look and behave like asbestos fibers, which have been shown to cause mesothelioma, a deadly cancer of the membrane lining the body's internal organs (in particular the lungs) that can take 30 to 40 years to appear following exposure. ... The researchers reached their conclusions after they exposed lab mice to needle-thin nanotubes: The inside lining of the animals' body cavities became inflamed and formed lesions."

- Interview with Dr. Peter Gehr, the tissue effects of nanoparticles. <http://www.bafu.admin.ch/dokumentation/umwelt/10649/10659/index.html?lang=en>

"Summary: Synthetic nanoparticles can penetrate tissue and cells, and spread throughout the body - even to the brain. Professor Peter Gehr of the University of Bern, an internationally renowned tissue specialist, is astonished that potential health risks are barely acknowledged outside the scientific world and government agencies."

- "Toxic Potential of Materials at the Nanolevel", Science 3 February 2006: Vol. 311 no. 5761 pp. 622-627. Authors: Andre Nel,^{1,2*} Tian Xia,¹ Lutz Mädler,³ Ning Li¹.

<http://www.sciencemag.org/cgi/content/full/311/5761/622?ijkey=2eB0nrqZwskKs&key>
(need to be a member to access)

“Engineered nanomaterials (NM) are already being used in sporting goods, tires.....It is possible that the release of nanotubes from an intended commercial use products such as car tires could become airborne.....Nanomaterials are engineered structures with at least one dimension of 100 nanometers or less. Possible undesirable results of these capabilities are harmful interactions with biological systems and the environment, with the potential to generate toxicity.”

- [http://wn.com/Nanoparticles Linked to Deaths at Chinese Factory](http://wn.com/Nanoparticles_Linked_to_Deaths_at_Chinese_Factory). Nanoparticles manufactured in certain paints and tires led to deaths of 7 Chinese workers when nanoparticles entered their lungs.

On Leachate (Zinc and other toxins):

- “Runoff Water from Grass and Artificial Turf Soccer Fields,” poster presented by Claire Dworsky and Adina Payton at the 2009 American Geophysical Union meeting.
<http://dig.abclocal.go.com/kgp/PDF/2009%20AGU%20Poster%20-20Claire%20Dworsky-final.pdf>

“Synthetic turf water samples had zinc levels of 1000s of ppb and copper levels typically above 20ppb. These samples always exceeded the Monterey Bay Basin Plan Water Quality Objective for copper (< 30 ppb) and zinc (<200 ppb) and at times the EPA drinking water levels as well. Cadmium and cobalt were also higher in the artificial turf runoff than in grass runoff and levels exceed runoff targets in some samples but not all. Within 24 hours about 80% of the *Daphnia* died in synthetic turf water; within 36 hours all of the turf-exposed *Daphnia* were dead. The *Daphnia* in the grass field runoff and the spring water all lived over 36 hours.”

- From the Plastics industry website under the heading: Banning of harmful chemicals will play an important role in the plastic industry.
<http://www.plastemart.com/upload/Literature/Banning-harmful-chemicals-play-important-role-in%C2%AC-plastic-industry.asp>.

“In 1995, zinc and zinc derivatives were included in a priority list of rubber chemicals compiled by the Swedish Environmental Protection Agency, which should be replaced or used restrictively. In 1995, zinc and zinc oxide were placed on the second European list of priority substances in the EU Risk Assessment Programme.

In June 2002 the German Standard DIN 18035-7 "Sports Grounds, Part 7" "Artificial Turf Areas" was published. According to this standard, two leaching tests are required for post-consumer tyre rubber granulates used as infill material for artificial turf and the following limits are set in leachates:

- 0.5 mg/l after leaching with deionized water (DIN 38414-4)
- 3 mg/l after leaching with water saturated with CO₂

Between 1998 and 2004, draft Assessments were produced and responses put forward by the zinc chemical and rubber industries. Since 29 April 2004 (see Council Directive 2004/73/EC, relating to the classification, packaging and labelling of dangerous substances) zinc oxide is officially classified as "Dangerous for the Environment" with the risk phrase "Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment", and with the safety advice "This material and its container must be disposed of as hazardous waste" and "Avoid release to the environment. Refer to special safety instructions/safety data sheets". Rubber compounds containing more than 2,5 % in total of zinc chemicals or other chemicals classified as R50/63 (such as IPPD) are classified as "Toxic to aquatic organisms, may cause long-term effects in the aquatic environment".

A Final Word

- The Coastal Marine Resource Center Policy Project: The Effects of Crumb Rubber on Water Quality, September, 2008. http://www.synturf.org/images/Crumb_Rubber_Final.pdf

“Conclusion: The quandary that this situation poses is such that on the one hand, crumb-rubber is a means for using some of the many waste tires crowding our landfills. However, if and when synthetic fields are retired and the crumb rubber is disposed of, the synthetic fields will have served as a temporary stopover for used tires in crumb form, eventually destined for landfills. Crumb rubber is not a solution to tire waste if the outcome leads to a degraded environment.”

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Subject: Artificial turf at Blair HS - in response to artificial turf questions

From: Josh Kickenson (joshkick52@gmail.com)

To: Turf ReportResponse@yahoo.com; county.council@montgomerycountymd.gov;
oce mail@montgomerycountymd.gov; boe@mcpsmd.org; synturf.facts@gmail.com;
councilmember.Riemer@montgomerycountymd.gov; councilmember.Berliner@montgomerycountymd.gov;

Cc: councilmember.floreen@montgomerycountymd.gov; councilmember.Leventhal@montgomerycountymd.gov;
councilmember.Rice@montgomerycountymd.gov; councilmember.Navarro@montgomerycountymd.gov;
councilmember.Elrich@montgomerycountymd.gov; councilmember.Andrews@montgomerycountymd.gov;

Date: Tue, 07 Jun 2011 14:08:43

Dear County Council Members and Artificial Turf Working Group,

I am a graduating student at Blair HS. I play basketball but many of my friends play field sports at Blair. Although they are happy to have a better field than before (that one was really bad) they would have been much happier with a really good grass field as some other schools have (like Churchhill). especially in august it gets REALLY hot! The soccer and football players say they can't ever stand still or their feet and legs burn. It feels like someone turned up the heat on stove underneath your feet. For football falling on it is very painful, especially the turf burns and if they get a facefull of hot pieces of rubber. the pieces get inside their clothes and shoes and hair also. My brother wants to play football but my parents told him no, partly because of the turf.

Whatever you can do to improve the grass fields (including the practice field at Blair) and to cool off the turf in the heat (and players!) would really help. Just drinking more water doesn't help the burning. I understand that there are other particle substitutes for between the blades and lighter colors that would help to make it much cooler when they replace the top of the field in a few years. That would be awesome. (note -i am a lifeguard at our local pool. we have different color plastic chairs. the yellow chairs are the coolest but light blue might be also or light green if we had it)

Best regards,

Joshua Kickenson
Silver Spring, MD 20902

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Subject: Fwd: RE: FISCAL ISSUES - artificial turf report - without revenue - artificial turf much more expensive. jerry kickenson

From: Jerry Kickenson (jerry.kickenson@verizon.net)

Turf ReportResponse@yahoo.com; county.council@montgomerycountymd.gov; boe@mcpsmd.org; oicemail@montgomerycountymd.gov; councilmember.Riemer@montgomerycountymd.gov;

To: councilmember.Berliner@montgomerycountymd.gov; councilmember.floreen@montgomerycountymd.gov; councilmember.Leventhal@montgomerycountymd.gov; councilmember.Rice@montgomerycountymd.gov; councilmember.Navarro@montgomerycountymd.gov; councilmember.Elrich@montgomerycountymd.gov; councilmember.Andrews@montgomerycountymd.gov;

Cc: safe-healthy-playing-fields-coalition-@googlegroups.com;

Date: Tue, 07 Jun 2011 15:11:56

Dear County Council Members and Artificial Turf Working Group,

Thank you for the chance to respond to the artificial turf report.

Some comments on the financial information described in the report:

1. The bottom line is that without factoring in revenue (which cannot be certain for each field) the report confirms that artificial turf has higher costs (both initial and lifecycle costs) than even premium (sand base) natural turf fields. Only if the high anticipated revenue is realized on EACH field can each make up for the higher up front and replacement costs even on a per use basis (which also cannot be certain for each field)
2. Borrowing costs are included in the discount rate net costs presented in the table. The report gives net costs for 3%, 5% and 7% discount rates. The appropriate discount rate to use at this time is approximately 4% (Montgomery County can currently borrow at rates of 3% for short term to 5% for 15-20 years).
3. The net cost difference, assuming a 4% discount rate, would be about \$1. million, given all the report's assumptions.
4. The two main factors in the report's difference is maintenance and revenue assumptions.
5. Maintenance - report assume least cost for artificial (only \$10,000) and most for natural (\$50,000). As you know, most research and experience do not show such a difference. Assuming \$20,000 and \$40,000 reduces the difference by \$20,000 per year or \$400,000 over 20 years, to \$800,000.
6. Revenue is the other, and main, factor that the report uses to argue for cost-effectiveness of artificial turf.

