



PRINCETON UNIVERSITY has fielded a championship women's field hockey team for more than three decades and this season has been a banner year for the Tigers. For the first time in

program history, the women's field hockey team won the NCAA Division I National Championship Title in November in a 3-2 victory over #1-ranked University of North Carolina. The Tar Heels had been six-time national champs.

Under coach Kristen Holmes-Winn, the Tigers (21-1) have become known as the "team of destiny," as they also clinched their 21st Ivy League trophy in 2012 and count two Olympians and four US National Team players on the squad.



Giving the Tigers home turf advantage is a new state-of-the-art facility at Princeton's Bedford Field. The field is a model of advanced technologies—from the custom-designed synthetic turf/drainage system to an innovative irrigation control and watering program.

"In field hockey the condition of the field is critical to the playability of the game," says Princeton Associate Athletic Director for Facilities Jeffrey Graydon.

"The surface has to be wet so that the ball moves without bouncing. A faster, more consistent playing field ensures a challenging game that allows the players to compete at the highest level," he says.

BEDFORD: A TWO-PHASE PROJECT

The Bedford Field project was planned in two phases: Phase 1 included new turf, updated drainage and irrigation systems, perimeter fencing and PA. It also features a new field hockey-specific scoreboard with PCS (penalty corner

PRINCETON FIELD HOCKEY TURF *GOES HIGH TECH*

This article was supplied by Creative Services, Encinitas, CA.

» THE PRINCETON TIGERS women's field hockey team plays a fast and furious game on the new AstroTurf 12 JG surface at the campus's recently renovated Bedford Field.

shots) called out and portable grandstands for 1,200 spectators. Phase 2 will see the construction of permanent grandstands, team rooms, event lighting, a press box, shared filming platforms, improved concessions and landscaping. After 2 years of effort, Phase 1 opened in summer 2012, ready for pre-season practice.

Before the Bedford revamp, the Tigers shared the nearby Class of '52 Field with men's and women's lacrosse teams. That field's synthetic turf had seen 9 years of relentless varsity action, yet the toughest challenge was prepping the site for field hockey.

Every day, 2 hours before practice or a game, a grounds crewman rolled out two portable water cannons, fired up the engines and saturated the field for 80 minutes, laying down nearly 12,000 gallons of water. This created a wet surface that reduced bounce, but lacked uniformity due to the inconsistencies of the water cannons and the time required to irrigate the field. Most of the water drained through to a subsurface elastic cushioning layer.

At half-time, the grounds crew went through the drill again, this time shooting water from the end zones toward the middle of the field.

"It was extremely labor-intensive, wasted a huge amount of water, and usually resulted in patchy wet and dry areas," says Graydon. "There was very little consistency."

Conferring with the coaching staff during the Bedford Field redesign, Graydon was charged with creating a best-in-the-nation fa-

Princeton University is one of the eight universities of the Ivy League, and one of the nine Colonial Colleges founded before the American Revolution.

cility that would be a model for the league and a future site for international competitions.

"Thanks to the generosity of Princeton's alumni, we were able to realize our dream of developing one of the finest field hockey facilities in the world," says the associate director.

Graydon is well-known in college athletics and has been affiliated with the university since the 1970s. He originally joined the school as a consulting entomologist, then oversaw field maintenance for nearly 10 years as assistant director for facilities and events. In 2005 he was named associate athletic director and oversees capital projects and manages the athletics facilities staff.

SYNTHETIC TURF: 18+ YEARS AT PRINCETON

Princeton installed its first synthetic field in the mid-1990s and now has six artificial turf surfaces for men's and women's lacrosse, baseball, track, football, field hockey and soccer, while also sharing the facilities with club sports, intramurals and summer camps.



TIFSPORT DELIVERS

Any sport played on natural grass is a natural for TifSport Bermudagrass, whether it's indoors on the fields like Reliant Stadium in Houston TX, or outdoors like FedEx Field in Landover MD. If you're looking for a sports turf that can handle non-stop action, a transition zone climate and heavy overseeding, TifSport's your answer. It's ideal for intramural fields, practice

fields and game-day venues, where everything has to be perfect. Coaches and players love the way it looks and plays and you and your crew will appreciate how easy it is to manage. TifSport can only be sold as certified sod or sprigs and only by licensed members of the TifSport Growers Assoc.

For more information call 706 552-4525 or visit us at www.tifsport.com.





>> MIRAGE HEADS “cannon out” irrigation coverage to 174 feet. Within 12 minutes the entire field can be irrigated for cleaning, cooling and prepping for field hockey practice and games.

With nearly 13 acres of artificial turf on the campus, Graydon knows the subject. Bedford Field became his research lab for cutting-edge technologies.

