

# Exeter College

## Floodlit, recyclable all-weather turf pitch at Flowerpots Field, Exeter

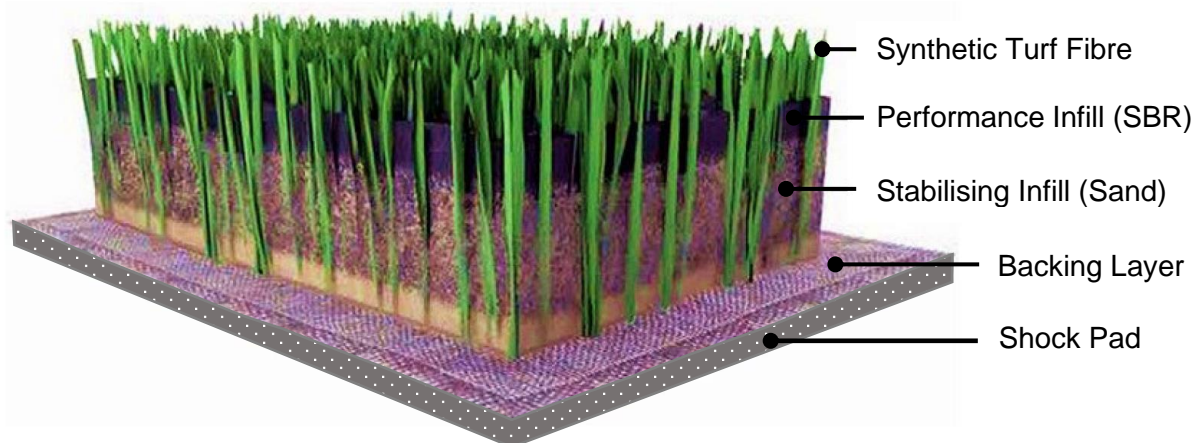
### Synthetic Surface Proposals & Outline Management Plan

Over recent years, concerns have been raised about the safety, environmental impact and sustainability of synthetic turf fields. They can be summarised as follows:

1. Potential impact on people's health resulting from exposure to contaminated granular material, typically styrene butadiene rubber (SBR), originating from shredded waste tyres.
2. Potential microplastic contamination of soil and water from the components used in the artificial turf pitch construction.
3. Potential sources of pollution from the installation phase through to end of life, including disposal.

Exeter College have taken these issues seriously and implemented specific design features to either eliminate or mitigate any perceived risk.

**Health Concerns** – A key component of existing 3G pitches is performance infill. This layer sits within the top of the synthetic turf system. It ensures that the players' shoes have a good grip and can also reduce the strain on muscles and joints by acting as a cushion along with maximising sliding characteristics. Historically most artificial turf pitches utilise styrene butadiene rubber (SBR) for this purpose, this is the most common used type of performance infill in the UK. See illustration below.



The concerns identified relate to potential risk of exposure to polyaromatic hydrocarbons (PAHs) that are contained in SBR granulate. PAHs are a widely occurring group of chemicals that people are most commonly exposed to through breathing air contaminated with motor vehicle exhaust, cigarette smoke or wood smoke. People also ingest PAHs when they eat grilled or charred meats or foods. High or prolonged exposure to PAHs can cause cancers.

In 2016 the European Chemical Agency (ECHA) launched a study to assess whether the concerns were justified and if restrictions on the use of SBR infill were required. Sport England, Sport Scotland, Sport Wales, the GMA, Football Foundation, The FA, RFL, SAPCA and England Rugby) contributed to the study.

In 2017 ECHA published their report which concluded: “ECHA has found no reason to advise people against playing sports on synthetic turf containing recycled rubber granules as infill material”.

In 2020 the results of a major pan-European scientific study undertaken by internationally respected independent researchers, and published in the scientific journal Science of the Total Environment, concluded:

- No health concerns were found for AGPs with ELT-derived infill material.
- Cancer risks for exposure to PAHs were below 1 in 1 million.
- Risk characterisation ratios (RCRs) for non-carcinogenic substances were below 1.

Nevertheless, after extensive research, the college have opted to **eliminate** the use of SBR granulate from the proposed synthetic turf system altogether. The system will incorporate Brockfill, a vegetal (organic) infill – This replaces the rubber crumb, offering the same performance characteristics whilst eliminating the residual risks associated with SBR.

This product is produced from an abundant species of southern pine grown at high density in sustainable forests on farmland across the south-eastern United States. The pine is grown, harvested, and replanted in continuous cycles, making it ideal for a sustainable, renewable organic infill product. Brockfill only came onto the market in May 2019 and has now been rolled out on 100+ sites. At end of life, the 100% natural wood pellets will be used as a soil amendment for golf course, lawns, and gardens.

The infill has no smell, keeps cool in hot weather, drains well and has less ‘splash’ (displacement) and is less abrasive than rubber crumb. It is hydroscopic, gaining weight when wet so it doesn’t float away.

**Microplastic Contamination** - Microplastics are defined as non-biodegradable polymeric (rubber or plastic) materials that are 5mm or less in size.

Microplastics may be intentionally added to products (e.g., micro-beads in cosmetics) or unintentionally occur through wear and tear (e.g., micro-fibres from clothing) or through the breakdown of discarded polymeric products.

Polymeric infills meet the definition of an intentionally added microplastic. If they are allowed to migrate from a pitch into the surrounding neighbourhood, they become a microplastic pollutant.

By using Brockfill, a vegetal (organic) infill, the proposal **eliminates** approximately 120 tonnes of microplastics over a traditional installation by eliminating this from the performance layer alone. An additional 112 tonnes of microplastics will be **eliminated** using a prefabricated shock pad as a substitute for a traditional “insitu” shock pad. The use of this shock-pad will also prevent the use of 13 tonnes of binder which can be harmful if allowed to contaminate the environment.

It is also acknowledged that there is the potential for the synthetic turf fibre to degrade or to become disconnected from the backing layer. The proposed synthetic turf uses a woven construction method rather than a traditional latex coating.

This provides a higher level of tuft preservation and will reduce the risk of fibre from pulling away from the backing material. The pitch will be subjected to a regular programme of maintenance where the field is brushed and vacuumed thereby lifting and removing any displaced or broken-down fibre. The use of this specialist grooming equipment to collect these filaments will enable responsible disposal.

Additional measures as outlined within the FIDRA Pitch In to reduce microplastic loss from artificial pitches: Guidelines for Designers and Procurement Specialists will also be incorporated into the design as follows:

- **Turf System** – As previously mentioned, the proposed turf system **eliminates** the use of microplastic based performance infill. Woven turf technology will ensure a higher level of fibre retention.
- **Pitch drainage and filters** – The pitch drainage system incorporates SUDS principles and utilises existing natural groundwater infiltration. This system is self-attenuating and disconnected from the wider public sewer network. Silt traps will be installed at regular intervals to ensure any potential contamination can be removed.

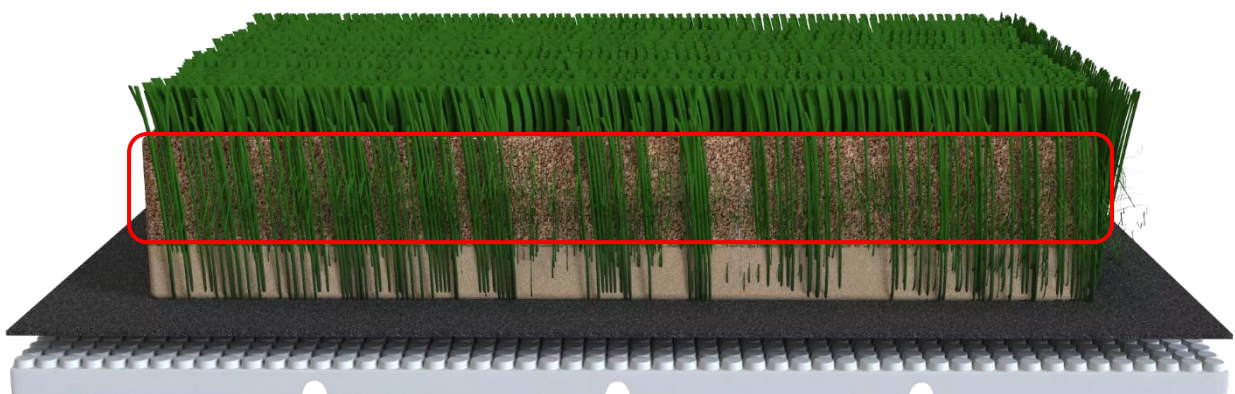
A Drainage Strategy accompanies the revised planning application proposals. A detailed drainage management and maintenance plan can be secured by condition attached to any planning permission granted.

