AN ASSESSMENT OF THE RELEVANCE OF LANDSCAPE ARCHITECTURE AND DISC GOLF

by

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A REPORT

submitted in partial fulfillment of the requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture and Regional & Community Planning
College of Architecture, Planning, & Design

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Approved by:

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Abstract

Disc golf is on the rise. Disc golf is a sport based on traditional golf but played with a flying disc instead of a ball and club. It was formalized in the 1970s and has grown steadily ever since, particularly in the last decade. Landscape architecture has largely ignored this phenomenon, except for two MLA theses (Plansky, 2013a; Hutzelman, 2012). This seems unusual, considering that landscape architecture has been called the most relevant degree to disc golf course design (DGCD, 2014). This study assesses the relationship between landscape architecture and disc golf.

A general research question guides this study: what added benefit, if any, might landscape architects bring to disc golf course design and development? This guiding question is explored through three sub-questions: 1) what services might landscape architects offer disc golf course development, 2) how might landscape architectural services be used by the current state of disc golf course development, and 3) how might future course development types take full advantage of the services provided by landscape architects?

This project used literature synthesis, analysis of existing data, and three types of exploratory designs to answer the above questions. The results of these methods showed that landscape architects can add value to disc golf course design and development through their skillsets and process. Not every landscape architect necessarily possesses the skills and experience to design a disc golf course, but landscape architects as a whole can propose disc golf courses if they have a basic knowledge of course requirements. A closer relationship between landscape architects and disc golf would be beneficial for the growth of the profession and the sport. This report concludes with recommendations and an action plan to reach this goal.

An Assessment of the Relevance of

Landscape Architecture

and

Disc Golf

A Landscape Architecture Master's Project by Joshua Wilcox

Kansas State University | May 2015 | College of APDesign

AN ASSESSMENT OF THE RELEVANCE OF LANDSCAPE ARCHITECTURE AND DISC GOLF

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Masters Report submitted in partial fulfillment of the requirements for the degree of: Master of Landscape Architecture (MLA)

Major Professor: Howard Hahn
Supervisory Committee: William P. "Chip" Winslow III and Blake Belanger

Kansas State University
College of Architecture, Planning, and Design
Department of Landscape Architecture and Regional & Community Planning

LANDSCAPE ARCHITECTURE
/ REGIONAL & COMMUNITY PLANNING
THE COLLEGE of
ARCHITECTURE, PLANNING & DESIGN

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To my classmates at K-State, I have learned more from you than I thought possible. It has been a pleasure to go through the program with you all. Brendan, I enjoyed sitting next to you and learning from your design sensibilities and graphic skills. I hope you enjoy this report, I'm looking forward to playing some 'frolf with you in the future.

I would like to thank everyone I've played disc golf with. Keep throwing!

I also thank you, the reader, for your interest in this report. I hope that you are an avid disc golfer, and if you are not, that you soon become one! And if this report persuades you to try disc golf, I think that would be pretty cool.

Finally, and most importantly, I would like to thank my saviour Jesus Christ. He deserves any credit for this report, from providing each of the blessings listed above, to making the creative people who came up with fantastic things like disc golf and landscape architecture in the first place.

01
Introduction

Disc golf is on the rise. Disc golf is a sport based on traditional golf but played with a flying disc instead of a ball and club. It was formalized in the 1970s by a handful of Frisbee players at the world Frisbee championships (Professional Disc Golf Association, n.d.-a). Since the 70s the sport has grown steadily to 2 million regular players (Professional Disc Golf Association, 2015). Thanks to this growth, disc golf has received academic attention from several disciplines in recent years, including geography, forestry, and sociology (Benson, 2000; Oldakowski & McEwen, 2013; Trendafilova, 2011). Landscape architecture has largely ignored the phenomenon, except for two MLA theses (Hutzelman, 2012; Plansky, 2013a). This seems unusual, considering that landscape architecture is considered the most relevant degree to disc golf course design as

Figure 1.2 Disc Golf in Revierpark Wischlingen, Germany (Vincent, 2014) (Licensing: Creative Commons Attribution-Share Alike 3.0 Unported)

cited by current course designers (DGCD, 2014). It is possible that a lack of connection between landscape architects and disc golf would explain the lack of attention from landscape architecture practitioners and academics. The relevance of landscape architecture to disc golf has not been studied.

For both landscape architects and disc golf course designers, literature on designing courses is fragmented across multiple sources. A synthesized compilation of this literature for those interested in learning how to design disc golf courses does not exist. A landscape architect wanting to design a disc golf course would need to spend valuable time researching course design practices, which could be prohibitive to many firms.

A general research question was used to guide this project: what added benefit might landscape architects bring to disc golf course design and development? This guiding question was explored through three sub-questions: 1) what services might landscape architects offer disc golf course development, 2) how might landscape architectural services be used by the current state of disc golf course development, and 3) how might future course development types take full advantage of the services provided by landscape architects? This project uses existing literature, existing data, and exploratory design to answer these questions.

This project found that there are compelling reasons for landscape architects to be involved in disc golf course development. Currently, the best opportunity for landscape architects to add value for disc golf courses is their ability to propose courses concurrently with new development. As the economic impact of disc golf grows, opportunities to aesthetically enhance, or even design disc golf courses may present themselves.

Figure I.3 Fairmont #6 (Author, 2015)


INNOVA
DISC GOLF
6


2

02
Background

In order to understand how landscape architects can be involved with disc golf, the nature of disc golf and how landscape architects are currently involved with the sport must be established. This background chapter will first describe the sport of disc golf in the context of other sports. Next it will describe disc golf course design in terms of course character and design processes. Finally it will discuss the current documented involvement of landscape architects in disc golf course design.

Figure 2.1 Fairmont #2 (Author, 2015)

What is Disc Golf?

Disc golf is played on courses made up of individual holes arranged in a linear sequence. Players start each hole from a tee and try to make it to the target by throwing their disc. Each throw after the tee begins where the previous throw came to rest. Players try to complete the hole with the fewest number of throws possible. This requires avoiding on-course hazards and staying in bounds. Player scores are calculated the same way they are in traditional golf: each disc golf hole has a par rating, and the number of throws above or below that number affects a player's overall score. Disc golf scoring uses the same system (birdie, par, bogey, etc.) as traditional golf.

The only equipment required to play disc golf is a golf disc. Although players often carry multiple discs designed for different flight patterns, an entire course can be played with only one disc. Disc golf uses specialized plastic flying discs of different types to make different throws. The three basic types of discs are drivers, mid-range, and putters. Drivers are designed to be thrown hard and fly far, they are usually used off the tee and for long throws down the fairway. Mid-range discs trade the extreme long distance of drivers for a straighter flight pattern. Putters are designed for short, accurate throws that float to the basket. Like traditional golf, disc golf has rules and etiquette. For example, when a group of disc golfers is teeing off they throw in a particular order. The player with the best score throws first and the player with the worst score throws last. After all the players have thrown from the tee, the player whose disc is farthest from the target throws first. Once all players have moved along the fairway to the target and completed the hole, they move on to the next hole. Special rules govern what to do if a disc goes out of bounds or if a player loses a disc (Professional Disc Golf Association, 2013a).

The Professional Disc Golf Association (PDGA) is a membership organization representing professional and amateur disc golf players. The PDGA's primary concern is "the promotion and sustainable growth of disc golf" (Professional Disc Golf Association, n.d.-e). The PDGA organizes tournaments and publicizes events with the goal of promoting disc golf into a "globally recognized competitive sport" (Professional Disc Golf Association, n.d.-e). Together with the Disc Golf Association (DGA) and the Disc Golf Course Designers network (DGCD), the PDGA is the primary source of knowledge on disc golf course design.

The DGA manufactures discs and targets in addition to generally promoting the sport and course development. When it comes to course development, the PDGA provides information for disc golfers and parks departments on developing disc golf courses covering funding methods, permitting processes, design recommendations, and networking with experienced course designers through the DGCD (Professional Disc Golf Association, 2013b, 2014). The DGCD is "dedicated to pursuing excellence in disc golf course design for all skill levels" (DGCD, 2014). The DGCD created the design guidelines that are currently adopted by the PDGA. The guidelines give standards for design goals, elements, tee design, targets, signs, and setting par. The guidelines also provide information on the typical amount of space required for different types of courses, typical length, and basic hole design notes (Professional Disc Golf Association, 2014, n.d.-b, n.d.-c, n.d.-d).

Growth and context

To understand the growth and context of disc golf, this study will compare it to the more familiar sport of golf. Central to the differences between the two sports, golf discs and golf balls have different flight characteristics (Figure 2.2). Golf discs have a flatter trajectory and do not fly as far as golf balls. Also, golf discs do not have to roll. Since disc do not have to roll on the ground, disc golf courses do not require heavy modification to the landscape for a course to be installed. The ground does not need to be smooth enough for a ball to roll on, thus the original terrain on a disc golf course is usually preserved. A typical hole only needs a tee and basket, and a clear path between the two to make a "flyway" (Houck, n.d.-h). Golf discs can also fly long distances under tree canopies, requiring less tree removal for a clear path to the target. Thus, disc golf courses tend to appear more natural. They do not require irrigation, mowing, or fertilizers to maintain a playable surface. The low maintenance cost means that many disc golf courses are also free to play. For comparison, average greens fees for a round of traditional golf range from $40-$60, depending on course age. Disc golf also does not require special equipment other than

a golf disc, and those can be purchased for less than $10 apiece. By comparison, a set of clubs and used golf balls will typically cost at least $175 (Trageser, 2012). Lastly, a four person group can easily play 18 holes of disc golf in half the time (2 hours) it would take to play the same round of traditional golf (4 hours), assuming the courses are not crowded ("How Long Does It Take to Play a Round of Golf?," n.d.). It is probable that these factors that differentiate disc golf from traditional golf have contributed to the growth of the sport since its inception (Professional Disc Golf Association, 2015).

In spite of the growth of recent years, disc golf is still much smaller than traditional golf (Figure 2.3). The PDGA estimates that there were over 2 million regular disc golfers in 2014, representing a fourfold increase since 2012 (Professional Disc Golf Association, 2015). For comparison, the National Golf Foundation (NGF) reports 14.4 million regular players of traditional golf (referred to as "core golfers", or

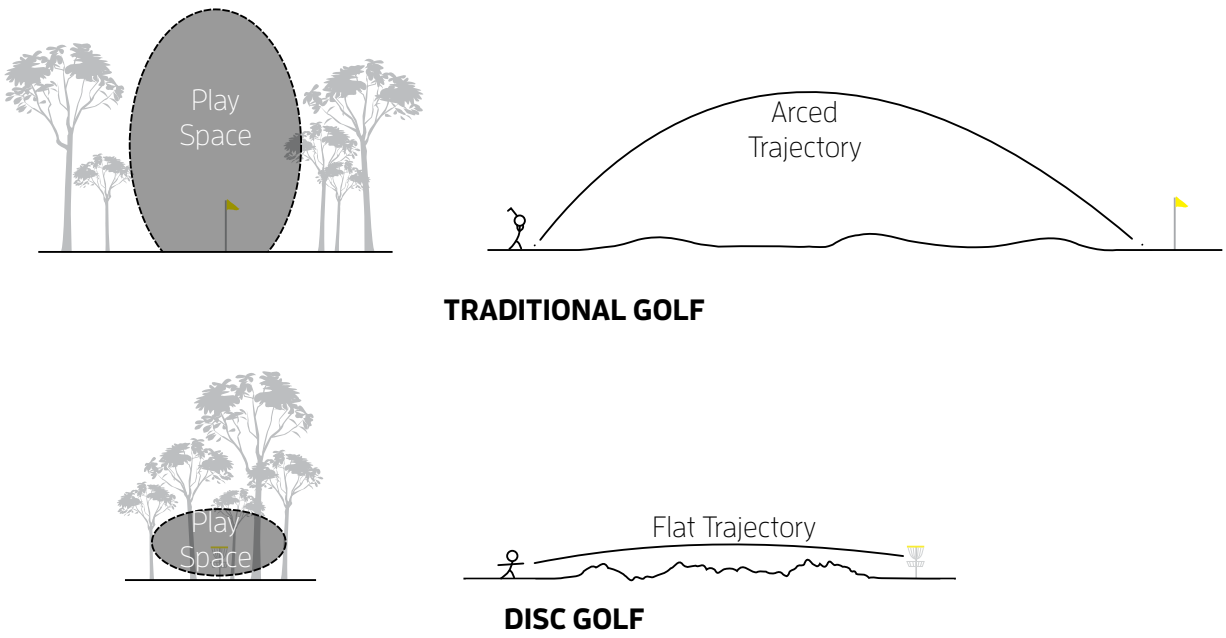


Figure 2.2 Ball Golf and Disc Golf Fairways (Author, 2015)

golfers who play at least 8 rounds a year) and 25.7 million total U.S. golfers (National Golf Foundation, n.d.-a). Thus, traditional golf's regular users represent approximately seven times that of disc golf's regular players. In terms of the number of courses, disc golf is also smaller. In 2014 the PDGA reported there were 4,723 disc golf courses, representing a 139% increase since 2005 (Professional Disc Golf Association, 2015). The NGF reports approximately three times that number in traditional golf courses in 2013, or 15,516 individual facilities (National Golf Foundation, n.d.-b).

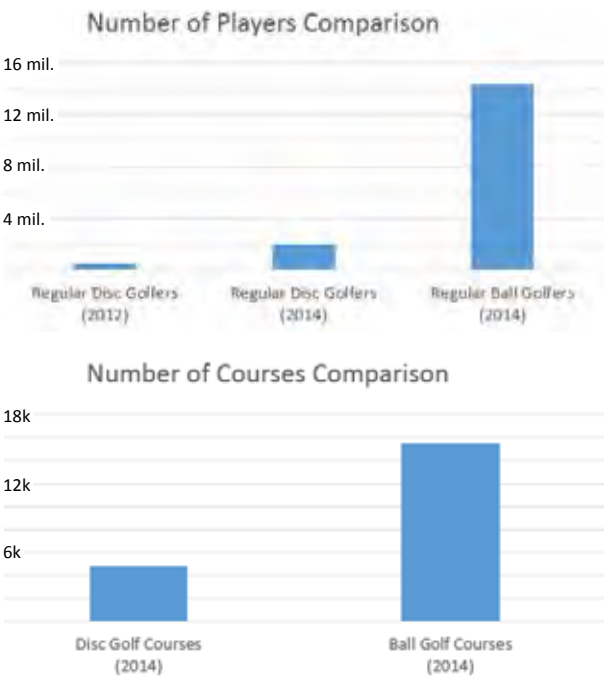


Figure 2.3 Disc Golf and Ball Golf by the Numbers (Author, 2015)

Disc golf course development

COURSE DESIGN

There is no rule about the number of holes a course should have, but traditionally the number is a multiple of three. Most courses tend to have 9 or 18. The number of holes on a course depends on the type of course and the available area (See PDGA Disc Golf Course Acreage Estimator, Appendix A (Professional Disc Golf Association, n.d.-c)). Disc golf courses often share space in public parks with walking trails and play spaces. Disc golf can cause safety conflicts with high traffic pedestrian areas if the course is not carefully designed. This is because a properly thrown golf disc can reach speeds of over 50 mph, causing serious physical harm if it should strike someone. Clear paths for players and pedestrians can keep them from accidentally wandering onto a fairway and into the path of a disc. It is also helpful to place the tee for the first hole and the target for the last hole near the entry area to provide a clear entry and exit. Courses with more than nine holes may also want to provide ways for players to get back to the entry point from midpoints in the course (Professional Disc Golf Association, 2014).

Basic infrastructure required for each permanent hole on course is a tee, a target, signage, and paths. The PDGA defines the standards for each of these elements. The tee is considered a clear area 5'-6' wide at the front and at least 12' long. Concrete pad tees are common, as are bare dirt tees on low-use courses. Next to the tee every hole should have a sign that gives the par rating and length of the hole measured in feet. These signs usually provide a map of the hole as well, with out-of-bounds and mandatory paths (called "mandos") clearly marked. If a local business sponsors the hole their name will usually be on the sign as well. Some courses

Figure 2.4 Disc Golf (Progressive Charlestown, 2012) (Licensing: Creative Commons Attribution-ShareAlike 4.0 International)

may also have trash cans and benches to the side or behind the tees (Professional Disc Golf Association, 2014). The PDGA has a tee rating system that rates each tee based on the designed skill level. Red, white, blue, and gold represent the different skill levels in order, with gold representing the highest skill level (Professional Disc Golf Association, n.d.-d). A hole can have multiple tees for different skill levels. The tee points down the fairway to the target, which is usually a steel basket. These special baskets have chains hanging above them that catch flying discs and drop them into the basket. The PDGA sets technical standards for basket dimensions, but several manufacturers make different versions of these targets. Courses may also have a putting practice basket near the first hole. Some courses may also have a pro shop with golf discs and other equipment available to purchase or rent. Between the tee and the target lies the fairway. Disc golf fairways can be very different. They can contain a mix of open areas, hazards, tight shots, and elevation changes. The ground surface of the fairway can be mowed grass, plain dirt, rocks, or even hay meadow. Fairway hazards can include water, cliffs, brush, and out of bounds areas. The actual shape of a disc golf fairway is difficult to define. It could be defined as the clear area for

Figure 2.5 Disc golf baskets (Photobucket User Hendrickus88, 2007) (Licensing: non-commercial use (Photobucket terms of use))

Figure 2.6 Pirita Disc Golf Course Hole 14 (Kantokari, 2014) (Licensing: Creative Commons Attribution-NoDerivs 3.0 Unported)

Figure 2.7 Hole #1 (DG Course Review, 2013) (Permission granted November 24, 2014)

players to walk on; but unlike ball golf, in disc golf a shot landing outside the fairway may still present a good shot to the basket. A fairway is better defined in the sense of available routes to the basket (Houck, n.d.-h).

Disc golf does not have a term for the area around the disc golf target (called a "green" in traditional golf). Disc golf targets can be situated on the side of cliffs, in the middle of a thicket, or in an open field. The target can be permanently cemented in the ground, or it can be installed in a sleeve. The sleeve method allows a basket to be moved to a different location periodically, adding variety or challenge to a hole. Moving the basket also allows the area around the basket to recover from foot traffic damage.

