Newton Girls Soccer,
Newton Youth Soccer

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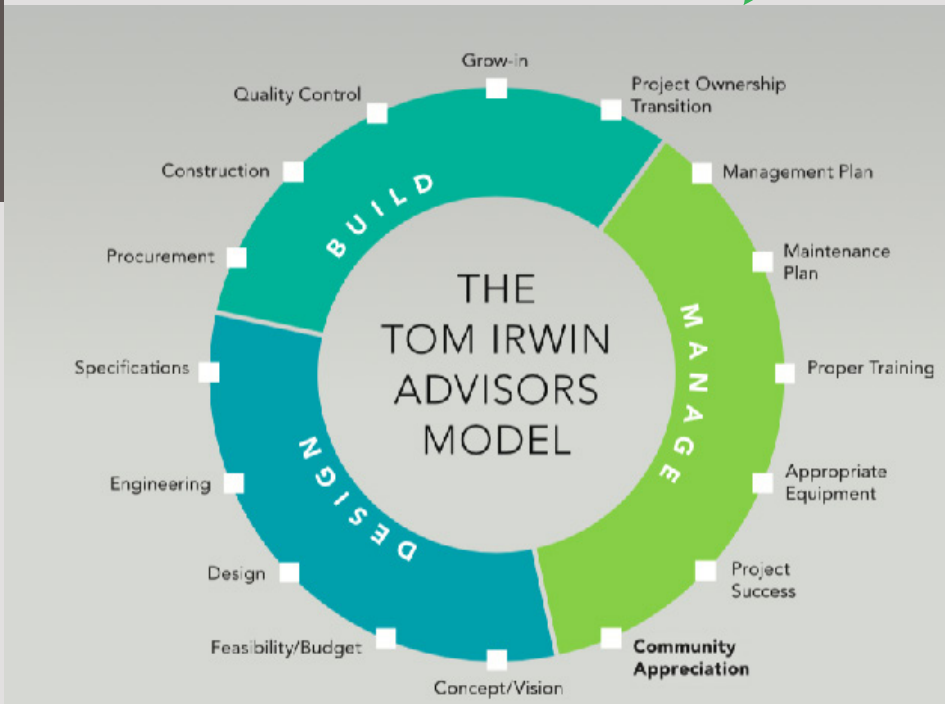

ATHLETIC FIELD ASSESSMENT REPORT

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INTRODUCTION:

Tom Irwin Advisors had been contracted by Newton Girls Soccer and Newton Youth Soccer to assess the fields used by both of Newton's youth soccer programs as well as other athletics programs including Newton Public Schools.

The following objectives of the assessment project include:

- Carry out a broader review of the Athletic Fields currently utilized by both soccer associations
- Determine the overall Performance Quality level of each field
- Identify the fields that have a high weed contamination
- Identify the next steps –– Utilize the results of the inspections to provide guidance in planning the 2021 IPM program.

Prior Field Assessments (PQS)

In April of 2019 a Core Performance Quality Assessment was performed at Weeks Park Athletic Field G (11 v 11). This is an in-depth performance analysis of the field comprising over 130 test criteria. A follow-up evaluation was performed in October 2020 at Weeks Park fields G (11 v 11) as well as Field K (11 v 11). These reports are available in the appendix. Being performed before and after the Pilot IPM strategy was put into place, the results of the PQS will offer insight into the initial changes occurring on the fields under a new maintenance regime.

It should be noted only two locations surveyed in this assessment were part of the Pilot 2020 IPM program, Weeks Park and Albemarle Field A. However, Weeks Park Fields C,D,G and K did not receive the complete IPM strategy as the herbicide product, Pylex which is very effective in controlling grassy weeds in particular Prostrate Knotweed (*Polygonum aviculare*), Crabgrass (*Digitaria spp.*) and Goosegrass (*Eleusine indica)*, was not applied. Additionally, only the Eastern half of Albemarle Field A received the full IPM program, the West side did not have receive any herbicide applications.

PERFORMANCE TESTING:

A total of 13 fields across 8 different locations were assessed using two separate techniques which help to determine performance quality of an athletic field.

In order to gain an understanding on the quality of the different sites used by the soccer associations, an assessment using criteria of the Core PQS assessment was designed to recognize current challenges, and pinpoint strategies for improvement.

The evaluation was carried out in October of 2020 at the following fields:

Site	Fields/s	Site	Field/s
Weeks Park	C and D (7 v 7)	Brown	A1 and B1 (11 v 11)
Cold Spring	11 v 11	Burr	11 v 11
McGrath	11 v 11	Forte	11 v 11
Hamilton	A and B (9 v 9)	Albemarle	A (11 v 11)

Note: Field reference maps are available in the appendix.

METHODOLOGY:

All of the fields at the sites were assessed in three different areas of the field:

- Goal Mouth, Penalty Spot, Center Circle

The following 14 criteria were assessed at the 3 areas identified above:

Moisture	Compaction 1" depth	Compaction 3" depth
Percentage of bare area	Percentage of weeds	Percentage of desirable Turf
Percentage of poa	Percentage of Clover	Percentage of Plantain
Percentage of Crabgrass	Percentage of Knotweed	Percentage of Bentgrass
Percentage of Disease	Percentage of Pests	

The tools used to assist with the assessment were:

Grass Quadrant (Used to measure percentages of weed, desirable grass, pests)

Penetrometer (Used for measuring compaction)

Pogo Pro Plus Moisture Probe and GPS (Used to GPS Map and measure moisture levels in soils)

RESULTS AND SUMMARY OF FINDINGS

The following results were based on assessment of 14 criteria and identified the following:

Site/Location	Field/s	PQS Score	Grade
Weeks	C (7 v 7)	40	C+
Cold Spring	11 v 11	36	C
McGrath	11 v 11	34	C
Brown	B1 (11 v 11)	29	C-
Hamilton	B (9 v 9)	29	C-
Weeks	D (7 v 7)	27	D+
Burr	11 v 11	26	D+
Forte	11 v 11	24	D
Albemarle	A (11 v 11)	20	D
Brown	A1 (11 v 11)	23	D
Hamilton	A (9 v 9)	12	E

Core PQS Assessment Results

Field	Core PQS Score	Grade
Weeks Field G – April 2019	17	D
Weeks Field G – October 2020	22	D+
Weeks Field K – October 2020	21	D+

Note: Please see appendix; Performance Quality Standards Ratings for an understanding of the above results.

MAJOR THEMES

- All the fields assessed had an average of over 50% weed cover at the locations tested.
  - A majority of the weed cover consisted of White Clover (*Trifolium repens*), Annual Bluegrass (*Poa annua*), Prostrate Knotweed (*Polygonum aviculare*) and Annual bluegrass (*Poa annua*)
  - Some fields also displayed a high percentage of frost killed Crabgrass (*Digitaria spp.*).
  - Highest Percentage of Broadleaf Weeds - Brown B1 (*White Clover and Knotweed*), McGrath (*White Clover*), Brown A1 (*White Clover and Knotweed)*.
  - Highest Percentage of Grass-like Weeds- Hamilton A and B (Crabgrass), Weeks Field D (Poa) and Forte (Crabgrass and Poa).
- Most fields suffered from differentiating planarity (Surface Levels) Issues.
- Moisture % - Weeks fields C and D, as well as Weeks field K had below standard VWC%. This is likely due to the day of testing being sunny and warmer compared to other test days that were overcast or drizzling, making the readings taken at the other fields in the standard rating.
- Compaction at 3" Depth - Albemarle A, Cold Spring, Burr, Weeks C, D and G all showed high compaction readings at the 3" depth. These fields all had compaction levels nearing 300 psi, which can be a restrictive environment for turfgrass roots to grow. An ongoing schedule of proper cultural activities (core aeration, deep time aeration, Verti-Quake and, top dressing) can alleviate high compaction.
- Weeks fields C and D - Original assessments carried out in September 2019 identified both of the fields to have approximately 85-90% weed cover. When assessed in October 2020 the weed % had reduced to between 73.3% - 75% an improvement of between 10-17% respectively
  Weeks C scored 48% higher than Weeks D. This disparity was created by the difference in weed pressure between the sites. Particularly in our PQS scoring matrix, we classify Poa annua and Bent grass as weed grasses.
  While each site was similar in the percentage of weed , the range and variety off weeds in Weeks D lowered its score.
  Weeks C had an average of 66% Poa Annua and 6.6% Crabgrass/Goose grass.
  Weeks D, however, had 13.3% Poa Annua, 3.3% Clover, 26.6 crabgrass/Goosegrass, 3.35 Knotweed, and, 31.6% Bent Grass.
  It also had 18.3% of diseased grass. All of these categories resulted in a lower score.