These measures, in addition to the fact that any microplastics will have been filtered through the general construction layers, mean that all methods have been taken to prevent microplastic contamination from entering the surrounding environment, ground and waterways.

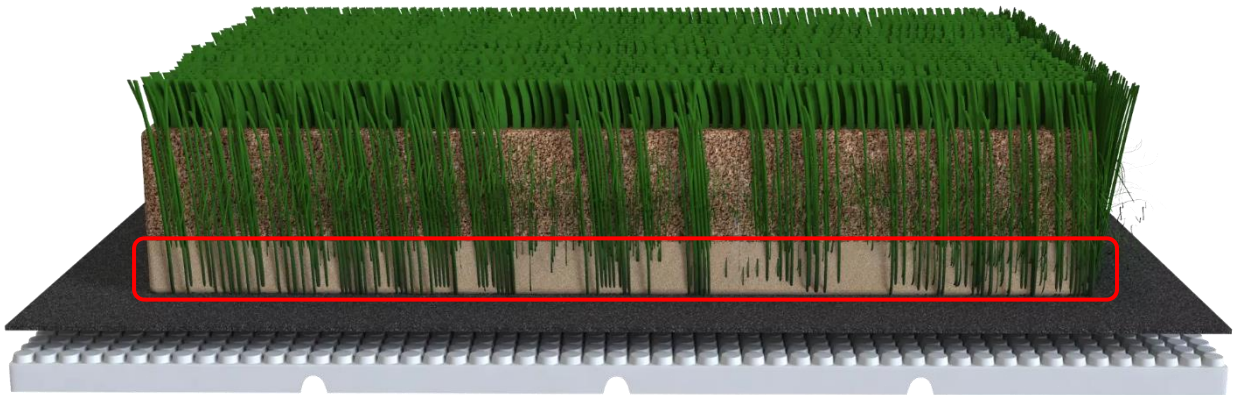
- **Access Points** - All entrances/exits shall incorporate a 'cattle-grid' style exit to collect loose fibre as users leave the pitch and 'boot brushing' stations, will be included within the pitch perimeter.
- **Enhanced Maintenance Procedures** – FIDRA Pitch In to reduce microplastic loss from artificial pitches: Guidelines for Owners and Maintenance Teams shall be implemented.

**Lifecycle Impact** – The proposed system has been chosen to avoid potential sources of pollution from the installation phase through to end of life, including disposal.

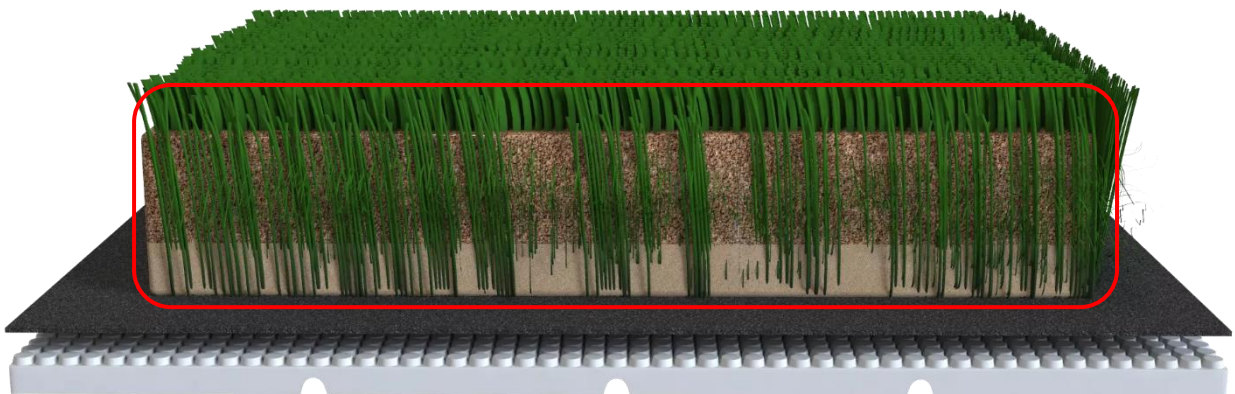
- **Performance Infill** - The 100% natural wood performance infill will be used as a soil amendment for golf course, lawns, and gardens.



- **Stabilising Infill** - The sand stabilising infill can be cleaned and re-used again for the same purpose or used to improve drainage on natural turf fields.

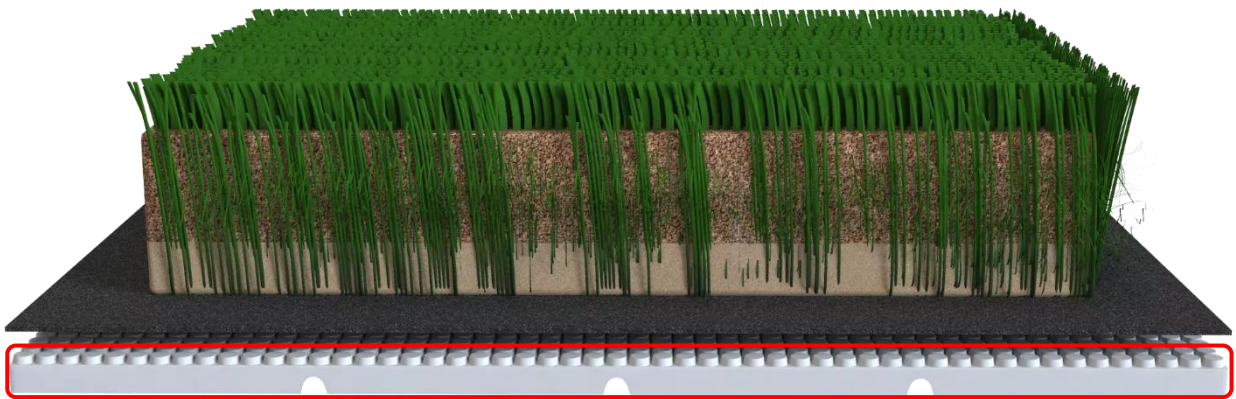


- **Synthetic turf** – Many existing products use plastic fibre which is fixed to a backing material using latex which makes recycling virtually impossible so that it ends up in landfill at end of life. The proposed product uses just one type of polymer for both the artificial blades of grass which are woven, using a pioneering technique, onto a backing which is made from the same polymer, a process which requires no glue, binders, or latex, enabling recycling. This new system allows 1-step recycling, once the infill is removed the artificial turf can be fully re-processed.



- **Shock pad** – The proposed solution utilises a pre-formed shock-pad. Historically, this layer is created on site using a larger grade of styrene butadiene rubber (SBR) originating from shredded waste tyres. This material is combined with a resin to create an even layer (typically 15mm to 25mm) across the entire pitch footprint. At present there are restricted opportunities to recycle this material.

The proposed Brock Shock-pad represents the most sustainable product and design in the industry, at the end of life (25 years) the material is re-processed and remade into the same product. Cradle to Cradle Certified. From a sports performance and biomechanics perspective, Brock's shock-pads are the most respected and best performing product on the market.



- ***Installation Phase***

The college will ensure that the successful contractor is fully competent and demonstrated compliance with the following standards:

- Achieved ISO 14001 Certification - ISO Environmental Management
- SAPCA Principal Contractor Member implementing ACOP's.

The synthetic turf installation processes shall not take place until the boundary fencing has been completed. In addition, any site compound shall be fully enclosed to ensure that arisings cannot leave the field or construction zone at any time. The provision of a full Construction Environmental Management Plan, which specifically addresses the management of plastic waste during the construction phase, can be secured by condition attached to any planning permission granted.

- ***Operational Use***

As previously discussed, by using an alternative vegetal (organic) infill, many of the issues surrounding microplastics have been **eliminated**. However, the college are committed to “keeping plastic on the pitch”. To that end the facility has been designed to restrict the loss of fibre from the field footprint, access points have been kept to a minimum with in-built features to capture any loose or degraded fibre and a robust maintenance regime will be implemented to remove any remaining material on a regular basis.