DISC GOLF COURSE DESIGNERS

The DGCD wiki states that the most applicable degree for disc golf course design is landscape architecture (DGCD, 2014). However, the development model currently promoted by the PDGA and the DGA does not directly involve licensed landscape architects (Figure 2.8) (Disc Golf Association, n.d.; Professional Disc Golf Association, 2013b, 2014). Their development model is designed to increase the popularity of disc golf and disc golf courses. For their part in this model, they provide resources for local disc golfers to introduce disc golf to their local government and propose creating a course on public property. The resultant courses typically cost less than $20,000 for 18 holes, which includes a design fee of $2,000-$3,000. They are built on

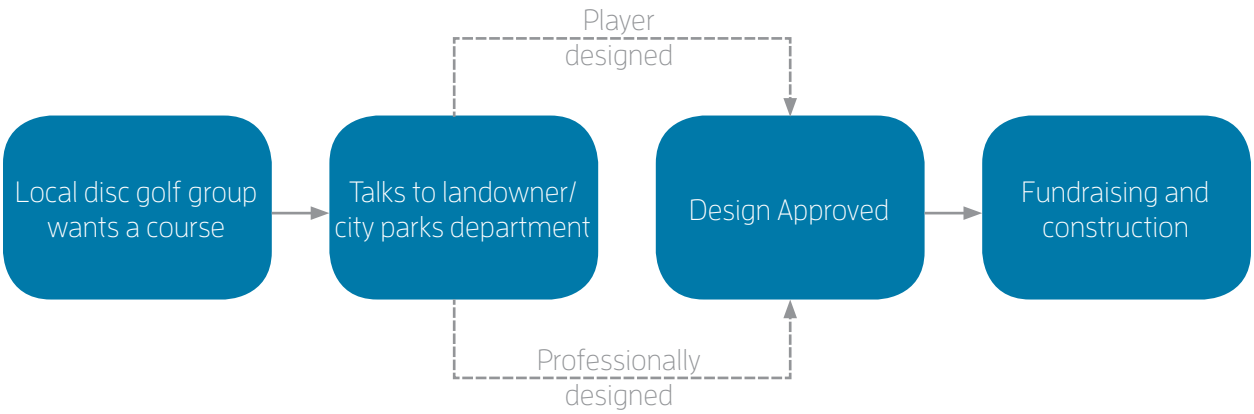


Figure 2.8 Typical Disc Golf Course Development Process (Author, 2015)

donated land using volunteer labor for installation (Professional Disc Golf Association, n.d.-f). The course design can come from a local player, but the PDGA and DGA recommend hiring a designer from the DGCD with the experience necessary to complete the project successfully.

The DGCD wiki provides a list of disc golf course designers according to their location. If the designer has a website, it is linked to their name on the DGCD website. The DGCD uses a ranking system to distinguish different levels of designers. Anyone can join the DGCD at the "associate" level. In order to gain the title of "designer" an individual must visit 12 courses, post five course reviews in the PDGA course directory, and design or co-design the equivalent of two 18-hole courses. The subsequent levels of Senior and Master Designer require playing more courses, reviewing more courses, designing more courses, evaluating a number of your designs with a tool called a "Hole Forecaster", designing a course for a high tier event, training at least one other designer, and being recommended for advancement by two peer course designers. These requirements suggest that designing a disc golf course requires specific knowledge of how disc golf is played.

The model of course development discussed previously is the only documented model of disc golf course development (Figure 2.8). It also appears that some disc golf courses were developed with a top-down model, as original elements of parks designed by landscape architects. Although not documented, Williamson County Park near Austin, Texas, appears to be one of these courses. The course was designed by John Houck (DGCD Master Designer) and installed about the same time as the rest of the park. The park was designed by RVi Landscape Architecture + Planning and includes sports fields and a splash pad. The disc golf course is separate from the rest of the other amenities, effectively avoiding safety conflicts with other uses. It seems likely that other disc golf courses have been constructed in this manner, but this has not been documented.

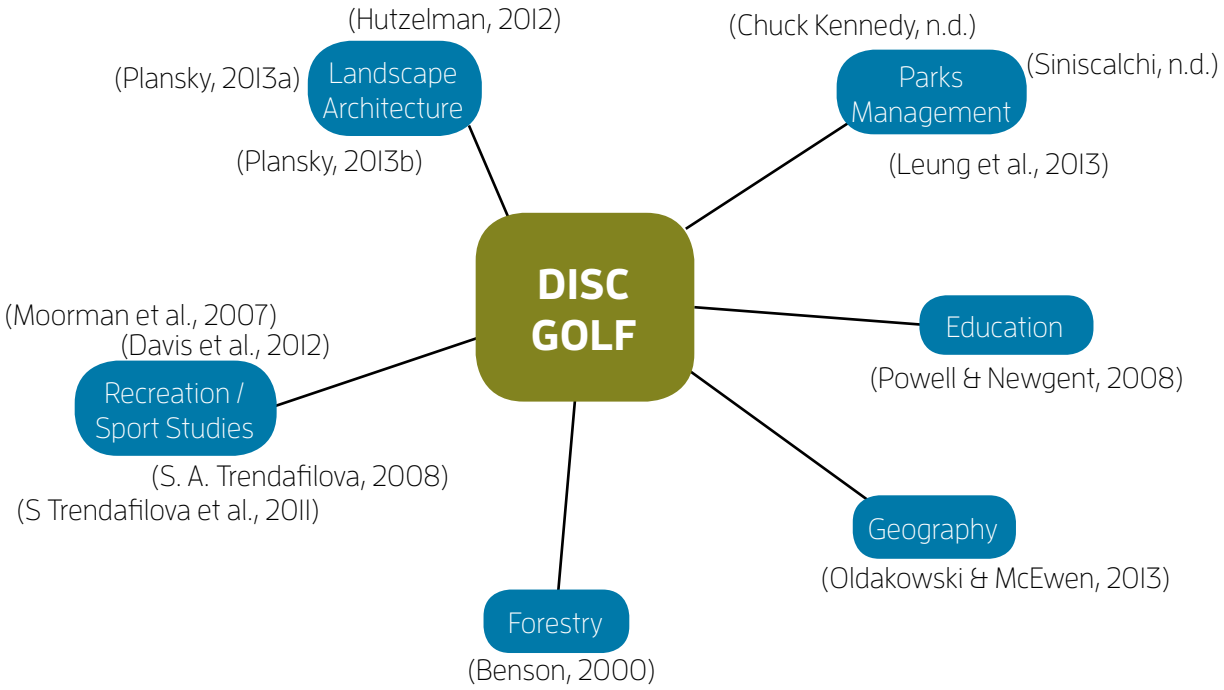


Figure 2.9 Disc Golf Literature Map (Author, 2015)

Landscape architecture involvement

ACADEMIC INVOLVEMENT

Landscape architecture academia has produced two works on disc golf. The first of these, authored in 2012 by Stephen Hutzelman, applied sustainable trail design techniques to the design of a disc golf course using a McHargian overlay process. The author then proceeded to complete a detailed design for three disc golf holes that included grading and planting design (Hutzelman, 2012). The second thesis, authored in 2013 by Michael Plansky, used interviews of disc golfers in Southern California to evaluate the possible use of underutilized landscapes for disc golf courses (Plansky, 2013a). Both of these works assume that because landscape architecture is the most relevant degree to disc golf course design, there is an inherent involvement in disc golf course design by landscape architects. This involvement (or lack of) has not been studied.

Disc golf has been studied by disciplines other than landscape architecture, including geography, forestry, and sociology (Figure 2.9). These studies have focused on environmental impact, disc golfer behavior, site analysis, and other topics. Although none of these works are focused on landscape architecture specifically, they provide valuable information on the benefits, impacts, and potential growth of disc golf. Some of these works will be discussed in the following chapter on motivation for landscape architecture involvement.

PROFESSIONAL INVOLVEMENT

There has been no study documenting whether or not landscape architects are designing disc golf courses. However, several factors suggest a low involvement from landscape architects. First, current disc golf course design practices are aesthetically simple. They rely on minimal manipulation of the landscape to keep costs down, so there is not much need for landscape architect involvement. The exception to this appears to be landscape architects specializing in disc golf course design. Only one known firm, Boutte Design (www.bouttedesign.com), offers both disc golf course design and landscape architectural services. Second, the DGCD website states there are no landscape architecture programs in the United States that cover disc golf course design. This could explain the relative lack of academic study by landscape architects. Finally, while it seems likely that landscape architects have consulted DGCD's, there has been no study providing documentation. It appears that landscape architecture is more or less unaware of the sport.

Summary

In spite of the small reach of the sport, disc golf is growing. Courses are generally smaller, cheaper, and less manicured than traditional golf courses. Landscape architects seem to be barely involved currently, with very little academic engagement and almost no professional engagement. The following chapter will explore reasons for and against further involvement by landscape architects.


1

03
Motivation

Before any study of the relationship between landscape architecture and disc golf can begin, the potential benefits or detrimental aspects should be established. This chapter will look at the motivation for landscape architect involvement in disc golf by investigating the sport's 1) intrinsic appeal, 2) social benefits, 3) potential applications, 4) opportunities for landscape architects, and 5) potential objections to landscape architect involvement.

Figure 3.1 Disc Golf (Photograph by Flickr user formatcl, 2007) (Licensing: Creative Commons Attribution-Share Alike 2.0 Generic)

Intrinsic appeal

Disc golf's intrinsic appeal begins with the low impact of disc golf courses. The minimal modification of the landscape that disc golf relies on allows much of the original landscape to remain intact. This tends to preserves the existing vegetation and environmental features. In addition, disc golf courses do not intrinsically require the irrigation, mowing, or chemicals that golf courses require (Hines, n.d.). The foot traffic from disc golfers walking on the course can cause soil compaction, erosion, and vegetation damage; but well-designed courses can take advantage of Best Management Practices (BMPs) to mitigate the harmful effects (Clark, 2005; Lichter, 2005; Plansky, 2013b; Trendafilova & Waller, 2011). For a list of BMPs, see Appendix B.

Disc golf courses are also inexpensive to build. A nice 18-hole course on donated land with donated labor for installation will cost around $20,000 (Professional Disc Golf Association, n.d.-f). For comparison, this is less than the installed cost of a basic play structure in a public park. A disc golf course can also serve as many as 100 players at one time, depending on the course (Disc Golf Association, n.d.). Disc golf is also inexpensive, both in equipment costs and course fees. A "starter set" of three discs can be purchased at major retailers for less than $30. Only one disc is really needed to play, however, and many discs cost less than $10. Many disc golf courses are free to play, but some charge a small fee. These courses are called "pay-to-play" courses, and they can generate revenue. A case study of Madeline Bertrand County Park in Michigan, done by the DGA, showed over $50,000 in revenue a year from passes, permits, disc sales, disc rentals, and disc golf merchandise (Disc Golf Association, n.d.). No study has been done of how widespread this type of profit generation may be in pay-to-play courses, but a survey by Jason Siniscalchi indicated that over 60% of disc golfers would be willing to pay up to $5 to play a disc golf course (Siniscalchi, n.d.).

Social benefits

Siniscalchi conducted a survey of a random sample of disc golf stewards and contacts in the United States. The surveys revealed four primary reasons individuals play disc golf: to be in nature, to get exercise, to be with other people, and for the challenge (Siniscalchi, n.d.). Although not all were reflected in the survey, Siniscalchi's literature review revealed other potential benefits based on studies of recreational benefits (Figure 3.2). Trendafilova found these benefits at least partially reflected in a study of the disc golf subculture. She found that the disc golf subculture has value for promoting community development, stewardship of the land, and social interaction (Trendafilova, 2011).

COMMUNITY BENEFITS OF DISC GOLF (ADAPTED FROM SINISCALCHI, N.D.)
ECONOMIC
Low cost of construction, maintenance, and play
Attracts players to the local community
COMMUNITY HEALTH
Provides a low impact and safe means of exercise for all age groups and genders
Mental strategy is involved in negotiating obstacles
Reduction of mental fatigue
ENVIRONMENTAL
Aesthetic enhancement of park
Low resource impacts
SAFETY
Crime deterrent as the park is utilized by more people
EDUCATION
Schools may introduce into their curricula for physics, physical fitness, ecology, planning, and others
COMMUNITY INVOLVEMENT
Formal and informal games and tournaments bring community members together
Families and friends can share time together

Table 3.1 Community Benefits of Disc Golf (Author, 2015; adapted from Siniscalchi, n.d.)

Opportunities for landscape architects

In addition to disc golf's potential to provide benefits for communities, there appear to be opportunities for landscape architects to enhance the sport and expand its reach. Landscape architects could mitigate some of the concerns raised by opponents of disc golf and bring the sport to new markets. Over time landscape architects would gain new markets through disc golf.

MITIGATE CONCERNS

Opponents of disc golf have raised concerns about the safety and environmental impact of disc golf courses. Because of the retrofitted, player-designed nature of many courses, disc golf courses can be unsafe for surrounding activities when they are improperly designed (DGCD, 2014). Licensed landscape architects are charged with promoting the health, safety, and welfare of the general public; and with proper knowledge of safety distances, they could ensure that safe distances are maintained between disc golfers and surrounding uses.

Controversy over the environmental impact of disc golf has on occasion blocked the establishment of new courses and caused older courses to close (Friends of Anna Jean Cummings Park, 2012). The chief environmental concerns for disc golf are soil compaction and tree damage. Trendafilova et al. tied disc golf to erosion, soil compaction, and vegetation loss on three disc golf courses in Austin, Texas (Trendafilova, 2011). The damage on the Austin courses was caused by the players walking on the courses, particularly when the ground was wet. The researchers suggested BMPs to mitigate these impacts. The effect of golf discs on tree health has not been empirically studied, but reports from licensed arborists indicate damage from discs is likely negligible, except in young trees and certain specific species (Clark, 2005; Lichter, 2005). In any case, Best Management Practices (BMPs) were proposed to mitigate the concerns (see Appendix B). Landscape architects have the opportunity to use these BMPs to create disc golf courses the entire community can enjoy.

GROW THE SPORT

Perhaps the greatest opportunity for landscape architects to be involved with the sport of disc golf is their ability to propose disc

golf courses in the program mix of their projects. While disc golf courses are not for every project, it seems that the potential benefits could be an asset to projects with enough space and an amenable program. If landscape architects have the knowledge required to propose (and possibly design) a disc golf course, they could bring the sport to new markets. The current development model allows for retrofitted courses, but landscape architects could bring disc golf into projects as a program element from the start. This would create the opportunity for better integration between the course and site.

EXPAND PRACTICE BASE

Finally, if the current rate of disc golf growth continues it is likely that there will be more disc golf courses in the future. By involving themselves in disc golf course development now, landscape architects are setting themselves up to expand their practice base if this growth continues and disc golf becomes more mainstream.

Objections to landscape architect involvement

There is potential for landscape architecture and disc golf, yet the two are not intricately related. There are a few objections to landscape architect involvement in disc golf that may explain why landscape architecture does not appear to be heavily involved in the sport. Firstly, disc golf course budgets are typically very small and would not adequately support landscape architecture consultation or design fees. The typical design fee suggested by the PDGA could provide for as little as 20 hours of work from a landscape architecture firm, depending on the firm. Although the topic has not been studied, it seems unlikely that 20 hours would be even close to sufficient for a landscape architect to design 18 holes of a disc golf course. This figure also does not include construction documentation costs, which would likely be higher (Professional Disc Golf Association, n.d.-f). Secondly, landscape architects do not appear to be needed by the current development model. The minimalist approach to course design does not require planting design, grading, or any other common landscape architectural service. By the current model of design, there is simply not much to

require the involvement of landscape architects. If landscape architects are to become heavily involved in disc golf course design, there will need to be models of development that overcome the two objections listed above.

Summary

It seems that while there are potential benefits for both landscape architecture and disc golf, there is currently little opportunity for greater interaction. The remainder of this study will engage this issue more fully to understand exactly what services landscape architects could bring to disc golf and how those services could be applied, both now and in the future.

GUIDING QUESTION

While there has been study on the benefits, potential applications, impacts, and potential solutions for disc golf; as yet there is no study of how landscape architects could be involved or why they would want to be. The guiding research question for this project is: compared to current disc golf course designers, what added benefit might landscape architects bring to disc golf course design and development? Three sub-questions will be used to study the guiding question: 1) what services might landscape architects generally offer disc golf course development, 2) what landscape architect services might be used by the current state of disc golf course development, and 3) what future course development types might take full advantage of the services of landscape architects?

This study is split into three parts, one for each of the sub-questions listed above (Figure 3.3). Each sub-question utilizes a unique set of methods, and comprises a chapter of the report. The study concludes with recommended next steps, discussion of future study opportunities, and closing thoughts.

