

GOLF COURSE RENOVATION GUIDE



Contents

Foreword	3
When to renovate?	4
Planning Renovation	10
Master Plan	12
Design Process	14
Construction	21
Conclusion	29

Foreword

Have you had any complaints about the poor playability or bad playing conditions on your golf course?

Do you feel a pressure to upgrade your golf course and facilities to remain competitive in your marketplace?

The golf course is a living entity that changes and ages continuously. Time, weather and heavy play leave their marks on every course. Bad design, incorrect construction or wrong construction materials will definitely deteriorate the turf.

On many regions the environmental regulations are creating more pressure on course maintenance practices and budgets. Restrictions on the use of water, fertilizers and fungicides make the work of superintendent more challenging every day.

During the last 20 years the longer balls and enhanced drivers have greatly affected the playability of the courses by destroying the original playing strategy and causing safety problems.

Read this guide! We will give you advice how to plan and implement your renovation project. We will also describe why the Master Plan is the best solution for your long term planning.

Oulu, the 27th of February 2013

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When to renovate?

Golf course renovation is not a uniform or an easy task. Every course has its own problems that need to be fixed using different approach and resources. But, in the end, the upgrading, renewal, remodelling or modernizing of any existing course is inevitable and unavoidable.

When evaluating whether renovation is needed, it is important to calculate realistic cost estimate for the whole construction. In addition to this you should estimate how many new members new enhanced course will attract and how much green fee and clubhouse sales can be increased. On the other hand you must also evaluate how much your cash flow will be decreased during construction to balance the calculations.

On some courses the renovation is no longer an option. It is an unavoidable must. If you cannot get the greens in good condition with normal care anymore or after heavy rain the course must be closed for several days you must ask yourself how bad the conditions will be if nothing is done. How many members you may lose? How many green fee rounds will be lost? Are you faced with even higher repair costs in the long run?

Maintenance Problems

The typical golf course maintenance problems are:

- Poor greens
- Soil compaction
- Drainage problems
- Small tees and greens
- Shade and roots of the trees
- Irrigation system defects
- Poor bunkers

With good maintenance practices it is possible to keep the golf course in good shape for longer time but in the end the golf course components will weaken so much that a renovation is needed. If the original construction methods or materials were poor, the life span will be even shorter.

The ASGCA (American Society of Golf Course Architects) has published the following life spans for golf course components:

- | | |
|------------------------------|---------------|
| • Greens | 15 – 30 years |
| • Tees | 15 – 20 years |
| • Bunker sand | 5 – 7 years |
| • Irrigation system | 10 – 30 years |
| • Irrigation guidance system | 10 – 15 years |
| • Pumps | 15 – 20 years |

Case: Tree problems

As beautiful the trees are they cause a variety of problems on golf courses. Wrong type of trees in wrong places is disastrous for turf grass quality which increases substantially the maintenance costs.

In shade the turf grows thin and the root growth is poor thus making the turf exposed to wear and tear. E.g. bentgrass greens have 30 – 50 % less root mass in shade compared to greens in direct sunlight.

As a rule of thumb turf grass needs at least eight hours of direct sunlight. Greens and tees with high stress need it even more. The most important for the turf is the morning sunlight that dries the morning dew and starts the growth. The trees growing on golf courses will also develop shallow roots that take a lot of turf grass water and nutrients.



The turf on this tee looks thin even though it is large enough to support the stress caused by the players. The grass grows poorly because it is shaded by a thick wall of trees on both sides of the teeing ground.

Restoring Challenge

The challenging hazards are one of the most important features on the golf course that make golf interesting. Unfortunately many older courses have lost part of the challenge because of new enhanced equipment. Especially long hitters can too easily hit over the fairway bunkers and other hazards.

When renovating the course the long hitters are usually challenged by building new back tees further away but in case there is no space for that, new hazards need to be built further away from the tees to restore the original challenge and strategy of the course.

On 9th hole in Kartanogolf the fairway bunkers that challenged the long hitters 20 years ago are totally obsolete now.

Because there is no room for new back tee, two closest bunkers are filled and two new ones are built.



Playability and Safety

Fair hazards make golf interesting but when trees start to block your views and line of play or when blind shots are dangerous the game is not fun anymore. Golf is hard enough without any frustrating obstacle that does not belong to the original design.

On Peurunkagolf short par 4 4th hole the trees blocked the view to the green. Long hitters who played straight to the green could not see if the green was free or where the ball finally ended. For the short hitters it was a different problem. They could not play their second shot over the trees in the steep hillside thus making frustrating to be forced to play around the trees.

We removed almost all trees and built new bunker to the hillside. Now you can clearly see to the green and short hitters are no longer punished too much.





Case: Kartanogolf 12th hole

On this par 5 there are two large trees growing by the stream in front of the green. Year by year the trees have slowly tilted more and are now a big risk for players and maintenance staff.

Unfortunately there are many players who do not want to remove the trees because especially the pine "looks so nice". Both trees will inevitably fall because the erosion caused by the stream eats the dirt around the roots continuously.

The trees also make the play more and more difficult because the gap between them gets all the time narrower. This forces players to position their ball at the same spot to be able to play over the trees. Unfortunately this area gets too much play causing turf wear and compaction.



Landscape

Golf course landscape changes all the time. Especially the tree growth changes the visual look of the golf course. The esthetic problems usually arise when there was not enough money for landscaping when the course was originally built or the green keeping committee members have planted too many misplaced trees on the course.

