



*Planning | Landscape | Athletic Facilities*

## REPORT

Delivery: *via email (ccronin@andoverma.gov)*

Date: June 27, 2017

To: **Mr. Christopher Cronin**  
Town of Andover

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Project: **Andover Athletic Fields Study**  
#15031.00

re: Athletic Fields Study Summary

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### **BACKGROUND:**

The Town of Andover implemented a study of their existing active recreational spaces (fields) to understand where the Town was deficient on field space. There had been complaints about playing surface characteristics from various user groups and the Town wanted to understand how its existing field quantity and maintenance of field space compared to a desirable program. An analysis was completed that reviewed number of fields and sizes to Andover's typical annual programs. Along with this analysis a comparison of existing maintenance practices to recommended maintenance practices was completed.

After the initial review, Activitas worked with the Town to select five (5) sites for further analysis to determine ways to best utilize the existing space without major renovation. Soil samples were obtained from four of the five sites for an analysis of the suitability to support athletic use in order to determine if additional amendments to the soils may improve conditions.

### **PROGRAM QUANTITY AND MAINTENANCE STUDY:**

Activitas reviewed each of Andover's outdoor athletic spaces for current programming and usage and compared it to the growing needs of the Town. Activitas compiled the hours of use (provided by the Town); type of use (provided by the Town); physical factors including orientation, general condition of turf grass, and information on known field issues; and maintenance practices at the various sites with appropriate Town personnel input. This information was compiled to produce Table 1 which rates the fields on a scale of best to worst based on maintenance personnel input (Columns I and II); shows the number of actual hours of scheduled use (annually) on each field (Column III); calculates and shows the Average Wear Index Value Hours (AWIV) which takes into account hours of use and type of use on each field in order to better equate fields with different uses (Columns IV and V); and provides information on existing maintenance practices. The existing maintenance practices were compared to the STMA's recommendations for Medium Maintenance practices (Columns VI-IX) which is appropriate for municipal fields. The Medium Maintenance practices are suggested to keep athletic fields in good condition where maintenance budgets and man-hours are

limited. The AWIV Hours were compared to the recommended use hours for a field receiving Medium Maintenance (Column X).

**TABLE 1**

I	II	III	IV	V	VI				X
					Medium Maintenance Practices (recommended per year) for 301-350 AWIV Hours				
Pts.	Fields (Rated Best to worst)	Hours of Use (Per Year)	AWIV Multiplier (Per STMA)	Average Wear Index Value Hours (AWIV)	Hollow Core	Deep Tine	Top-	Over-	Falling within Hours for Medium Maintenance (301-350hrs AWIV)
					Aeration (12) # / year being completed by Town	Aeration (1)	Dressing (1)	Seeding (1)	
	78 HS Turf	1152	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	59 Plateau	288	2.25	648	1	1	0	1	No
	58 Doherty Multi-Use	710	2.5	1775	1	1	0	1	No
	55 Doherty Baseball	440	2	880	0	0	0	0	No
	54 Practice Field	792	2.5	1980	0	1	0	1	No
	52 Aumais	768	1.25	960	1	1	0	1	No
	48 South Little League	programming to be determined			0	1	0	1	TBD
	47 Recreation Park	1258	2	2516	1	1	0	1	No
	47 Doherty Softball	173	1.25	216	0	0	0	0	Yes
<b>MULTI-PURPOSE FIELD USE</b>	47 Doherty Little League	120	1.25	150	0	0	0	0	Yes
	47 Lower Shawsheen	424	2.5	1060	1	1	0	1	No
	46 Upper Shawsheen	377	2.5	943	1	1	0	1	No
	46 West Middle	960	1.25	1200	0	1	0	1	No
	46 Wood Hill 3	246	2.5	615	1	1	0	1	No
	46 South Soccer	programming to be determined			0	1	0	1	TBD
	45 Bancroft South	120	2.5	300	0	1	0	1	Yes
	44 Wood Hill 1	390	2.5	975	1	1	0	1	No
	43 Blanchard Diamonds	programming to be determined			1	1	0	1	TBD
	42 Shawsheen School	not currently programmed			0	1	0	1	n/a
	41 Blanchard Soccer	160	2.5	400	1	1	0	1	No
	41 Sanborn Baseball	312	1.25	390	0	0	0	0	No by 40 AWIV
	40 Sanborn Upper	432	2.5	1080	0	0	0	0	No
	34 West Elementary	581	2	1162	0	0	0	0	No
	32 Sanborn Lower	144	2.5	360	0	0	0	0	No by 10 AWIV
	29 Stowe	programming to be determined			0	0	0	1	TBD
27 Bancroft East	131.25	2.5	328	0	0	0	0	Yes	
27 Ballardvale	not currently programmed			0	0	0	0	n/a	
25 Bowling Green	240	2.5	600	0	0	0	0	No	

