



REMODELING UNIVERSITY

TABLE OF CONTENTS

I.	INTRODUCTION	PG. 3
II.	2005/2006 SYMPOSIA	PG. 4
III.	CO-SPONSORS	PG. 9
IV.	ARTICLES	PG. 10
	THE BUSINESS OF GOLF COURSE REMODELING	PG. 11
	<i>Jeffrey D. Brauer, ASGCA Past President</i>	
	DECIDING WHEN A GOLF COURSE NEEDS RENOVATION	PG. 20
	<i>Bob Lohmann, ASGCA Past President</i>	
	IMPROVEMENT PLANS AND RENOVATIONS	PG. 23
	<i>Dr. Michael J. Hurdzan, ASGCA Past President</i>	
	DETERMINING THE NEED FOR RECONSTRUCTION	PG. 28
	<i>James Moore, U.S. Golf Association</i>	
	IS RE – ROUTING WORTH IT?	PG. 33
	<i>Jeffrey D. Brauer, ASGCA Past President</i>	
	TEES	PG. 35
	<i>John LaFoy, ASGCA Past President</i>	
	GREEN DESIGN	PG. 37
	<i>John LaFoy, ASGCA Past President</i>	
	BUNKERS	PG. 41
	<i>W. Bruce Matthews, ASGCA</i>	
	THE MASTER PLANNING PROCESS	PG. 43
	<i>Bob Graves, ASGCA Past President</i>	
	WHAT TO EXPECT FROM A LONG TERM MASTER PLAN	PG. 46
	<i>Jeffrey D. Brauer, ASGCA Past President</i>	
	GOLF COURSE RENOVATIONS AND MASTER PLANS: WHY AND WHEN?	PG. 49
	<i>Steven P. Forrest, ASGCA Treasurer</i>	
	FIRST STEPS FOR PRIVATE CLUBS	PG. 51
	<i>John LaFoy, ASGCA Past President</i>	
	RENOVATION APPROVED! “LET’S GET STARTED”	PG. 53
	<i>John LaFoy, ASGCA Past President</i>	
	IN-HOUSE VS. OUT-SOURCE	PG. 55
	<i>Dr. Michael J. Hurdzan, ASGCA Past President</i>	
	RENOVATION CONSTRUCTION PHASE	PG. 59
	<i>John LaFoy, ASGCA Past President</i>	
	MORE COURSES REMODELING COURSE –ALL AT ONCE – RATHER THAN PHASING OVER TIME	PG. 63
	<i>Greg Muirhead, ASGCA Vice President</i>	
	THOUGHTFUL TREE PLANNING	PG. 65
	<i>Paul Vermeulen, U.S. Golf Association</i>	
	MAKING YOUR CASE FOR AN IRRIGATION RENOVATION	PG. 68
	<i>Kenne James, The Toro Company</i>	
	CHOOSING THE RIGHT IRRIGATION CONTRACTOR FOR YOUR RENOVATION PROJECT	PG. 71
	<i>Kenne James, The Toro Company</i>	
IV.	CASE STUDIES	PG. 74
	PINEHURST COUNTRY CLUB	PG. 75
	<i>Rick Phelps, ASGCA</i>	
	GROESBECK MUNICIPAL GOLF COURSE	PG. 77
	<i>Denny Spencer and Jerry Matthews, ASGCA</i>	
	RIDDELL’S BAY GOLF AND COUNTRY CLUB	PG. 79
	<i>Ed Beidel, ASGCA</i>	
	LOS ANGELES COUNTRY CLUB NORTH COURSE	PG. 83
	<i>John F. Harbottle, III, ASGCA</i>	
	BIDE-A-WEE GOLF COURSE	PG. 85
	<i>Tom Clark, ASGCA Past President</i>	



REMODELING UNIVERSITY

LA JOLLA COUNTRY CLUB	PG. 87
<i>Cary Bickler, ASGCA</i>	
PARRIS ISLAND GOLF COURSE	PG. 90
<i>Clyde Johnston, ASGCA Past President</i>	
MEADOWBROOK COUNTRY CLUB	PG. 92
<i>Bob Lohmann, ASGCA Past President</i>	
WOODWAY COUNTRY CLUB	PG. 94
<i>John Harvey, ASGCA</i>	
PROJECT COMPARISONS	PG. 99
<i>Michael Hurdzan, ASGCA Past President</i>	
V. APPENDICES	PG. 104
APPENDIX I: ASGCA OVERVIEW	PG. 105
APPENDIX II: MEMBERSHIP DIRECTORY	PG. 106
APPENDIX III: ASSOCIATE MEMBERSHIP DIRECTORY	PG. 112
APPENDIX IV: ASGCA PUBLICATIONS	PG. 113
APPENDIX V: ALLIED ASSOCIATIONS	PG. 114
APPENDIX VI: SUGGESTED REFERENCES	PG. 115
APPENDIX VII: SYMPOSIUM NOTES	PG. 121



REMODELING UNIVERSITY

INTRODUCTION

Welcome to Remodeling University! We're glad you're here.

As technology, the economy and player expectations continue to impact golf course design, more and more clubs are considering renovation. We hope that this seminar will provide you with insight to assist in a future remodeling project, or answer any questions you may already have regarding golf course renovation.

Remodeling University provides select opinions that are introductory in nature and is not intended to be an exhaustive view of the entire remodeling process. As always, we recommend assembling a professional team to tackle any renovation projects. At this seminar, you will learn who should be part of your remodeling team and much more about the remodeling process that you will be able to apply to future projects.

In addition to Remodeling University, ASGCA offers several other useful resources for the remodeling process, including the free publications: *The Golf Course Remodeling Process – Questions & Answers*, *Selecting Your Golf Course Architect – Questions & Answers*, *Master Planning – Questions & Answers*, *Golf Course Development Planning Process – Questions & Answers*, sample request for proposal, and printed membership lists. To obtain a copy of these publications, contact ASGCA by mail at 125 N. Executive Drive, Suite 106, Brookfield, Wis. 53005, by e-mail at info@asgca.org or by phone at (262) 786-5960. For more information on ASGCA, visit our website at www.asgca.org.

A special thank you to the co-sponsors of Remodeling University 2005-2006: Carolinas Golf Association, Golf Course Superintendents Association of America, Golf Industry Show, Southern California Golf Association, The Toro Company and the Wisconsin State Golf Association.

Thank you for attending Remodeling University!



REMODELING UNIVERSITY

FLORIDA SYMPOSIA –SPEAKER BIOS

Hyatt Coconut Point, Bonita Springs, Fla.

September 12, 2005

Presented as part of the Florida Turfgrass Association Conference



**Jan Beljan,
ASGCA**

Jan Beljan, ASGCA, seemed destined to a career in golf, as her father, George Beljan, was a long-time club professional and golf course superintendent, and four of her uncles were well-known Pittsburgh area club professionals. After graduating cum laude from West Virginia University with a degree in landscape architecture, she went to work for Davey Tree Company in their lawn care division. In 1978, she was introduced to Tom Fazio, who hired her as a design associate. She is currently a senior designer with the firm and has been involved with countless projects throughout the U.S., Europe and the Far East. Some of these include The PGA at the Reserve in Port St. Lucie, Fla., and The Bayou Club in Largo, Fla.



**John Sanford, Jr.,
ASGCA**

John Sanford, Jr., ASGCA, is a licensed landscape architect since 1981. John has a diverse background in land planning, golf course design and construction management. His design skills have most recently been showcased at Granite Links at Quarry Hills, Taba Heights Golf Resort and The Links at Madison Green. John is a graduate of Louisiana State University with a degree in Landscape Architecture.



**Lewis Powell,
ASGCA**

Lewis “Chip” Powell, ASGCA, began his professional career as a golf course superintendent in 1974. After nearly 10 years, he entered the field of golf course construction, where he oversaw the construction and remodeling of numerous golf courses while working closely with several highly acclaimed golf course architects. In 1991 he founded Powell Golf Design Company where he has completed over fifty design projects, including Solana Golf Club, Ft. Myers, Fla.; Renaissance Golf Club, Sun City Center, Fla.; and St. Cloud Golf Club, St. Cloud, Fla.



REMODELING UNIVERSITY

MILWAUKEE SYMPOSIUM – SPEAKER BIOS

Westmoor Country Club, Brookfield, WI

October 4, 2005

Presented with the Wisconsin State Golf Association



**S. Bruce Charlton,
ASGCA Secretary**

Bruce Charlton, ASGCA Secretary, grew up in Iowa, where he took up golf at an early age and enjoyed a fine amateur career. Before graduating from the University of Arizona with a Bachelor of Landscape Architecture degree, Charlton served as an assistant golf course superintendent at Manchester (Iowa) CC. Upon graduation, Charlton joined the design firm of Robert Trent Jones II, where he has developed a number of outstanding designs, including University Ridge in Verona, Wis.; Thunderhawk Golf Club in Lake County, Ill.; and The Bridges Golf Club in Rancho Santa Fe, Calif. He currently serves as president of the firm.



**Rick Jacobson,
ASGCA**

Rick Jacobson, ASGCA, began his career with Packard, Inc. in Chicago. Shortly thereafter, Rick accepted a position with Jack Nicklaus Golf Services as assistant designer, where he worked on the preparation of plan documents for the Renegade Course at Desert Mountain. Upon completion, he was promoted to design associate, where he worked closely with Jack Nicklaus in the development of golf course routing and general strategy. In 1991, Rick formed Jacobson Golf Course Design, Inc. based on his firm belief that “only organizations that deliver a quality product with uncompromised service will endure.”



ASGCA

Garrett Gill, ASGCA, grew up following in the business established by his late father, David Gill of St. Charles, Ill. Garrett and David worked together for many years and completed numerous golf facilities, including Meadowbrook Links in Rapid City, S.D., and the Hulman Links in Terre Haute, Ind., each ranked in the Top 50 Public Golf Courses by Golf Digest Magazine.



REMODELING UNIVERSITY

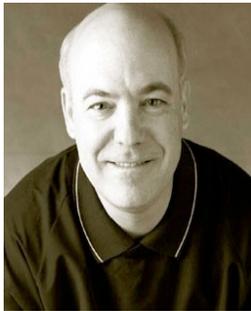
ORANGE COUNTY SYMPOSIUM—SPEAKER BIOS

Mesa Verde Country Club, Costa Mesta, California
October 26, 2005
Presented with the Southern California Golf Association



Damian Pascuzzo,
ASGCA Past
President

Damian Pascuzzo, ASGCA Past President, has designed golf courses around the Western United States and the Pacific Rim, including Paradise Valley Golf Course in Fairfield, Calif.; La Purisima Golf Club in Lompoc, Calif.; and Meadowood Golf Club in Spokane, Wash. Pascuzzo is a leader in computer-aided design, which allows him to examine numerous design alternatives quickly and easily. He currently serves as president of Graves and Pascuzzo Design in El Dorado Hills, Calif.



Forrest Richardson,
ASGCA

Forrest Richardson, ASGCA, established Forrest Richardson & Associates in 1988 and is the firm's current president. He also worked with the late ASGCA Past President Arthur Jack Snyder for two decades. Together, they completed new design and remodeling projects including Phantom Horse Golf Club, Phoenix, Ariz.; The Hideout Golf Club, Monticello, Utah; and Coyote Lake Golf Club, Surprise, Ariz. Internationally, they have worked in Mexico, Canada and Asiatic Russia. He is also the author of "Routing the Golf Course," which was published by Wiley Press in 2002.



**John F. Harbottle
III, ASGCA**

John Harbottle III, ASGCA, has won acclaim for his extensive design and remodeling of some of the nation's top courses. A graduate of the University of Washington, Harbottle began his career with ASGCA Past President Pete Dye, where he collaborated on projects throughout the United States and the world. Some of his award-winning layouts include Ridgecrest Golf Course in Nampa, Idaho; Stevinson Ranch in Stevinson, Calif.; The Olympic Course in Bremerton, Wash.; and The Golf Club at Genoa Lakes near South Lake Tahoe, Nev. All were awarded "Best New Courses in the United States" by Golf Digest. He currently serves as president of John Harbottle Design in Tacoma, Wash.



REMODELING UNIVERSITY

NORTH CAROLINA SYMPOSIA—SPEAKER BIOS

Country Club of North Carolina, Pinehurst, NC

November 2, 2005

Presented with the Carolinas Golf Association



Steve Forrest,
ASGCA Treasurer

Steve Forrest, ASGCA Treasurer, Principal with Arthur Hills/Steve Forrest and Associates, has been with the firm since earning his Bachelor of Landscape Architecture degree in 1979. Since that time, he has designed more than 180 new private, resort and upscale public golf courses around the world. In addition, the firm has renovated more than 120 courses, including The Links at Lighthouse Sound, Ocean City, Md.; Red Hawk Run, Findlay, Ohio; and Rose Creek, Oklahoma City, Okla.



Robert W. Moore,
ASGCA

Robert W. Moore, ASGCA, graduated from Wake Forest University in 1979, and then earned a Masters Degree in Landscape Architecture from North Carolina State University in 1983. He joined JMP Golf Design Group in 1990 and became a Principal in 1994. Leading JMP into the Southeast Asia market, he produced some of the region's best courses, including Mount Malarayat Golf Club, Philippines; Rajpruek Club, Thailand; and Bukit Pelangi Country Club, Indonesia. Most recently, the focus of his work has been in the United States, including The Golf Club at Roddy Ranch in Antioch, Calif., and Heritage Golf Club in Wake Forest, N.C.



Bobby Weed,
ASGCA

Bobby Weed, ASGCA, began his career as a student of ASGCA Past President Pete Dye, then served as lead designer for the PGA Tour, creating many of the TPC layouts in use today. Since becoming principal of Weed Design, his solo work has garnered significant attention: The Olde Farm GC in Bristol, Va. was named Golf Digest's Best New Private Course for 2000, while Timuquana CC, a complete renovation of a Donald Ross design, hosted the 2002 USGA Senior Amateur. Weed lives and works in Ponte Vedra Beach, Fla.



Drew Rogers,
ASGCA

Drew Rogers, ASGCA, is a senior design associate at Arthur Hills/Steve Forrest and Associates. He graduated from the University of Kentucky with a Bachelor of Science in Landscape Architecture. He has been involved in many new course design and restoration projects, including Legends Course at LPGA International, Daytona Beach, Fla.; Chevy Chase Club, Chevy Chase, Md.; and Country Club of North Carolina, Pinehurst, N.C.



Dr. Leon Lucas,
CGA

Dr. Leon T. Lucas, CGA received his BS degree from NCSU and his PhD from the University of California at Davis. He retired from NCSU in 1998 as a professor of Plant Pathology after working on turfgrass problems in North Carolina for 30 years. He then assumed the position of agronomist for the Carolinas Golf Association. He visits about 150 golf courses each year, giving advice on turfgrass problems. He will discuss factors to consider in renovating golf courses to improve turf conditions such as removing trees and improving soil drainage.



REMODELING UNIVERSITY

COLUMBIA SYMPOSIA—SPEAKER BIOS

Forest Lake Country Club, Columbia, South Carolina
January 17, 2006



Tom Marzolf,
ASGCA President

Tom Marzolf, ASGCA President, is a senior design associate with Tom Fazio Golf Course Designers in Hendersonville, N.C. An ASGCA member since 1990, Marzolf has designed more than 45 courses throughout the U.S., including Hudson National, Pinehurst #4, TPC Myrtle Beach, Wade Hampton, and Caves Valley. Marzolf has also been selected to perform renovations for courses in preparation for major golf tournaments, including Winged Foot for the 2004 U.S. Amateur and 1997 PGA; Oak Hill for the 2003 PGA Championship; Caves Valley Golf Club for the 2002 U.S. Senior Open; Merion for the 2005 U.S. Amateur; and the Riviera Golf Club for the Nissan L.A. Open.



Jeff Brauer,
ASGCA Past
President

Jeff Brauer, ASGCA Past President, began his career in Chicago, after graduating from the University of Illinois. In 1984, he formed Jeffrey D. Brauer/GolfScapes in Arlington, Texas, which has since designed over 40 new courses and remodeled over 80. Brauer has been commended for his work in such publications as *Golf*, *Golf World* and *Golf Digest*, which has named several of his courses on its "Best New" and "Best in State" lists. Included on the list is Giant's Ridge in Biwabik, Minn., which is currently the highest rated public course in the state and has a second Brauer designed course under construction.



Richard Robbins,
ASGCA

Richard Robbins, ASGCA, began his career with the firm of von Hagge & Devlin, Inc., where he was Vice President and Lead Designer. In 1986, he became Vice President of Planning & Golf Course Development for Nicklaus/Sierra Development Corporation. In 1991, he formed Robbins & Associates International, and has since designed and renovated many courses, resorts and golf communities in the Far East and U.S., including Millcreek Golf Club, Mebane, N.C.; Horseshoe Bay Golf Club, Egg Harbor, Wis.; and Palm Garden Golf Club, Kajang Selangor, Malaysia.



Dr. Leon Lucas,
CGA

Dr. Leon T. Lucas, CGA received his BS degree from NCSU and his PhD from the University of California at Davis. He retired from NCSU in 1998 as a professor of Plant Pathology after working on turfgrass problems in North Carolina for 30 years. He then assumed the position of agronomist for the Carolinas Golf Association. He visits about 150 golf courses each year, giving advice on turfgrass problems. He will discuss factors to consider in renovating golf courses to improve turf conditions such as removing trees and improving soil drainage.



REMODELING UNIVERSITY

CO-SPONSORS



Carolinan Golf Association

P.O. Box 319
West End, NC 27376
Phone: 910-673-1000
Fax: 910-673-1001
Web: www.carolinangolf.org



Southern California Golf Association

3740 Cahuenga Blvd
North Hollywood, CA 91604
Office : 818-980-3630/ 800-554-7242
Fax : 818-980-2709
Email : www.scga.org



Golf Industry Show
www.golfindustryshow.com



Wisconsin State Golf Association

333 Bishop's Woods, Suite 104
Brookfield, WI 53005
Office: 888-786-4301
Fax: 262-786-4202
Web: www.wsga.org



**Golf Course Superintendents
Association of America**
1421 Research Park Drive
Lawrence, KS 66049-3859
Phone: 800/472-7878 or 785/841-2240
Web: www.gcsaa.org



The Toro Company
8111 Lyndale Avenue South
Bloomington, MN 55420
Phone: 612-888-8801
Fax: 612-887-8258
Web: www.toro.com



ARTICLES



REMODELING UNIVERSITY

THE BUSINESS OF GOLF COURSE REMODELING

Jeffrey D. Brauer, ASGCA Past President

All aspects of golf course management are becoming more business oriented with each passing year. This extends to the business of golf course remodeling. Now, more than ever, all decisions pertaining to renovation of an existing golf course are made in a businesslike fashion.

Questions such as: ***Do we need to remodel?; What are our priorities?; Can we afford it?***, precede a substantial renovation plan for a golf course.

Occasionally, decisions on remodeling are forced on a club suddenly, such as in the case of a natural disaster or other unplanned events. However, the well-run club, like the well-run business, will have a long-range business plan which anticipates the need for continual replacement and renovation of its facilities to stay current in the marketplace. For your golf course, this plan can be established through the development of a long-term redevelopment plan.

WHEN IS IT TIME TO REMODEL?

Clubs decide to remodel when it becomes apparent to the governing body that deficiencies exist in the structure of the club in one of the following areas:

1. Economic problems
2. Maintenance problems
3. Design problems
4. Aesthetic problems

The above list was listed in decreasing order of importance, according to our experience as golf course architects. A closer look at each area follows:

Economic Problems

Golf clubs, even equity clubs, are marketing a service and a product. Economic problems become evident when it is difficult to raise dues and difficult to attract new members.

Typically in such cases, existing clubs often find that new clubs are offering potential members a better choice. Other local clubs that remodel or renovate have also been upgraded to where the public perceives better value.

It is easy for this type of problem to go unnoticed for several years. This is especially true if substantial money were invested in a renovation seven to ten years ago. By believing that the golf course is “set for life,” other courses slowly catch up until you recognize that you need to act to keep from falling behind.

It’s important to remember that the golf course, your product, needs to be continually updated to stay ahead in the marketplace.

A rare situation is the case when a golf course must be renovated to better meet the needs of its target market (whether that be membership or public play). This is happening generally as golf’s



REMODELING UNIVERSITY

appeal broadens and more women come into the game. Renovations, including women's tee programs, should be a part of virtually every club's long-range plan.

Demographic shifts in an area (such as more senior citizens moving into the area) occasionally necessitate a shift in golf course philosophy. Major changes of operational philosophy, such as converting from public to private or vice versa, also require close study to necessitate sea of design changes are necessitated.

Maintenance Problems

The next important category that leads to long-term, large-scale renovation problems is the need to correct serious maintenance problems. Typical among these include:

- Deteriorating greens
- Desire for USGA greens
- Need for larger tee surfaces
- Need to eliminate difficult to maintain bunkers
- Need for new irrigation system
- Drainage problems
- Flooding problems
- Cart path extensions

Design Problems

Occasionally, we are called by a club to create a renovation problem to solve golf course design problems. While less frequent than other types of renovation projects, occasionally without economic transition or serious maintenance problems, the club membership is composed of serious golfers who desire that the club be updated or be changed, to enhance their golf experience. Typical problems that facilitate golf course renovations include:

- Desire to update design of course
- Desire to make course more difficult/less difficult
- Regional or national tournament
- Rebunkering to accommodate longer tee shots
- Need to revise individual unfair holes
- Restore course for sake of historical accuracy

The nature of the design problems to be corrected is as individualistic as each golf course, club membership or golf course owner.

Aesthetic Problems

It is very common to have a golf course that is well built and solid in terms of playability that needs help with aesthetic treatment. The professionally trained eye of a golf course architect (often trained as a landscape architect) can assist a club in improving this important aspect of its course.



REMODELING UNIVERSITY

Typically, aesthetic problems are created either through inadequate and originally inadequate landscape budget, through improper planting by well meaning, misguided tree planting committee, or other in-house improvements that were simply not carried out well.

Many architects note that a majority of the renovation business comes when a club is making its second major attempt at improvements. While golf course architects and contractors are expensive, it often takes mistakes in the name of saving money for clubs to realize that professional help is necessary.

RENOVATION PLANNING – THE GOLF COURSE ARCHITECT’S PERSPECTIVE

When a golf course has identified, however vaguely, one or more of these problem areas needs to be addressed, it’s time to call a golf course architect.

The golf course architect will likely add another perspective on how positive changes to the golf course can solve specific business problems. His/her experience will likely show that proper design solutions can solve problems in more than one area.

For most golf course architects, remodeling work constitutes a significant portion of their business. Almost universally, architects will tell you that it is more challenging than designing a new golf course.

This often stems from the architect being involved in the “go/no go” decision in renovation. At equity clubs, it is typical for the older members to be resistant to change. While they pay an equal share of the cost, they may feel they do not have as many years to enjoy the value of the potential changes. Senior members also typically have many positive memories of their many years at the club, thus making it more difficult to understand why anybody would want to change “their course.” At any golf course and for any member, partial or total disruption of play is difficult to tolerate.

And because most players at a given course have fond memories and an intimate attachment to the golf course, design issues often shift from technical terms to more emotional ones.

Additional challenges for the golf course architect and club manager form expanding their roles to include, communicator politician, negotiator and arbiter!

DETERMINING THE SCOPE OF WORK

When called to prepare a golf course redevelopment plan, we recognize that club members have a difficult time visualizing potential golf course changes. Based on second hand information about renovation programs at other clubs, a renovation committee might have wildly different ideas about what is in store for their club. This is individualistic as the clubs that undertake them.



REMODELING UNIVERSITY

An experienced golf course architect will tailor the redevelopment plan to build the quality of the existing facility and the long-term goals of the club. Therefore, the renovation plan undertaken at your golf course may be completely different than one undertaken just down the street.

To begin flushing out the types of changes needed on a particular golf course, we begin by reviewing the established goals based on identifying problems as listed earlier. We then inform the membership of the potential remodeling techniques, or program types and how they might be utilized to solve specific problems.

In the general rule, we classify remodeling programs into three basic types:

1. Budget-minded improvements
2. Rebuild in place
3. Relocation of major features

Each tends to carry a successively larger price tag, yet can solve more problems if properly executed. Most renovation problems eventually contain some elements of each. Major relocations, including rerouting golf holes, is relatively rare compared to the other two types of improvements.

Budget-Minded Improvements

In one sense, golf courses, through their superintendents, are always pursuing incremental improvements that can be instituted economically. Included in this type of program are:

- Contour fairway mowing
- Contour tee mowing
- Creation of chipping areas through green bank mowing
- Tee extensions
- Green extensions
- Bunker elimination/construction
- Introduction of wildflower areas
- Landscape additions
- Cart path extensions
- Irrigation lake additions
- Minor drainage additions
- Flower beds

Most clubs would benefit by utilizing a golf course architect to assist them, even with the simplest improvements. Most architects will consult on a daily basis to assist in such situations. If a golf course redevelopment plan is being prepared, the golf course architect will likely include several of these elements, which, when properly done, can greatly enhance the appeal of the golf course.



Rebuild In Place

This type of remodeling is probably most common. It is necessary to solve most of the design and maintenance problems that typically arise at a golf course. Provided that the golf course has a sound routing, rebuilding in place can be used to solve design, maintenance and aesthetic problems as they may occur on the course.

Rebuilding elements of the golf course requires a greater commitment from the golf course, as disruption now becomes an issue. If a green or tee is to be rebuilt, that portion of the golf course will remain out of play, not only during construction period, but for a subsequent grow-in period as well. Unless construction is timed perfectly, disruption to the golf course can last for six months to a year.

Relocation of Major Features

As mentioned, substantial rerouting of golf holes is relatively rare, if for no other reason than its more prohibitive cost. Whereas rebuilding a green can often be done with minimal disruption to surrounding areas, rerouting of fairways requires a much greater degree of infrastructure replacement (irrigation, drainage, etc.) and the cost tends to rise proportionately.

However, the cost is worthwhile if it can allow golf holes to be substantially improved, such as relocating them out of flood prone areas. In other cases, golf holes **must** be relocated due to loss of land for highway widening. For extreme, longer cases desire exists to relocate a golf hole to improve safety. Many clubs have been able to acquire additional usable land to add to the length of the golf course or add other facilities such as driving range, pool complex, etc. In these cases, the relocation of features is an opportunity to overcome long-standing limitations of the existing layout.

Typically, in the preliminary design phase the golf course architect will assess a variety of options with an analysis of the respective costs for presentation. The club should decide early in the process whether its financial situation, including existing debt, dues structure and other factors, will allow it to commit to major elements of the plan the golf course architect may propose. If it cannot, financial realism should be incorporated into the final redevelopment.

CREATING A PHASING PLAN

The question of how to prioritize construction improvements involves many variables. Once several basic questions are answered, the direction of the remodeling program will take shape.

The first consideration is “how big a piece do you bite off at one time?” There are two basic options, with variations of each:

1. Massive renovations at one time
2. Spread renovation over as long a period as possible; or
3. Combination approach



REMODELING UNIVERSITY

A summary of each method follows.

Massive Renovation

Massive renovation entails closure of the golf course as work progresses. It is often promoted by one of several motivations:

- Course is already closed due to flood, freeze or other damage;
- Immediate need due to flooding, freezing or other problems;
- Desire to see results quickly; or
- Unique opportunity to financing project.

Advantages include lower unit costs for construction due to economy of scale, a greater tendency to “do it right” (rather than do makeshift changes to minimize disruption), and avoidance of yearly disruptions to play.

Disadvantages typically include difficulty in providing financing for such a large project, disruption of cash flow in the dining room and pro shop, and the natural fear of driving members away.

Spreading Renovation Over Period of Several Years

This is a more typical method to accomplish a renovation of program. Typically, financing is easier because of the smaller nature of each project, and if properly timed, there is little disruption to cash flow. At most clubs, the inconvenience of playing one or two temporary features will not affect play levels.

Disadvantages include playing a golf course that is inconsistent in style and play value for several years, some resentment of continually tearing up the golf course, and the possibility of changing direction or losing momentum in the program. Maintaining a consistency of materials (greens mix, etc.) may also be difficult, and this can affect play and maintenance practices.

Combination Approach

The combination approach accepts some of the advantages and disadvantages of both. It is predicated on the premise that if you are playing 15 holes, you may as well play nine holes (twice if desired) and build nine holes each year. This alleviates some logistics problems in the pro shop and maintains cash flow at the club. The renovation is completed in two years so results are seen relatively quickly. It is also possible to schedule some preparatory and/or recuperative years in this method.

In the preparatory years, it is possible to make minor changes including creation of high caliber temporary greens. These would be made in an effort to minimize the “down time” during major reconstruction.



REMODELING UNIVERSITY

Recuperative years can be spaced into the program to give the members a respite. This is especially important if maturation is not as rapid when constructing the front nine.

SETTING PRIORITIES

Unless review of phasing options indicates that the club should undertake a complete renovation of the entire 18 holes immediately, it will be necessary to finalize each course's specific phasing plan by setting priorities.

Setting priorities for planned improvements typically involves answering several either/or type questions. Typical choices include the following:

(1) Technical Projects vs. "Visual Projects"

Technical includes irrigation; drainage and planting bed improvements that help the superintendent improve the overall quality of the golf course. However, these improvements are often subtle and therefore not noticed by members who may then ask where the money went!

Visual projects, such as new greens, definitely get more attention. They can also solve some technical problems at the same time.

(2) Projects That Impede Play vs. Projects That Leave the Course Open

This decision can dovetail with the "preparatory years" scheme. It is also a function of politics at the club. Is the temperament to "get our feet wet" or to "plunge in?" Strong sentiment to do only small projects may indicate lack of general support for renovation. Ideally, a larger project that has impact (dramatically solving a long-term problem) can be a catalyst to keep the program going.

(3) Large Projects vs. Small Projects

The decision is impacted by many of the same factors pointed out above. More directly, this can be related to the depth of the overall financial ability of a golf course to pay for improvements.

The golf course architect may offer a perspective to a club on setting priorities. The concept of a long-term redevelopment plan is to avoid making construction errors, and avoid making them out of sequence. This is illustrated by a recent and typical exchange with a club. Their most immediate perceived problem was the need to extend cart paths. Many members wanted to extend the paths immediately even though greens reconstruction was clearly on the near horizon. Had I not pointed out that a substantial portion of the paths would have to be relocated when greens were enlarged and in some cases relocated in the near future, the club would have spent hundreds of thousands of dollars on work to be torn up two years later.

This example also illustrates the value in setting the long-term design elements of the golf course based on the course's needs rather than budget. Given that most renovations do not typically need to occur in one year, time can be the ally of any golf course in paying for needed renovations. A golf course should never scale back its



REMODELING UNIVERSITY

renovation plan to something that does not solve a problem because money is not available this year. Rather, it should use its redevelopment plan to set aside adequate funds and provide financing for needed improvements in future years. The key is preparing a workable phasing plan.

