PREPARED FOR

City of Sunnyvale

ESD 24-01:

EVALUATE THE USE OF ARTIFICIAL TURF VERSUS LIVING GROUNDCOVERS

PREPARED BY

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ESD 24-01:
Study Issue to Evaluate the Use of Artificial Turf Versus Living Groundcovers

Sunnyvale

Prepared for:

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Executive Summary

The City of Sunnyvale (City) has a need to review the issue of artificial turf versus natural grass for use within public open space and private property within the City. Concerns regarding the environmental and health impacts of artificial turf fields have been raised by community members. The City seeks to evaluate the advantages and risks of using artificial turf versus natural grass for sports fields at City Parks and on private properties, including residential and commercial landscapes. This Study Issue report assesses planning and environmental considerations associated with the use and construction of artificial turf fields versus natural grass fields.

The level of significance of those issues will need to be considered in conjunction with the results of available studies, and continuous improvements to artificial turf products, as well as monetary and physical constraints associated with providing open space and recreational opportunities to residents and visitors to Sunnyvale. This information is compiled for planning-level consideration. Detailed studies or reviews under the California Environmental Quality Act (CEQA) of future projects will be completed, as necessary, at a time when a specific project is proposed.

Key Findings

This section comprises of the study's key conclusions based on the literature review, the City's field conditions and programming realities, policy context, and public outreach. The findings are intended to inform planning-level decision-making; readers are encouraged to review the full report for supporting detail, assumptions, and limitations.

- **Natural grass can provide broader "green infrastructure" benefits, but high performance requires sustained inputs and rest.** Natural grass offers cooler surface temperatures, living landscape benefits, and potential compatibility with chemical-minimizing/organic management approaches. However, consistently supporting higher levels of use requires enhanced irrigation design and operation, soil and turf health practices, and periodic non-use time to allow recovery—constraints that can limit total playable hours and increase operational complexity when demand is high.

- **Field playing capacity and program reliability are the primary practical drivers.** Artificial turf fields can typically sustain substantially more hours of intensive, year-round programmed use with fewer weather- and recovery-related closures than natural grass. Concentrating heavy programming on synthetic fields, particularly during periods when natural grass is less resilient and slower to recover, reflects a capacity-management strategy aimed at maintaining playable conditions and reliable schedules.

- **Environmental and public health considerations remain central, with a mixed and evolving evidence base.** The literature reviewed in this report reflects two concurrent realities: (1) several studies and agency reviews conclude that, under typical conditions of use, measured exposures associated with crumb-rubber infill are not significantly different from background levels or do not indicate significant risk; and (2) ongoing concerns regarding heat retention, microplastic generation and migration, PFAS and other turf-system components, runoff and potential contaminated runoff, greenhouse gas emissions, and end-of-life disposal or recycling limitations. These considerations support a precautionary, standards-based approach when artificial turf is proposed, along with continued monitoring of regulatory guidance and emerging research. Science is still evolving regarding what the direct health impacts are from exposure to the environmental impacts directly related to artificial turf.

- **Lifecycle, cost-per-use, and policy alignment point toward a balanced portfolio rather than a single solution.** The report's 20-year cost comparison indicates that cost-per-use outcomes depend strongly on assumed annual playable hours and the selected maintenance model: some natural/organic management approaches show low cost per use in the chart but with materially

fewer available hours than artificial turf, while artificial turf's higher upfront cost can be offset by greater capacity and lower maintenance demands. At the same time, artificial turf is inconsistent with the City's Zero Waste plan and with aspects of the Climate Action Playbook related to greenhouse gases and waste, while natural grass can conflict with City policies around water conservation. Public outreach reflects strongly held and sometimes competing community priorities—more playable hours and reliable scheduling on one hand, and concerns about environmental and health impacts and the loss of living green space on the other—suggesting that decisions will benefit from transparent standards, clear performance metrics, and context-specific siting rather than broad, one-size-fits-all policies.

General Recommendations

1. Based on a review of requests for athletic events, park system conditions, and community values in the City of Sunnyvale, it is recommended that the City continue to pursue a balanced and context sensitive approach to the use of artificial turf within City parks. This approach should increase access to City Parks where demand exceeds available capacity, while preserving natural grass parks and minimizing potential environmental and public health impacts.

2. The City should formally adopt a surface policy that supports the continued use of both natural grass and artificial turf within the Sunnyvale parks system. Natural grass should remain the preferred surface for City Parks that serve a broad range of recreational and environmental functions. Artificial turf should be treated as a specialized surface, considered only where its functional benefits are clearly demonstrated.

3. Consider funding an organic turf management (OTM) natural grass project, using limited, clearly defined areas, established performance metrics, and comparison to conventionally managed natural grass to evaluate local feasibility, maintenance needs, performance, and community acceptance before broader application.

4. Prioritize artificial turf installations for athletic facilities with sustained, high levels of programmed use that cannot be reliably supported by natural grass alone (e.g., multiuse rectangular fields, tournament level facilities, and sites with limited opportunities for rotation or rest) to increase total playable hours, reduce closures, and improve scheduling reliability.

5. Prioritize artificial turf in adaptive reuse locations where natural grass fields are not feasible (e.g., parking structures, rooftops, and other underutilized hardscape) to expand capacity without reducing existing green space or altering the character of established parks.

6. Where artificial turf is proposed on City-owned property, the City should require compliance with clearly defined health, environmental, and performance standards to be outlined in City's Park Design Guidelines as well as any manufacturer specifications. These standards should address material composition, heat mitigation, stormwater management, and end-of-life disposal or recycling, and should be periodically updated as regulatory guidance and product standards evolve.

7. Before converting any natural grass field to artificial turf, require a lifecycle evaluation comparing long-term costs, maintenance requirements, water use, and environmental considerations for both surface types to support transparent decision making. For City initiated projects and projects that require discretionary approval from the City, specific performance standards for recyclable materials and waste reduction measures should be included in bid documents or as conditions of approval to ensure City goals or policies are being implemented with regards to the use or artificial turf fields.

8. The City should consider establishing a regulatory framework for the installation of artificial turf on private residential and commercial property. Any such framework should recognize that regional water district policies do not currently identify artificial turf as a preferred or credited water-saving measure, and that the water conservation benefits of turf may be context-dependent. Regulations could focus on drought-resistant landscaping performance standards, preferred plant species, permeability, and stormwater management rather than promoting artificial turf as a conservation substitute for living landscapes.

9. In developing regulations for private property, acknowledge enforcement challenges and prioritize clear, objective, installation time standards (e.g., via permitting and plan review) over ongoing compliance monitoring, and coordinate with local water districts to align land use regulations and water conservation messaging.

10. Commit to ongoing community engagement and transparency related to artificial turf policies on both public and private property, including regular reporting on turf installations, natural grass preservation, field usage, and unmet demand so policies can evolve as conditions, technology, and community priorities change.

Introduction

Background

At the October 24, 2023, Sunnyvale City Council (City Council) meeting, community members raised concerns about using artificial turf in the proposed design of the Lakewood Park Renovation project. City Council directed staff to replace artificial turf with natural grass in the approved design for Lakewood Park. Council also considered a ban on future installation of artificial turf in city parks; however, the motion did not pass. In response to the community's opposition of artificial turf installation in public parks and athletic fields, the Sustainability Commission sponsored Study Issue ESD 24-01, Evaluate the Use of Artificial Turf versus Living Groundcovers (ESD 24-01).

On February 15, 2024, the City Council approved Study Issue ESD 24-01. The intent of the Study Issue is to analyze the benefits and challenges regarding the installation and use of artificial turf on private properties, including residential and commercial landscapes, and public properties, including athletic fields. The Study Issue will also provide recommendations for the City to develop a policy regarding the use of artificial turf.

At the August 27, 2024, City Council meeting, City Council voted against a proposed ban of artificial turf at City facilities. Community members spoke in favor of artificial turf as it provides more playtime on fields, there are lower maintenance needs associated, it is a drought-tolerant alternative, and the playing surfaces on artificial turf fields are smoother and seemingly safer for teams to play on. City Council directed staff to propose an amendment to Environmental Services Department (ESD) Study Issue 24-01 to include an evaluation and analysis of options for improved maintenance practices that would maximize the quality and use of the City's current natural grass athletic fields and options for future construction of natural grass athletic fields.

The City of Sunnyvale does not have designated sports playing fields within its City Parks, rather it has public open space parks in which outdoor sports, both organized (e.g., sports leagues) or unorganized (private events or "pick-up games") can be played. This study evaluated the current conditions of the natural grass field conditions at 15 City parks, including one park with existing artificial turf.

Approach

This study consists of three main parts:

- A summary of research of existing publicly available literature on safety and playability concerns related to artificial turf;
- Public outreach; and,
- A cost comparison analysis of artificial turf and natural grass.

This study is not intended to be an exhaustive analysis of all existing literature on this subject or evaluate all types of ground covers. This analysis did not include any field testing or chemical lab analysis of materials or treatments related to artificial turf or natural grass. The intent of this report is to provide a summary of environmental and health issues related to artificial turf and natural grass, summarize public sentiment on the issues as obtained from public outreach events, and provide a cost comparison analysis looking at various factors such as installation, maintenance, and playing capacity for both artificial turf and natural grass surfaces. Issues and concerns raised by decision makers and the public on similar projects have included:

- Toxicity of materials used in turf and crumb rubber fill materials
- Microplastics (per- and polyfluoroalkyl substances – also known as PFAS)
- Volatile Organic Compounds (VOCs) and off gassing
- Water quality and drainage controls
- Water Usage
- Heat generation
- Greenhouse gasses
- Material renewability and lifespan/lifecycle
- Pathogens and allergies
- Field Uses/Field Capacity
- City Policy Consistency

Ultimately, the information presented here is not to advocate for one particular type of turf or another, but to provide decision-makers with information on this topic with which to make informed decisions regarding whether to permit the use of artificial turf for recreational uses in public open space areas and for private uses.

Environmental Constraints and Benefits Assessment

Materials

Artificial turf has multiple layers consisting of a base layer made of gravel or stone, artificial grass carpet with backing material and artificial grass fibers, and infill materials that provide cushioning.[1] Infill has historically been made from crumb rubber made from recycled tires or styrene butadiene rubber (SR). Tire crumb typically consists of metals, PAHs, VOCs, SVOCs, and other chemicals. Metals typically found in tire crumb rubber infill include zinc and some instances of lead and cadmium. PAHs are organic compounds that contain or may contain carcinogens. However, alternatives to recycled tires include other synthetic

[1] Toxics Use Reduction Institute (TURI) at UMASS Lowell, Athletic Playing Fields: Choosing Safer Options for Health and the Environment, Available at https://www.turi.org/publications/athletic-playing-fields-2/.

materials, mineral-based materials, plant-based materials, or a mixture of natural and synthetic materials. For example, the City's Fair Oaks Park artificial turf field has infill made of sand and cork.

Artificial turf and backing is typically made with Per- and Poly-fluoroalkyl Substances (PFAS)[2] and typically also contain plastic fibers, such as polypropylene, polyethylene, and polyamide plastics, in the pile fiber and backing that may leak out microplastics. Direct health effects of PFAS in artificial turf is difficult to determine as there are limited studies and a wide variety of pathways of exposure.[3] Based on the Synthetic Turf Field Recycled Tire Crumb Rubber Research Under the Federal Research Action Plan published by the EPA in partnership with the Agency for Toxic Substances and Disease Registry (ATSDR), concentrations of metals in artificial turf users were similar to those in the general population and no difference in urine was observed between natural grass and artificial turf users.[4] A review of scientific literature published by the Santa Clara County Medical Association in 2024 concluded that it is uncertain whether artificial turf itself has long-term health impacts on people though various components of artificial turf may be harmful when considered on their own.[5]

Alternatively, natural grass would eliminate chemicals found in the surfacing material but would still have chemicals applied to the surface from fertilizers and pesticides. Implementing an OTM natural grass field is one approach that could help reduce or eliminate the use of chemical pesticides or fertilizers on natural grass areas. The goals of an OTM project are to develop a natural ecosystem by creating a sustainable system to develop healthy soil through a maintenance regimen that includes, in part, aeration, overseeding, and topdressing with compost to create the main source of plant nutrition. Planting turf species that are less susceptible to pest and diseases and well adapted to the environment are also important considerations.[6]

[2] TURI, Per- and Poly-fluoroalkyl Substances (PFAS) in Artificial Turf Carpet, Available at turi.org/publications/per-and-poly-fluoroalkyl-substances-pfas-in-artificial-turf-carpet/.
[3] US E.P.A., 2024, *Our Current Understanding of the Human Health and Environmental Risks of PFAS*, Available at https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas.
[4] U.S. EPA & CDC/ATSDR, 2024, *Synthetic Turf Field Recycled Tire Crumb Rubber Research Under the Federal Research Action Plan*, Available at https://www.epa.gov/system/files/documents/2024-04/tcrs-exposure-characterization-volume-1.pdf .
[5] Santa Clara County Medical Association, 2024, Policy Recommendation on the Use of Artificial Turf on Landscapes, Schools and Playing Fields, page 7). https://www.sccma.org/LinkClick.aspx?fileticket=C0f6wf5p9uY%3D&portalid=19.
[6] Nally, Shannon, et al. 2004*, Organic Turf Management at Tufts*, https://sustainability.tufts.edu/wp-content/uploads/OrganicTurf.pdf

Table 1: Comparing Chemicals and Other Health Hazards of Artificial Turf with Natural Grass

Category	Subcategory	Artificial Turf	Natural grass – conventional	Natural grass – organic
Chemicals	Present in surface	Polymers, PFAS, additives; respiratory hazards, e.g., zeolite	Ambient environmental exposures only	
	Applied to surface	Cleaners, disinfectants, herbicides	Synthetic pesticides, fertilizers, and chemicals generated by mowing equipment.	Soil health built through aeration, proper mowing practices, organic soil amendments, and other approaches, and chemicals generated by mowing equipment.
Other Health Hazards	Heat	Higher	Lower	
	Risk of skin abrasions and infections	Higher	Lower	
	Other injuries	Visible injury patterns		

Source: TURI, 2018, Athletic Playing Fields: Choosing Safer Options for Health and the Environment, Available at https://www.turi.org/publications/athletic-playing-fields-2/

Microplastics and PFAS

Microplastics are tiny plastic particles that come from plastic bottles, packaging, and clothing fibers. PFAS are a group of chemicals used in everyday items like non-stick cookware, water-resistant clothing, firefighting foams, and numerous industrial products. PFAS and microplastics are known as "forever chemicals" because they don't break down easily and can build up in the environment, leading to potential risks for both wildlife and humans. Both PFAS and microplastics can be transported through water systems.[7] As discussed in the above section, plastics from artificial turf may degrade and break down and microplastics may end up in water supply. Research suggests that artificial turf microplastics could be responsible for up to 15% of the micro- and meso-plastics found in some water supplies.[8] Research on microplastic impacts on human health is still ongoing. Current scientific research suggests that PFAS may

[7] University of Birmingham, U.K., Microplastics and PFAS – combined risk and greater environmental harm, https://www.birmingham.ac.uk/news/2024/microplastics-and-pfas-combined-risk-and-greater-environmental-harm

[8] de Haan WP, Quintana R, Vilas C, et al. The dark side of artificial greening: Plastic turfs as widespread pollutants of aquatic environments. Environ Pollut. 2023;334:122094, Available at The dark side of artificial greening: Plastic turfs as widespread pollutants of aquatic environments - ScienceDirect

lead to adverse health effects and that children may be more sensitive to the harmful effects of PFAS exposure. [9]

Volatile Organic Compounds (VOCs)

Volatile Organic Compounds (VOCs) are compounds that have high vapor pressure and low water solubility. [10] Many VOCs are human-made chemicals that are used and produced in the manufacture of paints, pharmaceuticals, and refrigerants. VOCs are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors. Artificial infill material made from recycled tires has the potential to release VOCs. Tire crumb consists of over 350 chemicals found in tired crumb that have the potential to release VOCs, such as benzene, benzothiazole, hexane, naphthalene, styrene, toluene, xylenes.

A study conducted by the Office of Environmental Health Hazard Assessment (OEHHA) published in 2010 concluded VOCs on artificial turf fields were not detectible and emitted at levels too low to be measured in the open air. [11] However, recycle crumb rubber infill tested in laboratory settings emitted more VOCs as the temperature increased. [12] This is consistent with the findings by the EPA stating that VOCs are consistently higher indoors.

Water Quality and Drainage

A 2021 Study comparing runoff and water retention between artificial lawns (short and long grass) and natural, living lawns found that artificial grass overall has greater volumes of runoff than living grass; and, between short artificial grass and long artificial grass, long artificial grass had greater runoff than short artificial grass. [13] Another study published by Utah State University found that artificial turf has a higher potential for runoff and lower potential for rainfall capture and infiltration. [14] Therefore, drainage systems, such as catch basins and exit drains, are required to prevent stormwater runoff.

There are environmental concerns pertaining to water quality due to contaminated runoff. Multiple studies measuring chemical leachate notes a high likelihood to be found in contaminated runoff deriving from artificial turf. [15] Infill particles and artificial grass blades have the potential to runoff into the environment. The City follows its adopted Integrated Pest Management practices to limit water pollution which means the City utilizes environmentally friendly alternatives to pesticides on natural grass when feasible. If pesticides are used on natural grass, this would impact water quality due to contamination. An organic natural grass alternative with no pesticides used would not result in water quality issues and water pollution.

Water Usage

The City of Sunnyvale receives most its water from treated surface water from two wholesalers: the San Francisco Public Utilities Commission (SFPUC) and Santa Clara Valley Water District (Valley Water). The

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[9] EPA, 2024, Our Current Understanding of the Human Health and Environmental Risks of PFAS, Available at Our Current Understanding of the Human Health and Environmental Risks of PFAS | US EPA .

[10] EPA, 2024, What are volatile organic compounds (VOCs)?, Available at https://www.epa.gov/indoor-air-quality-iaq/what-are-volatile-organic-compounds-vocs.

[11] CalRecycle, 2010, Safety Study of Artificial Turf Containing Crumb Rubber Infill Made From Recycled Tires: Measurements of Chemicals and Particulates in the Air, Bacteria in the Turf, and Skin Abrasions Caused by Contact with the Surface, Available at https://plantscience.psu.edu/research/centers/ssrc/documents/2010-oehha-turf-study.pdf.

[12] New York State, 2009, AN ASSESSMENT OF CHEMICAL LEACHING, RELEASES TO AIR AND TEMPERATURE AT CRUMB-RUBBER INFILLED SYNTHETIC TURF FIELDS, Available at http://www.synturf.org/images/NYDECcrumbrubfr2009.pdf.

[13] Simpson, T. & Francis, R., Artificial lawns exhibit increased runoff and decreased water retention compared to living lawns following controlled rainfall experiments, *Urban Forestry & Urban Greening*, Available at https://kclpure.kcl.ac.uk/ws/portalfiles/portal/154401824/Artificial_lawn_rainfall_UFUG_anonymised_revised_for_PURE.pdf

[14] Utah State University, 2023, Water Quality Impacts from Artificial Turf and Xeriscaping, Available at: https://extension.usu.edu/stormwater/residential/Water-Quality-Impacts-from-Artificial-Turf-Xeriscaping-Fact-Sheet.pdf

[15] Warner, 2022, Health Impacts of Artificial Turf: Toxicity Studies, Challenges, and Future Directions, Available at https://pmc.ncbi.nlm.nih.gov/articles/PMC10262297/pdf/nihms-1903943.pdf

remainder of the City's water is comprised of groundwater from six City-owned wells.[16] Artificial turf does not require irrigation like natural grass turf does. A study determined that a natural grass field requires approximately 0.5-1 million gallons of water per year for irrigation of an average American football field (57,600 square feet or approximately 1.32 acres). While irrigation is not required for artificial turf, water usage is required for the process of creating turf (an average of 22 gallons per pound of plastic[17]). Water can also be used on the artificial turf as a strategy to cool the turf down[18]and if washing is desired. Artificial turf requires less water usage than natural grass turf on an annual basis however, artificial turf does still require a substantial amount of water use when the manufacturing process is considered. Fair Oaks Park is the only City Park that has an artificial turf field. The City does not have any irrigation infrastructure for the artificial turf field at Fair Oaks Park. It should be noted that Valley Water does not include artificial turf in its Landscape Rebate Program for residential users.

Heat Generation

Surface temperatures on artificial turf fields is greater than natural grass fields.[19] There has been research testing surface temperatures of alternative infill options compared to the typical black rubber associated with tire crumb infill; however, those alternatives only had the potential to lower surface temperatures by five or ten degrees but would offer little benefits when surface temperatures exceed 150° F.[20] Heat guidelines must be circulated and considered during hot days in which practices are encouraged to be conducted in the mornings or evenings.[21] Natural grass fields, in comparison with artificial turf fields, can reduce the heat island effect in urban areas and rarely exceeds 100° F. Heat generation is greater in artificial turf than natural grass but mild climates, such as that in the City of Sunnyvale, may experience intense heat only during limited times of the year.

Greenhouse Gasses

Sources of greenhouse gas emissions associated with artificial turf include the extraction of material resources, materials production, construction, use and maintenance, and disposal. There is potential to reduce GHG emissions associated with reusing soil and rock materials onsite in addition to potential reuse of the turf mat and/or infill.[22] Reuse of materials would require less truck trips associated with transportation of soil and rock and have the potential to reduce greenhouse gas emissions. Overall, the greenhouse gas emissions associated with artificial turf is greater than natural grass; however, when considering the hours of use, average greenhouse gas impacts per hour of use can be less for artificial turf than for natural grass. The break-even point for greenhouse grass emissions is approximately 800 hours for natural grass and approximately 1,600 hours for artificial turf.[23] Nonetheless, natural grasses sequester greenhouse gas emissions unlike artificial turf.

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[16] City of Sunnyvale 2020 Urban Water Management Plan, approved January 29, 2021. https://www.sunnyvale.ca.gov/home/showpublisheddocument/380/637889141541470000

[17] Cumberbatch IS, Richardson L, Grant-Bier E, Kayali M, Mbithi M, Riviere RF, Xia E, Spinks H, Mills G, Tuininga AR. Artificial Turf Versus Natural Grass: A Case Study of Environmental Effects, Health Risks, Safety, and Cost. Sustainability. 2025; 17(14):6292. https://doi.org/10.3390/su17146292

[18] Cumberbatch, Iman S., Leonard Richardson, Emma Grant-Bier, Mustafa Kayali, Mutanu Mbithi, Roberto F. Riviere, Eline Xia, Hailey Spinks, Gabrielle Mills, and Amy R. Tuininga. 2025. "Artificial Turf Versus Natural Grass: A Case Study of Environmental Effects, Health Risks, Safety, and Cost" Sustainability 17, no. 14: 6292. https://doi.org/10.3390/su17146292 .

[19] New York State Department of Environmental Conservation, 2009, AN ASSESSMENT OF CHEMICAL LEACHING, RELEASES TO AIR AND TEMPERATURE AT CRUMB-RUBBER INFILLED SYNTHETIC TURF FIELDS, Available at http://www.synturf.org/images/NYDECcrumbrubfr2009.pdf

[20] Penn State Center for Sports Surface Research, 2012, Synthetic Turf Heat Evaluation – Progress Report, Available at https://plantscience.psu.edu/research/centers/ssrc/documents/heat-progress-report.pdf.

[21] National Recreation and Park Association, 2019, Synthetic Sports Fields and the Heat Island Effect, Available at https://www.nrpa.org/parks-recreation-magazine/2019/may/synthetic-sports-fields-and-the-heat-island-effect/.

[22] Simon Magnusson, Josef Mácsik, Analysis of energy use and emissions of greenhouse gases, metals and organic substances from construction materials used for artificial turf, Resources, Conservation and Recycling, Volume 122, 2017, Available at: https://doi.org/10.1016/j.resconrec.2017.03.007

[23] Zurich University of Applied Sciences, 2021, Life Cycle Assessment of Artificial and Natural Turf Sports Fields – Executive Summary (page 4), Available at https://digitalcollection.zhaw.ch/server/api/core/bitstreams/96187766-dbec-4f96-9281-7229483427c0/content.

Material Recyclability and Lifespan/lifecycle

A study conducted by the San Francisco Recreation & Parks Department estimates the average life span of artificial/synthetic fields is approximately 10 to 15 years.[24] However, some manufacturers suggest artificial turf can last up to 20 to 25 years with proper quality, installation, and maintenance.[25] The life span of a natural grass field varies depending on usage and maintenance but typically requires a major overhaul every 10 to 12 years.[26]

A study analyzing the life-cycle cost of artificial turf fields and natural grass fields found that the installation and maintenance costs of artificial turf fields is greater than natural turf fields. However, the maintenance alone in artificial turf fields was less than that of natural grass fields. Furthermore, that study found that synthetic fields would have greater number of uses than natural grasses and have the potential to be more cost effective than natural grass[27] as they are estimated to be open approximately 28% more of the time in year than natural grass fields due to their durability and ability to withstand heavy use.

In terms of material recyclability, there is possibility that artificial turf can be recycled through mechanical recycling or chemical recycling. Mechanical recycling is the automated process of separating artificial turf from its components of turf and infill using machinery. Extending this process further, the separation includes extracting the different polymers in the turf carpet and can include the separation of different infill types. Similarly, chemical recycling works to separate the specific material components of artificial turf by using chemical compounds instead of a mechanical process. The recovery of materials is mainly achieved by mechanical recycling, as chemical recycling technologies are still new, but are increasingly entering the global market.[28] Chemical recycling includes many challenges with requiring more energy than saved, lack in collection infrastructure, difficulty sorting, and consumer contamination.[29]Mechanical recycling has been difficult to implement with the diversity of materials included in artificial turf yarn and backing consisting of many different synthetic and organic materials—including rocks, leaves, dirt and so on—making separation difficult.[30] As such, the most complex aspect of artificial turf recycling is the separation and decontamination of all components. This step in the process is critical due to its direct effect on the quality of the recycled materials, while simultaneously requiring substantial effort and leading to significant costs and energy consumption.[31] Once the recycled materials have been produced, they are typically used as feedstock for the new sports fields or infill. The market for recycled artificial turf materials continues to grow in the United States and North America. In 2024, North America had an estimated 38.5% market share of a $1,09 billion global market for artificial turf recycling. This market share is predicted to grow at a compounded annual growth rate of 8.2% between 2025 and 2033.[32] It should be noted that despite the growth and increased demand for recycled materials from artificial turf, complete recycling has not been

[24] City of San Francisco Recreation and Parks, Bernal Heights Playground Renewal Project FAQs, https://sfrecpark.org/DocumentCenter/View/25691/Bernal-Heights-Playground-FAQ_updated-May-2025?bidId=
[25] Bella Turf, 2024, How Long Does Artificial Grass Actually Last?, Available at https://bellaturf.ca/blog/how-long-does-artificial-grass-actually-last/#:~:text=Conclusion,and%20under%20the%20optimal%20conditions.
[26] Claudio L., Synthetic turf: health debate takes root, Environ Health Perspect. 2008 Mar;116(3):A116-22, doi: 10.1289/ehp.116-a116, Available at https://pmc.ncbi.nlm.nih.gov/articles/PMC2265067/.
[27] Daviscourt, B.L., Kowalewski, A.R., Lamrinos, J.G., and Eleveld, B., A Life-Cycle Cost Analysis of Synthetic Infill and Natural Grass Systems, Available at https://link.springer.com/epdf/10.1007/s43615-021-00115-z?sharing_token=uniwJ2WHiUkN9REj81Hw_ve4RwlQNchNByi7wbcMAY7L4Ern1XfrIjdlt_qN17FertDTtej1YLcdgpFN4S5ThTuXTDEM2belI6kutA-xSZ4W6vxXJ8jO6C1-9X5fHDknizCV6Z510j-zr6lFEaIdmKOc1wcejYer6vaYvJJo3MI%3D.
[28] Anna Lena Seibel, Michèle Jampolski, Julia Walz, Mario Schmidt, Katharina Weber, Iman Taha, End-of-life management of artificial turf: State of the art and future challenges, Journal of Environmental Management, Volume 406, 2026, https://www.sciencedirect.com/science/article/pii/S030147972601282X
[29] Rollinson, A., Oladejo, J, 2019, '*Patented blunderings', efficiency awareness, and self-sustainability claims in the pyrolysis energy from waste sector*. Resources, Conservation and Recycling, Volume 141, 233-242. https://doi.org/10.1016/j.resconrec.2018.10.038 .
[30] https://returf.com/recycling-artificial-turf/
[31] Anna Lena Seibel, Michèle Jampolski, Julia Walz, Mario Schmidt, Katharina Weber, Iman Taha, End-of-life management of artificial turf: State of the art and future challenges, Journal of Environmental Management, Volume 406, 2026, https://www.sciencedirect.com/science/article/pii/S030147972601282X
[32] Anna Lena Seibel, Michèle Jampolski, Julia Walz, Mario Schmidt, Katharina Weber, Iman Taha, End-of-life management of artificial turf: State of the art and future challenges, Journal of Environmental Management, Volume 406, 2026, https://www.sciencedirect.com/science/article/pii/S030147972601282X

achieved under current conditions, given that turf construction involves permanent bonds of different materials, and that recovered materials are frequently heavily contaminated, which limits their reuse. [33]

For private uses, in particular, there are manufacturers (as seen with manufacturer, One-DNA) that have developed products that use a single base material: polyethylene, to facilitate recycling because it removes the obstacle of material separation. [34] As seen with TenCate, an artificial turf manufacturer located in the United States, has a facility in Baton Rouge, Louisiana which converts the old artificial turf into polyethylene pellets, which become the feedstock for new products. [35] Another product, FieldTurf, makes artificial turf components that are recyclable, and to use recycled carpet in manufacturing new products. [36]

Pathogens and Allergies

Allergen risks associated with synthetic turf include potentially harboring more bacteria than natural turf, requiring proper maintenance and sanitation to remove bodily fluids and animal waste and proper drainage to prevent the risk of mold. Mold is known to worsen allergy and asthma symptoms. [37] Nonetheless, there are mixed results in the literature on whether artificial turf harbors more bacteria than natural grass. [38] There have also been concerns on the potential for the presence of latex in recycled tire crumbs that may trigger latex allergy and asthma; however, the amount of latex in tire crumbs may be unknown and there have been little or no reports on latex allergy due to synthetic turf fields. [39]

Allergens commonly associated with natural grass include grass allergy with grass pollen allergy affecting approximately 40% of allergic patients. [40] Pathogens associated with artificial turf diseases include brown patch, dollar spot, pythium, helminthosporium leaf spot, fading out, gray leaf spot, fairy ring, take-all root rot, rust, slime mold, and nematodes. [41]

When comparing artificial turf fields and natural fields, a study published by the National Institute of Health (NIH) found that both environments contained the presence of pathogens but had different microflora environments. That study also found that synthetic turf fields harbor a microflora from anthropic and environmental sources whereas the natural grass carpets show a soil-related microbial community. [42]