Based on discussions with a local specialty athletic field contractor (maintenance and construction) it was determined that in the New England Region, the STMA's recommended maintenance practices and associated AWIV hours could be adjusted to provide for greater use of the fields and is consistent with practices being used in other municipalities as well as private organizations. Recommended practices are provided below and the hours of use can realistically be increased to 350-400 hours per year. It is important to note that wear on a field is not an exact science. As maintenance programs are implemented it will be important to evaluate the fields performance after the season to understand the level and hours of play on the field and see how a field has responded.

At present, the existing maintenance practices for all the fields in Andover do not meet the recommended practices (see Typical Yearly Maintenance Program table below). In addition each of the fields need to be brought back from its existing condition to an acceptable level prior to moving to Typical Yearly Maintenance Program practices. One year needs to be provided (with sport-use on the field likely allowed) of aggressive aeration, seeding, top dressing, soil amendments,

and fertilization within the field. This first year of maintenance will take the field from its current condition (provided there are not issues with the grades on the field) and improve the soil properties, grass growth, grass type, and overall surface quality. If a field has grading problems this program cannot fix those types of issues, that particular field would need to be stripped, re-graded, and seeded/sodded. After that first year if the field is maintained with a Typical Yearly Maintenance Program that includes the following and limits AWIV hours to that 350 hour maximum, the field will be able to remain in good playing condition.

- **1 Year Aggressive Maintenance** – Costs approximately \$18,000-\$20,000 per field; includes (final quantities depends on current field condition which will vary field to field):
  - Hollow Core Aeration
  - Deep Tine Aeration;
  - Top Dressing with sand and/or compost;
  - Over-Seeding
  - Fertilizing
- **Typical Yearly Maintenance** – Costs approximately \$12,000-\$15,000 per field per year; includes:

TYPICAL YEARLY MAINTENANCE PROGRAM	Late April/Early May	June	July	mid-August / early September	Late October / Early November
Soil Test for Development of Annual Fertilizer Program	X				
Core Aeration	X			X	
Overseeding	X	X			
Slice Seeding at High Wear Areas				X	X
Topdress with sand and/or compost	X			X	
Apply Fertilizer per Soil Test	X	X	X	X	X
Apply Lime	X				
Apply Herbicide (pre-emerg. Crabgrass)	X		X		
Apply Grub Control			X		

The recommended maintenance program can be done in-house or by contracting to an outside vendor. Likely there is a mix of both approaches to allow for timing and use of proper equipment in consideration of the particular maintenance practice. Fertilizer programs taking place on school properties will need further consideration to ensure they meet state and local regulations for use at these properties.

Table 1 clearly shows that the current hours of use do not allow for field surfaces to remain in good condition even if maintenance practices are adjusted, there are too many hours of use on the majority of fields. It is important to note that the user data that was obtained from the Town only accounts for scheduled use of the fields and the analysis does not take into account any added use of the fields from unscheduled use. Some rules of thumb aside from the AWIV recommendations in respect to hours of use on fields with good maintenance practices are as follows:

- |                   |  |
|-------------------|--|
| 200 Hours or Less | Sustain good field conditions  |
| 400-600 Hours     | Good field conditions with some thinning in localized high use areas |
| 800-1000 Hours    | Fair field conditions; expect thinning and wear throughout           |

1000+ Hours	Expect significant thinning, turf loss, surface damage, increased risk of athlete injury
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Based on the results and recommendations there are two options for consideration to improve the Town's field surfaces:

Option 1: Add "usable field surface hours". This will have to be in the form of either additional fields or conversion of existing fields to a synthetic turf surface with the addition of lights in order to extend use on those particular fields. This will help decrease the number of hours and use on the existing grass fields improving their condition.

Option 2: Further increase maintenance on the existing fields and decrease use on the fields. This option is likely infeasible as increasing maintenance beyond the recommendations of Yearly Maintenance Practices is costly and decreasing programs is not an option.