- ***End of Life Recycling***

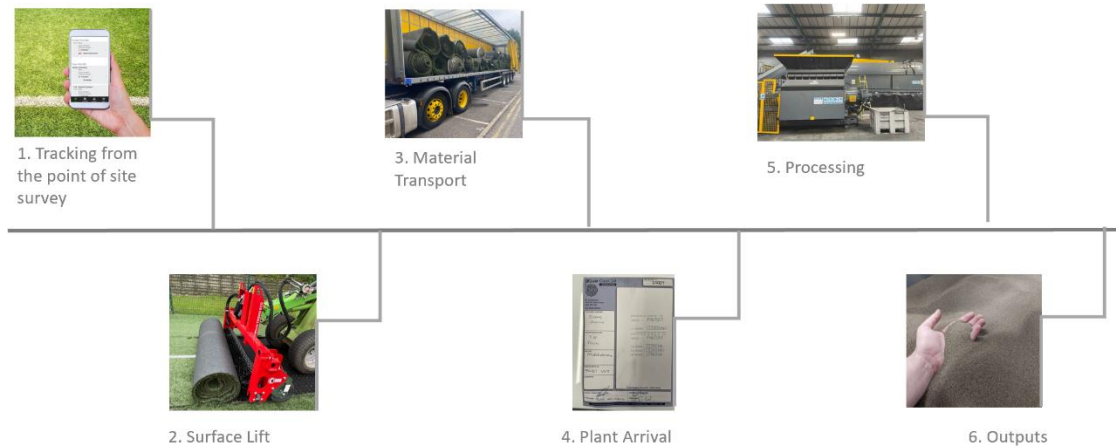
Whilst options for recycling the synthetic turf system are limited, several viable options are now emerging within the UK market. Over the next decade, further options will develop and make re-use of the various components more viable. The proposed system makes this process as simple as possible. The following explains one of the current available options.

Replay Recycling combines Blue Castle, experts in ‘difficult to recycle’ materials, and Passport365, a cloud based, web and mobile application enabling the complete tracking and tracing of synthetic surface recycling.

Passport365 not only improves visibility for both the owner of the pitch, the contractors involved and those at Replay Recycling, but also improves efficiency, reporting and reduces paperwork, further improving the environmental impact.

100% of the synthetic surface is recycled, with Blue Castle's expertise the process has been continually refined to ensure minimal to no wastage, converting the entire surface into usable and high-quality output product whether that be the performance infill, the sand or the synthetic fibres that can be used in a large number of recycled plastic products.

By creating a solution for synthetic pitches reaching end of life, Passport365 has enabled the field owner to have a complete history of their surface, its makeup, and facilitate a reduction in the organisation's carbon footprint.



## Summary

By utilising all available guidance, the college has incorporated sufficient mitigation measures to ensure the facility is safe, minimises its impact on the environment and utilises the most sustainable technology available today.

## Appendix

Fidra Pitch Fact Sheet designers and procurement

Fidra Pitch Fact Sheet Owners and Maintenance Teams

SAPCA FAQ 3G AGP July 2022

# PITCH IN

Pitch In to reduce microplastic  
loss from artificial pitches:

## Guidelines for Designers and Procurement Specialists



## Pitch In to reduce microplastic loss from artificial pitches:

# Guidelines for Designers and Procurement Specialists

The synthetic rubber or plastic granules used on 3rd generation artificial pitches are a potential source of microplastic to the environment. The 'rubber crumb', used to improve quality of play, particularly for football and rugby pitches, can be lost during use, escaping to drains, waterways as well as to soils surrounding the pitch. Once in the environment, microplastic particles can be eaten by animals and may also leach environmental contaminants, such as zinc, at levels that can cause harm to aquatic animals. This is not only harmful to the environment, but also to the players and pitch owners, as reduced pitch infill can lower quality of play and increase the chance of injury. If well-maintained, pitches are topped up at a rate of [2-3 tonnes per year](#)<sup>ii</sup>, which is an expense for those who own and maintain the pitches.

The following guidelines have been created for industry to take into account microplastic loss during **design, build and renewal of pitches. These guidelines are also relevant to procurement specialists, and those submitting a pitch construction to tender.** Recommendations are made assuming a new pitch to be built, but many also apply to retrofitting old pitches. The aim is for any changes to be as simple and low cost as possible.

The guidelines have been compiled by KIMO and Fidra by reviewing existing recommendations, reviewing best practice trials conducted internationally and by speaking directly to pitch owners, maintenance staff and industry representatives. This is a constantly changing field and we welcome any feedback from experts to improve or adapt the content of this guide.

Further guidelines are available for pitch OWNERS & MAINTENANCE CREW, and pitch USERS.

## Procurement

It is essential that the procurement process starts with a requirement for the pitch to be designed in a way that minimises infill loss. This will ensure that all designers competing for the tender are required to incorporate at least some of the following design protocols, or other innovations, to reduce impact of microplastic pollution.

- Include microplastic management as an element of procurement. Within the procurement strategy, highlight microplastics as an issue and, within the tender process, value strategies which reduce the risks of contamination. Use the following guidelines to provide more specific criteria.

## Health and Safety on the Pitch

Health and Safety of pitch users will always be priority in design / build / retrofit of pitches. Any designs should be sure to incorporate required health and safety precautions that already exist. For example, any physical barriers or tarmac surfaces must be beyond the minimum requirements for run-off zones at the edge of the pitch area<sup>1</sup>. Any physical barriers should be designed so that they cannot represent a trip hazard for players, for example.

Another element that has been raised as a potential health and safety risk in recent years is the use of recycled SBR rubber as infill on pitches. Concerns about levels of chemicals leaching from rubber crumb used on pitches have led to press interest and several monitoring studies have investigated the potential impact on health of pitch users. A review of studies by Health Protection Scotland concluded that evidence does not currently support the hypothesis that artificial turf SBR poses a significant health risk<sup>1</sup>. More information about ongoing studies and recommendations to reduce risk of exposure can be found on the website of the European Chemicals Agency (ECHA). Recommendations include ensuring adequate ventilation on any indoor pitches using recycled SBR rubber.

<sup>1</sup> Guidelines for minimum run-off distances can be found, for example, in the Sport Scotland School Playing Fields design guide: [https://sportscotland.org.uk/documents/resources/ssc0100192amendedplayingfields\\_playingfields\\_web.pdf](https://sportscotland.org.uk/documents/resources/ssc0100192amendedplayingfields_playingfields_web.pdf)

## Part 1. Deciding on the type of pitch

This guide is focused on reducing microplastic loss from 3G artificial pitches. However, there may be alternative options, which would lead to significantly less, or no microplastic loss. This first section highlights some of these. If you are past this part of the decision-making process, skip to part 2.

### Would a natural pitch be a suitable alternative?

- Make sure to explore the alternatives to 3G artificial turf
  - [Online guidance by Sport Scotland](#) can help you choose the correct pitch type.
  - A more detailed report and decision making guide has been created by the [government of Western Australia](#).
  - [Hybrid pitches](#), where natural grass is reinforced by synthetic fibres, are becoming increasingly popular for large venues.

### Is non-infill turf a viable alternative for your pitch?

- No-infill technology has developed in recent years and is becoming increasingly popular for community and [school play pitches](#).

Sport England have created a useful guide to options for [artificial surfaces for outdoor sports](#).

## Part 2. Deciding on your infill

### Alternative infill options

- The most common performance infill for 3G pitches is Styrene-Butadiene Rubber (SBR) crumb, made from recycled tyres. Alternatives are available, however, including organic infills such as cork and coconut husk, which are increasingly being used as an alternative, and they might be a great, cost-effective option for your pitch.
- **Use our summary guide to alternative infills** in Appendix A to see pros and cons of each infill type.
- **Read feedback from [pilot studies](#)** testing the quality of these infills to check if it works for you.

**Remember, the majority of alternatives are still plastic or synthetic rubber, so any spills will still count as microplastic pollution. Even if you choose an organic infill, it's still better to keep your infill on the pitch, both for your pitch and the local environment. So, whatever infill you choose, please keep going to Part 3.**

## Part 3. Choosing your 3G turf type

- **Choose a high-quality turf that has been 3rd party verified.** A poor-quality turf will disintegrate quickly and pose a health and safety risk, as well as releasing microplastic.