Personal Health Factors

In March 2026, the Office of Environmental Health Hazard Assessment (OEHHA), of the California Environmental Protection Agency released a final report regarding a multi-year study of 35 artificial turf fields of various ages and in areas of different climate across California, by collecting data on environmental conditions of each field. Overall, this study found no significant health risks to players, coaches, referees, and spectators from on-field or off-field exposure to chemicals in crumb rubber infill from synthetic turf fields

[33] Anna Lena Seibel, Michèle Jampolski, Julia Walz, Mario Schmidt, Katharina Weber, Iman Taha, End-of-life management of artificial turf: State of the art and future challenges, Journal of Environmental Management, Volume 406, 2026, https://www.sciencedirect.com/science/article/pii/S030147972601282X
[34] https://one-dna.com/en/circular-artificial-explained/
[35] TenCate website. https://turfrecycling.us/
[36] https://fieldturf.com/en/why-fieldturf/sustainability-commitment/
[37] Allergy & Asthma Network, 2025, Mold Allergy, Available at: https://allergyasthmanetwork.org/allergies/mold-allergy/; Mayo Clinic, 2021, Mold Allergy, Available at https://www.mayoclinic.org/diseases-conditions/mold-allergy/symptoms-causes/syc-20351519.
[38] CHE Partnership, 2022, Environmental Health Impacts of Synthetic Turf and Safer Alternatives, Available at https://www.healthandenvironment.org/assets/images/webinarimages/Artificial%20Turf%20Q&A_FINAL.pdf.
[39] New York, 2009, Information About Crumb-Rubber Infilled Synthetic Turf Athletic Fields, Available at https://www.health.ny.gov/environmental/outdoors/synthetic_turf/crumb-rubber_infilled/docs/fact_sheet.pdf.
[40] Gangl K., Niederberger V., and Valenta R., 2013, Multiple grass mixes as opposed to single grasses for allergen immunotherapy in allergic rhinitis, Clin Exp Allergy, Available at https://pmc.ncbi.nlm.nih.gov/articles/PMC6624134/pdf/EMS83545.pdf.
[41] University of Georgia, 2022, Turfgrass Diseases: Quick Reference Guide, Available at https://secure.caes.uga.edu/extension/publications/files/pdf/C%20891_7.PDF.
[42] Valeriani, 2019, Artificial-turf surfaces for sport and recreational activities: microbiota analysis and 16S sequencing signature of synthetic vs natural soccer fields, Available at https://pmc.ncbi.nlm.nih.gov/articles/PMC6728760/pdf/main.pdf.

based on the assessment method and available data.[43]

However, artificial turf fields consist of other materials besides crumb rubber that can release other pollutants as discussed in the sections above. A report prepared by the New Jersey Institute of Technology concluded that existing studies have focused exclusively on a single component, crumb rubber infill, neglecting the complexity of the mixture caused by simultaneous exposure to all components and that more studies are needed to assess potential health impacts of artificial turf on athletes and communities.[44] It should be noted that athletes and communities are also exposed to toxic chemicals with natural grass surfaces from fertilizers, pesticides, and lawnmower exhaust. Pesticides can be ingested, inhaled, or absorbed via the skin. Assessing the cumulative impacts of numerous exposure routes and determining their proportional contributions to overall exposure can be difficult, leading to uncertainty in understanding the full impact. Pesticides have adverse impacts on the environment and human health.[45] The City is required to be consistent with the Department of Pesticide Regulation with regard to pesticide use. Pesticide use at City parks is consistent with the City's Integrated Pest Management (IPM) program.[46]

With regard to personal injuries there are many documented studies regarding injury rates on artificial turf and natural grass, particularly at the professional and collegiate levels. The studies provide mixed results on which playing surface results in more injuries. In a study performed by Translation Sports Medicine, a comparison of the incidence of in-game, season-ending lower extremity injuries on natural and artificial playing surfaces in the National Football League (NFL) was conducted during the 2020, 2021, and 2022 seasons. For this study, publicly available data was used to determine and classify the specific injury, where the injury occurred, field surface type, and duration of recovery. The study concluded that natural grass saw an injury rate of 0.199 per game, and artificial turf saw 0.242 injuries per game. The study determined that there is no significant difference in rates of season-ending lower-extremity injury between artificial and natural turf. Any perceived difference in injury rates could possibly be attributed to the increased amount of play on artificial surfaces and anecdotal evidence related to high profile cases. Translation Sports Medicine concluded that while there is no significant difference in incidence, surfaces should continue to be monitored and regulated for traits such as hardness, and player preferences should be considered for qualities that are not quantifiable.[47]

Conversely, a study published in the American Journal of Sports Medicine, on National Collegiate Athletic Association (NCAA) football players, concluded that artificial turf is an important risk factor for specific knee ligament injuries in NCAA football. Injury rates for PCL tears were significantly increased during competitions played on artificial turf as compared with natural grass. Lower NCAA divisions (II and III) also showed higher rates of ACL injuries during competitions on artificial turf versus natural grass.[48]

[43] Pesticide and Environmental Toxicology Branch, Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, Synthetic Turf Study: Assessment of Health Risks from Exposure to Chemicals in Crumb Rubber Infill, Final Report, March 2026. https://oehha.ca.gov/sites/default/files/media/2026-03/oehhaturffinal.pdf
[44] Murphy, Maire, Warner, Genoa R., New Jersey Institute of Technology, Newark, NJ, USA, Health impacts of artificial turf: Toxicity studies, challenges, and future directions, https://www.sciencedirect.com/science/article/abs/pii/S0269749122010557?via%3Dihub
[45] MD, Faruque Ahmad, et al, Pesticides impacts on human health and the environment with their mechanisms of action and possible countermeasures, https://pmc.ncbi.nlm.nih.gov/articles/PMC11016626/
[46] Stark, Jim, Superintendent of Parks, Personal Communication, January 26, 2026.
[47] McCormick, William F, et al, Field Surface Type and Season-Ending Lower Extremity Injury in NFL Players, Translational Sports Medicine, https://onlinelibrary.wiley.com/doi/10.1155/2024/6832213
[48] Loughran G. J., Vulpis C. T., Murphy J. P. et al., Incidence of Knee Injuries on Artificial Turf versus Natural Grass in National Collegiate Athletic Association American Football: 2004-2005 through 2013-2014 Seasons, The American Journal of Sports Medicine. (2019) 47, no. 6, 1294–1301, https://doi.org/10.1177/0363546519833925

City of Sunnyvale Planning Policy Consistency

Zero Waste Strategic Plan

The City adopted a Zero Waste Policy in December of 2009 that lays out the City's goal of reducing disposable waste. The City adopted the Zero Waste Strategic Plan [49] to provide analysis of current waste in the City and recommendations to reduce disposable waste. The use of artificial turf would not support the City's Zero Waste Strategic Plan vision to achieve a 90% diversion from the landfill by the year 2030. As discussed in the *Material Renewability and Lifespan/Lifecycle* section, some synthetic materials may be recyclable however the waste generated from the replacement of artificial turf would go against the City's Zero Waste Strategic Plan.

Climate Action Playbook

The City of Sunnyvale Climate Action Playbook [50] outlines steps for the City to take to move towards carbon neutrality. Artificial turf would have more greenhouse gas emissions, waste disposal, and heat generation than natural grass. Natural grass would support the City's overall goal of carbon neutrality as natural grasses sequester greenhouse gas emissions and produces oxygen. However, natural grass would go against the playbook's water reduction strategy.

General Plan

See **Table 2: General Plan Policy Consistency Analysis** for artificial turf and natural grass consistency with the General Plan. Artificial turf aligns less with the City of Sunnyvale's Climate Action Plan, water runoff and contaminated runoff policies, and waste reduction policies. Natural grass does not align as well with the City's extension of usable recreation facility life policy, pest management and water use reduction policies, and the City's Park Design Guidelines. While the different turfs align better with different general plan policies, both the artificial and natural grass turf would be consistent with General Plan policies and implement measures to reduce impacts.

Other Planning Considerations

Adaptive Reuse of Urban Infrastructure for Athletic Fields

The City is an urbanized area that is mostly built out with limited opportunities for the City to acquire additional undeveloped land for more City Parks. The City may consider adaptive reuse of existing public infrastructure to provide recreational and athletic facilities where natural grass fields are not feasible. In densely developed urban environments, facilities such as building rooftops, structured parking garages, and selected parking areas can offer underutilized surfaces that are capable of supporting multi-use athletic fields when designed to accommodate structural loading, safety, and access requirements.

The use of artificial turf playing surfaces can be a strategy for these adaptive reuse scenarios, particularly where soil depth, irrigation capacity, or long-term maintenance of natural turf is not practicable. An example in the region that demonstrates the feasibility of this approach is the University of California, Berkeley's Underhill Parking Facility and Playing Field. This facility is an example of combining a multi-level parking structure with a roof-level artificial turf athletic field in an urban setting. 51 The rooftop field supports

[49] City of Sunnyvale, 2013, Zero Waste Strategic Plan: A Quantifiable Approach, Available at https://www.sunnyvale.ca.gov/home/showpublisheddocument/2984/637822783379870000 .
[50] https://docaccess.com/docviewer.html?url=https%3A%2F%2Fwww.sunnyvale.ca.gov%2Fhome%2Fshowpublisheddocument%2F1066%2F638606111674670000&url_hash=aaf0e21e9bbbe72008175738441c8a2274da3cad7c1b35be9449abcb0dcfe9bf&domain=sunnyvale.ca.gov&found_on=https%3A%2F%2Fwww.sunnyvale.ca.gov%2Fyour-government%2Fcity-initiatives%2Fsustainability
[51] UC Berkely Underhill Parking Garage. https://www.berkeley.edu/map/underhill-parking-facility-playing-field/

Table 2: General Plan Policy Consistency Analysis

Policies	Artificial Turf Option Consistency	Natural Grass Option Consistency
City of Sunnyvale General Plan *Chapter 3: Land Use and Transportation*		
POLICY LT-9.2: *Follow management and preventive maintenance strategies to extend the usable life of open spaces and recreation facilities, such as planning for and implementing "non-use times" for open space and facilities in order to assure adequate maintenance and regeneration time.*	Artificial turf use is consistent with this policy. Artificial turf would minimize "non-use times" and would have an extended usable life compared to natural grass turf.	Natural grass is consistent with this policy. Natural grass would require implementation of "non-use times" as part of adequate maintenance. This would reduce the usability of the facility when compared to natural grass.
POLICY LT-9.3: *Adopt management, maintenance and development practices that minimize negative impacts to the natural environment, such as supporting and enforcing the integrated pest management system; and landscaping in ways which minimize the need for water.*	Artificial turf use is consistent with this policy. Artificial turf does not require pest management and therefore would not need to enforce integrated pest management systems. Artificial turf does not require irrigation and therefore would minimize water usage on an annual basis compared to natural grass. .	Natural grass is consistent with this policy. The City would follow integrated pest management systems for natural grass. The installation of natural grass would follow irrigation guidelines to minimize water needs as natural grass utilizes more water than artificial turf on an annual basis.
POLICY LT-9.13: *Utilize design and development guidelines for all park types within the city's open space system.*	Artificial turf use is consistent with the City's *Park Design Guidelines*[52] which states "Synthetic turf athletic fields shall be provided in parks with adequate demand for evening and year-round sports activities."	Natural grass is consistent with this policy for City Parks and athletic fields.
City of Sunnyvale General Plan *Chapter 7 Environmental Management*		
POLICY EM-2.1: *Lower overall water demand through the effective use of water conservation programs in the residential, commercial, industrial and landscaping arenas.*	Artificial turf is consistent with this policy because artificial turf requires less water than natural turf[53]. Artificial turf could sustain less water use during periods of drought or City mandated water restrictions.	Natural grass is consistent with water conservation if recycled water is used. However, athletic fields require between one to two inches of water per week during the growing season[54]. Overall water consumption can be reduced by maintenance and replacement of aging irrigation equipment once it has exceeded its useful life. Natural grass would be more likely to experience adverse health conditions during periods of drought or City mandated water restrictions.
POLICY EM-8.2: *Continue to support the identification and development of approaches to stormwater treatment and best management practices to control sources of pollutants through participation in local, regional, statewide and national associations and agencies (e.g. Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVRRP), Bay Area Stormwater Management Agencies Association Stormwater Quality Association, and American Public Works Association and similar organizations).*	Artificial turf use is consistent with this policy. Studies show that artificial turf has a higher volume of runoff compared to natural grass and has the potential to have contaminated runoff from sources in the materials used to manufacture the artificial turf. The City would need to implement water quality Best Management Practices (BMP) consistent with local and regional agencies to contain pollutants from surface water runoff.	Natural grass is consistent with this policy. Natural grass turf would result in a lower volume of surface water runoff and a lower potential for contaminated runoff compared to artificial turf. Potential sources of contamination include fertilizers and pesticides. The City would need to implement water quality Best Management Practices (BMP) recommended by local and regional agencies to contain pollutants from surface water runoff.
POLICY EM-10.1: *Consider the impacts of surface runoff as part of land use and development decisions and implement BMPs to minimize the total volume and rate of runoff of waste quality and quantity (hydro modification) of surface runoff as part of land use and development decisions.*	Artificial turf use is consistent with this policy. Artificial turf has a higher potential for increased volume of surface water runoff compared to natural grass. Implementation of artificial turf fields would require BMPs and water retention features to control and minimize the total volume and rate of runoff from the field.	Natural grass is consistent with this policy. Natural grass turf would result in a lower volume of surface water runoff compared to artificial turf because due to the previous nature of natural grass. runoff and a lower potential for contaminated runoff. Implementation of artificial turf fields would require BMPs and water retention features to control and minimize the total volume and rate of runoff from the field.
POLICY EM-14.1: Reduce *generation of solid waste by providing source reduction programs and promoting reduction behavior.*	Artificial turf use is consistent with this policy. The artificial turf produces more solid waste than natural grass when the whole lifecycle of artificial turf is considered. The City can pursue options for purchasing artificial turf made from recycled products or pursue recycling options for artificial turf after its useful to reduce waste impacts.	Natural grass is consistent with this policy. Natural grass produces less solid waste than artificial turf when the whole life cycle of artificial turf is considered.

[52] City of Sunnyvale, Park Design Guidelines, Available at https://www.sunnyvale.ca.gov/home/showpublisheddocument/4229/638084199958730000 .
[53] Santa Clara Valley Water District, Artificial Turf Water Conservation Fact Sheet, Available at https://suwater.stanford.edu/sites/g/files/sbiybj19876/files/media/file/scvwd_artificialturf.pdf.
[54] Cornell University, 2025, Watering, Available at https://safesportsfields.cals.cornell.edu/routine-care/watering/.

intramural sports, recreational programming, and special events while preserving valuable ground-level space below for other uses. This facility is an example of how rooftop athletic fields can function safely and effectively as a recreational asset when appropriately programmed. In a similar manner, another option would be for the City to encourage a public-private partnership where a private entity constructs and operates an artificial turf field or develops an artificial turf field as an entertainment type of development such as the Skyline Pitch project in Glendale, California. [55]

For the City, similar adaptive reuse strategies could be considered for municipal facilities such as structured parking garages, civic buildings, or large publicly owned parking areas. These concepts may help the City expand access to athletic fields and accommodate growing recreational demand, while acknowledging physical land constraints that limit traditional park development.

Decision Making Framework

The City can apply a decision-making framework to determine when artificial turf fields may be appropriate for City parks, with the overarching objective of maximizing playable hours to meet community demand for sports fields while responsibly managing environmental, operational, and public safety considerations.

Exhibit 1: Decision Making Flow Chart, provides an illustration of a flow chart as an example of the steps that can be taken as part of the decision-making process for determining which playing surface might be best suited to meet the City's needs at any given location. The decision-making process begins by evaluating how a park is used. City Parks that support high-intensity activities, such as organized sports or year-round use, need a playing surface that can support sustained use with short recovery periods. If a park is not used intensively or does not require year-round field availability, natural grass may continue to be appropriate. If intensive or continuous use is required, the City proceeds to evaluate whether natural grass can reasonably meet that demand.

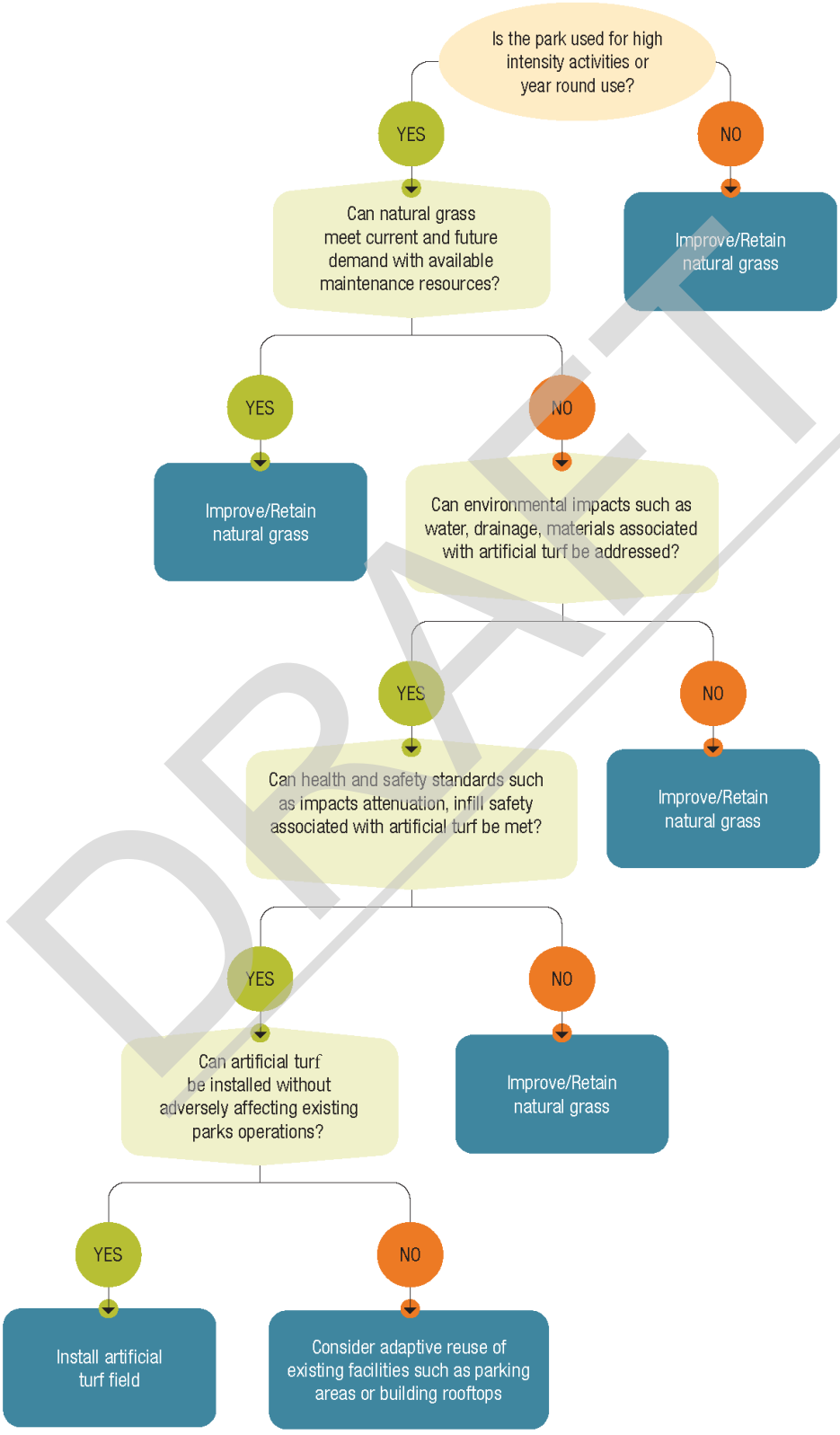
The next step assesses whether natural grass fields can accommodate current and future demand given available maintenance resources, field recovery needs, water supply, irrigation constraints, and drainage performance. If natural grass can be improved or retained through enhanced maintenance practices while meeting demand, or other improvements such as the addition of lighting to allow extended hours of play, the preferred approach is to continue using natural turf. If natural grass cannot support the required level of use without excessive closures or resource impacts, artificial turf might be considered.

Where artificial turf is evaluated, the City reviews whether environmental considerations; including water use, stormwater management, drainage, and containment of microplastic materials associated with artificial turf, can be addressed through design, construction, and operational measures. If these environmental considerations cannot be adequately addressed, natural grass remains the preferred option. If they can be addressed, the evaluation proceeds.

The framework then considers health and safety standards, including impact attenuation, , infill materials, and compliance with applicable safety guidelines Examples of this include minimum height of turf length and infill type and depth to specify cushioning. [56] Artificial turf is only considered further if these standards can be met to ensure safe play conditions for users of all ages.

[55] https://www.skylinepitch.com/la/
[56] Example of these types of standards is the City of Irvine, Artificial Turf Standards: https://codelibrary.amlegal.com/codes/anaheim/latest/anaheim_ca/0-0-0-69871

Exhibit 1: Decision-Making Flow Chart



If health and safety criteria can be satisfied, the City assesses whether artificial turf can be installed without adversely affecting existing park operations, such as shared recreational uses, community access, programming flexibility, or adjacent amenities. When artificial turf can be integrated without disrupting park operations, installation of an artificial turf field may be appropriate.

If on-site installation of artificial turf would adversely affect park operations or is otherwise infeasible, the final decision pathway considers adaptive reuse opportunities. This includes evaluating alternative locations such as existing parking areas, structured parking facilities, or building rooftops that could accommodate artificial turf fields while preserving ground-level park space and minimizing conflicts with other park functions.

By applying this decision-making process, the City engages in process that considers artificial turf options only where impacts can be addressed, and only where a significant increase field playing capacity would result. This structured approach allows the City to balance recreational demand, environmental effects, public health and safety, and efficient use of limited City Parks space.

Regulatory Approaches for Artificial Turf on Private Property

In the San Francisco Bay Area, the City of Millbrae is the primary city that has implemented a ban on new, 100% plastic artificial turf installations, including a requirement to remove existing artificial turf once it begins to show signs of wear. Other jurisdictions such as the County of Santa Clara have considered bans on artificial turf but have not passed any binding regulations.

If the City elects to restrict the installation of artificial turf on private property, the City would need to structure a regulatory approach to balance policy objectives such as environmental protection and public health considerations with fairness and enforceability. Key considerations include whether the restriction is prospective or retroactive, how to treat existing installations, and how compliance would be administered and enforced over time.

Enforcement would most effectively occur through existing permitting and plan review processes, rather than complaint-driven code enforcement alone.

For properties requiring a building permit, grading permit, or discretionary approval, landscape plans could be reviewed at the permitting stage to verify compliance with the prohibition**.** New development, major remodels, or substantial site reconfigurations typically require landscape plan approval, providing a clear opportunity to enforce a prohibition on artificial turf.

However, many residential artificial turf installations occur without a permit, particularly when replacing lawn areas. If the City wishes the prohibition to apply broadly, it would need to decide whether:

- Artificial turf installation itself requires a permit, or
- The prohibition applies regardless of whether a permit is required.

Requiring landscape review only when a permit is triggered (such as a major remodel or addition) provides administrative efficiency but may result in uneven application across the City. Conversely, requiring compliance during all remodels—even those unrelated to landscaping—could be viewed as overly burdensome unless clearly linked to the proposed project.

Another consideration is whether code enforcement officers would be required to cite properties with artificial turf after the ordinance takes effect. Under a proscriptive framework, enforcement would typically focus on new violations, not existing conditions.

Code enforcement could be structured to:

- Respond to complaints regarding new installations after the effective date through the City's current Code Violation reporting process on the City's website.[57]
- Verify compliance where unpermitted work is observed.

Other Regional Artificial Turf Study Approaches

The City of Palo Alto City Council directed staff to replace the existing synthetic turf at El Camino Park with improved synthetic turf using organic infill.[58] The City is advancing a comprehensive Turf Study to evaluate the environmental, operational, and financial considerations related to the future use of synthetic and natural turf fields. The study was designed to inform decisions about product selection and field design for the City's athletic fields, with a particular focus on El Camino Park.

Concurrently, Palo Alto directed City staff to develop and advance a natural grass pilot project to evaluate enhanced maintenance practices, playability, durability, and operational considerations. Staff will return to the City Council at a future date for budget appropriations related to turf replacement and pilot implementation as well as to provide future updates.

Public Outreach

The City conducted different public outreach events as part of this study issue. Public outreach consisted of the following:

- A stakeholder meeting was held on January 27, 2026. This meeting consisted of representatives from various groups involved in the use of public parks. Attendees included representatives from the Parks and Recreation Commission, artificial turf industry, recreational sports organizations, and members of advocacy groups for sustainable practices involving natural grass. The intent of this meeting was to communicate with members of the aforementioned groups that had directly reached out the City on this issue. A total of eight stakeholders attended the meeting. A discussion took place around the groups priorities for Sports Field Playing Time, Environmental Health Factors, Open Space Field Maintenance, and Personal Health Factors. The handout providing the discussion prompts is shown in **Exhibit 1: Stakeholder Group Discussion Handout.** Notes regarding the various priorities discussed at the Stakeholder meeting are provided in **Appendix A**.

- A pop-up outreach event was held at the Sunnyvale Farmers Market, on February 7, 2026. At this event members of the public were primarily asked to identify their priorities for artificial turf and were secondarily asked to identify views on artificial turf if they were willing to engage in further discussion. The survey team spoke to approximately 40 Sunnyvale residents. The statements that were asked of the people who stopped to provide feedback are shown in **Exhibit 2: Farmers Market Outreach Survey Board #1** and **Exhibit 3: Farmers Market Outreach Survey Board #1.** For the people who responded, they were asked to put a sticker next to the statement that best reflects their views. A tally of the responses received from members of the public in response to the statements in Exhibits 2 and 3 are provided in **Appendix B**.

[57] https://sunnyvale.dynamics365portals.us/neighborhood-complaints/
[58] Synthetic Turf and Natural Grass Turf Study at El Camino Park – City of Palo Alto, CA

- A public community meeting was held on February 10, 2026 at City Hall. The meeting was noticed on the City's website and was also promoted at the Stakeholder Meeting and Farmers market event. The meeting was attended by 31 individuals. Attendees discussed the same priorities as the stakeholder group, shown in Exhibit 1. Attendees were also asked to record their responses to Exhibits 2 and 3. Attendees met in small groups and their responses were recorded and tabulated. The responses are provided in **Appendix C**.

- The City conducted a public survey online survey. The survey was promoted through a variety of methods including City Council meetings, social media, City website, and the outreach events listed above. The City received a total of 850 responses. The survey was open from January 29 to March 6, 2026. The majority of the responders, 723 people (90%), live or work in Sunnyvale. A total 789 of the responders (92%) identified that they are users of Sunnyvale parks both recreationally and through sports leagues, A total of 626 people (74%) indicated that they use the City's parks one a week or more. Additionally, 112 people (13%) responded that they currently have artificial turf on their property. Responses to questions 5 and 6 from the survey are summarized below in **Exhibit 4: Question 5 from Online Survey** and **Exhibit 5: Question 6 from Online Survey**. These excerpts from the survey provide a succinct summary of the survey takers positions on the use of artificial turf in the City. The complete results of the survey can be found in **Appendix D**.

With regard to Question 5, when asked whether artificial turf should be generally restricted or used in special use cases., approximately 57 percent of respondents replied that artificial turf should generally be allowed or allowed only for a specific use.

In Question 6 when asked about environmental and health concerns related to artificial turf versus more playing times, approximately 32 percent of respondents stated they would accept environmental concerns of artificial turf in exchange for more playing time, while approximately 37 percent of respondents would accept environmental concern associated with natural grass to avoid artificial turf even with no increase in available playing time, and 17 percent of respondents stated while concerned about both types of surfaces, they would support natural grass field if the City, updates its maintenance methods to increase play time and avoid environmental and health concerns. Approximately 10 percent of the respondents stated that both artificial turf and natural grass have environmental trade-offs that are acceptable given their respective benefits.

A total of 468 respondents or approximately 55 percent of the survey respondents that supported allowing artificial turf (either generally or for specific use cases) also indicated that they or members of their household actively use the City's Parks for sports leagues and/or recreational enjoyment.

When asked if they would replace artificial turf on their private property, approximately 70 percent of respondents indicated that they did not have artificial turf on their property.

Exhibit 1: Stakeholder Group Discussion Handout

Sunnyvale Artificial Turf & Natural Grass Study

Priorities for Sports Field Playing Time:
There are a variety of types of sports fields depending on the type of sports played and location. Priorities could include proximity, play time, field quality, or general availability.
What considerations are most important to you?

Environmental Health Factors:
Using and maintaining open space/sports fields/private use could raise concerns regarding environmental health factors, such as fertilizers, water use, or microplastics.
How would you prioritize environmental health factors?

Open/Space Sports Field Maintenance
Maintenance of open space and/or sports fields will vary depending on the type of field, location, (e.g., proximity to natural features such creeks or canyons), soil types, and surface conditions.
What priorities for field maintenance are most important to you?

Personal Health Factors:
What personal health factors regarding open space/sports fields /private use are important to you regarding surface quality?
Specifically, what investments or improvements should be priorities to maximize personal health will using open space open space/sports fields?

