January 23, 2022

To Any/All Interested Parties:

In a Memorandum dated December 3, 2021,¹ Josh Whipple of NH DES MtBE Remediation Bureau details the reason, procedure, and results for surface water testing of the Sagamore Creek taken at three different locations on October 21, 2021. This sampling was performed in response to concerns raised by Non Toxic Portsmouth² regarding Total Fluorine detections in samples of artificial turf material from Tom Daubney field and the potential for PFAS in runoff from the Portsmouth High School field impacting Sagamore Creek.

Mr. Whipple included in his memo descriptive sampling information and protocol, some of which is included here in Appendix A. Full analytical laboratory information is also available in the original report while Mr. Whipple’s extracts are included here in Appendix B. Appendix C of this brief includes charts created to better visualize the data reported in the memo.

In his narrative, Mr. Whipple noted that:
1. Procedures for sampling, storage, transport, and chain of custody were all followed;
2. Samples were not contaminated and analytical results were precise (quote in Appendix B);
3. “of the three sites WSHEDTB1 appeared the most likely to be flooded on a spring tide;”
4. “the NHDES Ambient Groundwater Quality Standard for PFOA is 12 ng/L and PFOS is 15 ng/L;” and
5. “Given that a similar suite of PFAS compounds were detected at relatively low concentrations at all three sample locations, it suggests that the PFAS in surface water in the sampled locations is more indicative of area-wide impact in the region rather than specific sources near each of the Sagamore Creek inlets.”

It is also worth noting that:
1. The moon was full the night before the samples were taken, referring to Mr. Whipple’s “spring tide” annotation³.
2. The infill at Tom Daubney field is scrap tire crumb rubber⁴;

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¹ [http://www4.des.state.nh.us/IISProxy/IISProxy.dll?ContentId=4963375](http://www4.des.state.nh.us/IISProxy/IISProxy.dll?ContentId=4963375)
3. Selenium is classified as a trace element, is used in the rubber industry as a vulcanizing agent\textsuperscript{5}, and leaches into water and acidified water from crumb rubber\textsuperscript{6};

4. The total PFAS detected in the sample downgradient of Tom Daubney field was roughly double the total PFAS detected in the samples taken at the other two locations; (Appendix C)

5. The installation of Tom Daubney field was completed in 2010;\textsuperscript{7} and

6. FieldTurf states that “After their life expectancy of 8-10 years, artificial turf fields do require to be replaced to ensure proper performance and safety.”\textsuperscript{8}

This information has been referenced, collated, and shared with you in support of further sampling of the surface water at these Sagamore Creek locations, and to suggest performing both Selenium testing and a full non-targeted PFAS analysis, to help understand and potentially identify the common source of the “area-wide impact” Mr. Whipple so carefully sampled and judiciously documented.

The question of whether or not the artificial turf field system components installed at Tom Daubney Field are leaching PFAS and other chemicals into the surrounding ecosystem should be answered before decisions are made regarding an upcoming need for field disposal and replacement.

Thank you for your consideration.

Sincerely,

Kristen Mello

____________________________________
Kristen Mello, M.Sc. (she/her)
Co-founder / Director, WRAFT
Westfield Residents Advocating For Themselves
https://www.facebook.com/WRAFT01085

CC: NH Senator Rebecca Perkins Kwoka, NH Representative David Meuse
MA Representative Jeff Roy
Portsmouth, NH: Mayor, City Council, School Board, City Manager, City Attorney, Director of Public Works
Oak Bluffs, MA: Board of Health, Planning Board, Conservation Commission
Nantucket, MA: School Committee, Board of Health,
Medway, MA: Board of Health, Conservation Commission, School Superintendent

\textsuperscript{5} https://geoinfo.nmt.edu/staff/mclemore/teaching/documents/naumov.pdf
\textsuperscript{6} Mattina, Mary & Isleyen, Mehmet & Berger, William & Özdemir, Saim. (2007). EXAMINATION OF CRUMB RUBBER PRODUCED FROM RECYCLED TIRES.
https://www.researchgate.net/publication/339932637_EXAMINATION_OF_CRUMB_RUBBER_PRODUCED_FROM_RECYCLED_TIRES
\textsuperscript{8} https://fieldturf.com/en/articles/detail/how-to-know-when-its-time-to-replace-your-artificial-turf-field/
Appendix A: Sampling

From the memo, regarding sample locations:

“Three sampling locations were selected; one from the inlet downgradient from the field (labeled WSHEDTB1 at 43.05558, -70.76521), one from an inlet to the west in the headland area of the creek accessed from and sampled upstream of Greenleaf Ave (labeled WSHEDTB2 at 43.05423, -70.77732), and one from an inlet on the south bank of the creek (labeled WSHEDTB3 at 43.04537, -70.76220) which drains from under Elwyn Road in the vicinity of Harding Road. Approximate sample locations are depicted on the attached aerial photo excerpt from Google Maps.”
Appendix B: Results

