

25-Year Life Cycle Cost Analysis: Synthetic Turf vs. Natural Grass for Dunaway Field and New Multi-Sport Baseball Field

This analysis provides projected costs and benefits of installing and maintaining natural grass compared to synthetic turf for the Dunaway Football Field and an adjacent new multi-sport field over a 25-year period. All costs presented are related to the surface options only and do not include cost estimates for features common to both surface types or other recommended athletic facility amenities (running track, lights, restrooms, spectator seating, etc.). Cost estimates are derived from various sources cited below and have been corroborated with analysis previously assembled by the Joint Building Committee and information provided by the City's contracted turf management contractor. All costs are presented in nominal terms without adjusting for inflation or applying a discount rate.

Key Assumptions:

- **Field Size:** Costs are based on field sizes that will allow for multi-sport and other uses with the main stadium field constructed within an oval running track and a separate multi-sport field incorporated into the outfield area of the adjoining baseball field.
- **Synthetic Turf Lifespan:** 10 years, requiring replacement and recycling of the used turf at year 10 and year 20.
- **Natural Grass Renovation Cycle:** 10 years, requiring partial re-sodding at year 10 and year 20.

Cost Breakdown & Analysis

1. Synthetic Turf

Synthetic turf typically involves a higher initial investment but lower annual maintenance costs with greater availability for multiple sports and other events.

- **Initial Installation Cost:**
 - o Dunaway \$828,000 + Baseball Multi-sport \$1,244,000 = **\$2,072,000**
 - o This covers the turf material, base preparation, drainage, and installation.
- **Annual Maintenance Cost:**
 - o Dunaway \$12,350 + Baseball Multi-sport \$12,350 = \$24,700 per year
 - o Covers regular grooming, testing, infill replenishment, cleaning, and minor repairs.
 - o Total over 25 years: \$24,700/year * 25 years = **\$617,500**
- **Replacement and Recycling Costs (Turf Surface Only):**
 - o Dunaway \$675,000 + Baseball Multi-sport \$825,000 = **\$1,500,000**

- o Occurs at Year 10 and Year 20.
- o Total replacements over 25 years: $\$1,500,000 * 2 = \$3,000,000$

Total 25-Year Life Cycle Cost for Synthetic Turf: $\$2,072,000$ (Initial) + $\$617,500$ (Maintenance) + $\$3,000,000$ (Replace/Recycle) = **$\$5,689,500$**

2. Natural Grass

Natural grass has a lower initial installation cost but higher annual maintenance requirements, especially under heavy use with significantly less/limited usability.

- **Initial Installation Cost:**
 - o Dunaway $\$428,000$ + Baseball Multi-sport $\$659,000 = \$1,087,000$
 - o Includes grading, soil amendments, irrigation, sod installation and germination blankets.
- **Annual Maintenance Cost:**
 - o Dunaway $\$40,500$ + Baseball Multi-sport $\$40,500 = \$81,000$ per year
 - o Covers mowing, watering, fertilizing, pest control, aeration, overseeding, and minor repairs.
 - o Total over 25 years: $\$81,000/\text{year} * 25 \text{ years} = \$2,025,000$
- **Renovation/Re-sodding Costs:**
 - o Dunaway $\$40,000$ + Baseball Multi-sport $\$50,000 = \$90,000$
 - o Occurs at Year 10 and Year 20 to restore significant wear and tear and replace germination blankets.
 - o Total renovations over 25 years: $\$90,000 * 2 = \$180,000$

Total 25-Year Life Cycle Cost for Natural Grass: $\$1,087,000$ (Initial) + $\$2,025,000$ (Maintenance) + $\$180,000$ (Renovation) = **$\$3,292,000$**

Cost-Benefit Analysis: Uses Per Year

A critical factor in comparing these surfaces is how often a field can be actively used for practices, games, and other events without significant damage or requiring extensive recovery time.

1. Synthetic Turf

- **Estimated Uses Per Year:**
 - o 274 total days (March 1-November 30) - Synthetic turf is highly durable and restricted less by weather conditions (rain, drought, snow), allowing for nearly year-round use.
 - o Estimate 28 days lost use due to weather (precipitation/temperature) – Synthetic turf is generally usable beginning late winter/early spring depending on snow melt and immediately following rain/heat events, therefore fewer days lost.
 - o Estimate an average of 2 actual uses per day per field (potential for varied events and greater uses/day when needed)

- o $(274 \text{ total days} - 14 \text{ lost days}) \times 2 \text{ uses per day} \times 2 \text{ multi-sport fields} = 1,040$
available uses per year (minimum)
- **Total Uses Over 25 Years:**
 - o $1,040 \text{ available uses/year} \times 25 \text{ years} = \mathbf{26,000 \text{ Uses}}$
- **Cost Per Use:**
 - o $\$5,689,500 / 26,000 \text{ uses} = \mathbf{\$219 \text{ per use}}$