The Peurunkagolf 16th hole has been visually one of the best par 3 holes in Finland. During the last 20 years trees around the hole have grown taller and wider thus shading the tees and blocking the views to the lake. After tree removal the tees recovered quickly and the original lake views were restored.



Planning Renovation

Planning renovation is not a specific solution. Each case is different. Renovation can be subtle as soft facelift or as brutal as a total rebuild of the course but it always needs a comprehensive planning.

The real challenge is to find the best solution to reach the goals with available resources. The will and ambition of the course membership or owner strongly influences the goals of the project.

It takes a careful mapping of the current situation to be able to evaluate the project challenges and construction costs. The planning should be started at least one year earlier before the construction to guarantee enough time to get player feedback, produce construction documents and organize the construction project.

Renovation Team

All renovation projects should have a team of decision makers that represent both the players and employees of the course. The members of the team could be e.g. chairman of the board, managing director, superintendent, green keeping committee, teaching pro and other committee representatives. The main idea is to have people with different interests in the team in this early planning phase.

The renovation process is though not easy to keep on track. The following list describes the pitfalls that can lead the project in wrong direction:

- Renovation team is too big
- Team members are changed during the project
- Some team members are too dominant
- The team has not enough decision power
- Key decision makers are not golfers
- There is no clear goal for the project
- The team does not communicate enough about the goals and progress of the project

When construction starts an efficient team of 3 – 5 members should be set up to have the operational responsibility of the project. The ideal team should be small to be able to do quick and flexible decisions if any problems should occur.

Renovation Goals

The current course conditions need to be carefully evaluated before any detailed planning should occur. Unfortunately the problems are too often fixed one by one without considering how they affect other course features. At worst the original design character of the course is lost.

If the original plans of the course are still available, you should find out how the course has changed during the years. The original design can be very different compared to current situation or maybe the original intentions of the architect have never been realized. This is why you must decide whether the original character will be restored or do you want the whole course to be re-modeled into new direction when defining the final renovation strategy.

If the main goal is to have better playing conditions the first priority could be to enhance drainage, remove trees and rebuild some greens. On the other hand if the main goal is to have better playability and playing strategy the priority issues would be to add new tees and move some bunkers.

The renovation team should have a clear goal that has been decided together. The team has to find out why the renovation is done: do we want better playing conditions, upgrade the course or organize big competitions. Unfortunately it is too common that the courses are renovated without a clear strategy in mind.

Funding Renovation

The earlier you are prepared for the renovation, the easier it is to organize the funding. On many courses the more extensive renovation is usually needed about 20 years after construction. This is why you could start saving money in advance in renovation fund few years before that.

Renovation is usually funded using both internal and external financing. Smaller repairs can be funded using yearly income financing but large projects need usually external financing. When construction starts additional yearly member payments can be collected or take low-interest loan from players.

Internal financing possibilities are:

- Yearly income financing
- Renovation fund
- Additional yearly member payments
- Player loans
- Selling land
- Using own work force in construction

Master Plan

Golf course renovation without any comprehensive plan is very short-sighted. Redesigning some greens, bunkers or tees are only a part of the whole planning process. Doing any degree of remodelling needs considerable thought, design and construction method input. The goal should be to have a long-term plan for the whole golf course, a Master Plan.

Without a comprehensive plan the repairs and changes on the course will remain just as occasional fixes without any bigger picture. The worst-case scenario would be tearing up the same parts of the course again that were fixed already earlier. Unfortunately it is quite common that just recently installed new cart paths or new irrigation system doesn't work well with the other new improvements. To provide a commonly agreed strategy for the renovation of the whole golf course, a Master Plan should be used.

Helping Decision Makers

Master Plan gives concrete and realistic information for decision makers. By stepping back and taking a look at the bigger picture, the Master Plan process often allows the club to avoid costly mistakes and to save money by phasing the project in a more logical sequence.

The players often find it difficult to perceive how the possible changes will affect the course conditions. By looking at renovation plans of other golf courses the players may get different ideas about what needs to be done on their own course. The architect on the other hand tries to create a long term renovation plan that is best for current course conditions and available resources. This is why the plan may be totally different compared with the plan designed for the course next door.

The cost of the Master Plan is a small investment compared with nearly any of the physical work done to a golf course and it will last for many years. In the end the architect saves the time and resources of the decision makers and money that is spent without a Master Plan.

The Role of the Golf Course Architect

It takes an objective insight and knowledge about golf course design and construction to make a Master Plan. It is quite rare that there is a qualified person for the job in course management or among the club members. This is why a golf course architect should be hired to do the job.

The architect brings his objective and outsider visions how to solve the course problems. The board and committee members will notice the most important pain in play and maintenance but the architect notices often new details and different options how to solve the problems.

Golf course renovation is often more challenging project than new course design for the architect. In addition to designer's role he has to deal with different opinions and objections when assisting board members in design, marketing and construction. That is why the architect needs the skill of communicator, politics, negotiator or referee to help client to fulfill the project.

The architect's tasks in the renovation process:

- Consulting with course superintendents, green keeping committees, management and owners on priorities and the on-going aging and improvement of their golf course
- Preparing master plan for the golf course, including the factors of strategy, playability, maintenance, turf grass improvement, drainage, irrigation, and aesthetics
- Preparation of cost estimates
- Assistance in the approval of the renovation by making visual presentations to promote the plan
- Preparing construction documents
- Observation of construction progress and compliance with specifications and plans



Re-construction of 12th green in Tawast Golf.