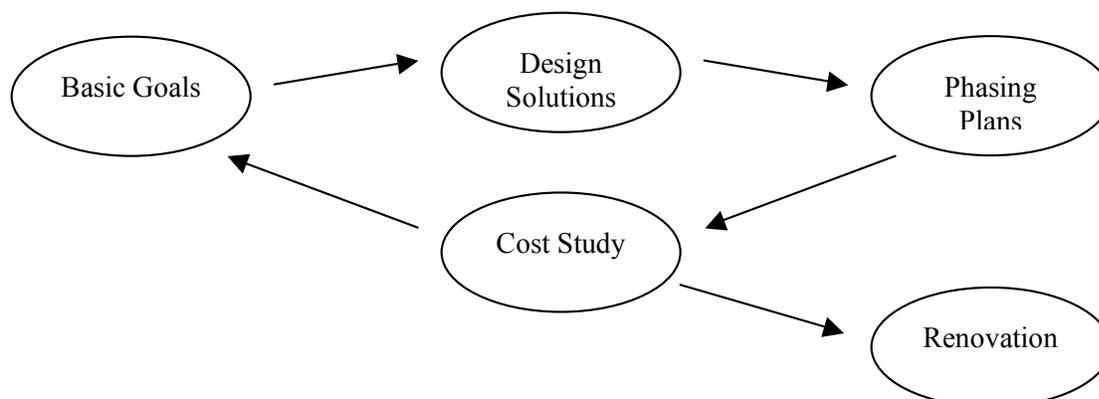
Phasing should generally be prioritized on the following principles:

- (a) Holes that logically go together in construction. Example: The cut from a new irrigation pond should be used on surrounding holes to keep disruption to a minimum.
Keeping cut/fill hauling distances short saves cost; reduces damage to course; and has less effect on play.
- (b) Holes most in need of change to increase drainage, safety, or seedbed content.
- (c) In general, a hole or area should be completely reworked and then left. Going back into an area tears up completed work and costs more money.
- (d) Areas with the highest impact, or that can affect the most holes, should be done first. Areas which make only cosmetic changes or affect only one hole can be done last.
- (e) Within each phase, certain priorities are interchangeable, as are some phases.

COST STUDIES

After the basic goals have been established, design solutions prepared and prioritization and phasing plans complete, it is important to put a realistic cost study together to complete a realistic long-term golf course redevelopment plan. If all elements have been realistically assessed earlier in the process, the cost study should contain no surprises. Occasionally, an analysis of costs can send the entire plan back to the “drawing board.” As with renovation design, cost estimating for renovations is more of a challenge for the golf course architect. The golf course architect typically keeps old bids on file for a wide variety of projects. In new course construction, recent bids can be updated for inflation and other specific changes in scope of work to provide a reasonable accurate estimate.

The Remodeling Process





REMODELING UNIVERSITY

In renovation projects, the variables are bigger and problems of estimating become more of a challenge. For example, contractor's unit costs typically rise as the scope of work is reduced, as is typical in renovation projects. The contractor applies overhead to smaller amounts of work because the contractor has certain fixed overhead on a weekly/monthly basis, which must be spread out over fewer work items. This must be accounted for on any cost estimate.

Other factors include the golf course's ability to carry out certain elements of the work and timing of the work, which is often pushed to the fall season to avoid major tournament schedules. Lastly, the architect must account for yearly inflation for long-term projects.

DOCUMENTATION OF PROCESS

As can be seen from the above, long-term development planning is actually a process rather than a final product. At the same time, the golf course architect typically will deliver documentation of the final plan, with all elements completed, and backup report, including prioritization plans, phasing plans, cost estimates and other memos and opinions related to the master planning process.

Most golf courses find that the formal documentation of a long-term redevelopment plan is helpful in legitimizing the plan. Many equity clubs include the master plan as part of its by-laws, thereby preventing whimsical or non-conformance changes by future greens committees. If properly documented, a well-prepared master plan can assist in this effort. A well thought out master plan will contain some flexibility. This is particularly necessary in the case of a golf course that chooses to extend its redevelopment program over a period of several years. Flexibility can be built in by providing a variety of projects with a variety of budgets that the golf course can select, based on its financial condition in any given year.

The final redevelopment plan documentation can serve as a road map to the future for the club that sticks to its goal and objectives. It is important to note that further services will probably be required from your golf course architect at the time of implementation. The master plan is not a bid document or set of construction drawings. Typically, the golf course architect is retained again in a more detailed level of design as established for each specific feature, specifications prepared and bids let. Master plans do not typically give detail consideration to exact lines and grades.

CONCLUSION

A well-prepared golf course redevelopment plan is essential for nearly every golf course that takes a business-like approach to its long-term existence. Proper methods as established in other areas of business such as goal setting, long-term planning, cash flow analysis, combined with the architect's unique sense of value engineered design solutions is a valuable asset that can keep any golf course from being caught off guard and unaware that it is falling behind the marketplace.



REMODELING UNIVERSITY

DECIDING WHEN A GOLF COURSE NEEDS RENOVATION

Bob Lohmann, ASGCA Past President

As a superintendent or a golfer, you become familiar with your golf course. It is possible that you have been playing or maintaining the same golf course for years without any significant improvements taking place. Is it okay to continue to maintain your golf course at its current level? Or is it possible that a golf course can become outdated?

How do you know if your golf course needs renovation? You first have to look at the game of golf as it is played today and the people playing it.

The game of golf is changing, and has been for some time. Recent trends in golf course architecture have had a tremendous impact on the playability and maintainability of golf courses. Technological advances in turfgrass, irrigation systems, maintenance equipment, chemicals, and maintenance practices are all changing the face of the game. All of these things are interrelated and affect each other as they are applied to the golf course.

MAINTAIN PLAYABILITY

As the number of players continues to increase, more and more stress is placed on the turf and on the superintendents to maintain playable conditions on golf courses. The superintendent's primary job is to provide the best playing conditions possible on the golf course. Unfortunately, every effect the golfer has on the golf course is counterproductive to this effort. As more and more golfers play, the superintendent's job of maintaining the golf course becomes more and more difficult. If you feel you cannot keep up with the wear-and-tear the golfers are producing, then it is time to look at remodeling as a means of helping you do your job.

There are many ways to address wear-and-tear through modifications in design. For instance, tees can be made larger, bunkers can be located out of the way of circulation patterns, positive surface drainage can be provided throughout the golf course, greens can be made large enough to combat the negative effects of compaction, etc.

Not only are there more players, but their abilities are improving as well. This is partly due to technological advances in the equipment. As a result, the golf ball is traveling farther, requiring adjustments in the layout of the golf course.

The use of golf carts has also had a big impact on golf course design and maintenance. The carts are desirable economically, but place a tremendous strain on the turf, causing compaction and worn-out turf areas, as well as circulation and cart storage problems.

Another factor that leads to changes on the golf course is the popularity of televised golf tournaments. Golfers see tournament golf courses in top condition and expect these same conditions on their golf courses throughout the playing season. Providing these types of playing conditions places a lot of stress on the turf, as well as on the superintendent.

As you can see, the golfers and the way golf is played, places demands on the golf course. We've reviewed what some of these are. Now you need to look at your golf course and determine if it is successfully meeting these demands and satisfying the needs of the golfers.



REMODELING UNIVERSITY

EVALUATE COURSE

Most people desire to make their course one of the best in playability, variety and playing conditions. As the playing season comes to an end in the northern climates, they should evaluate their golf course, remarking on the good as well as the problem areas that were noticeable during the golf season. After the winter retreat from the golf course, the problem areas are somewhat forgotten when its time to “tee it up” in spring. Before the snow falls, the golf course should have a final critique that is recorded so it can be remembered and discussed throughout the winter months. The items to be studied should include problem areas, specific design features, and maintenance procedures that seem to distinguish the golf course.

Some of the areas to be considered would be:

- 1. Green and bunker design – size, shape and location.**
- 2. Size and condition of tees.**
- 3. Variety and challenge of each golf hole as well as the entire golf course.**
- 4. Use of detailed landscape elements.**
- 5. Amount and condition of fairway area.**
- 6. Types, location and condition of trees.**
- 7. Circulation patterns.**

These items are part of what makes up the character of the golf course. Those who have studied their home golf course and other golf courses have found that character is very distinguishable. It is the essential quality that may make a successful golf course a great golf course.

When remodeling is being planned for the golf course, it should be to improve or modernize some area in either design or maintenance. Remodeling that is proposed to drastically change the course to look something like a Florida resort or a Tournament Players course will affect the character and possibly do more harm than good.

RECOGNIZE INTEGRITY OF THE COURSE

Hopefully, the club members, superintendents, professionals, and managers realize the integrity present in their golf course and how it developed over a period of years.

All golf courses need improvement or modernization, but before any work is started, the present course conditions need to be evaluated. It is necessary to look back and analyze what is present, what needs improvement and how to implement the improvements without destroying the wholeness of the golf course.

A successful golf club is not one that is continually changing, but one that is changing according to a plan that leaves the course playable during construction and recognizable after the work is completed. A great golf course, be it a new model or an old edition, is a creation and not a copy of good golf holes from various courses.



REMODELING UNIVERSITY

As we advance through this era of improved maintenance procedures and golf equipment, let's not forget about design and its importance in the development and existence of the character of every golf course.

ASK YOURSELF QUESTIONS

- Is your golf course supporting or drawing the optimum number of rounds or memberships, or are these down because of poor playing conditions?
- Can you compete with other golf courses in your area in terms of green fees and the quality of golfers who play your golf course?
- What is your golf course's reputation among area golfers?
- Is the general golfing experience a positive one, or would improvements to the golf course make it better?

The superintendent's job is to provide desirable playing conditions on the golf course. As we have outlined, everything the golfer does counteracts this effort. Often, it is possible to address maintenance problems from a design and construction materials standpoint, in addition to a maintenance approach. A "band-aid" approach to fixing maintenance problems can be avoided by making improvements in the design or construction materials. Maintenance will then become much easier, efficient and cost-effective.

For the sake of argument, let's assume that we can recognize when a golf course needs renovating. What do we look for? Aspects might include:

- 1. Greens**
 - a. Tillinghast's Deadly Sins
 1. Greens that drain too little
 2. Greens that drain too much
 3. Greens that are too small for large shots
 4. Greens that are too large for small shots
 5. Greens that are too freakish for any shot
 - b. Compaction
 - c. Layering
 - d. Shade
 - e. Air Circulation
- 2. Tees**
 - a. Size/Usable Area
 - b. Surface Condition
 - c. Turf Condition
 - d. Alignment
 - e. Shade
- 3. Bunkers**
 - a. Physical Condition
 1. Sand Consistency
- 2. Sand Build-up on Edges/Droughty**
- 3. Sand Depth**
 - b. Location
 - c. Quantity
- 4. Drainage**
 - a. Surface Drainage/Major Storm Drains
 1. Contouring
 2. Piping
 - b. Sub-surface Drainage/Minor Drainage
- 5. Shade/Air Circulation**
 - a. Trees, Trees, and more Trees
 - b. Golf Feature Orientation
- 6. Traffic/Circulation**
 - a. Turf Loss/Traffic Concentration
 - b. Steps & Walks
 - c. Safety
- 7. Landscaping**
 - a. Scale
 - b. Plant Materials



REMODELING UNIVERSITY

IMPROVEMENT PLANS AND RENOVATION

Dr. Michael J. Hurdzan, ASGCA Past President

For most of us, a concept like geologic time is difficult to fathom. We tend to measure all things in relationship to our human experience. So it is understandable that most people view the golf course as a static entity. But in fact, it is a dynamic, slowly evolving organic complex. The growth, spread, and decline of trees, the succession of grasses and other plants, the meandering of streams, the ebb and flow of the edges, shapes, and sizes of tees, greens and bunkers all contribute to the natural processes by which golf courses undergo gradual but perceptible change.

REASONS FOR IMPROVEMENT

There are human factors as well that cause a golf course to change and age—factors such as increased play, demand for higher maintenance levels, automatic irrigation, golf carts, the buildup of chemicals, and, sad to say, damage from vandalism.

Moreover, the game of golf has changed over the last century, with breakneck speed the last fifty years. Golf equipment has shifted from wood-shafted clubs and crudely made balls to space-age materials and computer-generated dimple patterns in the search for “the longest ball.” The pitch-and-run shot has been replaced by the wedge shot. Small wonder that the golfer of today wants fast, sure-playing surfaces. The golf course, in turn, must respond to these changes if it is to endure the demands placed on it and serve the golfers who pay for its existence. As the golf course grows old slowly, like all complex systems, it must be rejuvenated, and oftentimes renovated.

UNPRODUCTIVE IMPROVEMENTS

Once the members of a golf course become aware of its needs, a typical pattern seems to develop. Usually a green committee chairman or course supervisor takes it upon himself to alter, add, or delete golf features using golf course personnel or a local bulldozer operator. Decisions about such things as a bunker’s size and placement, tee location and expansion, or fairway width and mowing patterns are frequently made on an ad hoc basis, with each item modified as a stand-alone unit instead of as part of a whole. Sometimes the work turns out acceptably, but more often it is a feeble attempt to improve existing features, basically because most of the people involved are inexperienced. All the while, the rest of the membership indulges these men’s fancies while patiently paying higher dues or green fees. And every time a club appoints a new green chairperson, he or she invariably sets out on his own pet project. There is seldom a plan or a semblance of continuity.

PROPER IMPROVEMENT PLANNING

Clubs considering structural changes to the design of the golf course need an experienced golf course architect to give them a long-range plan. Yet to suggest turning to “an outside agent” is tantamount to club heresy and usually ignored at least until two or three hair-brained schemes fail or are aborted.



REMODELING UNIVERSITY

Once the decision is finally made to employ a professional designer, the best procedure for a club to follow is the formation of a long-range golf course improvement committee. It should consist of the golf pro, the course superintendent, the green chairperson, a member from the Board of Directors, a representative from the women's golf committee, and someone from the seniors golf committee. This committee can be supplemented by as many others as practical, but it should always provide for input from these various constituents. The functions of this committee are: to select a golf architect to prepare a long-range study; provide the architect with thoughts, ideas, feelings, and opinions regarding specific improvements; and approve the prepared plan before it is presented to the Board of Directors or the general membership.

SELECTING THE ARCHITECT

The first job of this committee is to contact several design firms and invite them to an interview. The best time to arrange for such interviews would be just after the first of the year, before the construction season begins. After arranging these interviews, the committee should prepare a list of general objectives in order of importance. It should also locate a recent aerial photograph of the course and an up-to-date contour map.

The interview of the golf architect should be as specific as possible and deal with his past work on improvement studies. It is not unreasonable to ask for specific locations of his work and names of contacts in order to arrange for an inspection of his work. The committee should ask to see plans or studies that were prepared for those projects and the cost of preparation. It should also determine how the work will be done and the function the architect will serve during the renovation. Of course, the committee should inquire about his fees and present his philosophy of design.

The committee may now ask each architect the most troublesome hole on the course and ask what he or she would do to improve it and at what cost. After similar interviews, the committee can then choose the firm that is best for them. Once the designer is selected, the committee should ask for a written proposal that would include starting and completion dates of the study, the total cost of the study, an estimate on the number of trips to the site the golf architect will make in preparation for the study, the procedure to be used to prepare the plans, and the construction cost estimates for each major element, section, or hole.

When the proposal is in hand and funds are approved to retain the golf architect, the club should arrange to sign a contract or return a letter to him or her acknowledging his proposal and authorizing him to proceed.

IMPROVEMENT COMMITTEE

There are many approaches to preparing improvement studies. The one that follows is a personal method that I've found best satisfies the needs of my clients at the most reasonable initial cost. The goal of an improvement study is to provide sufficient detail and rationale for proposed improvements and to communicate the intent of the plan to even the most inexperienced or emotionally hostile parties. I have never done an improvement study without some vigorous opposition from selected members who oppose any change whatsoever. However, after



REMODELING UNIVERSITY

explaining the procedure used to form the plan and the reasons for the proposed change, and paying respect to their objections, I have found only a small percentage of members will steadfastly cling to total opposition. Changing a golf course is an emotionally charged issue that must be handled with patience and understanding. For the process to succeed, politically as well as architecturally, the architect has to rely upon persuasion, and to listen.

REQUIRED BASE MAPS

The club is expected to supply maps including: a new, scale-verified, engineering-type aerial photograph; a topographic map with at least 5- to 10-foot contour lines (1- or 2-foot lines are preferred); a property line map; existing irrigation map; and a map of underground utilities or rights-of-way. All maps should be of a scale of 1 inch = 100 feet.

I begin preparing an improvement study by taking the maps supplied by the club, overlaying them, and redrawing the existing golf course to show the location of each golf feature—cart paths, property lines, trees, contour lines, and other prominent features. Then I return to the course and physically check the drawing against the actual golf course to guarantee that I have included all major items and that no items have changed since the aerial photograph or contour maps were made.

ANALYZING THE GOLF COURSE FEATURES

Satisfied that the drawing is complete, a meeting of the improvement committee is arranged to walk the course. The committee and I start at the first tee and we discuss that tee for any maintenance problems, location, size, quality, alignment, traffic patterns, and so on. I encourage input from all committee members, especially the senior and ladies representatives. We discuss possible solutions for the perceived deficiencies, and alternate plans, and I offer my personal views. Then we walk down to the first impact area of the seniors or ladies. That impact area is analyzed for golfers of all abilities.

Finally, we reach the green and it is analyzed for maintenance factors, number of cupset areas available, internal and surface drainage, slope, size, integration of mounds or traps, and so forth. Then we consider the entire hole as a unit and discuss what can be done to parts of it to make the hole safer, fairer to poor players yet more challenging for the best players, more enjoyable for all golfers, and a better aesthetic experience.

During the walkaround I summarize most of the collective thoughts of the hole until we have a general, if not complete, agreement on possible improvements. I then annotate my map accordingly. This procedure is followed for the other holes. To do so takes an entire day.

SUMMARIZING IMPROVEMENT IDEAS

Having completed this analytical tour, I am then able to draw the proposed improvements onto a master map, which becomes the basis for the study. In addition, I write a few paragraphs on each hole, explaining the reasons for the proposed improvements. This is sent to the committee for its approval.



REMODELING UNIVERSITY

After reviewing the initial information we generated at the first walk-through of the course, the committee remarks are incorporated into a second incarnation of the plan, which is again returned for their review. The same procedure is used at another meeting to answer questions or clarify solutions to holes that still lack committee agreement. The committee provides insight into how it views each golf hole, and each group should be satisfied with the recommendations.

This method assumes that the delegate to the committee speaks for the entire group and does not simply give his or her personal opinion. This is especially true of better golfers, particularly the best woman player, who wants to make the course tougher at the expense of 95% of the other golfers. It has been my experience that sometimes the best players provide the most partisan information. The improvement committee is sometimes better served by average players, or by golfers who were very good 20 or 30 years earlier and now have a great deal of empathy for less skilled golfers.

COMPLETING THE STUDY

Having carefully and slowly examined the entire course, I am able to produce a plan that best suits the individual club's needs. By including a written rationale for the proposed changes, I permit any interested party to understand the problem and propose an alternative solution. This often helps the overall study gain majority approval. However, it is not enough simply to state the changes for all 18 holes, for the committee has no idea where to start. Therefore, I prioritize the holes according to need and I include an estimated cost. By listing the holes in order of need, and by generating an overall estimated cost, the long-range improvement committee can budget intelligently and phase the work out over a number of years.

With a completed study in hand and a phase and budget plan worked out, the committee is then ready to go to its board for approval. If the board approves the study and phase plan, then these should be presented to the general membership by the golf architect at a special meeting.

EXPLAINING THE STUDY

Without fail there will be many distortions and untruths about the study and plan, especially if word gets out and the media catch hold of the story. By having the special meeting and presenting the study and plan to the rank and file membership, anxiety is allayed, especially when it is explained that every group was represented and heard during the preparation phase. Once the study and plan are approved by the membership, it then becomes the basis for any and all improvements.

The cost of such a study depends upon golf architectural firm, the scope of the study, and what the committee wants for a final plan. The study is not a set of working drawings, but rather a conceptual representation that only shows relative size and location. If working drawings are required, the cost would be five times higher than for the concept or feature plan. Since it is not known if all the improvements will be approved, it is better to wait until the actual work is to begin before creating detailed working documents.



REMODELING UNIVERSITY

CONCEPT VERSUS WORKING DRAWINGS

The kinds of detailed working documents that are needed to do the improvements can range from a verbal or written description of the work to grade stakes in the ground accompanied by detailed scaled drawings and voluminous specifications. The fewer drawings or descriptions used, the greater must be the club's trust in the golf architect and the contractor, for there is little basis for resolving misunderstandings of what the finished product is or how much it will cost. For simple improvements, such as reshaping a bunker, the club might wish to get bids from capable contractors to work by the hour, with the club buying all the materials. This way the club only pays for the labor and construction equipment, and not for overestimates of time and material. If the project is more complex, then the golf architect should be instructed to produce a written estimate of the total quantity of work involved and a description of acceptable standards of workmanship on which a contractor can bid and bond the work. If the improvement is extremely complex, such as on the sensitive issue of constructing new greens, then the club should pay the golf architect to make detailed drawings and specifications for the project that can be approved by the board before the contractors bid and bond the work.



REMODELING UNIVERSITY

DETERMINING THE NEED FOR RECONSTRUCTION

James Moore, U.S. Golf Association Green Section

This is one of the most important questions that can be asked regarding every golf course. Usually this question is followed by questions such as:

- Do greens wear out over time?
- Why is it some greens last for over 50 years and other are rebuilt within 10 years?
- How long will it take?
- How much will it cost? (Which is often followed with a repeat of the first question - do they really need to be rebuilt?)

At first, these questions would seem to be relatively easy to answer. But the person asking such questions will quickly find that they will receive many different answers to the same question- depending largely on the perspective of the person being asked.

There are at least four distinct perspectives that come into play.

AGRONOMIC CHARACTERISTICS

The agronomic aspects of the existing and proposed greens involve the greatest amount of science and technical considerations. The following procedure is recommended to determine whether or not the greens should be rebuilt.

1. Arrange for a Turfgrass Advisory Service visit from the Green Section agronomist in your area. The agronomic staff of the Green Section can provide an unbiased assessment of the ability of the greens to perform up to expectations. This assessment will be based on formal agronomic training and invaluable experience gained from visiting a wide variety of golf courses and green construction techniques.
2. Please do not assume the Green Section agronomist will recommend the reconstruction of any green simply because that green is not currently built to the USGA Guidelines for Green Construction. (The USGA Green Section's Guideline for the Construction of Greens can be found at USGA Guidelines.) The USGA agronomists fully realize that there are many greens that perform extremely well that are far from being Spec greens as they are often referred to in the industry. In fact, the agronomist will make every effort to determine whether or not the existing greens can be improved through modifications to the maintenance programs.
3. Improve the growing conditions of the existing greens as much as possible. Often greens that are performing poorly can be greatly improved with practices including a more aggressive aerification program (including various types of aerification), adjustments to the fertility and/or fungicide programs, the provision of additional light and air movement to better support turfgrass growth, the raising of cutting heights to create a stronger plant, the acquisition of better quality water, or even something as simple as increasing traffic control efforts to distribute traffic over a larger portion of the green. The Green Section agronomist can be very helpful not only in helping the golf course superintendent identify



REMODELING UNIVERSITY

4. such steps, but also in documenting the need for such work in a written report to the course leadership.
5. Please note! Seldom do greens fail solely because they are poorly built. More often, there are many stresses on a green that cause it to fail. While reconstruction may well be justified, unless the other conditions that contributed to the turf's failure are not corrected as well, the new green is unlikely to perform up to expectations. One good method of ensuring all aspects of the current growing conditions of the greens have been considered is to complete a Report Card for each of the greens.
6. Remove samples from the existing greens and submit them to an accredited, physical soils laboratory (Accredited Laboratories List) for analysis. Provide your Green Section agronomist with the results of the testing. The golf course superintendent and the agronomist can then evaluate the impact of the root zone on the overall performance of the green and determine if corrective maintenance practices are in order - or if complete reconstruction is necessary.

Once you have completed the steps listed above, you will have a very good idea of the agronomic strengths and weaknesses of your greens. However, the most difficult part of the assessment process remains. That is, to determine at what level of maintenance the limitations in the greens will become apparent in terms of lost or damaged turf.

For example, a golfing membership that expects near championship putting quality on a daily basis (an unrealistic goal in most parts of the country) will need greens that are much better constructed and subject to very few other stresses. Predictably, the low cutting heights necessary to produce very fast greens place a great deal of additional stress on the greens. Such greens are invariably be less able to tolerate heavy play, limited light, poor air movement, or extremes in temperatures. Those golfers desiring the ultimate in playing conditions will also need to provide the ultimate in growing conditions for the turf. The reverse is true as well. On those courses where the majority of the players can be kept happy (assuming golfers can ever be kept happy) with moderately paced greens and the greens "enjoy" otherwise good growing conditions, limitations in the construction of the greens will be far less influential on their overall performance.

Another example how the construction of greens impacts courses differently can be found in areas of varying water quality. In many communities the quality of the water can vary widely from one part of town to another. While all greens should be irrigated with good quality water, those that receive water high in salts, sodium, and bicarbonates are under a great deal more stress. Such greens must have good internal drainage to allow leaching of these components out of the upper portion of the root zone and away from the plant.

Often golfers have a hard time understanding the interrelationships between the various stress factors the greens must endure. There is a tendency to look for one thing that needs correcting in an effort to simplify the problem (the problem being poor turf performance). The reality is that all greens are exposed to a wide variety of stresses. Just a few examples include heavy play, low cutting heights, poor air movement, limited light, tree root competition, inadequate cupping area,



REMODELING UNIVERSITY

limited entrance and exit points to and from the green, compaction of the root zone, poor quality water, and bentgrass grown too far south - and bermudagrass grown to far north. And of course - poorly constructed greens. Again, prior to making the decision to rebuild the greens, every superintendent and representatives of the course leadership are urged to complete the Report Card to get a better idea of the "big picture".

ARCHITECTURAL CHARACTERISTICS

Most often, greens are targeted for reconstruction because of their agronomic limitations. However, poor or inappropriate architecture is every bit as good a reason to rebuild as a root zone that does not drain.

Architecture has a tremendous impact on the overall performance of a putting green. Consider a green design that includes severe contouring of the putting surface. Although the green may measure 6000 square feet in surface area, from an agronomic standpoint the area that is usable for hole locations is the more important measurement. Even though the green may be large, if the contours are so severe that they limit hole locations to just a few areas the concentrated player traffic will wear the turf thin.

The design of the green obviously impacts it's ability to withstand traffic. The architect that designs small, heavily contoured greens for a course that receives heavy play does a disservice to all concerned. However, this seldom happens. What does happen is that many times the amount of play a course receives today is much greater than what the course received during the first few years after construction. This is exactly what has happened on many older courses. Golf has never experienced the popularity it now enjoys. While this has been good for the game and those who enjoy it, many older courses still have greens that were designed for much less play. The same "push-up", 50 years old greens that might withstand 15,000 round per year, may fail completely under 30,000 rounds.

Changes in the way golfers want the greens to be maintained have also impacted the design of the greens and the ability of the turf to withstand traffic. Greens that only 20 years ago were mowed at 3/16 of an inch and perhaps measured 6 feet on the stimpmeter (a device used to measure the speed of greens) may today be mowed at 1/8th of an inch and measure 9 feet. The low cutting heights necessary to produce fast greens greatly reduce the ability of the turf to withstand traffic. The faster speeds likewise "amplify" the contouring of the greens. Hole locations that were considered reasonable at 7 feet on the stimpmeter are often out of the question at 9 feet. This effectively makes the usable area of the green much smaller.

Obviously, the combination of lower cutting heights, faster putting surfaces, and more play will have a strong negative influence on the green's architecture as well as it's agronomic performance. As a result, the original architecture of a many courses is often inappropriate to today's conditions.

When the greens on a beautiful old course cannot withstand the amount of play they receive because they are just too small, a change in architecture is necessary. Often this is an extremely difficult decision for the golfers and leadership of the course. This is particularly true for courses



REMODELING UNIVERSITY

with architecture of historical significance to the game of golf. No one wants to lose the artistic touch of Tillinghast, Mackenzie, Ross, McDonald, Maxwell, or many other great architects that have done so much for the game. For this reason, perhaps the greatest test of today's architects is to be able to preserve the "flavor" and strategic value of a historical architectural style while at the same time incorporating design characteristics that will allow the green to better withstand today's pressures.

NEEDS OF THE GOLFERS

As discussed above, many of today's golfers expect greens for daily play that far exceed the quality that was expected for major championships just 20 years ago. Many golfers expect daily course conditions comparable to what they see on television on the weekend. Unfortunately, very few of these same golfers have any idea how much preparation goes into peaking a course for a championship. With very few exceptions, the course that is seen on television has undergone weeks and even months of extra preparation for the event. The main point of this discussion is that golfers should realize that rebuilding greens to USGA guidelines does not mean those greens will be able to support championship conditions on a daily basis.

There is another major factor regarding the needs of the golfer's that must be considered whenever the need for greens reconstruction is evaluated. Some golfer's greatly desire smooth, firm, and very fast greens, and are willing to pay whatever it takes to obtain such greens. However, many other golfers find greens that are softer and slower more in keeping with their games. Predictably, these different needs can lead to sometimes bitter disagreements within a golfing membership. And often, the split is well defined by age. Many seniors simply do not strike the ball as hard as their younger counterparts. As a result, their shots are seldom as high nor does the ball have as much backspin. Firm, fast greens are therefore more difficult for most seniors and many women golfers.

More importantly (from a construction standpoint), while the greens may need to be rebuilt in order to sustain the very low cutting heights necessary for very fast putting surfaces, their construction may be adequate for a less strenuous maintenance regime. In other words, a green that fails miserably when mowed at 1/8 of an inch for weeks at a time may perform quite well when maintained at 3/16 of an inch for the season. When faced with the cost of reconstruction and the fact that the greens may be closed for as much as 10 months for reconstruction and grow-in, many golfers will chose slower, softer greens mowed at the higher height. Please note - not all greens construction problems can be solved simply by raising cutting heights of the mowers. There are many greens that are so poorly built that regardless of the setting on the mower the greens will frequently fail.

NEEDS OF THE OWNERSHIP OR LEADERSHIP OF THE COURSE

When the conflict arises between those golfers that want new greens and those that find the existing greens satisfactory, the leadership and/or ownership of the course is caught in the middle. Which group should be appeased? Much depends on the need to attract new golfers and/or members. Courses located near other good courses must remain competitive. They cannot afford to offer playing conditions (or club facilities of any type) that are significantly inferior to



REMODELING UNIVERSITY

their competition. The leadership must also consider the need to constantly attract new players. Attrition is an undeniable and inevitable occurrence at almost every course or club.

In at least one respect, it is a shame greens are not depreciated over time. A very general rule for the life expectancy of greens is that the construction should last at least 20 years. Over that 20 year period there are likely to be major changes in the golfer's expectations for how the greens should be maintained. There could very well be major changes in the amount of play the courses receives. After 20 years the greens will probably not drain well internally. Without question there will continue to be major changes in the legal and environmental aspects of golf course maintenance. And, like almost everything else, there will be major improvements in grasses over any 20 year period. All of these factors will favor the periodic reconstruction of the greens. It is the responsibility of the course leadership to prepare for such work well ahead of time. Good preparation often makes the difference between a project that is accepted by the golfers and one that is not. Equally important, good preparation almost always makes the difference between a project that is successful and one that fails.

As you can see, there is much more to determining whether or not the greens need to be rebuilt than simply sending a soil sample to the laboratory. Again, one of the best steps you can take early on in this entire evaluation process is to involve your local Green Section agronomist.



REMODELING UNIVERSITY

IS RE – ROUTING WORTH IT?

Jeffrey D. Brauer, Past President, ASGCA

As we have discussed in earlier columns, the first thing a club looking at renovations must decide – in conjunction with deciding on theme – is whether substantial re-routing of the golf course is feasible, necessary and/or practical. Based on my experience, I would say the answer is usually “No.” in most situations.

To start with, most members at most clubs love their course, often ranking it unrealistically high in quality, because they have many good memories of the course! If they didn't, it's unlikely that they would have played there as much as they did. These good memories usually stem in equal parts to friendships made, great individual shots, or competitions – friendly or formal – won. These feelings have more to do with other issues than actual design quality, but they are real feelings, nonetheless.

Members may simply feel more comfortable with the status quo over unknown big changes a major renovation. They may believe (rightly) that major re-routings cost more money, which they are naturally averse to spending. They may also worry about trees being taken down, and the course being out of commission for longer than “necessary.”

Not long ago, five architects interviewed for a renovation at an old club that insisted they wanted to reroute extensively to get much needed length. The architect who won the interview was the sole candidate who went against the grain – stating that the big changes would reduce the character of the course than any additional length would add. I go into most renovations expecting club members to have a predisposition against major re-routing of the golf course – and wished I had stuck to that theory in the interview!

