BOARD OF HEALTH

~~ MINUTES ~~

Monday, March 2, 2026

Meeting PSF Community Room, 4 Fairgrounds Road, Nantucket MA, 02554

This meeting was held via remote participation using ZOOM and YouTube.

Called to order at 2:00 p.m.

Staff in attendance: Jerico Mele, Deputy Director of Health and Human Service; Andre Shapero, Environmental Contamination Administrator

Remote Staff:

Members attending: Ann Smith (chair), Meredith Lepore, Kerry McKenna, James Cooper, Thomas Dixon

Remote Members:

Public Participant: Dr. Margaret Ann Price; Fairwinds, Willa Arsenal; Nantucket Land and Water Council, Dr. Beth Hallet; Superintendent of Nantucket Schools, Dr. Sarah Evans; Associate Professor of Environmental Medicine at Mount Sinai, Steve LaRosa; Senior Technical Leader with Weston & Samson Engineers, Maire Rudiman; Risk Assessor and Toxicologist with Weston & Samson, Liz Denley; Weston and Samson, Dr Kyla Bennett, John McMeeking; Senior Landscape Architect with SMRT, Charlie Effman; Engineer from Horseley Witten Group, Ann Kitchell; Principal at Horseley Witten Group

I. PUBLIC ANNOUNCEMENT

II. PUBLIC COMMENT	
Discussion:	None provided

III. ROUND TABLE DISCUSSION OF PUBLIC HEALTH IMPACT FROM PROPOSED SYNTHETIC FIELD INSTALLATION	
Discussion	Mental health benefits of team sports • Dr. Margaret Ann Price presented protective mental health factors from team sports participation • Adolescent brain undergoes significant development with prefrontal cortex myelination affecting judgment, impulse control, and executive functioning • 40% of high school students report feeling sad and hopeless regularly, 42% report anxiety, and 20% have considered suicide • 97% of teenagers use at least one social media platform, with 46% reporting constant usage • Students on social media over 5 hours per day face much higher risk for depression and anxiety • Team sports specifically (not individual sports) show lower rates of anxiety, depression, social withdrawal, and rule-breaking behaviors • Benefits carry into young adulthood with decreased substance use, suicide risk, better sleep, and less social media use • Team sports provide sense of belonging, reduce loneliness and social isolation, and offer mentorship through coaches • Nantucket's island isolation makes community connection and team structure even more critical for teens • COVID pandemic demonstrated mental health decline when kids couldn't participate in team sports • Skills developed include frustration tolerance, collaborative problem solving, goal setting, time management, leadership, and empathy • Teenagers who participate in organized sports are 8 times more likely to be physically active at age 24 Artificial turf health and safety concerns • Dr. Sarah Evans from Mount Sinai presented environmental pediatric concerns with artificial turf • Children are more vulnerable to chemical exposures due to closer proximity to ground, hand-to-mouth behavior, higher food/water/air intake per body weight, and developing organ systems • Artificial turf is a complex multilayer mixture of various chemicals, with limited comprehensive studies on components other than recycled tire crumb • Exposure routes include inhalation, skin contact, absorption through open wounds, and accidental