Regarding revenue:

- i. Stadium fields need 300 hours for games. Report assumes remaining natural turf time (300 hours) would be used for HS team practices and not rental. Most HS stadium fields are now used only for games (and some practice). If all that practice time were used for rental, (and small investment in well constructed practice fields were made- these are needed anyway for heat situations on artificial turf), the natural turf field would have revenue of \$30,000 per year or \$600,000

over 20 years. This would reduce the net cost difference a further \$600,000 to only \$200,000.

ii. The 3000 hours of use is based on Field Turf warranty, as you know. Others have already raised the reality of this much use, whether the warranty would be violated if field used for practices, drills, band practice, physical education and other activities in addition to games.

iii. Even if the \$100,000 annual revenue for Blair and RM fields is true (*documentation is not provided and is needed- hourly logs for Blair are needed and invoices for actual use. The working group asked of other systems for their natural fields and excluded them if they did not have such documentation*), the report assumes this revenue would extend to any new field. The report says nothing about demand projections for additional fields. The report indicates there are 7 planned synthetic fields in the current 6 year CIP. The report analysis then implicitly assumes there is will be demand for an additional 7000 hours at \$100 per hour, on top of the existing (again, assuming the report is correct that there is already such actual use) 7000 hours.

Basically, report assumes there is demand for doubling supply of \$100 per hour rentals. There is nothing in the report supporting this implicit assumption. Of course, to go ahead and replace ALL HS stadium fields with synthetic fields would assume demand for even far more supply. There is no basis included for this assumption.

iv. Regarding equity: equity for high school rectangular field teams (JV and varsity) can be achieved by high quality natural turf fields. Yes, the current funding of maintenance is inequitable but there is no reason that cannot be changed. Artificial turf also requires maintenance and can become hard and dangerous if that maintenance is not done regularly and well.

The synthetic turf fields pay their way through expensive (five times current rate: \$22 vs \$100) rentals. Even assuming there is sufficient demand, who can afford these rates? With county recreation budget slashed, not even county sponsored recreational leagues are likely to find these fields affordable. I would be surprised if Boys and Girls Club, or Takoma Youth Soccer, would find them affordable. No guesses for what type of private clubs and leagues would find the fields affordable. Is this the direction our County Council (including at-large and down county representatives) really wish to go?

Even limiting the view to just school use - the more expensive artificial fields, even if they do realize all that revenue due to external rentals, will benefit (assuming they are a benefit!) only HS team sports that use rectangular fields. **Other teams and sports will not benefit.** Perhaps MCPS could better use scarce capital funds to provide high quality natural fields and use the savings over artificial turf fields to provide better gym facilities for basketball, wrestling, volleyball, cheer, dance, etc. *The foregone revenue (even assuming it is real) is irrelevant - that revenue is used only to make artificial turf "affordable" over time*. In other words, the report is narrowly focused on a single type of field, and not a wider context of all school athletics or all county (school and recreational) athletics (leaving aside even wider context, such as science labs, media studios, etc.).

Best regards,
Jerry Kickenson
Silver Spring, Maryland 20902
jerry.kickenson@verizon.net
301-649-5684

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Subject: Comments on Draft "Review of Benefits and Issues...Natural & Artificial Turf ...Fields"

From: Anne Ambler (anambler@gmail.com)

To: turfr eportresponse@yahoo.com; councilmember.riemer@montgomerycountymd.gov;

councilmember.berliner@montgomerycountymd.gov; Councilmember.Floreen@montgomerycountymd.gov;

Cc: county .council@montgomerycountymd.gov; Susan.Buffone@montgomerycountymd.gov; boe@mcpsmd.org;

Date: Tue, 07 Jun 2011 15:30:45

Dear members of the work group and of the T&E Committee:

We hope that the attached comments on the draft review may help to make it more comprehensive. Please also include them in the official record.

Thank you.

Anne Ambler
12505 Kuhl Road
Silver Spring, MD 20902

Comments on the Draft “Review of Benefits and Issues Associated with Natural and Artificial Turf Rectangular Stadium Fields”

Organic yard care is becoming increasingly popular. The concept of feeding the soil, restoring a living network of working microbes and earthworms so that plants can put down deeper roots and natural processes can provide the nutrients they need, is being popularized by lawn care professionals such as Paul Tukey.¹ Such practices with lawns and fields is producing turfgrass better able to absorb water during our increasingly heavy rains and survive our droughts.

Inspired by the potential of organic maintenance for athletic fields, Alex Palluzi, Director of Recreation for the town of Branford, CT and Kevin Mercer, Superintendent of Grounds at St. Mary’s College in Southern Maryland now maintain their fields almost exclusively that way. The Harvard Campus turf managers have also jumped on board and found that their well trampled lawn areas look great with little watering, since the grass has much deeper roots.²

Meanwhile, back in Montgomery County, the “can’t do” attitude prevails.

The review authors say (p. 13) that Parks staff, in conversation with Alex Palluzzi, “has not learned of any new information that would bring new maintenance practices to the management of parks and school natural turf fields that would improve their durability to support the amount of use currently recorded on Regional Parks or MCPS stadium fields.” And the authors “did not identify any ‘silver bullet’ practices ...that would allow MCPS and Parks to achieve hours of use on natural turf that would be comparable to the hours of use possible on artificial turf” (p. 13).

Does the evidence the report provides support these statements? Certainly the evidence it ignores suggests the county can do much better on all its fields.

Playability

The experience in Branford, in Maryland, and at Harvard is that durability is, indeed, increased within a couple of years when the switch is made to organic care. The fact that the Branford fields are open rather than fenced only *adds*—rather than subtracts—evidence of their durability, since one of the big complaints of field managers here is that unauthorized players use and abuse unfenced fields. Please see the appended table, approved by Mr. Palluzi, describing the Branford fields and their usage.

Some of the additional “hours of use” claimed for artificial turf are based on games not being canceled because of rain. However, it also appears that even a non-organic but well constructed natural turf field—even one more than 20 years old-- can indeed handle a vast amount of water – 3.75 inches an hour—and still allow a high level of play. The Pat Dye Field at Jordan-Hare Stadium at Auburn University in Alabama did just that in 2009. The game was played

¹ See <http://www.paultukey.com/> and documentary film, “A Chemical Reaction,” <http://pfzmedia.com/#/images/stories/screen/small/HomeDepot3.jpg>

² See <http://www.nytimes.com/2009/09/24/garden/24garden.html?emc=eta1>

immediately following a torrential downpour, and the field was not damaged.³ It would be worthwhile to check into how that field and drainage system were constructed.

Conversely, heat is a major issue for artificial turf—more than the report reveals. According to Dr. Joel Forman of the Mt. Sinai Children’s Environmental Health Center, on about 70% of the days when temperature readings were taken from the fields in the 2009 New York State study cited in the draft review, some special restrictions would need to be in effect for children and youth if one were to follow guidelines on exercise and heat from the American Academy of Pediatricians.⁴ Air temperatures were only in the 80s.

The experience of the Soccerplex with the heat problem is not transferrable to the school fields, since at the Soccerplex on weekdays games are only played from 5 to 11 p.m. when it is cooler. On weekends when the field is hot, according to Executive Director Trish Heffelfinger, misting and huge fans are used to cool the players. Is this contemplated at high schools and parks?

Cost Comparison

The cost comparison in the draft works out in favor of artificial turf because it attributes many more hours of play to artificial than to natural turf and assumes that nearly half those hours will bring in \$125 each (although several hundred thousand of that was actually part of the capital cost contributed by soccer leagues for field construction and cannot then be counted as revenue). Are these assumptions reasonable?

The 3,000 hours of use annually in the Field Turf warranty is very generous. But from experience around the country, we know that with high use, artificial turf fields can fall apart well before the warranty expires, and failure under warranty does not mean free replacement. In addition, from personal observation of the Blair field, we suspect that the usage claim of 2300 hours a year on which the cost comparison for school fields is based is inflated. Indeed, the chart on p. 22 makes an allowance for diminished use in summer and winter, as both heat (risk to players) and cold (risk of damage to field and players) make the field unusable.⁵ However, the stated use of 2300 hours of the possible 3,000, or 77%, seems high given the many times the field is observed to be empty. **The actual logs of the 1000 hours of permitted use and 1300 hours of other use should be included in the report, particularly since absent similar logs, the heavily used Branford fields were dismissed.**

The 20-year cost figures for artificial turf should include a major renovation of the gravel base along with the second replacement rug, apparently the industry standard. In the interest of a true cost comparison, Field Turf should be pressed on this issue and the answer obtained in writing for our existing Field Turf fields.

The maintenance costs for natural turf, according to Dr. Brad Fresenburg, Professor, University of Missouri Extension, are inflated. He would put 20-year maintenance cost at \$700,000 rather

³ Pat’s Dry Field <http://www.thewareaglereader.com/2009/10/pats-dry-field/>

⁴ <http://aappolicy.aappublications.org/cgi/reprint/pediatrics;106/1/158.pdf>

⁵ Plowing snow from the fields voids the warranty, and cold makes the plastic blades brittle and subject to breakage. <http://www.synturf.org/images/TenCateWinterConditions.pdf>.

than \$1 million for the sand base fields. See attached question and answer statement from Dr. Fresenburg, which covers other questions as well. Dr. Fresenburg's full comments on the report are also appended.

