

CITY COUNCIL AGENDA ITEM
CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Discussion of the Selection of Synthetic Turf Infill Material for the Twin Ponds Park Field Turf Replacement Project
DEPARTMENT:	Parks, Recreation and Cultural Services
PRESENTED BY:	Eric Friedli, PRCS Director Noel Hupprich, PW Project Manager
ACTION:	<input type="checkbox"/> Ordinance <input type="checkbox"/> Resolution <input type="checkbox"/> Motion <input checked="" type="checkbox"/> Discussion <input type="checkbox"/> Public Hearing

PROBLEM/ISSUE STATEMENT:

Staff is requesting Council input on the type of infill material to be used for the Twin Ponds Park Field Turf Replacement Project. As part of the 2006 Parks Bond, the Twin Ponds Park soccer field was converted to synthetic turf in 2008. The turf reached the end of its warranty period at the end of 2015, and a 2014 assessment of the surface and lighting of the athletic fields at Twin Ponds Park indicated they are in need of replacement. The project is nearing final design and scheduled to go out to bid this month. The contract award for this project is currently scheduled for Council consideration on June 19, which would be followed by construction of the project this summer.

Turf infill material is used to fill in between the blades of artificial grass and gives the field surface its resiliency to maintain safe play. The most frequently used infill material is Styrene Butadiene Rubber (SBR), commonly referred to as crumb rubber (ground up tires), and is currently used at the Twin Ponds and the Shoreline A&B fields. The use of SBR crumb rubber has been deemed safe to use by the Washington State Department of Health, while it has been questioned by some people due to concerns about potential negative health effects. At their April 2017 meeting, the Parks, Recreation and Cultural Services (PRCS)/Tree Board unanimously recommended that the City not use SBR crumb rubber due to its concerns over health and safety. The Board voted 4-2 to recommend the use of an organic material as infill for the synthetic turf field.

FINANCIAL IMPACT:

The Twin Ponds Turf and Light Replacement is one of three projects in the Turf and Lighting Repair and Replacement Project, a General Capital Fund project in the 2017-2022 Capital Improvement Plan (CIP). This CIP Project includes projects at Shoreline A&B fields, Twin Ponds and Hamlin Park Upper Baseball fields. The total overall budget is \$2,187,500. The total 2017 budget for the Twin Ponds Turf & Light Replacement is \$1.7 Million which includes a state grant of \$250,000. There would be no financial impact associated with the staff recommendation. However, if an alternative infill material is used for the Twin Ponds Project, the cost of the project is anticipated to

increase in the range of \$56,000-\$120,000, depending on the alternative material selected.

RECOMMENDATION

While this item is for Council discussion, staff is looking for Council direction on which turf infill material to select so that this material can be identified in the request for bid documents for this project. Staff recommends using Styrene Butadiene Rubber (SBR), commonly referred to as SBR crumb rubber, as the infill material for the soccer field at Twin Ponds Park.

Approved By: City Manager **DT** City Attorney **MK**

INTRODUCTION

As part of the 2006 Parks Bond, the Twin Ponds Park soccer field was converted to synthetic turf in 2008. The turf reached the end of its warranty period at the end of 2015, and a 2014 assessment of the surface and lighting of the athletic fields at Twin Ponds Park indicated they are in need of replacement. The project is nearing final design and scheduled to go out to bid this month. The contract award for this project is currently scheduled for Council consideration on June 19, which would be followed by construction of the project this summer.

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There are a variety of alternate materials that have recently been developed. They are generally more expensive and have not been tested for lengthy periods of time to assess their durability and long-term maintenance needs. A more detailed discussion about alternative materials is presented in the Discussion section of this staff report.

BACKGROUND

The Twin Ponds Park soccer field is actively used by the public. In 2016 there were 2,350 hours scheduled by user groups for competitive play on the field, which generated \$105,003 of revenue for the Parks Department. Approximately 17,100 youth and 15,800 adults in 27 different leagues use this facility on a yearly basis. Given this high level of use, the field operates at capacity.