SUMMARY OF INTEGRATED PEST MANAGEMENT OPPORTUNITIES

The Purpose of an Integrated Pest Management (IMP) plan is to sustain Athletic Fields in a socially acceptable, environmentally responsible, and economically practical system which utilizes all suitable control strategies, cultural, biological, and chemical to keep turf damage below established and evolving thresholds.

An IPM plan, by its nature is integrated. It is not narrowly defined around the decision to apply or not apply a Pesticide more specifically a selective post emergent Herbicide. An IPM plan must consider all of the factors, which promote plant health. This includes well thought out nutritional plans, cultural programs, maintenance policies, staff training, usage policies, and irrigation activities. Good turf grass management is the first tier of an effective Integrated Pest Management Plan.

In most cases, Herbicides will have a significant positive impact of the overall quality. In most of the fields assessed, the cultural approach and turf health strategies will complement the plan to extend the use of Herbicide applications wider than the initial pilot program carried out in 2020. This will focus on the reduction of competition from weeds and provide the correct growing environment for the turf grass.

Highest Priorities (Based on study results);

To help the Parks, Recreation and Culture Department, we have identified from our study, as a priority, 5 sites and specific fields which would best benefit from the IPM approach inclusive of extended Herbicide use on public property for 2021. They are as follows:

- Forte 11 v 11- This field has a high percentage of grassy weeds; it also has several low laying areas. Both of these challenges would be addressed by implementing the IPM Program. A cultural approach of core aeration, topdressing, over seeding and a targeted plant health program, will help to "raise up" the low laying areas and improve turf cover. The Herbicide applications will address the weed pressure, providing an improved performance quality athletic surface.
- Burr 11 v 11- This suffers from higher compact soil at the 3" depth of all the fields assessed. There was also a high percentage of broad leaf weeds, which are often seen as a symptom of compaction. The IPM Program would help address both concerns. Core aeration and topdressing, overseeding and a targeted plant health program (all components of a successful IPM program) will help alleviate compaction, improve the turf vigor Herbicides will help eliminate the weed pressure while
- Weeks Park Fields C,D (7 v 7),G and K (11 v 11) - Under the Pilot IPM Program, which included the Core PQS assessments. Results have highlighted improvements on Field G as an example in just one season. While it was decided at the time of application to remove from the program the application of Pylex due to lack of evidence of the weeds normally controlled by this product, it was unfortunate that many of the grassy weeds documented in the assessments may not be present had Pylex been applied, or if a follow up application had been applied later in the summer.
  It is therefore our opinion that it would be highly advantageous to continue and extend the IPM pilot with Weeks into 2021, thus allowing any remaining weeds to be controlled and further surface improvements to continue.

- Cold Spring 11 v 11- This is a perfect candidate for the IPM Program, due to weed pressure along with compaction challenges. This field will likely need a bit more time to recover than the above fields. It would also benefit from depressions being leveled off with the field. Weeds often take hold in compacted soils.
- Field A 11 v 11- While this field is not ranked high on the assessment scoring, it has great potential. The East half of the field received the full Pilot IPM Program, however the West half was not treated with herbicides to reduce runoff potential to a neighboring brook. If only the Pilot IPM side was tested, the score would have been higher. Attentive cultural activities can help mitigate field issues, such as compaction and infiltration, as well as, help mitigate against run off concerns.

The following 3 sites would be the next priorities based on our study and its results:

- Brown Fields A1 and B1 11 v 11- These fields had the most broad-leaf weeds. They also had the most pronounced depressions. The fields will likely need more effort in addition to the IPM Program to raise the playing performance.
- Hamilton Fields A and B 11 v 11- These fields had the most pest pressure and bare area of all the fields tested. We would need to collect more data as to the best way to approach improving conditions on both fields.
- McGrath 11 v 11- While this field displayed White Clover pressure, it had one of the highest percentages of desirable turfgrass. It also appeared to have the least surface undulations of the fields assessed. With a high percentage of desirable grasses and an acceptable surface, removing the clover will improve durability and allow the desirable grass to proliferate.

WEEKS FIELD G PQS SUMMARY COMPARISONS

Weeks Park Field G has been subject to two Core PQS assessments conducted in April 2019 and again in October 2020. The results of the initial assessment were used to guide TIA in developing a Pilot IPM program best suited to improve playing conditions on Field G.

- In June of 2020 the field was Core Aerated, Topdressed and had Q4 Plus broadleaf herbicide applied.
- The field was given additional nutrition in July and August.
- The fields were "rested" in 2020 due to COVID-19, no play was scheduled but the public still used the fields.
- On October 14th, 2020 the second Core PQS assessment was performed to initially determine the effect of the Pilot IPM program.

When comparing the results of the two Core PQS assessments it appears the field has already greatly improved.

Criteria	4/12/19	10/14/20	Change	% Benefit	Explanation of Improvement
Planarity	1.1"	0.6"	-0.5"	45.5%	Core Aeration and Topdressing levels off low areas
Infiltration Rate	3.1"/hr	5.2"/hr	2.1"	67.7%	Core Aeration and Topdressing increase soil aeration porosity
Root Depth	1.6"	2"	0.4"	25%	Core Aeration, Overseeding performance turfgrass varieties and increased plant nutrition
Thatch Depth	0.9"	0.7"	-0.2"	22.2%	Core Aeration and Topdressing replacing thatch with seed
% Vegetative Cover	45.5%	94.4%	48.9%	207%	Overseeding performance turfgrass varieties and increased Plant Nutrition

While the 2020 PQS results show there is a high percentage of Weeds on the field, it is predominantly grassy weeds which would not have been affected by the broad-leaf herbicide (Q4 Plus) application made in June 2020.

From our understanding Pylex, an herbicide used specifically to control grass-like weeds, was originally supposed to accompany the Q4 Plus, however it was removed due to the lack of visible Grass-like weed such as Crabgrass, Goosegrass and knotweed pressure on the field at that time (Documentation of pests exceeding thresholds is required by Newton's IPM policy for treatment to occur

Crabgrass will not germinate until soil temperatures warm to approximately 55-70F. Once emerged from the seed bank, Crabgrass is able to out compete turfgrass easily due to its vigorous growth habit, through the hot summer months, where turf growth slows (Even with the assistance of irrigation).

It is therefore important that any applications of herbicides such as Q4Plus and Pylex be timed specifically for late spring/early summer (Early June) during weed seedling establishment or late summer (Mid /end of August) before self seeding takes place, to have the maximum impact and control. Once the herbicide has been applied to the fields and control is gained and observed, they should be assessed to determine thresholds and a better representation of their effect on playability throughout the year.

INDIVIDUAL FIELD ASSESSMENTS DATA

These fields were evaluated in three major areas; moisture, compaction, and weed pressure. These three field criteria are synergistic. Weeds often thrive in areas that are poorly drained and compacted. If the compaction is relieved and the field allows the water to infiltrate the desirable grasses can displace the weed.

While an IPM program focus's on all aspects of turf management, weed control is one of the major challenges in Newton. Why are weeds a concern? Once weeds establish themselves, it has been proven that surface hardness increases to levels that exceed acceptable standards resulting in a significantly increased risk of traumatic brain injury. Similarly, it has been scientifically established that with the loss of turf and an increase in weed density, surface traction is reduced and this increases the chance of bone, joint, and ligament injury.