ingestion through mouth guards or eating without washing hands

- No prospective epidemiological studies have assessed health risks of play on turf fields
- PFAS class includes at least 15,000 chemicals, but labs can only test for about 40 of them
- Emerging data shows short-chain PFAS may be as toxic or more toxic than legacy long-chain chemicals like PFOA and PFOS
- EPA and multiple states have taken action to limit PFAS in drinking water and consumer products, including short-chain chemicals like PFBS and GenX
- CDC/ATSDR recommends screening patients for PFAS exposure, blood testing, and screening for associated health outcomes when levels are elevated
- Microplastics found in essentially all body tissues tested, with children experiencing higher exposures
- Study found microplastics (including polyethylene used in turf) in arterial plaques associated with increased risk of heart attacks, stroke, and death
- Microplastics accumulating in human brains, found highest in dementia patients, including polyethylene and polypropylene from turf
- EU analysis shows artificial turf fields are major source of environmental microplastics, with rubber and plastic infills being phased out
- Estimated 2 tons of microparticles lost from turf field annually from routine use and maintenance
- Spanish study found 20,000 plastic grass fibers shed per day from turf field, with widespread waterway contamination
- All types of turf fields tested get significantly hotter than natural grass because plastic can't produce water vapor for cooling
- Penn State studies found all infill types and grass blade colors considerably hotter than natural grass
- Turf can reach temperatures 40-60°F hotter than ambient air on days with 80-85°F temperatures, creating heat injury risk
- NFL study found significantly higher rates of serious injuries requiring surgery on artificial turf
- Systematic review of 53 studies found increased risk of foot and ankle injuries on both older and newer generation artificial turf
- Three studies showing higher injury rates on natural grass were funded by artificial turf industry
- Recent review found increased concussion risk on artificial turf, worsened by cold temperatures and improper maintenance
- Dr. Evans recommended natural grass as the safest and healthiest choice for the community

PFAS testing methodology and standards

- Dr. Kyla Bennett from PEER was one of two scientists who discovered PFAS in artificial turf in **2019**
- Detection limits are critical because they determine what can be measured (example: testing Coke for sugar with 100-gram detection limit would show non-detect despite 39 grams present)
- Method detection limit (MDL) shows something is present, reporting limit (RL) shows how much
- Testing should be done in parts per trillion (nanograms per kilogram) because that's how PFAS is regulated at federal and state levels
- EPA has **zero** as maximum contaminant level goal for PFOA and PFOS, meaning no safe level exists
- SPLP test uses pH **4.2** (same as apple juice), not "harsh" or "extreme" as characterized by some consultants
- SPLP mimics real-life conditions of UV light exposure, abrasion, and acid rain over **18-24 hours**
- Total Organic Fluorine (TOF) testing is screening tool but has limitations - can show false positives from non-PFAS fluorinated chemicals
- TOF detection limit is parts per million, so detections would be above **1 part per million**
- Recent court cases have thrown out TOF data due to false positive issues
- "No intentionally added PFAS" is very different from "PFAS-free" - should not care if intentional or not, only whether present
- Claims of compliance with California Prop 65 or REACH only regulate PFOA and PFOS, not broader PFAS class
- "No long chain PFAS" doesn't mean safe - short chain PFAS like PFBA can be toxic
- PFBA shows synergistic effect with PFOA and microplastics in new research
- Ultra short chain TFA (smallest PFAS) requires very high concentrations to be toxic, but levels are rising to concerning amounts
- Bennett recommends defining PFAS as one fully fluorinated carbon (how Massachusetts defines it)
- Detection limits should be as close to zero as labs can achieve
- Washington State Department of Health studied cancer cluster concerns in **2014** after soccer coach Amy Griffin observed athletes developing cancers
- Study did not find cancer cluster but was limited and not conclusive about health risks
- Background PFAS levels in New England soils are ubiquitous contamination, not true "background" since PFAS is entirely man-made

- Comparing to regional screening levels (designed for Superfund cleanup) is not appropriate comparison for new installations
- Just because something is legal doesn't mean it's safe - can buy carcinogenic products at stores
- Absence of regulatory limit doesn't mean chemical isn't toxic
- PFAS is additive - if you stop adding more tomorrow, existing contamination will persist for decades before declining