The \$1.66 million project to replace the field is funded through the CIP with \$250,000 from a State youth athletic fields grant. In addition to the field replacement, the project will replace field lights and add security lighting along the pathway from the parking lots to the field. The project is scheduled for construction during the summer, a low use period and optimum construction weather. A key component of the field construction specifications is what type of turf infill material will be used.

As noted above, infill material is used to fill in between the blades of artificial grass and gives the field surface its resiliency. The most frequently used infill material is SBR crumb rubber. It is what is used at the Twin Ponds field now as well as the Shoreline A&B soccer fields. While the infill material is the subject of this discussion, it is just one component of a synthetic turf field. The complete synthetic turf field consists of artificial grass blades, infill material, sand and gravel base and a drainage system under the field.

In 2014, when staff began seeing signs of significant wear and tear on the field a consultant was hired to conduct an evaluation of the synthetic turf and light poles/fixtures. Based on the results of the assessment, the report recommended replacing the Twin Ponds soccer field by 2018 to keep the field safe for play.

The field will have been in use for about nine years. Its replacement is necessary primarily due to the wear of the artificial grass blades that requires complete replacement of the field surface. Other jurisdictions have experienced approximately the same life expectancy on their fields. The Seattle Department of Parks and Recreation operates on an 8-10 year replacement cycle.

The 2014 assessment reported the following field deficiencies at Twin Ponds:

- Artificial grass blades had worn from 2.5" tall when installed to 1.0-0.5" – that height exposes the infill material which reduces the shock absorption to the field, making it unsafe for players.
- When installed, the synthetic turf is rolled out and then glued together. Since installed, the seams in some places have become loose and create trip hazards.
- The edge anchors which hold the turf blades in place are failing due to minor settlement of the base aggregate, also creating trip hazards.
- The low infill material is more noticeable in high use areas such as goal boxes, corners and midfield kick circles.

DISCUSSION

The use of SBR crumb rubber as infill material has been questioned due to ongoing concerns about its potential negative health effects. There have been a number of news stories on this topic. Searching the internet for 'news about crumb rubber' results in numerous stories about concerns over the use of the material made from old car and truck tires. Some parks and recreation agencies have stopped using the material, opting for higher cost and less studied alternatives, like ground up tennis shoe material, coconut husks, and cork, while others continue to install it.

Health Assessments of Crumb Rubber

For over a decade there have been health concerns and research studies considering the health and safety of using crumb rubber in synthetic turf fields. According to the US Environmental Protection Agency (EPA), "concerns have been raised by the public about the safety of recycled tire crumb used in playing fields and playgrounds in the United States. Limited studies have not shown an elevated health risk from playing on fields with tire crumb, but the existing studies do not comprehensively evaluate the concerns about health risks from exposure to tire crumb rubber." (US EPA Website 2016).

In January 2017 the Washington State Department of Health issued a report on its "Investigation of Reported Cancer among Soccer Players in Washington State." The study was conducted in response to the incidence of cancer among soccer players, and in particular, soccer goalies. The Health Department formed a team with researchers from the University Of Washington School Of Public Health to investigate the incidence of cancer and review the relationship of crumb rubber and artificial turf to human health.

They found that “seven review articles published in the last 10 years all concluded that playing on artificial turf fields is unlikely to expose children, adolescents or adults to sufficient levels of chemicals from fields to significantly affect health.” They did acknowledge that there are some limitations to the existing research. The study found less cancer than expected among the soccer players when compared to the population in general. The final conclusion from the report is “The Washington State Department of Health recommends that people who enjoy soccer continue to play irrespective of the type of field surface.” The Washington State Department of Health report can be found at the following link: <http://www.doh.wa.gov/Portals/1/Documents/Pubs/210-091.pdf>).

Searching the internet for ‘health studies of synthetic turf fields’ results in numerous studies about the use of crumb rubber in synthetic turf fields. The federal government began a new study of the health effects of synthetic turf fields that resulted in a status report at the end of 2016. The federal study reports that there are between 12,000 and 13,000 synthetic turf recreation fields in the U.S. with 1,200 to 1,500 added each year. The status report does not present any conclusions about the safety or health effects of crumb rubber or any other surface material. The EPA has collected field samples that it will study more extensively. Information about the EPA’s research on this issue can be found at the following link: <https://www.epa.gov/chemical-research/federal-research-recycled-tire-crumb-used-playing-fields>).