In one study, 5.7% of high school football injuries were definitely related to field conditions and 15.2% were possibly related to field conditions. That's 20% of all injuries likely related to field conditions. The University of Massachusetts conducted a study looking at sports injuries and they found 39% of the injuries related to the condition of the field. Higher turf grass density was the single most important factor in reducing injuries.

In 2018, nationwide, there were 215,000 youth football injuries and 110,000 youth baseball injuries, and 88,000 youth soccer injuries. 10% of all lawsuits related to sports injuries claim that the athletic field was inadequately maintained.

In conclusion, it is clear that the presence of the weed contamination to the levels found in the fields covered in the study is not only having a negative affect to the performance quality, but also to the user enjoyment, experience and potential safety. The IPM pilot as it extends over time will help improve athletic fields by reducing weed thresholds and creating a safer and more enjoyable playing surface. As athletic fields improve, the need for future pesticide applications should diminish.

FIELD ASSESSMENT:

Week's Park Field C (7 v 7)

October 14th, 2020

Observations-

- This small field is located adjacent to the Tennis courts, closest to the parking lot.
- The field had no line markings, test locations were determined using the goals as reference points.
- The field has a high percentage of Annual Bluegrass (Poa annua) across the field.
- The compaction at the 3" depth is nearing the 300psi threshold, in these tight environments, turfgrass roots growth can be restricted.
- The center location of the field was tested for compaction multiple times, the 3" compaction registered over 300psi every test.
- Areas of a park closest to the parking lot tend to be the most compact at many other clients we visit.
- There was a small percentage of frost killed Crabgrass (Digitaria spp.) present.
- **The field had no bare area!**
- Volumetric Water Content was an average of 14%, this is on the dry side of the spectrum, 20-25% is more desirable.

Next Steps-

Application of Pylex herbicide would reduce the amount of Crabgrass.

Core Aeration to relieve compaction at the 3" depth.

Overseeding more desirable species of turfgrass.

The use of wetting agents can help hold moisture in the soil profile more efficiently.

FIELD PHOTOGRAPHS:

Left: Weeks Park Field C Overall.

Right: Midfield looking West. Note tan patches of frost killed Crabgrass and lime green patches of Annual Bluegrass.

Above: Midfield grid aerial view. Note high percentage of Annual Bluegrass which is lime green in appearance.

Date: 10/14/2020		Location: Weeks Park Field C				
Criteria	**South Goal**	**Center Field**	**North Penalty Kick**	**Averages**	**PQS Scores**	**Grade**
Moisture %	13.1	14.2	14.7	14	1	E
Compaction 1"	109	105	104	106	2	D
Compaction 3"	243	331	218	264	2	D
% Desire	35	15	30	26.6	0	E
% Bare	0	0	0	0	5	A
% Weed	65	85	70	73.3	0	E
% Poa	55	80	65	66.6	0	E
% Clover	0	0	0	0	5	A
% Plantain	0	0	0	0	5	A
% Crab/Goose	10	5	5	6.6	0	E
% Knotweed	0	0	0	0	5	A
% Bentgrass	0	0	0	0	5	A
% Disease	0	0	0	0	5	A
% Pest	0	0	0	0	5	A
					Total:40	Overall: C+

FIELD ASSESSMENT:

Week's Park Field D (7 v 7)

October 14th, 2020

Observations-

- The South goalmouth had been decimated to the rootzone mix.
- It appeared the stand of turf in the goalmouth had been comprised of Bentgrass (Agrostis stolonifera), that had been inoculated and injured by a disease, then subject to traffic.
- High percentage of frost killed Crabgrass (Digitaria spp.).
- The average compaction at a 3" depth was 239 psi. This is firmer than we would advise.
- Most of the weed pressure was comprised of Annual Bluegrass (Poa annua), Crabgrass (Digitaria spp.) and Creeping Bentgrass (Agrostis stolonifera).
- The average Volumetric Water Content was 14.8%, it would be more desirable to be in the 20-25% range.
- The Creeping Bentgrass in the field had evidence of disease pressure, likely Dollar spot (Clarireedia homoeocarpa).

Next Steps-

Apply Pylex herbicide to reduce the amount of Crabgrass

Core aeration of the field, at least once per season, to relieve compaction at the 3" depth.

Overseeding more desirable species, particularly in the goal mouth areas.

Rotating or shifting the field more often could help spread out the foot traffic, mitigating wear areas.

FIELD PHOTOGRAPHS:

Left: Weeks Field D Overall.

Right: South Goalmouth Turfgrass damage.

Left: Midfield Looking North. Note the tan areas, comprised of frost killed Crabgrass.

Right: Mid-field Grid Aerial. Note high percentage of tan area, comprised of frost killed Crabgrass.

Date: 10/14/2020		Location: Weeks Park - Field D				
Criteria	**South Goal**	**Center Field**	**North Penalty Kick**	**Averages**	**PQS Scores**	**Grade**
Moisture %	15.6	13.9	15	14.8	1	E
Compaction 1"	90	131	85	102	2	D
Compaction 3"	258	227	231	238.6	2	D
% Desire	10	15	15	13.3	0	E
% Bare	15	0	5	6.6	0	E
% Weed	75	75	75	75	0	E
% Poa	5	15	20	13.3	0	E
% Clover	10	0	0	3.3	1	E
% Plantain	0	0	0	0	5	A
% Crab/Goose	0	65	15	26.6	0	E
% Knotweed	10	0	0	3.3	1	E
% Bentgrass	50	5	40	31.6	5	A
% Disease	45	0	10	18.3	5	A
% Pest	0	0	0	0	5	A
					Total:27	Overall: D+

FIELD ASSESSMENT:

Hamilton Field A (9 v 9)

Lower Falls Community Center

October 21st, 2020

Observations-

- The average Volumetric Water Content was measured at 20.2% on the day of testing. The weather was misty at the time of testing, there had been 1.57" of precipitation the previous 7 days.
- The average compaction at the 3" depth was registered at 126psi, this is on the low side of the range of acceptance.
- The turf in and around the South goal was showing the effects of disease pressure, likely Brown Patch (Rhizoctonia solani).
- Numerous low seams populated by Annual Bluegrass (Poa annua), Prostrate Knotweed (Polygonum aviculare), frost killed Crabgrass (Digitaria spp.) and voids.
- The bare areas also had high populations of earthworm casts and ant mounds.
- Area along the East side line, just South of midfield had ripped up turf which did not appear to be from cleats. It was likely caused by skunks looking for grubs.

Next Steps-

A soil investigation to gain more understanding of why there is so much bare area and pest activity.

Application of nutrients to improve soil health, once it is determined where the field is lacking.

Slice-seeding performance turfgrass when the soil conditions are better understood.

FIELD PHOTOGRAPHS:

Left: Overall View looking Southwest: note large swaths of tan and brown area.

Right: Turfgrass leaf blades from South goal mouth: note brown lesions likely caused by a disease.

Left: North goal area: note brown ant mounds and earthworm casts, tan area of frost killed Crabgrass, and shiny appearing broad leaf weeds in bottom right corner.

Right: South goal looking North: note the tan/brown areas in the field of play appear larger than the green areas.

