SPORTS&PLAY
INDUSTRY ASSOCIATION LIMITED

DESIGNING SYNTHETIC SPORTS FIELDS FOR BIODIVERSITY

From impact reduction to whole-of-park ecological uplift

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smart connection consulting

Designing Synthetic Sports Fields for Biodiversity

Sports Depends on Nature

Sport is often presented as separate from nature: a field, a fence, floodlights, lines and fixtures. In reality, every training session and community match depends on functioning natural systems. Players need clean air, safe temperatures, reliable water, shade, healthy soils, resilient landscapes and safe access. When those systems are degraded, sport feels it quickly through heat stress, flooding, poor air quality, cancelled games, damaged surfaces and rising maintenance costs.

Claire Poole, Founder and CEO of Sports Positive, provides a useful starting point for the sports infrastructure sector: protecting nature is not an optional environmental add-on; it is central to sport's future. If sport depends on nature, then the places where sport is played should be planned and managed as part of the natural system, not as isolated engineered assets.

This creates a more balanced way to discuss synthetic sports fields. A synthetic field does not improve biodiversity simply because it is synthetic. Done well, however, it can become part of a broader ecological strategy: concentrating high-intensity sport onto a durable surface while the surrounding parkland performs better for biodiversity, climate resilience and community health.

The debate therefore should not be reduced to synthetic turf versus natural grass in isolation. The better question is: how can a high-use sports field be designed as part of a whole-of-park ecological system that protects soil, water, trees, habitat, wildlife corridors and community access?

Whole-of-park thinking means the field of play performs for sport while the surrounding parkland performs for nature, climate resilience and community wellbeing.

The Five-Part Biodiversity Proposition

Well-designed synthetic sports fields can support biodiversity outcomes in five connected ways. These five principles should become sport and government's central framework and the test for whether a project is genuinely biodiversity supportive.

1. **Concentrate high-intensity sport onto a smaller, more durable footprint**

   A synthetic field can carry significantly more training and competition hours than natural turf. In high-demand urban areas, this can reduce the need to convert additional passive open space into active sport fields. The biodiversity benefit is not the surface itself; it is the avoided pressure on other open spaces and the opportunity to keep more land available for trees, habitat, passive recreation and ecological function.

2. **Free surrounding parkland for ecological enhancement**

   When the field is planned as part of a whole-of-park masterplan, surrounding land can be improved through canopy trees, native planting, habitat corridors, pollinator gardens, rain gardens, wetlands, shaded spectator areas and water-sensitive urban design. The field carries the sport load, the landscape around it carries the biodiversity response.

3. **Reduce environmental pressures associated with high-use natural turf**

   High-use natural turf can require irrigation, fertiliser, herbicide, pesticide, renovation, mowing and closure periods. With contemporary and environmentally sustainable design practice, a synthetic field can reduce these pressures while providing water harvesting and other ecological opportunities for the wider parkland.

4. **Design out key environmental risks**

   Biodiversity protection depends on preventing harm at the source. This means designing out microplastic migration, urban heat island impacts and heat stress, poor drainage, uncontrolled runoff, light spill, flood vulnerability and weak end-of-life outcomes.

5. **Use the project as a catalyst for whole-of-park ecological uplift**

   The strongest case is made when the project triggers broader landscape investment and design and construction practices that are sensitive and proactive towards biodiversity. A synthetic field can help structure canopy expansion, habitat planting, water harvesting, stormwater treatment, active transport links, circular economy procurement and long-term landscape maintenance commitments.

From Field-of-Play Thinking to Whole-of-Park Biodiversity

The biodiversity-positive synthetic field is not designed as a rectangle of play with some landscaping around the edges. It is designed as one component in a wider blue-green infrastructure system. This requires councils, planners, designers, managers, sports and communities to shift from field-of-play thinking to whole-of-park thinking.

Under a whole-of-park approach, the design team asks different questions. Where are the existing ecological assets? Which trees, soils, habitat patches, drainage lines and wildlife corridors must be protected? Where can new canopy be planted without compromising the playing surface? Can harvested water support the rest of the park? Can the perimeter become a habitat edge rather than a hard boundary? Can access paths, car parks and spectator areas be redesigned to reduce heat and support planting?

This approach is especially important in urban areas where open space is scarce. A natural turf field is not automatically biodiverse if it is compacted, overused, irrigated, fertilised and repeatedly renovated to meet community sport demand. Conversely, a synthetic field is not automatically negative if its purpose is to absorb high-intensity sport while the surrounding park is restored, shaded and managed for ecological value.

The design objective should be clear: the synthetic surface provides the durable sporting platform; the parkland around it provides the living system. Together they should deliver more sport, more shade, cleaner water, better habitat and a cooler, more resilient place for the community.

Designing Out Biodiversity Risks

A credible biodiversity argument must be honest about risk. Traditionally designed synthetic fields can harm environmental values. The answer is not to ignore these risks; it is to address them through planning, design, procurement and management.

Microplastic Migration

A best-practice field should avoid intentionally added microplastic infills, use organic infill where suitable, include a shockpad for reduced infill volumes, specify durable UV-stabilised yarn, use dual-yarn systems that help hold infill, and include physical containment such as perimeter hobs, boot-cleaning points, gate mats, vehicle grates and filtered sub-surface drainage. Maintenance should collect yarn debris and clean gates and drains before material can migrate beyond the field.