Organic maintenance of the fields would cost even less over the 20-year period, according to Grassroots, a non-profit organization "dedicated to educating the public about the links between common environmental toxins and human health."⁶ Their cost comparison report concludes:

The cost of a natural turf management program is incrementally higher in the first two years, but then decreases significantly as soil biology improves and water requirements diminish. Total expenditures over five years show a cost savings of more than 7% using natural turf management, and once established, annual cost savings of greater than 25%....⁷

Grassroots estimates the total cost over 5 years for a 65,000 sq. ft. field transitioned to organic maintenance is \$42,742, compared with \$45,855 for conventional maintenance with chemical fertilizers, pesticides, and herbicides. One can therefore reasonably question the figures in the present draft report: \$250,000 for 5 years for the sand base fields, \$225,000 for the Bermuda native soil field, and \$125,000 for the cool season grass on native soil (derived from chart p. 27).

No revenue at all is assumed from any of the natural turf stadium fields. But if a school had a sand base field controlled access field with the stated extremely good maintenance, why would it not be allowed to produce some revenue?

As Dr. Fresenburg notes in his responses, there is another option that is not as expensive as the sand based field but performs well: a sand capped field. Also, the USDA is working on soil amendments that should provide a better growing medium for athletic fields.⁸ The alternative to artificial turf does not have to be a pock-marked dirt field with patches of grass, and using such fields as the justification for many of the arguments for artificial turf is disingenuous at best. For the price of an artificial turf field, \$1.2 million, 8 fields (using Chris Hummer's figure, see below) could be reengineered to be play-worthy, and gone would be those long travel times used as justification for artificial turf. Or as recommended by Dr. Fresenburg, the money saved by NOT putting in artificial turf "could be placed in a maintenance fund with recurring bond

⁶ See <http://www.grassrootsinfo.org/pdf/qatp.pdf>

⁷ <http://www.grassrootsinfo.org/pdf/turfcomparisonreport.pdf>. (According to Appendix C, the county's fields range from 75,000 to 95,000 sq. ft., so some allowance is necessary for the size difference.)

⁸ (Kevin) Morris says, "There is money for constructed-soil research for golf courses and college and professional-level playing fields, but not for sports fields at the high school, elementary school, or park levels—until now. The costs are lowered by using inexpensive byproducts available locally." ... ARS is working with the West Virginia Natural Resources Council and NRCS to develop a computer model that will help users choose which local soils are best for ballparks, soccer fields, rain gardens, and other uses. It will use the NRCS soil survey data, the first such use of this data. <http://www.ars.usda.gov/is/AR/archive/nov10/gardens1110.htm>

revenue. Then the agency would have a premium natural grass field with most of the maintenance costs covered” (from appended comments by Dr. Fresenburg).

Chris Hummer, from his experience in the turf business and as a soccer coach and player, sums it up like this:

Think about that. \$1 million up front, plus minimum maintenance, plus interest on the bonds. That puts the total costs of a fake field at \$125K per year easily for a 10 year life. While for \$150,000 up front, a professionally maintained irrigated and draining grass field should support 75% of the usability of a fake field on a "proper" maintenance budget of \$25,000 per year. Plus, there are no real lifespan issues. You can repair irrigation. You can add more drainage. And you can even re-sod an irrigated field completely for less than \$45,000 turnkey.

Using those numbers, a natural grass field costs less than half a synthetic turf field, maintenance "savings" included, and never really needs replacing. Such a well-maintained grass field would easily deliver at least half of the "usability" of a synthetic, and much more if the climate can support a Bermuda grass variety. That means dollar-for-hour-of-usability, that natural grass comes out ahead. ... Ask any athlete other than a field hockey player whether they'd prefer a quality natural grass field or a synthetic, and anyone being honest is going to say "give me the real thing".

I propose floating a bond for a \$10 million, 10-year natural grass maintenance budget increase. That same money could go towards 7-10 new synthetic fields, or it could renovate and properly maintain 30-35 natural grass fields.⁹

The bottom line is that apparently the school system has around \$1 million to spend on athletic field(s) at each school renovation. Will it go for grass or plastic?

- Is this money best spent on one field, removing many cubic yards of soil and replacing them with rocks, plastic, and used tires, with uncertainty concerning the degree of health and environmental harm that will do? Or a natural turf field with proper drainage, maintained organically, that poses no such risks, with enough money left over for well constructed practice fields?
- Commit county taxpayers to disposing of, and replacing, plastic rugs and 30,000 or so tires every 8 to 10 years, while sowing tire crumb infill every couple of years (viz. Richard Montgomery)? Or commit them to sowing...grass seed?

When you sow tire particles- what you reap may be unwelcome; sow grass seed, and you reap the cool bounty nature provides.

Thank you for the opportunity to comment.

⁹ <http://www.potomacsoccerwire.com/news/5322/12633>, "How long until someone dies of heatstroke on a synthetic turf field?" 8/31/10, By Chris Hummer.

Anne Ambler
Silver Spring
301-946-5599

Diana Conway
Potomac

John Fay
Silver Spring

Kathleen Michels, Ph.D.
Silver Spring

Agnes Jones-Trower, Ph.D.
Gaithersburg

Branford, CT Athletic Fields

Field construction dates	Base and Grass type	Shape	Drainage and Irrigation	Maintenance regimen	Sports played	Lighting	Usage	Costs
24 total fields. Most built 1951-1962,	Built on salt marsh, landfill, and some on clay 50/50 bluegrass/rye mix, reseeded annually.	All square, to handle variety of sports.	No structured drainage system, just grass swales. All now have irrigation.	All organically maintained, e.g., no synthetic fertilizer or grub control. Organic grub control. Leaf compost and compost tea used. Regimen in place 3 years now for all fields.. Cut twice/week, at 2 ½" – 3". <u>Aerate once/yr.</u> Striping- daily or as needed	Youth sports, (Soccer, football, lacrosse, baseball, Softball). Some high school team sports (soccer, softball, baseball, field hockey) Camps, Sports clinics, Field days, School events, Special events.	one is lighted.	March to Nov. 7 hrs/day, during school session, 15 hrs/day Sat-Sun & summer = 2,720 hrs annually	Operating Expenses: Maintenance: \$98k/yr = ~ \$4k/ Per field Capital Expenses: \$20k capital/ yr all fields. \$200k over 18 yrs for irrigation system installation.
One built 1972								
2006 began testing organic on one field (now the best) < http://www.beyondpesticides.org/lawn/activist/BranfordCTpolicy.pdf >								
Oldest field built in 1918, renovated 1963, 1990, 2009/2010								

Evaluation of Montgomery County Artificial Turf Report by Dr. Fresenburg:

My first amazement in this section is that FieldTurf actually defines normal wear as 3000 hours or less. They never used to. However, if you read the entire exclusions of the warranty, there are plenty of windows to void the warranty even if the 3000 hour limit is honored. Things they do not define are "reasonable number of users." Does repetitive training mean repetitive practices, therefore warranty void. Practices with practice drills (High intensity?), therefore warranty void. Warranty voided due to lack of field maintenance according to their guidelines. If you damage the field by regular maintenance, warranty void since you are not an authorized party of FieldTurf. Not wearing the correct shoes, specifically flat soled shoes such as work boots should be avoided. Lack of monitoring public use could easily void the warranty on the specific exclusion.

Usage is difficult to define, however we know that facilities in Missouri that have 500 to 600 events per year are reducing the life expectancy of these fields. We are seeing some synthetic fields being replaced after 5 to 6 years with another significant investment to resurface these synthetic fields (removal of old surface, disposal of old surface, installation of new carpet). If you consider an event (game, practice, etc.) to be a 3 hour event, then we can say that 1500 to 1800 hours of use per year may be excessive. I would also venture to say that these events include intensive use, drills, some marching during football games and un-monitored public use. I would say that the hours of use by the Maryland soccer complex is more in tune with normal usage for natural and artificial fields receiving proper maintenance.

The biggest issue we have seen with natural grass fields is the lack of proper maintenance because they can't afford to maintain the field as needed. Then everyone jumps on the wagon to promote artificial fields as the solution and somehow raises over a million dollars to install a synthetic field. If facilities would invest up to \$20,000 per year per field, the 300 to 600 hours (100 to 200 events per year) as specified in the Maryland complex would be sufficient to host the number of high school events in a school year on a natural grass surface. True, rain events can destroy a natural grass field in a Friday night game; but even if you had to replace a surface on occasion, it would still be fewer dollars than the artificial.

The expense of sand-based fields (as described in the report) is not necessary for providing a natural grass field with better drainage than a native soil field. We find that sand-capped fields (6" sand cap over drains) are considerably less expensive and still perform as a sand-based field. It is not the maintenance cost that determines the cost advantages of one field over another, but the installation cost of the initial field followed by replacement cost. In most cases, maintenance cost of synthetic fields is less than natural grass fields; however the installation cost plus replacement of the surface over the life expectancy of the surface is the determining factor of overall annual cost. I prefer to use a 16 year cost analysis based on an average life of 8 years for the synthetic. Twenty years makes no difference as long as everything is on an even playing surface. I guess the question I have about their cost analysis in appendix D-1 is, "Don't natural grass fields have the opportunity to generate revenues as they have listed in the artificial field numbers?" No revenues were listed on any of the natural grass scenarios in the high school analysis. Remove the revenues from D-1 Artificial and compare it to the last scenario that I feel is acceptable and let's see the net cost. The artificial would be \$2,461,000 without revenues and

the Cool season grass with soil base would still be \$635,000 over 20 years. I suspect if we applied that same assumption (at fewer hours of rental) to the cool season grass scenario for revenues, the total cost over 20 years would have been less than the artificial.