Exhibit 2: Farmers Market Outreach Survey Board #1

Sunnyvale

Priorities For Artificial Turf

Which Statement Best Reflects Your Overall View?	If you have installed artificial turf on your property, what were your reasons for installing?
1. Artificial turf should generally be allowed.	1. Reduced Water Use
2. Artificial turf should only be allowed for specific uses.	2. Lower Maintenance
3. Artificial turf should generally be restricted.	3. Appearance
4. Not sure/Need more information.	4. Durability
	5. Other
	6. Don't have artificial turf on my property/residence

Exhibit 3: Farmers Market Outreach Survey Board #2

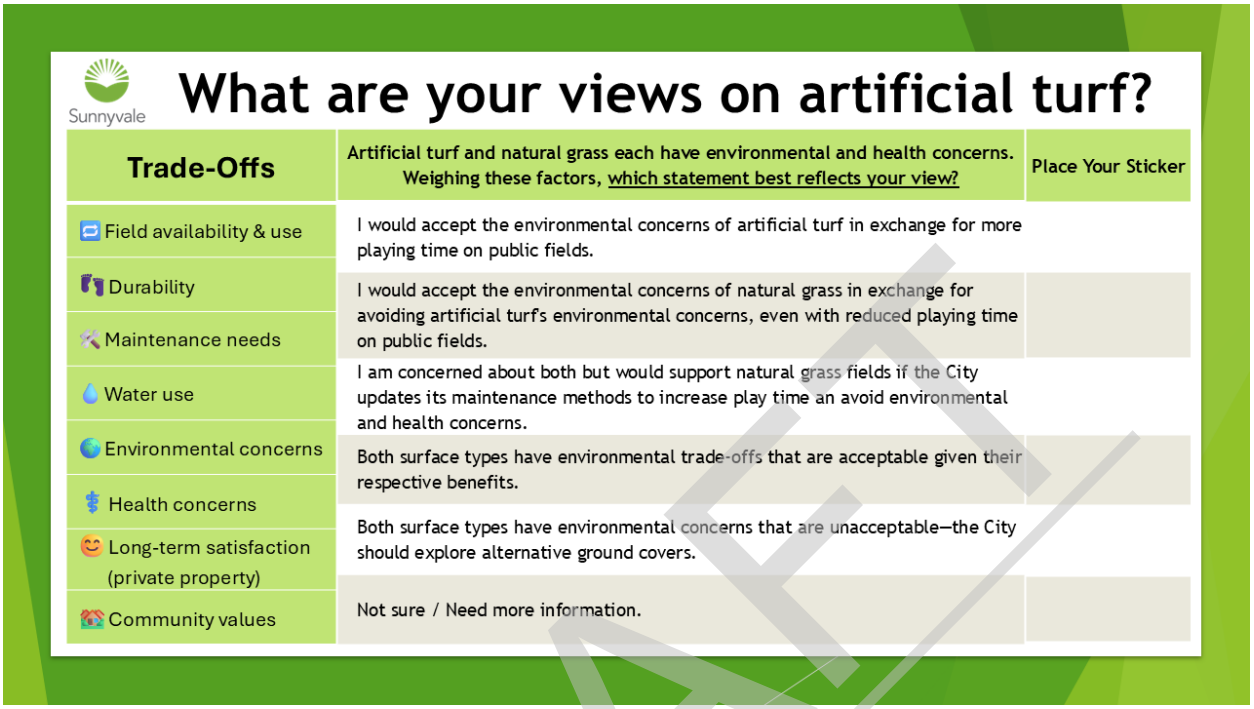


Exhibit 4: Question 5 from Online Survey

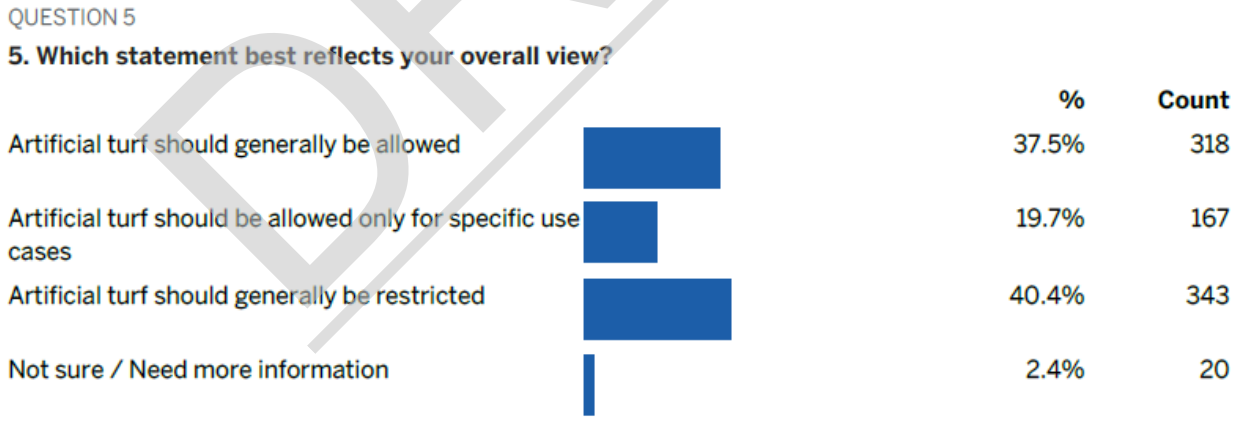
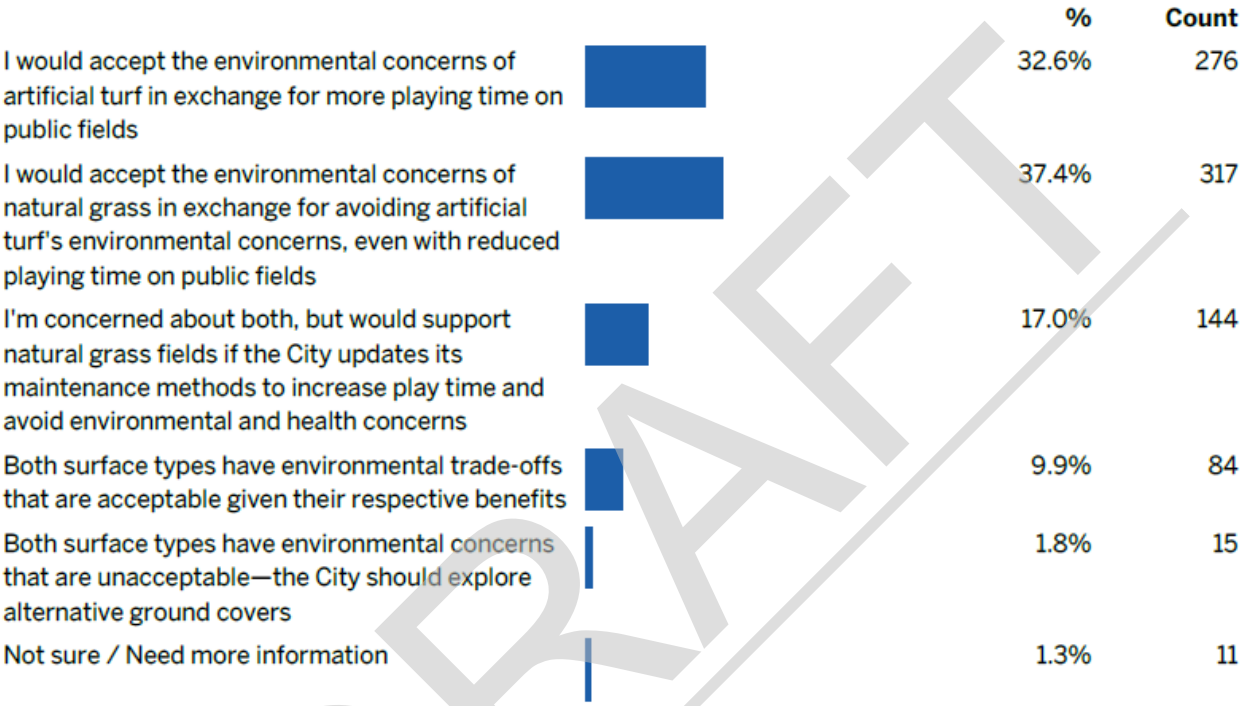


Exhibit 5: Question 6 from Online Survey

QUESTION 6

6. Artificial turf and natural grass each have environmental and health concerns. Artificial turf generally allows more playing time than natural grass on public fields (with current maintenance practices). Weighing these factors, which statement best reflects your view?



	%	Count
I would accept the environmental concerns of artificial turf in exchange for more playing time on public fields	32.6%	276
I would accept the environmental concerns of natural grass in exchange for avoiding artificial turf's environmental concerns, even with reduced playing time on public fields	37.4%	317
I'm concerned about both, but would support natural grass fields if the City updates its maintenance methods to increase play time and avoid environmental and health concerns	17.0%	144
Both surface types have environmental trade-offs that are acceptable given their respective benefits	9.9%	84
Both surface types have environmental concerns that are unacceptable—the City should explore alternative ground covers	1.8%	15
Not sure / Need more information	1.3%	11

Cost Comparison Analysis

A comparison of natural grass and artificial turf highlights important tradeoffs in cost, performance, and long-term management. The purpose of the study was to assess the operational and maintenance costs of the sports field for a 20-year lifecycle for artificial turf versus grass, considering staffing costs, maintenance costs including field striping mowing, fertilization, annual repairs for natural grass, and routine and periodic maintenance costs for synthetic turf.

Natural grass fields offer advantages such as biodegradability, lower initial construction costs, and cooler surface temperatures. However, these benefits are offset by higher ongoing maintenance requirements, sensitivity to weather conditions, and the need for periodic field closures to allow for recovery and turf regeneration.

By contrast, artificial turf fields require higher upfront construction costs but provide more consistent, nearly year-round usability. Artificial turf reduces routine irrigation demands and can better accommodate intensive programming, tournaments, and special events. These operational advantages are offset by environmental considerations, including microplastic generation, heat retention, and the finite lifespan of system components such as fibers, seams, and shock pads, which eventually require replacement and disposal.

Overall, cost comparisons and environmental considerations underscore that neither surface type is universally superior. Natural grass supports ecosystem functions and is often perceived as more environmentally compatible, but it requires sustained investment in labor, water, and maintenance resources to perform at a high level. Artificial turf may offer long-term economic efficiencies through lower annual maintenance costs and increased field availability, but it carries ongoing concerns related to environmental impacts, potential health considerations, and end-of-life material management.

As such, a cost comparative analysis was prepared specific to uses in public parks. A cost comparative analysis was not prepared for private uses as the installation costs will vary on the types of products used and the maintenance costs will vary substantially based on a variety of factors such as size, product type, and use. The cost comparative analysis for the City public parks is based on a field size of 148,500 square feet (approximately 3.4 acres). This field size was chosen because it is enough area for 2 fields of 225' x 330' (74,250 sf each). It is equivalent to two side by soccer fields. This configuration would also allow the fields to accommodate other sports such as lacrosse, field hockey or other sports requiring large field areas. For purposes of comparison, the artificial turf area of Fair Oaks Park in Sunnyvale is approximately 252,000 square feet (5.8 acres).

In **Exhibit 6: Comparison of Natural Grass Field and Artificial Turf Life Cycle Costs (20 Year Cycle)**, the chart compares costs between natural grass and artificial turf over a 20-year cycle, including initial construction and refurbishment costs for both natural and artificial turf fields. It shows average annual maintenance costs (including periodic major refurbishments), lists 20-year total maintenance plus capital costs along with the average annual combined costs, and is based on field-use assumptions of 20 hours per week for 32 weeks per year. Cost per use is calculated by dividing the total 20-year cost by the total permitted hours over the 20-year cycle.

The cost comparison analysis included a case study organic turf management (OTM) for natural grass in Menlo Park, California. The City of Menlo Park sports fields are managed by the Department of Public Works. The case study noted that while organic practices may cost more during the initial transition years, long-term costs decrease as soil biology improves and water and fertilizer uses decline. The case study noted organic natural grass has supported higher levels of use while maintaining field quality and reducing environmental impacts associated with synthetic chemicals. However, organic field management results in additional maintenance staff efforts and additional cost for materials. Organic management practices were not included in Exhibit 6, but Menlo Park cost projections for current operations and maintenance of the City's 13 organically managed sports fields are provided on page 34 of the cost comparison analysis in Appendix E (page 34).

As shown in Exhibit 6, the overall lowest cost per use is associated with artificial turf. Lifecycle cost analysis revealed stark differences among the surface types evaluated. Natural grass fields have the lowest initial construction cost but require ongoing maintenance that escalates with heavy usage. Synthetic turf systems, while significantly more expensive to install, offer far greater reliability and can accommodate substantially more play hours with fewer days when parks needed to be closed for repair or wet weather conditions. The cost comparison in Exhibit 6 shows that installation and maintenance of natural grass is approximately $54,000 less than artificial turf on annual basis when averaged over a 20-year period. However, given the difference in the number of playable hours per year between natural grass and artificial turf, the cost per use of artificial turf drops approximately 68 percent compared to natural grass over the same 20-year period.

Like many municipal capital investments, fiscal considerations often require a series of tradeoffs such as initial capital investment as well as ongoing costs for maintenance and supplies. The total cost has to be reconciled with current needs such as serving the community and supporting community health and safety. As such, cost alone may not be the only or even the most significant factor in decision making. The full cost comparison analysis report can be found in **Appendix E**.

Exhibit 6: Comparison of Natural Grass Field and Artificial Turf Life Cycle Costs (20 Year Cycle)

Natural Grass Field (148,500 SF Turf)		***Artificial Turf Field (148,500 SF Turf)***	
Initial Major Renovation Construction Cost	***$750,000***	**Initial Major Renovation Construction Cost** *Assumes $12/sq.ft. Install, 10% Design, 15% Contingency*	***$2,100,000***
Refurbishing/Rest Cost - 5 times over 20 years *Field refurbishment at year 4, 8, 12, 16 & 20 after initial project*	**$475,000** $95,000	**Refurbishing Cost** *Carpet Replacement (year 12)* *Assumes $6.80/sq.ft and $45K for removal/recycling of infill/turf*	**$975,000**
Average Annual Maintenance Natural Grass *Annual Maintenance Natural Turf every 3 out of 4 years* *Maintenance costs for refurbishment every 4th year*	**$57,360** $75,000 $48,000	**Average Maintenance Artificial Turf over 20 Years** *Annual Maintenance Artificial Turf for 18 years* *No maintenance. 1st year & replacement yr.*	**$30,770** $33,700
20 Year Maintenance Costs *15-Year Maintenance Costs w/natural grass* *Maintenance Costs with Renovation every 4 Years*	**$1,365,000** *$1,125,000* *$240,000*	**20-Year Maintenance Costs**	**$606,600**
20-Year Total Maintenance + Capital *Average Maintenance Cost/Year over 20 Years* *Avg. Annual Cost: Capital +Maintenance*	**$2,590,000** $68,250 **$129,500**	**20-Year Total Maintenance + Capital** *Average Maintenance Cost/Year over 20 Years* *Avg. Annual Cost: Capital + Maintenance*	**$3,681,600** *$30,330* **$184,080**
Natural Grass Field Use		**Artificial Turf Field Use**	
32 weeks @ 2 hours per day on weekdays and 5 hours per day on weekends less 15% rain dates		40 weeks @ 6 hours per day on weekdays and 10 hours per day on weekends	
Hours per Week	20	Hours per Week	50
Weeks of Use per Year	32	Weeks of Use per Year	40
Average Available Play Hours per Year	640	Average Available Play Hours per Year	2000
Hours per Year minus 15% for Rain	544		
Hours per Year * 20 years	10,880	Hours per Year * 20 years	40,000
Refurbish/rest field every 4 years or 5 times in 20 yrs. Close fields for 20 of 32 playable weeks each time. (20 weeks*20 hours*5 rest periods)	2000	Refurbish field at 12 years. Close for 20 of 40 playable weeks. (20 weeks * 50 hours)	1000
Total Hours Permitted Use in 20-Year Cycle	8,880	Total Hours Permitted Use in 20-Year Cycle	39,000
Cost per Use *(Total Maintenance. + Capital)/(Total Permitted Hours in 20-Year Cycle)*	**$292**	**Cost per Use** *(Total Maintenance. + Capital)/(Total Permitted Hours in 20-Year Cycle)*	**$94**

Conclusion

In reviewing the available literature and City uses, it is clear that no single field surface type is without tradeoffs. With respect to public health, the body of research includes scientific studies that have concluded that artificial turf fields do not pose a health hazard under typical use conditions, as well as studies that identify potential environmental concerns related to specific artificial turf pollutants (e.g., PFAS and microplastics) that are present in the materials used to manufacture artificial turf. Science is still evolving on potential adverse human health effects from these secondary exposure pathways. This mixed and evolving evidence base suggests that the City's policy making decisions should be grounded in the best available science while recognizing remaining uncertainties and the likelihood of continued product changes, additional research, and potential regulatory shifts.

From a lifecycle and operations standpoint, natural grass fields can perform well when supported by sustainable turf management practices (e.g., soil health–focused programs, efficient irrigation, and integrated pest management). However, achieving consistently higher quality and higher playing capacity would likely require changes to City maintenance practices and require additional resources, equipment, staffing, training; each of which have cost implications. By comparison, artificial turf fields generally involve higher initial construction costs, but lower annual maintenance costs and fewer weather- and recovery-related closures. Natural grass typically has lower initial construction costs, but higher annual maintenance costs and periodic closures to protect field conditions and allow regeneration.

A key practical distinction is playing capacity: artificial turf fields can typically accommodate substantially more hours of programmed use than natural grass without comparable loss of surface consistency (i.e., an even or smooth playing surface), which can translate into more available play time and greater scheduling flexibility across seasons. Ultimately, whether the City uses or allows artificial turf in City parks and private property will reflect a desire to balance a wide variety of factors—including a commitment to sustainable practices and environmental stewardship, and near- and long-term budgetary considerations.

Recommendations

Based on a review of athletic field demand, park system conditions, and community values in the City of Sunnyvale, it is recommended that the City continue to pursue a balanced and context-sensitive approach to the use of artificial turf within City parks. This approach should increase access to athletic facilities where demand exceeds available capacity, while preserving natural grass parks and minimizing potential environmental and public health impacts.

1. The City should formally adopt a surface policy that supports the continued use of both natural grass and artificial turf within the Sunnyvale parks system. Natural grass should remain the preferred surface for City Parks that serve a broad range of recreational and environmental functions. Artificial turf should be treated as a specialized surface, considered only where its functional benefits are clearly demonstrated.

2. At the same time, the City should preserve and protect natural grass areas in City Parks as essential green infrastructure. These spaces provide environmental benefits, urban cooling, visual relief, and opportunities for chemical-free recreation that are highly valued by Sunnyvale residents. Natural grass parks should continue to be managed using best practices that minimize fertilizers, herbicides, and pesticides while maintaining safe and usable conditions.

3. The City should consider piloting organic turf management (OTM) projects. An OTM pilot program could focus on a limited, clearly defined area within an existing City park, rather than at a high demand athletic field. To ensure clear evaluation, the pilot area should be limited in size, paired with defined performance metrics, and compared to a conventionally managed turf area within the same park or park system. Results from the pilot could then inform whether organic turf

management practices are feasible for broader application in City Parks. Pilot projects allow the City to evaluate performance, maintenance needs, and community acceptance under local conditions.

4. Artificial turf installations should be prioritized for sports fields at city Parks with sustained, high levels of programmed use that cannot be reliably supported by natural grass alone. This includes multi-use rectangular fields, tournament-level facilities, and sites with limited opportunities for field rotation or rest. The purpose of these installations should be to increase total playable hours, reduce field closures, and improve scheduling reliability across the City's athletic programs.

5. The City should consider the use of artificial turf in adaptive reuse locations where natural grass fields are not feasible. Opportunities may include parking structures, rooftops, existing paved or compacted areas, or other underutilized hardscape sites. The adaptive reuse of non-traditional locations can expand playing capacity without reducing existing green space or altering the character of established parks.

6. Where artificial turf is proposed on City-owned property, the City should require compliance with clearly defined health, environmental, and performance standards to be outlined in City's Park Design Guidelines as well as any manufacturer specifications. These standards should be updated, as needed, to reflect current standards related to artificial turf that address material composition, heat mitigation, stormwater management, and end-of-life disposal or recycling, and should be periodically updated as regulatory guidance and product standards evolve.

7. Prior to converting any natural grass field to artificial turf or replacing an artificial turf field, the City should require a lifecycle evaluation that compares long-term costs, maintenance requirements, water use, and environmental considerations for both surface types. This analysis should inform decision-making and provide transparency to the City Council and the public. For City initiated projects and projects that require discretionary approval from the City, specific performance standards for recyclable materials and waste reduction measures should be included in bid documents or as conditions of approval to ensure City goals or policies are being implemented with regards to the use or artificial turf fields.

8. In addition, the City should consider establishing a regulatory framework for the installation of artificial turf on private residential and commercial property. Any such framework should recognize that regional water district policies do not currently identify artificial turf as a preferred or credited water-saving measure, and that the water conservation benefits of turf may be context-dependent. Regulations could focus on drought-resistant landscaping performance standards, preferred plant species, permeability, and stormwater management rather than promoting artificial turf as a conservation substitute for living landscapes. Regulations could be enforced through building permit review or code enforcement.

9. In developing regulations for private property, the City should also acknowledge the practical challenges associated with enforcement. Artificial turf installations on private property are often difficult to monitor over time, particularly with respect to material replacement, infill management, and drainage performance. Clear, objective standards that can be verified at the time of installation, such as through permitting or plan review, are likely to be more effective than ongoing compliance monitoring. The City may also wish to coordinate with local water districts to ensure consistency between land use regulations and water conservation messaging.

10. Finally, the City should commit to ongoing community engagement and transparency related to artificial turf policies on both public and private property. Regular reporting on turf installations, natural grass preservation, field usage, and unmet demand will help maintain public trust and allow policies to evolve as conditions, technology, and community priorities change.

Appendix A

Priorities Discussed at Stakeholder Meeting

A stakeholder meeting was held on January 27, 2026. This meeting consisted of representatives from various groups involved in the use of public parks. Attendees included representatives from the Parks and Recreation Commission, artificial turf industry, recreational sports organizations, and members of advocacy groups for sustainable practices involving natural grass. A total of eight stakeholders attended the meeting. A discussion took place around the stakeholders' priorities for Sports Field Playing Time, Environmental Health Factors, Open Space/Sports Field Maintenance, and Personal Health Factors. A handout providing the discussion prompts is shown below.

Sunnyvale Artificial Turf & Natural Grass Study

Priorities for Sports Field Playing Time:
There are a variety of types of sports fields depending on the type of sports played and location. Priorities could include proximity, play time, field quality, or general availability.
What considerations are most important to you?

Environmental Health Factors:
Using and maintaining open space/sports fields/private use could raise concerns regarding environmental health factors, such as fertilizers, water use, or microplastics.
How would you prioritize environmental health factors?

Open/Space Sports Field Maintenance
Maintenance of open space and/or sports fields will vary depending on the type of field, location, (e.g., proximity to natural features such creeks or canyons), soil types, and surface conditions.
What priorities for field maintenance are most important to you?

Personal Health Factors:
What personal health factors regarding open space/sports fields /private use are important to you regarding surface quality?
Specifically, what investments or improvements should be priorities to maximize personal health will using open space open space/sports fields?

The following priorities were recorded on large posters during the discussion:

Priorities for Sports Field Playing Time:

- Equality/location (equal access for all City residents)
- Field availability
- Number of fields available for playtime
- Increased lighting for increased hours of play

Environmental Health Factors:

- Concerns regarding microplastics/shedding from artificial turf fields (PFAS)
- UV protection/flammable chemicals
- Water conservation/irrigation requirements
- Capture of pollutants
- Right product, right place (intentional location of sports fields both artificial turf and natural grass)

- Feasibility of recycling/reuse/disposal
- Using latest technology advancements in field construction and/or artificial turf products.

Open Space/Sports Field Maintenance

- Improved field quantity due to improved O+M
- Resting fields for more quality playtime.
- Preparation of substrate (fire surface and the material under the surface) affects performance
- Consistent maintenance
- Improved drainage on fields to reduce days fields are closed.

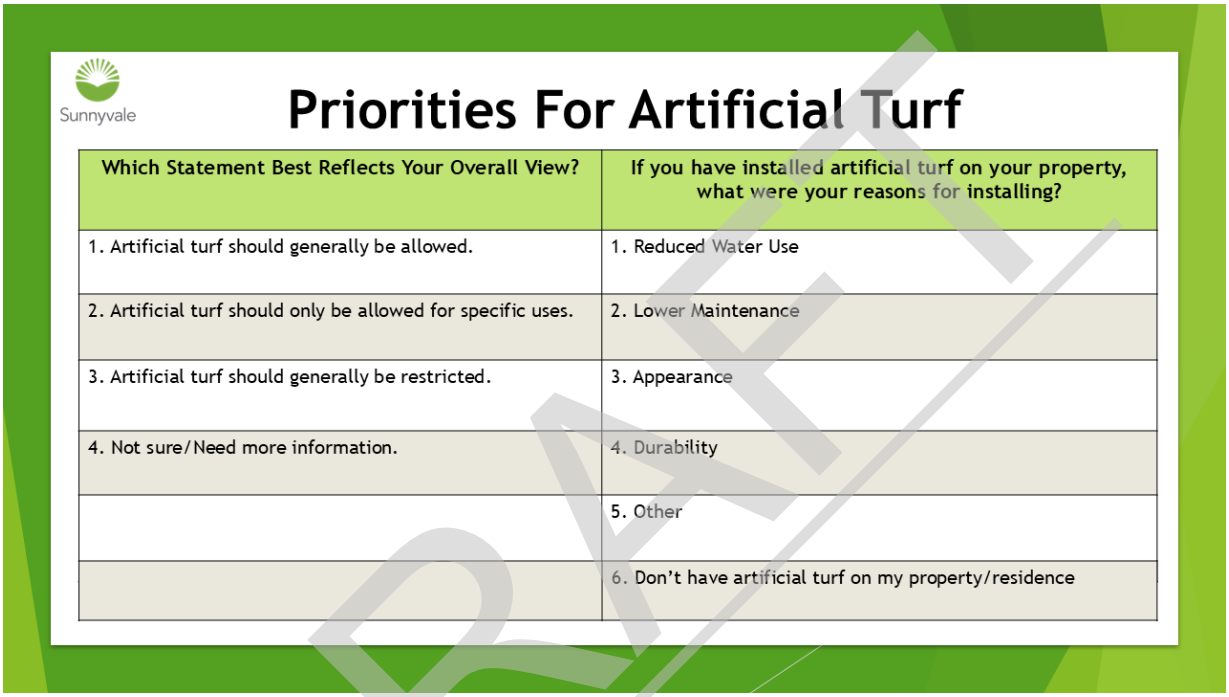
Personal Health:

- Concerns regarding high field temp on artificial turf.
- Concerns regarding injuries/ need for safer conditions (injuries such as ACL tears and other lower body injuries)
- Maximize play time to encouraging outdoor play/activity for youth (improve physical and mental health)
- Clearer policy for restrictions on playing during extreme heat
- Diverse outdoor/sporting activities to reduce burnout (mental health)
- Concerns regarding pesticide exposure for children

Appendix B

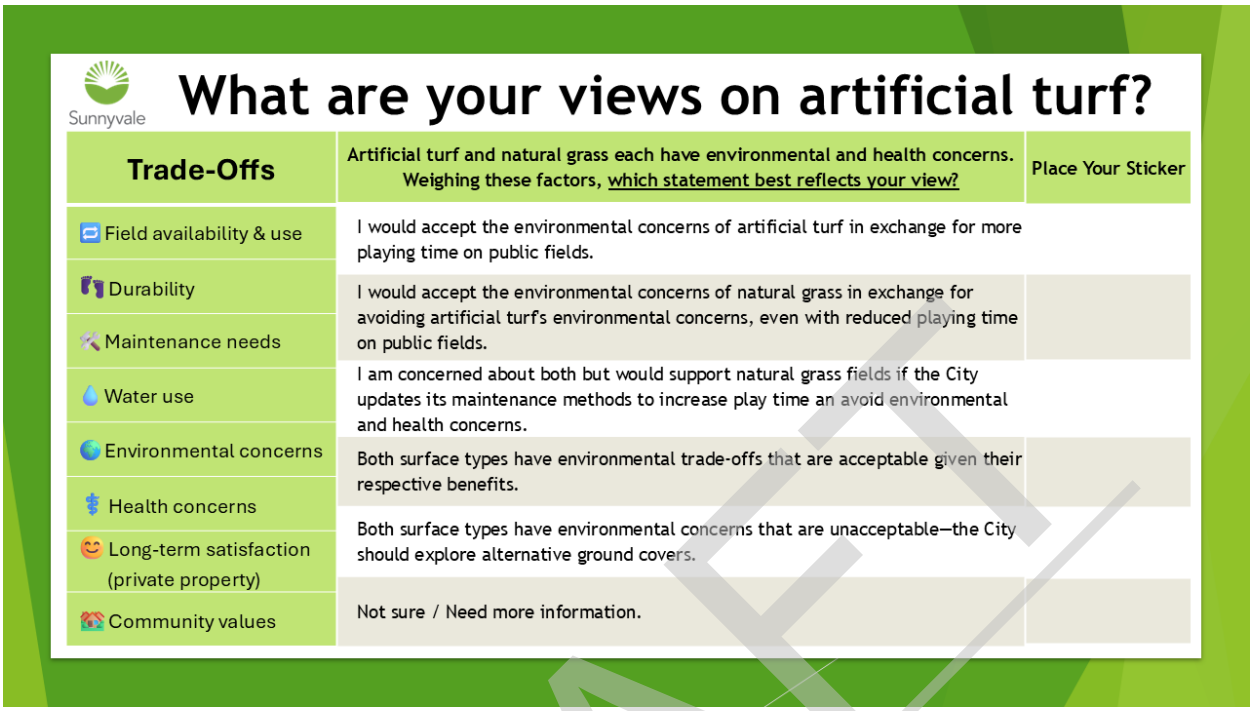
Farmers Market Outreach Reponses

A pop-up outreach event was held at the Sunnyvale Farmers Market, on February 7, 2026. At this event members of the public attending the Farmers Market were asked to provide feedback regarding their priorities for artificial turf and would secondarily be asked to identify views on artificial turf if they were willing to engage in further discussion. For the approximately 40 people who provided feedback, they were asked to respond to statements which best reflected their overall view. For the people who responded, they were asked to put a sticker next to the statement that best reflects their views. A tally of the responses received from members of the public in response to the statements are shown below.