Date: 10/21/2020		Location: Hamilton Field A				
Criteria	**South Goal**	**Center Field**	**North Penalty Kick**	**Averages**	**PQS Scores**	**Grade**
Moisture %	19	21.6	20.1	20.2	3	C
Compaction 1"	60	46	74	60	0	E
Compaction 3"	121	110	146	125.6	1	E
% Desire	10	5	1	5.3	0	E
% Bare	40	40	34	38	0	E
% Weed	50	55	65	56.6	0	E
% Poa	30	5	2	12.3	0	E
% Clover	15	1	0	5.3	0	E
% Plantain	0	0	0	0	5	A
% Crab/Goose	0	34	50	28	0	E
% Knotweed	3	15	13	10.3	0	E
% Bentgrass	2	0	0	0.6	3	C
% Disease	60	0	0	20	0	E
% Pest	5	4	7	5.3	0	E
					Total: 12	Overall: E

FIELD ASSESSMENT:

Hamilton Field B (9 v 9)

Lower Falls Community Center

October 21st, 2020

Observations-

- The average Volumetric Water Content observed across the field was 21.5%. There was a heavy mist present during testing and 1.57" of precipitation had fallen the previous 7 days.
- The average Compaction at the 3" depth was determined to be 180psi, this is a desirable range for maintaining healthy turfgrass growth.
- The field had large swaths of bare area, White Clover (Trifolium repens), and frost killed Crabgrass (Digitaria spp.), with smaller populations of Annual Bluegrass (Poa annua) and Prostrate Knotweed (Polygonum aviculare).
- The South goal mouth had patches of Creeping Bentgrass (Agrostis stolonifera), that appeared to be showing the effects of a disease, , likely Brown Patch (Rhizoctonia solani).
- The area in and around the South 18' box appeared to be depressed and was very bare.
- The bare areas had high populations of earthworm casts and ant mounds visible on the surface.
- A low area in front of the North 18' box on the East side, had a ripped-up appearance likely from a predator hunting for grubs.

Next Steps-

Apply Pylex and Q4 Plus herbicide to control grassy and broadleaf weeds.

A soil investigation to gain more understanding of why there is so much bare area and pest activity.

Application of nutrients to improve soil health, once it is determined where the field is lacking.

Slice-seeding performance turfgrass when the soil conditions are better understood.

FIELD PHOTOGRAPHS:

Left: North penalty kick spot looking back to the East side line: note tan and brown areas and inconsistent turf color. Also, skunk damage just outside the 18' box in center of the picture.

Right: Center field looking Northwest: note large tan area comprised of frost killed Crabgrass.

Above: South Goal looking North: note dark spots in the bare area caused by earthworm casts and ant mounds.

Date: 10/21/2020		Location: Hamilton - North				
Criteria	**South Goal**	**Center Field**	**North Penalty Kick**	**Averages**	**PQS Scores**	**Grade**
Moisture %	20.7	22.2	21.5	21.4	3	C
Compaction 1"	86	100	115	100.3	2	D
Compaction 3"	173	147	220	180	3	C
% Desire	1	5	1	2.3	0	E
% Bare	60	5	30	31.6	0	E
% Weed	39	90	69	66	0	E
% Poa	2	10	9	7	0	E
% Clover	0	75	10	28.3	0	E
% Plantain	0	0	0	0	5	A
% Crab/Goose	34	0	50	28	0	E
% Knotweed	3	1	0	1.3	1	E
% Bentgrass	0	4	0	1.3	5	A
% Disease	20	0	0	6.6	5	A
% Pest	0	15	13	9.3	5	A
					Total: 29	Overall: C

FIELD ASSESSMENT:

Brown Field B1 (11 v 11)

Oak Hill Middle School – Newton, MA

October 21st, 2020

Observations-

- The average Volumetric Water Content observed across the field on the day of testing was 20.8%, this in the desirable range for supporting healthy turfgrass growth.
- The field was not lined, the POGO App GPS aerial view (which had lines) was used to guide walking the border.
- The average Compaction at the 3" depth was determined to be 178psi, this level of compaction would support root branching and maturation.
- A smaller field was created in the middle third, running across the field. This area had the highest percentage of White Clover (Trifolium repens) and Prostrate Knotweed (Polygonum aviculare).
- The Northern third was very undulating, with a pronounced swale in the Northwest corner.
- There were more pronounced depressions on the Southern third of the field filled with Annual Bluegrass (Poa annua), White Clover (Trifolium repens), Prostrate Knotweed (Polygonum aviculare) and Broadleaf Plantain (Plantago major).

Next Steps-

Apply Pylex and Q4 Plus herbicide to control grassy and broadleaf weeds.

Smaller depressions should be filled in and leveled off using a compatible topsoil. Larger depressions may need the use of heavier equipment to remediate.

Soil test to examine the existing qualities of the topsoil and determine if it is conducive to healthy turf growth.

Overseeding performance turfgrass varieties, especially in areas with little to no cover.

FIELD PHOTOGRAPHS:

Left: South goal looking Northwest: note the depressions with lime green and brown appearance, also able to recognize it is a multi-field facility.

Right: Midfield looking Southwest: note very patchy turf growth and smaller field marked perpendicular to large field.

Above: North penalty kick spot looking towards the Northwest corner of the field: note large depression close to where the corner flag would be.

Date: 10/21/2020		Location: Brown Field B1				
Criteria	**South Goal**	**Center Field**	**North Penalty Kick**	**Averages**	**PQS Scores**	**Grade**
Moisture %	23	20.7	18.6	20.7	3	C
Compaction 1"	189	79	89	119	3	C
Compaction 3"	203	142	189	178	3	C
% Desire	15	15	28	19.3	0	E
% Bare	1	10	2	4.3	0	E
% Weed	84	75	70	76.3	0	E
% Poa	18	15	17	16.6	0	E
% Clover	30	30	25	28.3	0	E
% Plantain	10	0	3	4.3	0	E
% Crab/Goose	1	0	0	0.3	5	A
% Knotweed	25	30	25	26.6	0	E
% Bentgrass	0	0	0	0	5	A
% Disease	0	0	0	0	5	A
% Pest	0	0	0	0	5	A
					Total:29	Overall: C

FIELD ASSESSMENT:

Brown Field A1 (11 v 11)

Oak Middle School

October 21st, 2020

Observations-

- The average Volumetric Water Content observed across the field on the day of testing was 22.7%, this is within the desirable range for healthy turfgrass growth.
- The average Compaction at the 3" depth was determined to be 179psi, this is within the desirable range for maintaining healthy turfgrass growth.
- The field was not marked by lines, therefore the POGO App was used as a guide to identify the borders of the field.
- A smaller field was created on the Northern third, running perpendicular to the large field.
- The smaller field had large swaths of Prostrate Knotweed (Polygonum aviculare), frost killed Crabgrass (Digitaria spp.) and Broad leaf Plantain (Plantago major).
- The Southeast quadrant of the field had very pronounced depressions, one being over a foot deep.
- The low areas in the middle and Southern sections of the field are populated by Prostrate Knotweed (Polygonum aviculare), Broad leaf Plantain (Plantago major), White Clover (Trifolium repens), and Annual Bluegrass (Poa annua).

Next Steps-

Apply Pylex and Q4 Plus herbicide to control grassy and broadleaf weeds.

Smaller depressions should be filled in and leveled off using a compatible topsoil. Larger depressions may need the use of heavier equipment to remediate.

Soil test to examine the existing qualities of the topsoil and determine if it is conducive to healthy turf growth.

Overseeding performance turfgrass varieties, especially in areas with little to no cover.

FIELD PHOTOGRAPHS:

Left: North goal looking South: note patchy turf growth, shiny green areas of White Clover, and brown areas with Prostrate Knotweed.

Right: North penalty kick spot turf grid: note high percentage of White Clover, Prostrate Knotweed, and Broad leaf Plantain.

Above: South goal looking Northeast: note patchy turf growth and large swale on the field of play in the top right corner of the photo.