For every bit of research or study conducted diminishing the negative effects of synthetic fields, you can easily find information to counter those arguments. Look at work done in Europe - the Norwegian Institute of Public Health and the Radium Hospital – Artificial Turf Pitches, an assessment of the health risks for football players, Oslo, January 2006 or a report from Sweden – KEMI, Synthetic turf from a chemical perspective – a status report, July 2006, Swedish Chemicals Inspeccorate.

We have done the heat trials and just this past summer had a high reading of 183 F on a synthetic trial at our research facility. Syringing does reduce temps, but only temporarily. Surface temperatures will return to 90% of the original temperature after 30 minutes. The other question I raise, “Does syringing increase the humidity near the surface of synthetic fields enough to raise the heat indices above the playing surface?” We make recommendations to avoid the heat of the day during hot summer months, especially during two-a-days for high school football in August. Make sure players and coaches are pre-hydrated before practice and remain hydrated during practice and games with extra water stations and breaks every 30 minutes.

The final big question, “What about infections?” We simply do not know yet. Andy McNitt has done some work saying little chance of bacteria surviving in a synthetic field. Others have disputed his methods. We just don’t know. One side says yes, bacteria can survive; the other side says the infection was from another source (locker room, etc.). The fact remains that synthetic surfaces are responsible for 4 times more abrasions increasing the potential for infections regardless of the source! We recommend that abrasions be cleaned and bandaged immediately. Any towels used during practice should have a one-time use policy, then in the laundry. Laundry guidelines should follow strict cleansing procedures for water temperature and detergents to ensure bacteria free towels and uniforms.

Another concern I have had is the un-monitored public use of synthetic fields where these safety issues come into play – Heat, hydration, abrasions, water stations, infections, etc. Who is liable if a situation develops?

Hope these comments help. ...

Brad Fresenburg
Extension Assistant Professor
University of Missouri Extension

Followup Questions sent to Dr. Fresenburg and his responses:

1) *One of the many assumptions made in the report's 20-year cost comparison is a major costly renovation of each natural turf field. Is this necessary or reasonable?*

The cost of renovating a natural grass field would be based on many assumptions. Does it include re-grading the surface? Can we assume they are re-sodded rather than seeded? Re-grading can vary depending on the amount of new material being brought in to re-establish a crown. However on a field that was properly installed from the get go, that expense could be a minimum. Grade work for a football/soccer field could range around \$40,000 plus the price of sod – bermudagrass (\$35,000), bluegrass (\$20,000). Re-surfacing a natural grass field is necessary from time to time; however their figures seem inflated.

2) *Do the costs listed for installing and maintaining each type of natural turf field look reasonable? They are higher than in the report they did last year.*

Installation of a sand-based field as they describe (similar to a USGA profile) with 10 to 12 inches of sand root-zone over 4 inches of pea gravel with drains on a herring-bone design in the sub-grade is reasonable (\$500,000 to \$600,000). I do not understand why the sand-base field with bluegrass is higher. Bermudagrass sod is usually more expensive. I always felt a natural grass field on native soil should run around \$20,000 to \$25,000 for annual maintenance. Sand-based fields will have higher cost due to additional fertilizer and water needs, but not double. Sand-based fields should run about \$5,000 to \$10,000 more for maintenance, therefore annual maintenance should fall in around \$25,000 to \$35,000 annual over native soil fields.

3) *Could you define (or give some references) for sand-capped vs sand based?*

Defined the sand-based field above. A sand-capped field is less expensive by design to allow more high schools and park and rec departments to afford an improved natural grass field with better drainage. These are simply a 6 inch layer of sand root-zone (similar to the root-zone of the sand-based field) on top of graded sub-grade. The sub-grade will have a similar herring-bone drain system trenched into the sub-grade. Therefore the pea gravel layer is not included and the root-zone has 4 to 6 inches less sand.

4) *If expense of initial installation is no object, what in your expert opinion, is the most durable, lowest maintenance, best draining, natural turf field that can be installed?*

If installation cost is no object, a sand-based field with a crowned sub-grade (drains installed – herring-bone design) with 4 inches of pea gravel over drains topped with 8 to 10 inches of a sand root-zone mix. I prefer a tall fescue/bluegrass mix for a cool-season sod or bermudagrass. Being in the transition zone, we have the option of both specie selections in Missouri.

5) Heat on plastic turf- I have measured extreme differences in heat on white plastic turf vs green, blue, etc. (rolls left over from a Field Turf installation). Have you done any studies on different colors of the plastic, with or without infill, on any of your plots? Have you looked at any of the alternative infills such as the cork- coconut?.

I have not looked at different colors of synthetics. However, our campus intramural fields just installed the Mondo system with green colored infill. Their claim is 10 to 15 degrees cooler temps with this system. We did some measurements with infra-red thermometers comparing FieldTurf to the Mondo and found only 3 to 5 degree differences. Even if the 10 to 15 degree claim were true, when surface temps are in the 150s and 160s, 10 to 15 degree cooler temps is still HOT! I have not looked at cork or coconut.

6) What was the air temperature for your 183 F degree turf reading?

The air temp for that 183 F reading was 99.6 F. Just a note from my knowledge of our football team at Mizzou, after FieldTurf was installed in our stadium, practices were held more regularly in the stadium. Our players would stand on the asphalt track around the field because it was cooler.

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Subject: Heat on artificial turf. artificial turf related guidelines are needed. The Synthetic turf council: when it's hot - get of the plastic turf!

From: Kathleen Michels (kathleen.michels@verizon.net)

To: Turf ReportResponse@yahoo.com; county.council@montgomerycountymd.gov; councilmember.Berliner@montgomerycountymd.gov; synturf.facts@gmail.com; boe@mcpsmd.org; oicemail@montgomerycountymd.gov;

Cc: Susan.Buffone@montgomerycountymd.gov; debbiespielberg@yahoo.com; safe-healthy-playing-fields-coalition-@googlegroups.com;

Date: Tue, 07 Jun 2011 16:05:06

Artificial turf report response regarding Heat on artificial turf.
artificial turf related guidelines are needed. The Synthetic turf council:
when it's hot - get of the plastic turf!

Here is some more input for your report from the president of the synthetic turf council himself (see #1 below) and from Dr. Joel Forman Pediatric environmental health MD at the Mount Sinai School of Medicine. He suggests guidelines be adapted from the American Association of Pediatrics (see #2 below)

The county report does not seriously make any strong recommendations to address the heat problem, a significant omission, leaving decisions instead individual users. For recreational use this might be fine since most adults and children will leave a painfully hot field. But for teams where the children might be encouraged if not pushed to play beyond where it is healthy such heat is dangerous .

Note also that Trish Heffelfinger of the soccerplex, which the report rely on substantially, said at the MCCPTA meeting that the artificial turf fields are used only in the evening From 5 pm to 10 /11pm . In discussion afterwards she advised that when the artificial turf fields are used during the summer or on hot days during the day they use large fans with misters to keep the children cool.

The county report should actively recommend guidelines specifically for artificial turf and for cooling children off if they are playing in the heat on artificial turf.

1) When NPR finds air temperature in the 80s- artificial turf air temp in the mid100s
says Rick Doyle, president of the [synthetic turf] council:
"I don't think anyone in our industry would suggest it's a good idea to play on a surface that's that hot,"
"It's more of a management issue, Doyle says. "Just as coaches have to reschedule games due to rain when they play on grass fields," he says, so too they need to reschedule or consider an alternative surface to play on when it's hot and sunny."
(see full report transcript below and on-line

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

- 2) Joel Forman (presentation on artificial turf Chicago March 2011)
New York State Preliminary Report Dec. 2009:

Limitations: Mild ambient temperatures only studied (low 80's)

Still - Surface temps were MUCH Higher (~ 35 - 45 degrees) than natural turf

Approximately 70% of the measurement dates at both fields warranted some type of guidance for caution for exercising children and adolescents based on American Academy of Pediatrics (AAP) guidelines (even though ambient temps were only in the low 80s). There would have been no such cautions needed on natural turf.

High Temps On Turf Fields Spark Safety Concerns

by Allison Aubrey <<http://www.npr.org/people/2100208/allison-aubrey>>

August 7, 2008

Morning Edition <<http://www.npr.org/programs/morning-edition/>>

August 7, 2008

Lots of coaches and players love the benefits of artificial fields. There's no practice time or games lost to muddy conditions, and the fields are easy to maintain. They require no pesticides or water. But increasingly, municipalities are raising questions about extremely high temperatures on the playing fields when the weather is hot and sunny.

The first evidence of a "heat island" effect came a few years ago, when 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. In retrospect, he says he should have realized that, because they're a perfect sunlight-absorbing system.