Heat

Organic infill, lighter materials, shade, tree canopy, wetlands, water harvesting, blue-green infrastructure and careful orientation can reduce the heat load around the field. The goal is not simply to cool the playing surface, but to cool the whole parkland experience for players, spectators, neighbours and local biodiversity.

Water and flooding

Fields near waterways, flood paths or sensitive ecological areas require careful site selection, flood modelling and drainage design. Where a site cannot be engineered to protect the field and the receiving environment, the field should not be built there. Where it can be engineered well, drainage can become an asset by collecting, treating and reusing water for the surrounding parkland.

A Practical Design Model: The 5-Phase Lifecycle

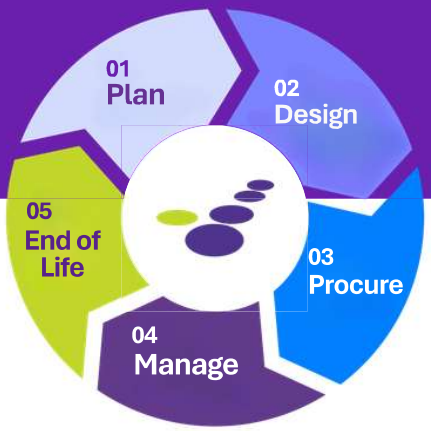
The biodiversity case becomes practical when it is embedded across the full lifecycle of the project. Biodiversity should influence the site decision, the design brief, the tender, the maintenance plan and the renewal strategy.

Planning	Select the right site, avoid high-value habitat, protect mature trees and waterways, understand flood risk, and develop a whole-of-park ecological masterplan before committing to the field footprint.
Design	Design the field and landscape together. Include canopy expansion, native planting, habitat corridors, WSUD, microplastic containment, cool materials, shade and safe access for active and passive users.
Procurement	Specify environmental outcomes, not just sporting compliance. Require recyclable components, low-impact materials, organic infill where appropriate, drainage controls, heat mitigation, durability testing and proof of end-of-life pathways.
Management	Maintain the field and the living landscape. Clean gates and drains, monitor infill and yarn wear, collect debris, maintain canopy and habitat planting, and reuse harvested water where feasible.
End of Life	Design for disassembly, reuse and recycling. Require certificates or proof of processing so the surface does not become a future waste or pollution burden

Biodiversity Checklist and Conclusion

Well-designed synthetic fields can concentrate intensive sport, reduce pressure on natural turf, harvest water, reduce chemical use, support tree canopy expansion, protect waterways, fund better landscape management and enable surrounding parkland to be restored for biodiversity. The difference is not the word synthetic. The difference is in the quality of planning, design, procurement, management and end-of-life accountability. If sport depends on nature, then the next generation of synthetic sports fields should be judged not only by how they play, but by how they help the whole parkland thrive.

This lifecycle approach also aligns with the 4P Framework: People, Planet, Prosperity and Performance.



Recommendations

The Sports & Play Industry Association (SAPIA) brings together the organisations that create the places where people of all ages and abilities can play, move and participate. Through professional standards, industry leadership and innovation, we are building and maintaining better places for a more active world.

To provide these SAPIA Insight Notes, we have partnered with Smart Connection Consulting to provide the latest technical knowledge on the issues that the community are keen to understand better. These notes are based around the NSW & SA Governments Frameworks for Decision Making for Synthetic Sports Fields.

Plan

- Assess biodiversity considerations before choosing a site.
- Avoid sensitive habitats, mature trees and ecological corridors.
- Prefer already disturbed or urbanised locations where impacts are lower.
- Consider wider parkland impacts, including heat, water, soil and shade.
- Consult the community early.
- Prepare key assessments where required, such as biodiversity, stormwater, soil, heat and amenity value.

Design

- Retain and increase tree canopy.
- Include native planting and green buffers.
- Connect planting areas to nearby habitat corridors.
- Use water-sensitive urban design such as rain gardens, swales and biofiltration.
- Select lower-impact materials and infill.
- Design drainage to capture and treat runoff through water harvesting.
- Reduce heat through shade, landscape design and appropriate material choices.

Procure

- Protect existing trees and root zones.
- Fence off no-go habitat areas.
- Prevent sediment, fibres, infill and construction waste from entering drains, waterways and landscape.
- Minimise soil compaction around planted areas.
- Use contractors with environmental management experience.
- Rehabilitate disturbed areas quickly after works.
- Procure companies with positive environmental experience and commitment

Manage

- Inspect and clean filters, drains and field edges regularly.
- Remove loose infill, fibres, litter and leaf matter.
- Monitor nearby tree and vegetation health.
- Monitor runoff and water quality where relevant.
- Maintain planted buffers and habitat areas.
- Adjust management if biodiversity, heat or pollution issues are identified.

End of Life

- Prepare a removal and recycling plan before construction.
- Separate turf, infill and shockpad materials.
- Prevent fibre and infill escape.
- Recycle where suitable pathways exist.
- Restore surrounding areas with planting.
- NSW guidance requires end-of-life planning and does not accept simply reusing cut-up turf elsewhere. The EU is also restricting polymeric infill microplastics.

To understand how SAPIA can assist you in making a difference to your projects and the community understanding of this technical subject please contact the SAPIA office at office@sapia.org.au or on our website www.sapia.org.au.