In addition to these options, there are things that can be done to reduce damage in high traffic areas:

- Restrict use when soil is extremely wet
- Restrict use when soil is very dry and turf is wilting
- Always rotate heavy play areas during practices
- Restrict use when grass is dormant
- Prohibit use when surface is thawing
- Prohibit all unofficial play, allowing no pick-up games
- During heavy use season, mow grass as tall as possible

Through discussions with the Department of Public Works, it was determined that Activitas should consider the ability to increase field space to help facilitate immediate improvements to field quantities. At this time, changes in field surface types (i.e. change to synthetic turf) have not been contemplated. Five sites were selected for the further review: Doherty Middle School, High Plain Elementary School, South Elementary School, Sanborn Elementary School, and Bancroft School.

#### **REVIEW OF SELECTED FACILITIES:**

Following the Program Quantity Study, it was determined that the following five (5) sites would provide the best opportunity for renovation / expansion to increase the playing field quantity within Town. The sites were selected based on amount of use, size, available parking, and acreage of surrounding available land for potential improvement. Review of each site's existing characteristics and soil conditions, and a recommendation for renovation is provided. Each recommendation considers proximity to the adjacent resource areas, field orientation, and other potential site restrictions.

While development of Cost Opinions was not included in this scope of work, the magnitude of costs associated with different field types should be understood. In the event that the maintenance programs described above may not be appropriate for some fields and a true renovation is required, the following are approximated project costs (design and construction) for a full size multi-purpose field, which is approximately 80,000 sf of space:

**Native Topsoil Natural Grass Field:** Assumes strip soil, amend soil, regrade subgrade, add drainage to perimeter of field, install new irrigation, and install thick cut athletic sod to field surface. This assumes that subsurface conditions have no issues and minimal permitting is required. Estimated Project Cost ~ \$325,000 - \$350,000.

**Infilled Synthetic Turf Filled:** Assumes strip and dispose of existing topsoil, grade subgrade, install drainage, install turf anchor, install new synthetic turf system similar to high school field. This assumes that subsurface conditions have no issues and minimal permitting is required. Estimated Project Cost ~ \$1.1M - \$1.2M.

*Refer to attachments for graphics and designs. All wetlands and riverfront areas are shown for intent only. Adjacent resource areas (wetlands) provide challenges with permitting new development, and updated site-specific survey will be required for fine tuning designs.*

Doherty Middle School (Playstead):

The existing athletic fields at Doherty Middle School include a walking track with a multi-purpose field inside, a softball field, a baseball field, and a little league field. Spaces within the outfield of the various fields also support multi-purpose activities. Parking for the athletic fields is provided via the parking lot that also serves the school building. Rogers Brook runs adjacent to the north side of the site and there is a bordering vegetated wetland that runs along the south side. Both of these resource areas have associated resource and buffer zones that would require permitting for work done within those areas. Soil testing was completed on-site. Soil pH and potassium levels were low; phosphorus levels varied between the fields; and organic matter was good in the fields. A fertilizer program should be considered to bring the nutrient levels within a preferred range.

It is understood that the existing track is for recreational use only. By removing the track and providing a recreational walkway around the edge of the site, the site will maintain the recreational walking program while providing the ability to expand field space. By reorganizing the fields, this site can support the following:

- (1) 210'x360' multi-purpose field (shown as soccer on plan)
- (1) 165'x240' multi-purpose field (shown as soccer on plan)
- (2) 135'x180' multi-purpose field (shown as soccer on plan)
- (1) 115'x180' multi-purpose field (shown as soccer on plan)
- (1) 90' baseball diamond with overlapping outfield area
- (2) 60' softball / little league diamond with overlapping outfield areas
- Formal Parking Area to support fields

The proposed layout eliminates the existing dead space at the complex thereby increasing usable field space.

High Plain Elementary School:

The athletic field facility at High Plain Elementary School consists of an open natural grass area that has two full size multi-purpose fields with the ability to shift fields and fit a small size practice area in between the fields. Parking is provided via the parking lot on the north side of the school. The facility is bordered by wetlands to the north, east and west. Soil testing was completed on-site. Soil pH, phosphorus, and potassium levels were low; organic matter was good in the fields. A fertilizer program should be considered to bring the nutrient levels within a preferred range.

Based on GIS information it appears that there is room to expand the existing field area to the north and east of the fields. There may be some expansion into 100' buffer zones to wetlands so renovations may require permitting with the Conservation Commission. By expanding the fields there is the potential at the site for:

- (3) 210'x360' multi-purpose field (shown as soccer on plan)
- (1) 165'x240' multi-purpose field (shown as soccer on plan)
- (1) 90' baseball diamond with overlapping outfield area

The proposed layout provides space for an additional full size field and a baseball diamond over what is possible in the existing condition.

