RUTGERS

New Jersey Agricultural
Experiment Station

2019
Turfgrass Proceedings

The New Jersey Turfgrass Association

In Cooperation with
Rutgers Center for Turfgrass Science
Rutgers Cooperative Extension

2019 RUTGERS TURFGRASS PROCEEDINGS

of the

GREEN EXPO Turf and Landscape Conference
December 10-12, 2019
Borgata Hotel
Atlantic City, New Jersey

The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. Through this forum, these professionals also reach a more general audience, which includes the public.

This publication includes lecture notes of papers presented at the 2019 GREEN EXPO Turf and Landscape Conference. Publication of these lectures provides a readily available source of information covering a wide range of topics and includes technical and popular presentations of importance to the turfgrass industry.

This proceedings also includes research papers that contain original research findings and reviews of selected subjects in turfgrass science. These papers are presented primarily to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

Special thanks are given to those who have submitted papers for this proceedings, to the New Jersey Turfgrass Association for financial assistance, and to Anne Diglio, Barbara Fitzgerald, and Nalini Kaul for administrative support.

Deborah Spinella, Proceedings Layout Editor
Dr. Bruce B. Clarke, Coordinator

BAYONNE GOLF CLUB
NEW YORK HARBOR,
A MOST AUDACIOUS AND IMPROBABLE JOURNEY

Richard Hurley, PhD[1]

SUCCESS IS BEST JUDGED AFTER THE PASSING OF TIME

More than ten years has passed since the completion of the Bayonne Golf Club (2006) and by any standards what was accomplished has far exceeded the original vision.

The golf course has been recognized as an engineering marvel and one of the finest examples of a man-made links golf course found anywhere in the world. The clubhouse, a stately castle situated atop the highest hill, is elegant in appearance, stylish, warm and inviting.

The total transformation of this once sterile landfill into a national model for a successful remediation continues to be recognized for excellence. The Bayonne Golf Club is the preeminent example of a brown field reclamation project in the State of New Jersey.

Most importantly is that no public, money was used for site remediation, building the wetland mitigation areas, constructing the public waterfront walkway and the Bayonne golf course and clubhouse. In its entirety all of the above was paid for and currently maintained with private funding.

For some observers, the most lasting measure of success is how building the Bayonne Golf Club has allowed this once barren waterfront environment to rebound, as the property is now a home for bird, fish, plant, and crustaceous life all thriving in a more stable and healthy tidal salt marsh, river front, and grassland ecosystem.

Building a Links Style Golf Course in a Urban Setting

As designed and developed, the Bayonne Golf Club sits on a 136 acre upland Hudson River site located just five miles from Manhattan – in New Jersey. The Bayonne Golf Club was built partially on a waterfront landfill where, prior to the mid-1990's, the site was best known for abandoned cars and a place for teenagers' late-night parties.

New York Harbor, like many waterways, requires continuous dredging. Additionally, for the Port Authority of New York and New Jersey to successfully compete as a world class harbor and accommodate the largest ships, river channels required deepening from 35 to 50 feet.

It had been the practice of the Army Corps of Engineers to deposit dredged river material three miles out to sea on barges and dumped off the coasts of Long Island, New York, and New Jersey. This practice was deemed harmful to ocean fishing and, with ongoing channel dredging, the authorities needed to identify land sites to deposit the river silt.

River dredging involves literally "sucking or scooping up dirt and river muck" from the bottom of a Hudson River channel and depositing the soupy dredged material on a flatbed barge for transport to an approved dumping site.

In the late 1990's the Bayonne site was selected as a convenient location to accept dredge. What is now the site of the Bayonne Golf Club became the home for millions of cubic yards of Hudson River silt and dredged material.

[1] Turfgrass Specialist, Center for Turfgrass Science, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey, New Brunswick, NJ 08901-8520.

Interested in Developing a Golf Course

Eric Bergstol, a New York developer, enjoys a resume which includes 11 golf courses constructed, five of which he personally designed. Eric could see the potential of the Bayonne site in the late 1990's. It was then that he first met attorney Rinaldo "Ron" D'Argenio whose advice and counsel was invaluable throughout both the permitting and construction phases of the project.

The Bayonne Golf Club is now a testament to Eric's imagination for creating golf holes – a rare talent to be sure. Eric was assisted by Richard Hurley who, with a PhD in agronomy and a faculty member at Rutgers University served as his consultant for the grasses and plant life, and provided assistance with golf course design. Prior to and during the planning and construction of the golf course Eric and Rich made numerous golfing trips to Scotland to observe and play some of the finest natural golfing links. As a result of these trips, a wealth of creative ideas were developed, many of which were used during the design and construction process.

Remediation of an Environmentally Damaged Site

There were significant environmental issues to be addressed prior to remediating the Bayonne site. First, needed to construct a soil-bentonite slurry wall mandated to hydrologically isolate the site and prevent contamination leaching into the Hudson River and Bay.

A containment requirement was directed by the New Jersey Department of Environmental Protection (NJDEP) prior to environmental improvements and acceptance of dredged material and fill necessary to sufficiently cap the site. Once installed, the 300,000-square foot impervious bentonite clay vertical underground wall extended 14,000 linear feet down to a depth of 47 feet, then abutting the underlying geological impermeable lay (bedrock).

Once in place, this wall prevented the movement of groundwater on and off the site. By preventing migration of ground water, it allowed for leachate collection and treatment. Imagine, if you will, a bathtub and how it contains water.

A Thousand Flat Barges Filled with Dredged Material

From 1998 to 2005, the property became filled with large quantities of dredged material, elevating the once flat site to rolling hills averaging 50 feet, with the highest point peaked at 93 feet above sea level. During the early stages of the process there were few traces of a golf course, as each of the 18 holes were in a unrecognizable form. For years, under Eric's direction, dump trucks hauled dredged material, and soil fill around the property to give the site it contours.