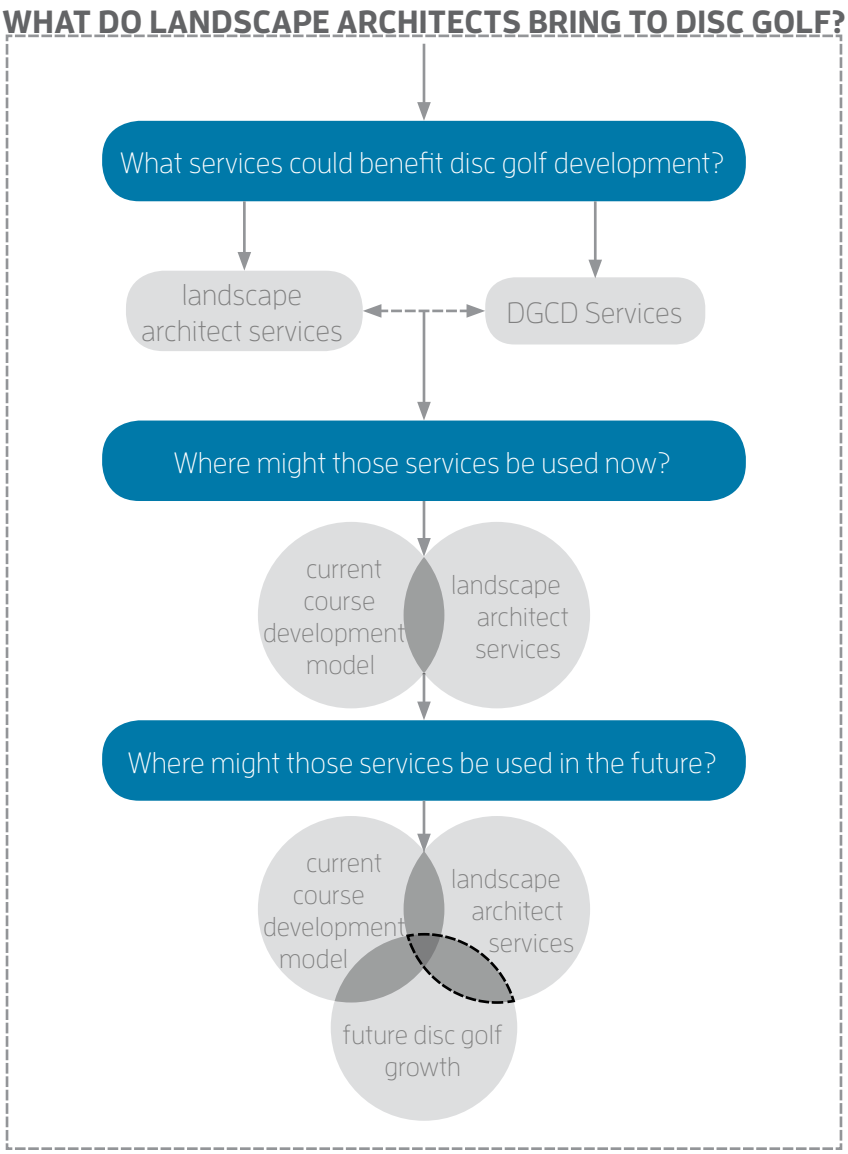


Figure 3.2 Study Process (Author, 2015)

04
Added Value

This chapter addresses the question of what added value landscape architects could bring to disc golf course design. First, the PDGA course design guidelines and literature from disc golf course designers will be synthesized into the skills/knowledge that a designer must know in order to design a disc golf course. Second, the potential roles for landscape architects will be discussed using precedents from other course sports. Finally, a matrix of core landscape architect services will be used to understand what added value landscape architects could contribute to disc golf course design.

Figure 4.1 Disc Golfer Tees Off in Chapel Hill (Ildar Sagdejev, 2009) (Licensing: Creative Commons Attribution-Share Alike 4.0 International)

Required Course Design Knowledge

Disc golf course design requires specific knowledge of the sport that the average player does not possess (Kennedy, n.d.). This knowledge includes navigating the political process (Professional Disc Golf Association, 2013b), understanding throw lengths and safety buffers (Houck, n.d.-d), and knowing how to maximize site characteristics (Houck, n.d.-e). This specific knowledge is outlined in the PDGA course design guidelines and in articles written by disc golf course designers.

PDGA DESIGN GUIDELINES

The PDGA course design guidelines contain five goals for disc golf course design (Professional Disc Golf Association, 2014). Specific knowledge of design and disc golf is required to satisfy these goals (Figure 4.2). The required knowledge in green is knowledge that landscape architects would not typically have.

DESIGNER ARTICLES

Several disc golf course designers have written articles on various topics related to disc golf course design. John Houck has written articles on fairway design, course length, course layout, and avoiding dumb holes (Houck, n.d.-a, n.d.-b, n.d.-c, n.d.-d, n.d.-e, n.d.-f, n.d.-g, n.d.-h, n.d.-i). Steve West has conducted research on disc golf course demand, flight path simulation, methods for using statistics to design better courses, and the geography of disc golf (West, n.d.). Mike Harrington has written a blog on the disc golf experience and articles on sustainably designing disc golf courses (Harrington, n.d.-a, n.d.-b, n.d.-c, n.d.-d). The topics discussed in these designer articles each relate to the goals outlined by the PDGA course design guidelines.

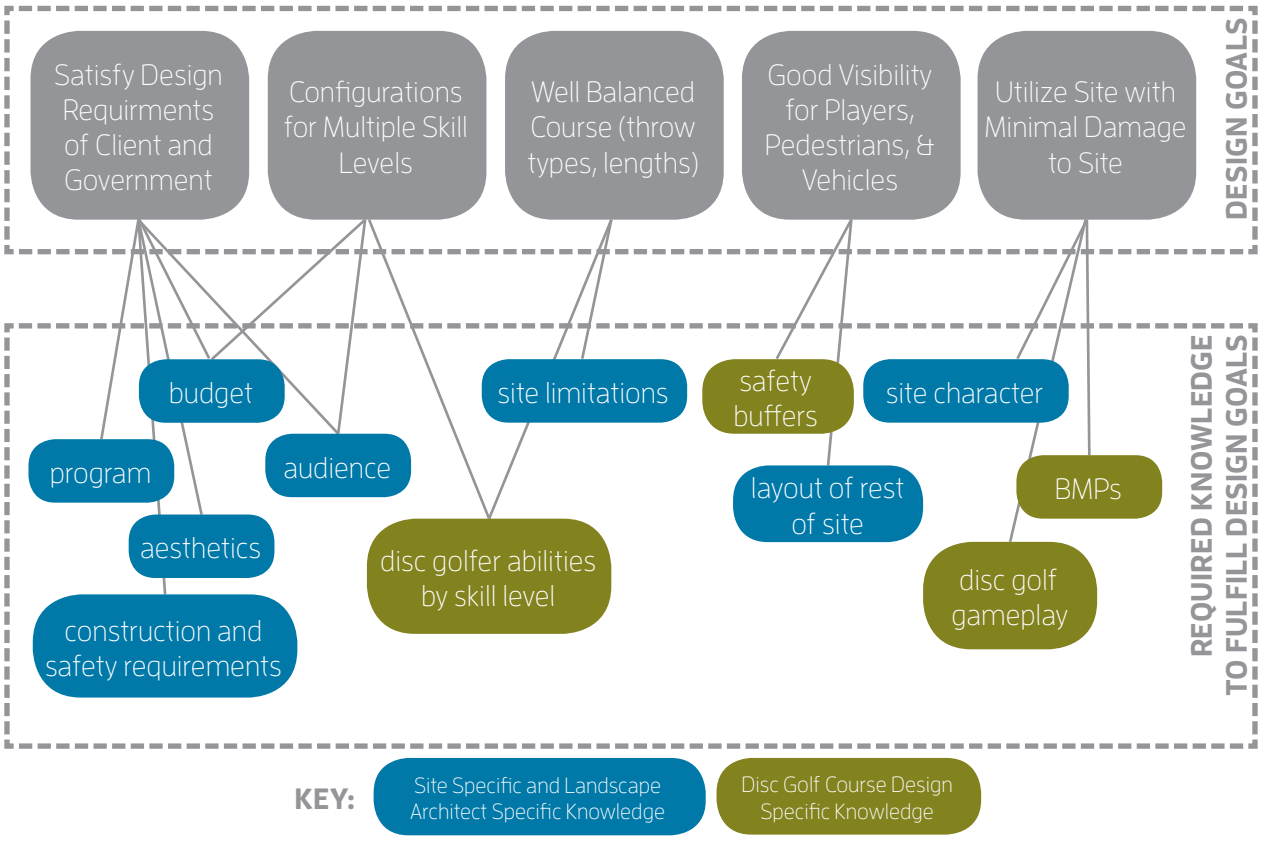


Figure 4.2 Disc Golf Course Design Required Knowledge (Author, 2015)

Landscape Architect Roles

The role of a landscape architect in a disc golf course project may vary based on the available budget for the course and the landscape architect's familiarity with the required disc golf course design knowledge shown in Figure 4.2. A landscape architect's role in disc golf course design can be described as a linear spectrum from minimal involvement to full or solo involvement. This spectrum also represents disc golf course designer involvement in a project, in the reverse order of the landscape architect's involvement. For partial involvement, landscape architects and disc golf course designers can work together. This section will develop the role spectrum into specific roles to guide further research. First, precedents from other course sports will be used to develop comparative and specific roles on this spectrum. Then the specific roles will be used to add context to any potential value landscape architects could offer.

PRECEDENTS

Traditional golf courses and skate parks will provide comparative precedents for involvement of landscape architect in disc golf course design. Each of the sports involves specialized knowledge about the sport that is necessary to design an excellent course. Skate parks in particular have a similar history to disc golf, including some animosity towards to sport from city governments and local communities.

Traditional golf course design typically involves several disciplines, including landscape architects, land planners, engineers, golf course architects, architects, and marketing firms. Land planners and landscape architects typically manage the project and determine where the golf course will be located, mediating between the golf course architect and the rest of the site (Mulvhill, 2001). For disc golf, landscape architects planning a park or similar facility could assume a similar role, deciding where the disc golf course should go and hiring a disc golf course designer to design the actual course. There are two potential levels to this partnership, separated by the size of the project budget. For a low budget project, the landscape architect could designate an area for a disc golf course and have no part in the course design, similar to an out parcel. For a high budget project, the landscape architect could work closely with the disc golf course designer to design holes for maximum visual effect. This might include grading, planting design, and the design of gathering spaces shared with the whole project.

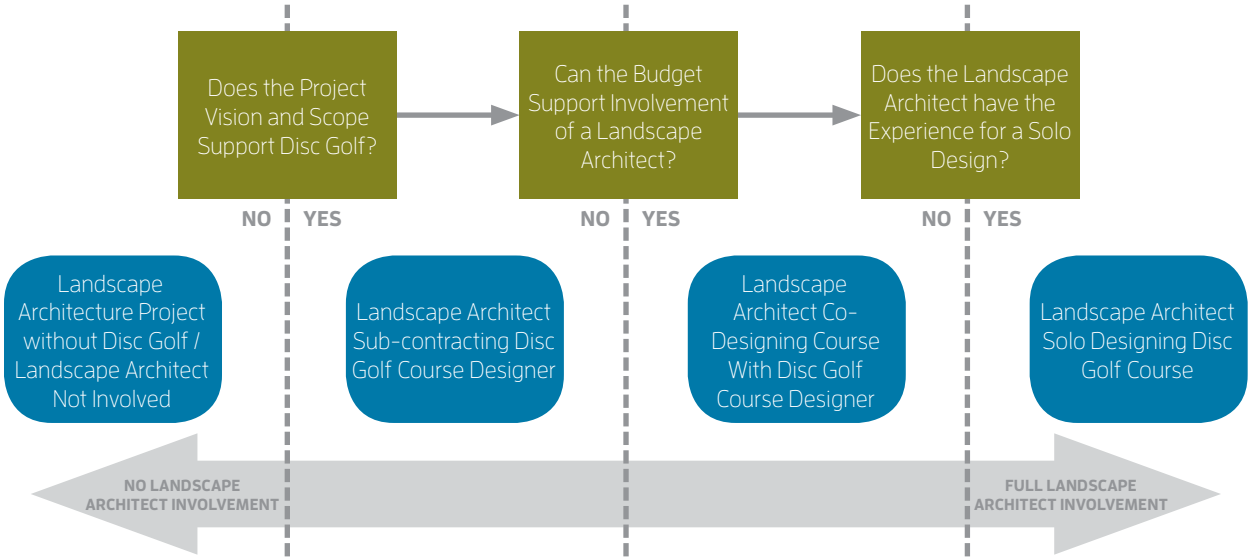


Figure 4.3 Landscape Architect Role Spectrum (Author, 2015)

Desmond Poirier wrote a thesis on skate park design and landscape architecture in 2008 (Poirier, 2008). He observed that, similar to traditional golf course projects, landscape architects tend to become managers for skate park projects, mediating between city governments and skate park designers. He also noted that landscape architects who are not skaters will "almost assuredly design a terrible park" (Poirier, 2008, p.10). This suggests another role for landscape architects in addition to the two already mentioned. If a landscape architect is a disc golfer and possesses the specialized knowledge required to design a disc golf course, they should be able to design an excellent disc golf course. However, since it has been noted that there is no single compilation of this specialized knowledge, it is not likely that many of these landscape architects exist.

LANDSCAPE ARCHITECT ROLES

Three roles are left for landscape architects: 1) proposing disc golf but taking no part in the course design, 2) proposing disc golf and co-designing the course, and 3) solo-designing the entire course. Figure 4.3 adds a fourth area (no landscape architect involvement) and plots it with the three other roles on the spectrum of landscape architect involvement. Each of these roles is separated by a barrier, defined by a question. The questions are phrased from the perspective of a landscape architect determining the potential role for disc golf in a project. If the answer to a question is yes, the landscape architect could be more involved in the course design. If no, the landscape architect should not be more involved.

Added Value

Analyzing the potential added value of landscape architects in disc golf course design starts with the core services of landscape architects and how they could apply to disc golf. The fourth role from Figure 4.3 will provide the contextual framework for determining how these services could be used to add value to the disc golf course. The added value is then compared to the services of disc golf course designers to remove overlaps and determine what added value is truly additional to the current state of disc golf course design.

CORE SERVICES

Core landscape architect services are drawn from the core competencies of the Landscape Architecture Body of Knowledge (LABOK) survey completed in 2004 (Appendix D). The matrix in Appendix D uses these core services and extrapolates how landscape architects can apply them to disc golf. This creates a list of the entire added value landscape architects can bring. Much of the services landscape architects can bring to disc golf are also offered by members of the DGCD community discovered through a survey of DGCD member websites (Appendix C). Thus, to determine the added value that only landscape architects can bring, services that overlap with DGCD services are removed, and the remaining services are synthesized into five categories. Figure 4.4 shows the simplified results of the matrix. The full matrix is located in Appendix D.

Services offered by the DGCD community are not easily defined. The basic requirements of becoming a member at the designer level assume that a member is competent in course design, and only requires that the member adhere to the guidelines adopted by the PDGA. To determine what services most disc golf course designers offer, websites of members of the DGCD community were surveyed (Appendix C). This survey found that typically, DGCD members offer hole layout and routing, tee pad design, and sign design or selection (called typical services in the appendix). Many DGCD members also offer course installation, and a few offer marketing services. Unfortunately, the certainty of the accuracy of this data is very low. Firstly, it is not certain that all disc golf course designers are members of the DGCD community. There is no membership requirement in order for someone to design disc golf courses. Secondly, only 14% of DGCD members have a working website listed

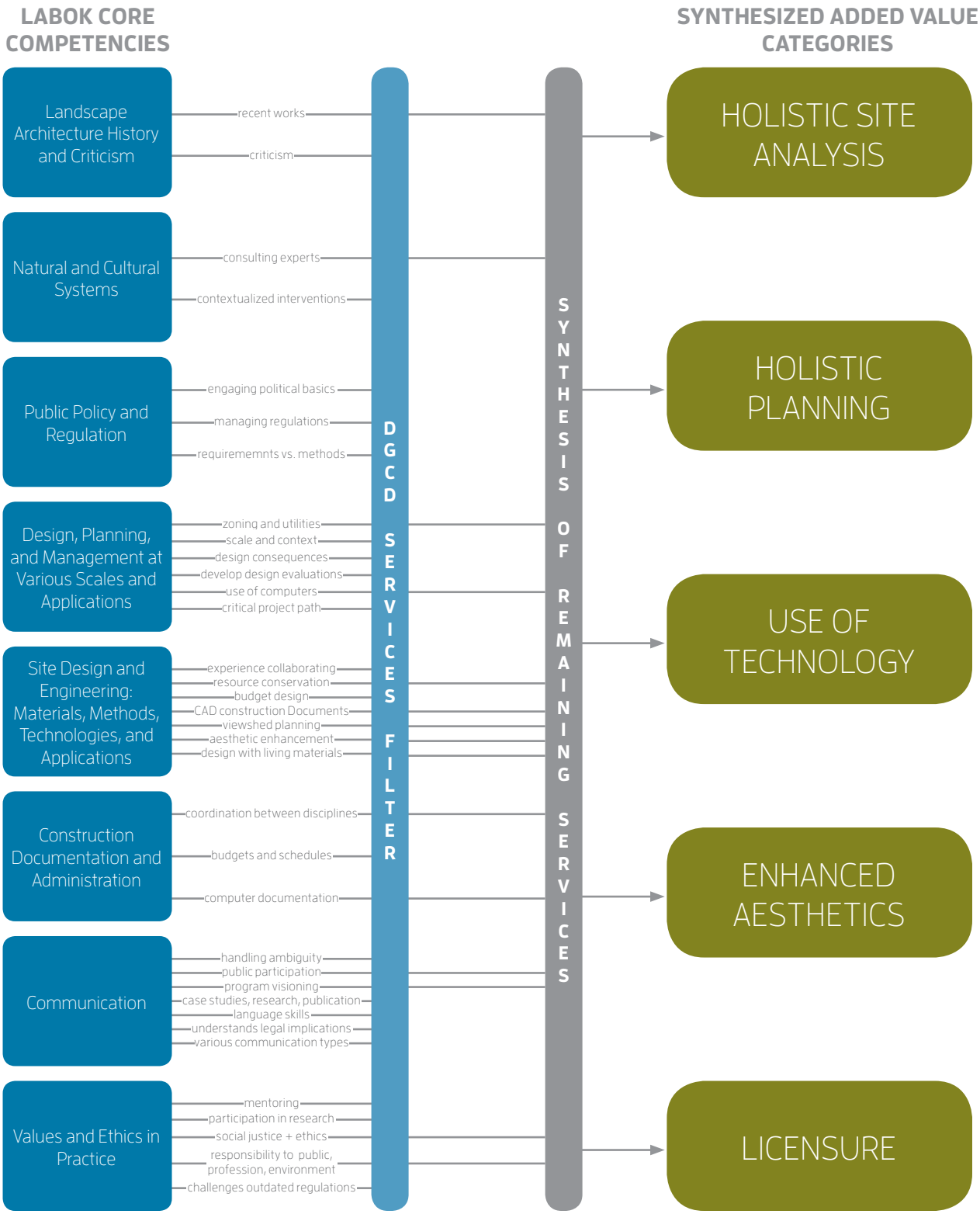


Figure 4.4 Potential Added Value of Landscape Architects (Author, 2015)

on their member profile. Statistically this means that only services offered by nearly all of the sample can be accurately generalized to the entire population. Finally, there is no guarantee that the services listed on the websites are an accurate depiction of all the services the designer offers, or even that the website is not outdated. Still, the results are the best available data on DGCD member's services. In spite of the potentially low accuracy of the data, it is the best available to project what value landscape architects can add to the services already offered by DGCD members.

ADDITIONAL VALUE

Figure 4.4 summarizes the potential added value for landscape architects. The chief added value from landscape architects comes from their ability to engage in holistic course planning, holistic site analysis, using technology for design and communication, enhancing course aesthetics, and the accountability and consistency of professional licensure.