Look for labels such as *European standard EN 15330-1 2013/ EN 14877:2013, DIN standard 18035-7 2014, RAL GZ-944, FIFA QUALITY standards.*

- **Choose a turf design that reduces loss.** Choose a turf with a higher density of grass fibres, or one that includes a proportion of [textured pile](#). This reduces the amount of infill needed, and the spray (the amount of rubber granule knocked up during play).

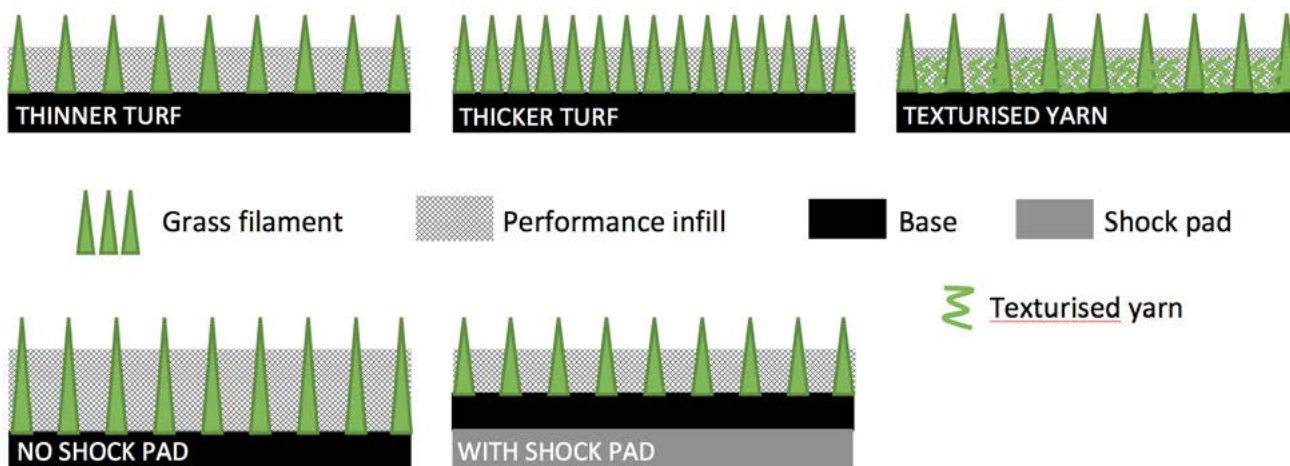


Figure 1 Choose your turf properties to reduce the amount of infill required in the first place, and the amount of splashback or migration of infill on the pitch. For example, use a thicker turf (either a higher density of fibres, or a thicker fibre), or a turf with additional texturised fibres to keep infill in place. You can also use a shock pad to reduce the length of fibre and total amount of infill needed.

- **Incorporate a shock pad into your design** – this can reduce the quantity of infill needed in the first place. Reducing pile length from 60mm to 40mm with additional shock-pad reduces the rubber content needed by 60-70%<sup>2</sup>.

## Part 4. Designing the pitch and associated infrastructure

NB Any changes to design should pose no additional risk to players. For example, all pitches in the UK have a legal obligation to include a [run-off boundary](#) at the pitch edge for health and safety reasons.

### 4.1 Pitch layout

- Add a solid (e.g. tarmac) surface around the pitch (Fig 2, A). This means that maintenance staff can collect scattered infill material and put it back on the pitch. Design the boundary surface to avoid; 1) joints where infill can accumulate or 2) using loose substrate (e.g. sand/gravel) that may contaminate the infill material. City of Gothenburg recommend a 1-1.5m tarmac boundary.
- Add an elevated edge. If there is no room for a solid surface around the track, or to add additional prevention, include an elevated edge, such as a curb, (this can be angled towards the pitch (Fig 2, B)) to reduce the spread of microplastic. This applies especially if the artificial turf course is elevated relative to the surroundings.
- Consider how the slope of the sports pitch might be adapted to reduce likely loss of infill.
  - A pitch for certain sports can be sloped by around 1-2° – for example, creating a central crown to reduce chances of ponding on a poorly drained pitch. However, this also means over time infill might migrate to pitch edges



Figure 2. Image of a 3G Artificial Turf pitch with (A) a solid (tarmac) surface surrounding the playing surface, (B) an elevated (concrete) edge with slope angled towards drainage gutter and (C) a ground up barrier (solid wall) surrounding the perimeter. Source: photo © LOA-Fonden, Rune Johansen.

#### 4.2 Physical barriers

- **Install a low-level perimeter boarding at the base of the fencing** around the pitch area. This is one of the easiest ways to reduce infill loss. This should be designed in a way to not pose a risk hazard to players. A perimeter strapping, solid or fine mesh, (circa 6 inches/150mm in height should be included as part of the perimeter fence
  - o NB perimeter fencing should be of durable standard, an appropriate height for ball retention and most critically safe, i.e. far enough back from the playing lines not to be a trip or head strike risk or hazard. – Suggested 5m from edge of play (3m run off plus a further 1 – 2m of hard stand for spectating purposes

#### 4.3 Pitch drainage and filters

- **Avoid as far as possible letting storm drains and gutters drain near the path around the pitch**, so that microplastic does not spread unnecessarily to the aquatic environment.
- **Storm drains and drainage troughs with open shafts should be avoided.**
- **Include silt traps in drainage plans** to avoid infill being lost down storm drains. Approximately 35% of infill lost to drains can be prevented from entering watercourses through the use of simple silt trap. [Advanced silt traps](#) which filter out microparticles are available and if budget allows, these would filter out a higher percentage of infill from stormwater.

#### 4.4 Helping players keep the infill in

- **Include in the design areas for players to remove infill before leaving the pitch (Fig 3).** Consider fitting a brush-off zone or stamp off tray at the exit to collect loose granules as users leave the pitch. Existing brushes should be surrounded by a physical barrier to stop granules escaping to the wider environment. NB this is already a Sport Scotland Recommendation.
- At the entrances/exits to the pitch install:
  - o a 'cattle-grid' style exit to collect loose granules as users leave the pitch
  - o 'boot brushing' stations, within the pitch perimeter
- **Put filters in shower drains.** Place granular traps in changing room drains - this will prevent microplastic spreading with shower water.



Figure 3. Foot grate - can be used to stamp off (image from [www.sportsequip.co.uk](http://www.sportsequip.co.uk))

## On existing pitches:

### Retrofit

- **Install a simple ground-up barrier around the perimeter of the pitch area**, to reduce loss of infill to the surrounding environment – a perimeter strapping, solid or fine mesh, (circa 6 inches/150mm in height included as part of the perimeter fence
  - o NB perimeter fencing should be durable, an appropriate height for ball retention and most critically safe, i.e. far enough back from the playing lines not to be a trip or head strike risk or hazard. – Suggested 5m from edge of play (3m run off plus a further 1 – 2m of hard stand for spectating purposes
- **Consider installing [removable filters](#) or [advanced silt traps](#)** in storm drains surrounding the pitch to ensure granules are not lost to drainage water.
- **Consider fitting a brush-off zone or stamp off tray at the exit(s)** to collect loose granules as users leave the pitch. See section 4.4 (Fig 3).

### Help players to keep the infill in

- **Provide information on best practice.** Use posters on the edge of the pitch to instruct best practice
- **Put filters in drains.** Place granular traps in drains from the changing room will prevent microplastic spreading with shower water
- **Collect granules from kit.** In the changing room, include a collection bin for loose pellets found in shoes and kit

### Installation and end-of-life

- Operate a careful site during installation. Enforce measures to minimize contamination of the environment with infill, or other loose material.
- Clean up after pitch installation/ removal / renewal. When an artificial pitch is removed, surrounding verges should also be scraped to remove the microplastics from the environment.
- Dispose of your pitch responsibly. A pitch should be disposed of responsibly. Stockpiling or inappropriate disposal will lead to further loss of plastic to the environment as the old pitch disintegrates.

## Pitch end of life

Disposal of the pitch at the end of life can be a major contributor of microplastic to the environment, as well as having a major influence on its environmental impact. This should be a major consideration to any new pitch. Pitches should be:

- Designed to be as recyclable as possible
- Installed with an appropriate end of life disposal method planned

According to recent analysis the most environmentally friendly method of disposal is by separation and recycling of individual components, which can lead to up to 99% recycling rates<sup>3</sup>. Re-use is sometimes referred to as recycling, but often leads to scattered smaller pieces of pitch in a variety of locations and does not solve the final problem of disposal.