Farmers Market Responses to Statement on Priorities for Artificial Turf

Which Statement Best Reflects Your Overall View?	Number of Responses	If you have installed artificial turf on your property, what were your reasons for installing?	Number of Responses
Artificial turf should generally be allowed.	6	Reduced Water Use	4
Artificial turf should only be allowed for specific uses.	21	Lower Maintenance	5
Artificial turf should generally be restricted.	15	Appearance	1
Not sure/Need more information.	3	Durability	2
Artificial turf should never be allowed (*Write in Response*)	1	Other	0
		Don't have artificial turf on my property/residence	29



Farmers Market Responses to Statements on Views of Artificial Turf

What are your views on Artificial Turf?	Number of Responses
I would accept the environmental concerns of artificial turf in exchange for more playing time on public fields.	1
I would accept the environmental concerns of natural grass in exchange for avoiding artificial turf's environmental concerns, even with reduced playing time on public fields.	0
I am concerned about both but would support natural grass fields if the City updates its maintenance methods to increase play time and avoid environmental and health concerns.	2
Both surface types have environmental trade-offs that are acceptable given their respective benefits.	4
Both surface types have environmental concerns that are unacceptable—the City should explore alternative ground covers.	1
Not sure / Need more information.	3

Appendix C

Community Meeting Outreach Responses

A public community meeting was held on February 10, 2026 at City Hall. The meeting was noticed on the City's website and was also promoted at the Stakeholder Meeting and Farmers market event. The meeting was attended by 31 individuals. Attendees discussed the same priorities as the stakeholder group. Attendees were also asked to record their responses to Exhibits 2 and 3. Attendees met in small groups and rotated around tables to discuss the priorities individually. Their responses were recorded and tabulated. The responses are provided in the following tables. **Please note in the following tables that a comment with a number in parentheses (e.g., (2)) represents a comment that had multiple people agree with the same response.**

Sunnyvale Artificial Turf & Natural Grass Study

Priorities for Sports Field Playing Time: There are a variety of types of sports fields depending on the type of sports played and location. Priorities could include proximity, play time, field quality, or general availability. ***What considerations are most important to you?***	***Environmental Health Factors:*** Using and maintaining open space/sports fields/private use could raise concerns regarding environmental health factors, such as fertilizers, water use, or microplastics. ***How would you prioritize environmental health factors?***
Open/Space Sports Field Maintenance Maintenance of open space and/or sports fields will vary depending on the type of field, location, (e.g., proximity to natural features such creeks or canyons), soil types, and surface conditions. ***What priorities for field maintenance are most important to you?***	***Personal Health Factors:*** What personal health factors regarding open space/sports fields /private use are important to you regarding surface quality? ***Specifically, what investments or improvements should be priorities to maximize personal health will using open space open space/sports fields?***

Community Meeting Responses to Priorities for Sports Field Playing Time:

Natural Grass			Neutral	Artificial Turf		
Pros	**Cons**	**Suggestions/Discussion for Natural Grass**		**Pros**	**Cons**	**Suggestions/Discussion for Art. Turf**
(2) Max play time but not at expense of long-term personal health	Limits sports to a specific season.	**(7)** Better utilize existing parks to maximize playing time on the natural grass	Allow for diversity of sports not just organized sports.	**(2)** Year-Round Playing	Irrigation for artificial turf for cooling and cleaning	**(7)** Maximize cleanliness
Allow for diversity of sports not just organized sports.		Parks closure policy – should be enforced	Regional or multi-city approach to maximize playing time.	Playability of sports fields – uniforms surface		
(8) Maximize general use of space over sports fields.		Prioritize drainage on natural grass to maximize playing time.	**(7)** Prioritize Sunnyvale residents	**(2)** Management of sports playing time – field conditions		
		2) Use modern maintenance methods	Maximize sports playing without extending hours to late at night	Maximize quality playing time – considering water		
			(2) Account for need for kids to play multiple sports	Playability of sports fields – uniform surface		

Community Meeting Responses to Environmental Health Factors:

Natural Grass			Neutral	Artificial Turf		
Pros	**Cons**	**Suggestions/Discussion for Natural Grass**		**Pros**	**Cons**	**Suggestions/Discussion for Artificial Turf**
(4) Supports diverse ecosystems that rely on soil and grass, such as worms, birds, bees, etc.	Natural grass uses herbicide and pesticides	**(2)** City should invest in ways to manage grass without pesticides, such as organic fertilizers	Shedding and chemical run off occurs regardless of natural grass or artificial turf. Clear planning of intended park usage maps a transparent long term maintenance. This is not a PFAS specific issue	Less pesticides and herbicides used for art turf maintenance	**(6)** Increase heat island effect	How much water does turf really save?
With water use mitigation, natural gas can rely less on water consumption	**(2)** mowing lawns requires gas powered machinery	Sports teams should pay to rent open spaces and the collected fees can be used to maintain natural grass. Residents can also reserve the space at a discount.	Regardless of artificial turf or natural grass, the City must commit to a long term maintenance of the open space for recreational use.		**(15)** Plastics from the artificial turf will leach into the environment, including water systems and this is not good for wildlife.	Don't want to rent our turf space, because maintenance is less required and the money just goes into the City funds for other use that will not benefit the neighborhood.
(2) safer for pets and other animals that come across the field to ingest grass than plastic turf	Grass fields need heavy machinery to maintain mowing 3 days a week	Instead of gas lawn mowers, city can invest in electric lawn mowers	Dirty water is used to water the fields		Plastics are unnatural and use petroleum energy to make.	There are new studies of artificial turf that have shown to improve their impacts on heat as well as avoid infill options that are less environmentally friendly. There is new developing turf that is PFAS free.
(3) Natural grass takes carbon from the air and gives back oxygen. Plastic turf cannot offer this trade.		Regulate sports usage on natural grass so it gives the field time to recover	Who is allowed to use our neighborhood parks (i.e. out-of-city groups)? When do residents get to decide how we can use neighborhood parks that would otherwise serve local resident?		**(5)** Once the life span of artificial turf is done, the material cannot be recycled. It will sit in landfill.	What does PFAS free really mean? What are the metrics used to determine when something is PFAS free?
Grass clippings can add nitrogen back to soil. Turf cannot do that.		Use natural fertilizers not synthetic fertilizers	Restrict how often sports leagues can use shared open space.		Water will be needed to clean and cool the artificial turf, so does that really save water from natural grass?	
			Sports leagues create parking problems within neighborhoods that they practice in.		**(2)** After pets or other animals leave waste on fields, the plastic will still harbor bacteria.	
					(3) Creation of turf will contribute to GHG emissions.	
					(5) Because turf is plastic and does not contribute to soil health, this will have a negative impact on surrounding plants in vicinity.	
					(4) Diminishes biodiversity	
					Increase sports at neighborhood parks will intensify parking problems as well as contribute to added noise and pollution	

Community Meeting Responses to Environmental Health Factors:

Natural Grass			Neutral	Artificial Turf		
Pros	**Cons**	**Suggestions/Discussion for Natural Grass**		**Pros**	**Cons**	**Suggestions/Discussion for Artificial Turf**
					(4) Injuries attained during sports or play on the turf can harbor bacteria on plastic and cause infections on those injured on turf.	
					Lead is one of the chemicals found in making turf, in order to make it UV resistant.	
					20-40 tons of plastic is used to produce on field of carpet (uncited claim)	
					GMAX studies would need to be performed regularly to ensure artificial turf readiness and safety for recreational use. How much will this cost the city?	

Community Meeting Responses to Priorities Open Space/Sports Field Maintenance:

Natural Grass			Neutral	Artificial Turf		
Pros	**Cons**	**Suggestions/Discussion for Natural Grass**		**Pros**	**Cons**	**Suggestions/Discussion for Art. Turf**
Balance maintenance cost w/ environmental affect	**(2)** Cost of field maintenance	How often would they mow fields	**(4)** Properly fund maintenance	**(2)** No pesticides	Need to keeping field cool, monitoring temperature	Regular GMAX testing
Cleanliness	The effect of maintenance on environment	Use electric maintenance equipment	Publicize maintenance records (testing)	**(2)** Amount of water use efficient		No gas-powered leave blowers – noise
	(2) The effect of the surrounding area maintenance	Water use – recyclable water	Playability for surface is a priority	**(2)** Maximize the time fields are available for use		**(2)** Follow manufacturers manual for synthetic turf main tenancy
		(2) For grass fields – look at modern methods such as organics (regenerate-treat soil)	Balance maintenance cost w/ environmental affect	Eliminate gopher holes.		**(6)** Longevity – analysis full life cycle
		Develop maintenance plan based on park classification (pocket, community, regional recreation, athletic, passive, active use)		No gas-powered leave blowers – noise		
		Maintain grass fields so they are consistently playable at quality for synthetic turf				
		Follow rotation plan for fields				
		Proper irrigation w/filtered water				
		(3) How do we drain field				
		(2) include effective storm water management (filtering)				

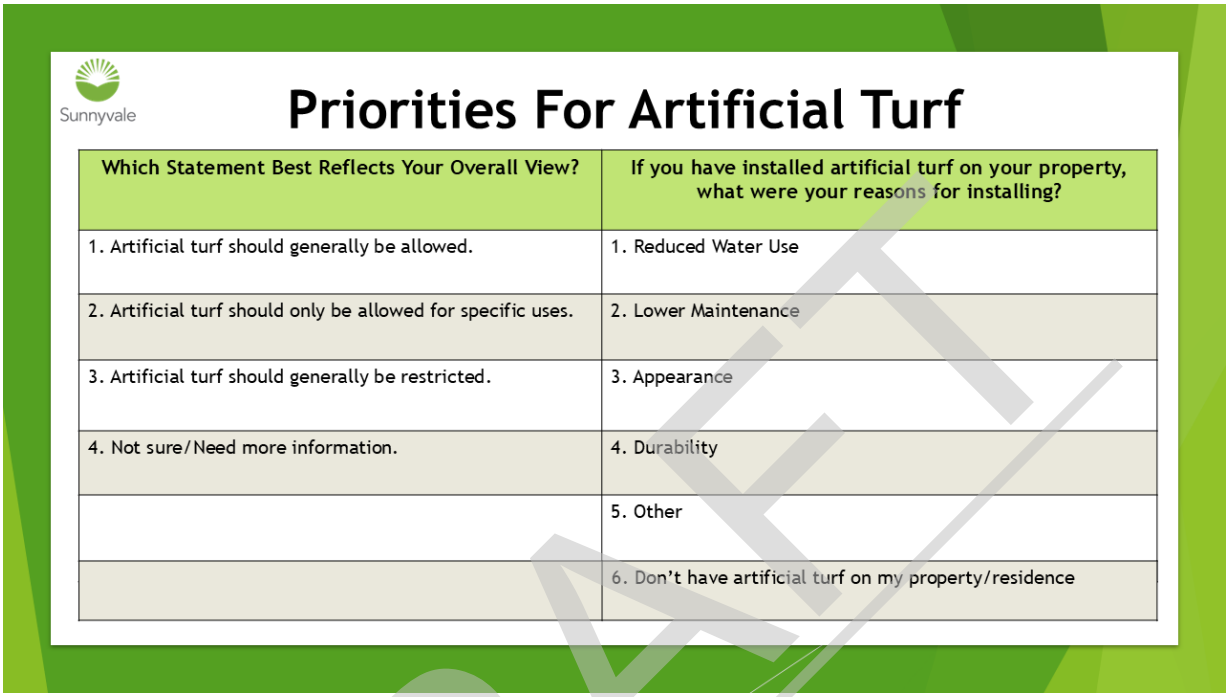
Community Meeting Responses to Personal Health Factors

Natural Grass			Neutral	Artificial Turf		
Pros	**Cons**	**Suggestions/Discussion for Natural Grass**		**Pros**	**Cons**	**Suggestions/Discussion for Artificial Turf**
(2) Improves and provides fresh air.	**(2)** Natural grass fields are closed at least 4 months out of the year, inhibiting play time and usage	City should replace natural grass with better quality which will improve the durability.	Don't replace grass or turf. Just create open space with drought friendly plants.	**(2)** Can use artificial turf mostly all year round and offers more play and sports time/use	**(6)** heat illness from playing on hot surface, as artificial turf collects and emits more heat because it's plastic.	If City proceeds with turf, GMAX testing should be done regularly and results must be posted at the entrance of the open space for users to see (like elevator certifications).
(3) Natural grass has a cooling effect and will encourage outdoor usage during hot days.	Natural grass needs more resources, such as water, fertilizers, etc. to maintain the aesthetic and usability.	There are sports programs that offer scholarships to low income student. Because these programs play on currently natural grass fields in Sunnyvale, these low income students are offered less play time than those who are affluent and are able to afford programs that play on artificial turf- exasperating the wealth and opportunity disparity. Perhaps there is an indoor field that can be created as compromise for those who want natural grass	**(2)** Injuries occur on natural grass and artificial turf. It all depends on the maintenance and what type of turf is used.	Artificial Turf is the only surface that can be used 10 hours a day	**(6)** chemical exposures from turf during injuries or inhalation/consumption is a concern for young children and workers. Children sometimes catch the plastic grass in their shoes and carry them into homes and other spaces.	**(3)** I would like to see artificial turf only in fields designated for sports fields.
(2) Reduces allergies for young children with more exposure.	Less than perfect conditions can cause recreational games scheduled on said fields to be cancelled and this causes a lot of issues for programs.	**(2)** City should consider better investments in construction of natural grass and avoid maintenance strategies that use synthetic inputs (i.e. fertilizers, pesticides, etc.)	Get rid of nonfunctional grass to save water and money. Transition to drought tolerant and native plants.	Offers more competitive field options for organized sports. This also supports programs that offer scholarships or free training to low-income students.	**(5)** artificial turf harbors bacteria; unsafe for young children to play	If we must have plastic turf, please ensure that we provide heat warnings as well as instate heat prevention protocols.
(2) Natural grass is safer for young children to play on, who may eat the grass.	Workers can be exposed to toxins used in natural grass maintenance	City should invest in better grass fields and ensure the infrastructure offers adequate drainage and provides drought tolerance.	How does the city intend to designate open space versus sports fields>	Artificial turf can still be accessed indoors even on rainy days whereas natural grass fields will be closed.	I don't care what people do on their private properties, but for open space natural grass is preferred because I just don't want my toddler to play and put plastic in her mouth.	City should invest in maintaining and improving natural grass fields so that plastics don't have to be considered.
(2) Workers are likely to receive positive effects being out in nature with real grass, which harbors other ecosystems	Pesticide exposure from use on grass field maintenance, especially harmful for children.	I would still love to see natural grass in open space that are not designated for sports.	As a matter of equity for families that don't want their kids to play on the city's 3 plastic fields, the city needs at least 3 highly available REAL GRASS fields where the surface is kept level and free of holes.	Most important health factor is amount of exercise available to people - turf enables outdoor usage.	Turf harbors strange odors	
Natural materials are very important to me and I prefer natural grass to reduce microplastics for community health.	Natural grass fields have sprinklers that people trip on and hurt themselves.	Keep the grass and invest in automated, electric machines for maintenance to reduce GHG emissions.	Which surface promotes fewer injuries on the field during play and use?		**(2)** Don't want plastics in our resources, like water systems and landfill.	

Community Meeting Responses to Personal Health Factors

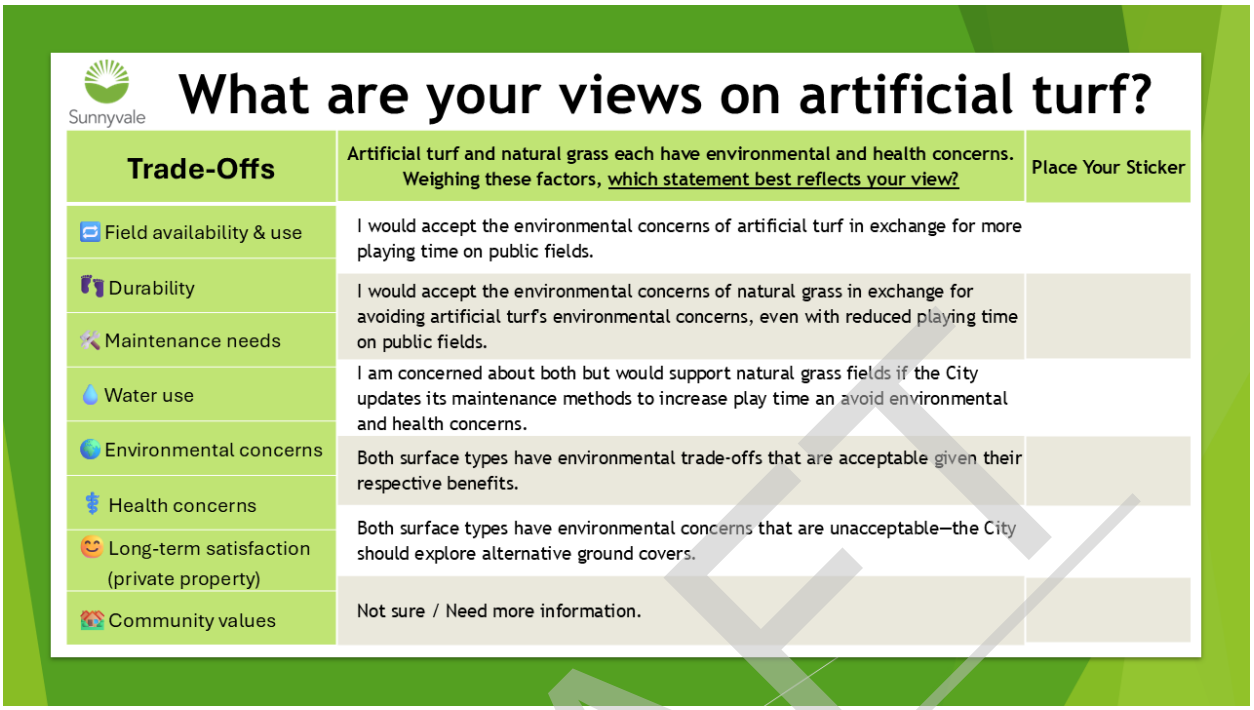
Natural Grass			Neutral	Artificial Turf		
Pros	**Cons**	**Suggestions/Discussion for Natural Grass**		**Pros**	**Cons**	**Suggestions/Discussion for Artificial Turf**
	Muddy fields are inaccessible for wheelchair users.		Kids will underreport injuries to avoid jeopardizing their standing in the team.		**(4)** Concerned about the slickness on plastic from artificial turf which may **increase injuries** for people who use/play on it (i.e. turf burns)	
			Too many fields are dominated by sports. We need more access to open space and improved surface regardless of grass or artificial turf.		GMAX testing is required and this will come out of city funds that could otherwise be used to maintain natural grass.	
			City needs to have policies on first come first serve play time for shared sport/open spaces.		I have concerns for the mental health of children that play on artificial turf. Children are more susceptible to chemicals developed by artificial turf. This can lead to more exposure to carcinogens.	
					Artificial turf at my school, Fairwood, causes a lot of static shocks and hurts kids and staff.	
					As artificial turf ages, the surface loses cushion and becomes uncomfortable to play on.	
					Even if infill for artificial turf has improved, I'm still concerned about the infill off-gassing and sports players inhaling VOCs and particulates.	
					I have concerns about how clean the artificial turf is for play and recreational use if people's pets defecate on it. How is it cleaned?	
					Kids need to play diverse sports. Artificial turf limits types of sports and play that they can participate in.	
					Users can't walk barefoot on artificial turf because it may be dirty or too hot. Being able to walk barefoot outside is a personal impact for many who use open space for respite and recreational.	

Similar to the Farmers Market Outreach event, attendees at the Community meeting were asked to put a sticker next to the statement that best reflects their views. A tally of the responses received from members of the public in response to the statements are shown below.



Community Meeting Responses to Statement on Priorities for Artificial Turf

Which Statement Best Reflects Your Overall View?	Number of Responses	If you have installed artificial turf on your property, what were your reasons for installing?	Number of Responses
Artificial turf should generally be allowed.	4	Reduced Water Use	1
Artificial turf should only be allowed for specific uses.	6	Lower Maintenance	0
Artificial turf should generally be restricted.	19	Appearance	0
Not sure/Need more information.	0	Durability	0
Artificial turf should never be allowed (*Write in Response*)	4	Other	0
		Don't have artificial turf on my property/residence	19



Community Meeting Responses to Statements on Views of Artificial Turf

What are your views on Artificial Turf?	Number of Responses
I would accept the environmental concerns of artificial turf in exchange for more playing time on public fields.	6
I would accept the environmental concerns of natural grass in exchange for avoiding artificial turf's environmental concerns, even with reduced playing time on public fields.	21
I am concerned about both but would support natural grass fields if the City updates its maintenance methods to increase play time and avoid environmental and health concerns.	3
Both surface types have environmental trade-offs that are acceptable given their respective benefits.	0
Both surface types have environmental concerns that are unacceptable—the City should explore alternative ground covers.	0
Not sure / Need more information.	1

Appendix D

Online Survey Results

Sunnyvale

Sunnyvale Artificial Turf Policy Study

March 9, 2026, 10:19 AM

Contents

Sunnyvale Artificial Turf Policy Study
Should we regulate use of artificial turf in Sunnyvale?

Summary Of Responses

As of March 9, 2026, 10:19 AM, this forum had:		Topic Start	Topic End
Attendees:	1175	January 29, 2026, 11:39 AM	March 6, 2026, 11:59 PM
Responses:	850		
Hours of Public Comment:	42.5		

QUESTION 1

1. Do you live or work in Sunnyvale?

	%	Count
I live in Sunnyvale	66.4%	564
I work in Sunnyvale	4.1%	35
I live and work in Sunnyvale	20.8%	177
I own property in Sunnyvale, but do not live or work here	0.6%	5
None of the above	8.1%	69

QUESTION 2

2. How concerned are you about each of the following?

Environmental impacts of artificial turf

	%	Count
Not concerned	25.8%	219
Slightly concerned	13.2%	112
Moderately concerned	13.0%	110

Sunnyvale Artificial Turf Policy Study

Should we regulate use of artificial turf in Sunnyvale?

		%	Count
Very concerned		46.7%	396
Not sure/Unaware		1.3%	11

Health impacts of artificial turf

		%	Count
Not concerned		25.2%	214
Slightly concerned		12.9%	109
Moderately concerned		13.0%	110
Very concerned		46.9%	398
Not sure/Unaware		2.0%	17

Environmental impacts of natural grass

		%	Count
Not concerned		46.6%	395
Slightly concerned		22.4%	190
Moderately concerned		14.2%	120
Very concerned		14.7%	125
Not sure/Unaware		2.1%	18

Health impacts of natural grass

		%	Count
Not concerned		62.9%	533
Slightly concerned		14.4%	122

Sunnyvale Artificial Turf Policy Study
Should we regulate use of artificial turf in Sunnyvale?

		%	Count
Moderately concerned		9.8%	83
Very concerned		10.4%	88
Not sure/Unaware		2.6%	22

QUESTION 3

3. What are your top 2 concerns with artificial turf?

Answered	848
Skipped	2

QUESTION 4

4. What are your top 2 concerns with natural grass?

Answered	848
Skipped	2

QUESTION 5

5. Which statement best reflects your overall view?

		%	Count
Artificial turf should generally be allowed		37.5%	318
Artificial turf should be allowed only for specific use cases		19.7%	167
Artificial turf should generally be restricted		40.4%	343
Not sure / Need more information		2.4%	20

Sunnyvale Artificial Turf Policy Study

Should we regulate use of artificial turf in Sunnyvale?

QUESTION 6

6. Artificial turf and natural grass each have environmental and health concerns. Artificial turf generally allows more playing time than natural grass on public fields (with current maintenance practices). Weighing these factors, which statement best reflects your view?

	%	Count
I would accept the environmental concerns of artificial turf in exchange for more playing time on public fields	32.6%	276
I would accept the environmental concerns of natural grass in exchange for avoiding artificial turf's environmental concerns, even with reduced playing time on public fields	37.4%	317
I'm concerned about both, but would support natural grass fields if the City updates its maintenance methods to increase play time and avoid environmental and health concerns	17.0%	144
Both surface types have environmental trade-offs that are acceptable given their respective benefits	9.9%	84
Both surface types have environmental concerns that are unacceptable—the City should explore alternative ground covers	1.8%	15
Not sure / Need more information	1.3%	11

QUESTION 7

7. Do you or members of your household use the public fields at Sunnyvale's parks?

	%	Count
Yes, for recreation and enjoyment	46.8%	396
Yes, as part of a sports league	8.5%	72
Yes, both a and b	37.8%	320
No	6.9%	58

Sunnyvale Artificial Turf Policy Study
Should we regulate use of artificial turf in Sunnyvale?

QUESTION 8

8. Thinking about times of the year when you are using Sunnyvale's public fields most frequently, how often do you or members of your household use them?

	%	Count
Multiple times per week	58.8%	495
About once per week	15.6%	131
A few times per month	15.2%	128
Rarely	7.2%	61
Never	3.2%	27

QUESTION 9

9. What type of ground cover is on the fields that you or members of your household use?

	%	Count
Artificial turf	9.0%	75
Natural grass	57.1%	476
Both artificial turf and natural grass	30.8%	257
Other	3.1%	26

QUESTION 10

10. Have you experienced barriers to accessing Sunnyvale's public fields?

	%	Count
Cost	3.0%	25
Limited availability	30.2%	250

Sunnyvale Artificial Turf Policy Study
Should we regulate use of artificial turf in Sunnyvale?

	%	Count
Transportation	2.1%	17
Accessibility or disability-related barriers	1.6%	13
Language or information barriers	0.2%	2
No barriers experienced	60.4%	500
Other	13.2%	109

QUESTION 11

11. What type of ground cover do you have on your property?

	%	Count
Natural grass	59.8%	507
Artificial turf	13.0%	110
Low-water/native	38.0%	322
Stone/gravel	22.8%	193
Do not own property	8.7%	74
Other	6.1%	52

QUESTION 12

12. If you do not have artificial turf on your property, what were the reasons for not installing it?

	%	Count
Never considered it	22.3%	181
Costly	13.4%	109

Sunnyvale Artificial Turf Policy Study
Should we regulate use of artificial turf in Sunnyvale?

	%	Count
Appearance	27.7%	225
Environmental concerns	41.5%	337
Health concerns	33.7%	274
N/A	22.3%	181
Other	15.0%	122

QUESTION 13

13. If you have installed artificial turf on your property, what were your reasons for installing?

	%	Count
Reduced water use	16.2%	123
Lower maintenance	16.1%	122
Appearance	10.0%	76
Durability	12.0%	91
N/A	79.8%	606
Other	3.0%	23

QUESTION 14

14. If you could, would you replace artificial turf on your property with another option?

	%	Count
Yes, with natural grass	7.8%	63
Yes, with other living ground cover	7.4%	60

Sunnyvale Artificial Turf Policy Study
Should we regulate use of artificial turf in Sunnyvale?

	%	Count
No, I prefer the artificial turf	13.7%	111
N/A, I do not have artificial turf	71.1%	577

QUESTION 15

15. How did you hear about this survey?

	%	Count
City Council Meeting	3.9%	33
Social Media	17.5%	147
City website or calendar	5.0%	42
Sustainable Sunnyvale newsletter	5.7%	48
Update Sunnyvale newsletter	6.5%	55
The community meeting	3.9%	33
The focus group meeting	1.4%	12
Word of mouth	44.2%	372
Other	23.4%	197

QUESTION 16

16. What zip code do you own property in?

	%	Count
94085	6.3%	53
94086	15.6%	132

Sunnyvale Artificial Turf Policy Study
Should we regulate use of artificial turf in Sunnyvale?

	%	Count
94087	59.4%	501
94089	4.4%	37
N/A	8.3%	70
Other	7.9%	67

QUESTION 17

17. Do you have children under the age of 18 in the household?

	%	Count
Yes	57.1%	480
No	42.9%	361

QUESTION 18

18. What is your age range?

	%	Count
Under 18	9.4%	79
18-34	7.3%	61
35-55	49.2%	411
over 55	34.1%	285

Appendix E

Cost Comparison Analysis

Sunnyvale, California

Artificial Turf Vs Living Ground Cover Study

Information included in this report compiled with assistance from:

The City of Sunnyvale staff and stakeholders
Kimley Horn
CHA Consulting, Inc.

Prepared by:

9020 Stony Point Parkway, Suite 160
Richmond, VA 23235

May 27, 2026

Sunnyvale, California
Artificial Turf Vs Living Ground Cover Study

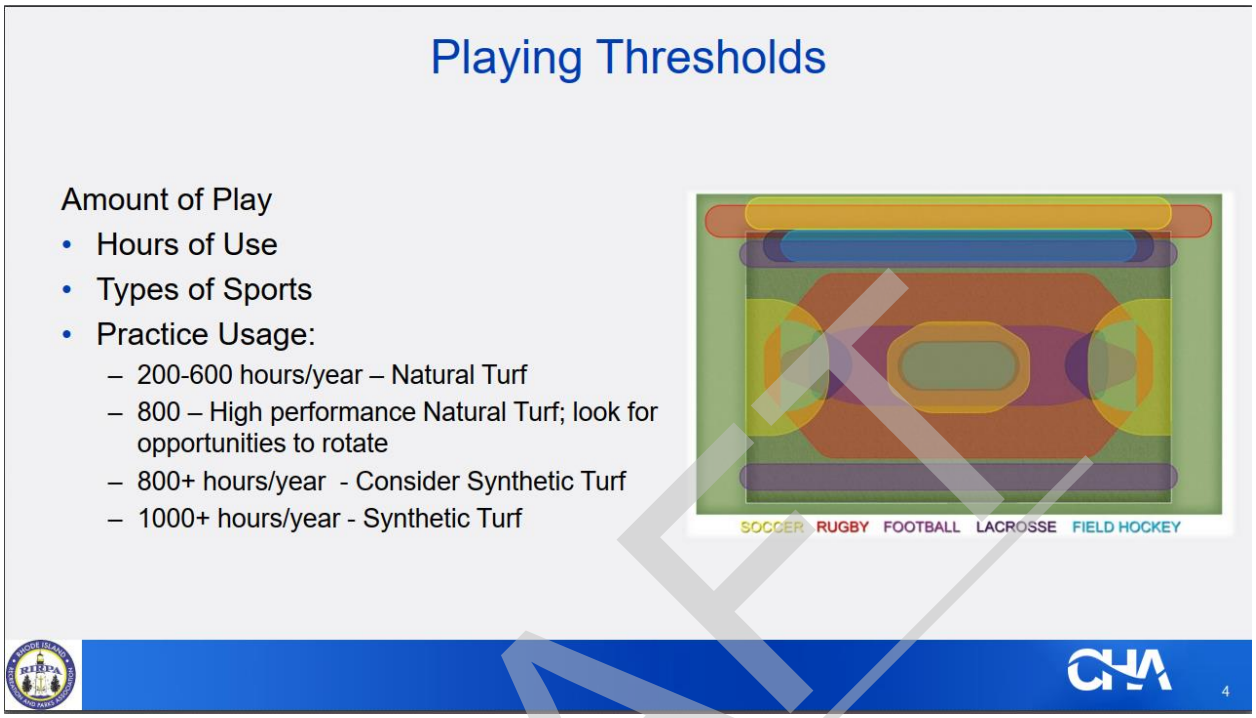
Table of Contents

Executive Summary – Sunnyvale Artificial Turf Vs Living Ground Cover Study

This executive summary synthesizes the key findings from the Sunnyvale Final Report Draft Artificial Turf Vs Living Ground Cover. The analysis compared conventional natural grass, organically managed natural grass, modern synthetic turf systems, and The City of Menlo Park, CA and The City of Sunnyvale, CA athletic field maintenance practices. The study integrates literature review, staff and stakeholder input, on-site observations, research and analysis, and recommendations.