Holistic planning

Landscape architects have the ability to integrate a course into the plan for a more comprehensive project from the outset. This allows the course to be more compatibly integrated with the other site elements, instead of being a tacked-on amenity. A disc golf course proposed by a landscape architect as part of a project can integrate with other systems, including storm water or utility corridors. Landscape architects can also coordinate a disc golf course with elements designed by architects and engineers.

Holistic site analysis

Landscape architects bring the ability to analyze a site based on complex environmental factors, including hydrology, microclimate, and cultural context. These factors can effect the long-term health of the course by avoiding erosion-prone areas, preserving critical water quality areas, and protecting plant health. Landscape architects also bring the ability to conduct community outreach workshops. These workshops can help the designer better understand the concerns of the surrounding community and to alleviate their concerns about disc golf. Landscape architects can then take all the gathered information and map the most suitable part of a site for a disc golf course.

Using technology

Landscape architects can use technology to communicate their designs, both to clients and other disciplines. Technology makes many of the processes more efficient and allows easier data interchanges with other disciplines and agencies. In particular, Geographic Information Systems (GIS) can make the site analysis process faster and easier, and produce maps that can convey the results to any audience.

Enhancing aesthetics

Landscape architects can offer more custom design options than disc golf course designers. Although some course designers offer sign design, landscape architects can offer custom design of signs, tees, benches, supporting spaces, grading, and planting to provide a truly unique disc golf experience.

Professional Licensure

The professional licensure of landscape architects provides a level of consistency and accountability not available from disc golf course designers. Figure 4.2 contains several services that are colored yellow and labelled "possibly". These are services that were offered by some of the designers in the survey, but not all. Licensed landscape architects should be able to provide all of the services listed, given the right background information. In addition to the consistency of services offered, landscape architect licensure also provides accountability that membership in the DGCD group does not.

Summary

To summarize, the biggest potential added value for landscape architects to give to disc golf course design are 1) holistic course planning, 2) holistic site analysis, 3) use of technology, 4) enhanced aesthetics, and 5) professional licensure. The remainder of this report will explore these contributions via the three roles defined earlier in this chapter. The first role, landscape architects contracting out the disc golf course design, is explored in the current opportunities chapter (Chapter 5). The second and third roles, landscape architects co-designing or solo designing the course, are explored in the future opportunities chapter (Chapter 6). Chapter 7 will conclude the study with recommendations of how the sport could move in the directions proposed in Chapters 5 and 6.


6

05 Current Opportunities

Current opportunities will be studied by examining current course types and how they fit into the spectrum of landscape architect roles. This will be done through identifying existing course types and identifying critical knowledge landscape architects need to be able to complete such a project.

Figure 5.1 Disc Golf in Revierpark Wischlingen (Vincentz,2014) (Licensing: Creative Commons Attribution-Share Alike 3.0 Unported)

Existing Course Types

A comprehensive study of the characteristics of different courses has not been done. With almost 5,000 courses in the United States ("Disc Golf Courses in the World - Disc Golf Course Review," n.d.), it is beyond the scope of this study to attempt to study the nuances of course types comprehensively. Instead this study will look at a small group of courses from a specific area and project the results to the full inventory. This approach is limited in its statistical accuracy, but is simpler and faster to execute than a random, statistically significant sample. Forty-five courses from the Austin, Texas, area were used as a sample due to a high concentration of courses and the author's familiarity with the area. Factors of analysis were chosen based on relevancy to the second potential role for landscape architect involvement: proposing a disc golf course and sub-contracting disc golf course designers to design it. This level of involvement requires that the project involves primary elements in addition to the disc golf course, specifically development that would involve landscape architects. Other factors studied include the course designer, course age, course rating, terrain type, vegetation type, target type, tee type, if the course is private, if the course is free or pay to play, and the number of holes. For more information on these factors and the full survey, see Appendix E. All data for the survey is courtesy of the website dgcoursereview.com (used with permission).

FINDINGS

Over 97% of courses in the Austin area have some sort of supporting development that landscape architects could be involved in. The unique types of development discovered by the survey were apartment complexes, business parks, campgrounds, churches, country clubs, neighborhoods, parks, resorts, school campuses, and summer camps (Figure 5.2). Other types of development likely exist in different parts of the country.

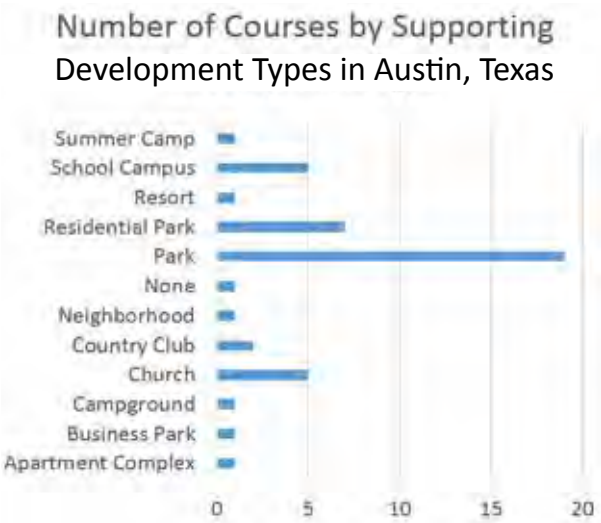


Figure 5.2 Number of Courses by Supporting Development Type in Austin, Texas (Author, 2015)

Potential contributions and required knowledge

The greatest contribution landscape architects can make to the sport of disc golf right now is their ability to propose disc golf courses and sub-contract the course design. In order to make this contribution, landscape architects will need to know four things about disc golf: 1) what site characteristics make a good disc golf course; 2) what are the area, budget, layout, and safety buffer requirements; 3) how to find a disc golf course designer; and 4) how courses are routed and supported with other program elements of the project. Most of this knowledge is available through a basic knowledge of how the game of disc golf is played and through information published by the PDGA.

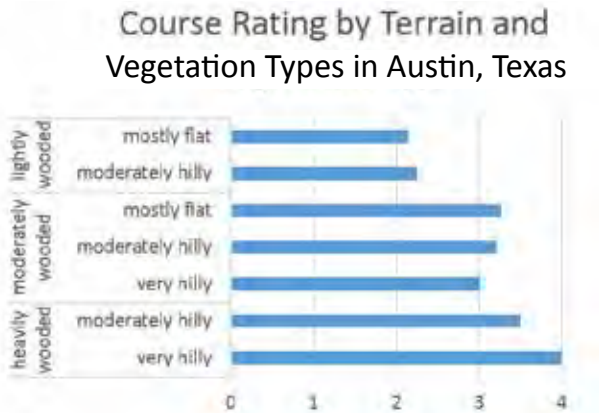


Figure 5.3 Course Rating by Terrain and Vegetation Type in Austin, Texas (Author, 2015)

SITE CHARACTERISTICS

As discussed in the Chapter 2 of this report, disc golf courses can be constructed in nearly any terrain, vegetation cover, and landscape type. However, not all landscape types make for good courses. Disc golf courses use terrain and vegetation to create interest and challenges, so a course on a flat, treeless field would be boring. The study of courses in Austin supports this: Of the 45 courses studied, the average rating was highest for very hilly courses with dense vegetation cover (Figure 5.3). Although the sample size for the study was small, it appears that there is a direct preference among disc golfers for hilly topography and dense vegetation.

COURSE REQUIREMENTS

A landscape architect will also need to know the required budget and area for a disc golf course. The PDGA publishes information on the cost of a disc golf course (Professional Disc Golf Association, n.d.-f), and a guide for estimating the area required for different types of courses (Appendix A). A summary of this information is shown in Tables 5.1 and 5.2.

CONTACTING COURSE DESIGNERS

The PDGA recommends hiring a member of the DGCD group to design disc golf courses. This advantage makes it simple to contact a local course designer, as the DGCD website contains a list of members by their city and state, in addition to contact information (DGCD, 2014). It may be helpful to contact a local disc golf group as well for information. Unfortunately there is no master list of disc golf groups, but many groups advertise their presence at local disc golf courses. Usually asking around on a busy day at a local course will be sufficient for finding these connections.

SUPPORTING SPACES

Depending on the scope of the course being installed, it may be desirable to supply supporting spaces to the disc golf course for the purpose of tournaments and local disc golf groups. Nearby open fields can have sponsor tents set up on them, and local disc golf groups could use picnic shelters, grills, drinking fountains, and other common park fixtures. To be useful, these features should be located somewhat near the end of the course. The disc golf course will also need parking access, typically accomplished with a dedicated parking lot at the start of the course.

COURSE TYPE	COST
low end (per hole)	$350
9 holes	$3,150
18 holes	$6,300
high end (per hole)	$1,000
9 holes	$9,000
18 holes	$18,000

Table 5.1 Cost of course by type (Author, 2015; adapted from PDGA, n.d.-f)

ACREAGE GUIDE FOR 18 HOLE COURSE BY DIFFICULTY	VEGETATION		
	Scattered	Average	Corridor
Gold Tees	26-39	18-27	14-20
Blue Tees	21-33	14-22	10-16
White Tees	16-27	10-18	8-13
Red Tees	12-23	9-15	6-11

Table 5.2 Area of course by difficulty (Author, 2015; adapted from PDGA, n.d.-c)

Trails can run through the course, but will need to be coordinated with the disc golf holes to avoid safety concerns.

Summary

The survey of disc golf courses shows that there is currently ample opportunity for landscape architects to propose disc golf courses. Landscape architects should be able to easily hire a member of the DGCD group to design the course. Depending on the type of course, the area and budget requirements will vary (Table 5.1 & 5.2). Although disc golf courses will work on nearly any landscape type, disc golfers probably tend to prefer more terrain and vegetation as opposed to less. Finally, landscape architects also need to work with the course designer to provide gathering spaces and coordinate circulation patterns. The next chapter will look at how landscape architects can be more involved in the design of the disc golf course itself.

06 Future Outcomes

The third and fourth roles for landscape architects (co-designing courses and solo-designing courses) can only be supported by projects with sufficient funding. Chapters 6-9 use design exercises to explore what future projects could look like within the fourth role. Although many possibilities exist, this project focuses on exploring three applications: 1) integration with other course sports, 2) high end disc golf resorts, and 3) disc golf residential communities. This chapter will outline the general design process and standards used to design the courses in these applications. This first section is also intended to be used as a reference for course design standards. The following chapters will explore each of the three possibilities listed above.

Figure 6.1 Fairmont #1 (Author, 2015)

General Design Process

The general design process followed in the applications has three steps: site inventory, conceptual design, and schematic design. The standards covered in this section are used for the disc golf course designs in each application. The design process described in this chapter takes a different approach than the process described in literature. This approach mimics the landscape architect's process for designing a traditional golf course. It relies on computer technology to determine where holes should go and uses site visits as a way to confirm the findings of the site inventory. This section is also intended to be a resource on this process for landscape architects designing disc golf courses.

SITE INVENTORY

The purpose of the site inventory is twofold. First, it must determine where the disc golf course cannot go. For some applications, this means identifying golf safety buffers or residential lots and giving them a sufficient buffer to ensure disc golf will not interfere with their function. This also includes identifying slopes too steep for disc golf, and bodies of water too large to play over. Secondly, the site inventory must identify the features of the site that the disc golf course should capitalize on. Depending on the project, these features may be environmental, such as trees, rocks, cliffs, or bodies of water; or they might be programmatic, such as a clubhouse, amenity center, or community park. All of these features must be mapped for utilization in the design.

CONCEPTUAL DESIGN

The conceptual design phase defines the goals and the big idea for the course and provides a rough spatial definition. The conceptual design process for the exercises in this project begins by selecting the features identified with the site inventory that the design will capitalize on. These features define points in the disc golf course that the route will follow. These points might be starting or ending points, such as a clubhouse or parking lot; or they might be midway points on the course, such as a signature hole that utilizes a special tree or view. The remainder of the disc golf holes must connect these points into a route. In the conceptual phase this means identifying areas where holes are likely to be easy to construct, such as patches of deciduous trees.

As the design is developed, holes through these patches of trees can be adjusted to flow through the existing vegetation.

SCHEMATIC DESIGN

The schematic design phase takes the big idea and goals for the course and develops their spatial form. In this phase individual holes are laid out with shot distances and safety buffers. The process for this mimics that of traditional golf course design. Disc golf, like ball golf, has three shots: the drive, the approach, and the putt. As a general rule, for a par 3 hole the disc golfer should be able to reach the basket area (equivalent of the golf green) from the tee, giving the disc golfer two chances to putt and make par. A par 4 hole introduces a landing area that the player must throw to first before throwing to the basket. The second shot to the basket is called an approach shot. Thus, the sequence of throws for a par 4 hole is drive-approach-putt-putt. Par 5 holes add another landing area and drive, making the sequence of throws drive-drive-approach-putt-putt. Safety buffers are calculated by drawing a radius around the tee, landing zone, and basket; and connecting the edges of the circles. With a knowledge of typical shot distances for each skill level, designers can lay out shots and safety buffers in plan view.

Hole Technical Standards

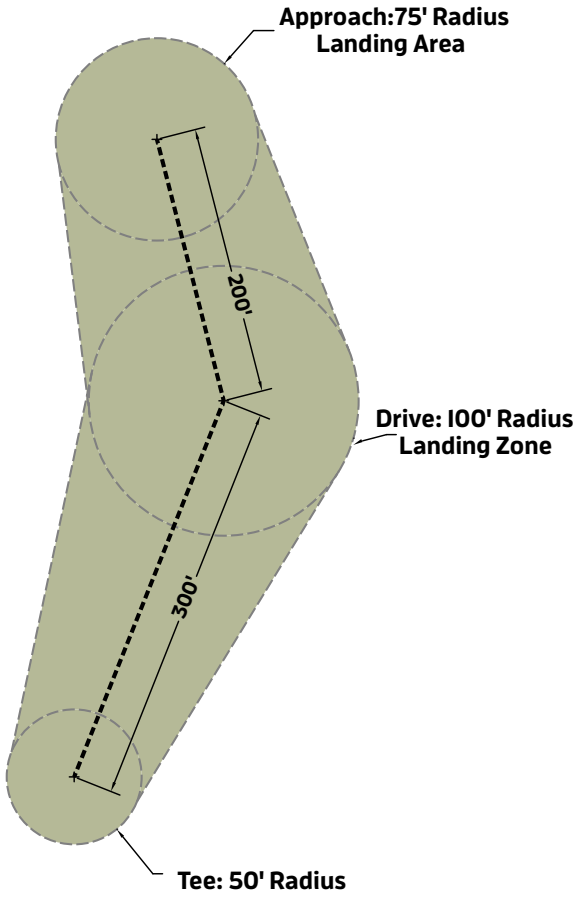
The PDGA tee colors of gold, blue, white, and red are used in these exercises to define skill levels. In his article titled "Dumb Holes", John Houck states that touring pros can typically drive 300-400 feet. Houck also states that approach shots for touring pros should be at least 200 feet (Houck, n.d.-d). For these exercises it is assumed that the gold tees are designed for touring pros. The PDGA publishes a document on determining par for various shot lengths for each tee color (Professional Disc Golf Association, n.d.-b). This document was used to interpolate target shot lengths for each tee color, using Houck's numbers as a starting point for gold tees. These target shot lengths are shown in Table 6.2. Disc golf holes for this project are laid out using the highest skill level that the holes will be designed for (all of these applications use gold tees). After all the holes have been laid out, the designer can go back and place the shorter tees.

Disc golf safety buffers can be drawn the same way in this process as ball golf safety buffers, however, just like ball golf these safety buffers

GOLD TEE TARGETS	
Drives	*300′-400′*
Approaches	*180′-250′*
BLUE TEE TARGETS	
Drives	*250′-350′*
Approaches	*130′-200′*
WHITE TEE TARGETS	
Drives	*200′-300′*
Approaches	*100′-170′*
RED TEE TARGETS	
Drives	*175′-250′*
Approaches	*80′-150′*

Table 6.1 Target Shot Lengths (Author, 2015)

must be used with a knowledge of how the game is played (Figure 6.2). These buffers are arbitrary, thus; discs will not necessarily fall everywhere inside the safety buffer. Nor will discs always fall within the buffer, thus prudence should be used when laying out the course. Safety buffer distances were calculated partly from the author's experience playing disc golf and partly from the distances used in traditional golf. Traditional golf distances are typically 2-3 times that of disc golf in hole lengths, so for this project it was assumed disc golf safety buffers should be at least half the size of ball golf buffers. Figure 6.2 diagrams the safety buffers used for these exercises.



The landing zone radius used depends on the designed shot. A par 3 where the first shot is designed as a drive will use the 100′ radius landing zone around the basket. A par 4 where the second shot is designed as an approach will use the approach radius of 75′ for the landing zone around the basket.