Of the numerous studies completed over the past decade, the indication is that SBR crumb rubber does not present a risk to people using fields with that infill material. Two recent, local studies have concluded that:

“The studies acknowledge that turf materials contain hazardous constituents and that the public, notably children, are in contact with these hazardous constituents. What has not been demonstrated, however, is an exposure pathway by which he constituents can enter the body of the field users and do damage or initiate disease.” (Elisabeth Black CIH, EMB Consulting, April 14, 2015)

“Based on the data publically available for this analysis, the chemical levels found in FieldTurf SBR and Geoturf infill do not present a risk to people playing on or using the fields with these products. These conclusions are consistent with those of multiple regulatory agencies that have evaluated the risk from artificial turf products in general.” (Gradient Corp., May 26, 2015).

Environmental Assessment of Twin Ponds Field Replacement

In addition to concerns about the health effects of crumb rubber there has also been concern about the impact on the environment. The Twin Ponds field is in a unique location given its proximity to the ponds and the creek that flows through the park. The PRCS Department contracted with an environmental consulting firm to conduct a field assessment and literature review of the potential impact of replacing the lights and the field surface at the park. The study concluded:

1. No adverse impacts to Fish and Wildlife Habitat Critical Areas (FWHCAs) due to increases in noise levels above those that currently pertain will occur as a result of the project.

2. Less light spill into nearby FWHCAs will occur under proposed conditions compared to existing conditions, and adverse impacts to FWHCAs due to lighting are not anticipated to occur due to the proposed project.
3. Adverse impacts to water quality and impacts to aquatic habitat and associated FWHCAs are not anticipated to occur as a result of the proposed project.

Alternative Materials

When the Twin Ponds soccer field was originally installed there were few options for which type of synthetic turf material to use. The choice was between grass fields and synthetic turf fields using SBR crumb rubber. Since that time the advantages of synthetic turf over grass has been reinforced. The choice now is what type of synthetic surface and more specifically what type of infill material to use. The City’s consultants working on the design for the field replacement provided extensive information about alternative materials.

The alternatives to SBR crumb rubber include:

- Coated Crumb Rubber (standard crumb rubber coated with a pigmented acrylic or polyurethane coating which encapsulates the SBR crumb rubber, preventing direct exposure);
- Granular Cork;
- Nike Grind (scrap from the sneaker manufacturing process); and
- Thermo-Plastic Elastomer – TPE (similar to what plastic wine corks are made of).

Some of these materials do not provide the resiliency of SBR crumb rubber and require an additional underlayment (pad) so as to increase the resiliency. As well, while each of these products have a variety of unique characteristics, cost also varies. SBR crumb rubber is estimated to cost between 14% and 75% less than the alternative products.

The estimated acquisition and installation costs for an 80,000 square foot synthetic turf project are as follows:

Material	Estimated Cost	Difference from SBR Crumb Rubber
SBR Crumb Rubber	\$508,000	\$0
Coated SBR Crumb Rubber	\$580,000	+\$72,000
Granular Cork & Pad	\$564,000-\$628,000	+\$56,000-\$120,000
Nike Grind	\$616,000	+\$108,000
TPE & Pad	\$888,000	+\$380,000

Following this analysis, the Public Works and PRCS Departments narrowed the consideration of alternative materials to granular cork and Nike Grind. Coated SBR crumb rubber did not receive further consideration as it is believed it would have similar health and safety concerns as SBR crumb rubber. Coated SRB crumb rubber has also not been extensively researched. Additionally, TPE was not further considered due to its much higher cost. The following section provides additional information about the alternative materials that are being further considered:

Granular Cork

Cork is a natural and sustainably-sourced material. However, cork products have been used less than Nike Grind for synthetic turf fields. Cork also requires additional supplemental padding and there is concern that the material is lighter than Nike Grind and Crumb Rubber. The lighter nature of this fill may make it more prone to ‘float away’ and need to be replenished. The City of Seattle recently installed this material in one of their heaviest used fields as a pilot project. The material is organic but little information is available about potential health and environmental impacts. Maintenance of granular cork requires the same equipment as Nike Grind and SBR crumb rubber. The additional acquisition and installation cost is estimated at \$56,000 and \$120,000.