Key Findings at a Glance

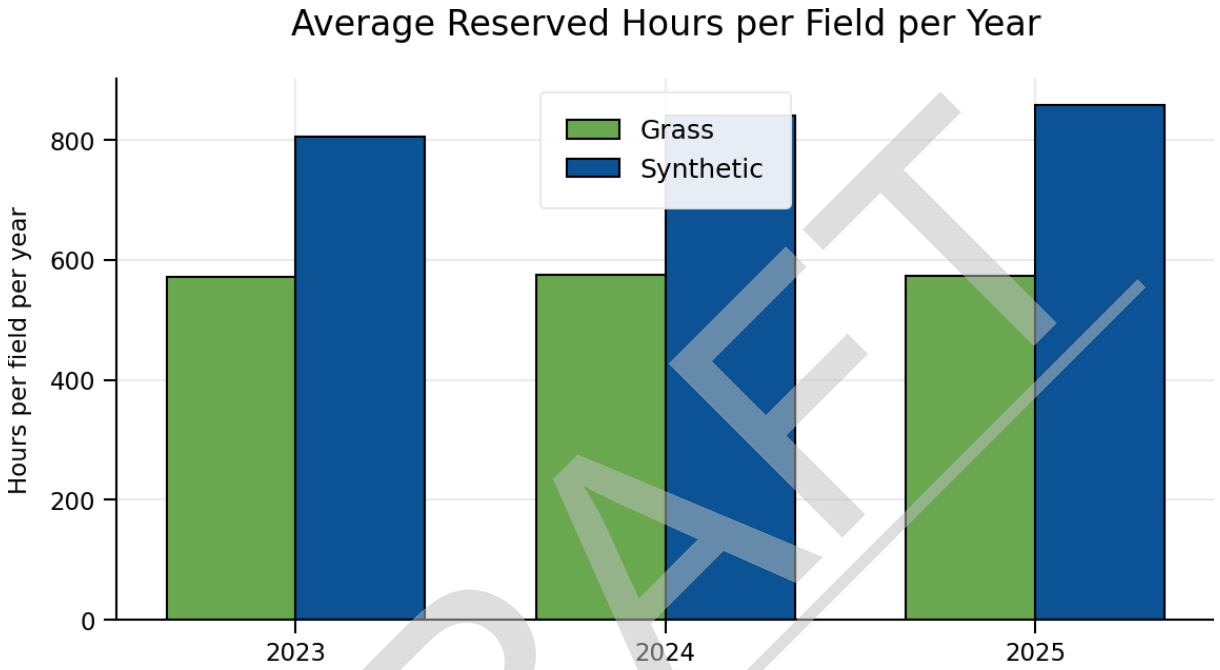
- Natural grass fields currently maintained as park open spaces within Sunnyvale generally rate from poor to good due to uneven surfaces, weed intrusion, bare spots and poor drainage. Heavy dog activity exacerbates damage. The assessment of the current conditions (it should be noted that this was done during the winter rest period and when conditions are likely to be not the best) of the natural grass fields informs future recommendations for Sunnyvale's operation and maintenance of natural grass fields and decisions regarding use/need for synthetic turf fields.
- During a 2026 presentation for the Rhode Island Recreation and Parks Association, titled - Sports Field Turf Management Restoration Techniques and Maintenance Planning for Rehabilitation, Michael S. Moonan, Sr. Landscape Architect, CHA, presented the following playing thresholds. The playing thresholds graphic has been used by the consultant who wrote this report for over a dozen years.



- The FairOaks Park synthetic field remained fully playable during rain and supported simultaneous multi-sport use with minimal visible wear.
- Irrigation problems are a persistent citywide constraint on natural turf quality; diamond infields are refurbished annually, below best-practice grooming frequencies. City staff reported “the main issue is that the irrigation systems are well beyond their useful life and need to be replaced before any significant improvements to the grass fields could be maintained. Most of the system was installed in the 1960’s. Also, there is no plan in place to replace irrigation at our many school sites. Any significant improvements in field conditions would have to address the outdated irrigation systems to begin with”
- Field demand is high. Based on RecTrac data, Sunnyvale Fields are reserved for an average of 704.5 hours per year: synthetic fields averaged approximately 806–859 reserved hours per field per year (2023–2025) versus approximately 572–576 for grass, with additional untracked informal use reported.
- Lifecycle costs show trade-offs: natural grass has lower initial capital but higher lifecycle and annual maintenance costs; synthetic options require higher capital costs but offer lower lifecycle and annual maintenance costs, more consistent playing conditions, more annual hours of usage, and greater year-round reliability.
- Organic turf management programs may cost more during a 3-year transition but can reduce long-term costs as soil biology improves.

Field Usage and Reliability

RecTrac data indicates consistently higher reserved hours on synthetic fields. Notably, informal use on both surface types is not tracked but is reportedly substantial; therefore, reserved hours likely under-represent total utilization. Natural grass field usage is potentially more under reported than synthetic turf due to the number of natural grass fields.



Summary of Research Completed

Environmental, Health, and Policy Context

Regional discussions highlight concerns about synthetic turf related to microplastics, PFAS, heat, and end-of-life disposal, prompting some jurisdictions to explore restrictions. At the same time, the California OEHHA risk assessment of crumb-rubber fields found no significant health risks for typical users under studied conditions. These perspectives should be weighed alongside playability and capacity needs.

Strategic Considerations for Sunnyvale

- Adopt differentiated surface strategies: deploy synthetic turf at sites requiring year-round, high-intensity use; pursue organic natural grass at sites prioritized for sustainability and lower peak user demands.
- Elevate maintenance standards for grass athletic fields (mowing height/frequency, infield grooming, aeration, overseeding) and address irrigation system reliability to improve safety and playability.

- Track informal field usage to better capture community demand and inform lifecycle planning and scheduling policies.
- Incorporate end-of-life recycling and waste-handling requirements into any synthetic turf procurement, with clear testing and maintenance protocols.

Chapter One Introduction - Sunnyvale, CA - Study of Artificial Turf Vs Living Ground Cover (Natural Grass)

CHA was contracted by Kimley Horn to assist The City of Sunnyvale, CA with a Study of Artificial Turf Vs Living Ground Cover (Natural Grass). CHA conducted:

- a review of data and information provided by the City
- completed additional research
- participated in multiple stakeholder discovery sessions
- participated in a public meeting
- development of an online survey and reviewed of the results of the survey
- Conducted staff discovery sessions
- completed onsite observations
- conducted comparative analysis of Artificial Turf Vs Living Ground Cover (Natural Grass).

Research focused on information and best practices for areas similar to Sunnyvale located in the Santa Clara Valley in northwestern Santa Clara County, California and other areas of California.

The following metrics were researched and analyzed:

- Capital Cost & Installation Metrics
- Operations & Maintenance (O&M) Metrics
- Usage & Capacity Metrics
- Cost Efficiency & Lifecycle Value Metrics
- Performance, Playability, & User-Experience Metrics
- Environmental & Sustainability Metrics

Four types of field surfaces were considered for this study:

- Open space athletic fields currently being maintained by Sunnyvale Parks Division
- Synthetic Turf – similar to what is in use at FairOaks Park
- Sustainably managed natural grass fields as recommended by Beyond Pesticides (Beyond Pesticides is a 501(c)3 nonprofit organization the City requested be included as an option for management of natural turf)
- Pivot ®System Synthetic Turf

1. Open space athletic fields currently being maintained by Sunnyvale Parks Division

City Parks Division staff provided irrigation documents, and memorandums outlining fertilization schedules for schools and athletic fields and maintenance procedures used to maintain open space athletic fields. Per review of several memoranda provided by Sunnyvale Parks Division Staff, open spaces and athletic fields have been planted with Trophy XRE. Seed Research by DLF™ indicates Trophy XRE is a turf-type tall fescue blend and is a rich dark green blend of rhizomatous turf-type tall fescues. Rhizomes give plants the ability to spread densely across large areas, binding a lawn together and quickly filling in any damaged or open spots. The high

incidence of rhizomes in Trophy XRE gives faster recovery from injury, superior wear resistance and better ability to recover from stress than other tall fescue blends.
Source - https://us.dlf.com/wholesale/pro-turf/species/tall-fescue/details/catagory/uswturf/mixes-blends/trophy-xre-prod5701

Per discussions with Parks Division staff and onsite observations, the open space fields are mowed with the same frequency and height as the remainder of the parks (approximately once a week or every 10 day) as opposed to typical athletic field maintenance practices (i.e. multiple mows per week cut at a lower height).

2. Synthetic Turf – Similar to what is in use at FairOaks Park

FairOaks Park is a 256,369 sq. ft. synthetic turf field using FieldTurf with a pad provided by PowerBase YSR with a cork infield, installed in 2021 per Brock USA website *https://www.brockusa.com/projects/city-of-sunnyvale-fair-oaks-park/.*

3. Pivot ®System Synthetic Turf – By TenCate

Statement from TenCate's website:
Designed to deliver grass-like athlete performance without performance infill, providing consistent traction and controlled release that support speed, acceleration, cutting, and confident movement under repeated load, in all weather conditions. Designed for continuous use, Pivot® supports 24/7/365 play and is backed by a 12 year system warranty for outdoor installations and a 15 year system warranty for indoor installations. TenCate's Pivot grass pivot is recyclable. It is designed to be recycled through TenCate's Turf Recycling Program, which aims to reduce plastic waste in landfills and promote sustainability. This innovative turf requires no performance infill, making it easier to recycle and contributing to a more sustainable approach to artificial grass. *https://pivot-turf.com/*

4. Sustainably Managed Natural Grass Fields as recommended by Beyond Pesticides

Beyond Pesticides promotes organic, non-toxic, soil-centered management of natural grass fields as an alternative to synthetic pesticides and fertilizers. Their approach emphasizes soil health, cultural practices, and long-term field resilience per beyond pesticides website: *https://mail.beyondpesticides.org/.*

Chapter 2 Literature Review - Sunnyvale, CA - Study Artificial Turf Vs Living Ground Cover (Natural Grass)

The following documents were reviewed during the research portion of this study:

Office of Environmental Health Hazard Assessment (OEHHA) of the California Environmental Protection Agency Final Report of the OEHHA Synthetic Turf Study
https://oehha.ca.gov/risk-assessment/report/release-final-report-synthetic-turf

The report evaluates the health risks to users of artificial turf fields by focusing on noncancer hazard and cancer risk to the chemicals detected in crumb rubber infill used on synthetic turf fields in California. Overall, the risk assessment study found no significant health risks to players, referees, coaches and spectators from on-field or off-field exposure to field-related chemicals in crumb rubber infill from synthetic turf fields. OEHHA reviewed comments received from the public, and the advisory panel and revised the report as appropriate following the April 28, 2025 SAP meeting, with the major conclusions of the study remaining unchanged.

This report by OEHHA evaluated health risks from chemicals in crumb rubber infill on synthetic turf fields. Sampling of 35 fields across California included air monitoring, chemical analyses, and exposure modeling. Key findings: no significant health risks for players, coaches, referees, or spectators; no acute hazards; developmental/reproductive and chronic risks low; cancer risks generally below one in a million except slight elevation for infants under worst-case ingestion assumptions. Non-field ambient pollutants contributed most air-related risks.

Study Background & Purpose

- OEHHA conducted a comprehensive health risk assessment of chemicals in crumb rubber infill used in synthetic turf fields across California, commissioned by CalRecycle.
- The study was initiated due to public concern over potential health effects, especially for children and athletes frequently using these fields.
- A total of 907 fields were identified statewide; 35 were selected for detailed sampling based on climate region and field age.

Key Findings of Office of Environmental Health Hazard Assessment (OEHHA) of the California Environmental Protection Agency Final Report of the OEHHA Synthetic Turf Study:

- OEHHA evaluated potential health risks from chemicals in crumb rubber infill on synthetic turf fields.
- 35 fields across California were sampled, including air monitoring and chemical analyses.
- No significant health risks were identified for players, coaches, referees, or spectators from chemicals in crumb rubber when using synthetic turf fields.
- No acute health hazards were found from exposure to synthetic turf chemicals.
- Developmental, reproductive, and chronic health risks were determined to be low.

- Cancer risks were generally below one in a million except for slight elevations in infants under worst-case ingestion scenarios.
- Most air-related risks came from non-field ambient pollutants rather than turf-related chemicals.
- Slight increases in non-cancer or cancer metrics occurred only under highly conservative, worst-case assumptions and are considered low concern.
- Ambient environmental pollutants—not synthetic turf—were the dominant contributors to air-related risks.
- Study limitations include focus only on crumb rubber infill (not turf blades/backing), no ecological analysis, and small percentage of total fields sampled (~4%).

Methods & Field Sampling

- 35 synthetic turf fields sampled across 5 major climate regions, representing diverse temperatures, humidity, and environmental conditions.
- Air monitoring included VOCs, SVOCs, carbonyls, and particulates (PM2.5) under both active (soccer play) and inactive conditions.
- Crumb rubber samples were collected at 6–10 locations per field and analyzed for organic chemicals, metals, and metalloids.
- Bioaccessibility testing used artificial sweat and gastrointestinal fluids to mimic dermal and ingestion pathways.
- Three Time-Activity Studies (TAS) captured real-world athlete behavior via surveys, video analysis, and prior study data to accurately model exposure.

Chemical Findings

- 119 organic chemicals detected in ambient air on fields; 75 detected in artificial sweat extracts; 76 in GI extracts.
- 35 metals/metalloids were assessed; most frequently detected included zinc, aluminum, calcium, and iron.
- PAHs, phthalates, benzothiazoles, and various nitrogen-, oxygen-, and sulfur-containing compounds were identified in crumb rubber.
- Most chemicals were detected at low concentrations, with bioaccessible fractions generally below 10%.

Exposure Assessment

- Exposure pathways analyzed included inhalation, dermal contact, and incidental ingestion.
- Athletes—especially goalkeepers—had the highest potential exposure due to elevated breathing rates and frequent skin contact.
- Infants and toddlers (spectators 0–2 years old) represented a unique ingestion risk group due to hand-to-mouth behaviors.
- Exposure modeling incorporated event frequency, time on field, breathing rates, dermal load, and ingestion rates derived from TAS data.

Risk Findings – Non-Cancer

- Acute inhalation hazard indices (HI) for all chemicals were well below the threshold of concern (HI < 1).
- Developmental and reproductive toxicity (DART) risks were low overall; slight exceedances for athletes aged 11–70 were driven by conservative assumptions and PAH values.
- Chronic non-cancer hazards were below concern for all groups except a slight elevation (HI ≈ 1.1) for infants (0–2 yrs), driven by assumed high ingestion of crumb rubber (worst-case scenario).

Risk Findings – Cancer

- Cancer risks from field-related chemicals were generally below 1 in a million for all groups.
- Infants (0–2 yrs) had slightly elevated lifetime cancer risk (up to 2.7 in a million) under worst-case ingestion assumptions.
- Non-field ambient pollutants—especially benzene, formaldehyde, and hexanal—were responsible for over 90% of total cancer risk in most scenarios.

Documents provided by the City:

Sonoma County Athletic Field Turf Workshop PowerPoint Presentation

Key Points

- The region maintains 23 athletic fields: 19 natural grass and 4 artificial turf, with 3 more planned. Field development considerations include:

- community need
- equity
- environmental compliance,
- turf selection
- drainage
- safety
- maintenance capacity
- cost
- partnerships.

Grant programs support recreation and equity through athletic field funding. Please see the following charts benefits and drawbacks of natural grass and artificial turf:

Natural Grass Turf Fields

Benefits

- Biodegradable & compostable
- Somewhat lower initial construction costs
- Stays cooler
- Potential for irrigation with recycled water
- Preserves soil ecosystem
- Higher shock absorption

Drawbacks

- Higher ongoing maintenance costs
- Uneven surfaces / gophers
- Wet season closures
- Pesticides and fertilizers
- Frequent field line marking
- Water Use / Drought restrictions
- Overuse in high wear areas

Artificial Turf Fields

Benefits

- Nearly year-round play
- Less water use
- Level playing surface
- Lined during installation
- Equity impacts – extended hours and season
- Larger scale tournament hosting

Drawbacks

- High volume of plastic and/or rubber materials used in construction
- High heat absorption
- 10-year fiber lifespan
- 25-year shock pad / drainage lifespan
- Off-gassing of toxic chemicals
- Breakdown of materials releasing microplastics
- Lack of recycling infrastructure
- Expensive and large volumes of materials to remove and remediate soil ecosystem

A model ordinance by Zero Waste Sonoma is being explored to ban or restrict artificial turf due to environmental concerns.

Zero Waste Sonoma Model Ordinance Discussion

Key Points - The AB 939 (California Integrated Waste Management Act of 1989) Local Task Force (LTF) formed an Ad Hoc Committee in December 2024 to evaluate environmental, health, financial, and lifecycle impacts of artificial turf compared to natural grass. Findings show artificial turf poses major waste management challenges, producing 200–250 tons of nonrecyclable waste every 8–10 years, with no large-scale recycling infrastructure. Environmental risks include microplastics, PFAS, heat island effects, and toxic chemical exposure. Public health risks disproportionately affect vulnerable communities, with increased heat exposure, chemical contamination, and injury risks. Financial impacts include high installation, replacement, and disposal costs, while natural grass has lower upfront costs but higher ongoing maintenance. Multiple jurisdictions in California and the U.S. are pursuing bans or moratoria on artificial turf. The LTF recommends developing a regional model ordinance aligned with SB 676
(legislative bill that modifies the California Environmental Quality Act (CEQA)) to restrict artificial turf, require lifecycle cost analyses, ensure responsible disposal, and standardize policy across Sonoma County. The draft ordinance process will include research, stakeholder outreach, drafting, review, and adoption phases through 2026–2027. The following graphics were included in this report.

Findings: Environmental Impacts

	Natural Grass	Artificial Turf
Pros	• **Can be irrigated with recycled water** • **Pesticides & fertilizers often used** • Cools naturally • Sequesters carbon and releases oxygen • Protects watershed and preserves soil ecosystem	• **Generally less water use** • **Pesticides and fertilizers often not required**
Cons	• **Generally more water use** • **Greenhouse gas emissions - mowers**	• **Lack of recycling infrastructure and data** • **Greenhouse gas emissions - materials derive from fossil fuels** • **Off-gassing of toxic chemicals and microplastics exposes humans, wildlife, and water to hazards** • **Heavier load on water treatment processes** • **Requires only potable water use** • Heat island effect

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Findings: Environmental Impacts

	Natural Grass	Artificial Turf
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Cons	• **Generally more water use** • **Greenhouse gas emissions - mowers**	• **Lack of recycling infrastructure and data** • **Greenhouse gas emissions – materials derive from fossil fuels** • **Off-gassing of toxic chemicals and microplastics exposes humans, wildlife, and water to hazards** • **Heavier load on water treatment processes** • **Requires only potable water use** • Heat island effect

50

Findings: Environmental Impacts

University of Missouri Turfgrass Research Center (2010)
Synthetic grass temperature increases of 50 to 70 ° F over natural grass.
On blue-sky days in mid-summer where air temperatures were at 98 degrees Fahrenheit with calm winds, temperatures would exceed 160 ° F on synthetic surfaces.
Natural grass under these same conditions would range between 99 and 102 ° F

Santa Clara County Medical Association (2024)
Synthetic turf in Sunnyvale (111-138 °F) versus the immediately surrounding area (102-111°F)

UC Ag & Natural Resources, California (2024)
Artificial grass found at 173 ° F in Palm Springs

Montclair State University, New Jersey (2025)
Artificial grass was 182% hotter than the natural grass field when measured with infrared thermometer during a mid-day reading in June.

Findings: Public Health & Safety Impacts

Vulnerable Communities are disproportionately impacted by the health impacts of contaminants like heavy metals, PFAS, and plastics

- Examples: Children, low-income, elderly, persons with disabilities

	Natural Grass	Artificial Turf
Pros	• **Natural sanitation** • Higher shock absorption • Natural cooling on hot days	• Provides more playing time – rainy seasons

Cons	• Injury risk in the case of improper maintenance
	• Less playing time in rainy seasons
		• **Toxic chemicals in artificial turf:**
		  ○ **Plastic and rubber materials can melt and off-gas toxic chemicals**
		  ○ **Exposure to PFAS, nano and microplastics, and other toxic chemicals in turf products linked to cancer, hormone disruption, and immune harm (PAHs, VOCs, heavy metals)**
		• Limited playing time on extreme heat days
		• Risk of legal claims from injuries and latent disease
		  ○ Heat related illness: dehydration, heat stroke, skin burns
		  ○ Increased infections (poor sanitation practices)
		  ○ Higher injury rates (cushioning fails with wear)

Findings: Financial Impacts

	Natural Grass	Artificial Turf
Pros	• **Less expensive upfront installation** • **Stable long-term costs** • **Resilient grasses use less water**	• **Generally less water use** • Provides more playing time – rainy seasons

Cons	• **More frequent maintenance needs**
	• Liability / Injury risk in the case of improper maintenance
	• Currently provides less playing time year-round (rainy seasons)
		• **Increasing installation, replacement, and disposal costs disposal costs across industry**
		• **Specialized maintenance needs – disinfectant & repair**
		• **Conversion back to natural grass requires mitigation of long-term soil damage**
		• Liability
		  • **Many unknown chemicals**
		  • Injury risk in the case of improper maintenance
		• Extreme heat day limitations on playing time
		• More playing time year-round

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Disposal

Natural Grass disposal options
- Proper maintenance reduces need for renovation (every 5-10 years)
- Disposal typically not necessary. If needed, materials composted or mulched

Artificial Turf disposal options
- Landfill
- Stockpile
- Limited or no recycling options

Data limitations on artificial turf disposal
- Unclear disposal practices and locations
- Lack of language in contracts requiring recycling or proper disposal
- Lack of contract language verifying final material disposition

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Disclaimer: As part of the community outreach and stakeholder engagement process for the Study Issue Report, the City received information and materials from Beyond Pesticides and TenCate, as representatives from both organizations participated in community engagement activities and stakeholder meetings. Information and materials related to natural grass and artificial turf was provided to the City by these organizations during the engagement process. This information was reviewed and considered by the City in the preparation of the cost comparison analysis. Where appropriate, select information was incorporated into this report to inform the analysis. Accordingly, Beyond Pesticides and TenCate are referenced in this document; however, such references are solely for informational purposes. Inclusion of these materials does not constitute endorsement by the City of either organization, any industry group, or any specific product or approach.

Documents provided by Beyond Pesticides:

Factsheet Building an Organic Maintenance Program for Athletic Fields April 2021

Key Points - *The guide explains how organic management of natural grass athletic fields can improve soil health, reduce reliance on synthetic pesticides and fertilizers, and create safe, high-performance playing surfaces. Core recommendations include conducting soil testing to diagnose nutrient and biological imbalances; using organic fertilizers and soil amendments; performing frequent aeration and mowing; and selecting grass seed varieties suited to climate and field use. Case studies from Springfield, Marblehead, Martha's Vineyard, Pennsylvania, and Ohio demonstrate that organic methods can rehabilitate or rebuild fields effectively, often reducing long-term maintenance costs. The document emphasizes the importance of trained consultants, customized maintenance plans, and the use of emerging tools such as soil*

sensors, drones, and smart irrigation systems. Successful organic field programs require ongoing monitoring, proper equipment, and coordination among groundskeepers, schools, and municipalities.

***Cost Comparison Organic vs Chemical Grass Field management**

Key Points - *Organic land management focuses on soil health through practices such as aeration, overseeding, proper mowing, watering, and use of natural fertilizers. Chemical management relies on synthetic pesticides and fertilizers applied on a calendar or reactive basis, which harms soil biology and biodiversity. Organic approaches address root causes of turf issues, while chemical methods treat symptoms.*

Research cited in the documents provided by Beyond Pesticides shows that organic turf management becomes more cost-effective over time. Organic programs may have slightly higher costs in the first one to two years due to training and soil restoration, but long-term costs drop as soil biology stabilizes. Studies from Grassroots Environmental Education and Osborne Organics found that organic management saves more than 25% compared to chemical programs, once established. Harvard University's transition demonstrated that long-term organic costs equal or outperform previous chemical programs. Connecticut's Department of Energy and Environmental Protection also concludes that organic lawns cost less over time due to lower water, fertilizer, and labor needs.

The document also notes externalized costs associated with synthetic pesticides, including an estimated $15 billion in annual U.S. health costs and an additional $8 billion in environmental damage. Organic land management avoids these hidden costs while improving soil quality, reducing water needs, and increasing ecological resilience. Some municipalities, such as South Miami, have codified organic practices and reported reduced waste and stable maintenance costs. Overall, organic grass management is presented as a cost-effective, safer, and environmentally responsible alternative to chemical turf programs.

***Financial Costs of Artificial Fields**

Key Points - *The report emphasizes that synthetic turf fields are often mistakenly assumed to require little maintenance, but in reality, they involve significant ongoing costs. Annual maintenance for synthetic turf ranges from $7,000 to $23,000 depending on geography, field size, turf type, and equipment needs. Maintenance tasks include infill replacement, grooming, irrigation for cooling, disinfecting, debris removal, seam repair, snow management, and periodic specialized testing such as G-Max and HIC impact tests.*

Artificial turf fields typically require full replacement every 8–10 years, though some fail sooner. Replacement costs range from $6.50–$7.80 per square foot, totaling $374,400–$449,280 for a standard football field. Annualized replacement costs therefore fall between $37,440 and $74,880 depending on lifespan. Additionally, vandalism or unusual wear can result in costly repairs not covered under warranty.

In contrast, natural grass fields—when properly maintained—have significantly lower annual product costs. One school district reported product costs of $49,076 to treat 659,998 square feet (approximately $0.74 per square foot), translating to about $4,283 per year for a typical football field, not including labor. Natural grass may not require resurfacing for up to 20 years when managed well, with potential resurfacing costs far below those of synthetic turf.

Overall, the document highlights that artificial fields incur high long-term financial burdens from maintenance, specialized labor, testing, and frequent replacement. Natural grass remains more cost-effective over its lifespan, making it an important consideration for municipalities and schools evaluating athletic field investments.

Natural Grass Playing Field Case Study Marblehead MA revised Nov. 2020

Key Points *- Marblehead has managed 20 acres of athletic fields organically since 2002, following a 1998 Board of Health commitment to phase out pesticides. Organic maintenance focuses on soil health - using aeration, mowing, soil testing, organic fertilizers, and amendments to build strong root systems. Four fields documented in 2018 demonstrated high use capacity: Seaside Park (~1360 total hrs), Hopkins Field (~1860 hrs), Veterans' Middle School (~2320 hrs), and Village School Lower Field (~2210 hrs). Minimal cancellations occurred (5 rain days, 2 heat days). Organic maintenance costs average $4,250–$4,500 per acre annually, including products, aeration labor, and mowing. In comparison, the town's 1.5-acre synthetic turf field requires $7,000–$7,400 annually for maintenance (excluding installation). Community participation, such as students removing weeds manually, supported organic field rehabilitation. The case study reports after 15+ years, Marblehead demonstrates that organic natural grass fields can meet high athletic demand cost-effectively while avoiding harmful pesticides.*

Mahady Report – FINAL(The City requested this report be reviewed)

Key Points - San Carlos' sports fields are heavily overused, exceeding recommended safe annual wear thresholds by 2–5 times, depending on field and soil profile. Total field use exceeded 13,455 hours: soccer accounted for 55.7% of use, baseball 40.3%. Wear-factor analysis shows higher turf damage from older and heavier players, especially in soccer and winter play conditions. Several fields, especially Crestview, Laureola, and Stadium, suffer from severe drainage, compaction, unsafe surface conditions, and organic layer buildup. Sand-based fields (Crestview, Highlands) need intensive aeration, sand topdressing, and drainage rehabilitation to remain safe and functional. Native soil fields (Arguello, Burton, Heather, Stadium, Laureola) drain poorly and become unsafe during wet seasons. Excessive scheduling leaves no 4-week renovation windows during the April–October optimal growing period, preventing proper turf recovery. Recommendations include adding synthetic turf fields, expanding total acreage, rotating/resting natural fields, improving drainage systems, enforcing field-use policies, and investing in equipment and staffing. To maintain safe turf quality, San Carlos would require approximately 31 acres of sports fields—double current acreage.

Internet Searches

The following documents were reviewed to develop the Athletic Field Playability Rating (Natural Grass vs Synthetic Turf (infill)) used for the Chapter Four Observation report:

City of Toronto – Sport Field Playability & Responsibility Guidelines

https://www.toronto.ca/wp-content/uploads/2018/04/8852-sports-field-playability-and-responsibility-guide.pdf

Key Points - Safety of participants and turf preservation are primary considerations when determining field playability. Indicators for closure include standing water, visible water or 'squish' sounds, footprints collecting water, easily dislodged grass divots, and frozen areas. For

ball diamonds - ponding water, sponging water around feet, and large mud areas indicate closure. Games should not be played during severe lightning. Water removal should be done with pumps/sponges, not brooms. Drying agents are permissible lightly. Awareness of weather hazards, especially thunder and lightning, is essential.

Sports Field Management Association (SFMA) – Playing Conditions Index (PCI)

https://www.sportsfieldmanagement.org/knowledge_center/stma-playing-conditions-index-pci/

Key Points -SFMA PCI helps assess field playability and safety for natural and synthetic turf fields. The updated tool provides immediate feedback and highlights unsafe areas requiring attention. Supports decision-making by identifying when fields may become unsafe through longitudinal data submission.

The Turf Zone – How to Measure Playability for Safe Sports Fields

https://www.turf-tec.com/Articles/Florida-Turf-Digest-Spring-2025.pdf

Key Points - Ensuring safety and playability requires evaluating natural and synthetic turf surfaces. Three key reference points for natural grass: gMax, soil moisture, and shear strength. These metrics are interdependent; adjusting one affects the others, similar to GPS trilateration. Proper balance helps prevent injuries and maintain consistent field conditions.

UConn Extension – Athletic Field Assessment Framework

https://ipm.cahnr.uconn.edu/assessment-tool/

Key Points - UConn developed a mobile-friendly Athletic Field Assessment Tool based on a 14-year legacy form to help school grounds managers evaluate turf safety and quality. The tool measures turfgrass density, surface uniformity, wear damage, pest presence, and tracks maintenance activities like mowing, irrigation, and overseeding. A web-based platform allows managers to enter static data (species, soil type) and dynamic reports (turf quality ratings, maintenance events), with photo uploads and unlimited field entries. Features include a turf quality rating scale (1–15), data filtering, printable reports, and mobile accessibility for on-site assessments.

RZ Sports Turf – Field Safety & Playability Audit

https://rzsportsturf.com/blog/athletic-field-safety-playability-audit-tips

Key Points - Routine safety and playability audits help prevent injuries, ensure compliance with NFHS/NCAA/municipal standards, and protect long-term field investment. Critical audit areas include surface evenness, compaction, drainage, turf health, shock absorption, mound stability, hardware safety, and ADA compliance. Red flags requiring immediate attention include standing water, exposed irrigation heads, divots, loose bases, unstable mounds, and excessive lip buildup. Some issues can be corrected in-house, while major grading or safety hazards may require professional intervention.

UC ANR – Sports Field Performance Factors

https://ucanr.edu/sites/default/files/2019-09/77437.pdf

Key Points - Sports field performance depends on safety, playability, aesthetics, and durability, influenced by design, construction, and maintenance. Ownership expectations dictate maintenance intensity and resource allocation for field quality. Users expect uniform, safe surfaces free of bumps, clumps, holes, wet/dry spots, and obstructions. A safe field must provide impact absorption, good footing, and a regular surface to prevent injuries and ensure fair gameplay.

A general search of Artificial Turf vs Natural Grass in Santa Clara Valley produced the following information:

- Santa Clara County agencies increasingly warn against artificial turf due to chemical pollution, heat island effects, PFAS concerns, injury risks, and runoff pollution.
- Medical experts and environmental groups recommend natural grass for children's health, environmental protection, and long-term sustainability.
- Water districts no longer support artificial turf in conservation programs, citing lack of ecological benefits, potential contamination, and higher-than-expected water use for cooling and cleaning.
- Artificial turf fields may require replacement every 8–10 years, creating landfill waste and long-term disposal issues.
- Advocates for artificial turf argue it offers extended field availability, especially during wet seasons when natural grass is unusable.
- Santa Clara County has debated, studied, and considered bans on artificial turf due to environmental and health concerns, reflecting rising regional scrutiny.