Figure 6.2 Disc golf Safety Buffers (Author, 2015)

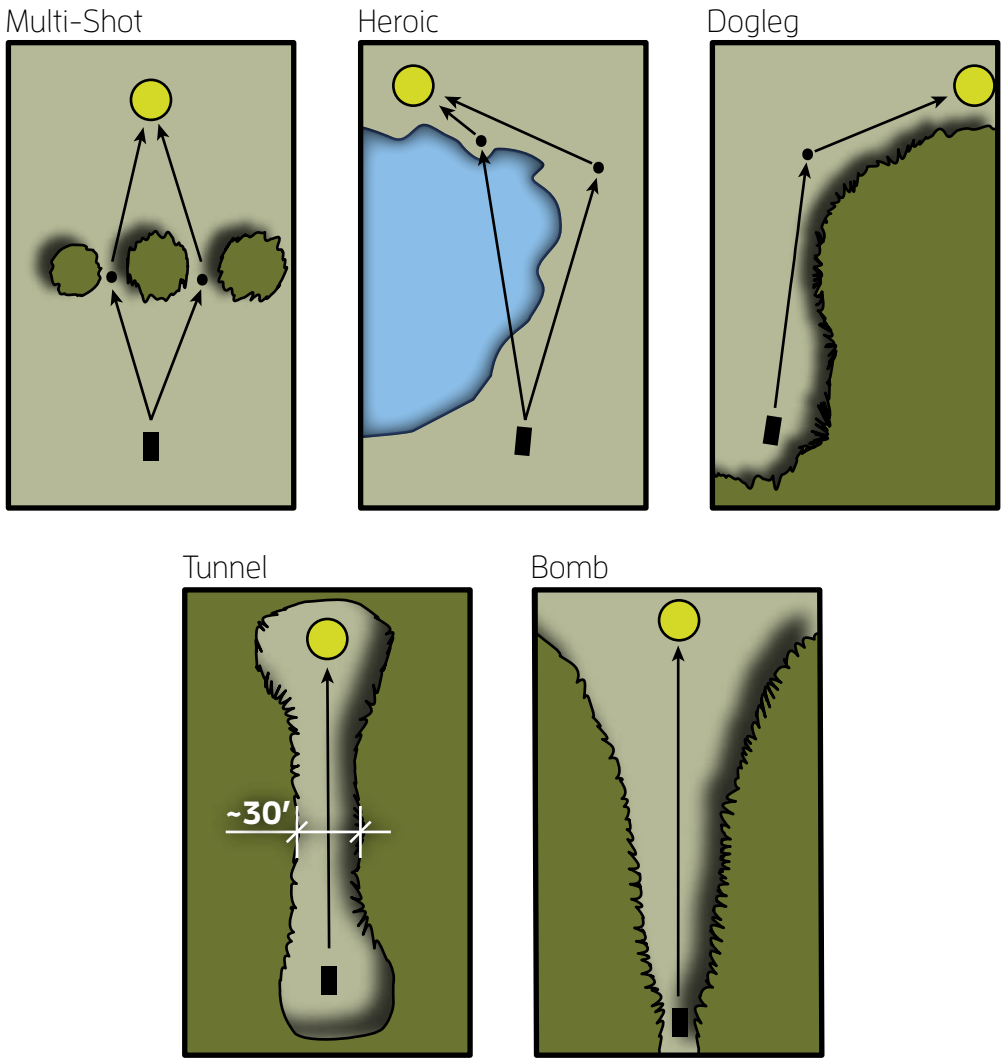


Figure 6.3 Disc Golf Hole Types (Author, 2015)

Strategy Toolbox

Nearly all disc golf holes can be classified as one or more of five types (Figure 6.3). These types were adapted from classic hole types in traditional golf, with the author's addition of the "tunnel shot" and the "bomb" types (Graves & Cornish, 1998). Not all holes can be placed in just one of these categories, however. Hole types can be combined either as multiple types in the same shot or multiple types in subsequent shots.

The intent of this classification is to make the different ways holes can be designed easier to understand, but this is not an exhaustive list of hole types. Disc golf holes can take nearly any form the designer can imagine, and it is up to the designer to push the limits of what a disc

golf hole can be. A thorough knowledge of the game of disc golf is paramount to making a truly unique hole type work. To help create these prototypical holes, designers have two tools for influencing disc throws. Mandatories (Mandos) and Out of Bounds (OB) areas force disc golfers to throw away from areas they could normally throw across. An example of this might be found on a sharp dogleg hole that cuts around the corner of a farmer's field. In order to keep disc golfers from cutting across the field, the designer could either designate the field as OB or create a Mando that forces players to not cut the corner. The two methods would not necessarily have the same result. In the example dogleg, with the field designated OB a disc golfer could still attempt to cut the corner by throwing across the field (Figure 6.4). If they succeed, they have saved themselves valuable distance. If they fail, they could be required to retrieve their disc, commence play from the spot it crossed the out of bounds line, and assess a penalty stroke to their score (out of bounds rules can vary by course). This type of OB area can create a desirable risk/reward scenario, however it can also lead to players occasionally walking on the farmer's field, potentially damaging crops. Mandos take a different approach in that they force players to throw around a certain object. In the example dogleg, the corner fencepost of the field could be designated as a Mando that players must throw to the left of (direction must be specified) (Figure 6.5). This method keeps players from attempting to cut the corner at all and keeps them out of the field, however it does not create the same risk/reward scenario. In any case, OB areas and Mandos must be clearly marked on the tee sign, and preferably with some type of signage on the course itself to avoid confusion about where players are supposed to be playing.

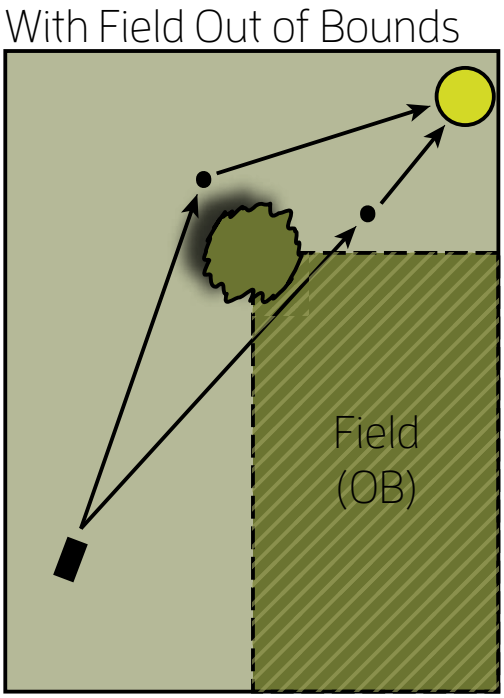


Figure 6.4 Out of Bounds Example (Author, 2015)

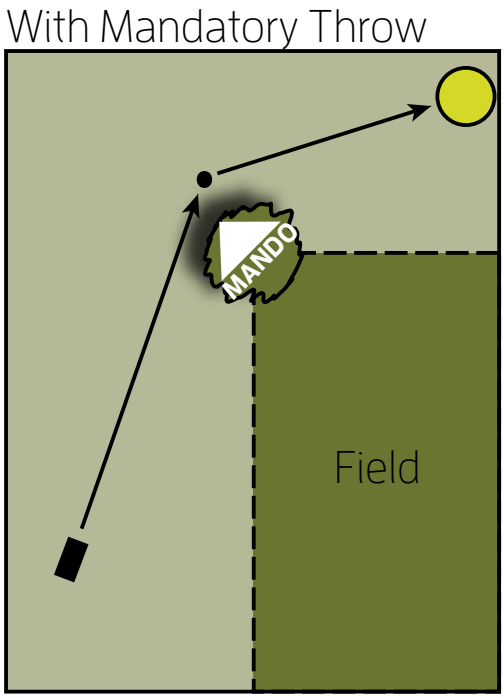


Figure 6.5 Mandatory Shot Example (Author, 2015)


5
PAR
3
240'
+5'

07

Exercise I: Integration

Disc golf courses are commonly found in parks, but they can also exist alongside other course sports. Both golf courses and ski slopes present opportunities for this integration. This exercise analyzes two disc golf courses built on traditional golf courses and responds to the results through a pair of disc golf course designs on golf courses in the Manhattan, Kansas area.

Figure 7.1 Disc Golf Water Hazard (Lovely, 2010) (Licensing: Creative Commons Attribution-ShareAlike 2.0 Generic)

Background

DGCD member Steve West specializes in disc golf for places with existing recreational amenities, which includes disc golf on golf courses (West, n.d.). The two disc golf courses analyzed by this application are Fort Snelling Disc Golf Course and Theodore Wirth Disc Golf Course, both designed by West. The analysis studied user reviews from dgcoursereview.com and synthesized the points using a Strengths, Weaknesses, Opportunities, and Threats (SWOT) framework (Appendix F). Table 7.1 shows the combined SWOT analysis results from the two courses (combined because the results of the analysis for each course were nearly identical). Two key points were resolved from this exercise: 1) disc golf fairways and traditional golf fairways are not ideally compatible (Figure 7.2), and 2) safety for disc golfers is made manageable by putting disc golf and ball golf play in the same stream. These two points contradict each other. If disc golfers play the course in the same stream as ball golfers, they are able to play relatively safely.

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
safety from disc golf and golf flow being integrated	a little boring	proximity to downtown areas	competing disc courses are free and potentially more fun to play
variety of multiple tees/pins	too long/not very technical	better maintained than competing courses	potential backlash from ball golfers
extreme length of holes	not completely safe	opportunities to introduce disc golf to ball golfers	
high level of maintenance		disc golf pro shop	

Table 7.1 Disc Golf on Golf Courses SWOT Analysis (Author, 2015)

However, because they are in the same stream they are forced to share fairways. This results in long shots with few obstacles comprising the entire course. Some users even called the courses "boring" because they lacked technical shots.

The concerns noted above relate to a lack of trees in the golf fairway. The disc golf holes for the two courses analyzed typically ran parallel to the golf fairway, although they might start in the trees at the edge. This means that the majority of shots are wide open throws with no obstacles. In order to add technicality to the disc golf holes, there will need to be more trees or other vertical obstacles. Golf courses typically have these trees in between the golf fairways. If disc golf holes played along the edges of the ball golf fairways more, it is possible that disc golf could use those trees to create more interesting shots. There are two ways disc golf courses could accomplish this. Holes could either 1) begin or end deeper in the trees on the edges of the golf fairway, or they could 2) run parallel to the golf fairway but off to the side in the trees. Both of these options separate the flow of disc golfers and ball golfers.

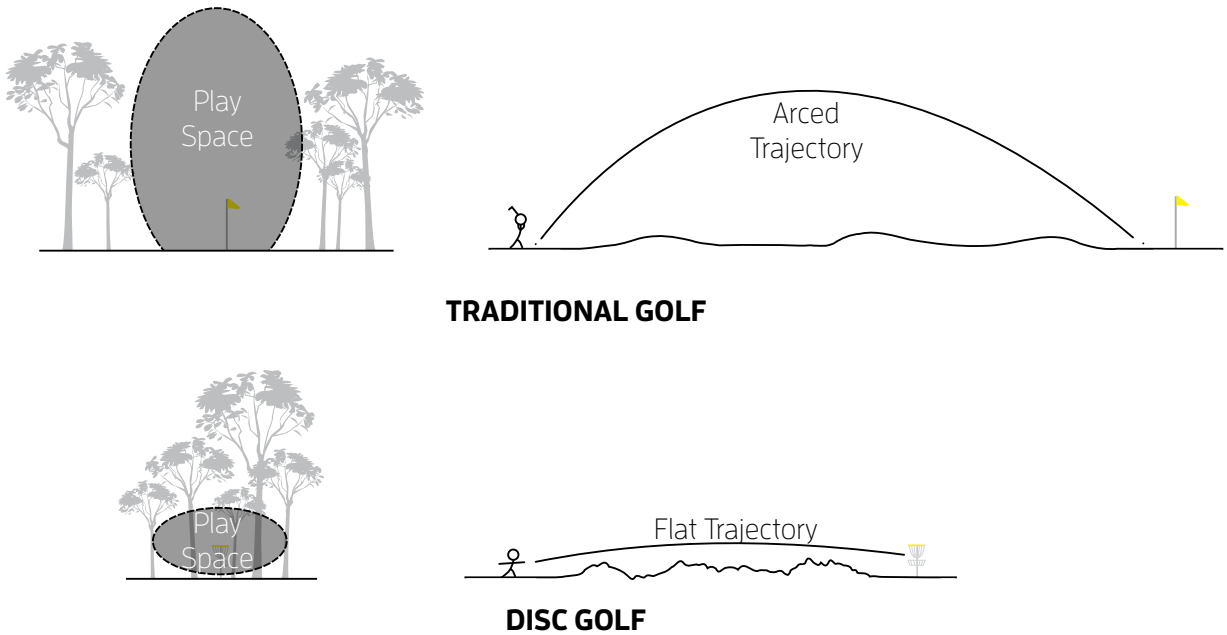


Figure 7.2 Golf and Disc Golf Fairway Comparison (Author, 2015)

Figure 7.3 Stagg Hill Location Map (Author, 2015)

Stagg Hill Golf Course

Stagg Hill Golf Course was selected specifically to test these two ideas. Stagg Hill is an 18 hole golf course and driving range on the banks of the Kansas River just southwest of Manhattan (Figure 7.3). It has the widest swaths of trees between golf fairways of any course in Manhattan, giving it the most potential for disc golf integration.

ANALYSIS

The analysis process began with mapping the safety zones for the ball golf course in order to find the safe areas for the disc golf course (Figure 7.5). Each traditional golf hole was mapped using shot lengths and safety distances from golf course design handouts and graphics from course lectures by Chip Winslow (Winslow, n.d.). Figure 7.5 shows clearly that the swaths of trees between

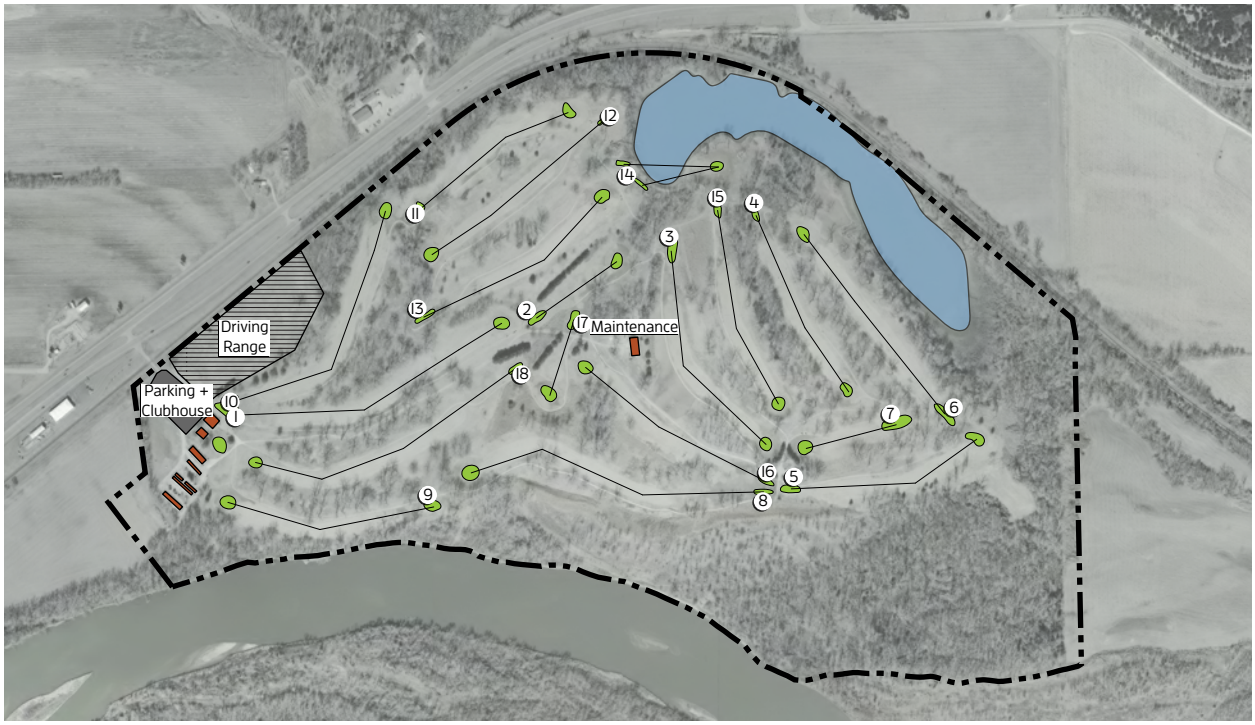


Figure 7.4 Stagg Hill Golf Course Map (Author, 2015)

Figure 7.5 Stagg Hill Ball Golf Safety Buffer Analysis (Author, 2015)

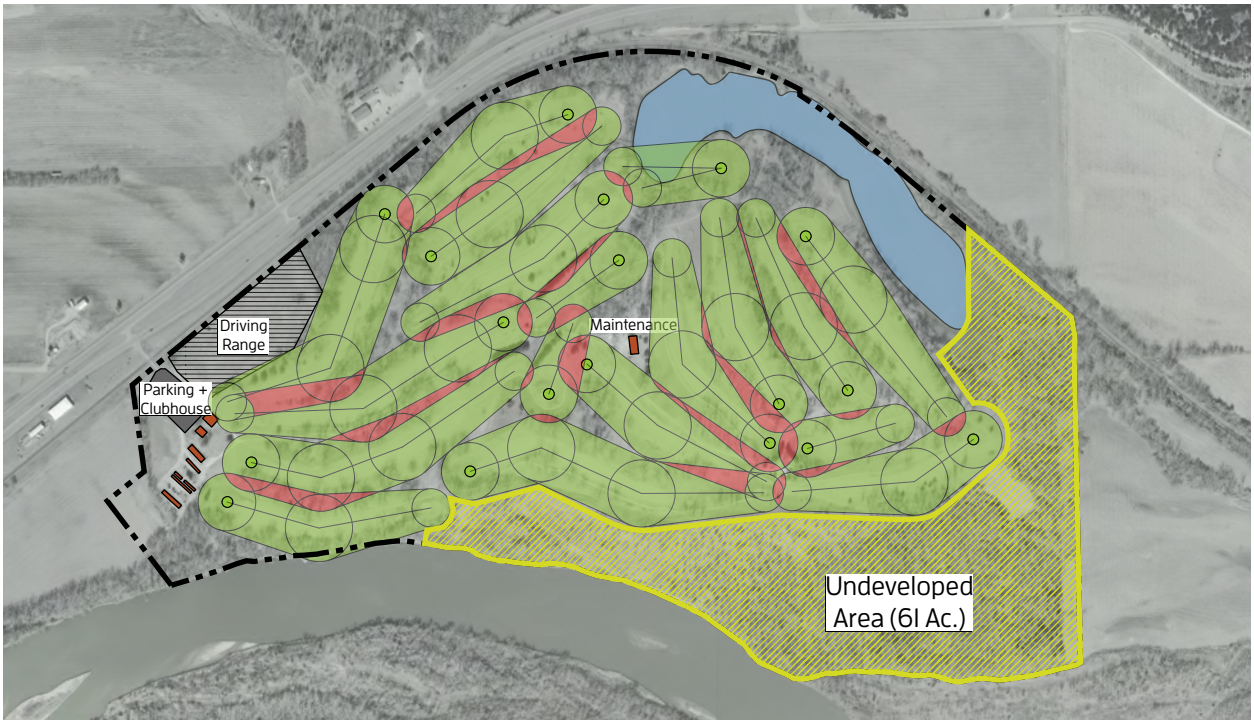


Figure 7.6 Stag Hill Undeveloped Area (Author, 2015)

fairways are not safe, and in fact are where the safety buffers of the golf holes overlap. Therefore, any disc golf course playing in the space between fairways would be unsafe.