Usually, the cost – or more accurately, the cost/benefit ratio, is my objection as a Golf Course Architect to major re-routings, too! I always advise a club to do a cost/benefit analysis before considering a major re-routing. What do they hope to achieve as benefits?

In many cases, re-routing is absolutely necessary because of land loss (or gain) due to highway expansion, ability to sell land for housing, etc. In other cases, clubs want to pursue re-routing to add length, get rid of a long standing unsafe situation, or perhaps even blow up a wildly unpopular hole. (That's one that is tough to play either by a majority of the members or by the current greens chairman)

In these cases, re-routing can be justified, because it represents a vast improvement to the course. In the case of a safety problem, the costs can be quantified fairly precisely – would a lawsuit cost us more than the cost of rebuilding several holes. If the answer is yes, then you should proceed!

Other justifications for re-routing are harder to quantify. Unless you have dozens of existing members clamoring for additional length, or dozens of survey cards from prospective members, or several magazine reviews saying “It would be a top ten course in the state, if only it were longer,” then I would seriously question whether major changes are in order.

The problem lies in the fact that not all golfers really need the extra length, or will appreciate it. It's fairly typical that the best players will appreciate it, and then, the question becomes, “Do we



REMODELING UNIVERSITY

spend a bazillion dollars to improve the course for our half dozen low handicappers?” For the answer to that, reread my column on club politics! Or, assess just what percentage of your existing – or proposed -membership fits the category, and decide based on that. Sometimes, the need to attract “young blood” is paramount, and distance is an issue. Of course, future members won’t remember the course in its “good old days” but it’s difficult to tear up the course that so many current members love for an unknown entity!

The cost side of the equation usually determines whether or not a re-routing is justified. The general rule of thumb is that it is much less expensive to rebuild the course in place than it is to reroute it.

The reason is that your course has a lot of infrastructure that is very expensive to replace. Typical among these are truly irreplaceable mature trees (plus the cost of clearing new hole corridors at up to \$ 20,000 per hole), irrigation systems (especially if relatively new - \$50,000 - \$75,000 per hole) drainage (about \$10,000 per hole) cart paths (about \$30,000 per hole), and turf (about \$50,000 per hole, if sodded), etc.

Greens cost about \$50,000 each, and tees and bunkers are relative bargains at \$10,000 - \$15,000 each, so the cost of re-routing a golf course goes up faster than dry prairie grass with a match when you start re-routing. In essence, it is the cost of a new course. If a hole is basically good, why spend over \$200,000 per hole to build a new hole, when you can spend about \$100,000 to improve the existing one?

We recently worked through just such a discussion. In this case, a 3 year old irrigation system and many 20 to 100 year old trees truly eliminated re-routing from the master plan equation almost immediately. They had a great course that needs some “tweaks” but no one could justify rebuilding the irrigation or removing the trees to pick up a few hundred yards of length. They are considering “re-positioning” a few tees and greens, while leaving the fairway corridors exactly the same. That is usually a cost effective way to add a bit of length and can often solve some other problems.

I think some members start looking at their course like a challenger to an incumbent – an apt analogy during this election year! It’s easy to start picking on the perceived problems of a course, but it’s also wise to remember that it must have some good qualities if it has lasted long enough to require some renovations! It’s also good to remember that almost any golfer is partly a frustrated golf course architect. In so many cases, the proposed changes are either limited in appeal to a small group of golfers, or don’t provide such compelling upgrades that they are worth pursuing.

Of course, there are always exceptions, but in the club renovation arena, you are not allowed to make that mistake once.....so tread carefully before blowing up a perfectly good golf course.



REMODELING UNIVERSITY

TEES

John LaFoy, ASGCA Past President

We begin every round of golf from the teeing ground or tee. Once called "tee boxes" where they were literally a square box containing sand, which was used to form a platform for the ball, we now think of them as a golf feature. As such, certainly it is important that they present a positive image. Although not as dramatic as the green complexes, the tees can have a dramatic impact on a round of golf.

Historically, most of the older golf courses, many of which are candidates for a renovation or restoration, originally had only one or two tees. Not only were the tees designed for 5,000 to 10,000 rounds of annual play, very few women played in the early years, and, were sometimes ignored completely. Also, golfers more advanced in years, were not considered when the tees were originally located and built. Therefore, it is very common to see many older courses with tees that have been added over the years. For the most part, many of these forward tees are very poorly built, too small and improperly located. Same with the "senior" tees if, indeed, the course has them.

One of the biggest complaints heard at country clubs and public courses alike is the alignment of the tees. How many golfers have blamed an errant shot on the tee "aiming me toward the woods?" Architects hear it all of the time. Certainly it can be a distraction, even if you are capable enough of lining up a shot without the aid of the tee alignment. A comprehensive tee renovation gives you a chance to correct this problem. If it were the only problem, it might not be worth the effort, but quite often, it is just one of a myriad of problems.

For some reason, which is easy to understand, golf club members do not like to cut trees. If you look at some of the photographs of many of the famous courses in their early years, you see very few or immature trees. You would not recognize the aerial photograph of the Augusta National taken soon after it opened in the 1930s. The huge southern pines that we associate with the course were very small. Now most of those same pines are protected with lightning rods and are considered invaluable. Indeed many of them are because they do define the holes. What would the 17th at Augusta be without the huge oak tree in the left center of the fairway? Unfortunately, trees cause many problems with the teeing surfaces. It would be hard to name a single golf course that does not have problems with tees due to shade. In the sunbelt, it is critical that Bermuda grass, the dominant tee turf, receive ample sun. Therefore, if you want viable turf on tees, you must consider some tree removal and/or pruning.

In addition to the shade problems, most older tees are just too small. They offer practically no flexibility in moving the tees' markers around and are susceptible to excessive wear. It is not uncommon that the tee is also poorly built, with the top being "turtlebacked," or rounded off, so as to shed water quickly. The result is a 600 sq. ft. tee, with 300 sq. ft. of useable surface. That is just not adequate.

Now days, laser leveling the tee tops is a becoming standard construction practice. A laser-leveling box installed on a small farm tractor will put a flawless grade on a tee top. Generally, a slope of 1/2% to 1 1/2% is built into the platform. The naked eye cannot detect such a small grade, yet the top sheds water quite nicely. Once in a while architects will visit a course that has adequate tees that only need laser leveling.



REMODELING UNIVERSITY

Tee locations, especially for the ladies, are quite often lacking. All too often, the ladies' tees are located on the wrong side of the fairway, usually to place them closer to the cart path. I am sure the thinking is that the ladies would rather be more convenient to their cart than to the playability of the hole. As a general rule, the ladies' tees should be located on the outside of the dogleg, so as to not over exaggerate the dogleg, and to allow them to get their balls to the corner. Of course, there are exceptions, and a good architect, along with representatives of the ladies' golf association should be able to fairly locate the ladies' tees.

Quite often a club will have several lady members who play in local, state and national events who require a longer course than the average player. It is grossly unfair, however, to penalize the average player by stretching out the course to 5,800 yards. I usually recommend that the better ladies play a course using the front of the men's or senior's tees on the shorter par four holes, and the ladies' tees on the rest of the holes. Some newer courses are now being built with five sets of tees, with the two forward tees being used by ladies and/or seniors.

Ultimately, whether building a new course or renovating an older course, it is prudent to consider building multiple tee complexes. The exception may be some of the older traditional courses where a large expansive complex would look totally out of scale. On those courses, many of which use two or even three sets of markers on one tee, it may be best to expand the platform as much as feasible, while still keeping it at a proper scale. This is where the experience of a skilled designer can help. If it is feasible to build multiple tees, you will not only add to the enjoyment of the course for all caliber of golfers, but you will be able to spread out the wear and create a much more aesthetically pleasing facility.

Another fairly common complaint from golfers about tees is that they can hardly press their tee into the turf. This is more prevalent on courses build in locales with clay soils. As a standard practice, many architects specify using the sand from the old greenside bunkers to plate the top four inches of the teeing surface. Of course, that assumes that you are also renovating the green complexes. It's a toss up as to whether you should till the sand into the topsoil or not. It really depends on the composition of the topsoil and should be considered on a course-by-course basis.

It will always be a matter of taste as to what types of tees look better - traditional rectangles (or rounded rectangles) or "free forms." Part of the answer depends on the golf course. Is it a traditional course or it is a modern course? Either of those scenarios are easy to determine, but it is the course that is somewhere in between that creates the difficult decision. If "free form" tees are selected, you have to make sure that they are built to a large enough scale to be really effective. Small "free forms" may look like bananas and create poor alignment. They look out of place. Although it may not be wise to do extensive tee renovations without professional help, you would probably be better off using rectangles, if no help were available.

When renovating tees remember:

1. Size
2. Location
3. Flexibility
4. Alignment
5. Shade
6. Drainage



REMODELING UNIVERSITY

GREEN DESIGN

John LaFoy, ASGCA Past President

Explaining how to design a green complex is much like an artist trying to explain how to paint a portrait. Technically, it may be easy, but doing it is another story. The curator at the Metropolitan Museum of Art once told a professional duck decoy carver that he was the first artist since John Audubon who had the ability to capture something in his bird carvings that no one else could achieve. It would be a safe bet that this artist could not explain what he did differently than other carvers. Even if he could, it would not mean that anyone else could do it. A USGA Green Section Representative once asked an architect how he knew when to elevate a green. The architect responded, "I don't know; I just do." That was as good an answer as any. He might have just said "experience," although all the experience in the world may not translate in the ability to design greens or carve ducks.

We have all seen enough films and presentations to know how to build a USGA green. Technically, it is quite straight forward, and quite frankly, there is no excuse for not being able to build a green complex properly. If that is the case, then the construction part is the easy part. It may be of some interest to seminar participants to know what thought process many architects go through in designing or re-designing an existing greens complex. The word "green complex" is used, because it includes the putting surface, greenside bunkers and grass hollows, and slopes and shoulders. Keep in mind that every architect may have a little different thought process and the following is that of the author.

First, when looking at a set of existing greens, look for those complexes that have redeeming qualities from both an aesthetic and playability standpoint. You probably are already aware that the greens are experiencing turf problems, so it is a forgone conclusion that they need to be rebuilt from an agronomic standpoint. For the sake of this exercise, we will also assume that this course is not a historic course, where we will put the greens back, as is.

At first you will make mental notes to formulate what a possible course of action will be. You may want to look at the following:

Bunkers - Are they attractive? Is there any variety in their placement? All too often, and many clubs do not realize it until pointed out, you go from hole to hole and see a round green with bunker left and bunker right, bunker left, bunker right, bunker left, bunker right, and so on. Very little variety. There is also a good chance that they have lost their shape and sand has built up on the lower margins (the author has witnessed sand build up of 36") or has made the greenside margins too droughty to support grass.

Putting - Is there any variety in the green shapes, or are all the surfaces round? Are there flagstick locations available behind bunkers? It is very rare that I look at a set of old green plans where all of the greens were designed round. However, after a number of years of routine maintenance, they all wind up round. All too often there is just too little variety or flexibility on the putting surfaces.

It is also not unusual to find older courses with green slopes that are no longer acceptable when mowed to modern standards. Greens surfaces that were designed for Common Bermuda grass



REMODELING UNIVERSITY

are just not going to be very playable when planted with Bent grass and mowed at an eighth of an inch.

Size - Is a green designed for 5,000 rounds of golf annually going to continue to support 30,000 or more rounds? How do you keep the character of an older course and dramatically enlarge the putting surfaces? When done properly, it is feasible to enlarge putting surfaces without making them appear too large.

Surrounds - Are the slopes around the putting surface too severe? Are the walk-ups between the bunkers too narrow, causing undue wear? Are there any chipping areas? All too often, designers compromise design due to traffic flow from the cart path to the putting surface. You might conclude that there should be no bunkers between the cart path and the putting surface. Unfortunately, that would mean designing a golf course based on the cart path location. Certainly there are designs that call for bunkers between the cart path and green and we should be careful not to over balance maintenance concerns with design criteria.

After making your initial assessment of the greens, many architects will survey and cross section the complex in order to make base sheets for the proposed renovations. The survey is useful for several reasons. First, it will accurately show you the size of the existing greens. You can almost be sure that the greens are not as large as the course owner or superintendent think. That is true in almost every case. Secondly, it is indispensable when doing the design work. An experienced designer can re-design green complexes by balancing the dirt that is already there. It may not make a lot of sense, on many occasions, to be hauling a bunch of fill dirt to a green site when it is not needed. Additional construction traffic around the course just adds to the damage.

After completing the base maps showing the existing green complex, most architects will discuss the new greens with their client and the course superintendent. The designer may want to know which of the existing greens the members/players like. This may not only have an effect on which greens remain similar, but it gives the designer an idea what the membership likes. You may also ask which greens the members do not like, so you know what to avoid. After some initial meetings, it is time to start some preliminary sketches.

Every architect probably has a different way of starting their preliminary design, but many find it useful to view the green complexes from the landing area to visualize what the new green will look like. Of course, with the base map in hand, showing the topography of the existing green complex, the proposed green should fit into the natural flow of the ground. An experienced designer will make the new green fit in with the site. As the designer looks at each individual green site, he/she may also want to mentally access whether or not too many of the greens are being oriented for the same type of golf shot. In other words, do fifteen of the eighteen greens favor a draw or a fade? A good designer should try and balance the design so that no one golfer consistently has the advantage.



REMODELING UNIVERSITY

CONSIDER ALL GOLFERS

While working in the preliminary stage, the designer will also have to consider that many of the golfers will not be able to execute the preferred shot to a particular green. Alternate routes are always a good idea. Island greens and forced carries may sometimes be appropriate, but whenever possible, you should give the high handicap player a chance to play the hole.

Diagonally oriented greens, with proper bunker placement, can offer great flagstick placements behind bunkers; yet still afford a run-up shot to the putting surface. The run-up shot may be more difficult or impossible to get close to the flagstick, as the preferred shot should be rewarded, when possible.

Continuing that same philosophy, many designers feel that it is always to give players a "bail out" area around the green complex where possible. However, if a player "bails out," they should not be rewarded with a better birdie opportunity than the player who hit the riskier shot. This is an easy concept to understand, but may not be so easy to execute for someone who has never designed greens. Again, experience pays off.

PLAYABILITY IS KEY

Green contouring is about as individual as fingerprints. However, all successful greens must have one thing in common. They must be playable. We have all encountered putting surfaces that are marginal, and probably even unplayable, but those are the exception rather than the rule. While some skilled designers prefer to put most of their movement within the putting surface proper, others like to incorporate the movement on the perimeter of the surfaces and run it onto the surfaces. An example of this would be carefully placing mounds around the perimeter of the green and tailing the mounds onto the putting surface. By doing this, you create some very interesting contours without using up too much of the cuppable area within the putting surface. These "tailing mounds" are also very helpful in segmenting the cupping areas. An ideal green may be a three lobed configuration with a "tailing mound" separating each cupping area. Each cupping area should offer six or seven cup placements. Balls stopping within the appropriate segment should offer a relatively easy putt within fifteen or twenty feet. Balls stopping on the edge of the green or in a different segment of the putting surface may require a double break or putting over a mound. Nothing impossible, but a more challenging putt.

Multiple-level greens have their place and are quite effective when used properly. They are best used to counteract a green site that slopes excessively from back to front. A multi-level green used here eliminates building a putting surface that slopes so severely that players cannot stop a ball close to the cup on downhill putts. It also keeps you from building a one level green where the front is built up so high that it looks completely un-natural. The secret to building a functional multi-level green is in the transition between the platforms. Many of the older multi-level greens use way too much of the putting surface in the transition between levels. It is not unusual to see as much as a third or half of a green un-cuppable due to the transition slope.



REMODELING UNIVERSITY

It is critical, during the initial grading of a multi-level green, to over exaggerate the slope between the two levels. It is also critical that the slope between the levels be flat and not convex or humped. As the green is built up with the various rock and top mix layers, the slope begins to mellow. What was previously a severe slope is now much more acceptable.

After the top mix has been installed, the designer should work with the superintendent to determine the final contouring, so as to avoid scalping the crown when grass is established.

One final tip: When fine grading the sub-surface or putting the final float on the top mix, do not "work" the slope from one level to the next. Work the top and bottom decks like they were separate greens, leaving the slope crisp, and on the last few passes, tie the slope in.



REMODELING UNIVERSITY

BUNKERS

W. Bruce Matthews, ASGCA

Hazards should be placed on natural highs or lows of the site and should be visible from the approaching shot for tactical decisions. They also should be a physical and psychological landmark. Depth, height and width should vary and be in proper accordance with the desired severity of punishment for the mis-hit shot. An alternate safer path to the hole is important, as average golfers cannot consistently maneuver a golf shot over hazards. Hazard placement should also allow every golfer an opportunity to hone their skills. A course void of hazards is boring to play and not as aesthetic or satisfying to all skills of golfers. The length of the golf hole dictates the size and shape of the hazards in the progress of play, adjacent terrain and vegetation, and scale to its surrounds.

Different sizes and shapes of the sand bunkers provide visual interest throughout the golf round as well as facilitate many functions. Aesthetic qualities and styles are limitless with the variety of settings.

Before bunker renovation, a few questions must be answered. Why is the bunker a problem? Is it in the wrong location on the hole? Is the sand contaminated with impurities? Is the standing water from last night's rain or sprinkler setting at the bottom of the bunker for any good reason? Why do you have to shovel sand back on the slopes after a heavy rain? What was the architect trying to accomplish with the sand bunker design and placement and how does the bunker fit into other features of the golf hole?

Different sizes and shapes of the sand bunkers provide visual interest throughout the golf round as well as facilitate many functions. Aesthetic qualities and styles are limitless with the variety of settings. There are a lot of great golf courses across the country that have been scarred by making unnecessary changes, in the name of improvement. Decisions were made to fill in bunkers, adding chocolate drops, lowering or elevating sand lines, cutting off capes and filling in bays of many great works. Tillinghast, Ross, Langford and Moreau would roll over in their graves if they saw some of their work today.

Consider the many functions of sand bunkers. These functions work independently or in conjunction with each other to provide the golfer the proper challenge to the game of golf. Sand bunkers are part of the strategy of the game. Utilized in strategic design a bunker is positioned in the golf hole to guard the desired position in the landing area or green. An alternate hazard free route is left for a safe and longer way to the hole. Penal design locates bunkers to create forced carries without regard to risk. Heroic design features bunkers, usually on the inside of a dogleg, that reward risky shots with a premium location in the hole. A variety of playing abilities is accommodated with heroic bunkers.

Sand bunkers provide a psychological landmark. They accentuate the hole and provide targets for directing the golfer to a defined landing area whether it is the fairway or green. Sand bunkers provide safety buffers for adjacent fairways, tees or greens, both physically and visually. They also provide a safety valve to catch balls careening to an adjacent out of bounds or water hazard.

The functions of the sand bunkers are combined with aesthetic and artistic style by the golf course architect to offer a harmonious and consistent transition in hole difficulty and playability. Sand bunkers provide color, texture, depth perception and scale. All golf courses have a certain style or sense of place of which bunkers are an integral part.



REMODELING UNIVERSITY

Bunkers evolve or change over a period of time. The average lifespan of a bunker is twenty to twenty-five years, depending on climatic conditions, original construction and maintenance practices.

Proposed sand bunker renovations and additions involve inventorying the following: site conditions; soils; topography; vegetation; current maintenance practices; traffic areas for both golfer and golf cart; the sand bunker position and effects on low and high handicap golfers; and sand type size and color. Club history, the original designer's intent and original bunker sizes all have to be probed. The analysis of a particular sand bunker and how it relates to the golf hole and other golf holes is undertaken as it pertains to shot value and aesthetics.

Before renovation or adding sand bunkers, evaluate what effect any proposed work will have on the golf course as a whole. It is important that original design and intent are not lost in over-eagerness to rectify a situation that may or may not be a problem. Proper planning and construction can achieve favorable results by retaining or rediscovering the original character of the golf course. It also increases efficiency of maintenance and course attractiveness for years to come. Upon completion of the analysis, work toward renovation can begin.



REMODELING UNIVERSITY

THE MASTER PLANNING PROCESS

Bob Graves, ASGCA Past President

THE MASTER PLANNING PROCESS

I. WHY DO WE NEED A MASTER PLAN

- A. General modernization
- B. Improvement (or change) in golf course playability
- C. Problem correction
- D. New facility addition
- E. Renovation

II. WHAT THE GOLF CLUB SHOULD DO

- A. Establish a governing committee to oversee the master plan process.
- B. Selection of design team (Golf Course Architect, plus other required design professionals)
- C. Collect and disseminate design project data (See Data Sheet).

III. AFTER THE GOLF COURSE ARCHITECT IS HIRED

- A. First meeting
 - 1. Familiarize with the site and project data
 - 2. Consultation with the governing committee, golf professional and golf course superintendent
 - 3. Establish the goals and objectives of a master plan
 - 4. Review the membership approval process. Discuss the type of product required of the golf course architect to present to the membership
 - 5. Set schedule for master plan completion and optimum construction start
- B. Design Team & Golf Club Representatives
 - 1. Preparation of Final Master Plan Program, Budget and Schedule
 - 2. Identification of basic development concepts controlling future design and maintenance
- C. Design Team
 - 1. Sketch studies, site checks and consultation with pertinent parties
 - 2. Preparation of preliminary Master Plan (alternate solutions if required), Design Analysis, preliminary construction cost estimate and schedule
 - 3. Review of basic development concepts in relation to preliminary work above
- D. Design Team and Golf Course Representatives
 - 1. Site check and consultation on all preliminary work
 - 2. Decision on best alternate solution(s) as required
 - 3. Second review of basic development concepts in relation to preliminary work
 - 4. Approval of all preliminary work
- E. Design Team
 - 1. Preparation of final Master Plan, Design Analysis, Construction Cost Estimate and schedules



REMODELING UNIVERSITY

IV. GENERAL CONSIDERATIONS DURING MASTER PLAN PROCESS

- A. Golf Club Commitment
 - 1. Commitment of Golf Club governing body to Master Plan process and to its long term implementation
- B. Scheduling and Accommodation
 - 1. Golf play
 - 2. Maintenance and operational procedures
 - 3. Available work force (staff and outside forces)
 - 4. Available funds
 - 5. Weather
- C. Allowing Golf Play to Remain As Normal As Possible
- D. Maintaining Continuity in Design, Construction and Maintenance of Golf Course Components When Accomplished Over An Extended Period of Time
- E. Retention or Improvements of Aesthetic Qualities
 - 1. Interest
 - 2. Attractiveness
 - 3. Satisfaction
 - 4. Conventional or traditional golf course characteristics with redeeming value
- F. Retention or Improvement of Technical Qualities
 - 1. Uniform soil conditions
 - 2. Complete and functional irrigation system
 - 3. Complete and functional drainage system
 - 4. Best possible turf condition
 - 5. Practical and economical construction requirements
 - 6. Practical and economical maintenance and operational requirements

PROJECT DATA FOR MASTER PLANNING

I. SITE DATA

- A. Base map (reproducible 100 scale drawing on photo mylar or Autoca .dwg file) of project site and surrounding
 - 1. Legal boundaries of property, right-of-ways, easements
 - 2. Topographical survey, (maximum 2' contour interval)
 - 3. Coordinate system for future location
 - 4. Location and general description of the existing golf course showing tees, fairway edges, bunkers, greens, lakes cart paths, and any other visible components
 - 5. Location and general description of other existing features, such as buildings, roads, fences, utility lines and major plants
 - 6. Location and general description of other existing features, near the project site affecting golf course remodeling/renovation work
- B. Aerial photographs of the project site; scaled verticals are best
- C. Climatological Data, including:
 - 1. Average monthly rainfall
 - 2. Average monthly wind direction and velocity (day and night)
 - 3. Average monthly temperature, humidity and evapotranspiration



REMODELING UNIVERSITY

- D. Soil analysis, chemical and physical, with separate analyses for different type turf areas as required
- E. Available utilities (location and capacity), including:
 - 1. Water
 - 2. Electricity
 - 3. Sewage disposal
 - 4. Storm drainage

II. GENERAL INFORMATION

- A. Existing or proposed master development plan for the overall project including the golf course site and adjacent areas
- B. Comprehensive list of golf course problems, deficiencies, and proposed improvements as related to the playability, maintenance and operation of the golf course
- C. Proposed participation of owner during construction phase, including:
 - 1. Water
 - 2. Electricity
 - 3. Sewage disposal
 - 4. Storm drainage
- D. Proposed time schedule for planning and construction phases
- E. Proposed budget covering planning and construction costs
- F. Proposed administrative, operational and maintenance procedures affecting golf course remodeling/renovation



REMODELING UNIVERSITY

WHAT TO EXPECT FROM A LONG TERM MASTER PLAN

Jeffrey D. Brauer, ASGCA Past President

Golf course renovations start in many ways! Some start with a disaster, like floods or freeze that damages the course. Others start with an owner's long term commitment to maintaining its course in "tip top shape." One sign of the commitment of a well-run course, like any well-run business, is having a Long Term Master Plan, anticipating the need to stay current in the marketplace, and where and how to spend funds wisely to meet your goals.

Some clubs don't recognize the pattern of declining interest in their courses early enough, making it difficult to catch up. Unlike buildings, where shifting foundations or leaky roofs are painfully obvious, golf course problems are often ignored. Many think golf courses are "natural", and take care of themselves. In many cases, the superintendent masks problems too well by keeping the course in great shape! Clubs that have invested substantially in the past, may mistakenly believe that the course is "set for life."

IF YOU DON'T CURRENTLY HAVE A PLAN IN PLACE, HOW DO YOU GO ABOUT IT?

Master Plans are created by golf course architects. You can find one experienced in renovations by contacting the American Society of Golf Course Architects. (262.786.5960 or asgca.org) Choose carefully! ASGCA members are well trained and ethical, but each has unique design and "personal" styles. You're entering a long term relationship, and "sticking with" one architect throughout the program is always best.

WHEN IS THE BEST TIME TO UNDERTAKE A MASTER PLAN?

As real estate agents say, "There's never a better time than now." You know your competition will build a "better mousetrap." Your Long Term Master Plan will show how to keep up, and where and how to spend funds wisely to meet your goals. You'll know that **now** is not just *nice*, but *necessary* to do some cosmetic and/or playability upgrades if:

- Your tees sheets and membership lists aren't full,
- You can't raise dues/fees and attract new members or players,
- Guests comment, "This course was great in it's heyday"

Similarly, if your superintendent spends more time fixing your course than maintaining it, you probably need infrastructure improvements. Additionally, your drainage, irrigation and turf types may need improvements simply to maintain the course to today's demanding standards.

WHAT SHOULD YOU EXPECT FROM AN ARCHITECT PREPARING YOUR LONG TERM MASTER PLAN?

You'll receive a 5 - 10 page letter agreement from your architect, which details their services and your responsibilities as Owner. The course may designate you as its key representative in working with the architect. You'll start the master plan process by obtaining information required for design, including:



REMODELING UNIVERSITY

- A recent scale aerial photograph, topography map, and property lines, including locations of existing buildings, trees; and any rights-of-way, easements and encroachments; etc.
- Utility Information, including available *and planned* utility lines both above and below grade.
- Environmental information if applicable, usually including, wetlands and floodplain information.
- Testing, including soil tests for lakes, subsurface rock, etc., to know exactly what natural conditions you'll face.

From there, the golf course architect will guide a sequential process, with input and approvals by you, your green committee, pro and general manager.

Before any design begins, the Golf Course Architect will evaluate your site, goals, schedule, construction options, and budget. He will appreciate knowing your financial situation, to avoid making design proposals beyond its ability to pay! He will determine if any subconsultants like irrigation designers or environmental consultants, need to be added to the team.

Then, he will enter the Preliminary Planning Phase, where he prepares and presents for your review and approval:

- Schematic Re-Routing Study(s) (if applicable) and upon approval of that,
- Preliminary Feature Design Studies, illustrating proposed feature designs and configurations of tees, greens, fairways, lakes, hazards and proposed improvements to drainage, cart paths, grassing and landscaping.

The Golf Course Architect may also depict the Clubhouse, Maintenance and parking and entry areas, etc. but is usually not responsible for site planning or final design of these features.

You'll likely go through several plan revisions before the greens committee approves it. Some greens committees have trouble reaching consensus, and it costs money to redraw plans, so most architects have limit on how many studies they'll do before you a charging for "supplemental services."

When all is agreed to, you'll get an Illustrative Plan. This is the beautiful colored plan that you often see in the clubhouse. While someone is guaranteed to say, "They hung the master plan, because they couldn't find the architect," by this time, the plan should incorporate the features your club desired most!

Some clubs stop the process here, wanting only to get an idea of what might be "someday." But, any course serious about implementing improvements should go further, either plunging into a complete renovation, or setting the stage for long term improvements, by completing a full master plan, which should provide:

- Written Descriptions of proposed changes, with their reasoning and benefits. A well thought out master plan can help avoid "whimsical changes" made by each new greens committee, which hurt the overall balance, design, and theme of the course.



REMODELING UNIVERSITY

- A Phasing Plan. Renovation programs range from one to ten years, depending on finances. A plan details which and how much improvements should be undertaken. This is usually driven by most pressing need, but can be dictated by construction efficiency.

For example, many master plans call for new irrigation lakes. It makes sense to use that fill to construct other planned nearby features. I've seen clubs haul good dirt off the site, and then pay a premium the next year to haul in more dirt for fill.

Most phasing plans will identify small projects the superintendent can do while waiting for "big projects" to be funded, like extend cart paths, plant trees, turf nurseries, landscape areas, or even provide "permanent" temporary greens for use when other greens are out of play. You can fix pressing needs, knowing they will fit the final configuration of a particular hole.

- Cost Estimates. Most – (not all - its best you know the history of the architect you retain) architects are adept at estimating construction cost by making area or volume estimates, and applying recent unit pricing from similar projects.

Your scope of work, amount of in-house work vs. contracted work, and your phasing program largely determines your total costs. Smaller projects cost more "per unit" than large ones. And, while most superintendents are both eager to help and resourceful, but you'll still have a golf course to maintain, so don't over commit! (If you know how to be in two places at once, please email me!)

- A Club Presentation. Actively 'selling' is critical to the success of the program. This requires effort from key club members. The wildest rumors don't start in Roswell, NM, but in grill rooms!

Most golf course architects are accomplished at explaining the benefits of their proposals, and handling questions. With Power Point, and AUTOCAD allowing 3-D presentations, many architects easily can convey the "new look", which can be a valuable selling tool. Combined with active "marketing" by the greens committee and board with the membership should allow the presentation to pass.

If so, then construction should begin in the very near future. As superintendent, you'll be even more involved at that point, being the clubs daily on site representative and working towards a high level of quality with both the architect and builder. Not all superintendents get that opportunity, and it's one you shouldn't pass up.



REMODELING UNIVERSITY

GOLF COURSE RENOVATIONS AND MASTER PLANS: WHY AND WHEN? Steven P. Forrest, ASGCA Treasurer

If you are a member of an older, traditional country club, you may have heard the terms “golf course master plan” popping up in general conversation recently. With all the “country-club-for-a-day” public courses that were created in the late nineties, many private clubs have felt the pressure to upgrade their golf courses and facilities in order to remain competitive in the marketplace. Almost everyone knows what a renovation is when talking about upgrading the kitchen or bathroom in a house, but may not fully understand why a golf course should ever be renovated. Throw in the term “master plan” and things can become even less clear.

A “golf course master plan” is simply the common term for a renovation or improvement program at an existing golf course. At a private club, it is typically the culmination of a series of exchanges of information between the membership, the governing board, a long-range planning committee or green committee, and the golf course architect. At a public facility, the process is usually less formal and is developed in response to the owner’s goals.

The actual “plan” usually consists of a colored drawing at a scale of 1” = 100’ that shows both the existing golf course and the proposed improvements. Accompanying the plan is a text that explains the basis for improvements along with a cost estimate and an implementation schedule.