Date: 10/21/2020		Location: Brown Field A1				
Criteria	**South Goal**	**Center Field**	**North Penalty Kick**	**Averages**	**PQS Scores**	**Grade**
Moisture %	21.9	24.2	21.9	22.6	3	C
Compaction 1"	68	95	76	79.6	2	D
Compaction 3"	253	121	163	179	2	D
% Desire	25	10	10	15	0	E
% Bare	10	0	5	5	0	E
% Weed	65	90	85	80	0	E
% Poa	10	5	15	10	0	E
% Clover	40	75	30	48.3	0	E
% Plantain	10	3	10	7.6	0	E
% Crab/Goose	0	0	0	0	5	A
% Knotweed	0	7	30	12.3	0	E
% Bentgrass	5	0	0	1.6	3	A
% Disease	5	0	0	1.6	3	A
% Pest	0	0	0	0	5	A
					Total:23	Overall: D

FIELD ASSESSMENT:

11 v 11 Field

Forte Park

October 21st, 2020

Observations-

- The average Volumetric Water Content in the soil profile on the day of testing was 19.2%, there had been 1.57" of precipitation the previous 7 days and none the previous 48 hours.
- The average Compaction at the 3" depth was measured at 204psi, it should be noted there was a wide range of readings for compaction. The lowest reading was 143psi at the South goalmouth, however the North penalty kick spot registered a reading of 272psi.
- All three grid surveys measured the percent of bare area at 40% or greater.
- The Southern end of the field had low areas populated with Annual Bluegrass (Poa annua), Prostrate Knotweed (Polygonum aviculare), and bare area.
- The Northern end of the field had low areas populated with Annual Bluegrass (Poa annua), Prostrate Knotweed (Polygonum aviculare), frost killed Crabgrass (Digitaria spp.) and voids.
- The area behind and within the North goal had evidence of successful slice seeding, however the high traffic areas in the field did not appear to survive.
- Based on low spots and worn areas on the sides of each half of the field, it is likely this field is reoriented to create two smaller fields on either half.

Next steps-

Apply Pylex and Q4 Plus herbicide to control grassy and broadleaf weeds.

A soil investigation may provide more insight in understanding why the bare area percentage is high.

Core Aeration and continuing the practice of Slice-seeding/Over-seeding.

Topdressing the low areas with a proper sand amendment, in an effort to make the surface more consistent.

FIELD PHOTOGRAPHS:

Left: Overall view looking Northwest: note brown patches which are low areas populated by weeds and voids.

Right: North penalty kick looking South: note brown bare area and bunch-type turf growth.

Above: Just outside the North end line: note the successful slice seeding rows in a low traffic area.

Date: 10/21/2020		Location: Forte (Lined Field)				
Criteria	**South Goal**	**Center Field**	**North Penalty Kick**	**Averages**	**PQS Scores**	**Grade**
Moisture %	20.8	17.4	19.3	19.2	3	C
Compaction 1"	97	87	63	82.3	2	D
Compaction 3"	143	197	272	204	3	C
% Desire	5	30	2	12.3	0	E
% Bare	40	65	65	56.7	0	E
% Weed	55	65	33	51	0	E
% Poa	15	20	3	12.7	0	E
% Clover	10	30	0	13.3	0	E
% Plantain	5	0	0	1.7	1	E
% Crab/Goose	10	0	20	10	0	E
% Knotweed	15	15	10	13.3	0	E
% Bentgrass	0	0	0	0	5	A
% Disease	0	0	0	0	5	A
% Pest	0	0	0	0	5	A
					Total: 24	Overall: D+

FIELD ASSESSMENT:

Burr Field (11 v 11)

Bigelow Middle School

October 27th, 2020

Observations-

- There were no lines marking the field, the goals were used as reference points.
- The Volumetric Water Content was an average of 22.1% on the day of testing, within the optimal range.
- The compaction at the 3" depth was an average of 277psi, indicating a tight soil profile, at 300psi turfgrass root growth can be restricted.
- The field has thin turf cover on the East and West ends, likely due to tall stand of trees on either end.
- There is a steep hill towards the field just outside the South sideline, this paired with the trees on the ends creates a boxed-in appearance, likely restricting air flow and light to the field certain times of the year.
- The North length of the field had noticeable depressions.
- The field had high percentages of White Clover (Trifolium repens), Plantain (Plantago major), and Prostrate Knotweed (Polygonum aviculare).
- There was noticeable wear in front of a lacrosse goal placed on the South sideline.

Next Steps-

Apply Pylex and Q4 Plus herbicide to control grassy and broadleaf weeds.

Core Aeration to relieve compaction at the 3" depth.

Overseeding with performance turfgrass cultivars.

FIELD PHOTOGRAPHS:

Left: Overall view looking East. Note tall trees behind the goal, dog walker. Right: Midfield looking North, note shiny broad leaf weeds and tan depressed areas.

Right: Midfield looking North, note shiny broad leaf weeds and tan depressed areas.

Above: Midfield looking Southeast, note the weed pressure, bunch-type turf growth and hill outside the South sideline.

Date: 10/27/2020		Location: Burr				
Criteria	**South Goal**	**Center Field**	**North Penalty Kick**	**Averages**	**PQS Scores**	**Grade**
Moisture %	21.2	22.9	22.2	22.1	3	C
Compaction 1"	201	185	159	181.6	1	E
Compaction 3"	302	260	269	277	0	E
% Desire	10	17	15	14	0	E
% Bare	5	20	10	11.6	0	E
% Weed	85	67	75	75.6	0	E
% Poa	20	10	10	13.3	0	E
% Clover	64	50	60	58	0	E
% Plantain	1	1	0	0.6	1	E
% Crab/Goose	0	0	0	0	5	A
% Knotweed	0	2	5	2.3	1	E
% Bentgrass	0	0	0	0	5	A
% Disease	5	2	2	3	5	A
% Pest	0	0	0	0	5	A
					Total:26	Overall: D+

FIELD ASSESSMENT:

Field A (11 v 11)

Albemarle Park

October 27th, 2020

Observations-

- I walked the Southern field at the park before assessing Field A, it was very firm and loaded with Crabgrass (Digitaria spp.), may require a more in-depth analysis.
- Field A had been split into two fields running horizontally on each half.
- The Volumetric Water Content was an average of 19.9% on the day of testing.
- The average Compaction at the 3" depth was measured at 230psi.
- The Southeast corner had the most desirable turfgrass.
- The Northeast corner had a few low areas populated by Annual Bluegrass (Poa annua).
- The Northwest corner was heavily populated with frost killed Crabgrass (Digtaria spp.)
- The Southwest corner had voids, bunch type turf growth, White Clover (Trifolium repens), and Annual Bluegrass (Poa annua).
- As part of the 2020 IPM Pilot program, only the Eastern half of the field was treated with Pylex and Q4 Plus herbicides, this explains why the weed populations differed so much across the field.
- Like many fields, the end closest to the parking lot seemed to receive the most traffic.

Next Steps-

Overseeding with performance turfgrass cultivars.

Core Aeration on the Western half of the field, followed by aggressive overseeding.

FIELD PHOTOGRAPHS:

Left: Albemarle A midfield looking East: note lime green patches of Annual Bluegrass.

Right: North penalty kick looking Northwest. Note: tan area in the top left corner comprised of frost killed Crabgrass.

Above: Albemarle South Field: note high percentage of weeds.

Date: 10/27/2020		Location: Albemarle - Field A				
Criteria	**South Goal**	**Center Field**	**North Penalty Kick**	**Averages**	**PQS Scores**	**Grade**
Moisture %	18.7	19.9	21	19.9	2	D
Compaction 1"	144	149	136	143	1	E
Compaction 3"	183	240	268	230.3	2	D
% Desire	10	10	45	21.7	0	E
% Bare	10	5	4	6.3	0	E
% Weed	80	85	51	72	0	E
% Poa	45	68	45	52.7	0	E
% Clover	10	0	0	3.3	0	E
% Plantain	10	2	1	4.3	0	E
% Crab/Goose	5	5	0	3.3	0	E
% Knotweed	10	10	5	8.3	0	E
% Bentgrass	0	0	0	0	5	A
% Disease	0	0	0	0	5	A
% Pest	0	0	0	0	5	A
					Total: 20	Overall: D

FIELD ASSESSMENT:

C. Evan Johnson Field (11 v 11)

Cold Spring Park

October 27th, 2020

Observations-

- While the field showed reasonable desirable cover, there were noticeable populations of White Clover (Trifolium repens) and Annual Bluegrass (Poa annua).
- The irrigation system was being blown out at the time of testing which likely caused the VWC% reading to be higher.
- The compaction levels, particularly in the center circle and South penalty kick location were close to or, exceeding 300 psi. At this threshold roots are restricted from branching out through the soil.
- There were many undulations in the field, the most pronounced along the West sideline on the Southern half, close to midfield. (These undulations are a safety concern in my opinion)
- Shallower depressions were also noted in front of the North goal and around midfield along the East sideline. The lowest spots of some depressions had irrigation heads.
- The low areas were primarily Annual Bluegrass (Poa annua) and White Clover (Trifolium repens), there was also a presence of Broadleaf Plantain (Plantago major).