# Alternative infill options

NAME	WHAT IS IT?	COST	ADVANTAGES	DISADVANTAGES
SBR Rubber	Used car and truck tyres, ground to a crumb.	LOW	<ul style="list-style-type: none"> <li>Cheap and easily available</li> <li>Durable</li> <li>Makes a good, comfortable playing surface</li> </ul>	<ul style="list-style-type: none"> <li>MICROPLASTIC leak into environment</li> <li>Can get very hot in the sun</li> <li>Can smell bad</li> <li>Potential to leach chemicals / heavy metals into the environment (with concerns raised for human health in public press)<sup>4</sup></li> </ul>
Coated SBR Rubber	Crumb rubber (as above) coated with a polyurethane plastic film.	MID	<ul style="list-style-type: none"> <li>Can be made into different colours</li> <li>Can reduce the amount of chemicals leaching from rubber crumb while outer film is intact.</li> <li>High durability, according to manufacturers.</li> </ul>	<ul style="list-style-type: none"> <li>MICROPLASTIC leak into environment</li> <li>Plastic outer coating might wear off over time.</li> <li>Additional use of virgin rubber plastic.</li> <li>Final mixture makes material more difficult to recycle.</li> </ul>
TPE (Thermoplastic Elastomer)	Virgin (non-recycled) plastic-rubber pellets	HIGH	<ul style="list-style-type: none"> <li>Durable</li> <li>Advertised as free of heavy metals and reduced leaching of chemical substances</li> <li>Good quality TPE makes a good playing surface</li> </ul>	<ul style="list-style-type: none"> <li>MICROPLASTIC leak into environment</li> <li>Using virgin material instead of re-use or recycling.</li> <li>If poor quality, it can harden over time and even melt if it gets too hot.</li> <li>Tests have shown that some TPE does contain heavy metals and other chemicals.</li> </ul>
EPDM rubber (Ethylene Propylene Diene Monomer)	Virgin rubber pellets.	HIGH	<ul style="list-style-type: none"> <li>Cleaner and cooler than SBR rubber</li> <li>Advertised as non-toxic</li> <li>Advertised as resistant to wear and tear and to resemble a natural surface.</li> </ul>	<ul style="list-style-type: none"> <li>MICROPLASTIC leak into the environment</li> <li>Using virgin material instead of re-use or recycling.</li> <li>Contain chemical fillers – not enough studies to ensure they can't leach chemicals into the environment.</li> <li>Reports of premature ageing, and potential reactions with turf carpet fibres.</li> </ul>
MIXES	Alternative organic infills e.g. coconut husk, rice husks, walnut shells... or a mixture of these	HIGH	<ul style="list-style-type: none"> <li>Naturally breaks down if it leaks into environment</li> <li>Keeps turf cool</li> </ul>	<ul style="list-style-type: none"> <li>Can freeze to a solid uncomfortable surface</li> <li>Concern of fungus growth if wet regularly.</li> <li>Break down of material could lead to insect infestations?</li> <li>Unclear how durable this is.</li> </ul>
CORK	Ground natural cork, which is the bark from the cork oak tree.	MID	<ul style="list-style-type: none"> <li>Naturally breaks down if it leaks into environment</li> <li>Naturally strong and waterproof</li> <li>Keeps turf cool and makes a good playing surface.</li> <li>Can be 100% natural – no additives needed</li> </ul>	<ul style="list-style-type: none"> <li>Needs to be replaced regularly (ever 3-4 years)</li> <li>If not properly maintained can compact hard.</li> <li>Problems reported with dust / fungus after wet weather.</li> </ul>
SAND	Silica sand – usually used as a base filler on 3G pitches or as main infill in hockey pitches.	LOW	<ul style="list-style-type: none"> <li>Cheap and easily available</li> <li>Creates solid base</li> <li>Loss into the environment in small quantity unlikely to cause harm</li> </ul>	<ul style="list-style-type: none"> <li>Sand dust can cause irritation if inhaled and is associated with long-term health effects.</li> <li>Hard surface – not a suitable replacement for 3G performance infill.</li> </ul>

Adapted from PlanMiljo 2017 – Environmentally friendly substitute products for rubber granulates as infill for artificial turf fields.

<sup>4</sup> Implications of chemical leaching from SBR rubber on human health are the subject of a number of ongoing studies, which indicate that exposure from chemicals within the SBR rubber indicate a very low level of concern. Current recommendations and updates on study results can be found at <https://echa.europa.eu/-/recycled-rubber-infill-causes-a-very-low-level-of-concern>.



Figure 4. 3G artificial turf with TPE pellets acting as performance infill (Gothenburg, Sweden)



Figure 5. A pitch that is elevated to its surroundings, and close to an open gutter represents a risk of granules escaping directly to storm water



Figure 6. Rubber granules scattered on the outside edge of a pitch - the fence is open at the base allowing granules to escape easily



Figure 7. A poor quality pitch where both infill and grass are escaping, and the pitch has become unusable



Figure 8. A non-infill design, with underlying shock pad

# PITCH IN

Pitch In to reduce microplastic  
loss from artificial sports pitches:

## Guidelines for Owners and Maintenance Teams



# Pitch In to reduce microplastic loss from artificial sports pitches: Guidelines for Owners and Maintenance Teams

Thanks for reading our guide to reducing microplastic loss from your pitches. If you're interested in this guide, you probably own or manage a synthetic turf field. These simple recommendations will help to make sure any infill you use stays on the pitch, with ideas for adding physical barriers, making small changes to your standard maintenance routines and by working together with pitch users. We hope that these small changes will not only protect the local environment of the pitch, but may also save resources, while keeping the pitch in the best possible condition for players.

All pitches are different, so we've created an [online tool to help you generate your own Microplastic Reduction Plan for your pitch](#). Simply pick the elements of the guide that suit your circumstances and we will create a plan matching your own personalised set of goals.

Once you have created your action plan – we'll celebrate your commitment to keeping plastic on the pitch by including your club/school in our nationwide 'Pitch In Progress Map'.

## Health and Safety on the Pitch

**Health and Safety of pitch users will always be priority in design / build / retrofit of pitches. Any changes to the pitch should pose no additional risk to players and obligations for health and safety must not be compromised by any microplastic barriers. For example, all pitches in the UK have a legal obligation to include a run-off boundary at the pitch edge for health and safety reasons.**

**You may also have heard about potential health and safety concerns about the use of recycled SBR rubber as infill on pitches, due to the potential for heavy metals and other chemicals leaching from granules. A review of studies by Health Protection Scotland concluded that evidence does not currently support the hypothesis that artificial turf SBR poses a significant health risk<sup>1</sup>. More information about ongoing studies and recommendations to further reduce risk of exposure can be found on the website of the [European Chemicals Agency \(ECHA\)](#). Recommendations include encouraging users to wash hands after using the pitch, and monitoring levels of PAHs present in SBR granules on your pitch<sup>2</sup>.**

<sup>1</sup> Health Protection Scotland, Nov 2017. [Evidence Assessment on the Potential Health Impacts of Tyre Crumb used in Artificial Ground Surfaces](#)  
<sup>2</sup> <https://echa.europa.eu/-/recycled-rubber-infill-causes-a-very-low-level-of-concern>

## Part 1. Adding physical barriers to stop infill loss

Below are some suggestions for simple options for retrofitting physical barriers to granule loss for existing pitches. *NB any physical barrier should be designed so that it does not pose a trip hazard to players (see Health and Safety box-out)*

- **Install a simple ground-up barrier around the perimeter of the pitch area**, to reduce loss of infill to the surrounding environment – a perimeter strapping, solid or fine mesh, (circa 6 inches/150mm in height) included at the base of the perimeter fence
  - *NB perimeter fencing should be of suitable standard to last, an appropriate height for ball retention and most critically safe, i.e. far enough back from the playing lines not to be a trip or head strike risk or hazard. – Suggested 5m from edge of play (3m run off plus a further 1 – 2m of hard stand for spectating purposes)*
- **Add filters to drains.** Consider installing [removable filters](#) or [advanced silt traps](#) in storm drains surrounding the pitch to ensure granules are not lost to drainage water.
- **Consider fitting a brush-off zone at the exit** to collect loose granules as users leave the pitch. *NB this is already a Sport Scotland Recommendation.* Options include:
  - Handheld brushes
  - Boot brushing stations
  - Stamp mats / ‘cattle grid’ style exit
    - Provide brushes **within** the pitch perimeter to allow users to remove loose granules before leaving the pitch.
    - Existing brushes **outside** the pitch should be surrounded by a physical barrier to stop granules escaping to the wider environment.