The reasons why a golf course master plan should be developed are varied. They can range from a desire to restore or enhance the character of a classic course to a need to establish uniform playing conditions on a daily fee facility. Often, there is an acute problem such as dead or extremely poor turf on greens that were built using less than ideal materials or construction practices. There may be a desire to create a high-quality practice facility by re-routing a few holes to create space. Perhaps a separate set of tees for seniors is needed. Whatever the reason, a golf course master plan program can be a very useful and effective method of achieving the goals for the golf course.

In most cases, the golf course architect will begin with a complete course analysis. He will look at all the components (tee, fairways, greens, etc.) of the course and develop an overall program that will provide variety and balance relative to the game of golf. Issues of safety will be addressed. The benefits of natural elements such as vegetation and water features will be accentuated. The efficiency of functional elements such as the drainage, irrigation and cart paths systems will be maximized. The aesthetics and beauty of the course will be enhanced by highlighting attractive focal points and by screening undesirable views. Ease of maintenance is usually another important consideration.

If there is a desire to restore the character of a classic course, the golf course architect will relate the design features or strategic principles from the classic era to the modern game and its improved technologies. Existing bunkering will be refurbished and the green complexes will be studied to make sure that the putting surfaces haven’t atrophied over the years. A skilled architect can even take a mediocre hole on a classic course and turn it into something that is truly memorable.



REMODELING UNIVERSITY

It is not unusual for a golf course master plan program to establish tee and course length options that are suitable for all users. Hazards are placed to establish strategy and challenge the best players, while safer, alternative routes are provided for less-skilled players.

At some private clubs, the rotation of members on green committees results in a series of revisions to the golf course that are contradictory over a period of years. An approved golf course master plan can foster consistency for the future by establishing guidelines that are in keeping with the long-term vision for the course and that are maintained throughout the tenure of each new committee.

Uniform playing conditions can be developed by adhering to the United States Golf Association's specifications relative to the construction of greens, bunkers and tees. The introduction of optimum turfgrass varieties can further improve the playing experience. Consistent agronomic standards and maintenance practices can also be developed, generally with the aid of a qualified agronomist.

A tree program is another aspect of the master plan for improvements. The golf course architect will evaluate the impact of existing trees on strategy, playability and turfgrass maintenance. Overgrown or inappropriate plantings will be removed. Trees may be added for framing, backdrop, separation or screening purposes.

There is no set schedule for a golf course master plan for improvements. However, it is always best to consider the need for a master plan before replacing a major component (such as the irrigation system, the greens or the cart path) of the golf course. Otherwise, the golf course architect's options may be severely limited in the upgrading of one of the major items, they are usually very reluctant to go in and rip out something even though the architect may have a fantastic idea for an improvement.

Most renovation construction work at private clubs is done in the late summer after the major tournaments have been held. The best time to start a golf course master plan program is about one year prior to the start of construction. That will provide sufficient time to obtain aerial and topographic mapping, gain member input, prepare the plan, receive feedback, make revisions, prepare construction drawings and put the work out to bid. The sooner that a project can be bid, the better the prices submitted will be. Contractors like to plan their work well in advance, and a timely bidding process will yield benefits.

During the planning process at a private club, it is vital that the improvement committee and the board of directors keep the membership well informed relative to key aspects of the program. An understanding of the timing, costs and basis for improvements by all users will foster widespread acceptance of the plan. Preparing a master plan that establishes direction for the future and adheres to the membership's vision can be one of the most challenging aspects of the golf course master planning process, but experienced golf course architects have the knowledge and expertise to meet such an objective.



REMODELING UNIVERSITY

FIRST STEPS FOR PRIVATE CLUBS

John LaFoy, ASGCA Past President

You may have already decided that your golf course needs renovation. But if you are the only one that has come to that conclusion, you may be very disappointed with the response that you get from those "in charge," whether it be an owner, club manager, or greens chairman. Those first steps that you take in planning a renovation may be more critical than the actual process of renovating the golf course. Why is it so important? Simply put, if a club membership turns a renovation project down, it will likely be five years or more before there is any kind of momentum to get another renovation proposal passed. How many times have skeptical club members commented at an annual meeting, "here comes Joe wanting to tear up the golf course again." You may recall that this is the same guy, mentioned earlier, who has not played at another golf course in fifteen years and sees nothing wrong with his course. The secret, of course, is not to fail the first time.

How can we not fail? The truth is we can't. You cannot brow beat a membership or an owner to renovate their golf course. You can, however, present them with all of the facts and hope that they will make their decision based on solid facts, rather than rumors and false science. We can all live with the outcome of a decision based on an honest effort with all of the facts presented.

Let's see several ways that we can get the process started:

"Building" Your Case

- ✓ Contact an Architect
- ✓ USGA/University Agronomists/Consultants Visits & Reports
- ✓ Document Maintenance Procedures
"Putting Out Fires"
 - Record Extraordinary Maintenance Practices
- ✓ Finding a "Flag Bearer"
- ✓ Contractor Visits

Informational Meetings

- ✓ Organize a Renovation Team
 - "Flag Bearer," Greens or Golf Chairman, Golf Architect, Superintendent, Club Manager, Finance Chairman, etc.
- ✓ Budgets
- ✓ Down Time
 - Alternative Courses to Play
 - Construction Schedule & Timing
 - Nine vs. Nine
- ✓ Program Presentation
 - Organizing Proponents
 - Minimizing Opponents

Pitfalls in Planning

- ✓ "Doing it Alone"
- ✓ Unrealistic Budgets
- ✓ Unlimited Add-ons



REMODELING UNIVERSITY

- ✓ Excluding the Membership
- ✓ Promising Unrealistic Completion Date

The importance of getting a renovation project approved on the first try cannot be stressed enough. Although there have been some successful attempts to get projects approved after they have been turned down, you should consider it a "one shot" deal. Your best effort ought to be given on the initial try. Half-hearted attempts will fail.



REMODELING UNIVERSITY

RENOVATION APPROVED! “LET’S GET STARTED”

John LaFoy, ASGCA Past President

The hard work is over. Let the fun begin. This is not entirely true, as there is still a great deal of work to be done, but successful renovation projects can be a great deal of enjoyment and satisfaction. Some architects do not particularly enjoy renovation and restoration work, but others find it very rewarding. In most cases, they are working for clients who truly love and care about their golf courses. They are not under the eye of a developer who may care more about lot count than the quality of the course. The feedback from the membership is almost immediate, as the excitement begins as soon as the first spade of dirt is turned.

Once the approval process is completed there are a number of things that need to take place. A full-scale project takes a great deal of time and proper planning is a necessity.

Some of the more critical steps are:

1. Hiring Your Golf Course Architect
 - a. Qualifications
 - b. Availability
 - c. Fee
 - d. Scope of Work
 1. Preliminary Plans
 2. Detail Plans & Specifications
 3. Inspection Visits
2. Hiring a Contractor
 - a. Qualifications & Track Record
 - b. Availability
 - c. Bidding vs. Negotiation
3. Owner Oversight
 - a. Design Approval Procedure
 - b. Owner's Representative

In practically every stage of planning a renovation project, there are pitfalls. Just as they were discussed in the first steps of the process, there are several others that may occur after the project has been approved. Most of them are quite innocent, and regardless of how careful you are to warn clubs of them, time after time they will fall into one trap or the other.

Some pitfalls to look out for include:

1. **Budget Mistakes** (Similar in earlier planning process, but now these are for real)
 - a. "Growing Like Topsy"
 - b. No Contingency or Buffer
2. **Poor Architect and Owner Communication**
 - a. Construction Committee
 - b. Architect's Responsibilities (Unrealistic Expectations)
3. **Environmental Concerns**
 - a. Permits
 1. Water Source, Tap fees for Irrigation
 2. Storm Water Retention
 3. Erosion Control
 4. Wetlands
 5. Timing/Waiting Period



REMODELING UNIVERSITY

All too often, a project is getting ready to start when it is discovered that one of the pitfalls listed above creates a significant delay in the start of the project. It is very disappointing in light of the fact that the timing for practically all golf course construction is based on planting seasons. Delay of just a month can throw off the schedule for six months to a year, especially for projects that are on a tight schedule. If the latest planting date for a warm season course is July 15 for the fairways, it is unlikely that they can be planted on August 15, and be grown in for a late Fall opening. That one month is critical. It can mean major disruption in revenue and could very well cause the club to incur additional construction and grow-in expenses. Certainly, such a delay would draw the ire of the membership toward those in charge of the project.

Although environmental concerns have not been a major topic of this particular seminar, practically every renovation, regardless of how small, can ill afford to ignore the reality that it may come under the jurisdiction of some local, state, or federal agency. There have been instances, when a particular project has been brought to the attention of local agencies, that their response was "we do not know if there are any permits or approvals required, but we will try to think of some." No, these are not actual words, but they might as well be. Many local agencies are fully aware of the nationwide trend in permitting almost anything.

Suffice it to say that you, golf course superintendents, managers and owners should be aware that your project may very well require permitting. Since most architects do not include that in their scope of work, it is your responsibility to attend to it. Do not wait until the last minute to find out your local requirements.

Assuming that you have avoided many of the pitfalls, it's time to think about starting the construction process. This too can be a great learning experience and one that will help you in the future. Hopefully, all of the previous planning has paid off and you are ready to begin a smooth transition into the construction phase.



REMODELING UNIVERSITY

IN-HOUSE VS. OUT-SOURCE

Dr. Michael J. Hurdzan, ASGCA Past President

Everyone enjoys the satisfaction that accompanies doing a job well. Human energy and skill combined to produce an outstanding result deservedly brings with it a sense of pride, exhilaration and more. But what makes accomplishment so great is the despair that accompanies failure - or as ABC Sports says, “the thrill of victory and the agony of defeat.”

As any performance-oriented person knows, the key to success is not attempting the impossible, but rather to operate within the extreme limits of our abilities. Attempting more than we are capable of accomplishing can make any of us very familiar with despair. When it comes to golf course construction, what are your limits? When should you dare – and when should you play it safe? Is the risk worth the reward? This article will try to help you answer that question.

EVALUATING POTENTIAL RISKS

Golf course construction or renovation is specialized work that requires skilled workmen and knowledgeable selected equipment. It should be done with economic efficiency, in the shortest time possible.

Problems can develop when a project is attempted using ill-suited or inadequate labor, equipment or materials. Problems can be further compounded by foul weather, low budgets, influential and vocal sidewalk superintendents, poor working conditions or very limited construction schedules.

Unsatisfactory results can take the form of:

- Disappointing final product
- Exorbitant construction costs
- Missed planting date
- Poor function or performance
- Extensive post-construction repairs
- Expensive establishment and maturation procedures
- Injuries, lawsuits or arguments

To avoid any of these liabilities, you should first consider the full scope and requirements of the construction job – particularly during renovation.

While planning a project, remember that golfers can be very protective about giving up any part of their golf course during the active golf season. Golfers do not want temporary facilities, ground under repair, noise or dust, delays caused by laborers or general inconvenience. This means that golf course renovation is usually done after the active golf season, which is usually Memorial Day in the South and Labor Day in the northern parts of the country.

To ensure that the golf course is ready for the next season, planting must be done by very early fall in the North or midsummer in the South. During this narrow window the golf course superintendent must continue normal golf course maintenance, and in many instances the grass is still growing.



REMODELING UNIVERSITY

~~Part-time help may not be available, aeration must begin, later fertilization starts, leaves may become a problem, soils may stay too wet or too dry for proper working conditions, and rainy seasons may commence. In addition, golf course renovation or construction is likely to be resented by die-hard, off-season golfers.~~

It is difficult for a golf course superintendent to maintain his course to golfers expectations while doing significant golf course reconstruction. And is it worth it? What if problems arise that prevent timely completion of the project? What if the newly built project fails in one way or another?

And if you succeed, will you be warmly thanked and rewarded or will your employers simply expect more of you next time? Each individual should ask himself honestly whether he is capable of doing the extra work while maintaining good playing conditions – and whether the risk is worth the reward.

Construction or renovation problems can begin with a poor design. A poor design can result in:

- Slow approval of plans
- Confused bidding process
- High construction costs
- Contractor disputes
- Slow construction process
- Missed planting date
- Unsafe construction costs
- Poor safety for golfers, maintenance staff and adjoining land users
- High maintenance costs
- Slow playing conditions
- Reduced number of playable days
- Bad reputation for golf course

The solution is to hire an expert with experience in projects like yours, to do detailed planning, and to follow a procedurally correct sequence.

PROJECT PREPARATION

Once you have a good design for the intended project, isolate all of one season's work into the smallest physical area possible. This area should be centered on a single main borrow site for fill, if fill is required.

The work area should encompass complete holes. Golfers don't mind giving up a golf hole for one year, but they don't like tearing up the tee one year, the bunkers the next, followed by the green the next year. The grouping of holes by work areas is called "phasing."

To determine the starting date of a project, select the ideal, latest planting date that will permit complete turf coverage of the project in the current growing season. Estimate the number of days that construction or renovation will take – building in a 20 percent time cushion – and subtract the number of workdays from the target planting date. For example, if you project a planting date of October 15 and you estimate 26 construction days plus 5 cushion days, then the construction should start on September 15 (*October 15 - 31 days = September 15*). This is called "**scheduling**."



REMODELING UNIVERSITY

Once you know the work area and have determined the scope of work that should be attempted to meet a normal planting date, club officials and members should be notified of the plans and the dates that the work will take place. This will allow them to schedule golf events, outings and guest visits.

If temporary facilities are to be used, then the members should know about the provisions well in advance – and the temporaries should be of the highest quality your budget will permit. Some superintendents have built temporary greens or tees in a rough area a year in advance. This has given their members a mature, albeit smaller, playing surface during construction and maturation of the main golf course project. Later the sod is stripped from the temporary and is used elsewhere.

Where possible on new designs, we try to design in a 19th green on a long par 5. Golfers can then play to the 19th green on the par 5 and play to the par 5 green as a par 3. They then have 18 holes of good golf even though one complete hole is closed.

As part of the planning process, begin to allocate in-house resources – labor, equipment and materials – toward the project. In addition, arrange for any supplemental help that may be needed and secure the proper construction materials.

Selection of contractors and materials are very important. A few suggested criteria for selection are:

- After-installation service history
- Product reliability locally
- Local successful projects
- Cost-benefit ratio
- Product availability

In this day of material and labor shortages, it is best to order early and get confirmation on availability and delivery dates. The best advice in selecting contractors and materials is to ask a lot of questions.

Source of Problem	High 3	Medium 2	Low 1
Unskilled work crew mistakes			
Improper installation equipment			
Insufficient installation equipment			
Inexperienced in problem recognition			
Extended installation period			
Workman compensation claims			
Improper irrigation functioning			
No guarantee of workmanship			
Perhaps no product warranty			

At this point you have decided to do a project, have an approved design have budgeted properly, limited your work area, set a realistic starting date, notified members of the construction sequence and schedule, made arrangements for continued care of the course to normal standard, installed good temporary facilities where appropriate, selected outside resources, and placed orders for services and materials. This should all be completed at least four to six months prior to start of the project.



REMODELING UNIVERSITY

Again, you should determine whether you should do the actual work or bid it out to contractors. Realistically assess the scope of the project by going through a potential risk evaluation. Honestly determine if the following sources of potential liabilities are high, medium or low. Check each item and add up the score for problems that might arise:

If your total score is 15 or less, do it yourself. If it is 16 to 20, try to lower the risk of examining your weaknesses and correcting them. If your score is 21 or more, contract it out.

If you still feel capable of handling the project, ensure you have proper installation training, adequate equipment installation time, experienced workmen or foreman, and harbor no false expectations.

Determining whether to do a project “in-house” or “out-source” must remain an individual decision. I would advise anyone that unless they have had substantial experience in the anticipated work and working conditions, it is best to hire established experts.

Doing a good job of planning and orchestrating a project brings with it almost the same pride for the superintendent as the contractor who builds it.



REMODELING UNIVERSITY

RENOVATION CONSTRUCTION PHASE

John LaFoy, ASGCA Past President

If everything goes perfectly, and it rarely does, one of the happiest days of your life is the day the golf course contractor completes his obligation and construction ends. You do not even want to guess what it's like if the project does not go as envisioned. Visualize the bonding company coming in on a half completed project and going through the bid process again to find a contractor to finish the work. Imagine an additional half dozen meetings with the contractor and their attorney to negotiate damages for not meeting the completion schedule. Imagine three months of solid rain. Imagine a contractor pulling a crew off your project so that they can complete another one. Imagine testing the greens top mix after installation and finding that it percolates at 8" rather than 16", as specified. It is not hard to imagine all of these, if they have happened to you. Every architect can tell a dozen such stories.

A successful project, from planning to completion of construction, is not luck, or chance, or a "toss up", or fate, or an aberration. It is a result of hard work and knowledge. There are four key ingredients that are present on every successful project.

They are:

1. A Competent Golf Course Architect
2. A Dedicated and Caring Owner
3. A Professional Golf Course Superintendent
4. A Knowledgeable and Competent Golf Course Contractor

These are not listed in order of importance. They are all equally important. When you start eliminating one or more of these key people, you are tempting fate and your chances for success diminish proportionately. Each of you could probably give one or more examples where a superintendent acted as his own contractor or architect and did a creditable job. Or where an owner acted as an architect and hired a good contractor to complete a reasonably nice project. The problem in thinking that is the way to proceed is two fold. First, you do not know how much better the project would have been if a competent architect or contractor had been employed. And secondly, it is flawed thinking to take the exception to the rule and use that as the norm, or justification for not doing it "*right*."

A good architect will earn his fee by assuring that you maintain or increase the level of play at your facility. One private country club in central North Carolina increased its play from 16,000 rounds to 36,000 rounds in just two years after a greens renovation. The increased cart revenue alone would have paid the architects fee many times over in just one year. Had an architect not been used, the club could potentially be losing the equivalent of four times the architect's fee every year, if it were not done correctly.

Likewise, a contractor who performs in a less than outstanding manner could conceivably cost the club for many years to come. Maintenance problems could be ongoing, and a golf course superintendent who is fixing irrigation leaks all day will have little time for grooming. Although a good golf course superintendent will keep an eye on the contractor, there are still a lot of mistakes that can be buried. Hopefully, the club has hired the best golf contractor that they can afford.



REMODELING UNIVERSITY

It goes without saying that all the hard work of the architect and contractor goes for naught without an excellent golf course superintendent to maintain and care for the golf course. The public and private golfer's perception of a good golf course has much more to do with the condition of the golf course than its architectural integrity. Of course, if a layout is bad enough, no amount of grooming will make it a great course, but given a good solid routing, with nice golf features, the level of maintenance makes all of the difference in the world.

Although some may argue that a great golf course can be built or renovated without a good owner, the owner sets the tone of a project. The last thing that any architect wants to do is build something that the owner does not want. An owner with a clear vision is the architect's best friend. On the other hand, an owner with no vision can leave an architect frustrated. A good architect will not be offended by ideas offered by the person or persons who are paying their fee. Some architects even obligate themselves in their proposal to oblige the owner's ideas that are "architecturally and engineering-wise feasible." Most owners will take the advice of their architect once they have confidence in that person or firm.

The ingredients that make a golf course project successful are particularly important in the construction phase, as each has an important role to play during this period.

The following are roles and responsibilities that each may play, but their involvement may not be limited only to these:

1. Architect

- a. Contract Administration
 1. Requests for Payment
 2. Change Orders
 3. Certificate of Substantial Completion
- b. Construction Observation
- c. Settle Disputes
- d. Approve/Reject Work
- e. Approve Materials (with Superintendent)

2. Owner/Construction Committee

- a. General Oversight
- b. Schedule Architect's Visits (with Superintendent)
- c. Approve Change Orders
- d. Pay the Contractor
- e. Approve Materials (with Architect & Superintendent)

3. Golf Course Superintendent

- a. Owner's Representative
- b. Coordinate Staging Area
- c. Traffic Control
- d. Approve Materials (with Architect)
- e. Architect's Eyes & Ears
- f. Locate and Mark Existing Utilities & Irrigation

4. Golf Course Contractor

- a. Comply with Architect's Plans & Specifications
- b. Supply Construction & Payment Schedules
- c. Supervise and Direct Work
- d. Provide Labor & Material (Occasionally Labor Only)
- e. Provide Material for Testing or Test Material
- f. Protect Personnel & Property
- g. Repair Golf Course



REMODELING UNIVERSITY

There are probably more pitfalls in the construction phase of renovations than all of the other planning phases combined. Unfortunately, most of the pitfalls have to be learned through experience. That is one reason that experienced architects and contractors are so important. Contractors and architects do this kind of work every day of the year, and you should draw on their experiences. Superintendents and owners may only have this opportunity once or twice in their lifetime and cannot be expected to know these things.

You can be sure that the following list in no way covers every potential pitfall. The best that can be said is that hopefully, at least you will not make these again. Golf course construction is loaded with built in "potential" for problems. Any kind of work that deals with "mother nature" can present problems. (Not to mention any kind of work that deals with humans)

The following are pitfalls construction related, but should have been addressed during planning:

1. Owner Supplies Materials and/or Equipment
 - a. Little Impact on Contractor's Profit
 - b. Owner Assumes Responsibility
 - c. Built in Excuse for Contractor
2. Split Contracts or Piecemealing
 - a. Poor Coordination between Subcontractors
 - b. No Clear Cut Responsibilities for Damage
 - c. Overlapping Responsibility

The following problems and snafus may occur at any stage of the construction phase and should be avoided:

1. **Inadequate Staging Area**
 - a. Unsecure Location/Storage
 - b. Parking Lot Damage
 - c. Poor Access to Work
2. **Materials**
 - a. Unavailability/Supply Can't Meet Demand
 - b. Matching Delivered Material to Tests
 - c. Contaminated Delivery Trucks
 - d. Delivery Access to Specific Sites (Greens)
 - e. Waste
 - g. Inadequate Quantities/Estimates (Sod/Sand)
3. **Conduct of Work**
 - a. Day & Hour Restrictions
 - b. Protection of Work
 - c. Inadequate Personnel
- d. Inadequate Equipment
- e. Poor Phasing / Construction Schedule
- f. Unauthorized Changes
- g. Rock Clause/Disposal of Rock
- h. Drainage
 1. Wet Weather Springs
 2. Minor Drainage
- i. Lake Leaks
- j. Poor Soil Conditions
- k. Protection of Public
- l. Improper Trench Compaction
- m. Others
4. **Damage to the Golf Course**
 - a. Fairways & Roughs
 - b. Cart Paths
 - c. Existing Utilities
 - d. Irrigation



5. Grow In/Condition upon Acceptance

- a. Watering Schedules
- b. Poor Water Source
- c. Acts of God
- d. Un-viable Sod/Sprigs/Seed
- e. Soil Infertility
- f. Mis-application of Pre-Plant Chemicals
- g. Pests (Army Worms, etc.)

Again, please be aware that these are only a few of the problems and pitfalls that may occur before, during, and after a renovation project. You may want to use these as part of a check list when starting any renovation project. It may be a good policy to heed "*Murphy's Law*"-anything that can go wrong, will go wrong. If you are only going to get one or two chances to renovate a golf course, make them successful and as pleasant as possible.



REMODELING UNIVERSITY

MORE COURSES REMODELING –ALL AT ONCE – RATHER THAN PHASING OVER TIME

Greg Muirhead, ASGCA Vice President

It's an amazing spectacle; the way pro sports teams maneuver near the end of the season. Playoff contenders trade away long-term projects to get the player who can "make an immediate impact" and propel the team into championships. Meanwhile, teams already out of the race trade away players to better their chances in future years.

Golf course owners, managers, superintendents and others also face a decision pitting the short-term versus the long-term. When it comes to remodeling, what should the timeline be? Should the course phase the remodeling process in over time? Or is it better to do it all at once?

Increasingly, golf clubs are choosing the latter. They're biting the bullet ... closing all or a major part of their golf courses ... and accomplishing all of their remodeling work at once.

MORE GOLFERS NEED MORE COURSES

The National Golf Foundation reported an increase of 1.5 million new golfers in 1997. The continued growth and increased popularity of golf has prompted the remodeling of numerous public and private courses throughout the country.

In the past, with fewer golfers and fewer courses competing to attract golfers, course remodeling was generally limited to small-scale projects, usually involving only two or three holes, or portions thereof. Traditionally, the work was targeted to address only the most severe deficiencies (i.e. flooding/poor drainage, significant lack of turf, safety/liability issues, etc...). Due to budget constraints and less concern over inconveniencing the golfer, remodeling was typically phased-in over a number of years.

The influx of new golfers and a significantly more competitive marketplace has created a new trend in golf course remodeling. Public and private facilities are less frequently phasing-in necessary improvements. Instead, these facilities are electing to close the course for a season and institute an 18-hole Comprehensive Remodeling Master Plan.

COMPREHENSIVE REMODELING MASTER PLANS

The Comprehensive Remodeling Master Plan is a document that defines the overall goals and objectives for improving a given facility. The plan is prepared by a design team that typically includes various representatives of the facility (public or private), a licensed engineer and a qualified golf course architect. Members of the American Society of Golf Course Architects are recognized as the most qualified individuals in the course design profession and are experienced in providing creative and cost-effective design solutions.

While not every facility can endure the short-term financial impacts associated with closing its course for a season, those who can typically enjoy several beneficial results, including substantial cost savings over the long term.



REMODELING UNIVERSITY

WHY BITE THE BULLET?

Some of the benefits that are strictly a result of a comprehensive remodeling approach include:

Design Continuity: A comprehensive approach ensures that the entire Remodeling Master Plan is implemented simultaneously, under the direction of a single architect and with a consistent design style.

Phased remodeling, over a number of years, often results in the involvement of several architects and committee chairpersons, each imposing their own opinions and preferences regarding the implementation of, or deviation from, the originally developed Remodeling Master Plan.

Less Inconvenience of Golfers: Providing an overall, quality experience and improved service for the user has quickly become a top priority for clubs and course operators. By closing the course and implementing a comprehensive remodeling program, golfers are not confronted with the annual disruptions and inconveniences associated with implementing a phased remodeling program. These would include, but not be limited to: the continuous implementation of temporary tees, greens, drop areas and ground under repair zones, noise and dust from construction equipment, unsightly staging areas and the loss of available parking.

Selection of A Qualified Contractor: Given the current golf "boom" and the number of new, 18 hole construction projects available to pursue, top quality contractors are often reluctant to become involved in smaller scale remodeling projects that, in most cases, offer less profit potential. Conversely, a comprehensive remodeling project, essentially the equal of constructing a new 18-hole course, is quite appealing. The comprehensive approach encourages competitive bidding, amongst several qualified contractors, and thus an overall cost savings for the scope of work to eventually be completed. Additionally, mobilization of the construction force is a "one-time" and not an annual expense.

Consistency of Play: A comprehensive remodeling approach ensures the use of identical construction materials for the development of greens, tees and sand bunkers. This typically results in more consistent playing conditions. Greens receive and hold shots in the same way and roll at the same speed. Bunker sand tends to be more consistent as well.

Eliminates Destruction Of Previous Work: Despite the best planning efforts, phasing of a Remodeling Master Plan can result in the partial, or complete, destruction of a prior year's work. For example, new turf and previously installed cart paths or irrigation components can be damaged while hauling materials during subsequent remodeling work.

CONSIDERING ALL OPTIONS

The preceding examples represent only a portion of the benefits associated with employing a comprehensive remodeling approach. It is important that a given facility - including its management, committees, engineers, superintendent, and architect - complete all desired improvements in a manner that is timely, cost-effective and otherwise appropriate for its method of operation. When possible, the concept of closing the facility and implementing a Comprehensive Remodeling Master Plan should be given strong consideration.



REMODELING UNIVERSITY

THOUGHTFUL TREE PLANNING

Paul Vermeulen, U.S. Golf Association

To the novice golfer or average club official, planting a tree on a golf course seems fairly straightforward. After all, it only takes a short trip to the nursery and 10 minutes to dig a hole. Well, not exactly. An improperly placed tree of the wrong species can seriously interfere with the original intent of the course architect, or even worse, completely destroy a putting green. The following are 10 guidelines that one should ponder before attempting to plant a tree. Hopefully, these guidelines will help ensure that a new tree becomes an asset to the entire club rather than a thorn in the superintendent's side.

Before reviewing these guidelines, please realize that each may not always apply strictly in all situations. For example, a large trees planted 25 yards from a putting green on the south side will cause greater problems than a tree planted the same distance on the north side, due to heavy shading.

Guideline No. 1- *Make sure to select a planting location so that the mature canopy of the tree will not protrude on the line-of-flight between a tee and a fairway.* Trees with protruding limbs dramatically reduce the usable size of a tee.

For example, a tree planted too close to the front right hand side of a tee will promote concentrated use on the left-hand side of the tee. The result of such concentrated divoting on one side of the tee usually promotes discussion about the superintendent's abilities. The solution to large overhanging limbs is usually sympathetic pruning that leaves the tree permanently disfigured. Actually, complete removal of a tree could be the best solution.

Guideline No. 2- *To allow for vital air movement and exposure to sunlight, resist the temptation to plant dense groves of trees around greens, tees, and fairways.* Poor air circulation, especially in areas where greens are located produces soaring temperatures and humidity during the summer that in turn promotes harmful disease development. Furthermore, poor air circulation and dense shade during the winter produces cooler soil temperatures that severely retards the growth rate, leaving greens helpless against foot traffic. In situations where poor air circulation and restricted sunlight penetration cause unacceptable turf loss, tree removal is absolutely necessary.

Guideline No. 3- *Never try to completely fill in rough areas between adjacent fairways with trees for the sake of safety.* No matter how many trees you plant to protect neighboring players, the odds are the first high handicapper will find a way through. Once they do, look out. The player automatically feels qualified to join the PGA Tour and aims directly into the oncoming players, hoping to hit a fade back over the trees.

If your intent is to protect players in adjacent fairways, then plant groups of tees strategically near the tee. This will prevent errant shot from even having a chance to stray. Leave several openings between adjacent fairways near the landing area so that if some do stray, they have the opportunity to return to their fairway uninhibited.



REMODELING UNIVERSITY

Guideline No. 4- *Never plant large trees closer than 75 feet from a green or tee, because they will become serious competitors for available water and nutrients.* Most individuals are under the mistaken impression that tree roots cannot extend outward from the trunk further than the drip line of the tree. In reality, tree roots can extend outward from the tree trunk approximately one to one and a half times the total height of the tree.

For example, if a tree is 100 feet tall, its roots can extend as far as 100-150 feet. Once tree roots have invaded underneath a green or tee, they sap water and nutrients away due to their overwhelming size. In situations where tree roots are a problem, sever them with a trencher and install a permanent barrier.

Guideline No. 5- *Without question, flowering trees add unmistakable beauty to any course.* However, due to their tender bark and dwarf stature, they are extremely sensitive to mower damage. This sensitive nature makes most flowering trees poor candidates for use on a golf course unless they can be carefully protected. Augusta National is a good example. The beautiful flowering dogwoods and azaleas have been planted underneath large pines where there is never an occasion to operate heavy mowing equipment.

Guideline No. 6- *Try to avoid screening out scenic vistas.* Scenic vistas include the clubhouse, ocean or mountain views, lakes or other open areas of the course. Once a scenic vista has been lost, it is usually forgotten and consequently may be lost forever.

Guideline No. 7- *It is often best to avoid using a standardized tree planting as yardage indicators.* Problems arise in the future when one of the plantings is lost or damaged.

For example, if palm trees are used on each hole to indicate a distance of 150 yards, it will be impossible to replace a dying palm with one of matching size. In addition, a tree planted to the edge of a fairway can severely penalize a golfer.

A better means of indication yardage may be to mark large, landmark trees already present throughout the course with small wooden or metal plaques. The advantage of marking landmark trees is that they blend in with the course surroundings, they are already present throughout the course, and because of their size, they can be seen by golfers that stray into adjacent fairways.

Guideline No. 8- *When selecting trees, choose species that match the existing vegetation and have favorable characteristics.* Cottonwoods and large fruit trees are not good candidates for golf courses because they are strong surface rooters or require continuous maintenance.