Next Steps-

Apply Pylex and Q4 Plus herbicide to control grassy and broadleaf weeds.

An overseeding program to increase the desirable turfgrass percentage.

Identify strategies to “level-off” the field or fill in the depressions.

FIELD PHOTOGRAPHS:

Left: Midfield looking West. Note light green turf appearance and patches of Clover. Top left along the sideline you can tell there is undulations by the sideline paint appearing curved.

Right: Close up of the center circle location. Note voids and presence of Clover, Poa and Plantain.

Left: Overall view looking North. Note the low seam highlighted by a lime green patch of Poa annua in the middle with brown area behind it, just in front of the mid-line.

Right: Center circle looking East. Note inconsistent turf cover with voids and Clover Patches.

Date: 10/27/2020		Location: Cold Spring - C. Evan Johnson Field				
Criteria	**South Goal**	**Center Field**	**North Penalty Kick**	**Averages**	**PQS Scores**	**Grade**
Moisture %	34.4	29.7	23.5	29.2	3	C
Compaction 1"	208	124	148	160	3	C
Compaction 3"	222	352	294	289.3	0	E
% Desire	40	10	40	30	0	E
% Bare	30	10	5	15	0	E
% Weed	30	80	55	55	0	E
% Poa	30	30	30	30	0	E
% Clover	0	40	25	21.6	0	E
% Plantain	0	0	0	0	5	A
% Crab/Goose	0	0	0	0	5	A
% Knotweed	0	0	0	0	5	A
% Bentgrass	0	0	0	0	5	A
% Disease	0	0	0	0	5	A
% Pest	0	0	0	0	5	A
					Total:36	Overall: C+

FIELD ASSESSMENT:

McGrath Field (11 v 11)

Newton, MA

October 27th, 2020

Observations-

- Volumetric Water Content had an average of 22.8%, this is within the desired range.
- Compaction at the 3" depth was an average of 193psi, this indicates the soil environment is conducive to root growth.
- This was the highest scoring field of all the fields assessed, it had the least depressions, and most consistent desirable turf populations.
- Both goals had been moved off the end lines.
- Shallow depressions observed on the field were populated by Prostrate Knotweed (Polygonum aviculare), White Clover (Trifolium repens), Annual Bluegrass (Poa annua), and frost killed Crabgrass (Digitaria spp.).
- The most noticeable depressions were in and around the 18-yard boxes.

Next Steps-

Apply Pylex and Q4 Plus herbicide to control grassy and broadleaf weeds.

Overseeding with performance turfgrass cultivars would fill the voids left by the dead weeds.

FIELD PHOTOGRAPHS:

Left: Overall view: note the very consistent color and goals moved off the end lines.

Right: South goalmouth: note the high percentage of White Clover.

Above: North Penalty Kick spot looking South. Note small depressions around the arc, shiny White Clover, and lime green Annual Bluegrass.

Date: 10/27/2020		Location: Brown - McGrath				
Criteria	**South Goal**	**Center Field**	**North Penalty Kick**	**Averages**	**PQS Scores**	**Grade**
Moisture %	22.9	18.8	26.7	22.8	3	C
Compaction 1"	134	201	120	151.6	4	B
Compaction 3"	182	208	188	192.6	3	C
% Desire	20	20	20	20	0	E
% Bare	0	5	1	2	3	C
% Weed	80	75	79	78	0	E
% Poa	10	52	12	24.6	0	E
% Clover	70	5	60	45	0	E
% Plantain	0	5	5	3.3	0	E
% Crab/Goose	0	3	0	1	5	A
% Knotweed	0	2	2	1.3	1	E
% Bentgrass	0	0	0	0	5	A
% Disease	0	0	0	0	5	A
% Pest	0	0	0	0	5	A
					Total: 34	Overall: C+

MOVING FORWARD

There are three subsequent stages following a PQS. The first is the *Curative Action;* following that is the *Preventative Action;* the final stage is *Monitoring.* The Curative Action corrects the most pressing and immediate issues challenging your athletic field. Once the potential for damage is lessened, the next step is the Preventative Action. This step preserves and protects that which you have fought hard to gain. The final step, which restarts the cycle of continuous improvement, is to Monitor and assess the efficacy of your curative and preventative actions. This virtuous cycle results in high level conditions that are sustainable over time with minimal inputs.

The Curative Action

Working with Tom Irwin Advisors will accelerate the immediate steps outlined in the What's Next section. Following that, a careful reading of the PQS Report Card may inform what needs to be done moving forward however TIA can assist. We can produce an Advisor Action Report. This report not only details the most pressing criteria in need of attention, it also details the related criteria that are impacted and it presents the data in intuitive visual "heatmaps". Furthermore each action item includes detailed recommendations and guidance on how to effectively and efficiently implement the curative actions. Sometimes, a resurface or reconstruction is the most effective approach. In that case, TIA can offer guidance in the form of Feasibility Studies, Specification Writing, and Project Advocacy.

The Preventative Action

Once the immediate concerns have passed, prevention is paramount. TIA can help you develop a Comprehensive Maintenance Plan that addresses all critical elements of field management; Maintenance, and Policy/Administration. Furthermore, we can, through our innovative Groundsmanship Program, train your staff in the essentials of professional level athletic field maintenance.

Monitoring

We also believe the continuation of the PQS process will have a significant positive affect on securing the future quality of the surface. The metrics developed by PQS can be useful in a variety of situations. These metrics can be used to make informed decisions on maintenance and management practices. Track usage can be better controlled over time. Potentially hazardous conditions can be identified and corrective action can be taken in a timely manner. Observations can be logged and documented. By measuring the tracks' performance over time, management decisions can be prioritized. The data presented can be used to support the budgetary process, to justify current expenditures, or for data driven planning for future needs. PQS is also useful for benchmarking a recently constructed track or for informed cost benefit decisions regarding renovation versus reconstruction.

FURTHER GUIDANCE

If you have any questions regarding this document, the actions discussed, or the challenges that you face, please reach out to us. We are eager to help support you and your vision moving forward.

We are composed of a unique team of highly qualified professionals who; have consulted on athletic fields globally for FIFA and other governing bodies of sport; have lectured at Universities and in other academic settings; have contributed to the development of many industry and professional standards; have renovated and constructed athletic fields for every level of the game, and, have spent decades carefully and conscientiously managing turf that we care deeply about. We would be honored to provide any assistance, guidance, and advice that you require.