Design Process

Master Plan is not a static plan. It should be thought as a process where the architect talks with the renovation team and assists them during planning and construction.

Needs Analysis and Site Inspection

The architect will meet the client and gather all needs and ideas to have a mutual understanding about the goals and available resources. The client provides valuable information about the history of the course and the local conditions. The architect will provide his own experience and ideas with client's thoughts to have a common understanding about the project objectives.

The site inspection is usually started with surveying an aerial photograph and a topographic map of the golf course. Through a series of site visits and meetings, the strengths and weaknesses of each hole are photographed, summarized and mapped.

The items to be evaluated on a site inspection are:

- Tees - Tees may need to be rebuilt or new ones added
- Fairways - Major grade work may be required to improve drainage, eliminate blind spots or to soften severe terrain
- Greens - The size, shape, soil structure and cupping areas of each green will be evaluated
- Bunkers - Bunker evaluation includes placement, strategy, playability, the quality of sand and drainage
- Water hazards - Visual impact, water quality and irrigation sources are evaluated
- Trees - A long-range tree planting, pruning and removal schedule will be created
- Irrigation system - New sprinklers may be added or old ones replaced by new more efficient ones
- Drainage - New drainage pipes or reshaping of contours may be needed
- Practice areas - Driving range may need more length, better quality turf or artificial turf installations. Better short game practice areas can be added.
- Clubhouse - New club house or restoration may be needed. More parking spaces could be added.
- Other buildings - The need for new maintenance or other buildings will be examined
- Roads and paths - The need for road and path improvements will be examined.

Current State Analysis

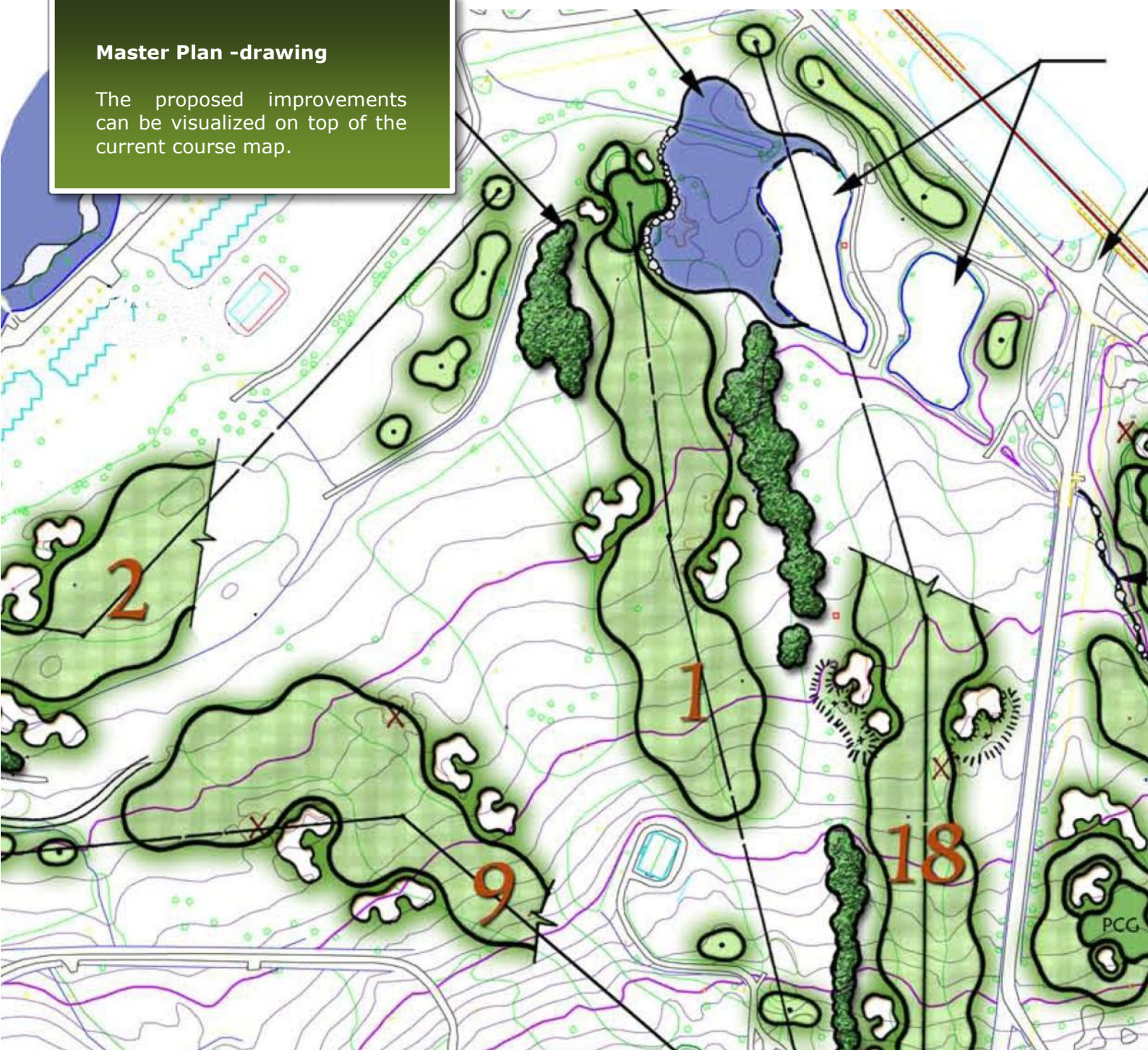
Based on the needs analysis and site inspection the architect will provide a general description about the current state of the golf course. Additionally the strengths and weaknesses of each hole are described separately in detail.