Stagg Hill has two opportunities for a disc golf course that would not conflict with ball golf play. The disc golf could be on half of the ball golf course (the front or back nine) which would be closed to ball golf during disc golf, while the other nine holes remained open. Stagg Hill, however, has an opportunity that many golf courses do not. The southeast corner of the property contains 60+ acres of undeveloped area, which is more than enough for a championship level disc golf course (see PDGA disc golf course acreage estimator, Appendix A). While it is certain that not all traditional golf courses will have a portion of undeveloped land suitable for disc golf, for Stagg Hill it presents the best opportunity at integrating the sports. The disc golf course could still take advantage of the golf pro shop, clubhouse, cart rental, and maintenance equipment. The disadvantage of the Stagg Hill property is that the disc golf course would not have direct access to the parking lot, but would instead require a short walk or shuttle from the clubhouse to get to the first tee.

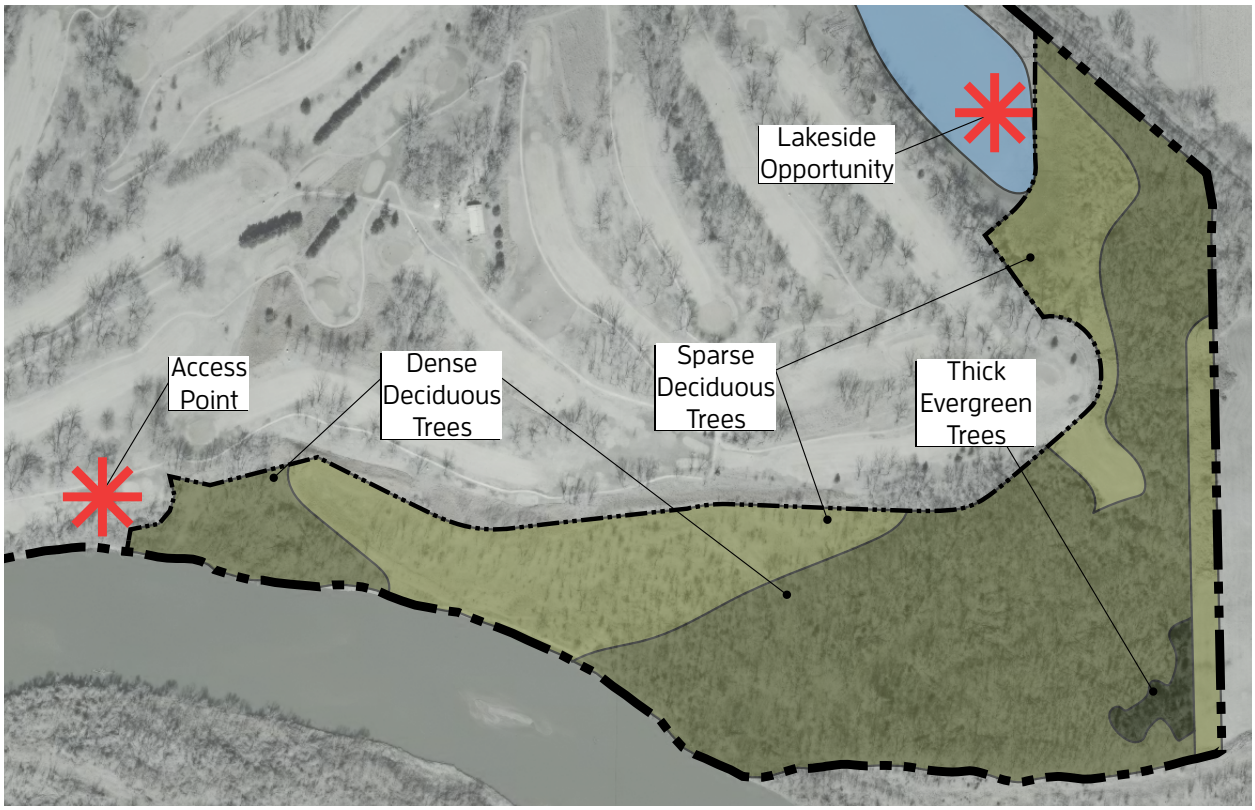


Figure 7.7 Stagg Hill Site Inventory (Author, 2015)

DESIGN

Site Inventory

Generally speaking, the site has the advantage and disadvantage of being located right next to the Kansas River. The close access to water is desirable for a disc golf course, but the flat terrain of the flood plain is not. The density of large trees on the site should compensate for the flat topography of the site. The trees on the site are primarily deciduous, with a small clump of evergreens. Deciduous and evergreen trees can be used differently on the disc golf course. Deciduous trees can be used as semi-permeable barriers, because their branches tend to be far enough above the ground to allow disc golfers to throw under them, while the low branches of evergreen trees (typically cedars in Kansas) and thick year round foliage create impenetrable barriers.

Figure 7.7 maps the key features of the site. These features include a small berm along the south side of golf hole #8, the lake in the northeast corner of the property, and the river running along the south side of the site. The site also has a few clumps of evergreen trees that can be used to create barriers around baskets or tees. The larger trees that are visible from the aerial have also been circled.

Figure 7.8 Stagg Hill Design Concept (Author, 2015)

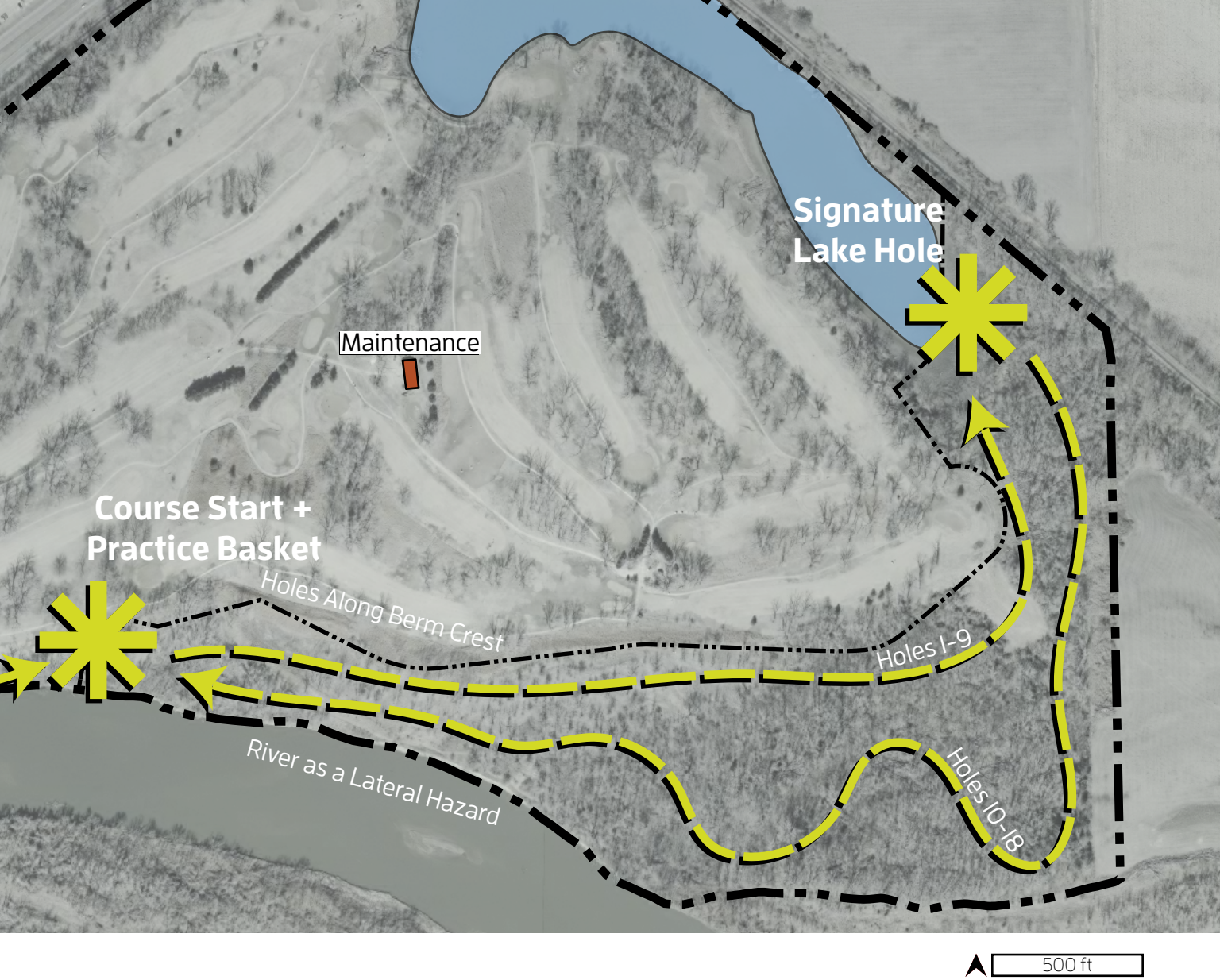
Conceptual Design

Figure 7.8 depicts the design concept for Stagg Hill's 18-hole championship level disc golf course. The course begins southeast of the clubhouse, halfway along the south side of golf hole #9. The disc golf course sign and practice basket are located here, at the start of the course, instead of next to the clubhouse. The advantage of this layout is that players can warm up while waiting for a group ahead of them to finish the hole, and that players can go straight from the course sign to the first hole. The disadvantage of this location is that it separates the start of the disc golf course from the clubhouse and potentially weakens the association between the two; thus, it does not do much to integrate the culture of disc golf with traditional golf because the disc golf course is tucked away in a corner. The start of the disc golf course could however be enhanced by restroom facilities and minor amenities like water fountains.

From the start of the course the disc golf holes play along the berm on the south edge of golf hole #8, curving up to meet the edge of the lake. The course then routes its way south and west back towards the start of the course, using the river as a lateral hazard for the last few holes. The thick vegetation on the site makes the conceptual design of connecting holes easier, because these holes can be easily adjusted to fit on the ground conditions later in the design process.

Schematic Design

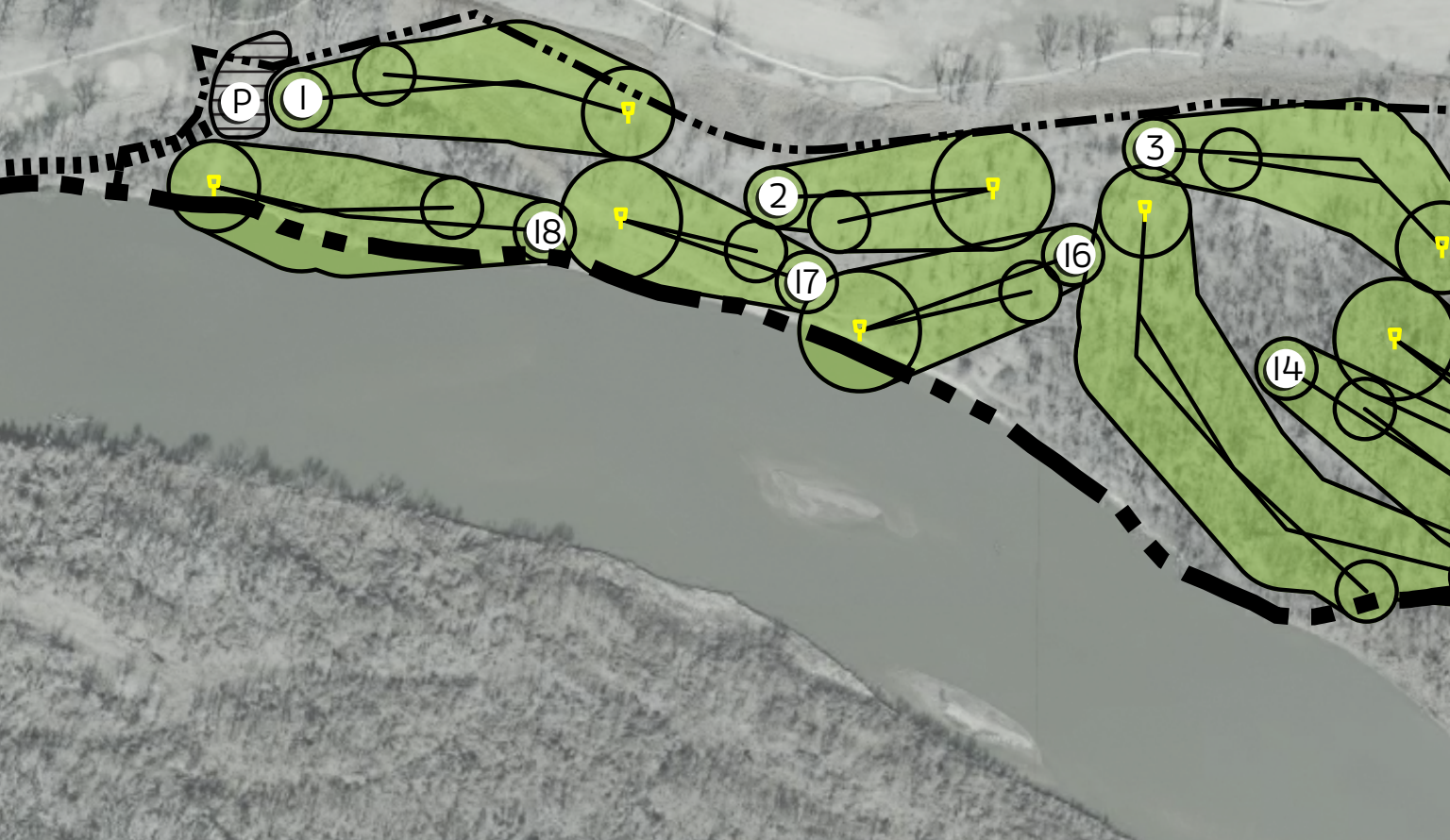
The schematic design of the site shows the route of each hole and how it will use the features of the site (Figure 7.9). Before construction, the schematic design would need to be confirmed

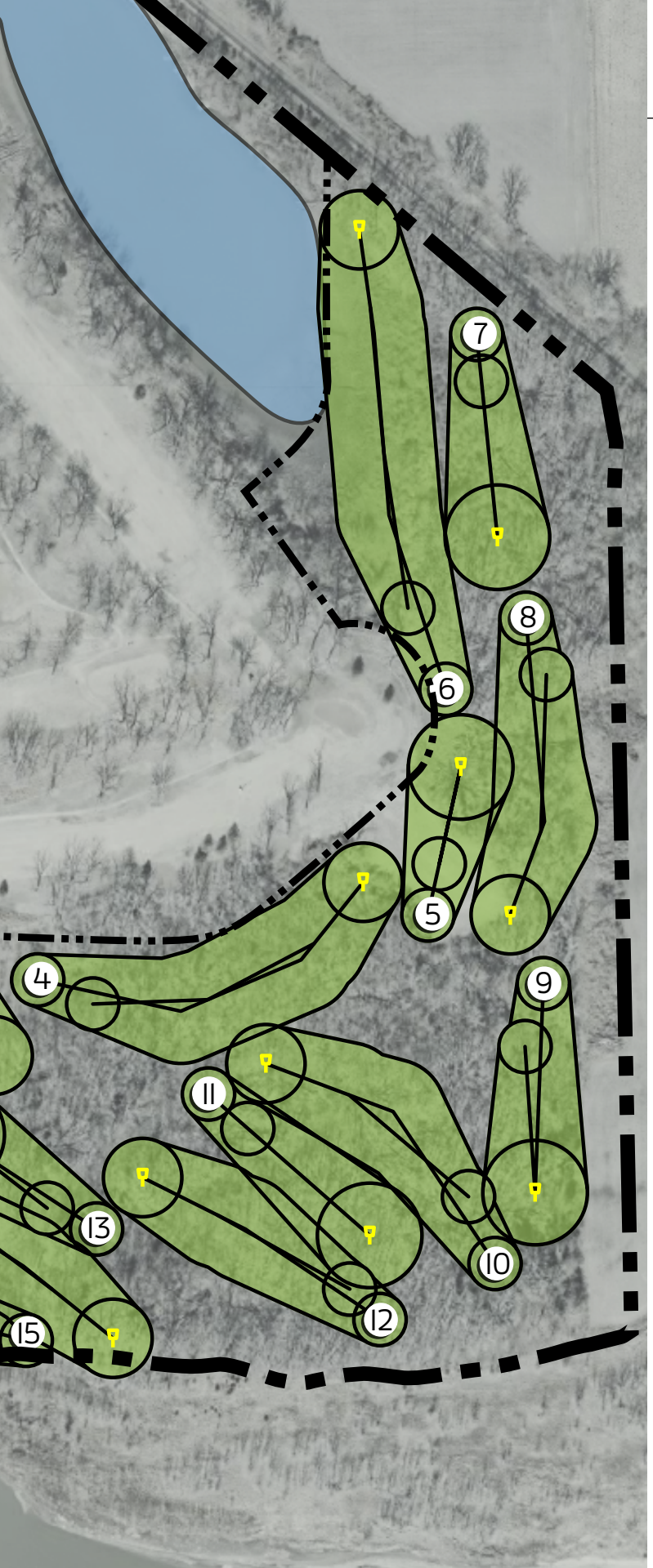


through a site visit, walking each "flyway" and noting trees or other features that could be problematic or better incorporated.

Stagg Hill Disc Golf Course has gold and white tees. Gold tees were used because they provide a level of challenge that will attract experienced disc golfers, and because none of the courses in Manhattan currently have tees that would be considered "gold" level. However, gold tees are not for everyone. Most players, especially new ones, will not be able to throw the distances necessary to play the gold tees correctly. For these players, the course also has white tees. The white tees are similar to the skill level of many of the holes in the Manhattan area. The different shot lengths for each tee color are then recorded in a spreadsheet and analyzed based on how they fit into the target lengths for that tee color (Appendix G).