Summary of Chapter Two: Literature and Data Review

Health and Safety (OEHHA Study)

- Large California OEHHA study found no significant health risks from crumb rubber exposure on synthetic turf. * *FairOaks Field doesn't use crumb rubber infield.*
- Slightly elevated risks only under extreme worst-case ingestion scenarios for infants.
- Ambient pollutants, not turf chemicals, were the primary drivers of air-related cancer risks.

Environmental & Regional Policy Insights (Sonoma County)

- Artificial turf contributes to heat absorption, microplastics, PFAS exposure, and landfill waste.
- Natural grass requires more maintenance and has wet-season play limitations.
- Regional model ordinance being developed to restrict artificial turf and require lifecycle analyses.

Organic Natural Grass Management

- Organic programs emphasize soil health and reduced reliance on synthetic pesticides/fertilizers.
- Long-term costs decrease as soil biology improves.
- Case studies show organic grass can meet high play demand effectively.

Cost Comparisons

- Artificial turf has high installation and replacement costs every 8–10 years.
- Annual maintenance costs significantly lower for artificial turf than natural grass in the studies referenced in this report.
- Well-maintained natural grass fields can last up to 20 years with lower lifecycle cost.

Field Use & Overuse Studies (Mahady Report)

- Many athletic fields are overused—2–5× recommended limits.
- Natural grass requires rest periods and greater acreage to maintain safety.
- Recommendations include increasing field inventory, maintenance improvements, and selective turf use.

Playability Standards & Field Assessment Tools

- Standards include GMax, drainage checks, turf density, and uniformity measures.
- Tools from Toronto, SFMA, UConn support consistent field evaluation.

Regional Internet Search Findings

- Some municipalities are increasingly opposes artificial turf due to health and environmental concerns.
- Water districts have stopped supporting artificial turf due to pollution concerns.
- Long-term waste and replacement costs remain major drawbacks of synthetic fields.

Sports Field Turf Management Restoration Techniques and Maintenance Planning for Rehabilitation, Rhode Island Recreation and Parks Association

Common turf performance problems include heavy wear, poor drainage, dusty conditions during dry weather, soil compaction, and insufficient maintenance—all of which negatively impact playability and safety.

- Field usage intensity is a critical decision factor:
  - 200–600 hours/year: suitable for standard natural turf.
  - ~800 hours/year: high-performance natural turf with field rotation.
  - 800–1,000+ hours/year: synthetic turf should be considered as use exceeds natural turf limits.
- Four primary field improvement paths exist, escalating in cost and intervention:
  - Improved maintenance (lowest cost, least invasive).
  - Minor renovation.
  - Major renovation.
  - Conversion to synthetic turf (highest cost).

- Natural grass field performance depends on multiple integrated elements:
  - Root zone and turf selection, subgrade condition, drainage, irrigation, equipment, and ongoing operations & maintenance.
- Proper analysis and testing drive solutions, including soil tests, shallow and deep test pits, and evaluation of percolation and water table conditions.
- An “If/Then” decision framework guides the response to drainage and soil problems, ranging from soil amendment and maintenance improvements to full drainage installation and field elevation.
- Improving maintenance alone can be effective:
  - Includes soil testing, fertilization, aeration, topdressing, overseeding/sodding, and irrigation.
  - Benefits: lowest upfront cost, continuous field use, gradual improvement.
  - Drawbacks: slower results, inconsistent grades, occasional wetness and bare areas.
- Minor renovations involve partial reconstruction (regrading, optional drainage, soil amendments, reseeding/sodding):
  - More affordable than major work.
  - Still requires annual higher maintenance and field shutdown during construction.
  - Can be cost-effective over a 20-year lifecycle versus synthetic turf.
- Major renovations are comprehensive reconstructions:
  - Subgrade rework, full drainage systems, engineered root zones, new irrigation.
  - Highest natural-turf performance potential, but also highest cost and disruption.
- Case studies demonstrate that both maintenance improvements and renovations can significantly restore field quality when matched correctly to site conditions and budgets.
- Successful projects require long-term commitment:
  - Client education, dedicated equipment, proper mowing, fertility programs, aeration, topdressing, reseeding, and planned rest/rotation.
- Early involvement of turf and drainage experts is essential to:
  - Control costs, assess soil and water table constraints, avoid unnecessary over-building, and determine early whether natural or synthetic turf is the most appropriate solution.

Overall Conclusions

- Artificial turf offers consistent year-round use but may carry environmental, financial, and chemical exposure concerns.
- Natural grass—especially organic programs— may provide safer, more cost-effective, and sustainable long-term outcomes.

APA Reference List (Alphabetized, Annotated, With URLs):

Beyond Pesticides. (2021). Building an organic maintenance program for athletic fields. Beyond Pesticides. URL: *https://www.beyondpesticides.org/*

- Explains principles and case studies of organic athletic field management, emphasizing soil health and reduced pesticide use.
- Beyond Pesticides. (n.d.). Financial costs of artificial fields. URL: *https://www.beyondpesticides.org/*

- Details long-term maintenance, replacement, and hidden externalized costs associated with synthetic turf systems.

City of Toronto. (2018). Sports field playability & responsibility guidelines. URL: *https://www.toronto.ca/wp-content/uploads/2018/04/8852-sports-field-playability-and-responsibility-guide.pdf*

- Provides municipal criteria for determining field safety, closures, and maintenance best practices.

Grassroots Environmental Education & Osborne Organics. (n.d.). Cost comparison: Organic vs. chemical grass field management. URL: *https://www.grassrootsinfo.org/*

- Compares long-term operational costs of organic and chemically managed natural turf systems.

Mahady, C. (2000). San Carlos sports field assessment report.

- Analyzes overuse, soil profiles, and maintenance deficiencies in San Carlos sports fields with recommendations for capacity expansion.

Marblehead Board of Health. (2020). Natural grass playing field case study: Marblehead, MA.

- Documents long-term success and maintenance cost stability of Marblehead's organic athletic field program.

Office of Environmental Health Hazard Assessment. (2025). Final report of the OEHHA synthetic turf study. California Environmental Protection Agency. URL: *https://oehha.ca.gov/risk-assessment/report/release-final-report-synthetic-turf*

- Comprehensive statewide analysis of chemical exposure and cancer/non-cancer risk associated with synthetic turf crumb rubber.

RZ Sports Turf. (n.d.). Field safety & playability audit tips. URL: *https://rzsportsturf.com/blog/athletic-field-safety-playability-audit-tips*

- Lists safety hazards and audit methods for maintaining safe sports field conditions.
- Sonoma County. (2024). Athletic Field Turf Workshop [PowerPoint slides]. Sonoma County Parks Department.
- Outlines environmental impacts, maintenance differences, and planning considerations for natural vs. synthetic turf.

Sports Field Management Association. (n.d.). Playing Conditions Index (PCI). URL: *https://www.sportsfieldmanagement.org/knowledge_center/stma-playing-conditions-index-pci/*

- Describes standardized tool for evaluating natural and synthetic field playability and safety metrics.

Sports Field Turf Management Restoration Techniques and Maintenance Planning for Rehabilitation, Rhode Island Recreation and Parks Association, Michael S. Moonan, Sr. Landscape Architect, CHA

- Field performance depends on matching use levels, soils, and drainage with the right solution—from improved maintenance to minor/major renovation or synthetic turf—based on hours of play, soil percolation, and water table conditions.
- Early testing, expert involvement, and sustained maintenance are essential; properly maintained or renovated natural turf can remain safe, playable, and cost-effective long term, but exceeds limits when overused without adequate drainage and upkeep

The Turf Zone. (n.d.). How to measure playability for safe sports fields.

- Reviews gMax, moisture, and shear-strength performance metrics for evaluating turf safety.

UConn Extension. (n.d.). Athletic field assessment framework.

- Mobile-friendly platform used by school grounds managers for turf quality ratings and maintenance tracking.

University of California Agriculture & Natural Resources. (2019). Sports field performance factors. URL: *https://ucanr.edu/sites/default/files/2019-09/77437.pdf*

- Identifies design, construction, and maintenance factors influencing long-term sports field durability and safety.

Zero Waste Sonoma. (2024). Model ordinance discussion on artificial turf restrictions. URL: *https://zerowastesonoma.gov/*

- Summarizes region-wide environmental and waste-management concerns driving artificial turf policy restrictions.

Chapter 3 Analysis - Sunnyvale, CA - Study Artificial Turf Vs Living Ground Cover (Natural Grass)

Review of Usage Data Provided by the City:

RecTrac Live Report 2025, 2024, 2023 Synthetic Lighted Fields reports:

- Calander report January – December
- Shows fields typically scheduled seven days a week
  - Monday – Friday primarily 4:00 pm – 10:00 pm
  - Saturday/Sunday 8:00 am – 10:00 pm
  - Primarily soccer and baseball

RecTrac Live Report 2025, 2024, 2023 Grass Unlit Fields reports:

- Calander report March - November
- Shows fields typically scheduled seven days a week
  - Monday – Friday primarily 4:00 pm – 7:00 pm
  - Saturday/Sunday 8:00 am – 7:00 pm
  - Primarily soccer, softball and baseball

RecTrac Live Report 2025, 2024, 2023 Grass Lit Fields reports:

- Calander report March - November
- Shows fields typically scheduled seven days a week
  - Monday – Friday primarily 4:00 pm – 9:00 pm
  - Saturday/Sunday 8:00 am – 7:00 pm
  - Primarily soccer, softball and baseball

RecTrac Facility Usage Stats 2025 Synthetic Fields report:

- Total Facilities Report: 7.00
- Total Days in Reporting Period: 341.00
- Days with One or More Open Facilities: 341.00
- Total Reservations: 1,515.00
- Total Headcount: 464.00
- Total Fees Charged: 309,490.50
- Total Hours Used: 6,015.25
- Total Hours Open: 33,418.00
- Total % Usage: 18.00

Average number of hours per field per year = 859

RecTrac Facility Usage Stats 2024 Synthetic Fields report:

- Total Facilities Report: 7.00
- Total Days in Reporting Period: 366.00
- Days with One or More Open Facilities: 366.00
- Total Reservations: 1,434.00
- Total Headcount: 708.00
- Total Fees Charged: 285,860.75
- Total Hours Used: 5,892.75
- Total Hours Open: 35,868.00
- Total % Usage: 6.43

Average number of hours per field per year = 841

RecTrac Facility Usage Stats 2023 Synthetic Fields report:

- Total Facilities Report: 7.00
- Total Days in Reporting Period: 365.00
- Days with One or More Open Facilities: 365.00
- Total Reservations: 1,447.00
- Total Headcount: 576.00
- Total Fees Charged: 276,932.50
- Total Hours Used: 5,640.50
- Total Hours Open: 35,770.00
- Total % Usage: 15.77

Average number of hours per field per year = 806

RecTrac Facility Usage Stats 2025 Grass Fields report:

- Total Facilities Report: 45.00
- Total Days in Reporting Period: 275.00
- Days with One or More Open Facilities: 275.00
- Total Reservations: 6,683.00
- Total Headcount: 5,809.00
- Total Fees Charged: 208,880.25
- Total Hours Used: 25,793.50
- Total Hours Open: 108,030.00
- Total % Usage: 23.88

Average number of hours per field per year = 573

RecTrac Facility Usage Stats 2024 Grass Fields report:

- Total Facilities Report: 45.00
- Total Days in Reporting Period: 275.00
- Days with One or More Open Facilities: 275.00
- Total Reservations: 7,120.00
- Total Headcount: 6,613.00
- Total Fees Charged: 189,907.00
- Total Hours Used: 25,937.67
- Total Hours Open: 107,814.00
- Total % Usage: 24.06

Average number of hours per field per year = 576

RecTrac Facility Usage Stats 2023 Grass Fields report:

- Total Facilities Report: 45.00
- Total Days in Reporting Period: 275.00
- Days with One or More Open Facilities: 275.00
- Total Reservations: 6,500.00
- Total Headcount: 7,751.00
- Total Fees Charged: 171,064.50
- Total Hours Used: 5,766.50
- Total Hours Open: 07,598.00
- Total % Usage: 23.95

Average number of hours per field per year = 572

Key Points

- Sunnyvale Fields are reserved for an average of 704.5 hours per year. Important to note that Sunnyvale does not track informal, unreserved field use which according to staff, stakeholders, and observations is quite substantial.

Sunnyvale Park Maintenance staff does not track expenses solely related to maintenance of the open space athletic fields.

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Review of Information Researched

The following section reviews information researched and collected from a Beyond Pesticides Organization, synthetic turf manufacturer, and a previous case study conducted for Los Gatos, CA, research conducted with the City of Menlo Park, CA, and the City of Sunnyvale, CA.

As part of the community outreach and stakeholder engagement process for the Study Issue Report, the City received information and materials from Beyond Pesticides and TenCate, as representatives from both organizations participated in community engagement activities and stakeholder meetings. Information and materials related to natural grass and artificial turf was provided to the City by these organizations during the engagement process. This information was reviewed and considered by the City in the preparation of the cost comparison analysis. Where appropriate, select information was incorporated into this report to inform the analysis. Accordingly, Beyond Pesticides and TenCate are referenced in this document; however, such references are solely for informational purposes. Inclusion of these materials does not constitute endorsement by the City of either organization, any industry group, or any specific product or approach.

Beyond Pesticides

Assumptions stated by Beyond Pesticides

Organic Turf Management (OTM)

- About 15% higher management costs than a conventional program for the first three years (including products and labor), then costs decline as product inputs become less. The long-term management costs after three years is the same or less than a conventionally managed chemical system.
  (The initial higher management costs could be about the same as conventional in the near future as synthetic fertilizers depend on petroleum for their development. Organic fertilizers are not affected by petroleum prices.)

- Costs decline after three years because OTM focuses on building the soil biomass, not on feeding the plant. Conventional turf management relies 100% on product input for turf function and appearance and does nothing for the biomass.
- It takes about three years, depending on the baseline soil health, to increase the biomass.
- A healthy biomass generates its own nitrogen, thereby eliminating the need to input nitrogen from a fertilizer bag. Product and application labor costs decline.
- Organic turf requires less water usage over time because the healthy biomass acts a sponge.
- To transition from a chemically intensive program to organics, it could require the use of an OTM consultant.
- The cost to transition from (almost) any grass field to Organic Turf Management (OTM)

TenCate

Assumptions stated by TenCate (Spring 2026):

Important note on cost modelling:
TenCate stated that one should first draw attention to the cost assumptions used in any comparison. Systems such as Pivot require very limited maintenance, largely focused on keeping the surface clean, and far less ongoing input than natural grass. While the initial capital cost may be slightly higher, the lower maintenance burden and longer expected service life mean whole life costs should be assessed with a replacement cycle closer to 15 years, rather than the older assumption of 8 to 10 years.

1. Usage, capacity, and community value

Surface value should not be judged only by hours of use per week. It should also consider how reliable that use is across the full year and how many players can use the space at the same time. Natural grass can be an excellent option when conditions, budget, and maintenance allow, and we strongly support a balanced model where grass and turf complement one another. However, turf offers much greater year-round reliability, can tolerate intensive and shared use (several teams and even sports at the same time - John Mise Park is a great example of this), and often delivers a much higher player hour return for communities where space is limited.

2. Modern material safety and compliance

Most modern turf systems, including those from TenCate, are designed to comply with leading chemical and consumer safety expectations, including REACH in Europe and relevant standards such as Proposition 65 in the United States. We continue to monitor emerging evidence and evolving risk factors closely, including the removal of PFAS from our systems several years ago way before any legislative requirements. It is also important to note that SBR rubber, which has often been the focus of historic debate, is no longer necessary in modern systems such as Pivot.

3. Life cycle performance and lower impact per playing hour

Our internal and published life cycle studies, including Environmental Product Declarations, show that modern turf systems such as Pivot perform strongly when assessed across their full life cycle. Compared with older infilled systems, they use less material, are lighter in construction, and are designed for longer service life. Published work in European cities has also shown that non infilled turf systems can deliver lower impact per playing hour than traditional turf, natural grass, and hybrid grass systems when modelled on a functional use basis (e.g. CO2 per playing hour).

4. Recycling progress and circularity expansion

We are continuing to expand recycling capacity globally and to improve the speed and simplicity of end-of-life recovery. Local recycling solutions are not yet available in every region, so some materials still need to be transported across state border, but progress is accelerating. Turf that has reached the end of its useable life is capable of being recycled. Aged turf is removed from the field and transported to TenCate's specialized processing facility in Baton Rouge, Louisiana. At this facility, the turf undergoes a series of steps designed to recover materials, such as infill and fiber components. The sand and crumb rubber infill are separated from the turf, cleaned and stored for reuse. The plastic materials are then sent to a third party for further processing where the recovered plastics from the old turf will be turned into polyethylene pellets. These pellets, which serve as feedstock for the production of new products, are then shipped to the final end-user in the recycling process which currently includes an advanced recycling facility certified under the International Sustainability and Carbon Certification (ISCC) PLUS program. These recycling efforts help to reduce reliance on raw materials and help to divert material from landfills. TenCate has accepted/processed and will accept/process artificial turf from other manufacturers, in addition to TenCate products.

A website dedicated to TenCate recycling work, TenCate Turf Recycling Solutions, can be found here: https://turfrecycling.us/

In Europe, the market is already several years ahead, with countries such as the Netherlands reaching very high rates of turf recycling, while France, Germany, the UK, and the Nordic region continue to build capacity. In the United States, multiple sites are now operating and capacity is increasing. We welcome continued support from legislators and local authorities to help scale this transition faster. Modern systems such as Pivot are also much lighter and easier to be recycled as they are more mono-material based meaning end of life value is much higher and supports the circular and recycling economy better than older fields that are requiring recycling today.

NOTE: Please note that Sunnyvale is in Santa Clara County, which is one of the 14 counties where the much higher Soft Floor Layer Union Rates apply (and are included in this pricing).

Pricing for the 148,500 sf synthetic turf system along with pertinent clarifying information for the civil scope established below is as follows (Note: estimates don't include any equipment in the Pivot scope):

1. Civil/Drainage for: $1,528,000 or $10.29/sf.
2. Pivot 100oz System Supply and Installation: $1,524,000 or $10.26/sf.
3. Pivot 90oz Turf Only Rip and Replace (Pad Remaining): $1,380,000 or $9.29/sf.

Pricing for the civil scope is based on the following clarifications on the initial scope:

- Ex/removal/disposal of existing material to create area for import of 6" of stone base (Note: This assumes no organics and that the material tests appropriately for disposal).
- Assumes 2 fields of 225' x 330' (74,250 sf each, 148,500 sf total).
  - This size bases drainage system on a perimeter drain of each field with three cross runs, sloped at subgrade to each cross run/edges.
    - Perimeter runs: 1,100 lf x2 fields = 2,200 lf of 6" perforated CPEP with standard drain rock wrapped section.
    - Cross runs: 675 lf x2 fields = 1,350 lf of 8" perforated CPEP with standard drain rock wrapped section.
- Supply/import/placement of 6" minimum of CA top/bottom rock to create new 148,500 sf base section for field(s).
- Standard manufacturer's planarity requirements of 1/8" in 10' for Pivot fields.

All of the following scenarios assume 148,500 square feet total, (3.4 acres), enough for 2 fields of 225' x 330' (74,250 sf each). This size was chosen because it is equivalent to two side by soccer fields. This configuration would also allow the fields to be configured to accommodate other sports such as Lacrosse, field hockey, etc.

Case Study Town of Los Gatos Creekside Sports Park Turf Operations Assessment Completed 2024

A. Purpose of the Sports Park Turf Operations Assessment

The purpose of the study was to assess the operational and maintenance costs of the sports field for a 20-year lifecycle for artificial turf versus grass, considering staffing costs, maintenance costs including field striping mowing, fertilization, annual repairs for natural grass, and routine and periodic maintenance costs for synthetic turf. The consultant completing this study is the same consultant working on the Sunnyvale study.

Assumption initial field cost $750,000 – verified by Town of Los Gatos staff
Field = 148,500 sf total,
Los Gatos, CA Study Field Life Cycle Costs (20 Year Cycle)

Comparison of Natural Turf Field and Artificial Turf Life Cycle Costs (20 Year Cycle)

Natural Turf Field (148,500 SF Turf)		***Artificial Turf Field (148,500 SF Turf)***	
Initial Construction Cost	***$750,000***	**Initial Construction Cost** *Assumes $12/sq.ft. Install, 10% Design, 15% Contingency*	***$2,100,000***
Refurbishing/Rest Cost - 5 times over 20 years *Field refurbishment at year 4, 8, 12, 16 & 20 after initial project*	**$475,000** $95,000	**Refurbishing Cost** *Carpet Replacement (year 12)* *Assumes $6.80/sq.ft and $45K for removal/recycling of infill/turf*	**$975,000**
Average Annual Maintenance Natural Grass *Annual Maintenance Natural Turf every 3 out of 4 years* *Maintenance costs for refurbishment every 4th year*	**$57,360** $75,000 $48,000	**Average Maintenance Synthetic Turf over 20 Years** *Annual Maintenance Synthetic Turf for 18 years* *No maint. 1st year & replacement yr.*	**$30,770** $33,700
20 Year Maintenance Costs *15-Year Maintenance Costs w/natural grass* *Maintenance Costs with Renovation every 4 Years*	**$1,365,000** *$1,125,000* *$240,000*	**20-Year Maintenance Costs**	**$606,600**
20-Year Total Maintenance + Capital *Average Maintenance Cost/Year over 20 Years* *Avg. Annual Cost: Capital +Maintenance*	**$2,590,000** $68,250 **$129,500**	**20-Year Total Maintenance + Capital** *Average Maintenance Cost/Year over 20 Years* *Avg. Annual Cost: Capital + Maintenance*	**$3,681,600** *$30,330* **$184,080**
Natural Turf Field Use 32 weeks @ 2 hours per day on weekdays and 5 hours per day on weekends less 15% rain dates		**Synthetic Turf Field Use** 40 weeks @ 6 hours per day on weekdays and 10 hours per day on weekends	
Hours per Week	20	Hours per Week	50
Weeks of Use per Year	32	Weeks of Use per Year	40
Hours Permitted per Year	640	Hours per Year	2000
Hours per Year minus 15% for Rain	544		
Hours per Year * 20 years	10,880	Hours per Year * 20 years	40,000
Refurbish/rest field every 4 years or 5 times in 20 yrs. Close fields for 20 of 32 playable weeks each time. (20 wks*20 hrs*5 rest periods)	2000	Refurbish field at 12 years. Close for 20 of 40 playable weeks. (20 wks * 50 hrs)	1000
Total Hours Permitted Use in 20-Year Cycle	8,880	Total Hours Permitted Use in 20-Year Cycle	39,000
Cost per Use *(Total Maint. + Capital)/(Total Permitted Hours in 20-Year Cycle)*	**$292**	**Cost per Use** *(Total Maint. + Capital)/(Total Permitted Hours in 20-Year Cycle)*	**$94**

Los Gatos, CA Study Field Natural Turf Annual Maintenance Cost Metrics

Natural Grass Itemized Annual Maintenance Costs

Task		Times/ Year	Labor Hours	Rate (avg hourly + benefits)	Subtotal Labor	Supplies	Subtotal Supplies	Equip.	Depreci Per Task	Depreci Per Year	Fuel (gal)	Fuel Cost Per Year @ $1.50/gal	Total
Core Aerate		2	6	$35.00	$420.00			Massey	$50.00	$100.00	10	$30.00	$550.00
Aerate/Seed		2	8	$35.00	$560.00	8lbs (per 1000 sq.ft) * 113.256 * 1.58 per lb TriRye Seed Mix = $1,431/application	$2,864.00	Massey	$50.00	$100.00	10	$30.00	$3,554.00
			*note above is 2 persons at 4 hours each										
Top Dress		1	18	$35.00	$630.00	Compost@ $1200	$1,200.00	Kabota Topdresser	$50.00	$50.00	20	$60.00	$1,940.00
			*note above is 3 persons at 6 hours each (would like to increase this to 2X per year)										
Slice Seed & Roll		4	12	$35.00	$1,680.00	8lbs (per 1000 sq.ft) * 113.256 * 1.58 per lb TriRye Seed Mix = $1431/application	$5,728.00	Massey	$50.00	$200.00	10	$60.00	$7,668.00
			*note above is 2 persons at 6 hours each										
Fertilizing		3	8	$35.00	$840.00	5 lbs (per 1000) * 113.256 * .28 (per 50 lb bag) = $158/application	$475.65	Massey	$50.00	$150.00	10	$45.00	$1,510.65
			*note above is 2 persons at 4 hours each										
Mowing		45	1.5	$35.00	$2,362.50			Toro	$50.00	$2,250.00	10	$900.00	$5,512.50
Field Paint	*Spring*	20	6	$35.00	$4,200.00	2 (5 gal container/ white)	$1,980.00	Machine/Truck	$75.00	$1,500.00	15	$450.00	$8,130.00
	Summer	10	6	$35.00	$2,100.00	$100/5 gal. container	$990.00	Machine/Truck	$75.00	$750.00	15	$225.00	$4,065.00
	Fall	20	6	$35.00	$4,200.00	$200	$1,980.00	Machine/Truck	$75.00	$1,500.00	15	$450.00	$8,130.00
Humate		1	6	$35.00	$210.00	$20 @ 18 lb/Acre $840 per application	$840.00	Massey	$50.00	$50.00	10	$15.00	$1,115.00
Renovate Plus		1	8	$35.00	$280.00	$4140 per application	$4,140.00	Massey	$50.00	$50.00	10	$15.00	$4,485.00
			*note above is 2 persons at 4 hours each										
Irrigation		800,000											$10,700.00
									Annual Turf Maintenance Total				**$57,360.15**
									Cost per square foot grass (148,500 sq. ft.)				0.56

Los Gatos, CA Study Field Synthetic Turf Annual Maintenance Cost Metrics

Itemized Annual Maintenance Costs for Synthetic Turf

Task		Times/ Year	Labor Hours	Rate (avg hourly + benefits)	Subtotal Labor	Supplies	Subtotal Supplies	Equip.	Depreciation Per Task	Depreciation Per Year	Fuel (gal)	Fuel Cost Per Year @ $1.50/gal	Total
Inspect & Groom		12	16	$45.00	$8,640.00			Massey	$50.00	$600.00	10	$180.00	$9,420.00
Address Goals		9	8	$45.00	$3,240.00			Hand	$0.00	$0.00	0	$0.00	$3,240.00
Add infill		1	12	$45.00	$540.00	$8,000.00		Massey	$500.00	$500.00	10	$15.00	$9,055.00
Water						$900.00							$900.00
Field Paint		6	8	$35.00	$1,680.00	$185	$1,000	Machine/T	$75	$750	15	$225	$3,655.00
Contractors Services	Advanced Grooming, Cleaning & Repair @ $2700 Fall Visit: Lg Field												$2,700.00
	Standard Grooming & Cleaning @ $1,800 Spring Visit: Lg. Field												$1,800.00
										Annual Maintenance Total			**$30,770.00**

*Industry Recommends Grooming every 80-100 hours of play

Los Gatos, CA Study Considerations

Consideration	Natural Grass Field	Synthetic Turf Field
Irrigation	required	not required
Drainage	restricts playability	doesn't restrict playability
Maintenance	more labor intensive	less labor intensive
	requires annual reseeding	
	requires weekly mowing	requires weekly sweeping
Field Markings	temporary	permanent
	requires weekly repainting of the lines	
Playability	limited	unlimited
Special Events	Special Events cause signifigant damage to nautral grass fields	Special Events don't typically cause signifigant damage to synthetic turf fields
Weather	can limit use	not affected
Environment	provides oxygen	no water or chemical applications
Life Expectancy	requires regular periods of non-use	does not require periods on non-use
	requires renovation/replacement very two - three years depending on types of usage	replace top surface every 8-10 years replace subsurface every 16 - 20 years
Health Concerns	use of herbicides and fertilizer	concerns regarding materials used

Summary of Research Completed Specific to Menlo Park, CA

Discovery sessions were conducted with the City of Menlo Park, CA, Public Works Supervisor | Parks. The Public Works Supervisor indicated that the City is using a pesticide fee management approach to maintain athletic fields. He indicated that this methodology is not considered industry standard for maintaining athletic fields. He has a dedicated crew maintaining 9.5 acres of athletic fields consisting of:

- Natural Grass Softball Fields 2
- Natural Grass Baseball Fields 4
- Natural Grass Soccer Fields 6
- Synthetic Turf Soccer Fields 1

The City of Menlo Park strives to allow fields to be rested for rehabilitation for six to eights weeks during a growing season each year and recommends a maximum usage of 600 hours per field annually. The Public Works Supervisor indicated that removing chemicals and using 100% organic fertilizers slightly improved the condition of the field but in turn resulted in additional maintenance efforts and costs compared to traditional field maintenance using chemicals.

As the chart below shows, the Public Works Supervisor believes that he should have 4.5 FTEs to maintain the City's 13 fields.