“Working with the AstroTurf company’s fiber, coatings and urethane technical team, we created a system that we believe will meet the challenges set by the FIH (International Hockey Federation) to retain water while providing the most consistent surface for play,” says Graydon. AstroTurf 12 JG is engineered with a premium knitted nylon system designed to provide uniform traction and consistent footing. It enhances playability when wet and absorbs water to maintain wet conditions longer.

“Synthetic turf has changed the game of field hockey by speeding up the sport, inspiring new tactics and techniques, and rules to accommodate a faster game,” he says.

Along with the new turf, a central feature of the Bedford Field improvements is a drainage system designed to hold a consistent amount of water over a longer period while providing fast surface drainage to prevent puddles.

“Vertical drainage is a major component of any synthetic turf plan,” says Graydon.

“There is a need to balance that drainage with field hockey’s requirements to retain some water by the hydrophilic turf. A wet but not soggy surface is the key to top-level performance. In addition, we had to balance water retention and drainage with environmental concerns. Storm water management is critical to Princeton’s sustainability goals,” he says.

The university originally considered a storage tank to retain rainwater for field irrigation, but instead chose to improve the water-holding capacity of the turf, along with a fast, efficient drainage system.

AstroTurf engineers worked with Graydon to devise AstroTurf 12 JG, a system with a 3mm urethane backing created with a uniform pattern of drainage holes in the turf. This allows the field to retain the right amount of water, while still allowing it to drain quickly and efficiently during periods of heavy rainfall.

Large test plots were installed adjacent to Bedford in fall 2011 and evaluations continued through spring 2012. These tests demonstrated that the new turf and drainage systems worked efficiently and met expectations for moisture retention, planarity and resilience.

NEW TURF AND BASE SYSTEM

Clark Companies installed the new Bedford Field base system, while the under-drain layout was designed by Van Note Harvey Engineering. The base measures 210 feet x 330 feet with a clean stone subsurface retaining area that tapers to nearly 7 feet deep (most base systems are 9 to 12 inches deep). The under-drain system, along with the volume of stone, allows 100% of irrigation and rainwater collected on the field to vertically drain through the turf and elastic layer down into the stone base.

The depth of the stone base allows water to infiltrate back to earth, recharging ground water and eliminating runoff into the campus storm water system. The base is designed to retain 100% of the water from a 100-year rainstorm, exceeding Princeton's sustainability goal for storm water management.

Princeton called on Underhill International to supply the automated irrigation, which featured the company's long-throw Mirage 160 sprinklers. The Mirage heads propel water out to 174 feet at 321 GPM, prepping the entire field in minutes. The Bedford Field installation required eight long-throw Mirage heads placed on the sidelines, away from the areas of play. The 90° corner and 180° field heads run in rotation before every practice and home game, delivering uniform water distribution over the entire field surface.

"With Underhill Mirage sprinklers we use just 1,200 gallons of water to saturate the entire field, compared to 12,000 gallons with the traveling water cannons. And it just takes 12 minutes, a sixth of



>> **NEW HYDROPHILIC ASTROTURF 12 JG** features a premium knitted nylon system that provides traction and consistent footing. It enhances playability when wet and absorbs water to maintain wet conditions longer.

the time we spent with the water cannons," he said.

Even on a very hot day, when two passes of water are required for prep, the Mirage heads cover the field with less than 2,500 gallons.

Before deciding on an irrigation system, Graydon had a set of criteria. "It's critical to cool and clean a synthetic field before events for player safety, and with field hockey we also need a wet playing surface. Additionally, the sprinklers had to be powerful enough to irrigate from the sidelines for safety reasons.

FEBRUARY 4-7
Marriott at City Center • Newport News, VA

2013

Mid-Atlantic Horticulture Short Course




INVITED SPEAKERS

- Diane Blazek**, All-America Selections, National Gardening Bureau
- Rolfe Carawan**, President, Lifematters International
- Linda Chalker-Scott**, Horticulture, Washington State University
- Bernie Erven**, HR Management, Ohio State University
- Billy Goodnick**, ASLA, Columnist & Garden Educator
- Robert "Buddy" Lee**, Breeder of the Encore® Azalea
- Monica Muir**, QuickBooks ProAdvisor, Muir & Associates
- Darrin Nordahl**, ASLA, Author, *Public Produce, Making Transit Fun*
- Ellen Ecker Ogden**, Kitchen Garden Designer, Co-Founder, Cook's Garden
- Daniel Potter**, Turf and Landscape Entomologist, University of Kentucky
- Bob Von Bernuth**, Irrigation Association, Education Director
- Maria Zampini**, President, UpShoot; Dir. of Plant Dev., Agricola Mgmt Group

\$95 PER DAY • CEUs & CERTIFICATIONS
Add Lunch & Learns or Evening Workshops to increase your CEUs!