Environmental protection and groundwater monitoring

- Nantucket has a sole source aquifer, meaning one drinking water source for entire island
- Private drinking water wells surrounding high school nearly all have quantifiable PFAS levels
- Existing high school field soil already has PFAS contamination from previous testing
- PFAS is ubiquitous in environment - found in rain, existing soils, and groundwater
- PFAS can travel about **120 meters** vertically through soil, so removing top **6 inches** of topsoil won't eliminate it
- Some PFAS adsorb to organic carbon, while ultra-short chain PFAS don't bind well and migrate more easily
- Some PFAS bind to soil minerals through ionic bonding, which is basis for emerging treatment technologies
- At some point, PFAS comes off soils and carbon filters and migrates to groundwater - doesn't stick forever
- Residential septic systems are substantive sources of PFAS to aquifers, currently impacting bedrock wells
- Zone 2 area uphill of high school has septic systems not yet connected to wastewater collection system
- Monitoring program would require **8 samples** from upstream, on-site, and downstream wells before field installation to establish statistical baseline
- Would need **8 more monitoring rounds** after installation to determine if concentrations statistically changed
- Groundwater monitoring is complex because PFAS concentrations naturally fluctuate based on rainfall, groundwater levels, and other inputs
- Testing materials before installation is more effective than trying to forensically determine source after installation
- If materials test clean before installation, risk of PFAS release from field is addressed upfront
- Atmospheric deposition of nitrogen would continue on synthetic field with no vegetation to absorb it
- Stormwater management plans from **2021** had multiple deficiencies including no nitrogen removal, off-site runoff at **4 locations**, and non-compliance with Massachusetts stormwater requirements
- **2021** plans increased peak flows from pre-existing to post-construction conditions
- Current design has changed considerably - removed **50-space** and **20-space** parking lots, now only **15-space** lot proposed
- School committee voted to pursue synthetic turf only **6 weeks ago**, so stormwater plans still being updated

Stormwater system and microplastics capture

- Proposed field is **~1.8 acres** of plastic (from 2021 plans)
- Field designed to drain vertically at up to **14 inches per hour** through carpet, infill, shock pad into base stone
- Stormwater fills voids in stone layers like a bathtub and slowly infiltrates into sand subbase
- Flat panel drains on **20-25 feet** on center sit on base stone layer to capture water that doesn't infiltrate
- Collector pipes convey water to infiltration galleries with inspection ports for vacuuming debris
- John McMeeking stated he's never seen debris actually get into infiltration galleries in **25 years** of experience
- Proposed capture methods include walk-off mats at every gate entrance, stormwater hoods for floating debris, deep sump catch basins for sinking materials, and trench drain baskets
- Typical catch basin pore size is **0.21 millimeters** (Merafhe N filter), but many microplastics and all nanoplastics are smaller and won't be captured
- Microplastics small enough to pass through system will infiltrate into aquifer and drinking water
- Nanoplastics are small enough to enter bloodstream and cells, will pass through soil filtration
- System will retain larger particles but not 100% of micro and nanoplastics
- No mechanical filtration can remove dissolved PFAS - would require activated carbon treatment system
- Anne Kitchel from Horsley Witten noted deep sump and hooded catch basins won't be effective for tiny plastic pieces that blow around
- Snow clearing tends to capture significant turf material - recommendation for designated snow melt areas to keep materials on-site
- Estimated **0.4 to 236 pounds** of micro and nanoplastics released annually from carpet alone (not

including infill)
- Study calculated **5,350 square meters** for football field size
- Airborne microplastics cannot be captured by stormwater system
- No way to capture all micro and nanoplastics coming off field according to John McMeeking

