UPDATE ON ARTIFICIAL TURF IN NEWTON

To the Sustainable Materials Management Commission
11/16/2023
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I. PURPOSE:

- **To provide an update on artificial turf fields in Newton since**:
  - The last report presented to SMMC on August 2, 2023, Artificial Turf in Newton: A Summary of Issues
  - The July 30, 2023 SMMC letter to the Mayor regarding the Safe and Appropriate Disposal of Artificial Turf at NSHS
  - The August 25, 2023 letters to the Mayor and City Council regarding the Waste, Toxicity, and GHG Considerations in Artificial Turf Installation and Disposal in Newton which Jonathan Yeo of the Mayor's Office responded to the same day in an email that stated "We believe that we have made very well-informed decisions about synthetic vs. grass and what type of field turf and infill are most appropriate."

- **To bring up for discussion i**f SMMC would like to pursue further communication with the Mayor and City Council before the Council committees (Finance and Programs & Services) discuss the $2.4million to be requested for the NNHS AT replacement field. It is expected to be on the 11/28/2023 agenda. And if so, what would this communication look like (another letter, educational summary of the issues, etc).

II. Update since last report:

- **Status of State Legislative Bills:**

H3948 and S2057 prohibiting AT. These bills have been voted out of committee as of 10/30/2023. These bills stipulate that: "*No state agency or municipality shall provide funding for the purchase, use or installation of artificial turf that contains zinc, plastic or perfluoroalkyl and polyfluoroalkyl substances (PFAS) for any new or existing field after October 1, 2023. Any artificial turf field containing zinc, plastic or PFAS that is in use prior to October 1, 2023 shall be allowed to be used for its useful life but shall not be replaced with artificial turf containing zinc, plastic or PFAS.*"

S523 forming a safety commission. is still in committee (Joint Committee on Environment and Natural Resources) and **addresses the safety of AT by forming a commission to report back within 24 months**.

S524 requiring a moratorium on AT.is still in committee (Joint Committee on Environment and Natural Resources) and **requires a 36 month moratorium on new turf fields while a report is done regarding their safety**.

- **Proof of Recyclability:** The Commission and others have had a lot of concern about the recyclability of the turf and infill materials given the apparent lack of a viable way to do it or of a market for the end products. When the Chain of Custody letter was provided for the NSHS project it appeared that there was a new technology that could separate out the materials. I had the opportunity to speak to the owner of the Italian manufacturer

of the machine. This email I sent to Chairperson Kahng summarizes my discussion : Discussion with Owner of Italian AT turf recycling machine manufacturer - 9/27/23.

Although I did not get a lot of useful information from the owner he did mention that in Europe the main source of revenue was from the service end of the business (ie: fees from the field owners who are having it removed) because there is not a lot of demand for the final products. He thought that in the US there was a better end product market but had no data to prove it. **Without such proof this endeavor is simply greenwashing.**

- **NSHS:**
  - **The two Artificial Turf (AT) fields and the track were replaced by Fall 2023.** The most substantial change made to the AT product compared to the old AT fields infill was the use of new TPE(thermoplastic elastomer) instead of the older crumb rubber (recycled used tires). This product was reportedly used because of the toxicity concerns with crumb rubber. It was chosen over organic infill (cork, coconut husks) because of less maintenance and the fact that it can be played on for longer into the winter season (past late Fall). However, the life cycle greenhouse gas emissions for TPE are considerably higher as shown in theTable below.
  - There were concerns over the infill spill when removing and replacing the turf. **There continues to be spilled infill in the area.**
  - A Chain of Custody document was provided by APW Enterprises d/b/a ART Turf Recycling of South Carolina that showed material was shipped (228 rolls or 15 truckloads) to their recycling facility in PA between July 24-July 31, 2023. They report that the infill will be reused and the turf will be shipped to their recycling partner who will extrude it into new plastic lumber products. They stated that no material other than dust, dirt and foreign debris will end up in a landfill. **No other information except for this short explanation can be found to verify that the material has been reused and recycled.** Note that reuse in the industry is considered to be eventually just sending the material to a landfill and that recycling is better.
  - **Project Cost**:There appears to have been a cost overrun that was funded with $332,000 in additional money from ARPA. There has never been any detailed cost breakdown for this project(no breakdown was required in the contract) other than the following:
    - Construction cost: $967,000
    - Turf materials for both fields: $2,232,907
    - Construction Administration: $40,000
    - **Total Original Budget: $3,239,907 + $332,000 overrun funded by ARPA= 3,571,907**

- **NNHS:**
  - **Requested funding is $2,400,000.**
  - **Specs will be the same as for the NSHS fields** (ie: TPE for infill) although the track will not be replaced.