2. Natural Grass

- **Estimated Uses Per Year:**
 - o 274 total days (March 1-November 30) - Natural grass fields require significant recovery time after heavy use or adverse weather (e.g., heavy rain creating muddy conditions, summer heat/drought). Usability is highly dependent on climate and usage intensity.
 - o Estimate 86 days lost use due to weather and ground conditions (precipitation/temperature/mud) - Natural grass turf is generally usable beginning mid/late spring depending on ground conditions (soil stability/ground water) and after a day or more following rain events, therefore more days lost.
 - o Estimate average of 1 actual use per day (potential for lower uses/day depending on field conditions/restrictions)
 - o $(274 \text{ total days} - 86 \text{ lost days}) \times 1 \text{ use per day} \times 2 \text{ multi-sport fields} = 376$
available uses per year (maximum)
- **Total Uses Over 25 Years:**
 - o $376 \text{ available uses/year} \times 25 \text{ years} = \mathbf{9,400 \text{ Uses}}$
- **Cost Per Use:**
 - o $\$3,292,000 / 9,400 \text{ uses} = \mathbf{\$350 \text{ per use}}$

Summary & Other Considerations

Feature	Synthetic Turf	Natural Grass
Initial Installation	\$2,072,000	\$1,087,000
Total 25-Year Maintenance	\$617,500	\$2,025,000
Total 25-Year Renovation/Recycle	\$3,000,000	\$180,000
Total 25-Year Life Cycle Cost	\$5,689,500	\$3,292,000
Uses Per Year	1,040	376
Total Uses (25 Years)	26,000	9,400
Cost Per Use	\$219	\$350

A synthetic turf field surface will provide nearly three times more usability as compared to natural grass, leading to a lower cost per use (\$219 vs. \$350). For both Dunaway Field and a new multi-sport field incorporated into the baseball field, maximizing field availability for various sports, practices, and community events is a priority. Not only will there be a greater return on investment in terms of cost per use, the ability to maximize the use of a synthetic turf field will support the City's efforts to rejuvenate and maintain other existing and future natural grass fields.

In addition to considering the above cost analysis, there have been a range of opinions provided by various stakeholders regarding the choice to be made between installing a synthetic turf or a natural grass field surface, with some preferring natural grass for health and environmental reasons and others advocating for synthetic turf to accommodate demand for more available field access for sports and other activities.

In a study completed July, 2024 for Montgomery County, Maryland a variety of considerations and findings were addressed comparing synthetic turf and natural grass fields. Excerpts of these other considerations and findings are listed below:

- Numerous competing factors are involved in decisions to choose natural grass or synthetic turf for an athletic field. Considerations specific to individual fields may recommend use of natural grass in some instances and use of synthetic turf in others.
- There are significant gaps in available research assessing the risk of synthetic turf field materials, particularly a lack of comprehensive epidemiological research on potential health effects and a focus mostly on crumb rubber infill, not other infill types.
- Both synthetic and natural grass fields can negatively impact the environment. However, the report noted that strategies exist to mitigate these impacts (e.g., using organic infill for synthetic turf, collecting and managing storm water runoff onsite for both synthetic turf and natural grass fields, adhering to organic management plans and investing in best management practices for grass fields, requiring PFAS free product testing and verifiable recycling certifications for synthetic fields).
- There are concerns for natural grass fields contributing to carbon emissions from maintenance machinery and requiring significant water usage for irrigation.
- There are limited and inconclusive research on the health effects of synthetic turf compared to natural grass, with a significant number of recent health safety studies relying on older data.
- The surface temperature of synthetic turf is widely acknowledged as a legitimate health concern, even though there is limited relevant data on the subject. Appropriate heat monitoring and use restrictions during extreme weather conditions are recommended.
- The type of playing field surface is not solely responsible for injuries according to many studies. Many studies examined older generation synthetic turf fields with crumb rubber infill. Most studies focus on athletes at a high level of competition (e.g., professional and college). All stakeholders agreed that both natural grass and synthetic turf surfaces are unsafe if not properly maintained.
- There has been legislation across the nation related to synthetic turf, ranging from bans on specific infill types to ensuring transparency in recycling of artificial turf.
- It is widely demonstrated that synthetic turf fields can accommodate significantly more hours and varied types of uses than natural grass fields.

Conclusion

While natural grass appears to have a lower total life cycle cost over 25 years (\$3,292,000 vs. \$5,689,500), the significant difference in usability per year (for both sports and non-

sport events) presents a compelling argument for synthetic turf from a cost-benefit perspective. This cost-benefit is further magnified when considering that the conditions and playability of all other current and future natural grass fields can be enhanced with the ability to shift demand, as needed, onto a synthetic turf field. By alleviating the demand for overuse of the City's fields for sports and other events, existing natural grass fields are able to be better maintained with the addition of a synthetic turf field allowing natural grass fields to be regularly rested furthering their playability and longevity.

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