## Part 2. General maintenance

The information provided below will help maintenance teams adapt their current care programme to minimise any loss of infill. Raising awareness with the team may lead to new ideas for how to prevent granule loss, which could be included in the personalised action plan for your pitch.

### Handling Infill

- **Take care when topping up infill.** When new infill is delivered or applied to the pitch, choose the best location to place the infill so that it is not dispersed into the environment by wind, rain or maintenance activities. If there is a danger of infill escaping to the surrounding soil or grass verges, temporarily cover/shelter the verge. Do not overfill the pitch. Ideally the grass pile should protrude 15-20mm above the infill layer so that the grass fibres keep the infill in place and less microplastics escape into the environment.
- **Store your infill safely.** Improve storage of new and used rubber granules, to make sure these are less likely to be lost by accidental spillage. For example, use a solid box storage system rather than plastic bags. Ensure the vessels used for storage are sealed and weather proof. This also prevents the material from being contaminated by leaves and other organic matter.



Figure 1 A ground-up barrier at the base of the fence perimeter can stop granules like these escaping the pitch.

## Equipment

- **Get the right tools.** Make sure that your maintenance equipment contains the necessary tools for recovering infill and preventing infill loss, for example adding a brush, rake, Hoover, and filters

## Leaves

- **Take care with leaf-blowers**
- Consider using rakes instead of blowers if there is no perimeter barrier in place to keep the microplastics on the pitch.
- If using a leaf-blower, blow the leaves from the outside to the centre of the pitch where they can be raked up.

## Sweeping/Brushing

- **Redistribute infill on the pitch regularly.** Regular grooming and drag-matting/brushing of the pitch is essential to keep infill evenly distributed and prevent excess loss of infill from the margins of the field. Infill tends to migrate to the margins of the fields from where it more easily escapes into the environment.
- **Sweep up escaped granules.** Make sure loose granules at pitch edges are regularly swept up and, if reusable, returned to pitch surface.
- Use Power Sweeping machines that can collect and sort the rubber granulate for re-use. This cuts down on cost by reducing the amount of new granulate added to the fields each year. Machines can be shared across clubs further cutting down on costs.
- **Clean equipment carefully.** Thoroughly brush or hose down sweeping/deep-clean/decompaction machines before leaving the pitch as infill will cling to the tyres and frame of the machine and be transported away from the pitch.
- **Cover drains during maintenance work.** If infill is dispersed into perimeter gutters and drains during maintenance activities, consider temporarily covering these before starting with sweeping/brushing

## Waste disposal

- **Debris from on or near the pitch will contain microplastic.** The following materials will contain microplastics. Where the material can't be cleaned and granules returned to the pitch, it must be disposed of as rubbish (i.e. they should not be composted or returned to the environment):
  - Leaf debris
  - Mixed debris from sweeping
  - Sludge from gullies and drains around the field

## Snow

- **Avoid removing snow from the pitch.** Snow removal from pitches can remove a huge amount of pitch infill. When it snows, consider leaving the snow on the pitch until it melts. If this is not an option, move the snow to one side of the pitch, so any granules that melt out remain on the pitch.
- **Never move snow from the pitch onto grass or soil outside the pitch.** If the snow must be removed from the pitch, be sure to place it on a hard surface or tarp (not the grass!) so that the rubber granules can be collected once the snow melts and re-used.

## Part 3. Help pitch users to keep the infill in

- **Provide information to users** using posters on the edge of the pitch to raise awareness and help players reduce microplastic loss, including
  - Why it's important to keep granules on the pitch
  - Instructions on how to use any brushes / cattle grid systems available
  - Instructions to dispose of any granules found in the bin and not outdoors or down the drain.
- **Provide brushes to help players remove granules before leaving the pitch.** Provide brushes for players to use within the protected pitch perimeter. Where possible install 'boot brushing' stations.
- **Put filters in shower drains.** Place granular traps in changing room drains - this will prevent microplastic being lost with shower water
- **Collect granules from kit.** In the changing room, include a collection bin for loose granules found in shoes and kit.

### Pitch In

We have created a Community Toolkit to help clubs show they care about microplastic and spread the word about reducing it. Sign up via our website to download the free poster and activities and become part of our **Pitch In community; keeping plastic on the pitch.**



Figure 3 An example of a portable boot brushing station (image from sportsequip.co.uk)

# Frequently asked questions – use of infill materials in 3G artificial grass pitches (AGPs)

## BACKGROUND

This document has been prepared as result of a collaboration between the key stakeholders listed below to bring together a series of frequently asked questions (FAQs) regarding the use of infill materials in “third generation” (3G) artificial grass (aka synthetic turf) pitches.

The FAQs are provided for general information only and are based on information, research and material that is currently in the public domain.

The guidance will be kept under review continually by members of the group and updated as necessary.

The FAQs are not intended to be a comprehensive guide replacing the need for specialist technical advice.

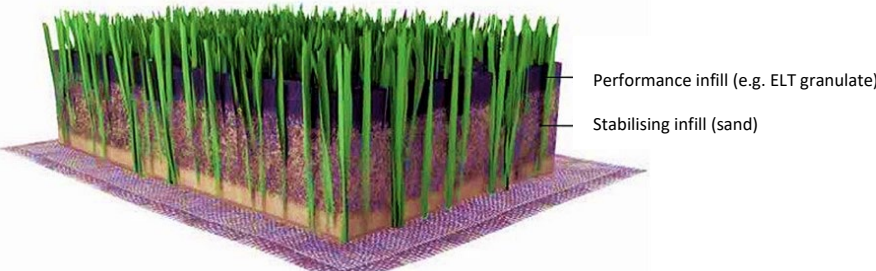
You should seek specialist advice from suitably qualified and experienced professionals in relation to concerns about specific sites or projects.

Care has been taken over the accuracy of the content of this guidance note, but the Stakeholders cannot guarantee that the information is up to date or reflects all relevant legal requirements at the time of reading.

**Updated July 2022**



# Frequently asked questions – use of infill materials in 3G artificial grass pitches (AGPs)

1.	What is the difference between an artificial grass surface and a synthetic turf sports surface?	There are no differences, various names are used to describe the same types of sport surfaces and the facilities they are laid on. These include synthetic turf, artificial grass, artificial turf, turf and artificial grass pitches (AGP). FIFA, World Rugby and International Hockey Federation also refer to the specific forms of artificial grass used for their sports as Football Turf, Rugby Turf and Hockey Turf. Increasingly, international standards, environmental regulations and the supply industry refer to synthetic turf.
2.	What is a 3G artificial grass surface?	The term “3G” refers to the third generation of artificial grass sports surfaces. The first generation are the non-filled short pile surfaces favoured by sports such as hockey; the second generation are the sand filled surfaces that were used extensively in the 1980s and 90s. The third generation were developed in the early 2000s and are intended to replicate the playing characteristics of natural turf, making them particularly suitable for football and the various forms of rugby.
3.	How does a 3G surface differ from other artificial grass surfaces?	<p>A 3G surface has a carpet pile that is typically between 40 mm and 60 mm, which is much longer than other forms of artificial grass that typically have pile lengths of between 10 mm and 25 mm, depending on the sports to be played on the surface.</p>  <p>To help provide the desired playing characteristics and to aid player comfort and protection, the spacing of the stitches forming the carpet's pile is quite open; this is to allow infill to be placed between the pile fibres.</p>