- **Albemarle Field**:

- ARPA funds have been set aside with planned construction to start in Fall 2024. Amount set aside for the field is not known because it is lumped in with Gath Pool items with a total budget of $2,500,000.

III. Concerns:

- **Greenhouse gas emissions are not being considered when making turf decisions.** The NNHS field alone has an estimated carbon output using the EPA Greenhouse gas Equivalency calculator based on this study researching the environmental impact of football pitches for FIFA, pg 9 as shown in the table below. These are compared to a natural grass field which, especially if organically managed, can be carbon neutral or an effective carbon sink.

Life Cycle CO2 Emissions for NNHS Athletic Fields

	SBR (Crumb Rubber)			TPE			Cork with Shock Pad		
	Metric Tons of CO2	Equivalent to Carbon Sequestered by X Tree Seedlings grown for 10 years	Equivalent to the Energy Use of X Houses for 1 year	Metric Tons of CO2	Equivalent to Carbon Sequestered by X Tree Seedlings grown for 10 years	Equivalent to the Energy Use of X Houses for 1 year	Metric Tons of CO2	Equivalent to Carbon Sequestered by X Tree Seedlings grown for 10 years	Equivalent to the Energy Use of X Houses for 1 year
Landfill	1,467	24,257	185	10,125	167,418	1,276	2,201	36,394	277
Incineration	4,402	72,787	555	12,840	212,311	1,618	2,201	36,394	277
Recycle	844	13,956	106	2,935	48,530	370	514	1,157	9

Assumptions:	
Field Sizes (sq m)	7,337
Field Life Span (yrs)	10

Note that the metric tons of CO2 for the AT fields using TPE compared to cork is 4.6, 5.8 and 5.7 times higher depending on if it is landfilled, incinerated or recycled, respectively.

Furthermore, Appendix A walks through the calculations that compare an AT field with TPE to black polystyrene takeout trays.

- **The State legislature is concerned enough to have four bills pending with two of them out of committee regarding restrictions on AT due to health, safety and environmental issues.** If the State is this concerned perhaps the City should be as well.

- **There had been no breakdown of costs in the NSHS contract.** This should be required in future contracts to see how much of the cost involves the removal of the turf and infill.

- **Further proof should be provided regarding the recyclability and reuse of the old infill and turf.** Although it is encouraging that there appears to be a way to recycle turf, given the new technology and the problems with previous attempts there should be more evidence that the NSHS field was recycled and there was an end use. One has to question that if there was a viable market why are there only 3 machines in the world that supposedly can separate infill and turf to be recycled.

- **Turf fields should be considered in the City's GHG inventory.** It is understandable, easy and human nature to not take longer term risks into consideration when making a decision but given the dire consequences of the planet this should take top priority.

- **A life-cycle cost comparison between natural grass and AT fields was never done.** One should be required before a decision is made. In other words, consider the long-term risks.

Appendix A:

CO2 Equivalencies of one AT field (with TPE) compared to black plastic takeout containers

-NNHS field assuming 7,337 square meters has approximate lifetime CO2 emissions of: 2,935 metric tons.
-A metric ton is 1,000kg, so this is equivalent to 2,935,000kg of CO2.
-Per Nextek.org polypropylene has approximately 2.0kg of CO2/kg.
-2,935,000kg of CO2 / 2.0kgCO2=1,467,500 kg of plastic.
-1,467,500kg x 2.2lbs/kg=3,228,500lbs of plastic
-Therefore, the CO2 emissions equivalent of an T field using TPE is the same as 3,228,500 lbs of polypropylene.

-Per Splash Packaging a 150 unit case of 28 oz polypropylene takeout containers weighs 15.1 lbs or 241.6 oz/150 or 1.6 oz/ container.
-the containers have a top and bottom therefore assuming the clear tops are recyclable, the black plastic bottoms weigh approximately 0.8oz each.
-therefore, there are approximately 20 tray bottoms/lb.
-so, 3,228,500 lbs of polypropylene x 20trays/lb = 64,570,000 trays
-64.6MM trays / 31,000 Newton households = 2,082 trays/HH
-2,082 trays/HH / 10 years is **200 trays/HH/year for 10 years!**