In addition, try to limit the number of different species as much as possible. A continuous vegetation scheme is often the trademark of many of America's highest ranked courses. An example is Oak Hill Country Club in Rochester, New York. This particular course has a continuous theme of oak trees from the first tee through the 18th green. Courses that tend to plant a potpourri of tree species are usually unflatteringly referred to as tree zoos or specimen parks.



REMODELING UNIVERSITY

Guideline No. 9- *Try to naturalize the appearance of large tree plantings by randomizing the distance between each tree.* A good way to develop a randomized tree planting would be to hit several dozen golf balls into a rough area from a distance of 200 yards. Then place a small flag where each ball has landed and selectively remove one flag at a time until there are an appropriate number left.

Guideline No. 10- *To prevent unnecessary neglect of newly planted trees, never plant more than the maintenance staff can adequately maintain.* During the first year of establishment, small trees require extra attention and frequent hand watering during the summer. If you must purchase trees in large numbers due to cost, it might be easier to establish a tree nursery near the maintenance facility where they can be easily cared for. Then, over the next several years, spread them over the course.

Summary- Remember that a good tree planting program on any course starts with a long range plan. What makes a golf course different from a park or your front yard is the presence of sensitive putting greens and the integrity of the game.

The agronomic impact of misplaced trees is commonly seen in the form of shade, root competition and poor air circulation. Thoughtful tree planting should not only improve the appearance and playability of your course, but more importantly remove those thorns from your superintendent's side.



REMODELING UNIVERSITY

MAKING YOUR CASE FOR AN IRRIGATION RENOVATION

Kenne James, Senior Marketing Manager, Golf Irrigation
International Business, The Toro Company

The life expectancy of a typical irrigation system varies from 10 to 30 years, depending on the geographic location of the course and the demands on the system. Good preventive maintenance can extend a system's longevity, but sooner or later, your irrigation will need to be renovated or replaced. Then what?

As the course superintendent, you know better than anyone when it's time for new irrigation. Maybe you've been struggling with an outdated system for years, and now you're finally ready to approach your greens committee about renovating.

However, even though you know first-hand how serious the situation has become, your board members and club officials probably don't . . . which is actually a compliment to you! If you've done a great job of maintaining the course's aesthetics and playability in spite of a poor irrigation system, other people might not even suspect the problem exists!

"We were really good at repairs, so no one knew how bad things were," says Terry Bonar, Superintendent at the Canterbury Golf Club in Beachwood, Ohio. Canterbury's irrigation system was already 30 years old, and the main lines were even older. The galvanized pipes were deteriorating and there were leaks in the fairways, although Bonar's staff quickly fixed them before serious damage was caused.

"But when it got to be a repair every week," Bonar adds, "there was no more denying the problem."

DEMONSTRATING THE NEED

If the true condition of an aging or substandard irrigation system isn't obvious to your greens committee or board members, it's up to you to make them aware of it. When you provide physical and/or measurable evidence, your club officials will realize that a renovation is in everyone's best interests.

In the case of Canterbury, superintendent Bonar started taking notes on every leak and repair, and recorded the activity in a logbook. Three years into that process, after dealing with an average of 40 leaks a year, he dug up a piece of the corroded pipe and presented it to the board members, along with his logbooks.

"When they saw the actual holes in the pipe, it really hit home," Bonar recalls. "Between seeing the number of leaks we'd repaired and the condition of the pipe, they knew it was time to move toward a renovation."

John Zimmers, superintendent at Oakmont Country Club in Pittsburgh, Pennsylvania, used the same approach with his greens committee. When he was first hired at Oakmont, Zimmers inherited an irrigation system which was over 20 years old.



REMODELING UNIVERSITY

“After about a year on the job, I noticed that irrigation maintenance costs were exceedingly high,” he explains. “We had major issues with leaks, breaks in the wiring and sprinklers sticking. I knew it was time for a renovation.” Zimmers’ next step was to photographically document his system’s problems to show the committee the extent of the situation. He presented photos of broken pipe, broken wires and other trouble areas. “That convinced them it was time to start planning to renovate,” he says.

Another dramatic way to illustrate the need for renovation is aerial photography. For a relatively small investment, you can obtain impactful overhead photos that clearly show your course from tee to green, and will help you identify specific problem areas.

Whether your system’s shortcomings are obvious (e.g., leaks, broken wires, skyrocketing maintenance costs) or more subtle (such as wet or dry spots caused by lack of individual head control, or increased water costs), documenting and visually reinforcing them will make a very compelling case for a renovation.

ANSWERING FINANCIAL QUESTIONS

Once you convince your club of the need to renovate, then comes the issue of cost. The expense of a renovation — often more than \$1 million — generally creates some concerns, so it helps to prepare effective selling points to use when presenting your case.

One key financial benefit of a new irrigation system will be significant savings in labor and maintenance. In fact, Zimmers says his annual maintenance costs dropped as much as \$75,000 since the renovation.

Lower utility bills are also a big plus. New, more efficient irrigation systems use much less water, while a modern pump station may lower electricity usage 30 - 40 % per year. Even the cost of fertilizer can be reduced with a new system that delivers better water placement.

In addition to those important considerations, Zimmers offers an approach which might have even more impact on your board: the inherent “return on investment” philosophy.

“The golf course is the club’s number-one asset,” he says. “The best way to protect your investment is to take care of the course.”

There may also be a question of financing. Ideally, a greens committee will have anticipated just such an expenditure and set aside a renovation fund, but most clubs must either assess members or obtain financing. One effective alternative is to finance the project directly through the irrigation manufacturer. That can streamline the process and be another favorable option for your board.

ADDRESSING LOGISTICS

After financial issues, usually the next big question is about members’ ability to play the course during system renovation. To address that concern with your greens committee, it helps to hire a professional irrigation consultant, as superintendents Bonar and Zimmers discovered.



REMODELING UNIVERSITY

“We hired a consultant at the beginning of our planning, and it was well worth the cost,” says Zimmers.

“He was able to communicate with our board and members in layman’s terms. He explained that the renovation was painless, and that construction could be done one hole at a time.”

“When our board expressed fears over closing the course, our consultant explained to them how the process worked and how little disruption there would be,” adds Bonar. “It really put everyone’s mind at ease.”

Working with an irrigation consultant at the sell-in stage is one helpful step, and it’s also an excellent time to bring in an architect or design consultant as well. While your course is undergoing an irrigation system renovation, it’s often highly efficient to make other changes at the same time. For example, if you’ve been considering alterations to fairways or rebuilding bunkers, a golf-course architect will help you maximize the design strategies and take advantage of construction work under way on a given hole.

Another design aspect to consider with a renovation is how the new irrigation system may affect the course and prompt other changes. It’s very possible that installing more accurate or more powerful sprinklers will cause you to rethink the positions of certain roughs, or necessitate adjustments in other plantings.

In any case, when your consultants and architects make recommendations, be sure that their proposals are supported by the contractor who will actually do the renovation. With that in mind, it helps to hire an expert contractor who specializes in golf course irrigation renovations.

REAPING THE REWARDS

The process of renovating an irrigation system may take a lot of time, documentation and other legwork, but the end result is well worth the effort.

“A renovation is a major investment, but irrigation is just too important to the course and the club to cut corners,” says Zimmers.

“Our renovation has made a big difference in our club,” Bonar says. “The members have noticed an overall improvement in the course, and it’s made life easier for me and my staff.”

Renovating an out-of-date system will not only improve your efficiency, provide better-quality turfgrass and enhance aesthetics, it can also give your course a competitive advantage. And as golf courses continue to vie for more members and rounds, that might be the biggest benefit of all.



REMODELING UNIVERSITY

CHOOSING THE RIGHT IRRIGATION CONTRACTOR FOR YOUR RENOVATION PROJECT

Kenne James, Senior Marketing Manager, Golf Irrigation
International Business, The Toro Company

Selecting a contractor for an irrigation system renovation can be a complex task, but making a good decision will help prevent trouble for years to come.

There are three key steps to an irrigation project:

1. Determine the system design
2. Choose a system manufacturer
3. Select a contractor to install the system

Each step is essential for the success of your renovation, but the importance of choosing the right contractor cannot be underestimated. The finest irrigation equipment may be useless if not properly installed.

GETTING STARTED

When selecting a contractor, ask for advice from irrigation distributors and manufacturers. They can be good sources of input about contractors.

Also, it's very helpful to hire a professional irrigation consultant, particularly one who specializes in golf courses. Consultants offer valuable assistance in determining the irrigation design and selecting equipment, but more importantly, they oversee the bidding process, provide impartial evaluations of the contractors and help manage construction.

For budget reasons, it may be tempting to undertake an in-house installation, but first consider these factors:

- Does your staff have the necessary expertise?
- Are professional licenses required?
- Would additional employees be needed?
- If your staff does the renovation, who performs their normal duties?
- How will it impact your club's payroll?
- Will special construction equipment be required?
- How would the installation affect play and revenue, and for how long?

After evaluating the options, you may realize that a do-it-yourself installation is impractical, or not as economically attractive as hoped. If you hire a professional contractor — which most courses do — the selection process can be affected by the source of your funding.

PUBLICLY FUNDED COURSES

In a government-funded project, the renovation contract is typically awarded to the lowest approved bidder. Nevertheless, use some precautions in the bidding process to avoid awarding a contract to an unqualified installer.



REMODELING UNIVERSITY

First and foremost, include an “experience-requirement” clause in the bid documents. This may call for a contractor to have a minimum level of golf course irrigation experience (e.g., five years), and to have successfully completed a certain number of installations.

If, after these steps, the low bidder is still a questionable contractor, you have other options. Examine the bid to ensure it fully complies with all requirements; if not, you may have grounds for rejecting it. You could even consider asking the low bidder to voluntarily withdraw, which some contractors will agree to when their ability is questioned. As a last resort, reject all the bids and have the project re-bid at a later date.

It makes no sense to proceed with a renovation that has a clear risk of substandard installation. However, any action you take should first be reviewed by appropriate legal counsels.

PRIVATELY FUNDED COURSES

Bid specifications for privately funded facilities often include a clause that the project will be awarded to the contractor of the facility’s choice. Contractor selection on private bids has two steps. First, a select number of contractors are invited to bid, and then the successful bidder is chosen from that group.

You should limit the number of bidders, and all of them should be acceptable candidates. Too many bids tend to impede the selection process.

CHOOSE EQUIPMENT FIRST

Selecting an irrigation system manufacturer before accepting bids can further streamline the process. By making the product decision first, you simplify bidding when all contractors are specifying the same equipment. Also, without the contractor influencing system choices, you and your course have the flexibility to buy irrigation products you prefer.

PRE-BID MEETINGS

Holding mandatory pre-bid conferences will allow you and your club’s committees to meet the bidding contractors and discuss your expectations and timetables. If you retain an irrigation consultant, he will usually arrange your pre-bid meetings.

Gathering input from several qualified contractors also serves to expose hidden problems in your irrigation design or timeline, and allows the bidders to suggest solutions. Take notes during the meeting and copy them to all attendees.

EVALUATING QUALIFICATIONS

Allow time to familiarize yourself with the bidding contractors’ qualifications. Items to consider include:

- Experience. Check each contractor’s background and references. If irrigation contractors in your area are required to be licensed, obtain a current copy of each bidder’s license.



REMODELING UNIVERSITY

Also, find out if the contractors are certified. (A list of certified Irrigation Association professionals in your area can be found at the IA website: www.irrigation.org.)

- Reputation. This is different from experience, because a contractor may have years of experience but a tarnished reputation. With so much interaction among you, your club's managers and other suppliers, you want contractors who are flexible and easy to work with. Also assess the contractor's reputation for quality of work and ability to stay on schedule.
- Company size. Make sure the contractor has enough workers to accomplish your installation on schedule. However, bigger is not necessarily better. Large companies running multiple crews often have quality-control problems. Ask contractors about conflicts they may face with other jobs during your installation, and stipulate that your project leader or foreman should not change for the duration of your renovation.
- Equipment. Verify that the contractor owns or has access to all of the equipment necessary to properly install your system.

If possible, visit the contractor on an installation job in progress somewhere else. The opinion of another superintendent in the middle of a renovation will be extremely insightful.

FINAL INTERVIEWS AND SELECTION

Once bids have been evaluated, schedule an interview with the contractor or contractors that you and your club prefer — even if not the lowest bidders. Include any club members or personnel responsible for managing the renovation.

During the meeting, confirm that the contractors can schedule sufficient time for your project, and that they believe the completion date is realistic. Ask if they anticipate any problems, and how they plan to solve them.

Other items to discuss include performance and maintenance bonds (if applicable), compliance with bid insurance requirements and construction/building permits.

HASTE CAN MAKE WASTE

A speedy installation may have disadvantages, especially if interruption of play threatens to reach unacceptable levels. Furthermore, the faster the pace of construction, the harder it is for you to oversee the installation and assure its quality. You'll want time to fine-tune the irrigation system while it's being installed . . . or you may regret it later.

For example, you should pinpoint quick-coupling valve locations, make allowances for possible future expansion, locate mainline drain valves or route pipe around a bunker scheduled for renovation, and other potential modifications.

A new irrigation system, properly installed, will provide a reliable turf management tool for many years. Time spent now to choose the optimal design, a high-quality product and the right contractor will pay great future dividends in system performance, reliability and lower maintenance costs — and ultimately, will improve your golf course and please your ownership.



CASE STUDIES



REMODELING UNIVERSITY

CASE STUDY: PINEHURST COUNTRY CLUB

Rick Phelps, ASGCA

Pinehurst Country Club, in Denver, Colorado is a 27-hole private facility that was opened for play in 1960. The golf course was designed by J. Press Maxwell, ASGCA. The course is set up to play as a regulation length eighteen-hole course, plus a stand alone nine. The eighteen-hole course is a par 70 of 6790 yards from the back tees. The shorter, nine hole course plays to a par of 36 at a length of 3061 from the back tees.

The members and staff at Pinehurst Country Club contracted with Richard M. Phelps, Ltd. to prepare a comprehensive Long-range Improvement Plan for the golf course. The intention of the Club was to complete a portion of the work shown on the plan each year for the next three to five years.

The four major elements of the remodel design were the playability, maintainability, safety and aesthetics of the entire golf course. With each of those four main topics as the focus, there were a number of sub-topics that became an important part of the design challenge. Design elements such as strategy, challenge or difficulty for various skill levels of golfer, drainage, aesthetics, speed of play, etc. all became important facets of the design phase.

This family-oriented club has a relatively active membership, with a total member roster exceeding 900. Thus, the golf course sees a high volume of play for a private club.

It was generally agreed to by the club members, the staff and the architects, that the greens were excellent examples of the work of Press Maxwell and, since they were in relatively good agronomic condition, they should be left alone. Otherwise, with a modest budget in mind, there were no significant restrictions placed on the architect in terms of design solutions.

Therefore, the remainder of the golf course, including bunkers, ponds, trees, tees, fairways, cart paths, etc. was studied, with the four major design elements in consideration throughout. As is fairly typical on a course of this age, there were a number of issues that needed to be resolved and, as such, they were included in the Long-range Improvement Plan. As a brief summary of the more glaring problems, the following items became priorities on the improvement list:

Bunkers: The bunkers had never been renovated in the thirty-year existence of the club. Thus, they had very high sand faces, droughty sand lips (from years of explosions), contaminated sand and very poor drainage.

Tees: The flexibility of multiple tees did not exist and the forward tee length of the golf course was exceedingly long (5900 yards). Also, many of the tees were too small to accommodate the high play volume.

Drainage: In addition to the poor bunker drainage, there were a number of other areas on the golf course where the surface drainage was inadequate.

Trees: There were a number of instances where tree planting had gotten out-of-control and/or trees were becoming a detracting element in the strategy or aesthetics of certain holes. There were also a few instances where tree planting was desirable for safety and aesthetic reasons.

Throughout the design process, these issues, among others, were identified and incorporated into a Draft Improvement Plan. The plan was then reviewed in detail with the Green Committee and



REMODELING UNIVERSITY

staff at the Club. Comments were received and minor revisions were made to create a "Final" Improvement Plan.

Once the Plan was in place, the Club requested the assistance of Richard M. Phelps, Ltd. in establishing a priority list and preliminary budgets for implementation. It was decided by all parties involved that the first phase of the improvement project should involve reconstruction of all of the bunkers. The decision was based on the thought that the bunker renovation would have the highest positive impact on the golf course and would generate support for the remaining work on the master plan.

The bunker renovation project was started in late January of 2000. The contractor was selected based on his expertise in remodel construction and his flexibility to work within the requirements of the Club. He utilized equipment specifically intended for use in turfgrass applications to minimize damage. He also limited the areas of disturbance to reduce interruption of play. Work was successfully completed by early May 2000, so the impact to the bulk of the golf season was minimal.

Although this construction project only represents a small portion of the work shown on the master plan, the success of this phase will prove critical when it comes time to begin planning for implementation of the next phase.



REMODELING UNIVERSITY

CASE STUDY: GROESBECK MUNICIPAL GOLF COURSE

Denny Spencer and Jerry Matthews, ASGCA

SOLVING STORM WATER CHALLENGES

Prior to the Clean Water Act of 1972, it was common practice for cities and towns to install only one drainage pipe in the ground to carry both sewer and storm water to a waste water treatment plant. The plant would treat the water and release it to a nearby river. As the cities and towns grew, treatment plants could not handle the influx of water after a heavy rain and much of it, sewage and all, was discharged directly into the waterway.

Amendments to the Clean Water Act in 1987 included a mandate that states must reduce the amount of pollution and sewage being released into rivers. The City of Lansing installed two pipes in the ground, one for storm water discharge into the Grand River and the other for sewer water headed for the treatment plant. After the construction, the city would no longer take the storm water from Lansing Township, a suburb three miles northeast of downtown, but it would continue to accept Lansing Township's sewage since it would be financially impossible for a town of only 9,000 residents to build its own treatment plant.

The Tollgate Drainage District of Lansing Township encompasses a watershed of 234 acres, 550 residential homes, 10 commercial properties, 500 plus apartment units, and four governmental agencies. On its western edge sits the Groesbeck Municipal Golf Course and Fairview Park.

The Ingham County Drain Commission was faced with the traditional solution of piping Lansing Township's storm water to one of three nearby rivers. But this solution would cost in excess of \$20 million and bankrupt the community. So the commission became very creative and assembled a team of professionals to design a 30-acre urban wetland system to handle all of the storm water discharge. Using an innovative method, the Tollgate Drain diverts storm water to the lowland area of Fairview Park, where it is naturally cleansed of non-point source pollutants such as road oil, organic debris, fertilizers and other forms of pollution. During heavy storms, excess water flows into seven acres of storage ponds located on the golf course.

The City of Lansing became a willing partner in the project. There had long been talk of remodeling Groesbeck Municipal Golf Course and the Mayor of Lansing and the Director of Parks and Recreation seized upon the opportunity represented by the Drain Commission. The plan included building a large system of interconnecting deep water ponds on the golf course. Since nine holes of the golf course would be closed during construction, and vast amounts of soil would be generated on-site, the Mayor encouraged the city to go forward with its desire to remodel this part of the course. In doing so, the project became a cooperative effort with the goals of the city and the golf course designed into the plan. The engineers were called upon to coordinate the design and construction of the project.

The challenge presented to the golf course architects was to redesign the new golf holes to include the ponds and wetlands required by the Drain Commission without requiring any additional land. The design goal was also to maintain the playability and safety that is required of municipal golf. The new water features affected six of the nine holes, bordering three (No. 1, 8, 9), providing the backdrop at No. 2 and calling for a tee shot carry at No. 3 and No. 7. At No. 8, a 185 yard par 3, a new perched wetland was created that borders the entire left side of the hole.



REMODELING UNIVERSITY

An aquatic plant specialist was consulted for the addition of a wide variety of wetland plantings. A recirculating pump brings water up to the wetland, which is eventually distributed, into a rock creek at the front of the green and then back into the pond.

In addition to beautiful and strategic water features, the pond construction provided nearly 90,000 cubic yards of soil for building new tee and green complexes and a large amount of fairway elevation and mounding. The fairways on No. 1 and No. 9 were raised four feet to provide additional storm water storage during an unusually heavy storm.

The ponds themselves provide a number of environmental advantages in addition to storm water storage. A combination of wetlands, waterfalls, underwater aerification and select deep water areas all contribute to sedimentation control and pollution reduction. The ponding system also relies on evaporation to reduce its volume, as well as providing a source of irrigation water for all 18-holes. Along with new double row irrigation, the Golf Course Architect worked with the irrigation consultant to design an underground recirculating system which exchanges the water in the ponds every 24 hours.

The HDPE pipe, with holes drilled in its top, was installed along the bottom of the wetland ponds. It not only recirculates the water throughout the entire water management system, but it also continuously pushes water from the lower depths to the surface. The total 30 acre urban wetland system, including the golf course, can handle 10 million gallons of water per day, or two 25 year storms back-to-back. More importantly, the water is naturally filtered and cleansed so that no pollutants are being discharged into the river, solving a complex environmental problem. The entire project was done for \$6.2 million, less than one-third of the cost of the traditional solution, with the golf course renovation representing less than \$2.5 million of the project total.

Groesbeck Municipal Golf Course, which previously had no water features, can now boast about its new nine with six beautiful and challenging water holes. Its new environment is also teaming with numerous species of fish, waterfowl, shore birds and other forms of amphibian wildlife.

SUMMARY

Heavy rains in Lansing Township used to mean flooded basements and backed-up sewers, but not any more. As Groesbeck Municipal has demonstrated, a course can offer a great deal more to a community than simply recreation and green space. It can become a primary factor in helping solve serious community problems and enhancing the environment in which people conduct their daily lives.



REMODELING UNIVERSITY

CASE STUDY: RIDDELL'S BAY GOLF AND COUNTRY CLUB Ed Beidel, ASGCA

PROGRAM AND DESIGN NARRATIVE

The Riddell's Bay Golf & Country Club is one of eight golf courses on the island of Bermuda. The facility is situated on a narrow peninsula that extends into the Great Sound near the central portion of the island in Warwick Parish. The original golf course, which was designed by Devereux Emmet, was built in 1922. Based on an old illustrative plan that hangs in the clubhouse, portions of the original golf course had been lost over the years due to the encroachment of adjacent mangroves and the waters of the Great Sound. In addition, the tidal flows in low lying areas and the inability to maintain quality turf in those areas dictated golf hole re-routings. Although not advisable, but typical of many facilities, a majority of the design changes that were executed on the golf course prior to 1995 were performed in-house by the acting greens committee, members and staff. Solicitation of comments and ideas from these individuals is a critical part of a Master Plan program, however a qualified architect serving as the design moderator ensures a logical, coordinated, compatible and successful effort.

In 1994, Riddell's Bay made a commitment to hire golf architect Ed Beidel, ASGCA to offer a fresh, un-biased evaluation of the facility and present recommendations for a long term improvement program. Since the golf course had never been entirely reviewed as a whole and evaluated by a qualified professional, numerous playing and maintenance conditions had evolved that deserved attention. The Club realized that the course needed a facelift to maintain and attract new members, increase revenues, generate interest and to serve as an attractive venue in the Bermuda tourist market. Even though the Club realized the benefits of implementing a remodeling program at one time, they also knew that economically and operationally, they had to spread the program out over a number of years. Mr. Beidel made a formal Master Plan presentation to the general membership in the Fall of 1994 with implementation scheduled to commence the summer of 1995. The equivalency of seven golf holes have been remodeled over the last six years. The years 1997 and early 1998 were devoted solely to the construction of a new golf car storage building and the first phase of the Clubhouse remodeling / addition program. The program is continuing today and the Club is still fully committed as it was in 1994. In reality, the recent improvements have been well received and have generated an increasing interest even from the "anti-change" membership.

The Riddell's Bay Golf & Country Club Board of Directors had defined five major objectives to be addressed in the Golf Course Remodeling Master Plan Program.

- Develop a plan that would make the course less difficult to maintain, thus reducing maintenance costs.
- Enhance the visual and playing qualities of the golf course to increase interest and attract players of varying abilities. Reduce or eliminate unfair playing conditions.
- Lessen or eliminate unsafe conditions on the golf course and affecting adjacent properties.
- Update the golf course to match the advancement in equipment technology as well as accommodate increased user activity.
- Implement improvements with minimal disruption to the existing operation.



REMODELING UNIVERSITY

These project-specific objectives are typical of remodeling program goals. Additional program objectives generally addressed in a Remodeling Master Plan Program and other useful information can be found in the American Society of Golf Course Architects (ASGCA) brochure entitled “The Remodeling Process: Questions and Answers.”

The 18-hole, par 69 golf course and ancillary facilities are situated on approximately 88 acres of land with little or no room for expansion. The course plays to a maximum of 5,800 yards and 4,900 yards from the front of the forward tee boxes. Even though the course would be considered short by today’s standards, the ever-present varying wind velocity and direction on the island offer challenges that offset the course length.

The tee boxes at Riddell’s Bay were generally small, geometric shapes that did not fit with the existing terrain. Many tee boxes were not level and in poor condition due to minimal size or lower construction standards. The smaller number and size of tee boxes drastically limited the playing lengths and directions of the golf holes, thus reducing variety and interest.

The greens ranged in size from 3,200 – 6,700 square feet, but the sizes did not adequately correspond to the intended shot length. Simple round or oval configurations did not promote visual interest and did not lend to strategic golf, where varying degrees of golf shots required different playing options. Green structure was the result of original pushed-up soil that had been amended over the years with sand and organic material. The underlying porous Bermuda limestone provided rapid drainage at a rate that would be considered detrimental to water and nutrient retention in the soil profile. Numerous greens had “false fronts” that did not contribute to the playing experience or promote strategy. These highly maintained areas were only used to reward poor golf shots. Excessive slope and firmness of several greens provided unfair playing conditions and increased maintenance.

Riddell’s Bay’s sand bunkers were rudimentary in appearance. A majority of the existing sand bunkers were located at the green sites. Fairway bunkers were non-existent. Previous fairway and cross bunkers had been abandoned to reduce maintenance and ease play. Bunkers were simply excavated areas filled with sand or actually fine pulverized coral. There was minimal mounding associated with each bunker. Bunker perimeters were generally uniform and featureless. Bunker lips, when incorporated, were usually located on the tee box side of the bunker versus the greenside. It was difficult to ascertain the reasoning and purpose of many sand bunkers. It appeared that bunkers addressed high priority safety issues more than strategy.

The irrigation system for the golf course was drastically improved prior to the Master Remodeling Program commencement. The Club had expended a large amount of money to construct their own reverse osmosis water plant to serve irrigation and drinking water needs. A pop-up sprinkler system was installed to primarily irrigate green sites. Tees were hand watered on an as-needed basis and fairways were not irrigated, a practice accepted on the island and at the home courses of the English members. Lack of water “through the green” also made it difficult to maintain a differentiation between fairway and rough areas, thus reducing hole and shot definition. Grass types on the golf course components were varied and the playing conditions comparable but unpredictable.



REMODELING UNIVERSITY

The following is a brief outline of existing issues that were identified by the golf course architect regarding the playability, maintenance and aesthetics at Riddell's Bay Golf & Country Club.

- Implement a strategic style golf course to offset the shorter length course.
- Provide a continuous and safer golf car path system to control worn turf areas and direct traffic away from danger zones.
- Eliminate or reduce blind areas, danger zones and unfair playing areas.
- Provide better definition of golf holes, at the same time eliminate unnatural-looking golf features and enhance on-site and off-site visual quality.
- Provide variety in hole lengths, playing directions and visual aspects.
- Analyze the size of tee boxes, greens, etc. with regard to maintenance and playability (shot value).
- Define mowing patterns, reduce high maintenance areas, and implement uniform grass stands and maintenance procedures.
- Fully evaluate the golf course for traffic circulation and playing variety. Address quirks in par sequencing, hole lengths and routing. Golf course needs to be challenging but fair and should provide a true, fun test to all golfing abilities.
- Expand or modernize irrigation system as the Master Remodeling Plan is implemented.

In order to fully identify, evaluate and address issues in the planning, design and construction phases, the following services were performed by Ed Beidel, ASGCA, as a part of the Master Remodeling Plan Program.

- Prepared of a 100 scale "Existing Conditions" site plan showing the present golf course features and facilities and their relationship to each other.
- Developed, distributed and tabulated a "Membership Questionnaire" which sampled the member's use and opinions of the present facility.
- Conducted a personal inspection of the golf course and observed play over a period of several days.
- Established a Master Plan Committee, comprised of club personnel and members of varying interests and abilities, who participated in design workshops and offered valuable insight to the recommendations presented and rendered final program decisions. The committee also spread discussions throughout the membership and generated and maintained program interest.
- Met with the Golf Professional, Golf Course Superintendent, Master Plan Committee and other personnel to gather ideas, concerns, opinions and expectations.
- Conducted design workshops with Master Plan Committee throughout the conceptual planning phase to generate feedback and interest.
- Obtained final approval and commitment from the Committee of the Master Plan concepts prior to finalization. Construction cost estimates for each golf hole with job task breakdowns were provided. Job priorities were established
- Golf Course Architect made a formal presentation of the Master Remodeling Plan program to the complete membership. Material was presented, questions answered and concerns were addressed. Members were included in the overall process.



REMODELING UNIVERSITY

During the conceptual planning process, the golf course architect maintained a consistent contact with the Master Plan Committee so that all issues were considered and evaluated and eliminated surprises. The final concept plan was approved and the Master Plan presented in September 1994. Riddell's Bay had the necessary resources to begin program planning and implementation. Fundamental parts of the Master Remodeling Plan Program narrative were the Cost Chart, which listed a preliminary cost for every task / improvement on each hole, and a Job Priority Schedule, which listed tasks / improvements in a suggested order of implementation. Job tasks were ranked by the golf course architect in collaboration with the Master Plan Committee and Club personnel. Issues of maintenance & grow-in, playability, safety aspects, operations, cost value and aesthetic qualities were considered. Some tasks were ranked individually while others were ranked in conjunction with other tasks / improvements due to an economic or operation position.

As mentioned, program implementation began in 1995 and is progressing as planned. Early each year, Beidel has met with the Owner to discuss the current year's "wish-list" drafted in accordance with the Master Remodeling Plan recommendations. Refined illustrative plans and budgets are generated for the proposed improvements and presented to the Board in March for necessary adjustments and ultimate approval. Once approved, the golf course architect prepares the necessary documents for construction which is scheduled to begin the first week of June in order to take advantage of prime growing season and additional work force. While documents are in preparation, the golf course superintendent and crew readies the course for any temporary alterations that need to be in place by June 1. In past years, generally one golf hole has been taken out of play during program implementation. A temporary green or hole has been set up elsewhere on the course to complete the 18-hole loop. Construction is usually completed by the end of June or the middle of July depending on the scope of work. The Golf Course Architect has been on site at key times during this period for stake-out and construction observation. Grow-in takes approximately 2-3 months and the remodeled golf hole or component is put into play no later than October 1st, when most members are returning to the island for the beginning of their golf season. Favorable weather the past few years has yielded early September openings. Even though there are benefits to implementing a Master Remodeling Program aggressively and quickly, there are equal benefits to the time-expanded Riddell's Bay program. Outside of the economic and operational issues, minimizing the area of disturbance at any one time, had some merit with the Bermuda Department of Planning. By protecting and preserving the environmentally sensitive areas of the site, review time was drastically reduced and permit issuance was almost guaranteed.

In summary, the Riddell's Bay Golf & Country Club Master Remodeling Plan Program has been successful and the course is gaining popularity and interest. Use of the facility and memberships have increased. Bermuda Golf Association have scheduled more events at Riddell's Bay than in previous years. Golf outings, whether local or international, have increased. In turn, Club revenues have increased and the Club is able to continue the program as well as provide other capital improvements at the facility without unduly taxing the current membership. The program's success was due to dedication and commitment and a collaborative effort of ideas and knowledge. We would like to think that having an experienced ASGCA member golf course architect on board, is at least part of the reason for satisfaction and acclamation.