Temperature Check

To understand just how hot the synthetic fields can get, we visited Riverside Park in Manhattan with Geoffrey Croft, founder of NYC Park Advocates.

Carrying a thermometer, Croft stood at the periphery of one of the turf fields that's used for a soccer camp.

In the shade it's 86 degrees. But out in the center of the soccer field where kids are playing soccer, the sun is directly overhead. Holding his thermometer waist-high, he gets a reading of 160.6 degrees Fahrenheit.

Croft is surprised. "It's way higher than I thought it would be," he says.

As the coaches call a water break, which they do every 15 minutes or so, a group of 8- and 9-year-olds stands dripping in sweat.

"It's hot," says 8-year-old Michael-Luca Natt. "Very hot." Nearby, two more day-campers, Max Rana and Billy Hurwitz, say it can be hard to keep playing when it's so hot on the field.

Heat-Trapping Recycled Tires

Part of what's trapping the heat are bits of ground-up recycled tires used by the manufacturers to cushion the turf. When Croft bounces a ball on the turf, bits of the black rubber bounce back up with it.

"It's getting all over my leg," Croft points out as the ball bounces. The kids attending the camps show me how the crumb rubber gets in their hair and in their shoes.

The Synthetic Turf Council is an industry group that represents manufacturers of the products. The group says using recycled tire rubber is a cost-effective way of making the surfaces more resilient. The group is aware of reports of 160-degree temperatures on the fields.

"I don't think anyone in our industry would suggest it's a good idea to play on a surface that's that hot," says Rick Doyle, president of the council.

Doyle says he knows of no documented cases of people being injured. It's more of a management issue, he says.

"Just as coaches have to reschedule games due to rain when they play on grass fields," he says, so too they need to reschedule or consider an alternative surface to play on when it's hot and sunny.

Concerns Over Chemicals

A number of cities and municipalities, including New York City, have many days of very warm and sunny weather.

Coach Mike Handell has permits to run baseball camps in Riverside Park. He says there are only so many green spaces in New York, and increasingly they're being converted to synthetic turf.

Handell says he likes the fact that the fields don't get dry and dusty. But he knows they're hotter, and he's heard concerns about the chemicals found in the recycled tires.

"It they're unsafe. I want to know. I'm mean I'm personally interested because I have permits for these fields," he says, and kids are playing on them.

Heat Is Primary Concern

The New York City Health Department hired consultants to assess potential health risks associated with crumb-rubber turf fields. The report concludes that the risk of harm from exposure to hazardous chemicals such as lead in the rubber appears to be very low unless the chemicals are basically eaten.

According to the report, another possibility is that players may inhale chemicals that vaporize to form a gas. Health assessments suggest that the exposure levels are likely below a level of concern to human health. But these assessments use conservative estimates of exposure. The report says additional studies measuring chemical exposures of players on turf fields should be conducted "to give more representative data on exposures related to urban field use."

Since crumb-rubber turf absorbs and retains heat, the NYC Health Department report says heat is the primary health concern associated with playing on the fields. It says people can suffer dehydration, heatstroke and thermal burns at field temperatures above 115 degrees.

Based on these concerns, the New York City Parks Department has now decided to move away from using recycled-tire rubber in new turf fields.

Commissioner Liam Kavanaugh says decisions have already been made regarding a small number of installations.

"We have two fields in construction where we've actually canceled the black crumb rubber and are actively looking for an alternative," Kavanaugh says.

The state of Connecticut has committed \$200,000 to conducting exposure studies, with testing scheduled to begin this fall.

The industry has offered up a couple of options, including a sand-based fill. The Synthetic Turf Council says one company, Mondo, advertises that its Ecofill is "up to 50 percent cooler." And another company that markets a product called "Cool Grass" synthetic yarn says it can reduce surface temperatures on synthetic turf by up to 35 percent.

"Technology is evolving all of the time," says the council's Doyle. Yet many of these new products can be quite a bit more expensive.

Kavanaugh says he's hopeful one will work since, overall, the city likes the low-maintenance artificial turf.

But Columbia University researcher Gaffin says he's skeptical. He says even without any black rubber added, the plastic blades of grass in synthetic turf trap a lot of heat.

"They're spongy and lightweight - and that means the solar energy that's absorbed quickly gets converted to high temperatures," he says.

Without the natural system of evaporation that living grasses have, everything's working in one direction to turn sunlit turf fields into heat islands, he says.

Related NPR Stories

N.L. Leaves Artificial Turf In The Dust

<<http://www.npr.org/templates/story/story.php?storyId=4532637&ps=rs>> March

For more information see: A recent presentation Dr. Michels gave to the Montgomery County Council of PTAs (MCCPTA) at <<http://www.artificialturffacts.org/>> and click on the presentation below the photo.

For recent scientific panel in Chicago is useful background - on You-Tube (Use this link and the associated links to see and hear the full forum).

<http://www.youtube.com/watch?v=VAdDqDRL2I&feature=mfu_in_order&list=UL

<http://www.youtube.com/watch?v=VAdDqDRL2I&feature=mfu_in_order&list=UL%20>

>.

Other useful information can be found at www.synturf.org .

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Subject: FW: Summary of issues County Artificial Turf report - our kids need YOU!
 From: Kathleen Michels (kathleen.michels@verizon.net)
 To: Turf ReportResponse@yahoo.com; county.council@montgomerycountymd.gov;
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 boe@mcpsmd.org; oicemail@montgomerycountymd.gov; Susan.Buffone@montgomerycountymd.gov;
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 Date: Tue, 07 Jun 2011 16:35:42

Dear County Council Members and Artificial Turf Working Group,

Thank you for your concern for and attention to safe, healthy playing fields (and playgrounds) for school children and other athletes in Montgomery County. Thank you also for attention specifically to the health and environmental concerns associated with artificial turf playing fields. We appreciate the time and effort of the working group. We are concerned however, that the focus, aims and scope of the report do not match the charge given to the working group by the Transportation and Environment Committee particularly in regards to health, safety and environmental issues, along with the fiscal issues.

The report States: "Specifically the committee requested the staff work group to further quantify the programming, environmental, cost-benefits, and other impacts of artificial turf vis-à-vis natural grass fields as part of its report" Conspicuously absent from this stated request is any direct mention of *health or safety* concerns even though this was an important concern for users of the fields (mostly children) and , in fact the key part of the initial charge from the T&E committee.

In summary, The report concludes that a particular type of artificial turf – green plastic with granulated tire infill (directly on a drainage bed of rocks and pipes) which must be disposed of and replaced every 8 years, is safe, of no concern to health and cost effective. This conclusion is not supported by the admitted substantial uncertainties, large gaps in knowledge and data on known and possible hazards and in spite of documented examples and data to the contrary. In particular issues of exposure to high heat and the long term effects of exposure to known and potentially hazardous compounds from tire crumb and plastic, while touched upon, were not adequately reviewed or solutions addressed. Issues of environmental impact were also glossed over without consideration of all the available information and need for local studies on fields.

In fact, the conclusion of safety is at odds with internal and stated conclusions of the working group's own summary on health and safety :

The report writers conclude in part: “ In the absence of either an environmental impact assessment or a health impact assessment on the installation and use of artificial turf fields, the work group identified some of the areas of potential human risks that were raised during the compilation of information that forms this report. This is not a complete set of risks. A formal process would be required to identify and examine all the human health risks from all the artificial turf field materials under consideration. Such an analysis was beyond the scope and capacity of the Artificial Turf Work Group”

However, this is exactly the most important part of what the work group was asked to do . If tire crumb is such a complex and potentially hazardous material that even after 9 months of workgroup review, only some of the risks could be identified and addressed, perhaps tire crumb is not an appropriate material to be using in direct contact with children. Certainly the report writers cannot then turn around and conclude it is safe right after they have explained they cannot so conclude. Given that almost everything KNOWN in tires is bad for human and animal health and that no field user of tire crumb can ever know the full composition of tire crumb since the full recipes are proprietary, the use of tire crumb for contact with humans is questionable at best. The apparent addition of carbon nanotubes, which act like asbestos fibers in lungs when airborne, is an example of the unpleasant and potentially hazardous surprises that may in store for our child athletes over the long term. .

The review of the available literature and expertise consulted is not detailed or comprehensive and reliance is made on a limited number of limited studies and reviews which generated limited data and are selectively interpreted to downplay issues with tire crumb artificial turf. A major oversight is the lack of Material Safety Data Sheets for the artificial turf rug and infill components or, in the case of tires, details from tire manufacturers as to the composition of their tires. Some of the major constituents of tires are not addressed at all – (in particular carbon black which is 30-60% of a tire by weight and is listed by national and international organizations as a possible carcinogen and has also been linked to lung, heart and brain damage in animals and humans). Most of literature discussed or cited is not published in the scientific peer-reviewed literature and some are directly linked to or even commissioned by entities with a direct interest in the use of tire crumb in particular or with financial or other association to industries involved (for example the entities conducting the California studies have as one specific goal the use of used tires, and the review by webmaster Rachel Simon is for the Mannex Corporation which has a multi-million dollar contract with the state of California to find and promote uses for used tires. There are other similar examples).