Detailed schedule available in late fall.
(757)523-4734 | www.mahsc.org




WE MAKE THE GAMES LOOK BETTER



quality bulk paints



custom windscreens



bright aerosols



custom stencils



painting equipment

WE MAKE THE GAMES LOOK BETTER

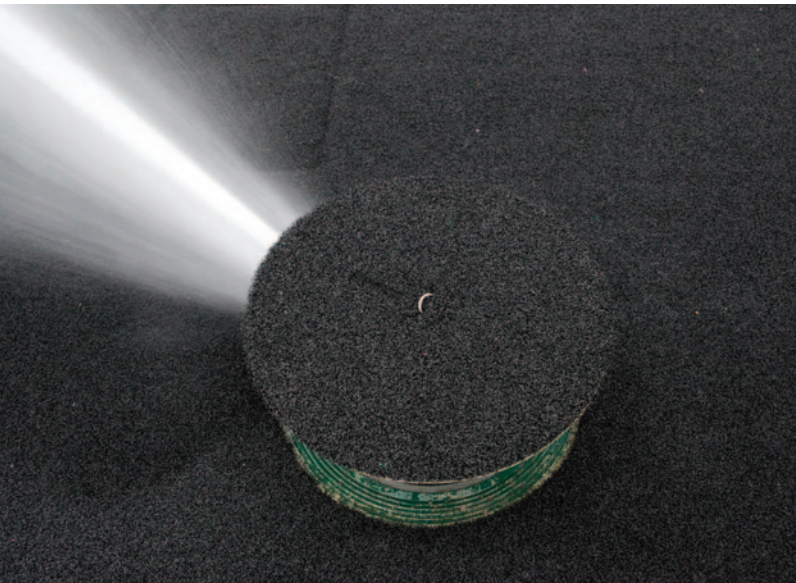
JOIN THE WORLD CLASS TEAM

STOP BY AND VISIT US IN DAYTONA BEACH



WORLD CLASS
athleticsurfaces

Find it all on our website:
www.worldclasspaints.com
1.800.748.9649



» UNDERHILL MIRAGE M-160 SPRINKLERS were fitted with a JG Top Cap covered in AstroTurf 12 for a seamless appearance and improved player safety. Heads can be adjusted from 30° to 360° of coverage. Rotation speed is also adjustable from 100 to 240 seconds.

Mirage sprinklers have been installed on Olympic stadiums and university fields around the world. The heads have a pop-up height of 2 ¾ inches and can be adjusted from 30° to 360° of coverage. They have a 23° trajectory and the rotation speed is precision adjustable from 100 to 240 seconds.

NEW JG TOP CAP

Graydon suggested several modifications that helped achieve a perfect, seamless appearance while also ensuring that the “carpet” was never disturbed or compromised by the high-pressure heads.

“First, we trimmed back the edge of the AstroTurf to 1 ½ inches from the sprinkler case. This allows all four Mirage upper and lower nozzles to completely clear the turf when operating. If turf is too close to these high pressure nozzles, the carpet can be abraded or separated from the base by water exiting the nozzles.”

A second suggestion was the modification of the Mirage sprinkler cap. Since the AstroTurf was now installed further away from

the sprinkler body, a new Underhill accessory, the JG Top Cap, was introduced. The new Top Cap (essentially a thin, 4-inch wide metal pancake) was screwed onto the existing Mirage cover and crowned with the synthetic turf. When retracted, it matches up perfectly with the carpet all around for a seamless appearance and unobstructed play.

Underhill and Sports Field Specialties also provided eight new Turf Box Kits, one for each zone, that house all the irrigation components in a single metal vault. Neatly packaged and out of sight, the Turf Boxes include all system components, including the isolation valve, electric sleeve valve, ductile iron swing joints, fittings and assemblies, along with the sprinkler. Easy through-the-top access allows routine maintenance without disturbing the turf.

The irrigation package also features an Underhill 2Wire controller with remote capabilities. Before practice and games, Program A is run, setting off the eight Mirage sprinklers in rotation. The 90° corner heads run for one minute each and the 180° field heads run for two minutes each, for a total of 12 minutes. At half-time, Program B is run, launching four Mirage sprinklers in sequence to clean, cool and wet the playing surface again in 8 minutes.

With its showcase field hockey facility, Princeton is at the forefront in presenting a new model for international field hockey competitions.

“We are currently working with FIH representatives and reviewing the traditional standards, which require complete watering within an 8-minute window at halftime. Bedford Field is consistently hydrophilic, fast and ready for play with a lower volume of water,” says Graydon.

“Our experience in working with AstroTurf and Underhill is that these companies are innovative thinkers who have the same goals of excellence and high performance that we value at Princeton. It’s been a great match-up of teams and talents.” ■

» PRINCETON’S Associate Athletic Director for Facilities Jeffrey Graydon oversees capital projects and manages the athletics facilities staff. He oversaw the design and construction of the Bedford Field facility.