For each hole the following issues are evaluated:

- Challenge and playing strategy
- Hazards
- Speed of play
- Safety
- Maintenance issues
- Aesthetics

Master Plan -drawing

The proposed improvements can be visualized on top of the current course map.

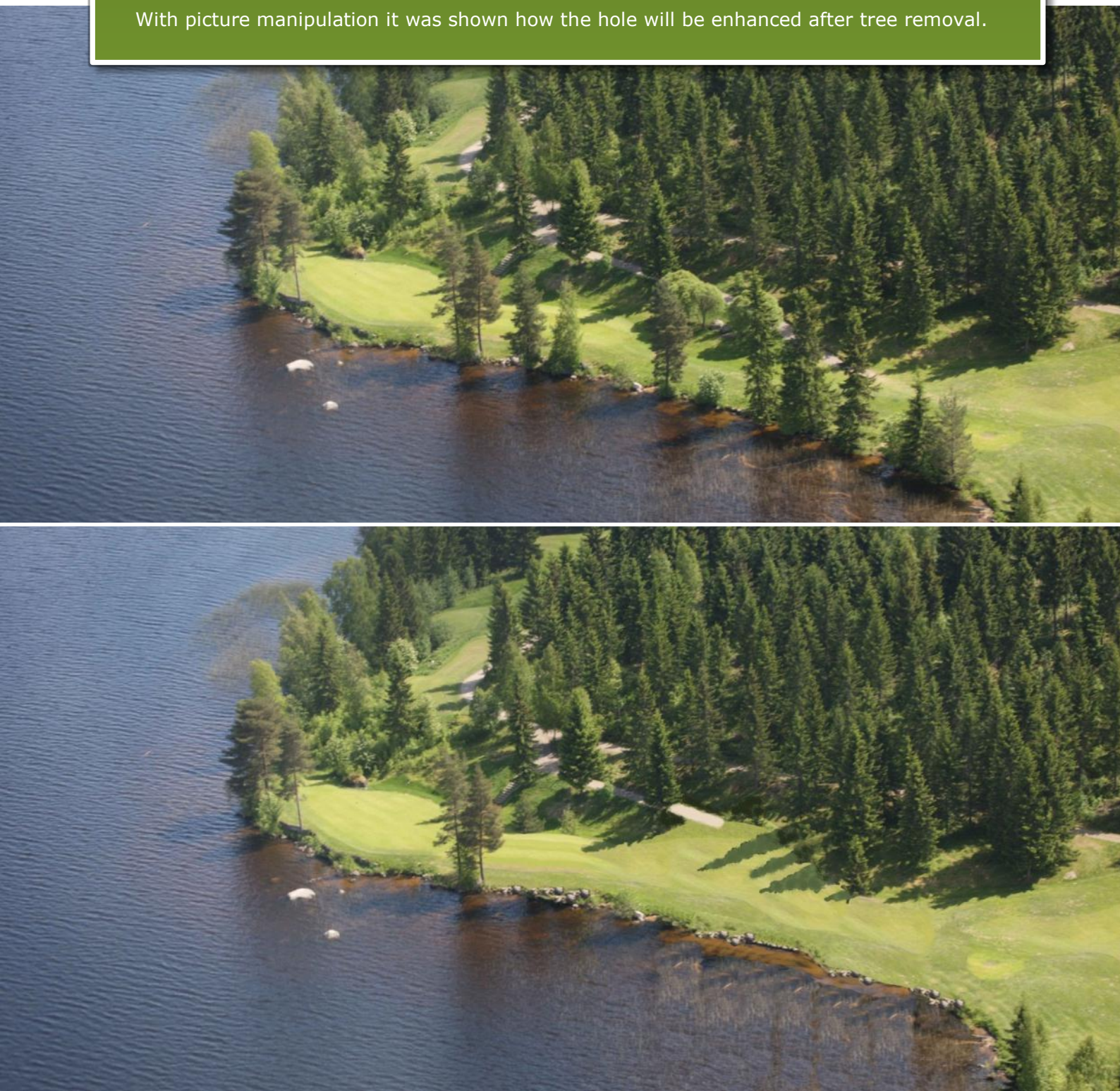


Before – After pictures

One of the best ways to visualise the proposed enhancements is to have two pictures side by side to show both the current situation and the new proposed ideas.

On the 6th hole in Peurunkagolf trees along the lake shore line blocked the lake views and made playing the hole very tight. According to the original plan only the tall pines by the green site were supposed to be left there. Small plants were left by the shore line and when slowly growing during last 20 years the players did not notice how the views were fading and the play was getting more difficult.

With picture manipulation it was shown how the hole will be enhanced after tree removal.



Visualizing

Master Plan helps to market the renovation ideas. It visualizes the problems and justifies the solutions for the members.