# Frequently asked questions – use of infill materials in 3G artificial grass pitches (AGPs)

4.	What is infill and why is it used?	<p>Infill is the term used to describe granular materials that are placed around the fibres forming the pile of an artificial grass carpet. In 3G turfs two layers of infill are normally used, a layer of rounded sand at the bottom, that acts as a stabilising ballast to hold the carpet in place, and an upper layer of performance infill that helps provide the playing characteristics and player welfare properties of the surface.</p>
5.	Are there different types of performance infill used in 3G surfaces?	<p>Initially, most 3G pitches had a performance infill made from granulated end of life car and truck tyres; this is often described as ELT or SBR (after the type of rubber) granulate. ELT infill is, the most commonly used type of performance infill in the UK.</p> <p>Alternative infill materials are now available including:</p> <ul style="list-style-type: none"> <li>• Polymeric infills made from virgin rubbers and plastics</li> <li>• ELT granules enclosed within an outer coloured polyurethane coating</li> <li>• Vegetal (or organic) infills made from an increasing range of materials including:             <ul style="list-style-type: none"> <li>- Granulated cork</li> <li>- Blends of granulated cork and coconut fibre</li> <li>- Blends of granulated cork and olive stone husks</li> <li>- Chipped timber</li> <li>- Crushed olive stone husks</li> </ul> </li> </ul> <p>See questions 17, 18 and 20 for more details on vegetal infills.</p>
6.	Why is ELT infill the most commonly used?	<p>ELT infill has many positive attributes including:</p> <ul style="list-style-type: none"> <li>• Low cost and being readily available in the UK</li> <li>• Good elastic properties that help ensure player comfort and protection</li> <li>• Very good durability and resistance to climatic degradation</li> </ul>

# Frequently asked questions – use of infill materials in 3G artificial grass pitches (AGPs)

7.	Does ELT infill pose a risk to human health?	<p>This question has been the subject of significant investigation since first being raised in the USA in 2015. The concerns identified relate to potential risk of exposure to polyaromatic hydrocarbons (PAHs) that are contained in ELT granulate.</p> <p>PAHs are a widely occurring group of chemicals that people are most commonly exposed to through breathing air contaminated with motor vehicle exhaust, cigarette smoke or wood smoke. People also ingest PAHs when they eat grilled or charred meats or foods. High or prolonged exposure to PAHs can cause cancers.</p> <p>In 2016 the European Chemical Agency (ECHA) launched a study to assess whether the concerns were justified and if restrictions on the use of ELT infill were required. The stakeholders listed on page 1 of this guide contributed to the study.</p> <p>In 2017 ECHA published their report<sup>1</sup> which concluded:</p> <p><i>“ECHA has found no reason to advise people against playing sports on synthetic turf containing recycled rubber granules as infill material”.</i></p> <p>In 2020 the results of a major pan-European scientific study undertaken by internationally respected independent researchers, and published in the scientific journal <i>Science of the Total Environment</i><sup>2</sup>, concluded:</p> <ul style="list-style-type: none"><li>• <i>No health concerns were found for AGPs with ELT-derived infill material.</i></li><li>• <i>Cancer risks for exposure to PAHs were below 1 in 1 million.</i></li><li>• <i>Risk characterisation ratios (RCRs) for non-carcinogenic substances were below 1.</i></li></ul>
8.	Are there standards or legal frameworks that currently regulate the chemical composition of infill used in artificial grass surfaces?	<p>Tyres sold within the European Union and UK have been subjected to regulations that limit their PAH content since 2011; this is why ECHA found that the ELT infill being used in the UK and European Union did not pose an unacceptable risk to human health.</p>

<sup>1</sup> Annex XV Report – An Evaluation of the possible health risks of recycled rubber granules used as infill in synthetic turf sports fields, ECHA, February 2017

<sup>2</sup> ERASSTRI – European risk assessment study on synthetic turf rubber infill, Schneider, Bierwisch, Kaiser. May 2020

# Frequently asked questions – use of infill materials in 3G artificial grass pitches (AGPs)

		<p>However, infill is produced around the world and the quality standards in some regions are not as robust as those in Europe. To prevent infills with unacceptable levels of PAH from entering the European market ECHA proposed a new legal restriction limiting the combined total content of the eight key PAHs to no more than 20 mg/kg (0.002%). This new EU regulation entered into European law in July 2021.</p>
9.	<p>But with the UK leaving the EU before their new regulation became law it does not apply here, so how do I ensure infill used on UK fields is also safe?</p>	<p>Anticipating the new UK regulation would not be automatically transferred over to UK law, the stakeholders listed on page 1 of this FAQ encouraged the UK industry, represented by the Sport and Play Construction Association (SAPCA), to develop a quality control protocol for sports performance infill<sup>3</sup>. Launched in 2019, this protocol replicates the criteria of the EU regulation, ensuring the same levels of protection. It also includes additional criteria to ensure infill materials do not contain hazardous amounts of heavy metals; the criteria being the same as that used for children’s toys.</p>
10.	<p>How do I ensure the infill being laid on my 3G pitch complies with the SAPCA Protocol?</p>	<p>Field owners and operators and those designing, building and maintaining 3G pitches each have a duty of care to ensure their pitch does not create unnecessary risks to players, match officials and those undertaking maintenance.</p> <p>As a condition of membership, SAPCA requires companies to comply with its Codes of Practice and Protocols. This means whenever you employ a SAPCA member to design, build, or maintain your pitch, only an infill that is been registered on the SAPCA Infill Protocol will be specified/used.</p> <p>In 2021 SAPCA launched their <i>Code of Practice for the Selection and Use of Sports Performance Infills</i> which further strengthens the requirement for members to use infills registered on the Infill Protocol.</p>

<sup>3</sup> [Sports performance infills for 3G surfaces – SAPCA](#)

## Frequently asked questions – use of infill materials in 3G artificial grass pitches (AGPs)

		<p>The Football Foundation have incorporated the SAPCA Infill Protocol into the requirements of their framework contract for new 3G pitches meaning any project they fund has to use a registered infill.</p> <p>If you maintain your pitch yourself, you should ensure that the infill being used for topdressings, etc is a product registered on the SAPCA Infill Protocol.</p>
11.	Should I keep records showing what infill is laid on my pitch?	As long-term traceability of the infill materials laid on a pitch are likely to become increasingly important, especially at the end of the surface's life, it is recommended pitch owners and operators retain records showing the brand of infill used and its conformity to the SAPCA Infill Protocol criteria.
12.	Do performance infills create a microplastic threat to the environment?	<p>Microplastics are defined as non-biodegradable polymeric (rubber or plastic) materials that are 5mm or less in size.</p> <p>Microplastics may be intentionally added to products (e.g. micro-beads in cosmetics) or unintentionally occur through wear and tear (e.g. micro-fibres from clothing) or through the breakdown of discarded polymeric products.</p> <p>Polymeric infills meet the definition of an intentionally added microplastic. If they are allowed to migrate from a pitch into the surrounding neighbourhood, they become a microplastic pollutant. See Q15 for information on how to significantly reduce any loss of infill.</p>
13.	How serious a problem is infill pollution of the environment?	The potential environmental threat caused by infill was first identified in Scandinavia. Studies there showed up to 900 kg of infill could be lost from a pitch each year. But importantly, approximately 50% of this was due to the repeated clearance and disposal of snow containing infill during the Scandinavian winter months. The same studies also showed that the other methods of infill migration that could occur in UK,

# Frequently asked questions – use of infill materials in 3G artificial grass pitches (AGPs)

		and highlighted in Q14 can result in around 500 kg of infill leaving a full size pitch each year.
14.	How does infill migrate from a pitch?	<p>Studies have shown the major infill transportation routes from 3G pitches are:</p> <ul style="list-style-type: none"><li>• On maintenance equipment, especially brushes</li><li>• Migration through use and maintenance to side of pitches and beyond</li><li>• On players' clothing and footwear</li><li>• Surface water run-off</li></ul>
15.	How can I ensure my infill does not become a microplastic pollutant?	<p>Independent studies<sup>4</sup> have shown that through good field design, operation and maintenance, infill migration from an artificial grass pitch can be reduced by up to 98% from typical worst-case situations. BSI Standards<sup>5</sup>, working with the European Committee for Standardisation (CEN), have developed a Technical Report describing the procedures that should be used to control infill migration. These include:</p> <ul style="list-style-type: none"><li>• Fitting containment barriers on a pitch's perimeter fencing</li><li>• Installing decontamination grates and boot cleaning brushes at all player and vehicle entrance gates</li><li>• Ensuring all stormwater drains around a pitch have suitable microfilters to capture any infill being carried by surface run-off, etc</li><li>• Keeping a dedicated maintenance brush within the boundaries of the pitch, so it cannot carry infill into the surrounding environment</li></ul>