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APPENDIX: PQS RATINGS

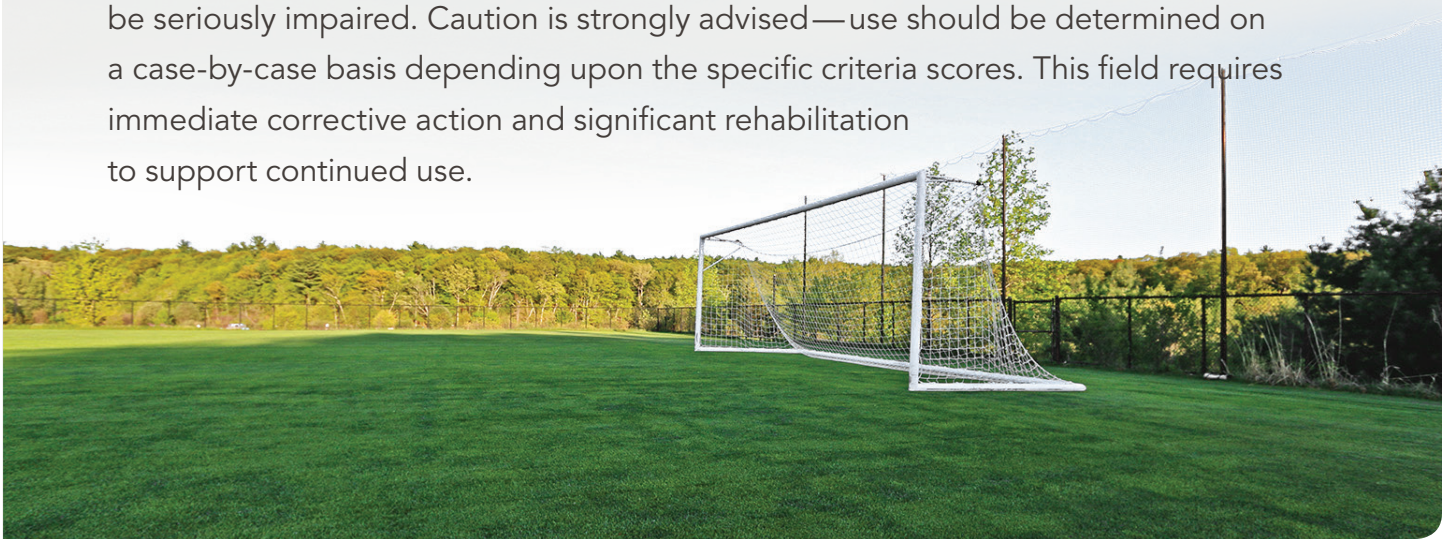
A: Superior Rating indicates an exceptional field which will demonstrate superior wear tolerance and be able to support prolonged above average usage under normal conditions. This field can tolerate reduced inputs/maintenance for longer periods without degrading. Aesthetically, this field is suitable for high-level play. This rating is difficult to achieve and a field may move between Superior and High Standard depending upon the stressors on the surface and varying natural conditions.

B: High Standard Rating equals a top-performing field suitable for use in high visibility community events such as varsity sports. This field will suffer less damage and recover quickly when subject to stress. This field is typically thriving under its current management practices and has a sustainable level of usage.

C: Standard Rating is acceptable for general recreational purposes under a carefully monitored management plan and with ongoing supportive maintenance.

D: Low Standard Rating is marginal and indicates a field that is currently fit for purpose but will likely need future remedial work to maintain playability. A Low Standard Field will continue to decline unless additional maintenance efforts and management changes are implemented quickly.

E: Below Standard Rating means significant aspects of playability and safety may be seriously impaired. Caution is strongly advised—use should be determined on a case-by-case basis depending upon the specific criteria scores. This field requires immediate corrective action and significant rehabilitation to support continued use.



FIELD ASSESSMENT BACKGROUND INFORMATION

Tom Irwin Advisors assessed the fields in this study for weed pressure, compaction and volumetric water content (VWC%). By taking specific measurements, field quality can be analytically compared to prior years and be used for inputs into the ongoing maintenance programs. As scores improve, maintenance may be able to be reduced so that limited resources can be redirected to those fields with lower quality assessments.

Weed Pressure

The percentage of weed directly impacts the durability and playability of the surface. Weeds are often shallow rooted making them easily dislodged during play. These bare areas present challenges to footing and ball roll. They also create areas where water can pond. The weeds will quickly re-establish themselves in these areas. Finally, weed pressure can be indicative of other field conditions such as poor nutrition, poor drainage, poor irrigation, and compacted soils.

Compaction

A cone-tipped penetrometer measures the pressure in pounds per square inch necessary to penetrate the soils. Highly compact soils limit the infiltration of water into the soil profile. Compaction is often, but not always, a proxy for surface hardness. (If surface hardness, or GMax, is a concern it should always be measured independently, under the right conditions, and with the proper equipment) Compact soils limit air exchange between the atmosphere and the plants roots this is vital for plant health. Heavily compacted fine-grained soils can be comprised mainly of micropores which will hold water around the plant roots depriving them of oxygen. Finally, very compacted soils can prevent root growth simply by inhibiting root penetration.

Volumetric Water Content (VWC%)

A soils water content is critical for plant health. Like any living thing, turf grass plants require water. Hydration not only supports the plants cells it also allows for the movement and uptake of nutrients by the plant's roots. Volumetric Water Content is the measurement of the amount of water relative to the amount of soil particles. This value can and should vary over time. However, it provides a valuable "snapshot" of the current conditions which can be used to ascertain the efficacy of the irrigation system, the stress on the plants, and the water holding capacity of the soils.

The three criteria chosen, while far from the minimal Core PQS or the Complete PQS, will provide data that can establish field monitoring and direct improvement plans while staying within fiscal constraints.

FIELD REFERENCE MAPS

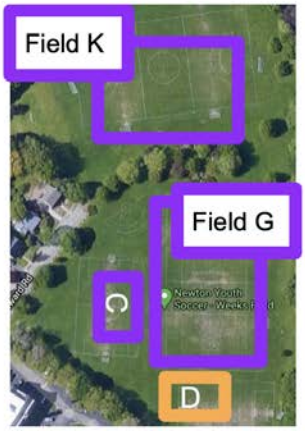
Field Maps

Cold Spring

Forte

Hamilton

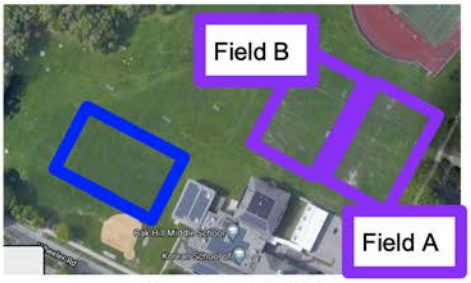
McGrath



Weeks

PQS Conducted on fields marked in purple

Albemarle



Brown, Oak Hill

Burr Park

PQS Conducted on fields marked in purple

Understand the fundamentals of your fields and make sound decisions based on objective core standards

SOCCER **REPORT CARD**

CORE PERFORMANCE QUALITY STANDARDS

TOM IRWIN **ADVISORS**, INC.

Core PQS Field Test for Natural Turf: Soccer

Organization: Newton, MA Girls Soccer

Field Name: Weeks Field K

Date Of Test: 10/14/2020

OVERALL GRADE

D / 21

CORE PLAYABILITY	Tool	Average Results	Points	GRADE
Planarity	**6-Foot Straight Edge**	.6"	3	C
% Desirable Vegetative Cover	**Grass Quadrant**	28%	0	E
Rotational Traction	**Traction Meter**	14.8 N/m	0	E
Surface Hardness	**Clegg/Gmax**	70.5 Gmax	1	E
Moisture 3" Depth	**FieldScout TDR-300**	11.8% VWC	1	E
In-Season Height/Quality of Cut	**Grass Prism**			
% Turf Cover	Grass Quadrant			
Compaction Rating 3" Depth	Penetrometer			
% Poa Annua	Grass Quadrant			
Ball Roll	Ball Roll Ramp			
Vertical Ball Bounce	6' Ball Drop			
Goal Posts	Observation and Measurements			
Boundary Fences	Observation and Measurements			

CORE PRESENTATION	Tool	Average Results	Points	GRADE
% Weed Cover	**Grass Quadrant**	67%	0	E
Surface Debris	**Observation and Measurements**	Minimal	4	B
Color Index	FieldScout GreenIndex			
Visual Index	FieldScout GreenIndex			
Field Line Markings	Observation and Measurements			
Overall Appearance	Observation			

CORE STRUCTURE	Tool	Average Results	Points	GRADE
Infiltration Rate	**Double Ring Infiltrometer**	6.9"/hr	2	D
Gradient Field Width	Surveyor's Laser Level			
Gradient Field Length	Surveyor's Laser Level			
% Bare Area	Grass Quadrant			
% Clover & Plantain	Grass Quadrant			
% Crabgrass & Goosegrass	Grass Quadrant			
% Knotweed	Grass Quadrant			
% Pests	Grass Quadrant			
% Disease	Grass Quadrant			
Core Soil Profile Observations				
Root Depth	**Observation and Measurements**	2.25"	2	D
Thatch Depth	**Observation and Measurements**	.75"	4	B
Rootzone Medium Depth	**Observation and Measurements**	7.25"	4	B
Soil Test Data				
pH	Logan Laboratories			
% Rootzone Combined Silt and Clay Content	Logan Laboratories			

SCORING KEY	PQS Soccer Field	Total Criteria	Total points available for each criteria
A = Superior	55–45 total points	11 criteria	5 points per criteria achieved
B = High Standard	44–34 total points	11 criteria	4 points per criteria achieved
C = Standard	33–23 total points	11 criteria	3 points per criteria achieved
D = Low Standard	22–12 total points	11 criteria	2 points per criteria achieved
E = Below Standard	11 and below total points	11 criteria	1 points per criteria achieved

CORE PQS RATINGS

A: Superior Rating indicates an exceptional field which will demonstrate superior wear tolerance and be able to support prolonged above average usage under normal conditions. This field can tolerate reduced inputs/maintenance for longer periods without degrading. Aesthetically, this field is suitable for high-level play. This rating is difficult to achieve and a field may move between Superior and High Standard depending upon the stressors on the surface and varying natural conditions.