REMODELING UNIVERSITY

CASE STUDY: LOS ANGELES COUNTRY CLUB NORTH COURSE John F. Harbottle III, ASGCA

The Los Angeles Country Club North Course was designed by George C. Thomas (working with Herbert Fowler's plans), with assistance from William P. Bell in 1921. It has a special ambiance: set in the center of the city, it possesses some of the most beautiful grounds you will find anywhere.

The scope of our work involved reconstruction of greens, tees, bunkers, cart paths and fairway drainage. The tight native soils were making it hard to maintain consistently good turf. Sand buildup from the wind and play changed the bunker forms and made maintenance more difficult. Trees had been planted and grown to the point they blocked critical air and light corridors necessary for healthy turf development.

Our initial step was to develop a master plan which mapped out all our proposed golf course changes. The club formed a master plan committee made up of the manager, superintendent and a cross section of members to work with us. We researched old photographs, letters, articles and plans to gather as much information as possible about the original design. We then formulated plan to develop the spirit of that original design, while still allowing for modifications needed for the current state of the game.

The heart of our work was rebuilding the greens. To ensure we had an accurate record of the original contours, we surveyed the greens with laser equipment. This allowed us to produce scaled maps with 3-inch contours. These maps gave us a great deal of accuracy in rebuilding the greens to their original contours. **Our green construction work was done in conjunction with the bunkers and approaches to ensure smooth transitions.**

Thomas attempted to emulate erosion with his bunkers and they were given a very irregular, jagged edge. The years of sand buildup had made the bunkers even more bold and dramatic. Our techniques for reconstruction did not lose that bold look. We removed the buildup of sand and brought in soil to recreate the character. Bunkers built or rebuilt over the years since Thomas were given the same look, creating a better continuity to the design. Some bunkers were shifted or added to bring back the original strategy. The original tees were far too small to accommodate the amount of play today. Tees were enlarged and rebuilt with modern construction techniques, using drainage and a sand cap. They were also rebuilt with the original rectangular form. **This work created a more classical design.**

Fairway drainage was improved greatly with the use of modern methods. In a relatively short time, we stripped the existing sod from problem areas with the use of a cutting machine which created giant rolls of sod. The area was then graded and drainage installed. The sod was then replaced by machine and rolled into place. In a matter of days, the fairway was back in play again. We wanted all paths to be out of play and out of sight. This involved removal of a lot of path and shifting the paths to one side or the other, taking them through the tree lines and away from the fairways. We used natural surfaces with a curb system wherever possible and hard surfaces on the steeper slopes where erosion was more of a problem. Vegetation was also planted to help buffer the paths from view.



REMODELING UNIVERSITY

The result greatly improved the playing experience and golf course design. The course rose about ten places in the annual Top 100 Greatest Courses ratings and sits in some very elite company. **The membership is extremely pleased with the course conditioning and perhaps their greatest compliment is that they cannot tell the new work from the old course features.**

Even the greatest of courses may have room for improvement. This is an example of what can be accomplished with thorough research, planning and cooperation at the committee level. Because of our natural quest for improvement, it is inevitable that changes will occur on a course. The key is to ensure that changes are of a lasting nature and in the best overall interest of the course.



REMODELING UNIVERSITY

CASE STUDY: BIDE-A-WEE GOLF COURSE

Tom Clark, ASGCA Past President

PROJECT DESCRIPTION

The Bide-A-Wee Golf Course of Portsmouth, Virginia is an 18-hole, par 72 municipal daily fee course. The acreage of the course had previously been expanded by removing 22 homes built for World War II's ship building effort, which allowed for an attractive entrance without passing through an undesirable neighborhood. The site was flat with 2-3' of fall. Ditches were used to drain the play area. Several thousands of seedling pines were planted in the 40 and 50's which matured to block all sunlight and hinder air circulation. The 18-hole course had no improvements during the 80's while under a private lease (Chandler Harper), and when the City took over the course in 1992, improvements were minimal due to limited resources in the early 1990's.

In 1998, the City of Portsmouth decided to fully renovate the Bide-A-Wee Golf Course. The overall objective of the 18-hole, par 72 course renovation was to improve it both "physically" and "fiscally." This included improving all facets of the course so people would want to return.

To achieve this, the improvement objectives included removing trees (Loblolly Pines) to aid air circulation and sunlight, adding eight lakes to aid drainage, adding a cathedral-style pavilion that could be rented for functions, adding a new pro-shop/grill with a veranda overlooking various greens, adding a new irrigation system through which all fertilizer can be spread (fertigation), and adding a practice tee with target greens at varying distances, two practice greens, and a chipping green.

REMODELING PROCESS

The construction occurred during the late fall and winter, which brought extremely wet conditions. Several feet of topsoil were removed, exposing sand that was usable for stabilization, tee tops, and waste bunkers. All new sand bunkers and tees were built. The course was also rerouted to accommodate additional acreage and alleviate unsafe conditions. The original Bide-A-Wee layout featured extremely narrow and small greens that fell off severely on the sides. To improve this, greens were completely rebuilt and enlarged to U.S.G.A. Specifications. A complete new irrigation system was installed with fertigation; a new pump plant and pump house were also installed. A superintendent was brought on board during construction to observe and oversee site drainage, irrigation, greens mix, etc. Once the sprigs, sod and seed were completed they were signed off on and turned over to the superintendent and crew for establishment.

To remove the trees, a logging contractor was brought on board. The stumps were then removed by the golf course contractor. More than 5,000 trees were removed from the site, which allowed enhanced sunlight exposure and air circulation. Also, due to the fact that the site was only 135 acres, most every usable area was utilized, with the exception of the wetlands, which were preserved in their entirety.



REMODELING UNIVERSITY

CONCLUSIONS

Today, the course handles 200+ rounds per day with its new clubhouse, golf car storage and maintenance buildings, area pavilion, and entrance parking. The practice facilities are the best in the area, which allows the course to remain open 365 days a year (weather permitting). The golf course is one of the top attractions in the Tidewater area. It has positive surface and subsurface drainage, which allows play to resume immediately even after the hardest rain along with the complete system of concrete paths with curbs. The trees that were removed allow all tees, fairways, and greens to have healthy turf year round. All existing “tree lines” and specimen trees were preserved. With green fees between \$20-30, most days see well over 200 players per day, who are able to complete 18-holes within 4 hours.



REMODELING UNIVERSITY

CASE STUDY: LA JOLLA COUNTRY CLUB

Cary Bickler, ASGCA

COURSE DESCRIPTION

18-Hole Championship golf Course
Private Country Club

Blue Tees	6,685	Par 72
White Tees	6,260	Par 72
Red Tees	5,970	Par 74
New Green Tees	5,335	Par 74

Note: Because the fairways are 100% kikuyugrass, the ball does not get much roll and the course plays considerably longer than the 6,685 yards from the back tees.

Construction Start Date:	7/93
Construction Complete:	11/93
Course Grand Opening:	7/94

SITE DESCRIPTION & ISSUES

This project was a complete 18-Hole Master Plan and remodel. Included was a Hole-by-Hole Evaluation and Colored Rendering. Plans also encompassed a new driving range, practice facility, maintenance yard, and nursery green. A separate Tree Master Plan was a second phase of the work.

La Jolla Country Club is situated above the small Southern California village of La Jolla on a magnificent site with Pacific Ocean views, canyons and natural rolling terrain. The original golf course, designed by William Bell in 1927, is a glistening example of his classic golf course architecture.

The 18-Hole Master Plan placed emphasis on 6 holes that had previously been redesigned over the years, and had been taken out of character from Mr. Bell's original theme.

A primary consideration was to redesign new greens with contours that were playable, manageable and congruent with the original design intent and character of the traditional style golf course.

The tree theme at La Jolla Country Club was expressed by Canary Island pine and eucalyptus. The pines gave masses of dense dark green background, while the skyline and horizon were defined by the eucalyptus. These theme trees combined well to present a good design basis, however due to the random planting of a large variety of other plant and tree species by Green Committees throughout the years, the landscaping had become a botanical collection of misplaced trees. Open space between trees is of equal aesthetic importance in tree and landscape composition.



REMODELING UNIVERSITY

Due to tree groupings growing into each other there was a lack of positive and negative space balance. Beautiful trees and plantings that were hidden by the overgrowth of other trees were defined and brought into view by removing and pruning trees. This enhanced the overall value of the course plant and tree-scape. It also reclaimed the original course strategy by eliminating trees that interfered with the corridors of play.

MEMBERS CONCERNS & OBJECTIVES

The Club's primary concerns were the replacement of all 18 greens to upgrade to USGA Standards, and the re-implementation of previously remodeled green contours to achieve continuity of the overall original design theme.

In the process, maximum cup-set locations were addressed while maintaining emphasis on the La Jolla Country Club tradition of small greens. This was accomplished by enlarging greens where it conformed, and/or softening slopes, while minimizing impact of foot traffic patterns. Some bunkering and adjustments were necessary to accomplish this. Original greenside bunkers were re-built, and some additional bunkers were added where appropriate.

USGA Greens Specifications were implemented for all putting green replacement. Contractor workmanship was closely monitored, and materials were lab tested as they arrived at the site to insure the quality control of construction.

PLANNING & DESIGN SOLUTIONS

The following strategy was the approach used in gaining membership approval for the course renovation work.

An educational and promotional campaign was launched that was specific to the Club's renovation needs. A strong but diplomatic leader was appointed to be the "flag bearer" and direct the campaign. Just prior to the general meeting and membership vote, a group of 40 members who were in favor of the renovation were selected by the Green Committee. The group was briefed with the facts, and afterward they defined the exact goals, and created a Mission Statement. The selected group of 40 members met for educational sessions. The Course Superintendent discussed the causes of unfavorable course conditions. Samples were taken from the course and laboratory tests were performed which provided accurate analysis of the pre-renovation conditions.

After the selected group of 40 members fully comprehended the facts supporting the need for renovation, they developed an outline to promote the renovation to the membership. During the general membership meeting, slides of USGA greens cross-sections were shown and compared to cross-sections of the Club's existing greens. The 40 supporters imparted their historic and recent knowledge to those present at the general membership meeting. Next, each of the 40 supporters selected 10 members to contact personally via an active telephone campaign. They imparted more information to substantiate the remodel and create enthusiasm. The active telephone campaign took place immediately over the few days following the general membership meeting while the ballot process was beginning.



REMODELING UNIVERSITY

The Club found there is no substitute for personal contact. This was the primary key to the success in gaining approval of the project. The vote count resulted in 90% of the membership in favor of the renovation.

CONCLUSIONS

All the goals for La Jolla Country Club were successfully accomplished. The course renovation and Tree Master Plan brought the original design theme back into sharp focus at this extraordinary historic country club. Membership entry fees and the waiting list increased measurably. Implementation of the Tree Master Plan is on-going. The Club retained the Golf Course Architect to work directly with the Green Committee to maintain consistency through the “revolving door of authority” as Club leadership and politics change.



REMODELING UNIVERSITY

CASE STUDY: PARRIS ISLAND GOLF COURSE

Clyde Johnston, ASGCA Past President

In 1996, the Parris Island Marine Corps Recruit Depot, Division of Morale, Welfare and Recreation began developing a plan to renovate the base's 1947 Fred Findley-designed golf course. More than half a century of routine play, maintenance and natural processes had caused the typical problems found on older golf courses.

The problems consisted of an outdated irrigation system with a limited water source, soil compaction, shade and root encroachment from maturing trees, poor drainage, etc. These conditions were counterproductive to providing the three elements most critical to a successful golf course: playability, aesthetics and maintainability. However, simply improving these conditions and updating the golf course features and infrastructure could not be accomplished without addressing the environmental and historically significant conditions surrounding the site.

Located on the southernmost tip of Parris Island in southeastern South Carolina, the site is bordered by salt marsh wetlands and deepwater creeks on the southern, eastern and western boundaries. Freshwater wetlands are located throughout the interior of the site. The average elevation across the site is seven feet above mean sea level. Additionally, Parris Island has one of the largest concentrations of Live Oaks per acre in the state of South Carolina. The location and condition of these majestic trees played a major role in the golf course renovation.

Historically, the site reaches back to the sixteenth century with the French occupation of Charlesfort. Later, the Spanish city of Santa Elena was established there and served as the capital of Spanish Florida until English raids in 1587 forced the Spaniards to evacuate to St. Augustine. Santa Elena is home to the oldest known European pottery kiln discovered in the United States. Three existing holes, the practice range and the existing clubhouse were all located within the Santa Elena archaeology site.

A policy of avoidance was adopted after evaluating all of the sensitive environmental and archaeological resources. The task then became to route 18 holes of golf and a practice facility that:

- avoided all known archaeology and environmental impacts
- provided a continuous flow to the golf course
- utilized as many existing golf corridors as possible

The final routing plan utilized 12 of the existing 18 golf corridors, with minimal impact to the surrounding wooded environment. Due to spatial constraints, the practice range was located within the Santa Elena site and approved utilizing a preservation in place method. This would require the careful placement of fill material to create a buffer zone to house the subsurface infrastructure required on a golf course. Upon the acceptance of the routing plan, the issues of playability, aesthetics and maintainability were again in the forefront.



REMODELING UNIVERSITY

All green, tee and bunker complexes were renovated utilizing the most current construction techniques in the industry. A new automatic irrigation system was installed, requiring an archaeological dig by the State Historical Preservation Society for the trench line that supplies the practice facility. New hybrid Bermuda grasses were planted on the primary playing surfaces, while native Spartina and waste areas were incorporated to reduce the total acreage of maintained areas and blend the golf course into the surrounding low-country environment.

Paramount to the success of the golf course were drainage improvements. Because of the low-lying nature of the site and proximity to tidal wetlands, small rain events would inundate the golf course for extended periods of time. To counter this, 11 lakes were strategically located throughout the golf course in conjunction with a sophisticated storm water conveyance system. The dredged lakes would provide the fill required to achieve positive drainage on the golf course while providing detention basins to slow storm water discharges from the site. All surface runoff is directed back to the lakes, which through the use of equalizer piping provides a large primary irrigation water source.

CONCLUSION

Based on a thorough understanding of the conditions surrounding the project site, through consultation and coordination with various professionals and agencies, this project has preserved significant cultural, historical and environmental resources for future generations. The increase in play at The Legends at Parris Island is testament to the success of the renovation project and meeting the demands of the initial program for the project.



REMODELING UNIVERSITY

CASE STUDY: MEADOWBROOK COUNTRY CLUB

Bob Lohmann, ASGCA Past President

Meadowbrook Country Club is an 18-hole private club, owned by the members and located in Racine, Wis. Opened in 1927, the layout at Meadowbrook measures 6,360 yards and plays to a par of 71.

Back in 1993, Lohmann Golf Designs (LGD) was asked to prepare a master plan for Meadowbrook, which had experienced difficulty retaining members in recent years. The golf course itself featured a solid routing, but most of the course features showed all of their 66 years.

The terrain at Meadowbrook is similar to that found at many of the private clubs in Greater Chicago: gently rolling with stands of mature trees, which frame many of the holes. All of the greens were push-ups but the 8th, which was renovated during the 1970's. Other than the broad contours which existed naturally on the property, there was little to no mounding in the fairways or green surrounds.

Before bringing in Lohmann Golf Designs, Meadowbrook had previously committed to the installation of a new irrigation system; a major portion of LGD's job was to consider future course improvements that would mesh with design of this new irrigation system. Following numerous site visits and meetings with club members/officials, LGD and the club agreed on a master plan which focused on the creation of strategically placed bunkers, the renovation of existing bunkers (which were scruffy and drained poorly), expanded tees, improvements to the 18th hole, a new 8th green and additional fairway mounding.

The club decided to move forward according to the LGD's master plan by slowly implementing small chunks of the plan over a number of years.

The first phase, undertaken in 1995, involved improvements to the 18th hole alone. LGD oversaw the creation of larger tee surfaces on #18, new fairway bunkers to define the landing areas on this par-5, and new bunkers and mounds to complement the existing green. LGD also graded the immediate approach area to improve visibility and drainage.

Upon completion, LGD's work at the 18th hole was well received by the Meadowbrook membership. So well received, in fact, the club decided to scrap its piecemeal approach and proceed with the remaining course improvements all at once.

Based on the club's enthusiasm for the new 18th, LGD and the members also chose to amend the existing master plan to include similar improvements to every hole on the golf course.

Phase II work at Meadowbrook began Aug. 11, 1997, and finished by the end of October. During that period of time, LGD and its sister construction division, Golf Creations, were able to create one new green (the 8th); 40 new bunkers, a figure which includes the renovation of existing bunkers; new tees on every hole; fairway and greenside mounding on 16 holes; and one new irrigation pond, strategically placed to enhance the par-3 11th hole. All the disturbed areas were seeded rather than sodded, and play resumed the following spring.



REMODELING UNIVERSITY

The Meadowbrook project illustrates several factors important to the renovation process, but one stands out. It shows that effective master plans are working documents that are flexible enough to accommodate change when it suits the client.

Good master plans are also strategic documents. In Meadowbrook's case, had LGD pushed for a master plan that included improvements to every single hole, the clearly cautious membership might never have approved it. However, by including renovations to the 18th in the original, more modest master plan - and tackling that portion of the project first - LGD was able to show members what was possible.

As it turned out, the changes to #18 - enthusiastically received by the members -- lead directly to substantial additions to the master plan. For example, LGD's work at the 11th green, where Golf Creations added a new pond to the front right portion of the putting surface. While this measure drastically improved the golf hole aesthetically and strategically, it was added to the revised master plan only after the members experienced LGD's work on #18.

Ditto for 14th green, where LGD and Golf Creations performed major grading to the approach area, lowering the fairway some 4 feet to improve sight lines and drainage performance.

Those projects included in the original master plan were also completed. LGD rebuilt the entire green complex at the 8th hole, lowering the putting surface to bring an adjacent water hazard more into play. The green was also regraded to better accept approach shots.

As it had done on #18, LGD also used mounding to frame landing areas and green complexes on all but one hole at Meadowbrook. It also enlarged the small, overburdened tee complexes on every hole.

Because the crews worked on a couple of adjacent holes at any one time, and because it was fall (meaning there wasn't much play), LGD and Golf Creations were able to complete their work without closing the course to member play. Golfers were able to skip these holes and play around the work.

The membership role at Meadowbrook is no longer declining. In fact, there is a waiting list for the first time in years.



REMODELING UNIVERSITY

CASE STUDY: WOODWAY COUNTRY CLUB

A. John Harvey, ASGCA

CLUB HISTORY AND AUDUBON

Woodway Country Club is located 35 miles north of New York City in Darien, Conn. Darien is an old New England town and home to the successful Wall Street executive. The community is also home to three championship clubs of which Woodway is included. Founded in 1916, Woodway looked for a formidable golf course architect to sculpture the 180-acre property of rolling farmland terrain into the 18-hole, 84-year-old facility that exists today.

Under the direction of Theodore Hoyt, one of four founding fathers and first Club president, the plot of land was purchased in November of 1916. Walter J. Travis, one of the great golfers of the day, was asked to appraise the land for the new golf course. "If ever nature was intended a plot for a first class course, it is here," said Travis after inspecting land.

In January 1917, Scotsman Willie Park, Jr. was selected from among a group of course architects to design the 18 holes. Park, a two-time winner of the British Open, was an experienced green keeper, club maker, and above all, a talented golf course architect. His plans approved in March of 1917, work could begin and the course was seeded in the fall of the same year and by summer of 1918 Woodway was complete. The new facility officially opened on Sunday, June 30, 1918.

Park's design work was immediately acclaimed. George Duncan, the 1920 British Open Champion, pointed to Woodway as the finest course he had played in America at the time.

Many other greats played Woodway, including Jimmy Thompson, known in his day as the world's longest ball striker and six time British Open Champion Harry Vardon.

But the most famous golfer to grace the fairways at Woodway was the late-great Bobby Jones. The former "Emperor" of golf played one of his last exhibition matches at Woodway in September of 1941.

Park, who recognized the importance of a variety of shot making requirements, created a thorough test for any golfer. All the clubs in the bag will be used throughout a typical round and the subtleties of the greens will test the eye of the best. Woodway currently measures 6,716 yards from the tips and plays to a par 71. The course rating is 72.8, with a slope of 139.

As well as being a great Club and formidable test of golf, Woodway is recognized as a Certified Audubon Cooperative Sanctuary by the Audubon International. Woodway Property Manager, Larry Pakkala, CGCS, has been enrolled in ACSP since its inception in 1990. Preserving and protecting the golf course environment has been the main focus of Pakkala's 10-member Audubon committee. Woodway was the first Club certified in Connecticut in 1991 and has excelled in its efforts to comply with Audubon International's five-point plan for environmental stewardship.



REMODELING UNIVERSITY

WOODWAY 2000

Back in 1994 the Club was seriously considering renovating the existing clubhouse at its original site to the tune of 4 million dollars. After further investigation by the membership who found numerous faults in the infrastructure of the 84-year-old structure, which had undergone numerous remodeling and additions during that period, a plan to build a new facility at another location on Club property was initialized. A new committee was formed and after a two-year study, formal plans were brought to the membership for a vote. The plan was much more suitable to the Club as it had many more benefits than negatives. First and foremost, it took the clubhouse location from directly on a state highway and put it offset by a long entry road, more into the center of the property. Secondly, it gave the golf course returning nines and a chance to build a more suitable practice facility with all the modern amenities both for golf and Club functions.

The Roger Rulewich Group was hired to assist the Club with its improvements to the golf course because of the firm's experience and reputation for remodeling world class golf courses. Rulewich's Design Associate, A. John Harvey, ASGCA, was responsible for the preparation of concept design drawings and field design for the first three phases of course improvements.

Woodway's Green Chairman, Jack Graham and Committee along with Golf Course Architect Harvey and Course Superintendent Pakkala structured extensive planning meetings. Before plans for returning nines and practice facilities could be implemented, support of the Golf Committee and Board of Directors had to be obtained. Although the internal approval process was rather lengthy for creating two new holes and a practice facility, the method of gathering support for the plan was necessary. The Cooperation of all parties has given Woodway a spectacular finish to some difficult course changes.

FIRST PHASE

After about a year of planning and permitting, construction of the new par 3, hole #9 began in October of 1999. The greensite is located on the irrigation pond along the main viewing axis from the back of the new clubhouse. The pond was enlarged in the location which previously served as the tee to hole #7, some 30 feet above water level. The excavated fill consisting of approximately, 12,000 cubic yards of material was used to create the green for the new hole within the pond. The irrigation pond was enlarged as a source of fill for the green and to help offset the loss of water storage volume as the result of building the green in the pond. In order to properly construct a stable wall to retain the green, the irrigation pond was drained and a rock foundation wall was constructed and backfilled layer by layer throughout the winter months. Fortunately, once the pond was drained, it was evident that bedrock was at the base of the pond. This served as a good footing to lock the bottom of the rock wall onto. Once the foundation wall, which in section looks like a trapezoid, was built to a top elevation of about 3 feet below proposed water level, a finish stone masonry wall was built to about 4 feet above the water design elevation. This portion of the wall was constructed with weep holes at the interface of the two types of wall with a gravel and fabric blanket placed at the back of the wall from this point to approximately 1 foot below the finished grade of the greensite. Although wetlands are present



REMODELING UNIVERSITY

along the back edge of the green adjacent to the Noroton River, the design was achieved without the need for fill placement in native wetlands.

In addition, these wetlands were enhanced with native wetland grass species, keeping in concert with the Audubon theme.

When a platform where the green would sit was created with backfill to an elevation of 3-4 feet above the finished top of wall elevation by the site earthwork contractor Peter Welling of Durante Inc., one of the Roger Rulewich Group's shapers started to mold and shape a green in similar fashion to what the Club had approved. The fine-tuning and finesse of the detailed shaping was a terrific evolution of what was depicted in sketch form to a green involving hands-on input from Harvey, Pakkala and Jack Graham.

The hole was designed to provide different tee angles and varied length from 90-195 yards. The putting surface, including the collar is approximately 7,300 square feet and offers multiple cupping areas with different degrees of difficulty. Two bunkers flanking the green were positioned to help define the target and help capture an errant tee-shot from the ever present water hazard. The green was built using the "California Method" of construction. The rootzone mixture consisted of a 12 inch profile of 70-20-10 by weight. With the aid of materials testing by Norm Hummel of N.W. Hummel & Co., the intent was to match the present growing medium of the existing push-up greens with the goal to produce uniform agronomic and playing conditions of the greens at Woodway. Both the sub-grade and the 6 inch rootzone mixture on the tees were laser leveled at a slope of 1% from front to back for consistency and uniformity. The hole was sodded and the green was seeded during April, 2000. The forward tee was opened-up in May, 2000 to serve as temporary tee to the old 7th green which plays some 90 degrees in a different direction from the new 9th hole which will be officially opened for play the in Spring of 2001.

SECOND PHASE

During July of 2000, start of construction on the new practice fairway began. For many years this location served as the Club's gun range and compost area. During construction of the new clubhouse, the gun club buildings located here were used as temporary field offices for Deluca, the clubhouse contractor. The site also served as a staging area for equipment, materials and supplies. Once clubhouse construction was well underway, this area was cleaned-up and about 7,000 cubic yards of fill was placed by truck at the new tee and target greens as per plan. The next step was to push about 8,000 cubic yards of material with a Cat D-6 while rough shaping the fairway and features. This was followed closely by installation of perforated drainage pipe and catch basins to pick-up surface and sub-surface water within the fairway. Pakkala and Harvey agreed that the only good way to handle water, ease ball-picking and maintenance of the range was to install this dual drainage system. Target greens with their respective bunkers were shaped at approximately 50, 100, 150 and 200 yards out from the center of the practice tee. Every effort was made in their set-up and location to reduce potential conflicts with the parking lot serving the clubhouse on the right side of the practice fairway. Mounding, trees and a 80' netting structure are part of the program to assist in keeping balls within the range and away from the clubhouse area.



REMODELING UNIVERSITY

Located at the far end of the practice fairway lies a cemetery about 1/3 of an acre in size which dates back to the early-1800's. Obviously the work zone avoids this location all together. But during Harvey's initial visit to the site, while scrambling over rock walls which are a New England trademark used to define fields, and in this case, cemeteries, he noticed one of the tombstones read "Here lies John and Caroline Harvey". As soon as he read that he got out of there as fast as he could. It was too bizarre. Caroline is also the name of his wife.

After installation of drainage was complete, finish shaping with a small dozer followed. Once finish shaping was completed, topsoil spreading, irrigation, finish preparation and grassing followed. While the majority of the practice area finished at this time, the tee will not be completed until late October, since an additional 3,500 cubic yards of fill used to elevate the tee another 3 feet will be transported from the third phase of work - new hole #1 fairway.

Positioned adjacent to the pro shop, bag drop and new 1st tee, the 7,500 square foot practice putting green was carved into a knoll. Again, the "California Method" of greens construction was used to complete the work within the shell. An effort was made during the shaping and finish floating of the seedbed mixture to try and capture some of the similarities and contours of the old Willie Park, Jr. greens.

THIRD PHASE

This phase scheduled to start Oct. 2 is the last portion of work directly associated within the vicinity of the new clubhouse. It involves the reconstruction of the existing hole #8 into what will become the new hole #1. As mentioned in phase two, about 3,500 cubic yards of fill will be moved to the practice tee to complete the range.

This par-4 golf hole at present has two greens. The old Willie Park, Jr. green playing straight away, and, a newer green, a slight dogleg right on the bank of a pond which was created as a source of fill when Interstate 95 was built. About 2 acres of tree clearing is required since the new tee complex will be built developing a sharper dogleg but also to allow views from the putting green and 1st tee to the pond along the fairway and to hole #9. After fill is transported to the practice tee, the fairway will be graded and shaped to better receive the ball off the tee and to help direct the ball away from the pond. The bunkers adjacent to the old #8 green will be reshaped as part of this phase of work. The bunkers surrounding the abandoned hole #7 green will also be reshaped as part of a converted practice green adjacent to the new 1st tee.

FOURTH PHASE

Once the first three phases are completed this fall, the Club's and The Rulewich Group's concentration will be on the preparation of a master plan. This plan will be developed during the year 2001 with input from Green and Golf Committees. The intent is to show proposed course improvements in a graphic format and to serve as a guideline for continuity with future course improvements. Continuity is of foremost importance when it comes to role changes and Club leadership. It will address the remaining 16 holes and any other issues which may need attention. The plan will focus on tees, fairway bunkering, green-side bunkering, putting surfaces, cart paths, trees, drainage and areas that might be planted and nurtured as native grasses.



REMODELING UNIVERSITY

Working closely with a competent golf architect is paramount to the success of a major renovation project on any golf course. There were times when controversy over design techniques from members became difficult to handle, but Harvey and Rulewich convincingly held their ground over these important issues. This ultimately led to a product that helped bring a divided membership back together.

It is imperative that with every remodeling project, the golf course architect and superintendent communicate and work in a cooperative fashion in order to achieve the goals and produce a successful project. While work was underway, Pakkala and Harvey spoke frequently on the phone and met at the job site at representative stages of the work to discuss field design implementation and shaping and to collectively approve each segment of the work. A sense of humor is important, as Pakkala and Harvey will attest, and appreciation of the Club's history and course subtleties a prerequisite. This relationship is an example of how even alumni from Big Ten rival schools can work together.

The only real conflict Pakkala had with Harvey was their alumni rivalry on the grid iron of Penn State and Michigan State and who had the better playing surface. If you like the smell of freshly cut grass, you know who wins that battle.



REMODELING UNIVERSITY

CASE STUDY: PROJECT COMPARISONS

Dr. Michael Hurdzan, ASGCA Past President

There is no such thing as a "typical" case study for golf course improvements or remodeling. Each project has its own unique blend of factors and conditions that require a tailored approach to bring about the work. There are, however, some generalities that do apply and are worth noting as a preface to this section on case studies.

One general truth about remodeling is that it is more difficult to do than new construction. In remodeling an existing golf course the goal is to correct someone else's mistakes or design, within a limited work area, with a limited budget, in a limited amount of time, under the watchful eyes of lots of people who may not have been strongly in favor of the remodeling to begin with. New course construction, however, gives the designer the freedom to adjust surface drainage over long distance, doesn't require new tile or irrigation to tie back into old or existing but serviceable systems, and there is no special significance placed on certain existing features be they trees, hazards, or golf landforms. The analogous situation is like trying to remodel a home or office with the residents around every day, versus building a whole new structure. Most contractors will tell you it is usually easier and a lot more fun to build new. So there should be no expectation that everyone is going to like the remodel. My personal goal is 51% no matter what I do, so anything above that is gravy.

Another generality is that golf course turf should really have 10-12 weeks of good growing weather before it sees the return of golf. This means that projects with warm season grasses should be planted by early July and golf courses with cool season turf should begin grow-in by early September. With these end dates in mind, then a backward planning sequence should take place to determine a reasonable start date. Occasionally, a project gets completed later than the ideal time and with a usually long and extended growing season. They do all right. However, the odds are against it and therefore allow adequate time to complete the work and grow it in.

Generally there should be a contingency fund of time and money to allow for unforeseen circumstances such as bad weather, undiscovered problems and other miscellaneous occurrences. A minimum of 5% contingency is wise, but 10% is better, and if it is not required so be it; however if it is needed and not there, then expect problems — perhaps big problems.

Hire experienced professionals to handle the design, construction and administration of the project. Don't assume that your golf course superintendent and green keeping staff will do any of the work, unless they are consulted in advance. As was pointed out earlier, renovation is a very complex and politically charged process and it may be unfair to put inexperienced or ill-equipped staff into an area that is not their specialty. Some golf course superintendents are fully capable of doing remodeling work, but the majority are not.

The last generality is to be patient. Don't have any unrealistic expectations about the project until it has had time to mature. Early criticism and panic attacks accomplish little, whereas good planning and lots of patience yield outstanding results.