HOLE #	PAR	GOLD TEES	WHITE TEES
1	4	550	410
2	3	360	260
3	4	540	400
4	5	720	600
5	3	290	190
6	5	900	730
7	3	390	300
8	4	580	470
9	3	400	280
10	4	610	470
11	3	410	310
12	4	530	450
13	3	330	230
14	4	595	450
15	5	950	770
16	3	375	290
17	3	325	230
18	4	555	400





STAGG HILL SUMMARY

If disc golf is not going to use the same fairway as traditional golf, the two sports should be separated completely for safety reasons. At Stagg Hill this means the disc golf course needs to be on the undeveloped portion of the property. The advantage of this arrangement is that the two sports can share the same clubhouse, pro shop, maintenance equipment, and other amenities the courses may have. The sports can also exist simultaneously, meaning no loss of greens fees income for the course. The disadvantage of this arrangement is that it adds a separate area that will need to be maintained. The strategy of shutting down the traditional golf course would avoid this extra maintenance. This strategy could be implemented on half of an 18 hole traditional golf course or on a nine hole traditional golf course, allowing the disc golf holes to snake in and out of the trees surrounding the course. The next section of this report will explore this possibility further.

Figure 7.9 Stagg Hill Schematic Design (Author, 2015)

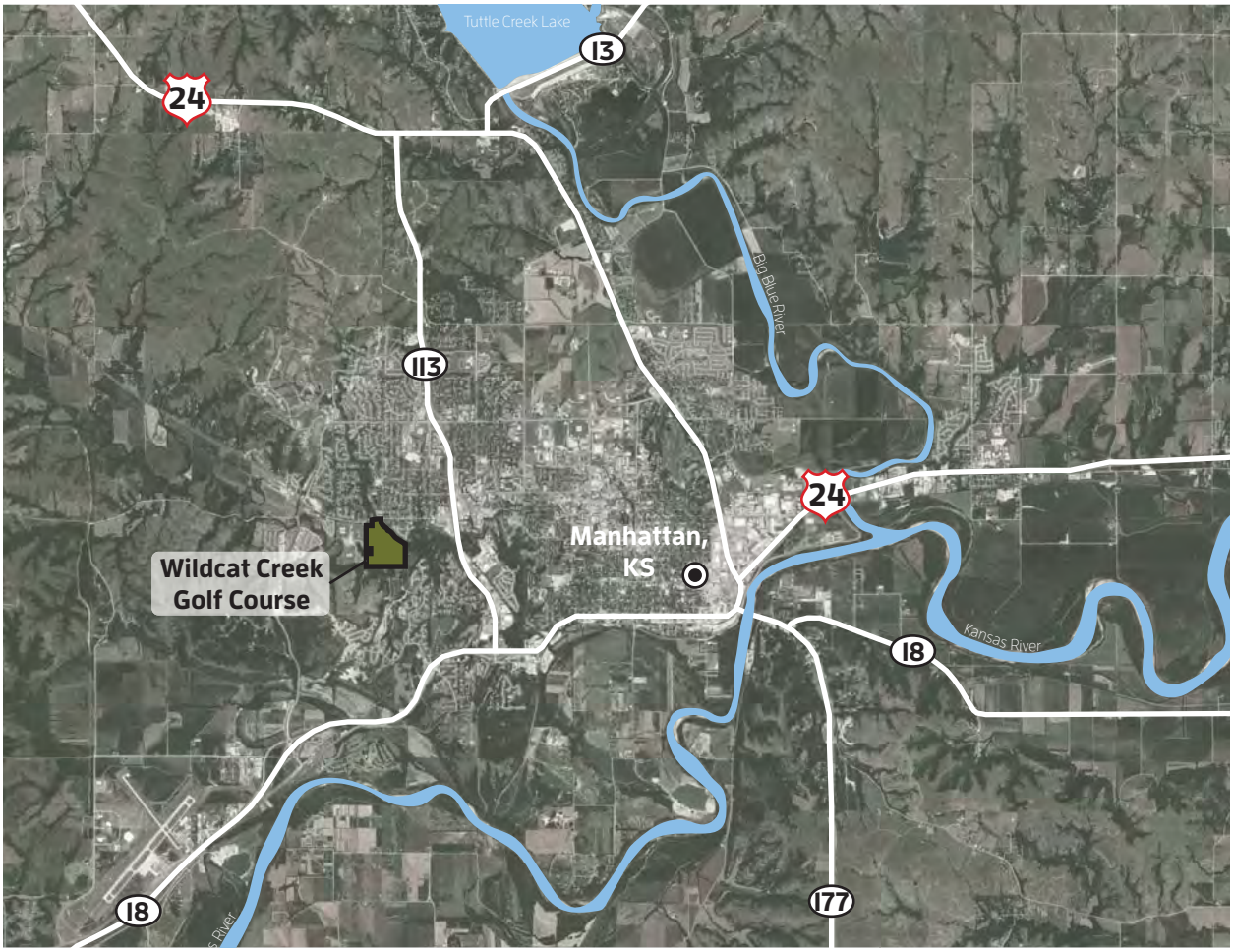


Figure 7.10 Wildcat Creek Location Map (Author, 2015)

Wildcat Creek Golf Course

The second site studied in this application is Wildcat Creek Golf Course. Wildcat Creek is a nine hole executive course located on the west side of Manhattan (Figure 7.10). The golf course is crisscrossed by creeks and utility corridors. Since it is only a nine hole course, it may be possible for the course to close traditional golf play at certain times of the day in order to allow disc golfers to play safely. Although Wildcat Creek is also located in a relatively flat floodplain, the golf course has enough topography in the form of mounds and raised greens to make the ground plane interesting. Disc golf holes at Wildcat Creek could cross the creeks, fairways, and in and out of the trees along the edges of the ball golf course. A course at Wildcat Creek could be ideal for tournament play, using the area and amenities that the golf course already possesses.

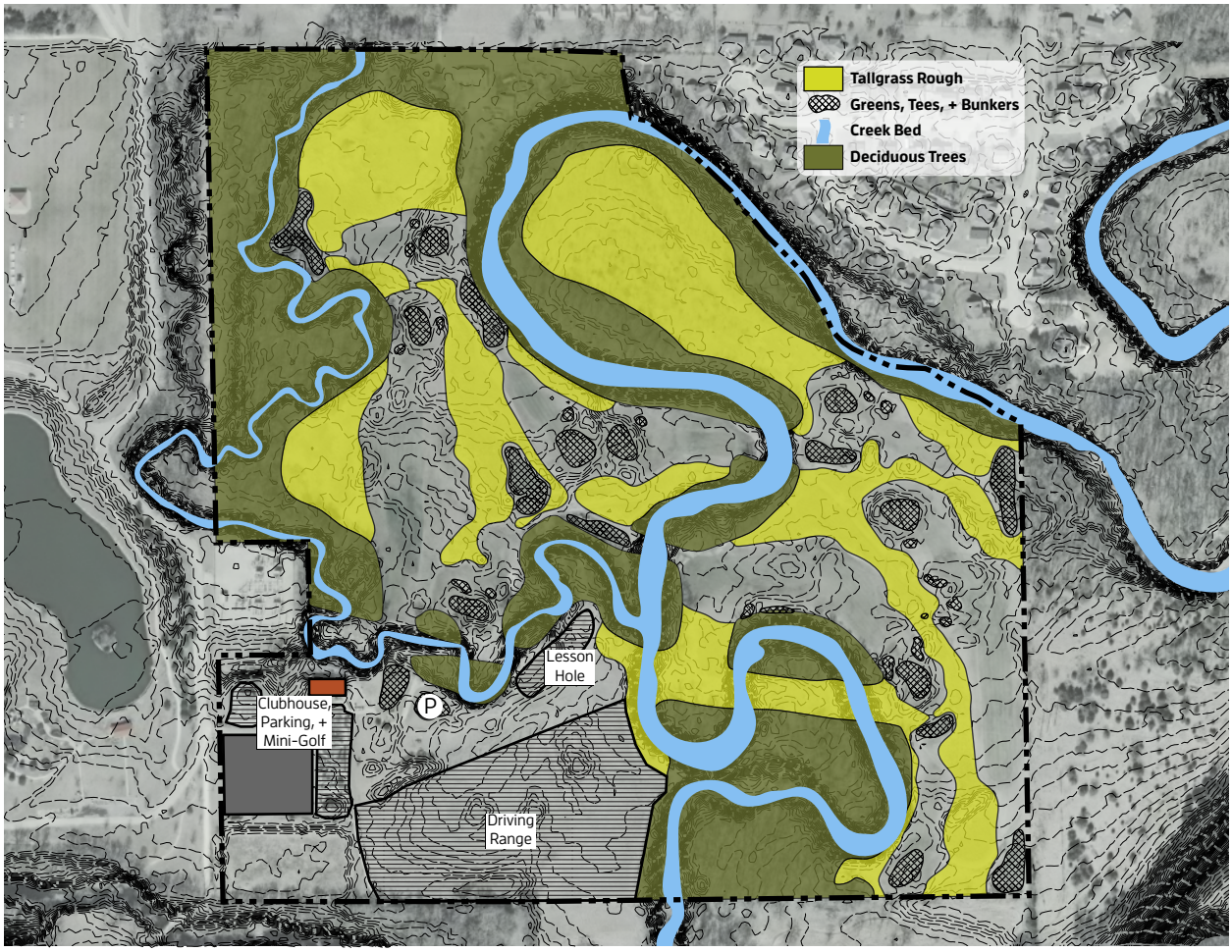


Figure 7.11 Wildcat Creek Site Inventory (Author, 2015)

DESIGN

Site Inventory

It is assumed for this design that the ball golf course will be temporarily closed, thus mapping the safety envelopes for the ball golf holes is not necessary as the entire site can be treated as safe for disc golf holes (Figure 7.11). The Wildcat Creek golf fairways are separated by swaths of waist-high native grass. Wildcat Creek cuts through the fairway of holes 4 and 8, but otherwise does not come into play. The course is surrounded by trees on all sides and along the edges of Wildcat Creek. Two electric transmission lines cross the site, one crossing midway on hole 6 and one forming the western border of the site. No specimen trees to highlight were identifiable in the aerial, however it seems that the majority of the trees on site are deciduous. This exercise assumes all trees are in good health, however, a site visit would be needed for confirmation.

Conceptual Design

The defining features of the site are Wildcat Creek and the well maintained golf fairways. The open golf fairways and greens provide a great opportunity for a highly maintained, aesthetic disc golf experience. What they do not provide is the challenge of executing tight shots and controlled drives. The disc golf course design proposes to mitigate this issue by calling all greens, tees, and bunkers out of bounds (Figure 7.12). Disc golfers whose disc lands in one of these areas must retrieve their disc and throw from the point that it went out of bounds (OB), and assess a penalty stroke to their score. Baskets and landing areas are placed close to OB areas to force players to carefully control their shots or make strategic or heroic decisions based on their own skill. The course design in this way rewards players with accuracy. On par 4 and 5 holes, disc golfers with the ability to throw far are rewarded with shorter shots to these small basket areas and landing areas.

These tricky fairway shots will not fully compensate for a lack of vertical barriers that force certain shots. To address this, several disc golf holes cut through the woods on the edges of

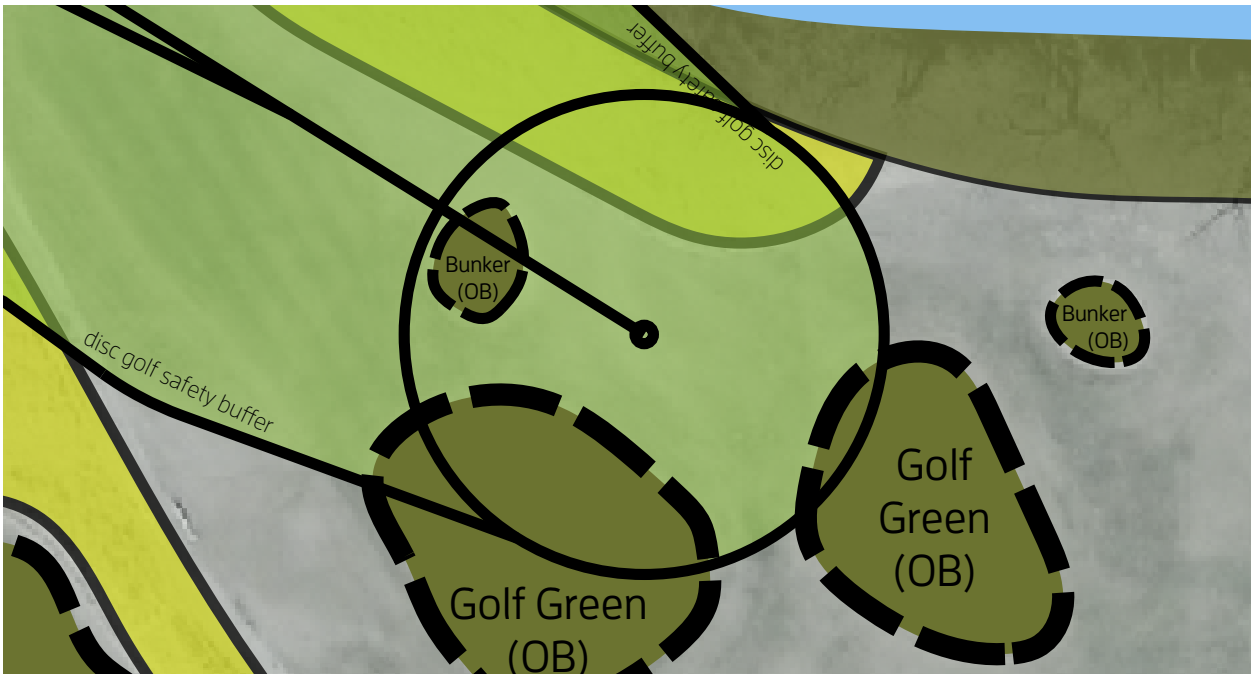


Figure 7.12 Out of Bounds Greens, Tees, and Hazards (Author, 2015)

Figure 7.13 Wildcat Creek Conceptual Design (Author, 2015)

the golf course (Figure 7.13). These holes provide the tight, technical shots that the open fairways lack. Some of these holes can cross the creeks or take advantage of the trees on site.

Two options can be used for tees: concrete pads or natural tees. Tees on the edges of the course that are not likely to come into contact with ball golf play can be concrete pads, while tees on the fairway or close to greens can be natural, marked with colored stakes in the ground. These natural tees can be moved every few weeks to keep wear and tear to a minimum.

Figure 7.14 Wildcat Creek Schematic Disc Golf Course Design (Author, 2015)

Schematic Design

The schematic design for Wildcat Creek is shown in Figure 7.14. The Wildcat Creek Disc Golf Course has gold and white tees. Both skill levels offer a long course challenge. The Wildcat Creek design can be considered to have between average vegetation and open, so the total length of all the holes fits between the target figures for the PDGA acreage guide for the gold tees (Appendix A). By the same measure, the white tees provide the challenge of a very long course.

Exercise I Summary

The analysis of this portion of this exercise revealed that disc golf and ball golf play conflict when in the same space. As discussed previously, disc golf and ball golf use different types of fairways. Ball golf fairways tend to be boring for disc golfers, while disc golf fairways are not big enough for ball golfers. The discrepancy between the fairways is exacerbated by the fact that both sports create a dangerous environment for anyone in the line of play. Because of the danger and play differences it is unlikely that the two sports can exist in the same area at the same time. This leaves disc golf with the two options explored above. The design portion of the exercise discovered four strategies and two issues that have potential to make disc golf on a golf course more successful. First, a traditional golf course may have undeveloped land, but it may not be easily accessible from the clubhouse because of safety buffers around the existing golf holes. Second, using the ball golf tees, greens, and bunkers as OB hazards could engage the ground plane more for disc golfers; but it is possible that this could cause damage to the golfing surface if the disc golf holes are not designed carefully. Third, the berms on a traditional golf course can be used to create a more interesting disc golf course, potentially making the case for grading on the disc golf course. Finally, using a taller rough, such as Wildcat Creek's waist-high native grasses between holes, can help define the disc golf flyways and make the course feel less wide open.

The process of using a landscape architect brought several benefits to this design process. First, the plan view safety buffer analysis that was adapted to disc golf (see Chapter 6) documented that safety distances were studied. Second, the plan view analysis method also allowed the designer to lay out first, second, and third shots more clearly, and then adjust those shots more easily based on their length. Both of these aspects of the landscape architect's process fall under the "holistic site planning" and "holistic site analysis" added values of landscape architects from Chapter 4. The author also used technology to map the sites and create the renderings of the design, incorporating the "use of technology" added value from Chapter 4.

08

Exercise 2: Resort

Selah Ranch is a disc golf resort in northeastern Texas. Selah Ranch is styled as a rustic retreat with multiple outdoor amenities, including two championship level disc golf courses. The two courses are among the top five highest rated courses in the country ("Top Ranked Courses Listing- Disc Golf Course Review," n.d.).

With the success of Selah Ranch's retreat style resort amenities and the decline of golf courses, it is plausible that a high-end resort similar to popular golf resorts could be successful in the near future, especially as disc golf continues to grow. This exercise will analyze Selah ranch based on golf resort design principles and attempt to further expand the disc golf resort horizon through a schematic design of a potential disc golf resort. The design will propose new game types, associations with other amenities, and a program based on the image of a traditional golf resort.

Figure 8.1 A Disc Golf Course in Yyteri Beach, Finland (Wikimedia user Kallerna, 2010) (Licensing: Creative Commons Attribution-Share Alike 3.0 Unported)

Analysis

Golf course designer Desmond Muirhead identified two types of golf resorts in his book on golf courses and real estate: the destination golf resort and the multi-use resort. The destination resort uses golf as the primary amenity, whereas the multi-use resort draws on multiple amenities, including golf, to attract guests. Muirhead also identified eight principles from traditional golf resort development that apply to either type of resort (Muirhead & Rando, 1994). These eight principles were used to analyze Selah Ranch.

ESTABLISH A THEME

Selah Ranch brands itself as a "Christian retreat center" ("East Texas Bed and Breakfast, Christian Retreat Center | Selah Ranch near Dallas," n.d.). This theme plays into its location, program, and aesthetic. Two hours from Dallas in the east Texas woods, Selah Ranch is designed as a getaway on the edge of a private lake. The program revolves around lodging, food, relaxing, and a few recreational amenities. The highly rated disc golf courses are the featured amenity, but the Ranch also has hiking, fishing, and shooting. The aesthetic of the property builds on the concept of a "retreat center". Terms such as "bunk house", "cabins", and "woodland cottages" all describe the architecture of the site. Pictures on the resort website show the rustic furnishings and décor of the lodging areas. The location, décor, and program each build on the retreat center theme.