In Peurunkagolf an extensive tree removal was needed. Trees shaded greens and tees and hid the great lake views. On some holes the trees were getting taller and wider thus blocking the line of play.

After studying the original plan of the course it was discovered that only part of the tree plantings had been done according to the plan. Some plantings were not done at all and some were planted in wrong places. In addition to this some original trees that should have been cut were not removed thus making the holes too tight.

Even though the planned tree removal was clearly justified, many players opposed it strongly. Fortunately the before – after pictures convinced the members to support it.

The trees were removed in late autumn and the results were evident next spring when the course was opened for play. Restored open lake views made players feel like playing on a different golf course! Having more sunlight on greens and tees made the turf conditions substantially better. Also enhanced playability brought very positive feedback.



But where is the green? Having this view from 150 m towards the green frustrates the player. After 20 years the planted trees block totally the view and the line of play.

Cost Estimate and Project Scheduling

When preliminary Master Plan is ready cost estimate needs to be calculated to be able to evaluate the magnitude of the whole project. If the estimate is bigger than it was earlier anticipated, the plan can be sent back to the “drawing board” or the low priority tasks can be dropped.

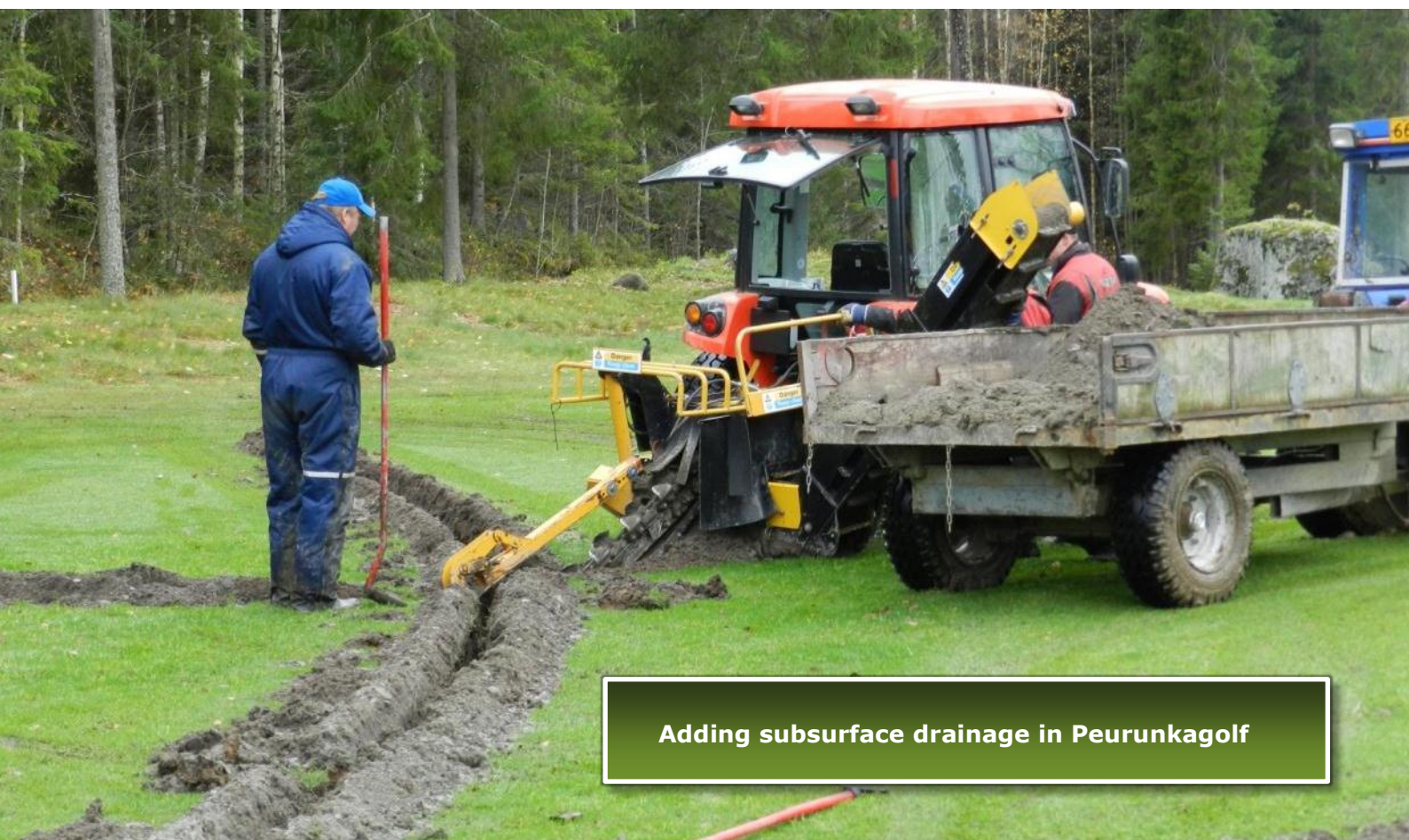
There are more variables in renovation cost estimation that make it more complex compared to new golf course construction. For example the contractor’s unit costs are higher because tasks are usually smaller. Also project scheduling is more difficult because usually work is done during short periods. In addition to this in the yearly inflation needs to be evaluated.

When cost estimate is ready the tasks can be prioritized and different scenarios can be done for construction phasing. When scheduling the project the total budget and yearly funding defines how much each year can be done. In addition to this how much the work restricts playing the course is an important issue when defining the final scheduling.