Field maintenance and operations
- Current Nobadeer farm field is **14 years old** (synthetic turf)
- Typical synthetic turf lifespan is **8-12 years**, often goes longer
- Track wear surface replaced every **5 years**, base surface lasts **20 years**
- Fields require grooming typically every **couple weeks** to redistribute infill properly
- Wear patterns appear in goal creases and between hash marks on football field
- Chip Clooney (facilities director) and crew of **4 members** responsible for field maintenance
- Maintenance includes sweeping and grooming on regular basis
- Walk-off mats proposed at every gate entrance and exit
- Synthetic turf fields are not irrigated (early versions were irrigated but made fields hotter)
- Only water used is for spot cleaning of blood or vomit
- Natural grass field at Capizo Stadium currently uses approximately **1,700,000 gallons** of water
- High-quality natural grass fields get **200 hours or less** of playing time per year
- Gillette Stadium only plays a few hours per week on natural grass
- **400-600 hours** on natural grass shows wear and tear, **600-800 hours** shows significant damage with rutting and bare spots
- Over **800-1,000 hours** creates maintenance difficulties and increased injury risk
- Current Nantucket fields at **~1,200 hours** per year, well above recommended levels
- Synthetic turf provides unlimited play with consistent planarity **24 hours** a day
- Current field is mud with snow, completely unviable for lacrosse season starting in couple weeks
- Synthetic turf allows play even in pouring rain, whereas natural grass becomes dangerous
- Natural grass degrades quickly and can cause more injuries
- Maintenance education planned for staff, including off-island training
- No fertilizer, herbicides, or pesticides needed for synthetic turf (unlike natural grass)

Natural grass alternative considerations
- Natural grass field would require **18 months** of no play for establishment
- School has no other space to play besides current fields and Nobadeer (already heavily used)
- Would need to find alternative playing locations or severely limit play during establishment period
- Would need multiple grass fields to rotate use and prevent overuse
- If town provided land, would need to go through entire procurement process to create viable field
- Field must have proper gradients and treatment, can't be "any old field"
- Would require multiple fields, significant time (potentially years), and substantial resources
- When natural grass project completes, field still needs time for grass to grow beyond building completion
- Estimated additional **year** beyond project completion for grass establishment
- High-quality natural grass like Gillette Stadium only supports few hours per week of play
- Recommended testing for natural grass materials: turf grass, sand underlay, fertilizer all tested before arrival
- If using rolled sod (vs. seed), test for herbicides and pesticides using EPA 1633 and TOP assay
- Irrigation well at site needs PFAS testing (every drinking water well around high school has quantifiable PFAS)
- Ongoing testing needed for replacement turf grass, top dressing soils, new fertilizer batches, herbicides, and pesticides
- Annual testing recommended for irrigation well
- Turf farms often used biosolids from wastewater treatment plants as fertilizer (class A treated but not tested for PFAS)
- Organic compost made with food waste contains PFAS and microplastics, especially if depackaged by machine
- Background PFAS in soils throughout New England at quantifiable concentrations
- Any materials brought to island should be tested regardless of natural or synthetic
- Steve LaRosa recommended same testing protocols for natural grass materials as for synthetic turf
- Natural grass would still be exposed to PFAS in rain and atmospheric deposition
- Pesticides and herbicides stick to grass and soil when applied correctly, unlike PFAS which migrates

Testing protocols and materials
- Weston & Sampson and TRC hired by school system as independent third-party consultants
- Steve LaRosa emphasized they are independent from school, not part of "school's team"