HEAT: One acute hazard to children that can be avoided by use of alternatives to plastic and mitigated somewhat by use of light colored plastic , is the high heat in direct sun. Artificial turf temperatures in the sun have been demonstrated over and over again to reach extremes no human being should ever be exposed to, much less children. The county should at the very least follow the advice of the synthetic turf

council itself:

Rick Doyle, president of the [synthetic turf] council said in a National Public Radio interview discussing New York City fields on a mid-80 degree day with artificial turf field temperatures in the mid-100s deg F:

"I don't think anyone in our industry would suggest it's a good idea to play on a surface that's that hot,"

"It's more of a management issue, Doyle says. "Just as coaches have to reschedule games due to rain when they play on grass fields," he says, so too they need to reschedule or consider an alternative surface to play on when it's hot and sunny."*

At the very least guidelines need to be put in place. We urge you to work with the American Academy of Pediatrics to adapt their "wet bulb" heat stress guidelines for artificial turf.

FINANCIAL: (please see previous analyses from Jerry Kickenson and Laurie Halverson) the financial conclusions are based on analyses using undocumented assumptions. In fact, without the revenue assumptions the analysis actually shows substantially higher cost for artificial turf over the life cycle of installation, maintenance and replacement as compared to even the highest level of natural turf. Considering that even if the county installs a number of artificial turf fields, the vast majority that most children and adults play on will still be grass. It makes much more sense to put funding and attention to creating many better constructed, more durable, better maintained natural turf fields.

ENVIRONMENTAL: Several but One of the other main KNOWN components of tires is zinc, present at from 2.5% to 5 % by weight depending on the type of tire. Since you can never be certain which type of tire is in the tire crumb for any field or part thereof. Leach tests for zinc contaminated run-off must be done routinely and especially during times such as snow cover when water may be continually seeping through and picking up toxins. We propose the European Guidelines for zinc in artificial turf be used. These were sent in a previous email but both Kathleen Michels and Anne Ambler. The California San Francisco study is on fields that do not see as much water as ours do in the east. So therefore along with the variability in tires the results are not applicable. The Connecticut 2010 study which found very high levels of zinc in some stormwater samples is much more relevant.

DISPOSAL: Issues of disposal, and in particular sustainability given the 8 year cycle of landfill disposal of acres of plastic and 30,000 or so tires are also not adequately addressed for a county that espouses an environmental ethic. No field should be installed unless recycling of current or others nearby, can actually be demonstrated. Neither FieldTurf nor any other vendor has demonstrated ability to recycle routinely and cost-effectively. Those familiar with the plastics industry cast doubt on the feasibility or even ability to recycle this mixed material.

ALTERNATIVES: Aside from the deficiencies in analyses of the currently used alternatives themselves, quality alternatives to artificial turf and artificial turf infill are not thoroughly or adequately addressed but are instead summarily dismissed. This includes better more durable natural turf fields and field care. The ability of the Auburn University stadium and practice fields to take a beating should be investigated as well. The artificial

turf fields at schools and parks are expensive to lease and so will not be available to those who need better fields most. (It is concerning that the list of those notified of this report and report comment extensions includes the FieldTurf artificial turf salesman but does not appear to include other artificial turf vendors or vendors/growers/installers of natural turf, even those who have previously testified before the county council, limiting this source of additional input). Indoor fields in particular can be made healthier through the use of alternative infills.

IN CONCLUSION: Given that the main purpose of school fields and to a slightly lesser degree Parks and recreation dept fields, is use by children, issues of health and safety should be front and center in any recommendations which should be based on a rigorous review of the available knowledge and knowledge gaps and attention to avoiding known and potential hazards, especially where good alternatives exist (which they do). Where concern remains, or uncertainty or lack of data exists, the county should err on the side of caution instead of perceived expediency. The fiscal issues are just as important since the vast majority of fields will still be grass and the same amount of money being spent on expensive artificial fields could go to reconstruct, improve and maintain many more grass fields for more users. A true equity issue. We look forward to a much improved report taking into account all these considerations .

We also urge and insist that due to the embryonic nature of the research on this very complicated product that the county council and Board of Education keep the discussion and lines of information sharing open and dynamic – open to changes at any time in response to any information on hazards and better ways of doing better fields.

Best regards,
Kathleen Michels
1701 Ladd St.
Silver Spring, MD 20902
301-922-3816

Jerry Kickenson
Silver Spring , MD 20902
301-649-5684

Anne Ambler
Silver Spring , MD 20902

[Print - Close Window](#)

Subject: RE: Summary of issues County Artificial Turf report - our kids need YOU!
From: Kathleen Michels (kathleen.michels@verizon.net)
To: Turf ReportResponse@yahoo.com; county.council@montgomerycountymd.gov;
councilmember.Berliner@montgomerycountymd.gov;
boe@mcpsmd.org; oicemail@montgomerycountymd.gov; Susan.Buffone@montgomerycountymd.gov;
debbiespielberg@yahoo.com; safe-healthy-playing-fields-coalition-@googlegroups.com;
synturf.facts@gmail.com; councilmember.Riemer@montgomerycountymd.gov;
Cc: councilmember.Berliner@montgomerycountymd.gov; councilmember.floreen@montgomerycountymd.gov;
councilmember.Leventhal@montgomerycountymd.gov; councilmember.Rice@montgomerycountymd.gov;
councilmember.Navarro@montgomerycountymd.gov; councilmember.Elrach@montgomerycountymd.gov;
councilmember.Andrews@montgomerycountymd.gov; debbiespielberg@yahoo.com;
Date: Tue, 07 Jun 2011 16:58:06

Please see attached presentation on artificial turf

It is adapted from presentations from scientists involved in reviewing or conducting artificial turf studies in both NY and CT. I was hoping to add information and more studies onto it but ran out of time. Note that to make it smaller you might want to print it out in outline view.

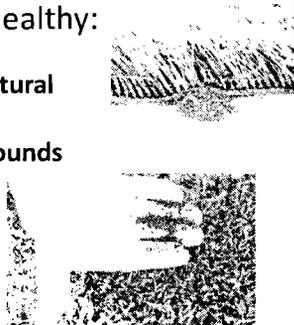
Please let me know if you have trouble viewing it and I can send a version without the photos

Best regards,
Kathleen Michels
Ladd St.
Silver Spring, MD 20902
301-922-3816

Play It Safe and Healthy:

Artificial and Natural Surface – Fields and Playgrounds

Kathleen Michels, PhD
Safe Healthy Playing Fields Coalition



A special thanks to:

- **Joel Forman, MD**
Associate Professor of Pediatrics and
Community and Preventive Medicine
Mount Sinai School of Medicine
- **Gary Ginsberg**, Toxicologist, CT Dept Public Health
- **YOU** – the Parents, coaches, players,
physicians, scientists and others here and
around the country supporting safe, healthy
play areas for children.

Disclosure

**I have no relevant financial relationship
with the manufacturer of any commercial
product and/or provider of commercial
services discussed in this presentation.**

WE ALL WANT SAFE, HEALTHY, DURABLE FIELDS AND PLAYGROUNDS FOR OUR CHILDREN-

Problem: poorly installed, poorly
or difficult to maintain grass fields
(or concrete in urban areas).

What are the options?

- BETTER GRASS FIELDS
- SYNTHETIC OPTIONS

**How can we make BOTH safer
and healthier?**

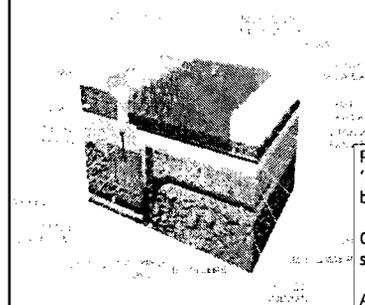


Synthetic Turf History

- 1st Generation AstroTurf (flat carpet like) - 1960s
 - Moses Brown - Prov, RI
 - Houston Astrodome
- 2nd Generation Turf (long fiber 'blades' and 'infill' tire crumb) - 1990s
- Outdoor installation – took off about 2000 with most installed since 2004.
- **Deterioration and replacement accelerating (note FieldTurf suing supplier over inferior plastic, on installed fields over years- quality control ?- how can vendors ensure lead-free ?)**



Modern Synthetic Turf Design



Plastic (nylon, PE)
'blades' in urethane
backing

Crumb rubber, coated
sand, or other infill

Asphalt, gravel with
drainage

<http://www.soccerworldsystems.com/Products.usp>

Blair HS Field installation



Plastic rug rolling out on deep layer of rocks

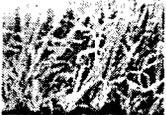
Heat on Blair field before tire crumb infill added - air temp 86 deg F

Artificial Turf, Natural Turf & Public Health:

"REDUCING ENVIRONMENTAL CANCER RISK What We Can Do Now" - President's Cancer Commission 2009. http://deainfo.nci.nih.gov/advisory/pcp/annualReports/pcp08-09rpt/PCP_Report_08-09_S08.pdf

- The incidence of some cancers, including some most common among children, is increasing for unexplained reasons.
- ...current methods...fail to take into account harmful effects that may occur only at very low doses. Further, chemicals typically are administered when laboratory animals are in their adolescence, a methodology that fails to assess the impact of in utero, childhood, and lifelong exposures. In addition, agents are tested singly rather than in combination.