From the memo, table of results:

<table>
<thead>
<tr>
<th>PFAS Compound</th>
<th>AGGS</th>
<th>WSHEDTB1</th>
<th>WSHEDTB2</th>
<th>WSHEDTB2 (Duplicate)</th>
<th>WSHEDTB3</th>
<th>FIELD BLANK</th>
<th>TRIP BLANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfluorohexanoic acid (PFHxA)</td>
<td>NS</td>
<td>5.4</td>
<td>1.7J</td>
<td>1.8</td>
<td>1.5J</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Perfluorooctanoic acid (PFoA)</td>
<td>NS</td>
<td>3.3</td>
<td>1.5J</td>
<td>1.4J</td>
<td>1.3J</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Perfluorooctadecanoic acid (PFODA)</td>
<td>12</td>
<td>8.3</td>
<td>4.0</td>
<td>4.0</td>
<td>4.1</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Perfluorodecanoic acid (PFDA)</td>
<td>11</td>
<td>1.1J</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Perfluorooctanoic acid (PFNA)</td>
<td>NS</td>
<td>0.44J</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Perfluorobutanesulfonic acid (PFBS)</td>
<td>NS</td>
<td>3.3</td>
<td>2.4</td>
<td>2.4</td>
<td>3.6</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Perfluorohexanesulfonic acid (PFHxS)</td>
<td>18</td>
<td>1.9</td>
<td>0.94J</td>
<td>0.92J</td>
<td>1.8</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Perfluorodecanoic acid (PFOS)</td>
<td>15</td>
<td>7.1</td>
<td>3.0</td>
<td>2.8</td>
<td>5.4J</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Perfluorobutanoic acid (HFBIA)</td>
<td>NS</td>
<td>4.7</td>
<td>2.2J</td>
<td>2.1J</td>
<td>1.8J</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Perfluoropentanoic acid (PFPeA)</td>
<td>NS</td>
<td>5.9</td>
<td>1.7J</td>
<td>1.6J</td>
<td>1.5J</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>NS</td>
<td>16.4</td>
<td>13.0</td>
<td>13.0</td>
<td>16.9</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Specific Conductance (us)</td>
<td>NS</td>
<td>1,170</td>
<td>402</td>
<td>402</td>
<td>961</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Notes:
- All analytical results are reported in ng/L or parts per trillion (ppt).
- NA - Not Applicable
- NS - No AGGS
- ND - Not Detected Above Laboratory Method Detection Limit
- AGGS - New Hampshire Department of Environmental Services Ambient Groundwater Quality Standard. Please note that there currently is no regulatory standard for PFAS in surface water.
- J - Value reported by the laboratory is an estimated maximum possible concentration.
- J - Concentration detected is reported as an approximate value by the laboratory since it was above the method detection limit but below the reporting limit.

From the memo, regarding the quality of the sampling and analysis, Mr. Whipple stated,

“No PFAS compounds were detected in the quality assurance samples (Trip Blank and Field Blank) suggesting that there were no outside contaminants introduced during sample collection, storage or transportation to the laboratory. The duplicate sample results showed either the same concentration or very close (within 0.2 ng/L) which further validates the concentrations reported in the laboratory analytical report.”
Appendix C: Charts

Chart 1:

Sagamore Creek, Portsmouth, NH, PFAS Results
Sampled on Oct 21, 2021

Concentration in ng/L or PPT

- Downgradient of HS Field
- Near Greenleaf Ave
- Passes under Elwyn Road

Chart showing concentrations of various PFAS compounds at different locations.
Chart 2:

Sum of All PFAS Detected at Each Location
NH DES Data for Sagamore Creek, Portsmouth, NH, Collected Oct 2021

- High School: 41.4 ng/L or PPT
- Greenleaf Ave: 17.2 ng/L or PPT
- Elwyn Road: 21.0 ng/L or PPT
Chart 3:

How does NH DES Sagamore Creek data compare with MA Maximum Contaminant Level of 20PPT for Sum of PFAS 6?

PFAS6 are PFHxS, PFHpA, PFOA, PFOS, PFNA, and PFDA

* Sum of PFAS6 is calculated by adding the concentrations of PFHxS, PFHpA, PFOA, PFOS, PFNA, and PFDA which individually exceed the 2.0PPT Reporting Limit (RL). Concentrations of these 6 PFAS that do not exceed the Reporting Limit do not count toward the PFAS6 regulatory sum.