South Elementary School:

The athletic field facility to the west of South Elementary School consists of an open natural grass area that hosts multiple sports that include soccer, flag football, and lacrosse. A little league field and two additional youth soccer fields are located in the area to the north of the school building, but a driveway leading to the school separates the two areas. Parking is provided via the parking lot that also serves the school building. Soil testing was completed on-site. Soil pH and potassium levels were low; phosphorus was optimum; and organic matter was adequate in the fields. A fertilizer program should be considered to bring the nutrient levels within a preferred range. The open natural grass area is located within an area identified as Natural Heritage Endangered Species Program (NHESP) Priority Habitat of Rare Species - PH 344.

While there is certainly land to expand into around the site, the presence of the NHESP overlay will require permitting with the MA Division of Wildlife and Fisheries.

If the permitting authorities allows for the expansion, expansion and reorganization can provide greatly increased space including:

- (2) 180'x320' multi-purpose field (shown as soccer on plan)
- (1) 135'x180' multi-purpose field (shown as soccer on plan)
- (1) 90'x105' multi-purpose field (shown as soccer on plan)
- (2) 60' little league diamond with overlapping outfield area

Expansion and reorganization would require modifications to existing drainage on-site as there is a large swale running through the site in the existing condition.

Sanborn Elementary School:

The athletic field facilities at Sanborn Elementary School are located within the wooded area between the school building and Interstate 93. The facilities include two (2) open natural grass areas that hosts multi-purpose fields. Additionally, there is a baseball field that has an outfield sized to fit many youth athletic fields. Parking for the facility is provided via the parking lot that also serves the school building. The facility is surrounded by wetlands on the north, west, and southeast. An additional wetland runs between the baseball field and the open natural grass area. Soil testing was completed on-site. Soil pH, phosphorus, and potassium levels were low; organic matter was good in the fields. A fertilizer program should be considered to bring the nutrient levels within a preferred range.

Sanborn appears to provide the greatest potential for expansion. By expanding into the adjacent wooded areas the area could fit:

- (4) 210'x360' multi-purpose field (shown as soccer on plan)
- (1) 165'x240' multi-purpose field (shown as soccer on plan)
- (1) 135'x180' multi-purpose field (shown as soccer on plan)
- (1) 90'x105' multi-purpose field (shown as soccer on plan)
- (1) 60' little league diamond with overlapping outfield area to replace the diamond previously down below

Permitting with the Conservation Commission will be required for this work as some portions of the fields are sited within 100-feet from the estimated edge of wetlands.

**Bancroft School:**

The athletic fields at Bancroft School are located at the rear of the school. However, there is an existing meadow area along the front of the school adjacent to Bancroft Road. This meadow area is large enough to be converted to a 135'x180' multi-purpose field for younger programs (e.g. U10 soccer). The conversion of this space to a field is likely the easiest and most quickly realized expansion of space.

It was requested to understand the costs of potentially converting the two (2) backfields at Bancroft from natural grass to synthetic turf:

Playground Field – field located to the south of the existing basketball court area is approximately 120'x170' = 20,400sf. To renovate this field from grass to synthetic assuming that there are no issues with subsoils (ledge, soil type, etc) the project cost would likely be in the \$250,000-\$300,000 range.

Parking Lot Field – field located to the west of the existing parking and south of the existing water tank is approximately 200'x130' = 26,000sf. To renovate this field from grass to synthetic assuming that there are no issues with subsoils (ledge, soil type, etc) the project cost would likely be in the \$310,000-\$360,000 range.

**CONCLUSION:**

The results of the Program Quantity and Maintenance Study demonstrate that the Town is deficient in field space and maintenance practices at most fields. As the analysis shows, even with improved and more stringent maintenance, the number of hours on playing surfaces needs to decrease. This can be accomplished by either finding additional field space to spread out programming and allow fields to rest; or by changing the actual surface type from natural grass to synthetic turf on various fields.

Through the review of the five selected facilities, Activitas has prepared numerous options to expand the available field space in Andover. It is recommended that the Town consider the expansion and rearrangement of fields as described. At this time, changes in surface were not contemplated, but it is highly recommended that future planning consider the use of synthetic turf on additional fields to relieve the burden on the natural grass surfaces.

The Town must be cognitive that as programs and user numbers continue to grow the maintenance requirements and need for field space will increase. The balance of all these items will be important in order to provide the community with playing surfaces that meet their needs.

# ATTACHMENTS

- Hours of Use
- Maintenance Questionnaire Results
- Analysis Questionnaire and results
- Field Wear Index Information
- Initial Site Assessment and Analysis
- Athletic Field Study Layouts
- Soil Testing Results