Blade Composition and Coloring



Blades can be any color! Lighter colors are cooler!

Nylon (older fields)- lead chromate – some very high-thousands of older fields may have high lead levels – see recent EHP review Van Ulirsch G et al. 2010

Polyethylene (Newer fields)- lower lead or lead-free? Variable:

No pre-consumer testing required – buyer is responsible for testing.

Lead concern increases as synthetic fields age

- Expert Review: review of all the available analyses (including the CPSC study often cited) the authors of this peer-reviewed 2010 article in the journal Environmental Health Perspectives conclude that:
 - synthetic turf can deteriorate to form dust containing lead at levels that may pose a risk to children and
 - all current fields should be tested for lead content and then routinely tested for surface lead if lead over limit for children's toys is found in the blades.

Evaluating and Regulating Lead in Synthetic Turf. Environmental Health Perspectives (EHP) 118(10): Oct 2010. Van Ulirsch G, Gleason K, Gerstenberger S, Moffett DB, Pulliam G, et al. http://ehp03.niehs.nih.gov/article/detailsArticle.action?journalid=329379690CEEF933977FD29953F_A863BF?articleURI=info%3A.doi%2F10.1289%2F.ehp.100229

Early Field Temperature Data

- University of Missouri Research - Brad Fresenburg, University of Missouri
 - Ambient temp - 98 degrees
 - Artificial Turf Surface Temperature - 173
 - Natural Grass Temperature - 105
 - Head Level Air Temperature - 138
- BYU Field study 2002 : Williams and Pulley, Brigham Young University
 - One of the trainers received blisters through his training shoes (which has also been reported by local coaches and players)
 - Artificial Turf Avg. 117, high of 157
 - Natural Grass Avg. 78, high of 88.5



HEAT

The Industry's solution

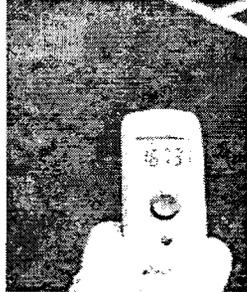


NPR in NYC- 86 deg F day- 160 deg F on the field- children dripping in sweat and wilting.

- Rick Doyle, president of the Synthetic Turf Council: "I don't think anyone in our industry would suggest it's a good idea to play on a surface that's that hot..." "Just as coaches have to reschedule games due to rain when they play on grass fields, so too they need to reschedule or consider an alternative surface to play on when it's hot and sunny." <http://www.npr.org/templates/story/story.php?storyId=93364750>

Samples of Coach's Laments on Artificial Turf

- Lynette Scaffidi- Coach, Mom- 2 elite middle school players, player – Montgomery County, MD (see attached notes)
- Chris Hummer- Soccer Coach, Coordinator, journalist, player, Fairfax, VA (see attached notes)
- Lacrosse Coach , St.Mary's College, MD (see attached notes)



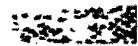
Heat Solutions for AT

- Develop guidelines using American Academy of Pediatrics Heat Stress guidance to decide when to take/keep kids off the field
- USE LIGHTER COLORS OF THE PLASTIC!

INFILL OPTIONS

- Pulverized used TIRES- (contain known and unknown neurotoxins, carcinogens)
- Virgin Rubber (no associated carbon black or vulcanization compounds but latex may be allergenic)
- Rubber Coated Sand
- Thermoplastic Elastomer (TPE) Infill (highly recyclable)
- Cork and Coconut Husk (biodegradable)

Infill option: **Pulverized Used Tires** (20-40,000 tires- 120-250 tons per field)



- RUBBER-** Natural latex or Synthetic
 - Styrene and Butadiene (30% or more)
- Carbon Black** (30% or more)- (10-100 nm ultrafine nanoparticles- see note)
- OTHER** (For vulcanization, heat, wear, strength)
 - *Recipe variable with different tire products*
 - lead, copper, chromium, zinc, cadmium, arsenic, others
 - Phthalates, phenols
 - Volatile aromatic compounds (VOCs)
 - Poly aromatic hydrocarbons (PAHs)
 - Other--WILL NEVER KNOWALL. SECRET, VARIABLE

Artificial Turf, Natural Turf & Public Health:

"REDUCING ENVIRONMENTAL CANCER RISK What We Can Do Now" - President's Cancer Commission 2009. http://deainfo.nci.nih.gov/advisory/pcp/annualReports/pcp08-09rptPCP_repor_t08-09_508.pdf

- The incidence of some cancers, including some most common among children, is increasing for unexplained reasons.
- ...current methods...fail to take *into account harmful effects that may occur only at very low doses*. Further, chemicals typically are administered when laboratory animals are in their adolescence, a *methodology that fails to assess the impact of in utero, childhood, and lifelong exposures*. *In addition, agents are tested singly rather than in combination*.

REDUCING ENVIRONMENTAL CANCER RISK "What We Can Do Now" - President's Cancer Commission

Regulation of Environmental Contaminants:

- The prevailing regulatory approach in the United States is **reactionary rather than precautionary**. That is, instead of taking preventive action when uncertainty exists about the potential harm a chemical or other environmental contaminant may cause, a hazard must be incontrovertibly demonstrated before action to ameliorate it is initiated. **Moreover, instead of requiring industry or other proponents of specific chemicals, devices, or activities to prove their safety, the public bears the burden of proving that a given environmental exposure is harmful**. Only a few hundred of the more than 80,000 chemicals in use in the United States have been tested for safety.

**REDUCING ENVIRONMENTAL CANCER RISK
What We Can Do Now" - President's Cancer Commission**

U.S. regulation of environmental contaminants is rendered ineffective by five major problems:

- (1) inadequate funding and insufficient staffing,
- (2) fragmented and overlapping authorities coupled with uneven and decentralized enforcement,
- (3) excessive regulatory complexity,
- (4) weak laws and regulations, and
- (5) undue industry influence. Too often, these factors, either singly or in combination, result in agency dysfunction and a lack of will to identify and remove hazards.

Potential Adverse Health Effects

- **Exposures to Toxins:**
 - zinc, lead, copper, chromium, cadmium, PAHs, phthalates, phenols, carbon black
- **Routes of exposure and concern:**
 - Breathing
 - Contact – Skin or Mucous Membrane irritation and absorption
 - Ingestion - Hand to Mouth
- **Excessive Heat**
 - Burns
 - Dehydration
- **Injuries?**
- **Increased 'turf burns' -**
 - Infection Risk ?



Nanoparticles in Tires

- 1) **Carbon black is a large component of tires and consists of the smallest nanoparticles.**
- 2) **Toxic Potential of Materials at the Nanolevel, Andre et al.**
 - Engineered nanomaterials (NM) are already being used in **tires**,
 - "It is possible that the release of nanotubes from an intended commercial use product such as car tires could become airborne."

WHAT IS GOOD FOR TIRES IS BAD FOR CHILDREN

- **What is good for tires is also bad for the health of our streams and rivers- Zinc in particular is toxic to aquatic organisms.**
- **Alternative infills or (organically) maintained natural grass fields are the solution.**

Stated Benefits of Synthetic Turf?

- Decreased maintenance requirement?
- All weather play *(but need guidelines for excessive heat)*
- Greater availability
- No need for pesticides and fertilizers *(but contains toxins)*
- Resource conservation *(fossil fuel and water- but needs grooming, replacement, cleaning, cooling)*
- Lower long term costs *(Not if you factor in replacement and disposal costs)*
- Aesthetics *(always the same shiny green- but that needs to be balanced against cooling)*
- A use for used tires *(but merely delays the trip to the landfill of 20,000 to 40,000 tires from another state or even another country)*

Synthetic turf Balancing Act

- Field Use *(but heat?)*
- Water Conservation *(but cleaning and heat reduction)?*
- Use for Used Tires *(but then they go to local landfill)*
- Less maintenance?
- Local Heat Effects and health risk
- Toxic Exposures on Fields
- Toxins Disbursed from Field
- Environmental Heat Effects
- High Cost
- Ecosystem Impact (runoff)
- Unsustainable - dispose repeatedly in landfills)

Benefits



Risks

Unique Vulnerabilities of Children

- Children consume more food, drink more water, and breathe faster than adults
7 times more water per Kg per day
- Children have unique behaviors, diets, and are closer to the ground
hand to mouth behaviors
- Young children have unique windows of heightened biological vulnerability
thalidomide, DES, fetal alcohol syndrome, Minamata, lead
- Children develop roots of adult health and disease (see effects years later)
cancer, cardiovascular disease, diabetes, immune disorders



Early Studies on Toxin Release

- Rutgers - 2006
 - NYC samples
 - PAHs leached from synthetic turf rubber pellets at levels 3x what is allowed in contaminated soil
 - Used solvents and nitric acid
- EHHI (CT - 8/07)
 - Demonstrated volatilization of phenols and PAHs at 118 degrees F
 - Zinc, Selenium, Lead, Cadmium were found in distilled water leachate after 7 weeks
 - Higher amounts when acidified water used

The lab conditions used may not have accurately reflected real world conditions- but intent to simulate digestion.