REMODELING UNIVERSITY

CASE STUDY ONE

En-Joie Golf Course, Endicott, New York. Public Golf Course, Total Remodel - Two Construction Phases

En-Joie Golf Course has been the site of the PGA Tour stop B.C. Open for 29 years, and will continue for the next few as well. The original golf course was built in 1927 on the floodplain of the Susquehanna River. Several times per year most of the golf course would be flooded by the river with up to eight feet of water. Clearly flooding was not a problem that could be solved but could be planned for. In addition the requirement to remodel the course to PGA Tour standards, the work had to be done after the tournament was played in mid to late September. This meant no construction work could begin until the day after the tournament and had to be completed before the heavy snows of winter or after the late floods of spring, yet was expected to meet tournament playing standards by the next tournament date. This was a formidable challenge.

Since it is a city owned, public course, the total renovation budget was set at a modest \$1.6 million, but swelled to \$2.1 million, by unforeseen problems, and the critics who weren't necessarily in favor of the remodel were not only citizen golfers, but also many tour players who had attended the event for 15-20 years. The project was being watched closely by a lot of folks including golfers, non-golfers, play professionals, PGA Tour, The Golf Channel and all of the tournament supporters.

Again, respecting the general principles discussed above, a lot of detailed planning took place before work began that included lots of contingency for time (allowed for three phases but hoped for two), and a 10% financial buffer. Lastly, none of the work was to be done by the green keeping staff until grow-in. Everyone was careful not to promise a firm re-opening date and steadfastly maintained that at least twelve weeks of good growing weather after planting was required. The selected contractor was local to the area, was willing to work from dawn to dark, and had a very large workforce of experienced craftsmen who could be dedicated to the project for the short construction schedule. Weekly meetings were held with the contractor, designer, owner's representative, golf course superintendent, golf course staff, and city representatives to review progress and resolve problems.

The first fall (Phase I) saw a late winter, so nine of the holes were entirely rebuilt and somewhat established before snowfall, although three days after planting about 50% of the area was briefly flooded; but without substantial damage. After a good spring grow-in, the course opened for limited play prior to the tournament. Some tour players didn't like the changes and said so publicly, which the sports reporters loved. So Phase II was an even scarier event, especially since bad weather rained out the final day of the tournament, and construction had to begin in the mud. Winter also came early and so Phase II didn't finish in the fall. Over the winter, it was decided to close the course for the entire next summer. This didn't sit well with the citizen golfers of Endicott, but they didn't have much choice. The golf course renovation was completed in July and was in perfect condition for the golf pros at the September tournament.



REMODELING UNIVERSITY

The objectives of remodeling were to:

1. Control floodwater where possible and restrict its silt deposition to manageable areas.
2. Improve shot making quality of the holes.
3. Rebuild all greens to modern root zone architecture.
4. Install a new irrigation system.
5. Make En-jolie one of America's greatest affordable public courses.

At the conclusion of the tournament after all remodeling was done, everyone, including local critics, both from the PGA Tour and golfing public agreed the operation was a success and the citizens of Endicott can boast having not only one of the best public golf courses in the country, but they can also play the course the pros play at a modest green fee.

CASE STUDY TWO

Private Country Club, Total Remodel - One Construction Phase

In 1930, Donald Ross designed the Burlington Country Club in Burlington, Vt. and for almost 80 years it was regarded as the best club in the state. With that reputation and being frugal New Englanders, the course was virtually unchanged except for the natural successions of trees growing and dying, green and bunker lines ebbing and flowing in and out, and more people playing the course and demanding faster, shorter turf conditions. Soon the stresses that accompany cutting grasses down to a fraction of anything Donald Ross ever conceived of started to show in the form of poor turf, slow drainage, more disease, and a greater requirement for intensive labor consuming counter or corrective measures. Then a new, modern, celebrity-designed, country club course was proposed only a few miles away, and the folks at Burlington Country Club decided they better do something to keep their prestige and position.

Now Vermont Yankees are very slow to accept new ideas, and even slower to spend money, so even though they knew they had a problem and the solution was remodeling, their attitude was "show me;" especially on their greens. To demonstrate how good their greens could become, a new practice green was built and they played on it for one year. They were hooked, for the practice green putting surfaces were faster and truer than anything they had experienced before.

Problem is that everyone seems to think that every Donald Ross golf course is a treasure, but his courses, like courses of today, are only as good as the site, construction budget, and building techniques would allow. At Burlington Country Club, the golf course was built inexpensively, with horses and mules, so there were some limitations to earthmoving that left some built in problems. One was a safety issue of blind shots over hills, and another was golf features being forced too close together given the amount of golf now played. The practice facilities were small which forced the use of practice mats for much of the year. Parking was limited by the golf course and other facilities, and many of the golf holes were poorly drained and uninspiring to look at. Despite those weaknesses, it was still a Donald Ross course, and so many of the members (usually older ones) opposed to the project (and assessment) claimed this was a sacrilege. Nonetheless, the project was approved, but it had to be done in two phases over two years, always giving the members nine holes to play.



REMODELING UNIVERSITY

The spring of Phase I was exceptionally dry and warm (El Niño) and the construction was going so fast, the club reevaluated and decided to close the entire course for the balance of the year and complete all 18 holes at once. This further irritated those members already irritated and they even threatened lawsuits to stop the work, but the board persisted and the course opened the following spring to rave reviews. Even the harshest critics now agree. The club did the right thing.

Between master plan presentation and the grand opening of the remodeled course, were lots of acquisitions about destroying a Donald Ross masterpiece, especially the greens. This grillroom grumbling was silenced when copies of the original Donald Ross greens drawing and photographs were provided to a member meeting that showed that the new designs were indeed inspired by 70-year-old Ross drawings, but without the excessive slope common to that era.

Subsequently, during construction at Burlington Country Club it was found that some greens laid on solid rock and had no drainage, others were built on mucky type soils that stayed excessively wet, and still others were built out of sand or clay depending what was found naturally at that individual green site. Virtually every one of the Ross greens played differently from all of the others, whereas after construction, they now all play consistently the same and more in line with what the members wanted.

Ross built small tees and no forward tees because they were not needed in 1919, but were badly needed now and so an extensive tee enlargement program was undertaken. Also the course received an extensive drainage treatment on part or all of 11 fairways, new bunker sand, improved irrigation system, and a unified and functional path system. The driving range was doubled or tripled in size, and there is lots of room to expand the parking lot.

The total cost of the project was \$1-2 million, not including the irrigation that was installed by Fred Martel, the course superintendent, and his crew.

The net result is that the golf course nor the country club lost any of their heritage, tradition or charm, and they have a much more fun to play and easy to maintain golf course with some of the best greens in all of New England because of their willingness to remodel. They will remain the best private club in the state for decades to come.

CASE STUDY THREE

Private or Public Course, Partial Renovation – Multiple Phases

Many clubs or courses need neither a total remodel nor have the budget to do one, but can be significantly improved with pinpointed projects unified by a master plan. The usual phasing is to do all of the work over three to five years, although some projects have been worked on for 12-15 years allowing one or two small projects a year. The preferred method is to do the remodeling in the shortest time possible for there is a great economy of scale in reducing total costs, as well as a marked reduction in aggravating non-supportive people. In addition with fewer phases, there is better uniformity of the playing surfaces for the turf is the same age, the same construction crews could do all of the work to the same standard of workmanship, the



REMODELING UNIVERSITY

construction materials would be more uniform, and there will be fewer seams or scars between old and new golf features and turf.

However for a variety of reasons, some golf course remodeling must be extended over a long period of time.

This approach is to set priorities on all of the improvements to be done, and then establish a unit price for each improvement and finally establish a list of work that can be done, in order of priority, for the time and money available. Prioritizing should follow these guidelines in this order:

1. Address all safety problems.
2. Address all potential habitat problems.
3. Correct drainage and long-term maintenance problems.
4. Improve playability for greatest number of golfers.
5. Address special interest group concerns.
6. Aesthetic improvements only.

Experience has shown that it is usually better to do entire golf holes at once, instead of trying to do all bunkers, tees, etc., in each phase. Doing a complete hole means never having to disrupt it again, whereas doing it the other way means tearing up a hole multiple times, which strains the patience of golfers (bill payers). What follows is an example of a protracted remodeling process.

Although case studies allow you to learn from others, remember one of the generalities mentioned in the preamble is that all projects are unique and allow for contingencies.



APPENDICES



REMODELING UNIVERSITY

APPENDIX I: ASGCA OVERVIEW

The American Society of Golf Course Architects is a non-profit organization comprised of leading golf course designers in the United States and Canada. Each member is actively involved in the design of new courses and the renovation of older courses.

ASGCA was formed in 1946 as the first professional organization of course designers in America. Robert Bruce Harris of Chicago was elected the first president and Donald Ross served as honorary president.

Members of ASGCA are, by virtue of their knowledge of the game, training, experience, vision and inherent ability, able to design and prepare specifications for a course of functional and aesthetic excellence. Qualifications for membership in ASGCA include experience and accomplishment (responsibility for five finished designs).

The Society is actively involved in several issues related to the game of golf, including responsible environmental designs. ASGCA members proactively design courses that are environmentally friendly and promote wildlife development. In addition, the Audubon Society of New York certifies many courses as wildlife sanctuaries.

The Society has several committees to address issues related to the challenges of course design:

Environmental Committee actively researches and promotes golf course design principles that follow sound environmental projects. The Committee's recent publication, *An Environmental Approach to Golf Course Development*, has won wide acclaim within the golf industry and general public.

The ASGCA Foundation collects and distributes funds for a variety of research projects.

Professional Development Committee organizes seminars at the Society's annual meeting and has developed a limited form of certification for golf course architects.

Awards Committee initiated an annual Donald Ross Award for the person who has made outstanding contributions to the game and golf course architecture.

2005-2006 ASGCA officers include:

President: Tom Marzolf, Hendersonville, NC

Vice President: Greg Muirhead, Montclair, NJ

Treasurer: Steve Forrest, Toledo, OH

Secretary: Bruce Charlton, Palo Alto, CA

Immediate Past President: Bill Love, College Park, MD

Executive Secretary: Chad Ritterbusch, Brookfield, WI



REMODELING UNIVERSITY

APPENDIX II: ASGCA MEMBERSHIP DIRECTORY

William W. Amick (Fellow) *
PO Box 1984
Daytona Beach, FL 32115-1984
386-767-1449/F 767-4809
amick@iag.net
Web: www.amickgca.com

Brian Ault *
3821 Farragut Ave.
Kensington, MD 20895
301-942-0716/F 942-2871
bault@acagolf.com
Web: www.acagolf.com

Gary Roger Baird
4117 Hillsboro Rd., #260
Nashville, TN 37215
615-252-4307/F 252-4497
garyrogerbaird@globalgolfdesign.com

Michael Beebe
138 Palm Coast Pkwy NE, #128
Palm Coast, FL 32137
386-931-1202/F 446-6076
bbassociates@aol.com

Edward M. Beidel, Jr.
9123 Old Annapolis Rd., Rt. 108
Suite 207E
Columbia, MD 21045
410-707-5623/F 997-9480
beideldesign@att.net

Jan Beljan
17755 SE Federal Highway
Jupiter, FL 33469
561-746-4539/F 746-7503
jbeljan@faziodesign.com

Kevin Benedict
124 Summerfield Dr.
Ponte Vedra Beach, FL 32082
904-273-4480/F 904-543-8244
RKBtheGCA@msn.com

Mike Benkusky
1043 Abbey Drive
Crystal Lake, IL 60014
815-474-8385 (phone & fax)
mjbinfo@comcast.net
Web : www.mjbgolfdesign.com

Dave Bennett
16103 W. Dorman Dr.
Austin, TX 78717
512-327-2257/F 327-0171
daveasgca@earthlink.net

Bradford Benz
5965 Almaden Expressway, Ste. 210
San Jose, CA 95120
408-323-8010/F 323-8153

Cary Bickler
1220 Rosecrans St., #314
San Diego, CA 92106
619-223-3240/F 221-5999
cb@bickler.com
Web: www.bickler.com

James W. Blaukovitch
1770 Allentown Rd.
Quakertown, PA 18951
215-538-2900/F 538-5355
staff@jbadesigns.com
Web: www.jbadesigns.com

Fredrick C. Bliss
1689 Willowside Rd.
Santa Rosa, CA 95401
707-578-4273/F 578-5679

Glenn F. Boorman
PO Box 327
Braselton, GA 30517-0327
770-867-4480/F 867-0102
glenn@dgagolf.com
Web: www.dgagolf.com

William Boswell
4437 Pierwood Way
Evans, GA 30809
706-364-0049
boswellgolfdesign@knology.net

Jeffrey D. Brauer *
2225 E. Randol Mill Road, #210
Arlington, TX 76011
817-640-7275/F 649-2059
jeff@jeffreymbrauer.com
Web: www.jeffreymbrauer.com

Douglas A. Carrick
255 Duncan Mill Rd., #302
Don Mills, Ontario M3B 3H9
CANADA
416-447-6295/ F 447- 6334
doug@carrickdesign.com
Web: www.carrickdesign.com

Nai Chung "Lee" Chang
3370 Woodrow Way, NE
Atlanta, GA 30319
404-303-0477/F 256-4056
lchgolfarchitect@yahoo.com
Web: www.ncchanggolfdesign.com

S. Bruce Charlton
705 Forest Ave.
Palo Alto, CA 94301
650-475-0337/F 326-6190
bcharlton@rtj2.com
Web: www.rtj2.com

Thomas E. Clark *
7393 Locust Run Dr.
Marshall, VA 20115
(540) 364-7665
golfcoursesearch@direcway.com
Web: www.acagolf.com

Lloyd Clifton (Fellow)
118 W. Plymouth Av.
Deland, FL 32720
386-734-2321/F 734-2829
lclifton@cegolfdesign.com

Chris Cochran
11780 U.S. Highway One, Suite 500
North Palm Beach, FL 33408
561-626-3900/F 626-4104
chris.cochran@nicklaus.com

John Colligan
200 East Abrams
Arlington, TX 76010
817-543-2001/F 459-4286
colligangolf@sbcglobal.net

Chris Commins
7645 Gate Parkway, #201
Jacksonville, FL 32256
904-731-2323/F 731-2699
chris@bashamlucas.com
Web: www.bashamlucas.com

Bill Coore
1800 Nueces St.
Austin, TX 78701
512-477-5441/F 473-2447
sayers@bencrenshaw.com
Web: bencrenshaw.com/candc.html

***ASGCA Past President**



REMODELING UNIVERSITY

Geoffrey S. Cornish (Fellow) *
Fiddler's Green, 1030 SE St.
Amherst, MA 01002
413-253-3913/F 508-278-6757
csmgolf@net1plus.com
Web: www.csmgolf.com

Robert E. Cupp
5457 Roswell Rd., #103
Atlanta, GA 30342
404-847-0070/F 847-9930
cuppsgn@aol.com
Web: www.cuppsgn.com

Brian Curley
8180 N. Hayden Rd., #D-200
Scottsdale, AZ 85258
480-483-1994/F 483-6292
info@schmidt-curley.com
Web: www.schmidt-curley.com

David M. Dale
2880 Cleveland Ave., #1
Santa Rosa, CA 95403
707-526-7190/F 576-1823
golfplan@golfplan.com
Web: www.golfplan.com

Michael Dasher
825 Greens Ave.
Winter Park, FL 32789-3344
407-645-3446/F 645-4525
dashgolf@aol.com
Web: www.dashergolf.com

Alice Dye (Fellow) *
3247 Polo Drive
Delray Beach, FL 33483
561-276-9728/F 276-0162
Web: www.dyedesigns.com

Kenneth Dye, Jr.
2000 S. Dairy Ashford, #210
Houston, TX 77077
281-496-4300/F 496-4303
fdsi@fingerdyespann.com
Web: www.fingerdyespann.com

P.B. Dye
12773 West Forest Hill, # 1201
Wellington, FL 33414
561-790-6733/F 795-0579

Perry Dye
5500 East Yale Ave.
Denver, CO 80222
303-759-5353/F 691-0607
dyedesigns@aol.com
Web: www.dyedesigns.com

Pete Dye (Fellow) *
3247 Polo Drive
Delray Beach, FL 33483
561-276-9728/F 276-0162
Web: www.dyedesigns.com

Lindsay B. Ervin
1686 Village Green, #204
Crofton, MD 21114
410-793-0310/F 721-7088
lbe@lbegolfcoursedesign.com
Web: www.lbegolfcoursedesign.com

Keith E. Evans
PO Box 285
Montclair, NJ 07042
973-744-4031/F 744-1044
rjonesinc@aol.com
Web: www.reesjonesinc.com

Floyd Farley (Fellow) *
55 Cathedral Rock Dr., #45
Sedona, AZ 86351
928-284-9616

Thomas Fazio
17755 SE Federal Highway
Jupiter, FL 33469
561-746-4539/F 746-7503
tfazio@faziodesign.com

Steven P. Forrest
7351 W. Bancroft St.
Toledo, OH 43615
419-841-8553/F 841-9600
spforrest@arthurhills.com
Web: www.arthurhills.com

Keith R. Foster
2585 N. Middletown Rd.
Paris, KY 40361
859-362-4169/F 362-4170
keithfosterdesign@msn.com

John Fought
5010 E. Shea Blvd., Ste #A-217
Scottsdale, AZ 85254
480-991-9858/F 991-5244
john@foughtdesign.com
Web: www.foughtdesign.com

Timothy Freeland
12021 Sunowa Spring Trail
Bryceville, FL 32009
904-879-0626/F 321-985-0209
tim@freelandgolf.com
Web: www.freelandgolf.com

Dana Fry
1270 Old Henderson Rd.
Columbus, OH 43220
614-457-9955/F 457-2250
dfryasgca@aol.com
Web: www.hurdzanfry.com

Les Furber
PO Box 8160
Canmore, Alberta T1W 2T9
CANADA
403-678-4803/F 678-5461
gdsgolf@telusplanet.net
Web: www.gdsgolf.ca

Ferdinand Garbin (Fellow) *
176 George Rd.
Export, PA 15632-9415
724-327-4704/F 325-2603
fandjgarbin@cs.com

Stan Gentry
PO Box 270392
St. Louis, MO 63122
314-843-2425/F 843-2429
stangentry@hotmail.com

Garrett Gill
122 N. Second St.
River Falls, WI 54022
715-425-9511/F 425-2962
garrett@gilldesigninc.com
Web: www.gilldesigninc.com

Michael E. Gleason
PO Box 4117
Pinehurst, NC 28374-4117
910-695-0778/F 235-9010
mgleason2@nc.rr.com



REMODELING UNIVERSITY

David W. Gordon (Fellow) *
626 Matthews Ave.
New Britain, PA 18901
215-345-1240
created18s@aol.com

Denis Griffiths *
PO Box 327
Braselton, GA 30517-0327
770-867-4480/F 867-0102
denis@dgagolf.com
Web: www.dgagolf.com

John F. Harbottle III
105 Country Club Circle SW
Tacoma, WA 98498
253-582-8058/F 582-8059
harbottledesign@mindspring.com

Jeff D. Hardin (Fellow)
PO Box 3825
Wickenburg, AZ 85358-3825
928-684-0525/F 684-0526

A. John Harvey
One Evergreen Place
PO Box 1927
Morristown, NJ 07962-1927
973-898-0300/F 898-9472
jharvey@rbagroup.com
Web: www.rbagroup.com

Neil Haworth
55 Caza Blvd.
Notre Dame Ile Perrot, Quebec
J7V 8P6
CANADA
514-887-9818/F 425-6806
nhaworth@nelsonhaworth.com
Web: www.nelsonhaworth.com

Ray Hearn
PO Box 2907
Holland, MI 49422
616-399-7686/F 399-7687
ray@rhgd.com
Web: www.rhgd.com

David Heatwole
624 Berkshire Dr.
State College, PA 16803
814-867-0322/F 867-8861
dave@heatwolegolf.com
Web: www.heatwolegolf.com

Don Herfort (Fellow)
10631 James Circle
Bloomington, MN 55431
952-881-8060
herforts@aol.com

Arthur Hills (Fellow) *
7351 W. Bancroft
Toledo, OH 43615
419-841-8553/F 841-9600
ahills@arthurhills.com
Web: www.arthurhills.com

Mark Hollinger
1513 Folger Dr.
Belmont, CA 94002
650-620-9670/F 620-9707
kahuna54@hotmail.com
Web: www.jmpgolf.com

Brian Huntley
4320 Mayfair Rd.
Uniontown, OH 44685
330-699-6409 (phone & fax)

Dr. Michael Hurdzan *
1270 Old Henderson Rd.
Columbus, OH 43220
614-457-9955/F 457-2250
mjh@hurdzanfry.com
Web: www.hurdzanfry.com

Richard Jacobson
1590 S. Milwaukee Ave., #101
Libertyville, IL 60048
847-918-1361/F 918-1374
rick@jacobsongolfcoursedesign.com
www.jacobsongolfcoursedesign.com

Tom Johnson
1759 Centinela Ave.
Santa Monica, CA 90404
310-828-6381
tjohnson@tsjgolf.com
Web: www.tsjgolf.com

Clyde B. Johnston *
31 McIntosh Rd.
Hilton Head Island, SC 29926
843-342-6335/F 775-860-5349
clyde@clydejohnston.com
Web: www.clydejohnston.com

Rees Jones*
PO Box 285
Montclair, NJ 07042
973-744-4031/F 744-1044
rjonesinc@aol.com
Web: www.reesjonesinc.com

Robert Trent Jones, Jr. *
705 Forest Ave.
Palo Alto, CA 94301
650-475-0333/F 326-3090
bjones@rtj2.com
Web: www.rtj2.com

Kenneth M. Kavanaugh
3920 N. River Bluff Place
Tucson, AZ 85750
520-323-8232/F 577-0874
info@kenkavanaugh.com
Web: www.kenkavanaugh.com

Stephen Kay
665 St. Andrews
Egg Harbor, NJ 08215
609-965-3093/F 965-9174
stephengkolf@aol.com

William A. Kerman
1270 Old Henderson Rd.
Columbus, OH 43220
614-457-9955/F 457-2250
bkerman@hurdzanfry.com
Web: www.hurdzanfry.com

Ronald L. Kern
12716 Wembly Rd.
Carmel, IN 46033-2473
317-580-9083
rkern@indy.net
Web: www.ronkerngolfarch.com

Ken Killian (Fellow) *
66 Brentwood Dr.
Palatine, IL 60074
847-358-8884/F 358-8945
Web: www.killiandesign.com

Ronald Kirby (Fellow)
530 E. Tall Oaks Dr.
Palm Beach Gardens, FL 33410
561-776-6434/F 776-6435
kirbyron@bellsouth.net



REMODELING UNIVERSITY

Donald Knott *
1951 Landings Dr.
Mountain View, CA 94043
650-968-9036/F 968-8411
don@knottbrookslinn.com
Web: www.knottbrookslinn.com

John LaFoy *
521 Blacks Rd.
Greenville, SC 29615
864-458-9073 (phone & fax)
linksmkr@aol.com

Erik T. Larsen
PO Box 1639
Ponte Vedra Beach, FL 32004-1639
904-285-3960/F 285-2119
erik@palmerdesign.com
Web: www.palmerdesign.com

Greg Letsche
11780 U.S. Highway One, Suite 500
North Palm Beach, FL 33408
561-227-0300/F 227-0548
greg.letsche@nicklaus.com
Web: www.nicklaus.com

Timothy Liddy
301 S. Pinehurst
Yorktown, IN 47396-9346
765-759-8697 (phone & fax)
timliddy@comcast.net
Web: www.timliddy.com

Gary Linn
1951 Landings Dr.
Mountain View, CA 94043
650-968-9036/F 968-8411
gary@knottbrookslinn.com
Web: www.knottbrookslinn.com

James W. Lipe, Jr.
10745 Ty Dr.
Shreveport, LA 71106
318-797-1700/F 797-1018
jimlipedesign@aol.com
Web: www.jimlipedesign.com

Robert M. Lohmann *
18250 Beck Rd.
Marengo, IL 60152
815-923-3400/F 923-3662
blohmann@lohmann.com
Web: www.lohmann.com

Bill Love *
7309 Baltimore Ave., Suite 215
College Park, MD 20740
301-345-1510/F 345-1515
wrl215@gte.net

Charles M. Mahannah, Jr.
(Fellow)
9309 SE Woodcrest Place
Hobe Sound, FL 33455
561-241-8131/F 241-5182

Dan Maples *
PO Box 1666
Pinehurst, NC 28370-1666
910-295-3437/F 295-3728
danmaples@danmaples.com
Web: www.danmaples.com

Victoria W. Martz
PO Box 1639
Ponte Vedra Beach, FL 32004-1639
904-285-3960/F 285-2119
vicki@palmerdesign.com
Web: www.palmerdesign.com

Thomas A. Marzolf
401 N. Main St., #400
Hendersonville, NC 28792
828-693-0052/F 693-0071
tmarzolf@faziodesign.com

Jerry Matthews (Fellow) *
2510 Kerry St., #108
Lansing, MI 48912
517-485-0480/F 485-0334
jerry@naturalcoursedesign.com
Web: www.naturalcoursedesign.com

W. Bruce Matthews III
PO Box 382
Okemos, MI 48805-0382
517-339-9700/F 333-3600
bruce@matthewsgolf.org
Web: www.matthewsgolf.org

Thomas McBroom
120 Carlton St., #305
Toronto, Ontario M5A 2K1
CANADA
416-967-9329/F 967-7105
thomas@thomasmcbroom.com
Web: www.thomasmcbroom.com

Mark McCumber
PO Box 7879
Jacksonville, FL 32238-7879
904-571-8274
markmccumber@aol.com

Harrison G. Minchew
PO Box 1639
Ponte Vedra Beach, FL 32004-1639
904-285-3960/F 285-2119
harrison@palmerdesign.com
Web: www.palmerdesign.com

Robert W. Moore, Jr.
614 Morgan Creek Rd.
Chapel Hill, NC 27514
919-960-4302/F 960-4303
deaconbob@hotmail.com
Web: www.jmpgolf.com

David L. Moote
14 Smithers Crescent
Brampton, Ontario L6Y 3L3
CANADA
905-454-5222/F 454-5589
david@mootegolfarchitects.com
Web: www.mootegolfarchitects.com

Robert F. Moote (Fellow)
38 Roberts Crescent
Brampton, Ontario L6W 1G8
CANADA
905-451-3952/F 454-5589
bob@mootegolfarchitects.com
Web: www.mootegolfarchitects.com

Jay Morrish *
5408 Sun Meadow Drive
Flower Mound, TX 75022
817-430-1235/F 430-2441
jaymorrish@comcast.net
Web: www.jaymorrish.com

Gregory B. Muirhead
PO Box 285
Montclair, NJ 07042-0285
973-744-4031/F 744-1044
gbmrji@aol.com
Web: www.reesjonesinc.com

Mark A. Mungam
207 N. Main St.
Uxbridge, MA 01569
508-278-3407/F 278-6757
csmgolf@net1plus.com
Web: www.csmgolf.com



REMODELING UNIVERSITY

Jeffrey Myers
1258 Pebble Ridge Lane
West Palm Beach, FL 33411
561-753-8822/F 753-0950
jcmgroup@bellsouth.net

Greg H. Nash
41426 N. Cedar Chase Court
Anthem, AZ 85086
623-551-8343/F 551-8789
swinebroad@aol.com
Web: www.gregnashdesign.com

Eric Nelson
2225 E. Randol Mill Rd., #218
Arlington, TX 76011
817-640-7275/F 649-2059
enelson@jeffreymbrauer.com
Web: www.jeffreymbrauer.com

Robin Nelson
106 Valley Circle
Mill Valley, CA 94941
415-381-1266/F 381-1207
rngca@mindspring.com

Jack W. Nicklaus
11780 U.S. Highway One
North Palm Beach, FL 33408
561-626-3900/F 626-4104

Jack Nicklaus II
11780 U.S. Highway One
North Palm Beach, FL 33408
561-626-3900/F 626-4104

Richard P. Nugent (Fellow) *
9902 E. Crystal Dr.
Sun Lakes, AZ 85248
480-883-9844 (phone & fax)
dcnuge@aol.com

Timothy P. Nugent
2062 N. Broadmoor Lane
Vernon Hills, IL 60061
847-680-0482/F 680-8659
nugentgolf@sbcglobal.net
Web: www.nugentgolf.com

E. Lawrence Packard (Fellow)
36750 U.S. Highway 19 North
Apt. 3453
Palm Harbor, FL 34684
727-938-7522

Arnold Palmer (Fellow)
PO Box 1639
Ponte Vedra Beach, FL 32004
liz@palmerdesign.com
Web: www.palmerdesign.com

Gary Panks
4856 E. Cheryl Dr.
Paradise Valley, AZ 85253
480-563-7175/F 563-0011
garyp@garypanks.com
Web: www.garypanks.com

Damian V. Pascuzzo *
4990 Hillsdale Circle, Suite B
El Dorado Hills, CA 95762
916-941-8692/F 941-8693
dpascuzzo@gravespascuzzo.com
Web: www.gravespascuzzo.com

Richard M. Phelps *
PO Box 3295
Evergreen, CO 80437-3295
303-670-0478/F 670-3518
dick@phelpsgolfdesign.com
Web: www.phelpsgolfdesign.com

Rick Phelps
PO Box 3295
Evergreen, CO 80439-3295
303-670-0478/F 670-3518
rick@phelpsgolfdesign.com
Web: www.phelpsgolfdesign.com

Kyle D. Phillips
5930 Granite Lake Dr., Suite 170
Granite Bay, CA 95746
916-797-2141/F 797-2151
kyle@kylephillips.com
Web: www.kylephillips.com

Gerald W. Pirkel
33752 Bridgehampton Dr.
Dana Point, CA 92629-2186
949-248-7098 (phone & fax)

J. Michael Poellot
18860 Bella Vina
Saratoga, CA 95070
408-867-3260/F 867-3534
jmichael@poellotgolfdesigns.com

Algie M. Pulley, Jr.
1190 Glen Rd.
Lafayette, CA 94549
925-284-9214/F 283-5120

David Rainville
100 W. Main St., # 11
Tustin, CA 92780
714-838-7200/F 838-4115
rainvillebye@earthlink.net

Mark F. Rathert
1301 E. Green Meadow Lane
Greenwood Village, CO 80121
303-794-2400/F 794-2495
mark@rathertgolfdesign.com

Andrew Raugust
4170 Yacht Harbor Drive
Stockton, CA 95204
209-942-1200 (phone & fax)

Forrest Richardson
2337 E. Orangewood Ave.
Phoenix, AZ 85020
602-906-1818/F 674-3530
forrest@golfgroupltd.com
Web: www.golfgroupltd.com

Richard Robbins
100 Parkthrough St.
Cary, NC 27511
919-319-1004/F 319-1605
rick@robbinsgolf.com
Web: www.robbinsgolf.com

Cabell B. Robinson
9 Harris St.
Marblehead, MA 01945
781-631-5927
golf@cabellgolf.com

Ted Robinson (Fellow) *
361 Forest Ave., #200
Laguna Beach, CA 92651
949-376-7002/F 376-7029
kristi@golfdesign.com
Web: www.robinsongolf.com

Drew Rogers
7351 W. Bancroft
Toledo, OH 43615
419-841-8553/F 841-9600
drogers@arthurhills.com
Web: www.arthurhills.com

Roger G. Rulewich
160 Purple Meadow Rd.
Bernardston, MA 01337
800-465-3668/F 413-648-0211
info@rrulewich.com



REMODELING UNIVERSITY

John Sanford, Jr.
1851 W. Indiantown Rd., #100
Jupiter, FL 33458
561-743-1897/F 743-1899
mail@sanford-golf.com
Web: www.sanford-golf.com

George F. Sargent, Jr.
375 Prospect St.
Franklin, NH 03235
603-934-3230/F 934-3300
golfdesign@metrocast.net
Web: www.golfdesign.net

Art Schaupter
59 Willow Brook Dr.
St. Louis, MO 63146
314-997-6229/F 997-7704
schaupetere@aol.com
Web: www.schaupeteregolf.com