The volume of material ultimately delivered to the site was staggering, 7.5 million cubic yards of approved materials, primarily Hudson River dredged material and clean fill. Of the total, approximately 4.5 million cubic yards was river dredge. Simply stated, the total amount of soil fill and processed dredge that came to the Bayonne site is almost too much for one to imagine.

While dredged material was being delivered to the landfill on flat-river barges, clean fill was also being transported to the site using large dump trucks. In total, the trucks delivered approximately three to four million cubic yards of clean fill.

Two Hundred Thousand Truckloads of Clean Fill Delivered to the Site.

The amount of clean fill required was enormous, with deliveries to the site averaging approximately 225 trucks per day, six days per weeks, over a three year period. Dozens of large dump trucks were arriving at the site each hour of the working day, lined up at the entrance at the weight station, awaiting their turn to dump.

Doing the math, there were over 200,000 truckloads of clean fill delivered to the Bayonne site primarily for use in capping (2 feet deep over the dredge) the mountains of river dredge after the final shapes and contours were completed.

This clean fill, originated from literally hundreds and hundreds of locations, with soil arriving in trucks from a vast number of totally unrelated sites, from a mile away to possibly 100 miles from Bayonne.

After the shifting of the contoured slopes of material, it was during the fall of 2004 and spring of 2005 when the final land forms were shaped and the entire property was capped with a soil growing medium. To

insure the fairways would play firm and drain well, a clean sand was applied to all fairways and primary rough areas.

Sand, Sand, and More Sand for the Fairways

A wise decision was made to purchase pure sand to place on fairways as a growing medium for grasses to grow and perform well. This would require trucking to the site sand to be used for dressing eight to ten inches deep on fairways, from slope to slope. The sand placed in the fairways is what would be used to construct the greens.

Regulatory Issues were Constant and All Consuming at Times

Any development project of this scope and scale will always need to face the scrutiny of numerous regulators and public interest groups who want a say in what will be allowed to be constructed.

Since the Bayonne Golf Club fronted on the Hudson River, has levels of contamination that needed to be cleaned up, imported more than 7 million cubic yards of various fill materials, deposited processed dredged material, there were numerous regulatory agencies that would take a long and active role in the approval and development of the club.

As part of the permitting process approvals were required to build a marina, a FAA regulated helistop, decisions on how best to create improved environmental habitats both in the water and on land, and construction of a 1.5 mile public walkway to include fishing platforms and a kayak launch.

A Golf Course Emerges After Years Moving, Shifting Dredge, Fill and Sand

In May of 2005, seeding was initiated, when the first signs of a golf course emerged with the green turf maturing throughout the summer and into the fall months. Richard Hurley, working closely with course superintendent Bob Wolverton, selected traditional links grasses with fescues for seeding the rough, hills, and mounds, and Colonial bentgrass and Chewings fescue for establishment on the fairways. Velvet and creeping bentgrasses were seeded on the putting greens.

Additionally, with the assistance of Steven Kristoph Nursery, plant groupings were established around the golf course using over 55 thousand plants from 20 individual species, including junipers, beach rose and Scotch broom. All plant species selected for use were identified to produce a natural links look to the site.

With construction of the golf course completed in the fall of 2005, the golf course opened for play in May of 2006.

The Bayonne Golf Club is a one of a kind experience. For those who have played the great links courses of Ireland and Scotland will understand that Bayonne offers a similar experience as one would find at some of the finest natural links courses of the world.

The Bayonne golf course meanders though vast man-made fescue covered hills and dunes some almost 93 feet high. The topography looks and has the feel of a totally natural landscape. From the golfers viewpoint, walking the fairways, down in the dunes, one could easily imagine being in a far-away place playing a traditional links course.

The clubhouse, reminiscent of a stately castle, sitting atop the highest hill, in the middle of the golf course, is elegant. – The clubhouse was completed in 18 months and opened to the members in the spring of 2008.

Nature Will Rebound if Offered a Chance

There is only one word to describe the remediation of the Bayonne landfill... “remarkable” recognizing that no Federal, State or City funds were required to plan and construct this project. Ongoing maintenance and upkeep of the adjacent waterfront public walkway is the responsibility of the Bayonne Golf Club.

Nature is resilient and can rebound if offered the opportunity. 100 acres of native grasslands on the upland property and for rejuvenating the wetlands marsh habitats with the planting of spartina, a native salt marsh grass species, all designed to create an expanded range of healthy environments in which wildlife could thrive in this urban community.

Since the opening of the golf course in 2006 there has been an impressive array of birds observed on and around the golf course to include great egrets, snowy egrets, black crowned night herons, greater scaup, snowy owls, killdeers, mocking birds, sand pipers, golden plovers, black bellied plovers, lesser yellow legs, yellow crowned night herons, clapper

rail, king rail, horned grebe, red breasted merganers including a range of duck species, large and small, some common, some exotic making their summer, winter or transient migrating home around or in the surrounding wetlands of the golf course

Also found are ospreys circling the wetlands and tidal areas, as well as blue herons and hawks, all either on or around the Bayonne golf course. On the golf course itself are populations of rabbits and voles that are a natural food source for hawks, falcons, and owls.

The Bayonne Golf Club is Now Recognized as a Engineering Marvel

Anyone who has visited the links courses of Ireland and Scotland can attest that Bayonne is of the same high caliber as the finest natural links course of the world – additionally, has been recognized by "Golf Gurus" as the number two rated golf course in the State of New Jersey. Seeing the Bayonne Golf Club is truly a one of a kind experience.