Injuries

- 5-year Prospective Comparison of Injuries on Natural Grass and FieldTurf. – *(mostly new artificial fields compared with older, probably compacted natural fields)* (Meyers et al. 2004, 32, 1626 *Am. J. Sports Med.*)
- Injury patterns differed:
 - Higher incidences of non-contact injuries, surface/epidermal injuries, muscle-related trauma, and injuries during higher temperatures were reported on FieldTurf.
 - Higher incidences of head and neural trauma, and ligament injuries were reported on natural grass.
 - Recent studies show higher rates of ACL injuries on artificial turf.

EPA Scoping Study 2009

- Key findings:
- Substantial variability in:
 - Materials used in the infill
 - Concentration of contaminants even at a single site
- Increased PM10 and metals at playground site with high activity
 - Above background levels
 - Below NAAQS levels
- EPA Conclusion: On average, concentrations of components monitored in this study were below levels of concern
- EPA Disclaimer:
 - Limited nature of this study
 - limited number of components monitored, samples sites, and samples taken at each site
 - Wide diversity of tire crumb material
- EPA Conclusion:
 - More comprehensive conclusions not possible without the consideration of additional data.



CT DEP Leachate and Storm Water Study 2010 (one of a group of studies)

- 80% of leachate acutely toxic to aquatic life for Cu and Zn and 20% for Cd, Mn, Pb
- Runoff samples from rain events:
 - Zn major metal in runoff
 - 3 of 8 runoff sampling events were acutely toxic to aquatic life
- Conclusion:
 - Potential risk to surface waters and aquatic organisms
 - From whole effluent
 - From Zinc

NY State DEC 2009

- Zinc and a few other compounds had the potential to be released above groundwater standards or guidance values
- VOCs and SVOCs not significantly elevated in air
- PM data deemed partly unreliable but did find elevated PM levels during play and downwind
- Surface temps were MUCH Higher (~ 35 - 45 degrees)
 - Approximately 70% of the measurement dates at both fields warranted some type of guidance for exercising children and adolescents based on American Academy of Pediatrics (AAP) guidelines (even though ambient temps were only in the low 80s)
- Limitations:
 - Mild ambient temperatures only studied (low 80's)
 - No personal monitoring during play!



California OEHHA Study Fall 2010

Particulate matter 2.5 and 10 - not increased (ULTRA FINES NOT MONITORED, NO PERSONAL MONITORING).

VOCs - A few detected

- Levels higher than natural turf comparisons (but levels were nonetheless deemed below health based screening levels).

Abrasions: found 2 - 3 fold higher for college soccer players in study

- The CDC cluster studies identified the locker room as a key source of MRSA (towels, whirlpool baths, etc.) Thus more abrasions could be significant - needs more study. The lower bacterial counts on the field may not be germane- SOIL HAS BENEFICIAL as well as pathogenic organisms- hence its detoxification of contaminants (see oxygen study)

California OEHHA Study Fall 2010 -Limitations

Limitations:

- Particulate monitoring height 4ft -above child breathing zone. No personal monitoring or monitoring for nanoparticles

Variability:

- of infill source material, age, type of processing, ambient temperatures- inability to know the full composition of tire crumb infill.
- Outdoor vs. Indoor
- Abrasion rates may vary- by sport, age, field, temp
- Bacterial presence on field may vary by season and temperature.
- Testing not done at high heat but Surface temps were still clearly much hotter than grass —16-39 degrees higher at mild air temperatures.

Other Concerns Not Well Studied

• **Black Carbon and Carbon Nanotubes (see notes)**

- Carbon black is 30 % or more of tire: Added to tires to give strength and color
 - Conducts heat away from tread and increases tire life
 - **Exposure?: Makes kids' skin black after playing**
- airborne nanoparticles? (see notes)

• **Health concerns of carbon black and engineered carbon nanotubes(from other settings):**

- Cancer (mesothelioma?)
- Elevated BP in adults
- Neurodevelopmental impact

Costs Not Considered for synthetic turf

- "Brooming", vacuuming or raking- (increases for heavily used fields)
- Grooming to loosen infill and keep blades standign upright (more often for more heavily used fields)
- Repairing loose seams or burns
- REPLACEMENT and disposal costs
- Potential environmental cleanup costs
- Cost variance by type of field (soccer vs baseball)

Alternatives

Alternative Infill:

- Rubber Coated Sand
- Thermoplastic Elastomer (TPE) Infill
- New Rubber - Ethylene Propylene Diene Monomer rubber (EPDM)
- Cork and Coconut Husk

Alternative surfaces and groundwork

- **Natural Grass**- native soil, engineered soil, sand based, sand capped etc.
 - **Problems: Synthetic Fertilizers and Pesticides.**
 - Solutions-** use IPM and organic maintenance

Alternative Natural Grass Systems

Natural Grass Systems evolving- Features:

- Selecting the right grass (prevailing weather)
- Drainage System
 - Perforated pipe system
 - Pea Gravel or Sand
- Root Zone Mix
- Grass Seed or Sod
- **F_ewer or no synthetic inputs: IPM and organic maintenance**

Brad Presenburg, University of Missouri

Options- Better Grass Fields

- Dramatic rise in research on grass varieties for fields in the 1990s (USDA, Universities)
- Improved: wear tolerance, shoot density and root depth, strength of recovery, shade and heat tolerance
- Engineered soils, drainage systems equivalent to the rock base for synthetic turf- *plus soil filters contaminants better*
- Stormwater recapture and reuse for irrigation – *(required in Fla, SW. St. Mary's College uses).*
- Fewer synthetic inputs: organic and IPM pest control – focus on improving soil

Summary-Playing Field Choices

- Compelling need for increased sports field access but...
 - Need to carefully evaluate how much Synthetic Turf really increases access (Heat Issues) over well constructed natural turf.
 - New techniques for better designed and maintained natural fields both increase access and get around health problems
 - In shade or indoors – Synthetic needed but check out alternatives to tire crumb infill with fewer known and unknown health issues

Summary Issues -synthetic turf

- Plastic turf heat issues very well demonstrated- lighter color plastic may help but not full answer.
- **Chemical and toxin exposure** from recycled tire infill are not adequately investigated and can never fully be known
- New issues like **Black Carbon and engineered nanoparticles** are troubling (what else don't we know that we need to know?)
- Cost calculations need to include **replacement and disposal** of artificial turf
- Increased abrasions may lead to more infection
- **Alternative infill may eliminate some concerns as a compromise (shade, indoors) and be more precautionary**

Tips for safer use of plastic turf fields:

- Do not use the turf fields on extremely hot days.
- Be sure to clean and monitor any "turf burns" obtained while playing.
- Attempt to remove all pellets from shoes and clothes prior to leaving the fields.
- At home, shake out your children's equipment and clothes in the garage or over the garbage.
- Have your child shower and wash thoroughly after playing on the field.

Natural Turf *see notes*

- For more information about better natural turf please visit the links below (and see attached notes):
- Branford, CT where Parks Director Alex Palluzzi maintains dozens of durable and long lasting grass athletic fields organically: <<http://www.beyondpesticides.org/lawn/activist/BranfordCTpolicy.pdf>> and see the recent follow up: <<http://www.beyondpesticides.org/dailynewsblog/?p=1099>> Fields are used (and rented) from March to November 7 days per week (all day on Saturdays and Sundays) for multiple sports. For more information contact apalluzzi@branford-ct.gov, phone: 203-488-8304.
- Kevin Mercer's St. Mary's College, Maryland (ksmercerc@smcm.edu, phone:(240)-895-3235) - responsible for: ▶ 25 acres of groomed lawn ▶ ▶ 12 acres of sports fields ▶ 100 acres of common lawns <<http://www.smcm.edu/rivgazette/archives/decjan09/DecJanSpread09new.pdf>> low cost, durable, low chemical input, organic

Turfgrass Research- durability, beauty, environmental footprint

- **Kevin Morris -USDA**, Executive Director, National Turfgrass Evaluation Program (Phone 301-504-5125 Kevin.Morris@ARS.USDA.GOV)
Research on new grasses and engineering better soils for athletic fields <http://www.ars.usda.gov/is/AR/archive/nov10/gardens1110.htm>
- **Harvard's wildly successful durable organic turfgrass**: The Grass Is Greener at Harvard: organic care withstands the pounding of thousands of feet daily <<http://www.beyondpesticides.org/dailynewsblog/?p=2530>>
<http://www.nytimes.com/2009/09/24/garden/24grass.html?em_c=eta.1>

Turfgrass research *continued*

- **Dr Brad Fresenburg (U. Missouri):**

field and Turfgrass expert

- conducting ongoing tests with both artificial and natural turf : "Synthetic Turf Playing Fields Present Unique Dangers" <<http://cafni.missouri.edu/research/turfgrass.php>>
- Turfgrass Debate video featuring Jerad Minnick and **Brad Fresenburg**: <<https://etcs.ort.missouri.edu/turfgrassdebate.wmv>>
- Suggests financing options for maintenance
- <<http://cafni.missouri.edu/research/turfgrass-costs.php>>
- as recently also advocated by Soccer Wire's Chris Hummer <<http://www.potomacsoccerwire.com/news/5322/12633>>

Thank You

Questions?