Communication

Be prepared to communicate the project goals and milestones to get the project approved. Every renovation project is confronted by the members so you need to be prepared for any objections. Master Plan needs to be visualized and justified to be able to assure the players about the benefits.

To communicate the plans you can use e.g. general member infos, golf course website or communicate in smaller groups (e.g. seniors, women, committees). You can also use independent expert testimonials and show the problems in practice on the course.



Adding subsurface drainage in Peurunkagolf

Case: Oulu Golf Irrigation System

The biggest task was the renewal of the whole irrigation system. Because the cost estimate was high we had to show a thorough explanation about the old system problems and the benefits of the new system.

In Oulu area there is a common phenomenon to have sulfate layers in soil. When these sulfates oxidized into sulfur acid they corroded the pipe joints and irrigation cables. At worst when joints of the big pipes broke down the high pressure water caused dangerous situations. In addition to this old sprinklers and one row fairway irrigation was too slow and inefficient.

After discussion with superintendent we finally decided to propose replacing the whole system because replacing only the joints would still leave us with several other problems. New two row system and more efficient sprinklers will reduce energy and water consumption by 25 – 30 %. The life expectancy will be substantially higher compared with the old system because steel has been replaced by plastic in new joints and new irrigation cables are more durable.



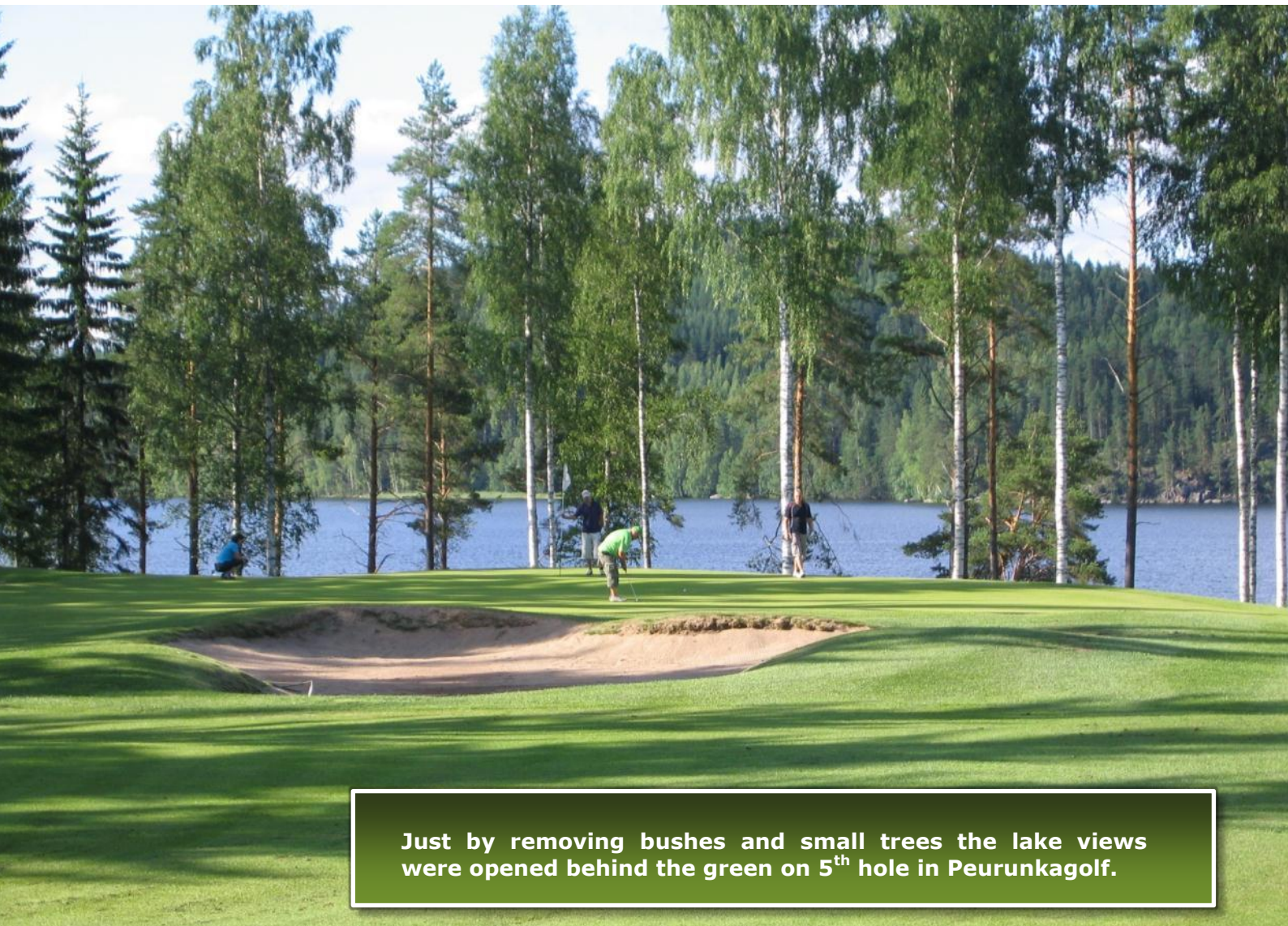
Project Approval

One of the biggest mistakes is to bring the renovation plan and strategy in front of the members too late. There is a big risk that the whole project will not be approved or it will be delayed.