Nike Grind

Nike Grind is a remnant material from the production of tennis shoes. The material is ground up and repurposed for turf infill. It has been used at several fields in the northwest. The content of the material has not been extensively studied and little information is available about potential health impacts. The Nike website says they do not allow toxic materials in any of their products, though independent testing is limited. This product was recently installed at a high school in Burien and is more extensively used in the Portland, OR area. Maintenance of the Nike Grind infill is very similar to the traditional SBR crumb rubber. The additional acquisition and installation cost is estimated at \$108,000.

User Experience

Staff conducted an informal survey of field users to ask if any of our regular users had any experience with either of the alternative materials. Some reported positive experience on a recently installed granular cork field in Seattle but none reported having played on Nike Grind.

Precedent

It is likely that whatever decision is made now regarding infill material for the Twin Ponds field will set a precedent for replacement of the fields at Shoreline Park - A&B. Shoreline A&B is a two field complex that is in need of replacement in the next year or two. Given those fields are roughly double the size of the Twin Ponds field it is likely that the budget impacts presented above would be doubled.

Estimated costs for a 160,000 square foot synthetic turf project:

Material	Estimated Cost	Difference from SBR Crumb Rubber
SBR Crumb Rubber	\$1,016,000	\$0
Coated SBR Crumb Rubber	\$1,160,000	+\$144,000
Granular Cork & Pad	\$1,128,000- \$1,256,000	+\$112,000-\$240,000
Nike Grind	\$1,232,000	+\$216,000
TPE & Pad	\$1,776,000	+\$760,000

Budget Considerations

The Twin Ponds Turf and Light Replacement Project is one of three projects in the Turf and Lighting Repair and Replacement project category in the General Capital Fund in the 2017-2022 Capital Improvement Plan (CIP). This CIP project category includes projects at

- Shoreline A&B fields: Completed in 2016 at a cost of \$194,655.
- Twin Ponds Light and Turf Replacement
- Hamlin Park Upper Baseball fields: planned for light pole replacement in 2018.

The total overall budget is \$2,184,655. The total 2017 budget for the Twin Ponds Turf & Light Replacement is \$1.7 Million which includes a state grant of \$250,000.

Turf and Lighting Repair & Replacement Projects

Year	Project	Budget
2015	Twin Ponds RCO Grant Application	\$2,845
2016	A&B Turf and Light Pole Repairs	\$194,655
2017	Twin Ponds Turf & Light Replacement	\$1,700,000
2018	Hamlin Upper Baseball Fields Pole Repairs	\$290,000
TOTAL PROJECT BUDGET		\$2,184,655

Selecting an alternative infill material is anticipated to increase the Twin Ponds Turf and Light Replacement Project budget by \$56,000 to \$120,000, depending on which material is selected. Although this is the case, there is sufficient funding in the overall budget. However, the Hamlin Upper Baseball Fields Pole Repairs project would need to be re-scoped to accommodate a reduction in its budget to accommodate the change to alternative material.

The Hamlin Upper Baseball Fields Pole Repairs project has not started design and is likely to undergo a scope revision under any circumstance due to the declining use of the fields. It is likely a recommendation will be made later in 2017 to remove, rather than replace, the lights at Upper Hamlin, which would result in a significant budget reduction. That recommendation is dependent on final analysis of usage information and community involvement.

The future budget request to replace the A&B soccer fields at Shoreline Park may be impacted proportionally.

PRCS/Tree Board Recommendation

The PRCS/Tree Board considered this issue at its December 1, 2016 and April 27, 2017 meetings. At those meetings staff recommended the use of SBR crumb rubber as the infill material for Twin Pond's field replacement. Five members of the public testified and all were opposed on health, safety and environmental grounds. The Board had a thoughtful discussion and voted unanimously to recommend the City not use crumb rubber in any form at Twin Ponds. The Board was concerned about the environmental and health concerns associated with the material. The Board members spoke about the importance of the City being innovative and a leader as a healthy community. The Board did vote 4-2 to recommend an organic material be used as infill.

FINANCIAL IMPACT

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