B: High Standard Rating equals a top-performing field suitable for use in high visibility community events such as varsity sports. This field will suffer less damage and recover quickly when subject to stress. This field is typically thriving under its current management practices and has a sustainable level of usage.

C: Standard Rating is acceptable for general recreational purposes under a carefully monitored management plan and with ongoing supportive maintenance.

D: Low Standard Rating is marginal and indicates a field that is currently fit for purpose but will likely need future remedial work to maintain playability. A Low Standard Field will continue to decline unless additional maintenance efforts and management changes are implemented quickly.

E: Below Standard Rating means significant aspects of playability and safety may be seriously impaired. Caution is strongly advised—use should be determined on a case-by-case basis depending upon the specific criteria scores. This field requires immediate corrective action and significant rehabilitation to support continued use.

CONTACT TOM IRWIN ADVISORS

Speak with Ian Lacy at **781-999-4320** or give us the details of your project at www.tomirwinadvisors.com/engage-with-us

TOM IRWIN **ADVISORS**, INC.

Understand the fundamentals of your fields and make sound decisions based on objective core standards

SOCCER **REPORT CARD**

CORE PERFORMANCE QUALITY STANDARDS

TOM IRWIN **ADVISORS**, INC.

Core PQS Field Test for Natural Turf: Soccer

Organization: Newton, MA Girls Soccer

Field Name: Weeks Field G

Date Of Test: 10/14/2020

OVERALL GRADE

D / 22

CORE PLAYABILITY	Tool	Average Results	Points	GRADE
Planarity	**6-Foot Straight Edge**	.6"	3	C
% Desirable Vegetative Cover	**Grass Quadrant**	26.6%	0	E
Rotational Traction	**Traction Meter**	14.2 N/m	0	E
Surface Hardness	**Clegg/Gmax**	68.5 Gmax	1	E
Moisture 3" Depth	**FieldScout TDR-300**	22.3% VWC	3	C
In-Season Height/Quality of Cut	**Grass Prism**			
% Turf Cover	Grass Quadrant			
Compaction Rating 3" Depth	Penetrometer			
% Poa Annua	Grass Quadrant			
Ball Roll	Ball Roll Ramp			
Vertical Ball Bounce	6' Ball Drop			
Goal Posts	Observation and Measurements			
Boundary Fences	Observation and Measurements			

CORE PRESENTATION	Tool	Average Results	Points	GRADE
% Weed Cover	**Grass Quadrant**	67.8%	0	E
Surface Debris	**Observation and Measurements**	Minimal	4	B
Color Index	FieldScout GreenIndex			
Visual Index	FieldScout GreenIndex			
Field Line Markings	Observation and Measurements			
Overall Appearance	Observation			

CORE STRUCTURE	Tool	Average Results	Points	
Infiltration Rate	**Double Ring Infiltrometer**	5.2"/hr	2	D
Gradient Field Width	Surveyor's Laser Level			
Gradient Field Length	Surveyor's Laser Level			
% Bare Area	Grass Quadrant			
% Clover & Plantain	Grass Quadrant			
% Crabgrass & Goosegrass	Grass Quadrant			
% Knotweed	Grass Quadrant			
% Pests	Grass Quadrant			
% Disease	Grass Quadrant			
Core Soil Profile Observations				
Root Depth	**Observation and Measurements**	2"	2	D
Thatch Depth	**Observation and Measurements**	.7"	4	B
Rootzone Medium Depth	**Observation and Measurements**	6.2"	3	C
Soil Test Data				
pH	Logan Laboratories			
% Rootzone Combined Silt and Clay Content	Logan Laboratories			

SCORING KEY	PQS Soccer Field	Total Criteria	Total points available for each criteria
A = Superior	55–45 total points	11 criteria	5 points per criteria achieved
B = High Standard	44–34 total points	11 criteria	4 points per criteria achieved
C = Standard	33–23 total points	11 criteria	3 points per criteria achieved
D = Low Standard	22–12 total points	11 criteria	2 points per criteria achieved
E = Below Standard	11 and below total points	11 criteria	1 points per criteria achieved

Field Progress Tracking: Soccer

Organization: Newton Girls and Youth Soccer

Field Name: Weeks Field G

		Test Date	Test Date	Test Date	Test Date	Test Date
		04/02/19	10/14/20			
		Overall Grade	Overall Grade	Overall Grade	Overall Grade	Overall Grade
		D	D			
		Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**
PLAYABILITY	**Tool**					
In-Season Height/Quality of Cut	Grass Prism	D	C			
Planarity	6-Foot Straight Edge	E	E			
Rotational Traction	Traction Meter	E	E			
Compaction Rating 3" Depth	Penetrometer	E	E			
Surface Hardness	Clegg/Gmax		E			
Moisture 3" Depth	FieldScout TDR-300	C	C			
% Turf Cover	Grass Quadrant					
% Desirable Grass Species	Grass Quadrant					
% Poa Annua	Grass Quadrant					
Ball Roll	Ball Roll Ramp					
Vertical Ball Bounce	6' Ball Drop					
Goal Posts	Observation and Measurements					
Boundary Fences	Observation and Measurements					

		Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**
PRESENTATION	**Tool**					
Visual Index	FieldScout GreenIndex					
Color Index	FieldScout GreenIndex					
% Weed Cover	Grass Quadrant	E	E			
Field Line Markings	Observation and Measurements					
Surface Debris	Observation	C	B			
Overall Appearance	Observation					

		Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
STRUCTURE	**Tool**					
Gradient Field Length	Surveyor's Laser Level					
Gradient Field Width	Surveyor's Laser Level					
Infiltration Rate	Double Ring Infiltrometer	E	D			
% Bare Area	Grass Quadrant					
% Clover & Plantain	Grass Quadrant					
% Crabgrass & Goosegrass	Grass Quadrant					
% Knotweed	Grass Quadrant					
% Pests	Grass Quadrant					
% Disease	Grass Quadrant					
Soil Profile Observations						
Root Depth	Observation and Measurements	E	D			
Thatch Depth	Observation and Measurements	B	B			
Rootzone Medium Depth	Observation and Measurements	C	C			
Soil Test Data Logan Laboratories						
pH	Logan Laboratories					
% Rootzone Combined Silt and Clay Content	Logan Laboratories					

SCORING KEY	PQS Soccer Field	Total Criteria	Total points available for each criteria
A = Superior	165–133 total points	33 criteria	5 points per criteria achieved
B = High Standard	132–100 total points	33 criteria	4 points per criteria achieved
C = Standard	99–67 total points	33 criteria	3 points per criteria achieved
D = Low Standard	66–34 total points	33 criteria	2 points per criteria achieved
E = Below Standard	33 and below total points	33 criteria	1 points per criteria achieved

CONTACT TOM IRWIN ADVISORS

Speak with Ian Lacy at **781-999-4320** or give us the details of your project at www.tomirwinadvisors.com/engage-with-us

TOM IRWIN **ADVISORS**, INC.