	• Proposed materials: Greenfield Iron Turf Ultra Green (carpet), Brock Fill (southern yellow pine infill), Shock Pad or PowerBase/YSR (underlayment) • Confusion about exact materials - Iron Turf vs. Iron Turf Ultra Green are different products (tufted vs. woven, different chemicals) • Question whether fabric backing of carpet is included in testing • Brock Fill is southern yellow pine, organic, natural infill (not crumb rubber) • Understanding from manufacturers: Brock Fill is chopped, sized to be round with no sharp edges, heavier than water so won't float • Brock Fill not treated with anything according to 2021 information, but recommend testing actual batch • Three main tests proposed: EPA Method 1633 (solvent extraction for 40 PFAS), TOP assay (oxidizes precursors), SPLP (leaching test) • EPA 1633 uses methanolic potassium hydroxide extraction - pulls PFAS out of material as-is • Weston & Sampson has not seen any PFAS detected using solvent extraction from turf carpet, pad, or various infills tested • TOP assay uses strong oxidizer to force transformation of polyfluoroalkyl compounds into measurable perfluoroalkyl compounds • TOP assay shows if additional unmeasured PFAS chemicals are present beyond the 40 testable compounds • Recent community testing with TOP found only PFBA (4-carbon PFAS) at trace concentrations below detection limits • PFBA detected at **4.1 parts per billion** (estimated), compared to EPA regional screening level of **78,000 parts per billion** and Maine standard of **120,000 parts per billion** • Results were **120,000 times** below EPA criteria and **196,000 times** below state criteria • SPLP uses pH **4.2** water matrix (mimics acid rain) shaken for **18-24 hours** • SPLP detected trace concentrations of few PFAS in carpet and sand, significantly below Massachusetts standard of **20 nanograms per liter** and EPA standard of **4 nanograms per liter** • Comparison standards: Massachusetts MCP S1/GW1 (soil direct contact and groundwater protection), EPA MCLs (drinking water) • S1/GW1 standard is **0.3 parts per billion** (300 parts per trillion) for soil • Dermal contact standards are ~**1,000 times** higher at about **300 parts per billion** • Detection limits must be below S1/GW1 standards to be meaningful • Some urethane testing of Brock materials had reporting limits exceeding S1/GW1 standards • TOF testing used **100 milligrams per kilogram** (parts per million) reporting limit • Some states dropping TOF standards to **50 parts per million** • Recommend testing all components separately: carpet and backing, infill, shock pad • Martha's Vineyard testing in 2021 included over **40 different tests** on 5 components with 6 tests each • Current Nantucket proposal based on **4 tests** total (1633 and TOF on turf and Brock infill only) • Recommendation: test exact batches before shipping to Nantucket, not just manufacturer samples • Materials get exposed to PFAS during transport (barge, rain, road dust), so test before installation • Contract should require testing of actual batches before shipment, with acceptance before materials sent • Track surface should also be tested, at minimum the top wear layer • Additional testing recommended: heavy metals, pesticides, phthalates, PAHs (petroleum compounds), SVOCs • Same suite of analyses typically done for fill materials in urban areas • Marie Ruderman (risk assessor/toxicologist, 30 years experience) emphasized focus is protecting public health • Risk assessment looks at bioavailability, concentration, exposure routes, and duration • Presence of chemical does not equate to health effect - depends on dose • Risk characterization compares concentrations to available standards • "No significant risk" conclusion based on comparison to standards and rigorous risk characterization • Very conservative exposure assumptions used in risk calculations, much higher than normal play would create • Surrogate toxicity values used for chemicals without toxicity data, selecting more toxic surrogates as conservative estimate • Microplastics analysis not standardized - no agreed upon method or regulations for acceptable limits • Portsmouth field referenced (2016) - at that time "PFAS free" meant only PFOA and PFOS (2 compounds) • Weston & Sampson will never call anything "PFAS free" because can't measure down to individual molecule • Recycling facility in Rockland, Massachusetts mechanically recycling turf into pellets resold on plastic market

	• Facility in Baton Rouge, Louisiana also recycling turf • Infill separated, washed, and reused • Pennsylvania facility (Rematch) went bankrupt and is out of business • Some recycling is pyrolysis (burning down) in Baytown, Texas • Track uses needle spikes - wear surface thick enough that spikes don't penetrate to base layer • Wear surface is **13 millimeters** thick, more than length of spike • Track lines repainted every **5 years** due to UV degradation (paint may contain PFAS) • Full project includes **980-seat** grandstand, athletic field lighting, press box, boosters/concessions building, team room building, **15-space** parking lot, pedestrian walkways

IV. ADJOURNMENT	
Discussion	**Motion to adjourn at 5:48 pm (Motion by: Dixon) (Seconded by: Lepore)** Carried 5-0//Smith, Lepore, McKenna, Dixon, Cooper(Aye)

Submitted by: Tomeka Gary