<sup>4</sup> Determining the effectiveness of Risk Management Measures to minimize infill migration from synthetic turf sports fields, Magnusson & Mácsik, Ecoloop, August 2020 [Knowledge Centre - ESTC - EMEA Synthetic Turf Council](#)

<sup>5</sup> BS PD CEN/TR 17519 Surfaces for sports areas – Synthetic turf sports facilities – Guidance on how to minimize infill dispersion into the environment, [BSI Shop - Buy British Standards. \(bsigroup.com\)](#)

# Frequently asked questions – use of infill materials in 3G artificial grass pitches (AGPs)

		<ul style="list-style-type: none"><li>• Thoroughly removing any infill from maintenance tractors, etc. before they leave the pitch</li></ul> <p>Further and more detailed information can be found on guidance published by SAPCA<sup>6</sup> and the European Synthetic Turf Council (ESTC)<sup>7</sup>.</p> <p>FIFA, World Rugby and the International Hockey Federation (FIH) have all included the recommendations of CEN into their certification programmes for artificial grass pitches. Contractors building fields that require certification should therefore include the measures within their designs.</p> <p>As with polymeric infills (see question 10), SAPCA members should now ensure all fields designed or built comply with the recommendations of the <i>SAPCA Code of Practice for the Selection and Use of Sports Performance Infills in 3G Artificial Turf</i> and incorporate infill containment measures.</p> <p>The Football Foundation have also incorporated the recommendations of BSI Standards CEN Technical Report into the requirements of their framework contract for new 3G pitches meaning any project they fund should now include appropriate containment measures.</p>
16.	These containment and management measures sound expensive, are they?	<p>The cost of the necessary containment measures are becoming lower as the market evolves, and more companies develop products specifically for this application. Currently the measures are typically adding up to £20,000 plus VAT to the cost of a new full-size field. As many of these features should function for at least 20 years, their life cycle costs are not considered to be disproportionate for the environmental benefits they bring.</p>

<sup>6</sup> The selection and Use of Sports Performance Infills in 3G Artificial Turf, SAPCA, 2021 [Codes of Practice – SAPCA](#)

<sup>7</sup> Synthetic turf infill control [Knowledge Centre – ESTC – EMEA Synthetic Turf Council](#)

## Frequently asked questions – use of infill materials in 3G artificial grass pitches (AGPs)

17.	What are vegetal (organic) infills?	Vegetal infills are made from vegetation or plant materials. As listed in Question 5 an increasing range of materials are being used. The materials are shredded or granulated to provide an infill with the required particle grading and density.
18.	With all of the concerns around polymeric infills should I consider a vegetal infill?	<p>The UK artificial grass market is starting to see an increasing range of vegetal infill materials being introduced. Many of these infills have been used in other European countries for a number of years, but experiences of them in the UK climate and on UK pitches, with their high levels of use are still quite limited.</p> <p>If you are considering a vegetal infill, you should assess the pros and cons thoroughly before deciding. There is nothing like real-life experiences to provide assurances you are making the best choice for your pitch; after all the decision will remain in place for many years.</p>
19.	What are the principal advantages to using a vegetal infill?	<p>The principal benefit of using a vegetal infill is that it is a naturally occurring material that does not contain chemicals and will eventually bio-degrade and not have any long-term impact on the environment. For many, these are good enough reasons to use this type of infill.</p> <p>Some types absorb less radiant heat from the sun meaning the turf is cooler than when a dark coloured infill is used.</p>
20.	What are the principal disadvantages to using a vegetal infill?	<p>Reported disadvantages include:</p> <ul style="list-style-type: none"> <li>• Some types float making them susceptible to dispersion in periods of heavy rain; this increases a pitch's maintenance requirements</li> <li>• Some types have slower drainage properties, meaning surfaces can become waterlogged in very wet conditions.</li> </ul>

# Frequently asked questions – use of infill materials in 3G artificial grass pitches (AGPs)

		<ul style="list-style-type: none"> <li>• Some types may freeze in cold winter conditions.</li> <li>• As the materials bio-degrade, they may need replacing partway through the life of the turf carpet; this could increase your on-going maintenance and life cycle costs</li> <li>• Fungal and algae growth can be a problem and may need chemical treatments to control persistent problems</li> <li>• Generally, they are more expensive than ELT infill, although costs are reducing</li> <li>• Many vegetal infills are produced overseas meaning they have a higher CO<sup>2</sup> transportation impact on the environment</li> </ul>
21.	Can I remove a polymeric infill and replace it with a vegetal infill without changing the turf surface?	A synthetic turf system is designed to provide playing and safety properties required for the sports to be played on it. Vegetal infills generally provide less energy absorption to players falling onto the surface than polymeric infills, meaning the turf systems in which they are used need to include a shockpad underlayer. If an existing field does not have a shockpad (of suitable quality and performance) changing from a polymeric to a vegetal infill is likely to result in an unsatisfactory and potentially unsafe playing surface.
22.	If I use a vegetal infill, do I still have to worry about infill migration?	Although vegetal infills do not create a microplastic pollution concern, they can still become a source of environmental pollution as they are not a naturally occurring material in the UK environment.
23.	Are there any standards for the various types of infills now being offered on the market?	BSI Standards is currently working with the European Committee for Standardisation to develop a standard for synthetic turf (artificial grass) infill materials. The standard <sup>8</sup>

<sup>8</sup> prEN 15330-5 Surfaces for sports areas: synthetic turf and textile sports surfaces Part 5: Specification for infill materials (draft under development)

# Frequently asked questions – use of infill materials in 3G artificial grass pitches (AGPs)

		is currently in draft format. It is hoped that it will be approved for publication in Q3 or Q4 of 2022.
24.	If vegetal infills are not the total answer to my concerns, should I be considering a 4G artificial grass surface?	<p>Responding to environmental concerns, a fourth generation of artificial grass surfaces have been developed. These are long pile (typically anything between 30 mm and 60 mm) artificial grass that either have no infill (non-filled) or are only partly filled with sand (sand dressed).</p> <p>4G turfs have a much denser primary pile, and often a secondary pile or thatch zone, both of which are designed to ensure the primary pile is supported and remains standing upright.</p> <p>To date, testing has shown 4G surfaces are not able to satisfy the FIFA criteria for artificial grass football surfaces and the World Rugby criteria for artificial grass rugby surfaces. This is primarily due to the surfaces' inability to satisfy the criteria for skin/surface friction, meaning there is an increased risk of a player suffering from a carpet burn when they slide on the surface. Low foot grip has also been found to be problem with some 4G turf systems.</p> <p>Currently 4G surfaces can comply with British Standard EN 15330-1<sup>9</sup>. It is worth noting, however, that this standard is currently being updated, having been published in 2013 and enhanced tests for foot/surface and skin/surface friction might be introduced to assess the ability of 4G surfaces to perform as players desire.</p>
25.	When an artificial grass surface needs replacing, what happens to the infill?	The artificial grass industry is increasingly developing methods of recycling all components of the surface. The European Synthetic Turf Council has published a

<sup>9</sup> BS EN 15330-1: Surfaces for sports areas. Synthetic turf and needle-punched surfaces primarily designed for outdoor use. Specification for synthetic turf

# Frequently asked questions – use of infill materials in 3G artificial grass pitches (AGPs)

		<p>comprehensive guide to the end-of-life options for synthetic<sup>10</sup> turf sports surfaces including the various types of infill discussed in this document.</p> <p>Polymeric infills can, after careful cleaning and processing, often be reintroduced into the market to be used again as an infill material. The British European standard for infill materials that is currently under development (see question 18) will contain performance and quality criteria for the reuse of infill materials. Until this standard is published, the advice of the artificial grass surfacing manufacturer should always be taken; they will be able to advise if an infill is suitable for reuse in their turf.</p> <p>Providing a vegetal infill does not contain polymeric components (some include rubber granules) and it has not been treated with herbicides, etc, it can often be used as a compost or mulch, before being allowed to degrade naturally.</p>
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<sup>10</sup> ESTC Guide End of Life Synthetic Turf Sports Surfaces, June 2021 [Knowledge Centre - ESTC - EMEA Synthetic Turf Council](#)