Menlo Park Fields Current; Maintenance Operations & Maintenance Projections												
MAINTENANCE & REPAIR TASK	UNIT	TAKE-OFFS MULTIPLIER (# of Units)	UNIT PERSONNEL HOURS	HOURLY RATE Inc. Benefits	HUMANPOWER	ANNUAL FREQUENCY	CONSUMABLES/UNIT	CONSUMABLES	UTILITIES	ANNUAL COSTS	UNIT PERSONNEL HOURS	FTEs
Prep Time	Each	2	0.5	$115.26	$28,815.00	250	$0.00	$0.00	$0.00	$28,815.00	250.00	0.12
Travel Time	Each	2	1	$115.26	$57,630.00	250	$5.00	$2,500.00	$0.00	$60,130.00	500.00	0.24
Fertilization all athletic fields	Acres	10	0.5	$115.26	$2,305.20	4	$0.00	$40,068.00	$0.00	$42,373.20	20.00	0.01
Overseeding all athletic fields	Acres	10	1	$115.26	$6,915.60	6	$0.00	$5,300.00	$0.00	$12,215.60	60.00	0.03
Aerating all athletic fields	Acres	10	1	$115.26	$6,915.60	6	$0.00	$30,000.00	$0.00	$36,915.60	60.00	0.03
Mowing warm season all athletic fields	Acres	10	0.5	$115.26	$59,935.20	104	$0.00	$4,800.00	$0.00	$64,735.20	520.00	0.25
Banding	Each	0	1.00	$115.26	$0.00	52	$0.00	$0.00	$0.00	$0.00	0.00	0.00
Field Marking / painting- Turf fields	Each	0	2.00	$115.26	$0.00	0	$0.00	$0.00	$0.00	$0.00	0.00	0.00
Drag/mark game field	Each	6	1.00	$115.26	$17,980.56	26	$0.00	$0.00	$0.00	$17,980.56	156.00	0.08
Mound Maintenance	Each	6	3.00	$115.26	$8,298.72	4	$0.00	$1,150.00	$0.00	$9,448.72	72.00	0.03
Base Maintenance	Each	6	3.00	$115.26	$8,298.72	4	$0.00	$1,150.00	$0.00	$9,448.72	72.00	0.03
Goal maintenance/placement/anchors	Pair	4	2.00	$115.26	$3,688.32	4	$0.00	$1,150.00	$0.00	$4,838.32	32.00	0.02
Irrigation - watering, inspection, minimal repair/zone	Sites	9	16.00	$115.26	$863,066.88	52	$0.00	$0.00	$0.00	$863,066.88	7,488.00	3.60
Equipment maintenance	Rodeo	1	2	$115.26	$5,993.52	26	$0	$0.00	$0.00	$5,993.52	52.00	0.03
Training	Each	1	1.5	$115.26	$8,990.28	52	$0	$0.00	$0.00	$8,990.28	78.00	0.04
Administration	Each	0	1	$115.26	$0.00	52	$0	$0.00	$0.00	$0.00	0.00	0.00
Quantity and Number of Athletic Fields												
Natural Grass Softball Fields		2										
Natural Grass Baseball Fields		4										
Natural Grass Soccer Fields		6										
Natural Grass Cricket		0										
Synthetic Turf Softball Fields		0										
Synthetic Turf Baseball Fields		0										
Synthetic Turf Soccer Fields		1										
Synthetic Turf Cricket		0										
MAINTENANCE AND REPAIR TOTALS					$1,078,833.60			$86,118	$0	$1,164,952	9,360.00	4.50
MAINTENANCE & REPAIR TASK	UNIT	TAKE-OFFS MULTIPLIER (# of Units)	UNIT PERSONNEL HOURS	HOURLY RATE Inc. Benefits	HUMANPOWER	ANNUAL FREQUENCY	CONSUMABLES/UNIT	CONSUMABLES	UTILITIES	ANNUAL COSTS	UNIT PERSONNEL HOURS	FTEs
TOTAL OPERATIONAL & MAINTENANCE EXPENSES					$1,078,833.60			$86,118	$0	$1,164,952	9,360.00	4.50

Summary of Research Completed Specific to Sunnyvale, CA

Discovery sessions were conducted with the City of Sunnyvale, CA, Superintendent of Parks and Parks Manager. Staff indicated that the City maintains the following open space/athletic fields:

- Natural Grass Softball Fields 12
- Natural Grass Baseball Fields 9
- Natural Grass Soccer Fields 23
- Natural Grass Cricket 1
- Synthetic Turf Softball Fields 1
- Synthetic Turf Baseball Fields 1
- Synthetic Turf Soccer Fields 3
- Synthetic Turf Cricket 2

The total estimated acres of fields maintained by the City is estimated to be 96.7 based on the following assumptions:

Recreational Fields Acreage Summary

Softball Fields (12) × 2.0 acres = 24 acres

Baseball Fields (9) × 3.0 acres = 27 acres

Soccer Fields (23) × 1.8 acres = 41.4 acres

Cricket Field (1) × 4.3 acres = 4.3 acres

Total Playing Surface: ~97 Acres

Note: Excludes buffers, parking, and infrastructure.

Staff indicated that their biggest challenge to maintaining the athletic fields is the failing irrigation system. More information related to the irrigation system cab be found in Chapter 4 Observation Report.

As the chart below shows, Sunnyvale staff currently uses approximately 10.94 FTEs to maintain open space/athletic fields.

Sunnyvale Athletic Fields Current; Maintenance Operations & Maintenance Projections												
MAINTENANCE & REPAIR TASK	UNIT	TAKE-OFFS MULTIPLIER (# of Units)	UNIT PERSONNEL HOURS	HOURLY RATE Inc. Benefits	HUMANPOWER	ANNUAL FREQUENCY	CONSUMABLES/UNIT	CONSUMABLES	UTILITIES	ANNUAL COSTS	UNIT PERSONNEL HOURS	FTEs
Management	Each	1	1	$107.36	$26,840.00	250	$0.00	$0.00	$0.00	$26,840.00	250.00	0.12
Prep Time	Each	11	0.5	$69.03	$94,916.25	250	$0.00	$0.00	$0.00	$94,916.25	1,375.00	0.66
Travel Time	Each	11	0.5	$69.03	$94,916.25	250	$5.00	$13,750.00	$0.00	$108,666.25	1,375.00	0.66
Fertilization all athletic fields	Each	45	3	$69.03	$18,638.10	2	quote provided by City	$23,047.20	$0.00	$41,685.30	270.00	0.13
Aerating/overseeding all athletic fields	Each	45	8	$69.03	$49,701.60	2	quote provided by City	$7,944.30	$0.00	$57,645.90	720.00	0.35
Broadleaf application	Each	45	8	$69.03	$49,701.60	2	quote provided by City	$719.42	$0.00	$50,421.02	720.00	0.35
Mowing warm season all athletic fields	Each	45	2	$69.03	$323,060.40	52	$5.00	$11,700.00	$0.00	$334,760.40	4,680.00	2.25
Banding	Each	45	1.00	$69.03	$161,530.20	52	$100.00	$234,000.00	$0.00	$395,530.20	2,340.00	1.13
Ballfield Preparation	Each	21	13.00	$69.03	$18,845.19	1	$100.00	$2,100.00	$0.00	$20,945.19	273.00	0.13
Goal maintenance/placement/anchors	Each	23	2.00	$69.03	$3,175.38	1	$10.00	$230.00	$0.00	$3,405.38	46.00	0.02
Irrigation - watering, inspection, minimal repair/zone	Sites	24	8.00	$69.03	$689,195.52	52	$3.00	$3,744.00	$0.00	$692,939.52	9,984.00	4.80
Equipment maintenance	Each	10	1	$69.03	$35,895.60	52	$15	$7,800.00	$0.00	$43,695.60	520.00	0.25
Training	Each	10	20	$69.03	$13,806.00	1	$0	$0.00	$0.00	$13,806.00	200.00	0.10
Quantity and Number of Athletic Fields												
Natural Grass Softball Fields		12										
Natural Grass Baseball Fields		9										
Natural Grass Soccer Fields		23										
Natural Grass Cricket		1										
Synthetic Turf Softball Fields		1										
Synthetic Turf Baseball Fields		1										
Synthetic Turf Soccer Fields		3										
Synthetic Turf Cricket		2										
MAINTENANCE AND REPAIR TOTALS					**$1,580,222.09**			**$305,035**	**$0**	**$1,885,257**	**22,753.00**	**10.94**
MAINTENANCE & REPAIR TASK	**UNIT**	**TAKE-OFFS MULTIPLIER (# of Units)**	**UNIT PERSONNEL HOURS**	**HOURLY RATE Inc. Benefits**	**HUMANPOWER**	**ANNUAL FREQUENCY**	**CONSUMABLES/UNIT**	**CONSUMABLES**	**UTILITIES**	**ANNUAL COSTS**	**UNIT PERSONNEL HOURS**	**FTEs**
TOTAL OPERATIONAL & MAINTENANCE EXPENSES					**$1,580,222.09**			**$305,035**	**$0**	**$1,885,257**	**22,753.00**	**10.94**

The City's current irrigation system has reached the end of its service life and requires replacement. Ongoing staff efforts, along with the materials and equipment being used, are no longer sufficient to maintain reliable and effective operation over extended periods. In addition to replacing the failing irrigation system, this consultant recommends increasing the frequency of field mowing and enhancing staffing resources dedicated to irrigation management.

As demonstrated in the chart below, in order to improve the quality of the natural grass fields, the consultant recommends an additional 8 FTE to support Park Maintenance. In lieu of hiring additional staff, Parks Maintenance could consider establishing a dedicated team of existing employees equating to approximately 18 FTEs to maintain athletic fields using specialized equipment and mowers. This approach would improve turf quality while reducing the spread of weeds from non-athletic areas.

Additionally, implementing defined Maintenance Modes (priorities) for different turf areas within parks is recommended.

Two maintenance modes are recommended and shown below.

Mode 1 - Athletic Field Turf Care – Includes mowing twice a week at a height of 1.25–1.75", trimming, edging, aeration, top dressing, reseeding or sodding, fertilizing, weed control and disease and insect control.

- General Best Practices
    - Never remove more than ⅓ of the blade at once
    - High-use fields): mow at a height of 1.25–1.75"
    - Mow frequently (2–4x/week for sports fields)
    - Use reel mowers for high-quality, low-cut fields
    - Keep blades sharp for clean cuts and injury prevention

Mode 2 - Open space – Includes native grass mowing, trimming, edging, and re-seeding, disease and insect control, weed control and trail maintenance.

- General Best Practices
    - Mow frequently enough to avoid removing >⅓ of blade
    - High-use fields): mow at a height of 3.0 –3.5"
    - Raise height in summer (by ~0.5")
    - Leave clippings when possible (adds moisture and nutrients)
    - Keep blades sharp (critical for drought-stressed turf)

This methodology follows the Park Maintenance Standards developed by the National Recreation and Park Association (NRPA) as a basic framework for developing Maintenance Modes.

As the chart below shows, the recommended staff level is a minimum of 17.99 FTEs dedicated to maintaining open space/athletic fields

Sunnyvale Athletic Fields Recommended Maintenance Operations & Maintenance Projections												
MAINTENANCE & REPAIR TASK	UNIT	TAKE-OFFS MULTIPLIER (# of Units)	UNIT PERSONNEL HOURS	HOURLY RATE Inc. Benefits	HUMANPOWER	ANNUAL FREQUENCY	CONSUMABLES/UNIT	CONSUMABLES	UTILITIES	ANNUAL COSTS	UNIT PERSONNEL HOURS	FTEs
Management	Each	**1**	1	$107.36	$26,840.00	250	$0.00	$0.00	$0.00	$26,840.00	250.00	0.12
Prep Time	Each	11	0.5	$69.03	$94,916.25	250	$0.00	$0.00	$0.00	$94,916.25	1,375.00	0.66
Travel Time	Each	11	0.5	$69.03	$94,916.25	250	$5.00	$13,750.00	$0.00	$108,666.25	1,375.00	0.66
Fertilization all athletic fields	Each	45	3	$69.03	$18,638.10	2	quote provided by City	$23,047.20	$0.00	$41,685.30	270.00	0.13
Aerating/overseeding all athletic fields	Each	45	8	$69.03	$49,701.60	2	quote provided by City	$7,944.30	$0.00	$57,645.90	720.00	0.35
Broadleaf application	Each	45	8	$69.03	$49,701.60	2	quote provided by City	$719.42	$0.00	$50,421.02	720.00	0.35
Mowing warm season all athletic fields	Each	45	2	$69.03	$646,120.80	**104**	$5.00	$11,700.00	$0.00	$657,820.80	9,360.00	4.50
Banding	Each	45	1.00	$69.03	$161,530.20	52	$100.00	$234,000.00	$0.00	$395,530.20	2,340.00	1.13
Ballfield Preparation	Each	21	13.00	$69.03	$18,845.19	1	$100.00	$2,100.00	$0.00	$20,945.19	273.00	0.13
Goal maintenance/placement/anchors	Each	23	2.00	$69.03	$3,175.38	1	$10.00	$230.00	$0.00	$3,405.38	46.00	0.02
Irrigation - watering, inspection, minimal repair/zone	Each	24	**16.00**	$69.03	$1,378,391.04	52	$3.00	$3,744.00	$0.00	$1,382,135.04	19,968.00	9.60
Equipment maintenance	Each	10	1.00	$69.03	$35,895.60	52	$15.00	$7,800.00	$0.00	$43,695.60	520.00	0.25
Training	Each	10	20.00	$69.03	$13,806.00	1	$0.00	$0.00	$0.00	$13,806.00	200.00	0.10
Quantity and Number of Athletic Fields												
Natural Grass Softball Fields		12										
Natural Grass Baseball Fields		9										
Natural Grass Soccer Fields		23										
Natural Grass Cricket		1										
Synthetic Turf Softball Fields		1										
Synthetic Turf Baseball Fields		1										
Synthetic Turf Soccer Fields		3										
Synthetic Turf Cricket		2										
MAINTENANCE AND REPAIR TOTALS					**$2,592,478.01**			**$305,035**	**$0**	**$2,897,513**	**37,417.00**	**17.99**
MAINTENANCE & REPAIR TASK	**UNIT**	**TAKE-OFFS MULTIPLIER (# of Units)**	**UNIT PERSONNEL HOURS**	**HOURLY RATE Inc. Benefits**	**HUMANPOWER**	**ANNUAL FREQUENCY**	**CONSUMABLES/UNIT**	**CONSUMABLES**	**UTILITIES**	**ANNUAL COSTS**	**UNIT PERSONNEL HOURS**	**FTEs**
TOTAL OPERATIONAL & MAINTENANCE EXPENSES					**$2,592,478.01**			**$305,035**	**$0**	**$2,897,513**	**37,417.00**	**17.99**

Chapter 4 Sunnyvale, CA - Study Artificial Turf Vs Living Ground Cover (Natural Grass) Observation Report

This report outlines the observations of a sampling of parks containing open spaces and athletic fields as identified by park maintenance staff in the Sunnyvale inventory during a site visit that occurred February 11/12, 2026, (it should be noted that this was done during the winter rest period and when conditions are likely to be not the best). Observations were made while spending time with the maintenance staff and during self-guided tours conducted by the consultant. Observations represent conditions at that point in time. The open spaces and athletic fields identified in this report were visited, identifying the type of field (open space, diamond, rectangle, outfield of diamond, multipurpose), the type of surface (natural grass, synthetic turf, other), and the amenities available. Only the City parks with open space areas that could accommodate a sports field were evaluated. Smaller parks or parks with no potential to accommodate a sports field were not observed. Each open space/athletic field was qualitatively assessed, and scored using the following rating system:

Athletic Field Playability Rating (Natural Grass vs Synthetic Turf (infill))

References used to develop playability rating system:

- City of Toronto – Sport Field Playability & Responsibility Guidelines.
- Sports Field Management Association (SFMA) – Playing Conditions Index (PCI).
- The Turf Zone – How to Measure Playability for Safe Sports Fields.
- UConn Extension – Athletic Field Assessment Framework.
- RZ Sports Turf – Field Safety & Playability Audit.
- UC ANR – Sports Field Performance Factors.

Excellent – Natural Grass

High turf density, free of weeds and pests; no divots, fissures, or undulations; drains quickly with no standing water. Firm, uniform footing with optimal moisture. No hazards such as holes or exposed hardware.

Excellent – Synthetic Turf

Proper infill depth and even distribution; fibers upright with minimal wear. Secure seams, consistent traction, and no low spots or drainage failures.

Very Good – Natural Grass

Minor wear but strong turf cover, free of weeds. Effective drainage with brief moisture retention only. Minimal unevenness and no easily dislodged divots.

Very Good – Synthetic Turf
Minor infill migration: fibers show light wear but remain functional. Seams stable, traction consistent across surface.

Good – Natural Grass
Moderate turf thinning and occasional bare spots. Some slow-draining areas and moderate unevenness. Usable but not ideal.

Good – Synthetic Turf
Moderate fiber wear or matting, some infill displacement affecting traction. Minor low areas or drainage slowdown.

Poor – Natural Grass
Standing water, mud, or footprints filling with water. Divots easily dislodged, fissures, or undulations present. Large bare areas, compaction, or safety hazards are present.

Poor – Synthetic Turf
Hard surface from insufficient infill, severe fiber wear, seam separation, weed growth, poor drainage, or dangerous inconsistencies.

Summary of Overall Observations

During the site visit, I met with the maintenance staff, who reported that the irrigation system is the most significant ongoing issue. Assigned staff members are responsible for all park maintenance tasks including open space and athletic field maintenance, with the exception of high tree work. A gang mower is used for the large turf areas.

The City's current irrigation system has reached the end of its service life and requires replacement. Ongoing staff efforts, along with the materials and equipment being used, are no longer sufficient to maintain reliable and effective operation over extended periods.

The park supports multiple recreational activities, including softball, baseball, volleyball, cricket, and informal pickup soccer, with volleyball being the most heavily used sport. The community also utilizes the open spaces and athletic fields as dog parks, and numerous dogs were observed during the visit.

The middle school field was regraded, top-dressed, leveled, and reseeded last year, yet it is already showing noticeable wear. The turf is a mix of grass and weeds, and it appears not to be mowed low enough (typically 2-3 "height is ideal) or with appropriate sports-turf equipment. Overall, the field is being maintained more like general park open space rather than as an athletic surface.

Sunnyvale's natural grass athletic fields are maintained using the same practices applied to general open-space park areas. Fields are mowed higher and less frequently than typical athletic field standards, creating a clumpy, uneven surface. Although aerification and fertilization occur regularly, diamond infields are refurbished only once per year, far less often than the

weekly grooming common in many agencies. As a result, the infields retain water, show compaction, and lack consistent leveling.

Natural grass areas contain a mix of weeds, thin turf, bare spots, and uneven surfaces, including potholes and clumping grass. Heavy dog activity (digging, urination, soiling) contributes to turf damage. Overall, the natural grass athletic fields typically rate from Poor to Good in playability.

The synthetic turf multipurpose field at FairOaks Park, observed on the same day after rainfall, remained fully playable. Multiple sports activities were ongoing, and a high-use synthetic turf area outside the fence showed minimal wear. I observed baseball, multiple soccer teams, practicing throughout the area and people just informally using the field.

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Baylands Park

Created By Tom Diehl
Created At Wed, 02/11/2026, 6:09 PM EST

Type of Field N/A
Playability N/A
Description
Bayland's Park did not appear to have any areas being used as athletic or recreational sports fields. This park similar to the other parks I visited on Wednesday, February 11, 2026, occurred during a cold and rainy day.

Surface
Natural Grass
Amenities
N/A

Field Photos

Baylands Park entrance sign.
Baylands Park
Photos

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Columbia Park

Created By Tom Diehl
Created At Wed, 02/11/2026, 6:34 PM EST

Type of Field Multipurpose;Open space; Diamond;Rectangle
Playability Good
Description
This park, similar to the other parks I visited on Wednesday, February 11, 2026, occurred during a cold and rainy day.

The sports fields were being used by several groups. The field playability condition was rated as good.

Surface
Natural Grass
Amenities
Infield;Backstop;Fencing;Goals

Field Photos

Skinned infield retains water, doesn't appear to drain properly.
Columbia Park
Photos

Skinned infield retains water, doesn't appear to drain properly.
Columbia Park
Photos

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Skinned infield retains water, doesn't appear to drain properly.
Columbia Park
Photos

Natural grass field area, not level, contains weeds and bare spots.
Columbia Park
Photos

Natural grass field area, not level, contains weeds and bare spots. Infield edge that meets the grass needs to be manicured.
Columbia Park
Photos

Open space, natural grass area, very clumpy and uneven, mowed a high height, contains many weeds, and bare spots.
Columbia Park
Photos

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Open space natural grass area has weeds, multiple types of plant growth, bare spots, and unlevel areas.
Columbia Park
Photos

Open space grass area is unlevel and has weeds growing throughout.
Columbia Park
Photos

Open grass area has weeds and the surface is not level.
Columbia Park
Photos

Open space grass area is unlevel and has weeds growing throughout.
Columbia Park
Photos

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Entrance sign for Columbia Park.
Columbia Park
Photos

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De Anza Park

Created By Tom Diehl
Created At Thu, 02/12/2026, 1:52 PM EST

Type of Field Diamond
Playability Good
Description
The skinned infield has some areas that water ponds on, but other than that is weed free and fairly level. The grass infield is not level and the pitchers mound area is not in good condition and the infield dirt is not properly manicured. The grass is fairly thick, has weeds, Several potholes or uneven areas.

Surface
Natural Grass
Amenities
Infield;Backstop

Field Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
De Anza Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
De Anza Park
Photos

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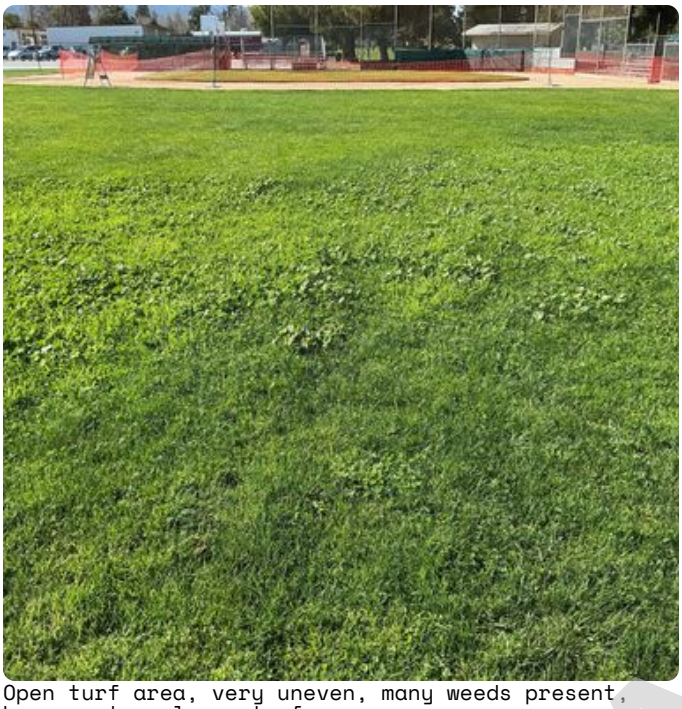

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
De Anza Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
De Anza Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
De Anza Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
De Anza Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
De Anza Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
De Anza Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
De Anza Park
Photos

This area of the infield appears to be properly maintained.
De Anza Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
De Anza Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
De Anza Park
Photos

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Encinal Park

Created By Tom Diehl
Created At Thu, 02/12/2026, 1:52 PM EST

Type of Field Open space;Diamond
Playability Poor
Description
The edge of the skinned infields need to be manicured and leveled. The grass is fairly thick, has weeds, Several potholes or uneven areas.

Surface
Natural Grass
Amenities
Infield;Backstop

Field Photos

Encinal Park entrance sign.
Encinal Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Turf is mowed at a high height.
Encinal Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
Encinal Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Turf is mowed at a high height.
Encinal Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
Encinal Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Turf is mowed at a high height.
Encinal Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Turf is mowed at a high height.
Encinal Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Turf is mowed at a high height. This section has some trenches in the truf.
Encinal Park
Photos

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Fair Oaks Park

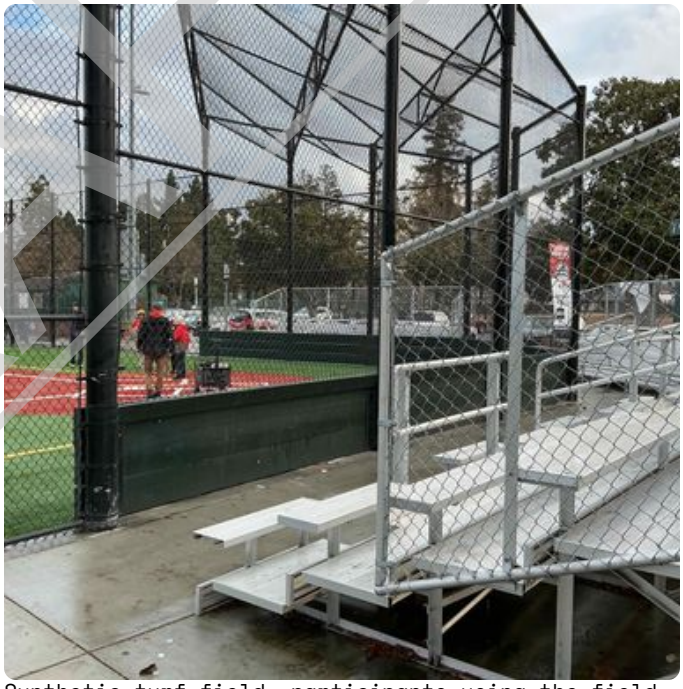
Created By Tom Diehl
Created At Wed, 02/11/2026, 7:23 PM EST

Type of Field Multipurpose
Playability Excellent
Description
Synthetic turf multipurpose field. Observed on the same day that I observed all of the other parks. The rain did not affect any activity on this field. I observed baseball, multiple soccer teams, practicing throughout the area and people just informally using the field. I also noted that one of the high use areas outside the fence had synthetic turf and it is not worn out.

Surface
Synthetic turf
Amenities
Infield;Backstop;Benches;Goals;Fencing

Field Photos

Fairoaks Park entrance sign.
Fair Oaks Park
Photos


Synthetic turf field, participants using the field in the rain. Multisport field.
Fair Oaks Park
Photos

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Synthetic turf field, participants using the field in the rain. Multisport field.
Fair Oaks Park
Photos

Synthetic turf field appeared to be in very good condition.
Fair Oaks Park
Photos

Synthetic turf field appeared to be in very good condition. Multiple user groups using the field for a variety of uses during the rainy day.
Fair Oaks Park
Photos

Synthetic turf field appeared to be in very good condition. Multiple user groups using the field for a variety of uses during the rainy day.
Fair Oaks Park
Photos

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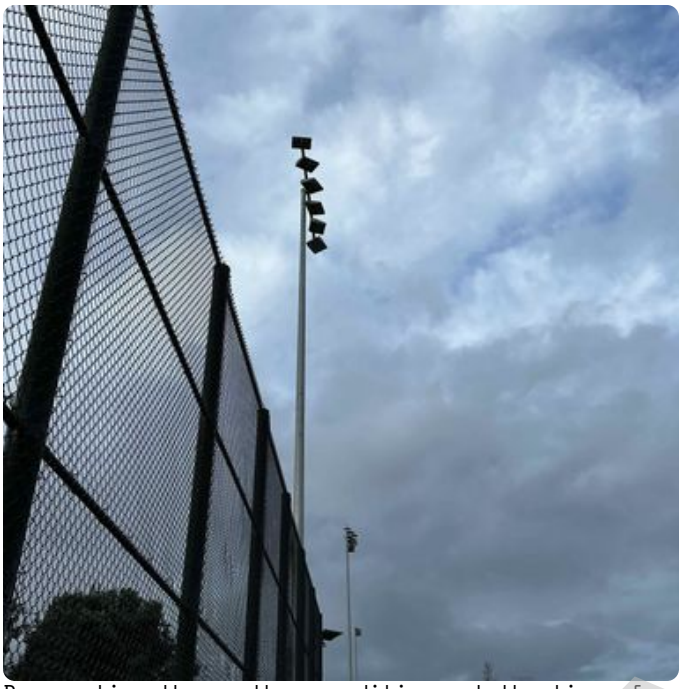

Documenting the weather conditions at the time of these observations.
Fair Oaks Park
Photos

Area outside the field fence containing synthetic turf in good condition. Normally, I would find this area containing bare spots if natural grass.
Fair Oaks Park
Photos

I walked the field, inspecting the seams, the inlaid lines, areas that had evidence of previous repair and I didn't find any area to be unsafe at the time of my observation.
Fair Oaks Park
Photos

I walked the field, inspecting the seams, the inlaid lines, areas that had evidence of previous repair and I didn't find any area to be unsafe at the time of my observation.
Fair Oaks Park
Photos

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I walked the field, inspecting the seams, the inlaid lines, areas that had evidence of previous repair and I didn't find any area to be unsafe at the time of my observation.
Fair Oaks Park
Photos

I walked the field, inspecting the seams, areas that had evidence of previous repair and I didn't find any area to be unsafe at the time of my observation.
Fair Oaks Park
Photos

I walked the field, inspecting the areas that had evidence of previous repair, and I didn't find any area to be unsafe at the time of my observation.
Fair Oaks Park
Photos

I walked the field, inspecting the seams, the inlaid lines, areas that had evidence of previous repair and I didn't find any area to be unsafe at the time of my observation.
Fair Oaks Park
Photos

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I walked the field, inspecting the areas that had evidence of inlaid lines and I didn't find any area to be unsafe at the time of my observation.
Fair Oaks Park
Photos

I walked the field, inspecting the areas that had evidence of previous repair, and I didn't find any area to be unsafe at the time of my observation.
Fair Oaks Park
Photos

I walked the field, inspecting the areas that had evidence of previous repair, and I didn't find any area to be unsafe at the time of my observation.
Fair Oaks Park
Photos

I walked the field, inspecting the areas that had evidence of previous repair, and I didn't find any area to be unsafe at the time of my observation.
Fair Oaks Park
Photos

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I walked the field, inspecting the areas that had evidence of previous repair, and I didn't find any area to be unsafe at the time of my observation. This visible seam measured less than 1/4" and did not appear to pose a safety issue.
Fair Oaks Park
Photos

I walked the field, inspecting the areas that had evidence of previous repair, and I didn't find any area to be unsafe at the time of my observation.
Fair Oaks Park
Photos

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I walked the field, inspecting the seams, the inlaid lines, areas that had evidence of previous repair and I didn't find any area to be unsafe at the time of my observation.
Fair Oaks Park
Photos

I walked the field, inspecting the areas that had evidence of previous repair, and I didn't find any area to be unsafe at the time of my observation. This seam repair should be inspected again and repaired if the synthetic turf begins to separate.
Fair Oaks Park
Photos

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Fairwood Park

Created By Tom Diehl
Created At Wed, 02/11/2026, 6:58 PM EST

Type of Field Open space
Playability Poor
Description
This is an open space field some areas have thick natural grass. Many areas have severe weeds. Several areas are totally bare. The surface is not very even or level.

Surface
Natural Grass
Amenities
Backstop

Field Photos

Fairwood Park entrance sign.
Fairwood Park
Photos

Open turf area, thick, many weeds present.
Fairwood Park
Photos

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Natural grass area has bare spots and clumps of turf, uneven surface, mowed very high.
Fairwood Park
Photos

Diamond infield is a bare spot, not manicured, grass is uneven, contains weeds and clumps of turf.
Fairwood Park
Photos

Diamond infield is a bare spot, not manicured, grass is uneven, contains weeds and clumps of turf.
Fairwood Park
Photos

Open turf area, thick, clumpy in some areas, bare spots in other areas, very uneven surface, many weeds present.
Fairwood Park
Photos

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Open turf area, thick, clumpy, uneven surface, many weeds present.
Fairwood Park
Photos

Open turf area, thick, clumpy in some areas, bare spots in other areas, very uneven surface, many weeds present.
Fairwood Park
Photos

Open turf area, thick, clumpy, uneven surface, many weeds present.
Fairwood Park
Photos

Open turf area, thick, clumpy, uneven surface, many weeds present.
Fairwood Park
Photos

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Open turf area, thick, clumpy in some areas, bare spots in other areas, very uneven surface, many weeds present.
Fairwood Park
Photos

Open turf area, thick, clumpy in some areas, bare spots in other areas, very uneven surface, many weeds present.
Fairwood Park
Photos

Open turf area, thick, clumpy in some areas, large bare spot, very uneven surface, many weeds present.
Fairwood Park
Photos

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Lakewood Park

Created By Tom Diehl
Created At Wed, 02/11/2026, 8:25 PM EST

Type of Field Open space;Diamond
Playability Poor
Description
The skinned infield is weed free and fairly level. The edge of the skinned infields need to be manicured and leveled. The grass is fairly thick, has weeds, Several potholes or uneven areas.