Strong opinions always arise when renovation plans are revealed. Rational discussion easily changes to emotional argument. Some members are satisfied with current situation and do not understand why anyone would like to change their home course and some protest the high costs.

Transparent and communicative process decreases uncertainty and resistance among the players. When proposed enhancements are thoroughly explained it is much easier to get approval for the project.

If there is a need for approval of an extensive renovation project, one strategy could be to repair a certain hole or area as a whole in the first phase as an example. The disturbance of play is restricted to a small area and the players can see the new dramatically improved conditions in its entirety rather than just seeing smaller individual projects that might go somewhat unnoticed.



Just by removing bushes and small trees the lake views were opened behind the green on 5th hole in Peurunkagolf.

Construction

Golf course renovation is often more difficult and slower than new course construction because you cannot start from scratch. You have to be careful not to destroy other parts of the course and you have to fit the new parts with the old course seamlessly. Renovation has also risks and surprises that can delay the project schedule or ruin your cost estimate.

Phasing Construction

Renovation project must always be phased according to resources, player opinions and time of year. There is no rule of thumb whether the course should be closed and build quickly or build in smaller proportions during longer time frame.

Closing the whole course at the same time is a big risk that is usually selected when new enhanced conditions are wanted quickly thus preventing having several years of disturbance in play. The weaknesses in this option are more difficult funding and losing a substantial amount of cash flow for a couple of years.

Instead of closing all 18 holes a more popular option is to fix first 9 holes and when those holes can be opened for play the renovation can continue to the next 9 holes. This way the players can still play on the course and the unit costs of construction can be kept fairly low.

The less yearly funding there is available or the disturbance of play must be kept low the longer the construction schedule will be. Unfortunately long schedule will increase the total costs and there is always the risk having problems in construction and material quality and the course could risk having a reputation being always under construction. There is also a risk that the motivation for renovation will fade down, the direction of goals will change or contractor will change. During long projects also some of the decision makers could be replaced.

By dividing work for several years it is easier to get funding and when having the work in late autumn the yearly cash flow will not decrease much either. Players will also tolerate the disturbance if only a couple of greens or some tees are in construction at the same time.

Construction Team

You need good communication between construction team members to have a successful renovation project. Well-coordinated and systematic construction method saves time and money. In each successful project the golf architect, project lead, superintendent and contractor are all equally important who need to work seamlessly together. If you remove one or more out of the equation, you will risk having a successful project.

Without architect's design and construction experience the resource usage could be inefficient and the course playability and design integrity could be compromised. The project lead should actively supervise the project so that there would not occur cost or schedule overruns. If there would be any problems, the project lead can quickly respond and decide how to proceed. Using inexperienced contractor could be very expensive in golf construction. Wrong construction methods can make the situation even worse than it was before renovation. Of course superintendent is responsible to supervise the work but if there are also daily maintenance responsibilities mistakes can occur.

Preparing Construction

It is advisable to restrict the work on a certain area during one growing season. Otherwise there is a risk that construction machines could unnecessarily destroy some parts of the course. Also the patience of the players is on trial if on the same hole tees are repaired first and then next year the fairway bunkers and the greens after that.

When considering the starting date for construction you first need to select the last possible seeding date to ensure having the renovated areas in good condition as soon as possible next year. Next you have to calculate how many days the construction will take and add 20 % allowance for any unpredictable surprises. Now you have the latest date when construction must be started. If any additional structures e.g. temporary greens or tees are needed, you have to start preparing them early enough to have them in use when construction starts.

When preparing the work you also need to plan how much you can use your own work force and what construction equipment and materials are needed? You also need to decide how much of the work need to be outsourced to outside contractor. Evaluate realistically the whole work load and quality requirements. Can you use your in-house maintenance workers or do you need additional work force. All mentioned above should be planned 4 – 6 months before the work starts.