Daniel J. Schlegel
169 Antiqua Place
Edgewater, MD 21037
443-203-0020/F 203-0021
dschlegel@verizon.net

Lee E. Schmidt
8180 N. Hayden Rd., #D-200
Scottsdale, AZ 85258
480-483-1994/F 483-6292
info@schmidt-curley.com
Web: www.schmidt-curley.com

Craig Schreiner
14695 S. Inverness St.
Olathe, KS 66061
913-856-3800/F 856-3822
cschreiner@csgolf.com
Web: www.csgolf.com

Ed Seay *
PO Box 1639
Ponte Vedra Beach, FL 32004-1639
904-285-3960/F 285-2119
ed@palmerdesign.com
Web: www.palmerdesign.com

Brian Silva
207 N. Main St.
Uxbridge, MA 01569
508-278-3407/F 278-6757
csmgolf@net1plus.com
Web: www.csmgolf.com

Steven R. Smyers
2622 W. Memorial Blvd.
Lakeland, FL 33815
863-683-6100/F 683-5888
ssgca@aol.com

William J. Spear (Fellow)
16 N. First Ave.
St. Charles, IL 60174
630-584-8200/F 584-8233
Web: www.wjspear.com

John Steidel
PO Box 6566
Kennewick, WA 99336
509-582-6706/F 582-6303
jrsteidel@aol.com

William G. Teufel (Fellow)
13102 N.E. 146th St.
Woodinville, WA 98072
425-821-8401

Robert C. Walker
PO Box 331066
Atlantic Beach, FL 32233-1066
904-241-3500/F 249-5733
rcwalkergolf@comcast.net
Web: www.walkergolfcoursedesign.com

Robert Weed
PO Box 328
Ponte Vedra Beach, FL 32004
904-249-3005/F 249-0019
bweed@bobbyweed.com
Web: www.bobbyweed.com

Steve Weisser
PO Box 285
Montclair, NJ 07042-0285
973-744-4031/F 744-1044
rjonesinc@aol.com
Web: www.reesjonesinc.com

David Whelchel
1270 Old Henderson Rd.
Columbus, OH 43220
614-457-9955/F 457-2250
dwhelchel@hurdzanfry.com
Web: www.hurdzanfry.com

Christopher Wilczynski
7351 W. Bancroft
Toledo, OH 43615
419-841-8553/F 841-9600
cwilczynski@arthurhills.com
Web: www.arthurhills.com

George Williams
34 Fairway Oaks Blvd., #200
Abilene, TX 79606
325-695-0220/F 691-0392
wga-golf@abilene.com
Web: www.abilene.com/wga

Shane Witcombe
501 N. Highway A1A
Jupiter, FL 33477
561-473-8818 /F 743-8831
Shane.witcombe@gwse.com
Web: www.gngcd.com

Philip A. Wogan (Fellow)
17 Walker Rd.
Topsfield, MA 01983
978-887-3672/F (call first)
pwgolfdesign@aol.com
Web: www.golfdesign.net

Rodney Wright
350 Ward Ave., #106
Honolulu, HI 96814
808-591-7911/F 596-0940
writgolf@pacific.net.sg

Brian Yoder
7351 W. Bancroft St.
Toledo, OH 43615
419-841-8553/F 841-9600
byoder@arthurhills.com
Web: www.arthurhills.com



REMODELING UNIVERSITY

APPENDIX III: ASGCA ASSOCIATE MEMBERSHIP DIRECTORY

Paul Albanese
3121 Rochester Road
Royal Oak, MI 48073
248-435-0142/F 435-2259
paul@golf-designs.com
Web: www.golf-designs.com

Ian Andrew
255 Duncan Mill Rd., Suite 302
Don Mills, Ontario M3D 3H9
CANADA
416-447-6295/F 447-6334
ian@carrickdesign.com

Richard Baril
17823 Theiss Mail Rt.
Spring, TX 77379
281-376-8282/F 251-4151
rbaril@vonhagge.com

Stephen R. Burns
5449 Marsh View Lane
Fernandina Beach, FL 32034-5445
904-277-4474/F 261-7005
steve@burnsgolf.com
Web: www.burnsgolf.com

Ty Butler
10700 Sikes Place, Suite 370
Charlotte, NC 28277
704-845-9840/F 846-4832
tbutler@rtj2.com

George Clifton
118 W. Plymouth Av.
Deland, FL 32720
386-734-2321/734-2829
gclifton@cfl.rr.com

Brian E. Costello
1513 Folger Dr.
Belmont, CA 94002
650-620-9670/F 620-9707
brian.costello@mindspring.com
Web: jmpgolf.com

Paul Cowley
100 Brunswick Ave.
St. Simons Island, GA 31522
912-638-7050/F 638-7728
cowley@bellsouth.net

Todd Eckenrode
17500 Red Hill Ave., #230
Irvine, CA 92614
949-476-6878/F 476-6875
todd@originsgolfdesign.com
Web: www.originsgolfdesign.com

Kenneth Ezell
118 W. Plymouth Av.
Deland, FL 32720
386-734-2321/F 734-2829
kaddy99@aol.com

Alan Hamilton
PO Box 600398
Jacksonville, FL 32260
904-287-4416/F 287-4810
alanhdc@comcast.net
Web: hamiltondesignco.com

Gil Hanse
9 Tiburon Ln.
Malvern, PA 19355
610-651-2977/F 651-2982
contact@hansegolfdesign.com

Grant Haserot
8180 N. Hayden Rd., Suite D-200
Scottsdale, AZ 85258
480-483-1994/F 483-6292
ghaserot@schmidt-curley.com
Web: www.schmidt-curley.com

Jeff Lawrence
3930 RCA Blvd., Suite 3001
Palm Beach Gardens, FL 33410-4214
561-624-0300/F 624-0304
jeff@garyplayer.com

Jeffrey Lucovsky
7502 Plantation Bay Dr.
Jacksonville, FL 32244
904-778-8333/F 778-1860
jeff.lucovsky@mccumbergolf.com

Brian Lussier
100 Parkthorough St.
Cary, NC 27511
919-319-1004/F 319-1605
brian@robbsingolf.com
Web: www.robbsingolf.com

Greg Martin
335 N. River Street, Suite 201
Batavia, IL 60510
630-482-2532/F 482-2536
g-martin@mdpltd.com
Web: www.mdpltd.com

Neal Meagher
4457 Linda Way
Pleasanton, CA 94566
925-417-7513/F 417-7514
nmgolf@pacbell.net
Web: www.nealmeaghergolf.com

Lewis "Chip" Powell
6603 Cooper's Hawk Ct.
Brandenton, FL 34202
941-752-6657/F 756-0422
chip@powellgolf.com
Web: www.powellgolf.com

Scot Sherman
PO Box 328
Ponte Vedra, FL 32004
904-249-3005/F 249-0019
ssherman@bobbyweed.com
Web: www.bobbyweed.com

Michael Smelek
17823 Theiss Mail Rt.
Spring, TX 77379
281-376-8282/F 251-4151
msmelek@vonhagge.com

Brit Stenson
1360 E. 9th St., Suite 100
Cleveland, OH 44114
216-522-1200/F 522-1145
bstenson@imgworld.com
Web: www.hansegolfdesign.com

Gary Stephenson
12590 Amen Corner
Celina, TX 75009
972-382-3811/F 382-8210
gastep@earthlink.net

Jason Straka
1270 Old Henderson Road
Columbus, OH 43220
614-457-9955/F 457-2250
jstraka@hurdzanfry.com

Ray Wiltse
PO Box 1234
Ponte Vedra Beach, FL 32004
904-910-6738/F 821-7904
cwiltse@cybermax.net



REMODELING UNIVERSITY

APPENDIX IV: ASGCA PUBLICATIONS

To assist those interested in building a new course or remodeling an existing one, the American Society of Golf Course Architects distributes a variety of publications. These include:

- *Master Planning: Questions & Answers*
- *Golf Course Development: Questions & Answers*
- *Printed Membership List*
- *The Golf Course Remodeling Process: Questions & Answers*
- *Sample Request For Proposal*
- *Selecting Your Golf Course Architect*

To obtain one of these free publications, send a stamped, self-addressed 9x12 envelope ASGCA, specifying the publication needed.

The following books may also be ordered through the Society:

- *An Environmental Approach to Golf Course Development* by Bill Love (\$15)
- *Building a Practical Golf Facility: A Step-by-Step Guide to Realizing a Dream* by Dr. Michael J. Hurdzan (\$10)

To obtain one of these books, send a check to cover the cost of the copies you need.

American Society of Golf Course Architects

125 N. Executive Dr., Suite 106
Brookfield, WI 53005
262-786-5960(ph) 262-786-5919(fax)
email: info@asgca.org
Website: www.asgca.org



REMODELING UNIVERSITY

APPENDIX V: ALLIED ASSOCIATIONS OF GOLF

The Allied Associations of Golf can be contacted for further information on the golf industry.

American Society of Golf Course Architects

125 N. Executive Drive, Suite 106
Brookfield, WI 53005
262-786-5960 (phone)
262-786-5919 (fax)
info@asgca.org (e-mail)
www.asgca.org (Web site)

Club Managers Association of America

1733 King St.
Alexandria, VA 22314
703-739-9500 (phone)
703-739-0124 (fax)
cmaa@cmaa.org (E-mail)
www.cmaa.org (Web site)

Golf Course Builders Association of America

727 "O" Street
Lincoln, NE 68508
402-476-4444
402-476-4489
staff@gcbaa.org (E-mail)
www.gcbaa.org (Web site)

Golf Course Superintendents Association of America

1421 Research Park Dr.
Lawrence, KS 66049
800-472-7878 (phone)
841-832-4488 (fax)
mail@gcsaa.org (E-mail)
www.gcsaa.org (Web site)

Ladies Professional Golf Association

100 International Golf Drive
Daytona Beach, FL 32124-1092
904-274-6200 (phone)
904-274-1099 (fax)

National Golf Course Owners Association

291 Seven Farms Drive, 2nd Floor
Charleston, SC 29492
843-881-9956
843-881-9958
info@ngcoa.org (E-mail)
www.ngcoa.org (Web site)

National Golf Foundation

1150 South U.S. Highway One, Ste. 401
Jupiter, FL 33477
561-744-6006 (phone)
561-744-6107 (fax)
ngf@ngf.org (E-mail)
www.ngf.org (Web site)

PGA of America

100 Avenue of Champions
Palm Beach Gardens, FL 33418
561-624-8400 (phone)
561-624-7865 (fax)
info@pga.com (E-mail)
www.pga.com (Web site)

PGA Tour

112 TPC Blvd., Sawgrass
Ponte Vedra Beach, FL 32082
904-285-3700 (phone)
904-285-2460 (fax)
info@pgatour.com (E-mail)
www.pgatour.com (Web site)

United States Golf Association

Golf House
Far Hills, NJ 07931
908-234-2300 (phone)
908-234-9687 (fax)
usga@usga.org (E-mail)
www.usga.org (Web site)



REMODELING UNIVERSITY

APPENDIX VI: SUGGESTED REFERENCES

OVERVIEW OF GOLF

- Bartlett, Michael, and Tony Roberts. The Golf Book. New York: Arbor House, 1980.
- Braid, James. Advanced Golf. London: Metheun, 1908.
- Cornish, Geoffrey S. Eighteen Stakes on a Sunday Afternoon: A Chronicle of North American Golf Course Architecture. Worcestershire, UK: Grant Books, 2002.
- Cornish, Geoffrey S. and Whitten, Ronald E. The Architects of Golf. New York City: Harper Collins Publishers, 1993.
- Darwin, Bernard. The Golf Courses of Great Britain. London: Jonathon Cape Ltd.
- Darwin, Bernard. The Golf Courses of the British Isles. London: Duckworth & Co., 1910, and Stamford, CT: Classics of Golf, 1988.
- Doak, Thomas. The Confidential Guide to Golf Courses. Chelsea, Mich.: Sleeping Bear Press, 1996.
- Dobereiner, Peter. The Glorious World of Golf. New York: McGraw-Hill, 1973.
- Dye, Alice. From Birdies to Bunkers. New York, N.Y.: HarperResource, 2004.
- Fazio, Tom. Golf Course Designs. New York, N.Y.: Harry N. Abrams, Inc., 2000.
- Golf Facilities in the United States. Jupiter, Florida: National Golf Foundation, 1998 edition.
- Golf Participation in the United States. Jupiter, Florida: National Golf Foundation, 1998 edition.
- Gordon, John. The Great Golf Courses of Canada. Willowdale, Ontario, Canada: Firefly Books, 1993. With photography by Michael French.
- Graffis, Herb. The PGA. New York: Thomas Y. Crowell, 1975.
- Hoffman, Davy. America's Greatest Golf Courses. New York, N.Y.: The Image Bank, 1987.
- Jenkins, Dan. The Best 18 Holes in America. New York: Delacorte Press, 1966.
- Jones, Robert Tyre. Golf Is My Game. Garden City, N.Y.: Doubleday, 1960.
- Low, John L. Concerning Golf. London: Hodder and Stoughton, 1903, and Far Hills, N.J.: USGA Rare Book Collection, 1987.
- Kato, Shunsuke. What Makes a Good Golf Course Good. Tokyo: Kato International Design, 1990.
- Macdonald, Charles Blair. Scotland's Gift GOLF. New York: Charles Scribners Sons, 1928, and Stamford, CT: Classics of Golf, 1985.
- Mackenzie, Alister. The Spirit of St. Andrews. Chelsea, Mich.: Sleeping Bear Press, 1995.
- Mulvoy, Mark, and Art Spander. Golf: The Passion and the Challenge. New York: Rutledge Books, 1977.
- Murdoch, Joseph F. Golf, A Guide to Information Sources. Detroit: Gale Research Co., 1979.
- Murdoch, Joseph F. The Library of Golf 1743-1966. Detroit: Gale Research Co., 1968. Supplement 1978.
- Ouimet, Francis (ed.). The Rules of Golf. Garden City, N.Y.: Garden City Publishing Co., 1948.
- Price, Charles. The World of Golf. New York: Random House, 1962.
- Ryde, P., Steel, D.M.A. and Wind, Herbert W. Encyclopedia of Golf. New York: Viking Press, 1975.
- Sheehan, Lawrence. A Passion for Golf. New York: Clarkson Potter, 1994.
- Sutton, Martin H.F., (ed.). The Book of the Links. London: W.H. Smith 7 Sons, 1912.
- Taylor, Dawson. St. Andrews, Cradle of Golf. London: A.S. Barnes & Co., 1976.



HISTORY OF GOLF

- Barclay, James A. Golf in Canada: A History. Toronto: McLelland and Stewart, 1992.
- Browning, Robert. A History of Golf. New York: E.P. Dutton, 1955.
- Clark, Robert. Golf: A Royal and Ancient Game. London: MacMillan, 1899.
- Colville, George M. Five Open Champions and the Musselburgh Golf Story. Musselburgh, Scotland: colville Books, 1980.
- Cousins, Geoffrey. Golf in Britain. London: Routledge and Kegan Paul, 1975.
- Darwin, Bernard; Campbell, Sir Guy and Others. A History of Golf in Britain. London: Cassel & Co., Ltd., 1952.
- Elliot, Len, and Barbara Kelly. Who's Who in Golf. New Rochelle, N.Y.: Arlington House Publishers, 1976.
- Farley, G.A. Golf Course Commonsense. Cleveland Heights, Ohio: Farley Libraries, 1931.
- Grimsley, Will. Golf: Its History, People, and Events. Englewood Cliffs, N.J.: Prentice-Hall, 1966.
- Hamilton, Edward A. (ed.), and Charles Preston (ed.). Golfing America. Garden City, N.Y.: Doubleday & Company, Inc., 1958. With text by Al Laney.
- Harris, Robert. Sixty Years of Golf. London: The Batchworth Press.
- Hawtree, Fred. Aspects of Golf Course Architecture: I 1889-1924. Worcestershire: Grant Books, 1998.
- Hurdzan, Dr. Michael J. Golf Greens: History, Design, and Construction. Hoboken, N.J.: John Wiley & Sons, Inc., 2004.
- Klein, Bradley S. Discovering Donald Ross. Mich.: Sleeping Bear Press, 2001.
- Kroeger, Robert. The Golf Courses of Old Tom Morris. Cincinnati, Ohio: Heritage Communications, 1995.
- Mahoney, Jack. The Golf History of New England. Weston, Mass.: New England Golf, 1995.
- Martin, H.B. Fifty Years of American Golf. New York: Dodd, Mead & Co., 1936.
- Rathbun, Mickey. Double Doglegs and Other Hazards. Kernersville, N.C.: Airlie Hall Press, 2002.
- Robertson, James K. St. Andrews – Home of Golf. St. Andrews, Fife, Scotland: J & G Innes, 1967.
- Tufts, Richard S. The Scottish Invasion. Pinehurst, N.C.: Pinehurst Publishers, 1962.
- United States Golf Association. Golf: The Greatest Game. New York: Harper Collins, 1994.
- Ward-Thomas, Pat. The Royal and Ancient. Edinburgh: Scottish Academic Press, 1980.
- Wind, Herbert W. The Story of American Golf. New York: Alfred A. Knopf, 1948 (1st ed.), 1956 (2nd ed.), 1975 (3rd ed.).

PLANNING, DESIGN AND CONSTRUCTION OF GOLF COURSES

- Access, EPA. Washington, DC: US Environmental Protection Agency, EPA/MSD- 100, 1991.
- Bahto, George. The National School of Design. Chelsea, Mich.: Sleeping Bear Press, 1997. Chelsea, Mich.: Lewis Publishers, 1993.
- Bauer, Alek. Hazards: Those Essential Elements in a Golf Course Without Which the Game Would be Tame and Uninteresting. Chicago: Tony Rubovitis, 1913, and Droitwich, Worcestershire, England: Grant Books, 1993.
- Beard, James B. and Green, Robert L. The Role of Turfgrasses in Environmental Protection and Their Benefits to Humans. *Journal of Environmental Quality*, 1994. Vol. 23(3): pp. 452-460.



REMODELING UNIVERSITY

Choate, Richard S. Turf Irrigation Manual. 5th ed. Dallas, Texas: Telasco Industries, 1994. (Available through the Irrigation Association, Fairfax, Virginia)

Colt, H.S. and Alison, C.H. Some Essays on Golf Course Architecture. Victoria Square, Droitwich, Worcestershire: Grant Books, 1990.

Cornish, Geoffrey S. and Robert Muir Graves. Golf Course Design. New York: John Wiley & Sons, 1998.

Cornish, Geoffrey, and Ronald E. Whitten. The Golf Course. New York: Rutledge Press, 1981, 1982, 1984, 1987, and Stamford, CT: Classics of Golf, 1989.

Doak, Thomas. The Anatomy of a Golf Course. New York: Lyons and Burford, 1992.

Dye, Pete, with Mark Shaw. Bury Me in a Pot Bunker. New York: Addison-Wesley, 1995.

Elliot, Mal. Perry Maxwell's Prairie Dunes. Chelsea, Mich.: Sleeping Bear Press, 2002. With photography by John R. Johnson.

Environmental Concerns. Jupiter, Florida: National Golf Foundation, NGF Overview (NGO09), 1991.

Environmental Desk References: Siting and Development. Jupiter, Florida: National Golf Foundation, 1994 (99GCP41).

Environmentally Friendly Golf Courses. Jupiter, Florida: National Golf Foundation, 1996 (99LB035).

Gimmy, A.E., and M.E. Benson. Golf Courses and Country Clubs: A Guide to Appraisal, Market Analysis, Development and Financing. Chicago: Appraisal Institute, 1992.

Golf Course Design, 2nd ed. Jupiter, Florida: National Golf Foundation, 1998 (99LB021).

Grant, Donald. Donald Ross of Pinehurst and Royal Dornoch. Golspie, Scotland: The Sutherland Press, 1973.

Ground Water Quality Protection. Univ. of OK.: Lewis Publishers, Inc., 1990.

Guide to Estimating Cost for Golf Course Construction. Chapel Hill, North Carolina: Golf Course Builders Association of America, 1996. Revised edition 1998.

Guidelines for Planning and Building a Golf Course. Jupiter, Florida: National Golf Foundation, Executive Summaries (GC-001), 1991.

Harker, D., S. Evans, M. Evans and K. Harker. Landscape Restoration Handbook. Boca Raton, Fla.: Lewis Publishers, not dated.

Hawtree, Fred W. The Golf Course. Planning, Design, Construction and Maintenance. London: E. and F.S. Spon, 1983; reprinted 1985, 1989, 1990, 1992, and completely revised in 1996 in collaboration with golf architect Martin Hawtree.

---Colt & Co. Golf Course Architects. Woodstock, Oxford, England: Cambuc Archive, 1991.

Hunter, Robert. The Links. New York: Charles Scribners Sons, 1926, and USGA Rare Book Collection, Far Hills, N.J. 1994.

Hurdzan, M.J. Golf Course Architecture: Design, Construction and Restoration. Chelsea, Michigan: Sleeping Bear Press, 1996.

Irrigation Systems Design Manual. Fresno, Calif.: Buckner, 1988.

Jones, Rees L. and Rando, Guy. "Golf Course Developments". Washington, DC: Urban Land Institute Technical Bulletin, No. 70, 1974.

Jones, Robert Trent, with Larry Dennis. Golf's Magnificent Challenge. New York: McGraw-Hill, 1989.

Jones, Robert Trent, Jr. Golf By Design. Boston: Little, Brown & Company, 1993.

Kains, Robert. Golf Course Design and Construction. Guelph, Ont.: University of Guelph, 1993.

Klein, Bradley S. Rough Meditations. Chelsea, Mich.: Sleeping Bear Press, 1997.

Klemme, Mike. A View From the Rough. Chelsea, Mich.: Sleeping Bear Press, 1995.



REMODELING UNIVERSITY

Price, William R. An Environmental Approach to Golf Course Architecture. Chicago: The American Society of Golf Course Architects, 1999.

Mackenzie, Dr. Alister, Golf Architecture. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd. 1920. Reprinted as Dr. MacKenzie's Golf Architecture. Victoria Square, Worcestershire: Grant Books Ltd., 1982.

Mackenzie, Alister. The Spirit of St. Andrews. Chelsea, Mich.: Sleeping Bear Press, 1995. New York: Bantam Doubleday Dell, 1998.

Marsh, William, M. Landscape Planning: Environmental Applications. New York: John Wiley & Sons, 1998.

Mead, Daniel W., and Joseph Reid Akerman. Contract Specifications and Engineering Relations. New York: McGraw Hill, 1956.

Muirhead, Desmond, and Guy L. Rando. Golf Course Development and Real Estate. Washington, D.C.: Urban Land Institute, 1994.

Peacock, C.H., Bruneau, A.H. and Spak, S.P. "Wetlands-Protecting a Valuable Resource." Golf Course Management. November 1990, Vol. 58(11): pp.6-16.

Peper, George. Golf Courses of the PGA Tour. New York: Harry F. Abrams, 1986.

Pira, Edward. A Guide to Golf Course Irrigation System Design and Drainage. Chelsea, Mich.: Ann Arbor Press, 1997.

---. Guidelines for Golf Course Irrigation Systems. Univ. of Mass., 1989.

Price, Robert. Scotland's Golf Courses. Aberdeen, Scotland: Aberdeen University Press, 1989.

Protecting Natural Wetlands: A Guide to Stormwater Best Management Practices. Washington, DC.: Environmental Protection Agency, October 1996 (EPA843-B-96-001).

Renovating Your Golf Course, 2nd ed. Jupiter, Florida: National Golf Foundation, 1998, (99LB022).

Rochester, Eugene W. Landscape Irrigation Design. St. Joseph, Mich.: American Society of Agricultural Engineers, 1995.

Ross, D.J. Golf Has Never Failed Me. Chelsea, Michigan: Sleeping Bear Press, 1996.

Shackelford, Geoff. The Captain. Chelsea, Mich.: Sleeping Bear Press, 1997.

---. Masters of the Links: Essays on the Art of Golf and Course Design. Chelsea, Michigan: Sleeping Bear Press, 1997.

Simonds, John Ormsbee. Landscape Architecture. New York: McGraw-Hill, 1998.

Smart, M.M., Spencer, R.N., Calvo, R.N. and Peacock, C.H. "Environmental Considerations in the Design, Construction and Operation of Golf Courses." Urban Land, March 1993. Vol.52(3): pp. 17-22.

Strawn, John. Driving the Green. New York: Harper Collins, 1991.

Sutton, Martin H.F. (ed.). Golf Course Design, Construction and Upkeep. Reading, England: Sutton & Sons, 1950.

The Golf Course: A Green-belt Asset. Jupiter, Florida: National Golf Foundation, Executive Summaries 1991(GC-038).

Tillinghast, A.W. The Course Beautiful. Warren, N.J.: Treewolf Productions, 1995.

Thomas, George C. Golf Architecture in America. Chelsea, Mich.: Sleeping Bear Press, 1997.

Ward-Thomas, Pat, Herbert Warren Wind, Charles Price, and Peter Thomson. The World Atlas of Golf. New York: Random House, 1976.

Walker, W.J. "Environmental Issues Related to Golf Course Construction: A Literature Search and Review", Far Hills, New Jersey: USGA Green Section, 1990.

Waterways Experiment Station Technical Publication Y-87-1. Corps of Engineers, 1987.

Wethered, H.N., and T. Simpson. The Architectural Side of Golf. London: Longmans Green & Co., 1929; second edition, titled Design for Golf, London, 1952, and Grant Books, Droitwich, Worcestershire, England: 1995.



MANAGEMENT OF GOLF COURSES

- A Guide to Environmental Stewardship. Selkirk, New York: Audubon International, 1996.
- Baird, J.H. "Reducing Pesticide and Nutrient Runoff Using Buffers." *Golf Course Management*, 1998. Vol. 66(9): pp. 57-61.
- Balogh, James C. and Walker, W. J. Golf Course Management & Construction: Environmental Issues. Chelsea, Michigan: Lewis Publishers, 1992.
- Beard, James B. "The Benefits of Golf Course Turf." *Golf Course Management*, March 1996.
- Beard, James B. Turf Management for Golf Courses, 2ND Edition. Chelsea, Michigan: Ann Arbor Press, 1999.
- Bohomont, Burt L. The Standard Pesticide Users Guide. Prentice Hall, 1990.
- Clark, John and Kenna, M.P. (ed). "Fate of Turfgrass Chemicals and Pest Management Approaches." American Chemical Society Series. Oxford Press: 1999 (in press).
- Cohen, Stuart Z., et al. "A Groundwater Monitoring Study for Pesticides and Nitrates Associated with Golf Courses on Cape Cod." *Groundwater Mon. Rev.* 1990. Vol.10(1): pp. 160-173.
- Cohen, Stuart Z., Svrjcek, A., Durborow, T. and Barnes, N.L. "Water Quality Impacts by Golf Courses." *Journal of Environmental Quality*, May/June 1999. Vol. 28(3) in press.
- Deubert, K.H. "Environmental Fate of Common Turf Pesticides - Factors Leading to Leaching." *USGA Green Section Record*, 1990. Vol.28(4): pp. 5-8.
- Dodson, R.G. and Smart, M.M. "Pond Ecosystems: Centers of Wildlife Conservation." *Golf Course Management*. November 1995: pp. 49-51.
- Environmental Desk Reference for Operations and Maintenance. Jupiter Florida: National Golf Foundation, 1994.
- Forman, R.T. and Gordon, M. Landscape Ecology. New York: John Wiley & Sons, 1986.
- Foy, J.H. "Integrated Pest Management - A Different Approach to the Same Old Problems". *USGA Green Section Record*, Vol. 26(5): pp. 9-11.
- Golf and the Environment, Environmental Principles for Golf Courses In the United States. Salt Lake City, Utah: The Center for Resource Management, 1998.
- Golf and the Environment. Far Hills, New Jersey: United States Golf Association, 1994.
- Golf and Wildlife. Far Hills, New Jersey: United States Golf Association, 1995.
- Golf Course Management and Construction: Environmental Issues. Far Hills, New Jersey: United States Golf Association, 1992.
- Golf Course Superintendent's Association of America. [Online database] Available: <http://www.gcsaa.org>.
- Grant, Z. "Integrated Pest Management in the Golf Course Industry." In Leslie, A.R. and Metcalf, R.L. *Integrated Pest Management for Turfgrass and Ornamentals*.
- Harivandi, Ali. "Effluent Water for Turfgrass Irrigation." University of California Cooperative Extension, 1991. Leaflet 21500.
- Hayes, A. "Comparing Well Water with Effluent: What Superintendents Need to Know." *Golf Course Management*, June 1995. Vol. 63(6): pp. 49-53.
- Kenna, Michael P. "What Happens to Pesticides Applied to Golf Courses?" *USGA Green Section Record*, January/February 1995. Vol. 33(1): pp. 1-9.



REMODELING UNIVERSITY

Pec, David, Mancino, C. and Nelson, D. "Using Effluent Water On Your Golf Course." USGA Green Section Record, 1993. Vol. 33(4): pp. 9-12.

Leslie, Anne R. (ed.) Handbook of Integrated Pest Management for Turf and Ornamentals. Boca Raton, Florida: Lewis Publishers, 1994.

Lilly, Sharon. Golf Course Tree Management. Mich.: Sleeping Bear Press, 1999.

Musser, H. Burton. Turf Management. New York: McGraw-Hill Book Company, Inc.: A Publication of the USGA, 1950.

Peacock, C.H., Bruneau, A.H. and Spak, S.P. "Wetlands-Protecting Valuable Resource." Golf Course Management, 1990. Vol. 58(11): pp. 6-14.

Peacock, Charles H and Smart, M.M. "IPM Monitoring and Management Plans-A Mandate for the Future." USGA Green Section Record, 1995. Vol. 33(3): pp. 10-14.

Peacock, Charles H. and Smart, Miles. M. Protecting Natural Resources on the Golf Course. Ann Arbor, Michigan: Ann Arbor Press, 1999 (in press).

Petrovic, A.M. "Golf Course Management and Nitrates in Groundwater." Golf Course Management, September 1989: pp. 54-64.

Phelps, Richard M. "Effluents for Irrigation: the Wave of the Future?." Golf Course Management, April 1985: pp. 106.

Schumann, Dr. Gail, et al. IPM Handbook for Golf Courses. Michigan: Ann Arbor Press, 1998.

Skorulski, James E. "Monitoring for Improved Golf Course Pest Management Results." USGA Green Section Record, 1991. Vol. 29(5): pp. 1-5.

Sloan, William H. "Irrigation of Public Use Areas By Land Application of Combined Industrial and Domestic Waste Effluent." Journal of the Water Pollution Control Federation, May 1984: pp. 478, 480.

Smart, M.M. and Peacock, C.H. "Proactive Environmental Management for Golf Courses." Through the Green. July/August 1993: pp. 17-19.

Snow, J.T. (ed.), et al. Wastewater Reuse for Golf Course Irrigation. Lewis Publishers, 1994.

Snow, J.T. An Overview of USGA Environmental Research. Far Hills, New Jersey: United States Green Association, 1997.

Terman, M.R. "Natural Links: Naturalistic Golf Courses as Wildlife Habitat." Landscape and Urban Planning, 1997. Vol. 38: pp.183-197.

United States Golf Association. "Results from the USGA Environmental Research Program.", USGA Green Section Record, 1995. Vol. 33(1): pp. 1-52.

van Bavel, C.H.M., Long, T. and Sanders, J.H. "Maximizing the Safe Application of Reclaimed water on the Golf Course Turf." Golf Course Management, April 1996. Vol. 64(4): pp. 52-55.

Watchke, Thomas L., Harrison S. and Hamilton, G.W. "Does Fertilizer/Pesticide Use on a Golf Course Put Water Resources in Peril?" USGA Green Section Record, May-June, 1989: pp.5-8.



REMODELING UNIVERSITY

APPENDIX VII: SYMPOSIUM NOTES



REMODELING UNIVERSITY