Surface
Natural Grass
Amenities
Backstop

Field Photos

Lakewood Park entrance sign.
Lakewood Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Lakewood Park
Photos

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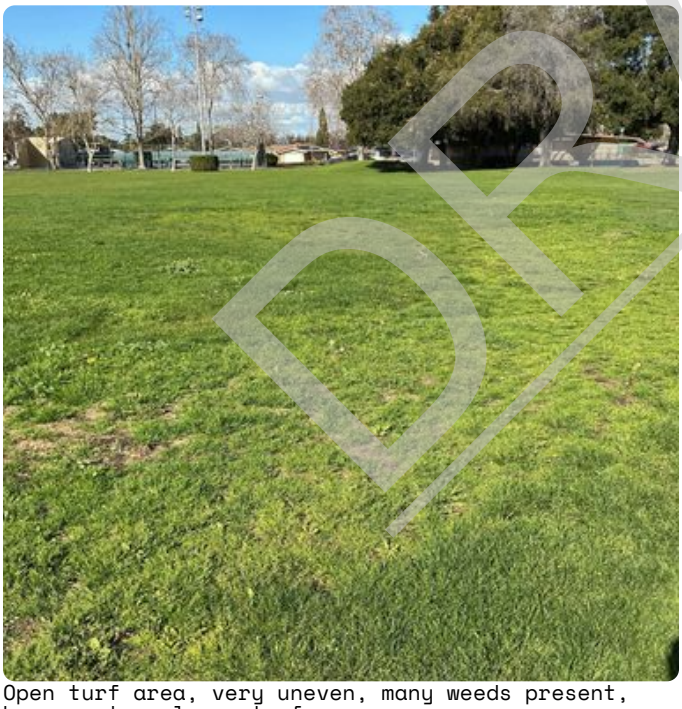
Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Lakewood Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Lakewood Park
Photos



Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Lakewood Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Lakewood Park
Photos

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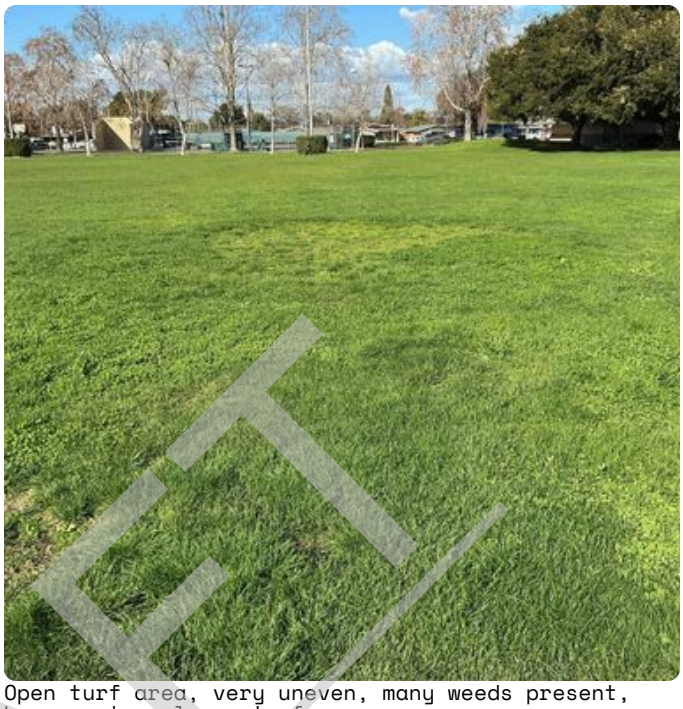
Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Lakewood Park
Photos



Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Lakewood Park
Photos

Open turf area, very uneven, clumpy turf, skinned infield in decent condition.
Lakewood Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Lakewood Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Many holes present, possibly from dogs digging.
Lakewood Park
Photos

Open turf area, very uneven, clumpy turf, skinned infield in decent condition.
Lakewood Park
Photos

This area of natural grass turf near irrigation head in good condition.
Lakewood Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Lakewood Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured.
Lakewood Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
Lakewood Park
Photos

Skinned infield appears to be in good condition.
Lakewood Park
Photos

Skinned infield appears to be in good condition.
Lakewood Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Lakewood Park
Photos

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Las Palmas Park

Created By Tom Diehl
Created At Thu, 02/12/2026, 9:56 AM EST

Type of Field Open space;Diamond
Playability Good
Description
Spoke with maintenance staff and they stated that the biggest issue is the irrigation system. Maintenance staff indicated that it takes a couple hours to mow this park's open space. Staff assigned to this park handle all maintenance tasks other than tree work. They use a gang mower for the large areas.

Activities played here are softball, baseball, volleyball, cricket, and some pick up soccer. Biggest use is volleyball. Also used by the community as a dog park.

Surface
Natural Grass
Amenities
Infield;Backstop;Fencing;Benches

Field Photos

Las Palmas Park entrance sign.
Las Palmas Park
Photos


Hardscape area appears properly maintained.
Las Palmas Park
Photos

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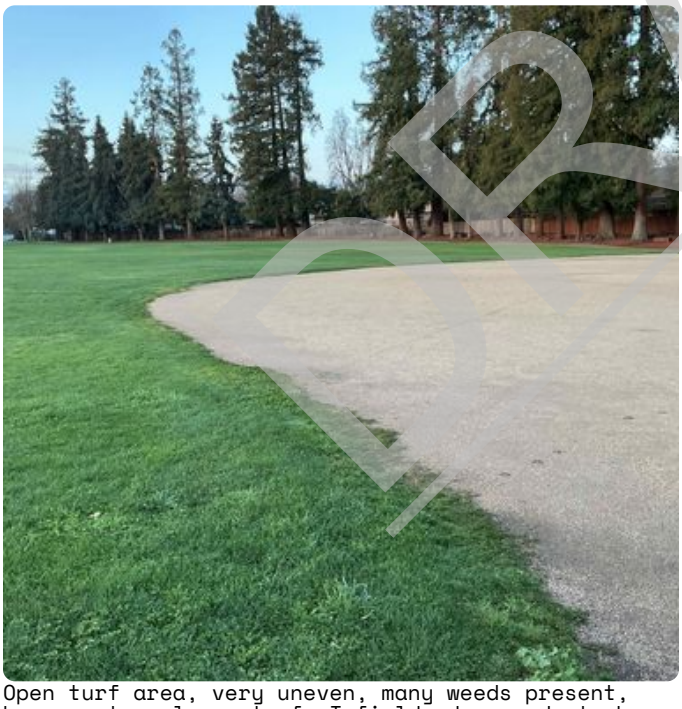
Area appears properly maintained.
Las Palmas Park
Photos

Infield appears to have some drainage issues. Resident's use all areas as dog parks.
Las Palmas Park
Photos



Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
Las Palmas Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
Las Palmas Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Several holes are present, appear to be caused by dogs digging.
Las Palmas Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Several holes are present, appear to be caused by dogs digging.
Las Palmas Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Several holes are present, appear to be caused by dogs digging.
Las Palmas Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Several holes are present, appear to be caused by dogs digging.
Las Palmas Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Las Palmas Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Appears to have drainage issues.
Las Palmas Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. I
Las Palmas Park
Photos

Open turf area is uneven, some weeds present, bare spots, clumpy turf.
Las Palmas Park
Photos

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Maintenance staff appears to have access to appropriate equipment.
Las Palmas Park
Photos

Secured storage area.
Las Palmas Park
Photos

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Maintenance Yard

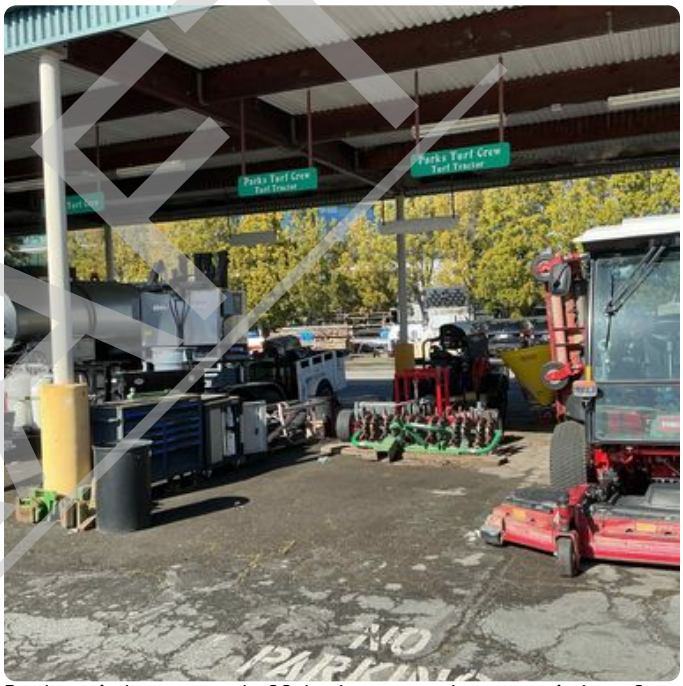
Created By Tom Diehl
Created At Thu, 02/12/2026, 4:59 PM EST

Type of Field N/A;Equipment
Playability N/A
Description
Maintenance yard is neat and organized. Staff have access to appropriate equipment. Equipment is stored under cover.

Surface
Other
Amenities
N/A

Field Photos

Park maintenance staff had access to a variety of appropriate equipment for maintaining athletic fields.
Maintenance Yard
Photos



Park maintenance staff had access to a variety of appropriate equipment for maintaining athletic fields.
Maintenance Yard
Photos

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Park maintenance staff had access to appropriate equipment for maintaining athletic fields.
Maintenance Yard
Photos

Park maintenance staff had access to a variety of appropriate equipment for maintaining athletic fields.
Maintenance Yard
Photos

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Ortega Park

Created By Tom Diehl
Created At Thu, 02/12/2026, 10:25 AM EST

Type of Field Diamond
Playability Good
Description
Large open space with a softball field, and a baseball field. Activities include softball, baseball, cricket, some informal soccer, and volleyball.

Surface
Natural Grass
Amenities
Infield;Fencing;Benches;Backstop

Field Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled. Infield does not drain properly.
Ortega Park
Photos

Infield edge needs to be manicured and leveled. Infield does not drain properly.
Ortega Park
Photos

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Infield does not drain properly.
Ortega Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled. Infield does not drain properly.
Ortega Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Appears to have a valley.
Ortega Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Ortega Park
Photos

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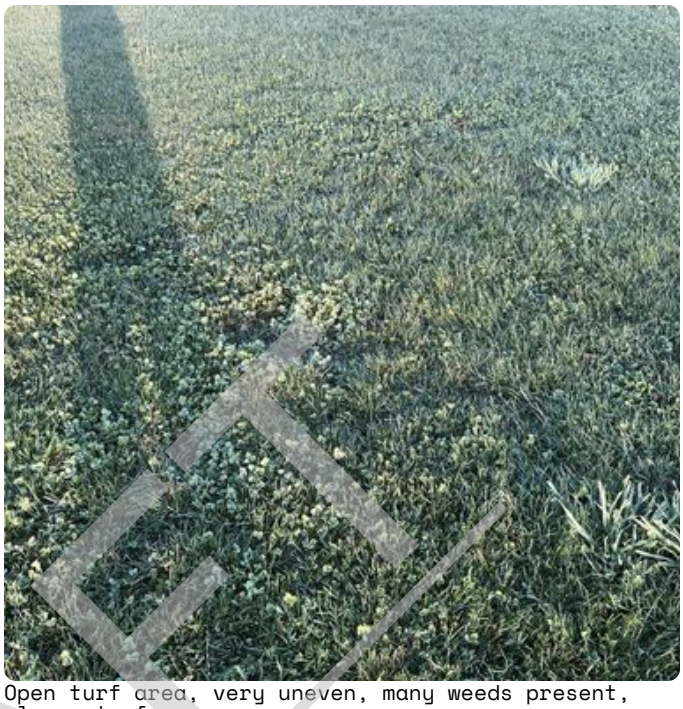
Open turf area, very uneven, many weeds present, does not drain properly.
Ortega Park
Photos



Open turf area, very uneven, many weeds present, clumpy turf.
Ortega Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
Ortega Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled. Infield does not drain properly.
Ortega Park
Photos

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Infield edge needs to be manicured and leveled. Infield does not drain properly.
Ortega Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Ortega Park
Photos

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Panama Park

Created By Tom Diehl
Created At Wed, 02/11/2026, 7:22 PM EST

Type of Field Diamond
Playability Poor
Description
This is a natural grass field area. The skinned infield is not level and has many areas that are holding water. The open space grass is a combination of weeds and some turf multiple areas of dirt with no grass. The park is being used as a dog park. I counted more than 15 dogs here today.

Surface
Natural Grass
Amenities
Benches;Fencing;Goals;Backstop;Infield

Field Photos

Panama Park entrance sign.
Panama Park
Photos

Skinned infield, retains water, doesn't drain properly.
Panama Park
Photos

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Skinned infield has weeds present.
Panama Park
Photos

Skinned infield, retains water, doesn't drain properly.
Panama Park
Photos

Skinned infield, retains water, doesn't drain properly.
Panama Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Panama Park
Photos

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Open turf area, very uneven, many weeds present, clumpy turf.
Panama Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Areas where dogs have dug holes - I witnessed this and residents in the parks told me this is what is causing these holes.
Panama Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Panama Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Panama Park
Photos

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Raynor Park

Created By Tom Diehl
Created At Thu, 02/12/2026, 1:53 PM EST

Type of Field Open space;Diamond
Playability Good
Description
The skinned infield has some areas that water ponds on, but other than that is weed free and fairly level. The grass infield is not level and the pitchers mound area is not in good condition and the infield dirt is not properly manicured. The grass is fairly thick, has weeds, Several potholes or uneven areas.

Surface
Natural Grass
Amenities
Infield;Backstop

Field Photos

Raynor Park entrance sign.
Raynor Park
Photos


Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
Raynor Park
Photos

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Infield appears to retain water. Infield edge needs to be manicured and leveled.
Raynor Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
Raynor Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
Raynor Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Raynor Park
Photos

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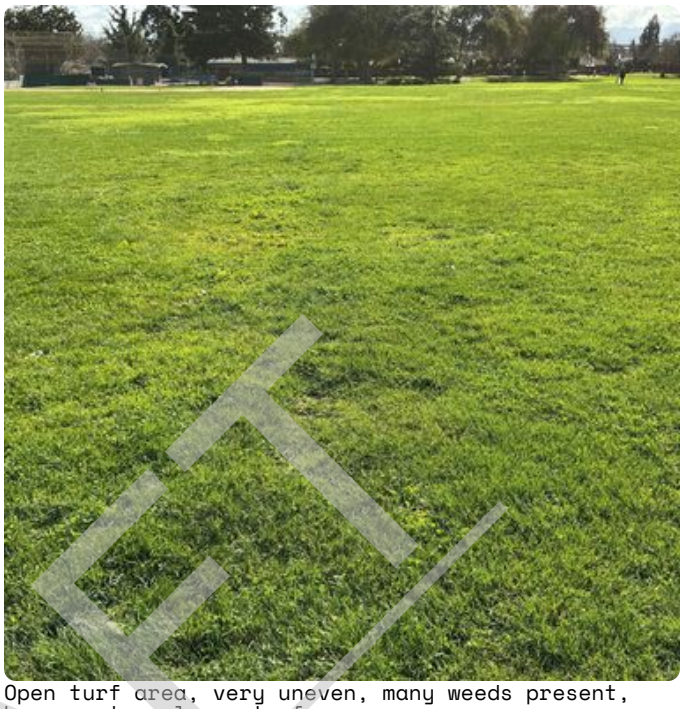
Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Raynor Park
Photos



Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Raynor Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Raynor Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Raynor Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled. Infield does not drain properly.
Raynor Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled. Evidence of tire rutting from vehicles being driven on the field.
Raynor Park
Photos

Skinned area exhibits drainage and surface levelling issues. Infield edge needs to be manicured and leveled.
Raynor Park
Photos

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San Antonio Park

Created By Tom Diehl
Created At Thu, 02/12/2026, 1:46 PM EST

Type of Field Open space;Diamond
Playability Poor
Description
The edge of the skinned infields need to be manicured and leveled. The grass is fairly thick, has weeds, Several potholes or uneven areas.

Surface
Natural Grass
Amenities
Infield;Backstop

Field Photos

San Antonio Park entrance sign.
San Antonio Park
Photos

Landscaped area properly maintained and area is clean.
San Antonio Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Turf is mowed at a high height.
San Antonio Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Turf is mowed at a high height.
San Antonio Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Turf is mowed at a high height.
San Antonio Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Turf is mowed at a high height.
San Antonio Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Turf is mowed at a high height. Evidence of dogs digging in the grass making potholes.
San Antonio Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
San Antonio Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Turf is mowed at a high height.
San Antonio Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Turf is mowed at a high height.
San Antonio Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
San Antonio Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
San Antonio Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
San Antonio Park
Photos

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Serra Park

Created By Tom Diehl
Created At Thu, 02/12/2026, 1:23 PM EST

Type of Field Open space;Diamond
Playability Poor
Description
The edge of the skinned infields need to be manicured and leveled. The grass is fairly thick, has weeds, Several potholes or uneven areas.

Surface
Natural Grass
Amenities
Infield;Backstop

Field Photos

Staff have storage area and equipment to maintain the fields.
Serra Park
Photos

Area maintained and kept clean.
Serra Park
Photos

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Residents use the fields and open space as dog parks.
Serra Park
Photos

Infield area closed for maintenance.
Serra Park
Photos

Infield edge needs to be manicured and leveled.
Serra Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Appears to be evidence of dogs digging in the grass causing potholes. May also be a sign of turf disease.
Serra Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Serra Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
Serra Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Turf is mowed at a high height.
Serra Park
Photos

Area of open space that is being repaired.
Serra Park
Photos

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Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Residents using field as a dog park.
Serra Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
Serra Park
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled.
Serra Park
Photos

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Seven Seas Park

Created By Tom Diehl
Created At Wed, 02/11/2026, 6:46 PM EST

Type of Field Open space;Multipurpose
Playability Poor
Description
This park, similar to the other parks I visited on Wednesday, February 11, 2026, occurred during a cold and rainy day.

The field playability condition was rated as poor due to the condition of the surface.

Natural grass area is mainly thick grass with some weeds. Many areas of uneven surface. Several areas of weeds that are quite substantial. The surface had many clumps of grass growing.

The open space field appeared to be mowed to high and too infrequently, leading to an uneven, clumpy surface.

Surface
Natural Grass
Amenities
N/A

Field Photos

Entrance sign to Seven Seas Park.
Seven Seas Park
Photos

This area of open space field had a thick natural grass covering.
Seven Seas Park
Photos

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This area of the open space was sunken, had bare spots, and was unlevel.
Seven Seas Park
Photos

Natural grass field area, not level, contains weeds and bare spots. Clumpy uneven surface, appears to be mowed at a height that is too high.
Seven Seas Park
Photos

This area of the open space was sunken, had bare spots, and was unlevel.
Seven Seas Park
Photos

This area of the open space was unlevel.
Seven Seas Park
Photos

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This area of the open space was unlevel.
Seven Seas Park
Photos

This area of the open space was sunken, had bare spots, and was unlevel.
Seven Seas Park
Photos

This area of the open space was unlevel.
Seven Seas Park
Photos

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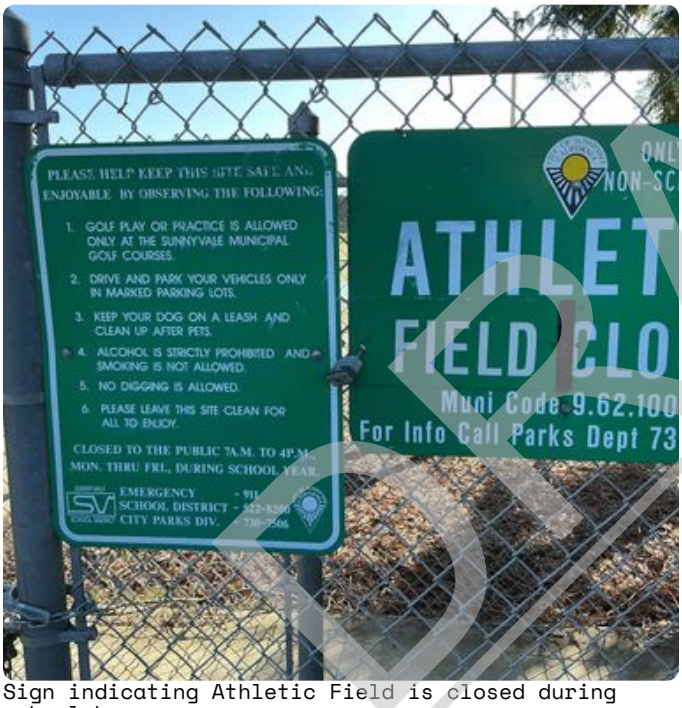
Sunnyvale Middle School

Created By Tom Diehl
Created At Thu, 02/12/2026, 12:36 PM EST

Type of Field Open space;Outfield of Diamond
Playability Good
Description
Middle school field was regraded and top dressed, leveled, reseeded, last year. Field is already showing signs of wear. The grass is a mixture of grass and weeds. The grass does not appear to be mowed, low enough or with the proper equipment. This field is not being managed like a sports field. It's being managed like an open space in a park.

Surface
Natural Grass
Amenities
Infield;Backstop;Benches

Field Photos



Sign indicating Athletic Field is closed during school hours.
Sunnyvale Middle School
Photos


Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Sunnyvale Middle School
Photos

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Infield edge needs to be manicured and leveled. Infield does not drain properly.
Sunnyvale Middle School
Photos

Evidence that water causes infield material to move making infield unlevel. Infield does not drain properly.
Sunnyvale Middle School
Photos

Skinned area, very uneven, many weeds present, bare spots, clumpy turf. Infield edge needs to be manicured and leveled. Infield does not drain properly.
Sunnyvale Middle School
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Sunnyvale Middle School
Photos

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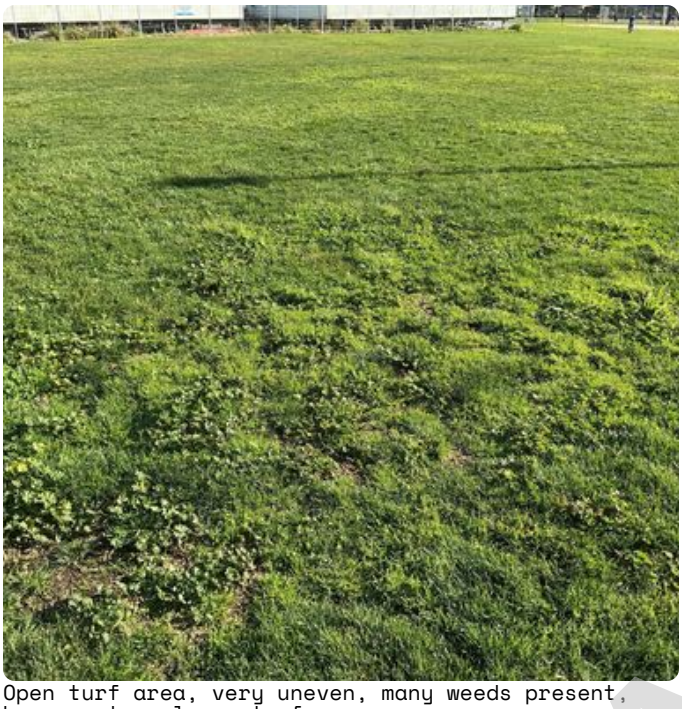

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Sunnyvale Middle School
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf.
Sunnyvale Middle School
Photos

Open turf area, very uneven, many weeds present, bare spots, clumpy turf. Appears to be an area the water doesn't drain well.
Sunnyvale Middle School
Photos

Open turf area, very uneven, many weeds present, clumpy turf.
Sunnyvale Middle School
Photos

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Open turf area, very uneven, many weeds present, large bare spots, clumpy turf.
Sunnyvale Middle School
Photos

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Washington Park

Created By Tom Diehl
Created At Wed, 02/11/2026, 8:03 PM EST

Type of Field Diamond
Playability Good
Description
The skinned infield has some areas that water ponds on, but other than that is weed free and fairly level. The grass infield is not level and the pitchers mound area is not in good condition and the infield dirt is not properly manicured. The grass is fairly thick, has weeds, Several potholes or uneven areas.

Surface
Natural Grass
Amenities
Infield;Fencing;Benches;Backstop

Field Photos

Overall, this natural grass playing surface is in good condition. The grass could benefit from being mowed at a shorter height more frequently. Vehicle other than specific lawn care equipment should not be driven on this field.
Washington Park
Photos

Overall, this natural grass playing surface is in good condition. The grass could benefit from being mowed at a shorter height more frequently. Vehicle other than specific lawn care equipment should not be driven on this field.
Washington Park
Photos

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This area of the field had a lot of weeds and was very uneven.
Washington Park
Photos

This area of the field had a lot of weeds and was very uneven.
Washington Park
Photos

This area of the field had a lot of weeds and was very uneven. Vehicle traffic on the fields should be restricted.
Washington Park
Photos

This area of the field had a lot of weeds and was very uneven. Vehicle traffic on the fields should be restricted.
Washington Park
Photos

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This skinned infield retains water and doesn't drain properly.
Washington Park
Photos

This area of the field had a lot of weeds and was very uneven.
Washington Park
Photos

This area of the field had a lot of weeds and was very uneven.
Washington Park
Photos

This area of the field had a lot of weeds and was very uneven. Vehicle traffic on the fields should be restricted. This skinned infield retains water and doesn't drain properly.
Washington Park
Photos

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This skinned infield retains water and doesn't drain properly.
Washington Park
Photos

This skinned infield retains water and doesn't drain properly.
Washington Park
Photos

This grass infield had a lot of weeds and was very uneven.
Washington Park
Photos

Summary of Observations

Overall Conditions

- Natural grass athletic fields generally range from Poor to Good playability.
- Common issues include uneven surfaces, weeds, potholes, bare spots, poor drainage, and high mowing height.
- Synthetic turf field at Fair Oaks Park remained fully playable in rain and was in excellent condition.

Maintenance Observations

- Irrigation system is the most significant ongoing issue across parks.
- Fields are maintained like general open space rather than athletic fields, leading to clumpy turf and unevenness.
- Diamond infields are refurbished only once per year instead of weekly grooming. Dog activity impact causing damage to fields.
- Many parks show extensive turf damage from dog activity including digging and soiling.

Park-Specific Findings.

- Columbia Park: Natural grass, uneven surfaces, weeds, bare spots, poor drainage in skinned infield.
- De Anza & Encinal: Very uneven turf, potholes, clumpy turf, infield edges need leveling.
- Fairwood & Lakewood: Severe weed presence, bare areas, thick clumpy turf, uneven surfaces.
- Las Palmas: Heavy dog use, irrigation issues, uneven turf, holes from digging.
- Panama Park: Field used heavily as dog park, poor turf conditions, standing water..
- Seven Seas Park: Thick grass, high mowing height, substantial unevenness and weeds.

Chapter 5 Overall Findings

The City of Sunnyvale commissioned a comprehensive evaluation of athletic field surface options, examining conventional natural grass, sustainably managed organic natural grass, and types of synthetic turf systems. This assessment integrated literature review, onsite field observations, stakeholder discussions, staff interviews, and comparative lifecycle cost analysis. The findings reflect both the current condition of Sunnyvale's athletic fields and the broader environmental, financial, and policy landscape influencing future field-surface decisions.

Across the city's natural grass fields, the study found consistent patterns of deterioration and uneven playability. Most open-space athletic fields are maintained using the same practices applied to general park areas - namely higher mowing heights, less frequent mowing cycles, and minimal sport-specific maintenance. As a result, the natural turf surfaces exhibit clumping, unevenness, widespread weed intrusion, bare patches, and poor drainage, all of which impact both safety and playability. Heavy dog activity, including digging and soiling, further degrades turf quality in many parks. These factors combine to push most natural grass fields toward a rating of Poor to Good, with only a few achieving higher levels of playability.

In contrast, the synthetic turf installation at Fair Oaks Park demonstrated excellent performance even under adverse weather. During the site visit - conducted during an extended period of rainfall - the synthetic multipurpose field remained fully playable with no drainage or surface issues observed. Multiple user groups were active simultaneously, highlighting synthetic turf's capacity to support intensive, year-round use. The field's high-use areas, including sections outside the fenced perimeter, also showed minimal wear.

Maintenance staff noted that irrigation challenges are one of the most persistent issues affecting natural grass field performance. Aging systems and inconsistent coverage contribute to turf loss and uneven moisture distribution, which in turn accelerate surface degradation. Meanwhile, diamond infields - another critical component of Sunnyvale's sports facilities - receive only annual refurbishment, far below the grooming frequency typically required to maintain safe and level conditions in high-use environments.

Lifecycle cost analysis revealed stark differences among the surface types evaluated. Natural grass fields have the lowest initial construction cost but require ongoing maintenance that escalates with heavy usage. Synthetic turf systems, while significantly more expensive to install, offer far greater reliability and can accommodate substantially more play hours with fewer cancellations. The study also considered organic natural grass management, noting that while organic practices may cost more during the initial transition years, long-term costs decrease as soil biology improves and water and fertilizer inputs decline. In several documented case studies including City of Menlo Park, CA fields managed by Public Works, organic natural grass has supported higher levels of use while

maintaining field quality and reducing environmental impacts associated with synthetic chemicals. However, organic field management results in additional maintenance staff efforts and additional cost for materials.

Regional policy trends add an additional layer of consideration. Local jurisdictions within Santa Clara County and surrounding regions continue to scrutinize synthetic turf due to concerns about microplastics, PFAS, heat island effects, and disposal challenges. Several agencies are exploring or implementing restrictions or moratoria on artificial turf installations. Conversely, state-level research—such as the OEHHA synthetic turf study—indicates that chemical exposure risks from modern synthetic turf infill materials are minimal under typical usage conditions. This contrast underscores the complex balancing act between perceived and measured environmental risks, practical athletic needs, and community expectations.

Field usage data demonstrates that Sunnyvale's fields - both grass and synthetic - support heavy annual demand. While synthetic fields show high reliability across the calendar year, many natural grass fields are overused relative to their ideal wear thresholds, leading to accelerated degradation. Combined with maintenance resource limitations, this heavy usage contributes to the widespread turf issues observed during the site visit.

Overall, the findings highlight a series of tradeoffs. Synthetic turf offers high reliability, consistent play quality, and exceptional capacity but carries environmental and end-of-life challenges. Conventional natural grass presents lower installation costs but struggles to meet usage demand under current maintenance practices. Organic natural grass provides a more sustainable long-term model but requires a coordinated shift in operations, training, equipment, and expectation as stated by City of Menlo Park, Public Works and other field managers. Sunnyvale's future decisions will depend on balancing these factors - field usage demand, cost efficiency, environmental considerations, and community priorities - to determine the most suitable surface types for different parks and sports uses.