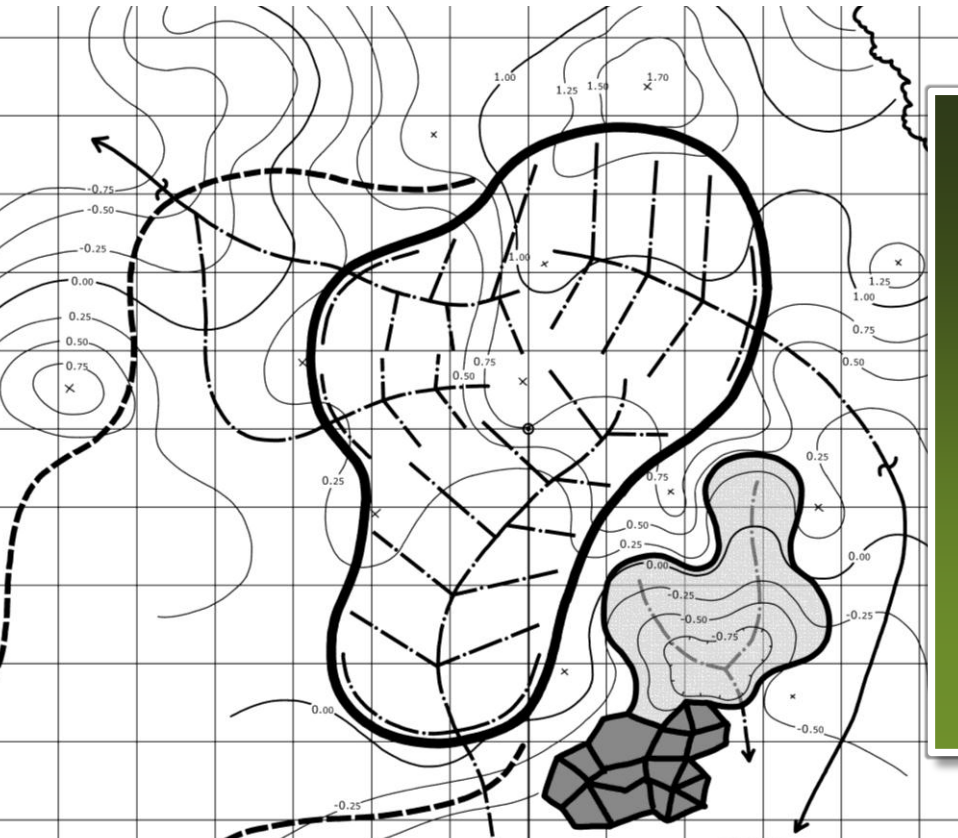


In Oulu Golf renovation the work was mainly done in-house using superintendent as project manager and a group of four men to install the new irrigation system. The greens, bunkers and tees were built using professional golf course shaping contractors. Seeding and other finalizing work was done using own maintenance staff.



Technical Design

The architect will create the technical drawings and specifications to ensure efficient construction. For irrigation and drainage design additional designers may be needed.



Case: Oulu Golf 12th hole

Old green was small and in bad condition. The surface water run only towards one direction in front of the green and the quality of the root zone mix was deteriorated. It was also very difficult for the short hitters to hold the ball on green.

New bigger green has more flag positions and interesting contours and the surface water is directed to three different directions. The alignment of the green is also changed so that you can hold the green even with a fairway wood.



Risks

Unfortunately renovation does not always go smoothly. Heavy machines can destroy course structures or when digging the ground you may find unpredictable and costly surprises that need more extensive repairs.

If the tasks are small and they are fixed sparsely, it may not be possible to have an experienced contractor to work. In addition to this if the schedule is delayed the contractor may leave the project unexpectedly.

When planning renovation you must remember that the players do not want to have any part of the course under construction during the active playing season. They do not want temporary greens, noise, dust or other inconveniences on the course. That is why work is usually done in autumn when you risk having long rainy periods stopping construction. When approaching winter there is also a risk you have to hurry the work or you may have to postpone the work until next spring thus losing your course opening schedule. When working in autumn it is also more difficult to have experienced extra labor and in the same time you need workers doing your mandatory end season course maintenance work.

When having in-house project there is a risk having not enough experienced workers or suitable equipment and not all superintendents have enough golf construction expertise.



Organizing Construction

There are many ways how construction may be achieved, from a fully in-house effort, to a situation where different parts of construction are contracted out or having all work outsourced.

The project organization for renovation can vary a lot depending on:

- Size of the project
- In-house skills and resources
- Available financial resources
- Available professional contractors

In-house Project

If there are relatively few tasks, the project can be done as an in-house project having the superintendent in charge.

Pros

- The end result and costs are in own hands
- When having problems it is easier to react and change tasks or schedule
- The disturbance of the play can be reduced because the club's own crew knows the course well
- Usually the most inexpensive way to build

Cons

- Own crew may not have enough construction skills
- You may burden course maintenance too much
- Lack of own construction equipment
- It takes a lot of experience to control the costs



In-house project with contractors

This is clearly the most common construction method because renovation usually needs at least some work to be done by an outside contractor. In this case the superintendent is usually in charge having contractors working on hourly basis or subcontracting smaller tasks. In complex projects it is better to hire an experienced project manager.

Pros

- The end result and costs are in own hands
- It is a flexible way to work, it is easy to stop the work e.g. because of bad weather
- Biggest choice of labour

Cons

- It takes more effort and experience in project management
- You may burden course maintenance too much
- The contractors charge all working days which can lead to inefficient use of resources
- It takes a lot of experience to control the costs

Outsourced contract

Having an outside contractor in charge is usually used when the course is put under total re-design or there is no course construction knowledge in-house.

Pros

- If the contractor has good references, the quality of the results can be anticipated in advance
- Own maintenance resources are not needed
- The final costs are known in advance

Cons

- Usually the most expensive construction method
- It can be difficult to find professional contractor for small projects
- It can be difficult to find a suitable schedule for both the client and the contractor
- The contractor may want to use own working methods

Renovation in a nut shell

1. Create renovation team
2. Analyze the needs and change proposals
3. Set project goals
4. Select designer
5. Architect's master planning
6. Define renovation strategy
7. Plan funding
8. Get approval for the project
9. Architect's technical design
10. Organize and phase construction
11. Start construction

**Remember proactive communication
in all project phases!**



Conclusion

Golf course is an investment worth of millions of Euros. The best way to secure your money is to be prepared and plan well in advance the inevitable course renovation.

The current situation and future goals are different on every golf course. The age of the course, local conditions, the level of maintenance and available resources determine what needs to be done. That is why you have to set a clear goal and financial framework for the project to be able to use your resources as efficiently as possible.

The architect's Master Plan will visualize and concretize the different optional enhancements. It helps to define the final renovation strategy, funding and scheduling for the project.



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