DISTINCTIVE HOLES

The Selah Ranch disc golf courses, designed by John Houck, are known for distinctive holes ("Selah Ranch - Lakeside in Talco, TX - Disc Golf Course Review," n.d.). The most famous is #7 of the lakeside course, a par 5 hole that plays along the edge of the lake to an island green. Houck uses the water to tempt players to throw long shots (heroic) or force players to choose between two equally appealing shots (strategic). The result is the top rated course in the country ("Top Ranked Courses Listing- Disc Golf Course Review," n.d.).

DETAILS OF HIGH-IMAGE AREAS

The theme of Selah Ranch avoids setting an expectation for grandeur that a traditional golf resort might have. The entry sequence, architecture, and landscaping are all muted to emphasize the surrounding woods. The effect works well for the retreat center theme and helps to build a rustic aesthetic for the resort.

PROVISION FOR ADDITIONAL SERVICES

Selah Ranch may be the only disc golf course in the country to offer golf carts. Typically disc golfers will walk a course carrying their discs or wheeling a hand-cart behind them. Although it was not mentioned, it is possible that the course is also ADA accessible, since each hole is at least reachable by golf cart.

MULTIPLE COURSES AND SKILL LEVELS

Selah Ranch has two disc golf courses, each with multiple tees. Even with two courses and multiple tees, some users did not recommend taking beginners to these courses because of their difficulty ("Selah Ranch - Lakeside in Talco, TX - Disc Golf Course Review," n.d.). It is acceptable for a resort to present a higher level of challenge than an everyday course, however the lack of a beginner friendly course hurts the appeal of the resort to larger audiences.

ROOM FOR MAINTENANCE

No maintenance for the course is noted on the course website or the course reviews. It seems necessary that the course would have some type of maintenance to keep fairways clear of brush. However, disc golf is a very low maintenance sport compared to traditional golf, so it is possible that any maintenance is accomplished by the owner.

ROOM FOR TOURNAMENTS

Selah Ranch hosts the PDGA Amateur World Doubles Championship. Tournaments require extra room for sponsor tents, grandstands, media, and accommodations. Accommodations include camping areas, a hotel, cabins, and offsite provisions.

ACCOMPANYING PROGRAM

The program at Selah Ranch includes not only disc golf, but fishing, shooting, hiking, and relaxing. These amenities strengthen the resort theme as a rustic retreat. Typical golf resort amenities, such as a day spa or recreational complex, would not fit with the rustic retreat theme.

ANALYSIS SUMMARY

Figure 8.2 summarizes how Selah Ranch responds to each of these eight principles. With the exception of maintenance, which is assumed to not be a major concern for disc golf courses, Selah Ranch appears to respond well to all eight principles. Based on the location and program of Selah Ranch, the resort can be classified as a destination resort. Landscape architects can build on the prototype of Selah Ranch in two ways: 1) by expanding the accompanying program to create a multi-use resort, and 2) by proposing creatives additions to the game of disc golf that create more unique holes.

Design

The design site for this exercise is an 80 acre property in Manhattan, Kansas, known as Springer Ranch. Located southeast of downtown, the site is characterized by steep topography and thick vegetation. The design process for this exercise follows a process of program development, site analysis, and conceptual design.

PROGRAM DEVELOPMENT

Every resort design should begin with an in-depth market analysis (Muirhead & Rando, 1994). A market analysis is outside the scope of

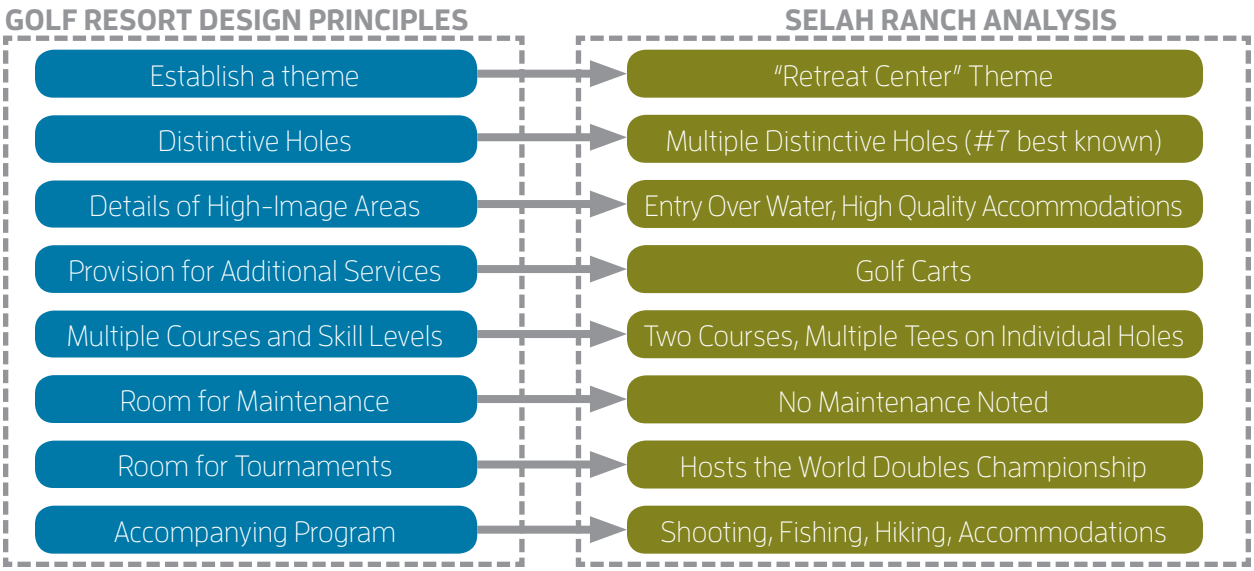


Figure 8.2 Selah Ranch Response to Golf Resort Design Principles (Author, 2015)

this project, so for the purposes of this exercise it is replaced with a few explicit assumptions. Firstly, this study assumes that Manhattan and its surrounding area has a sufficient population of disc golfers to support a resort, and that potential customers could be easily drawn from the nearby cities of Topeka, Lawrence, and Kansas City. In reality, it seems unlikely that Manhattan could support such a grand enterprise as a high-end disc golf resort; but this assumption allows the study to propose creative program elements without studying their long term financial feasibility. It is assumed the project will have two types of visitors: 1) day visitors that stop by for lunch or a round of disc golf, and 2) overnight visitors that stay in the resort accommodations. Springer Ranch is located close enough to Manhattan that it is likely the project could attract first type of visitors from town. The second type might come from nearby cities and towns or from across the country.

In order to broaden the appeal of the resort, the program will need to be as diverse as possible. The 80 acre Springer Ranch is small and steep and will not support a large program. As a solution to this, the resort will have a shuttle to local golf courses, Aggieville, and other attractions for overnight guests. In order to accommodate both types of visitors the resort will need to provide multiple activities. A restaurant, spa, disc golf course, and clubhouse could all serve overnight guests as well as day guests. Other amenities, such as a conference center, event venue, and hotel could be marketed towards overnight guests or special events. The full program used for this exercise is listed in Table 8.1.

PROGRAM	GOLF SUPPORT	DAY USE	OTHER USE
Disc Golf Course	✓	✓	
Trails	✓	✓	
Overlook	✓	✓	
Aerial Terrain Park	✓	✓	
Hotel	✓		✓
Restaurant	✓	✓	
Lounge	✓	✓	
Office Space	✓		✓
Day Spa		✓	
Tennis Courts		✓	
Maintenance Building	✓		
Clubhouse	✓	✓	
Event Venue	✓		✓

Table 8.1 Springer Ranch Proposed Program (Author, 2015)

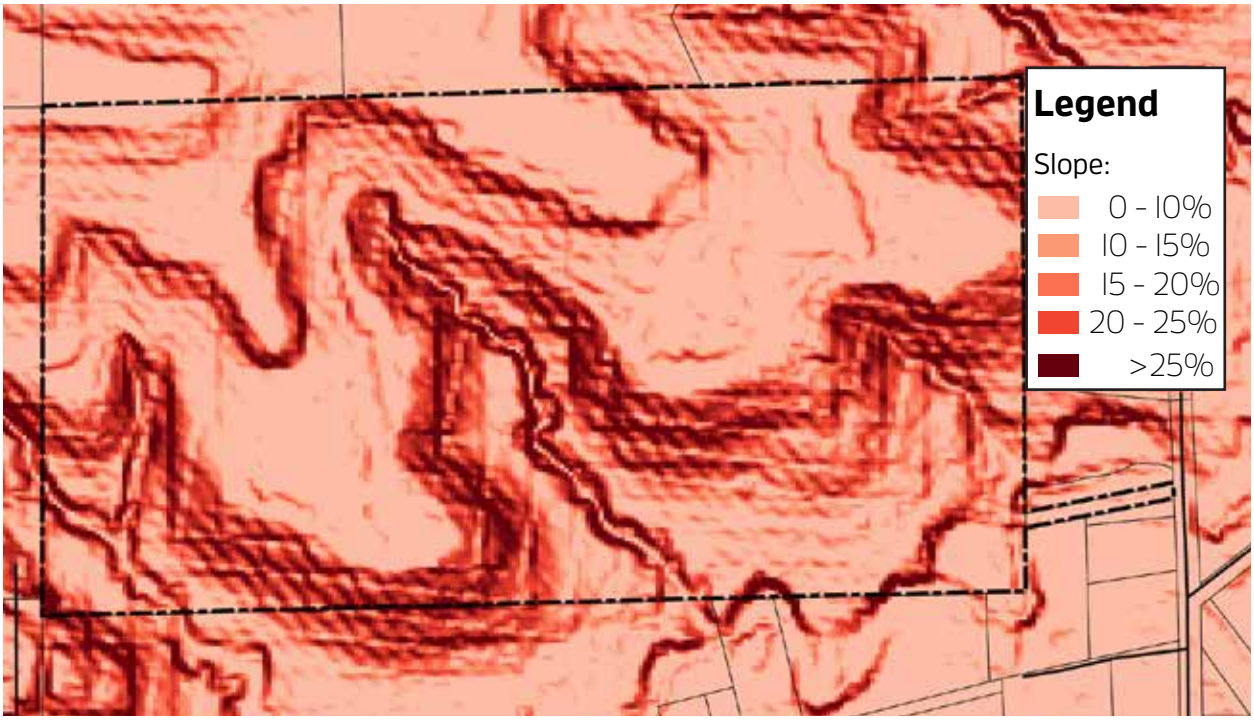


Figure 8.3 Springer Ranch Slope Analysis (Author, 2015)

SITE INVENTORY

Springer Ranch is a very steep site covered in dense vegetation (Figure 8.3, 8.4). Figure 8.4 maps three different vegetation types (deciduous, evergreen, and grassland) and highlights the areas on the site less than 10% slope. The extreme topography of the site creates an overlook opportunity on the southern hilltop which has views of the valley to the east of the site. Access to the site is in the northeast corner of the site via a gravel road. The site does not have direct access to the highway (Figure 8.5).

CONCEPTUAL DESIGN

The location for the structure elements of the program is restricted by the topography and access point to the flatter areas on the north end of the site (Figure 8.6). Guests will enter the site and drive up the entry road, passing underneath a pedestrian bridge that connects the hotel to the lounge. The hotel is small, but tall enough to account for the grade change between the hotel and the lounge. After passing under the pedestrian bridge, the entry road loops around to approach the main building head on. The main building sits on the edge of the lower slope to take advantage of the views to the valley. The main building contains office space, conference rooms, a spa, a restaurant, and a lounge. The patio behind

Figure 8.4 Springer Ranch Vegetation Map (Author, 2015)

500 ft

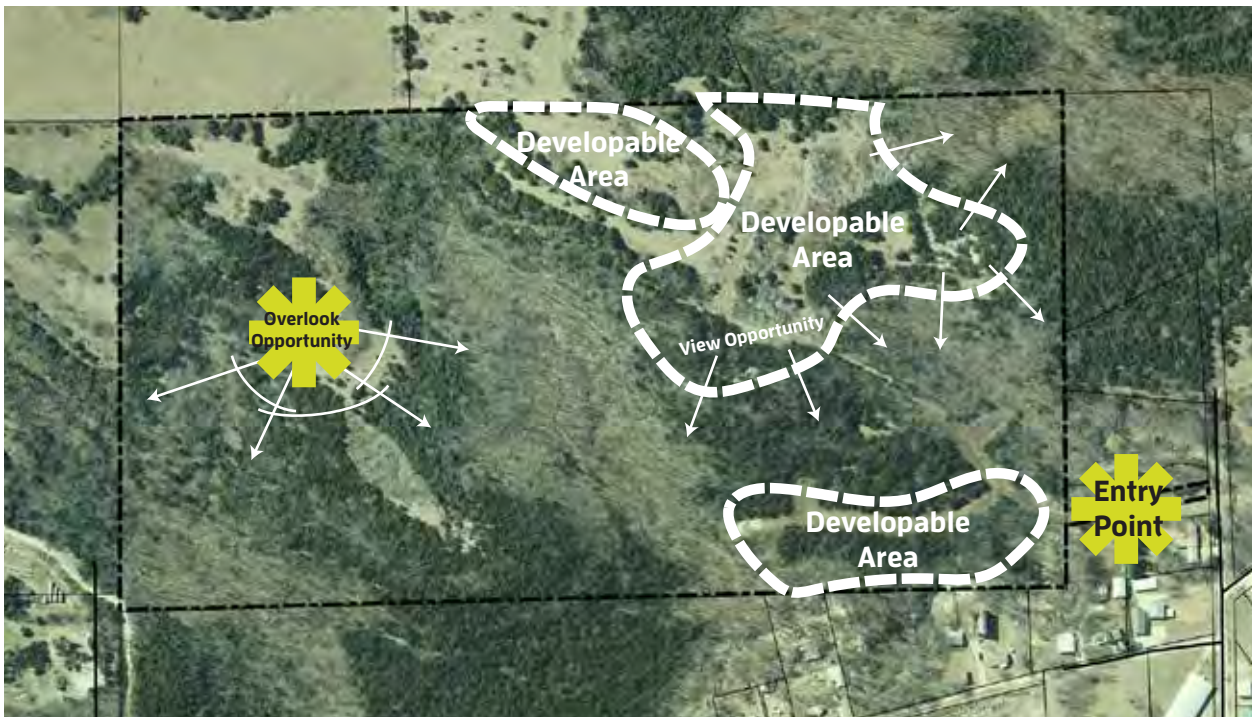


Figure 8.5 Springer Ranch Site Inventory (Author, 2015)

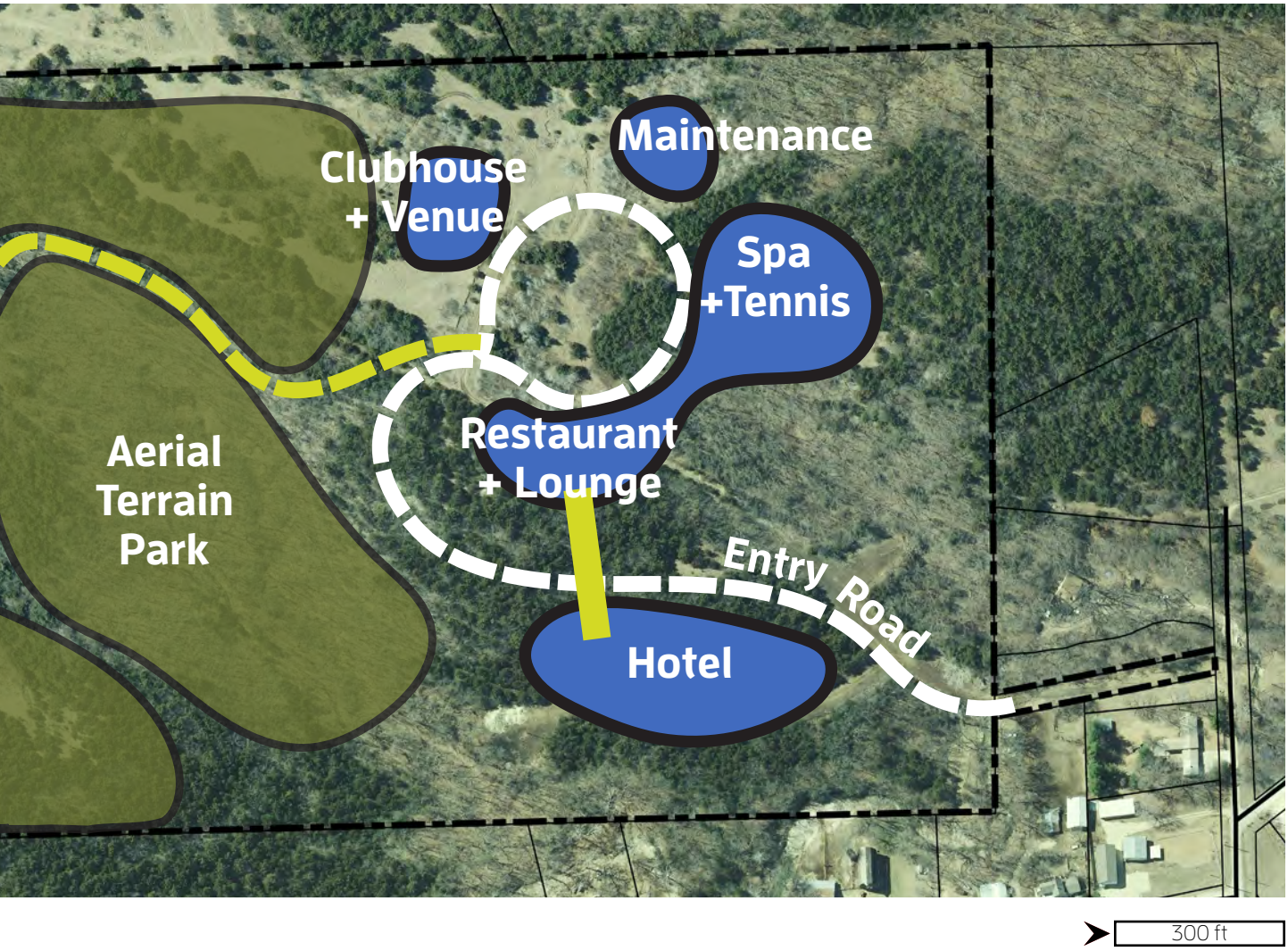
500 ft

the spa has a small swimming pool with an area for laps, a deck with a mini bar and facilities for outdoor gatherings, deck chairs for soaking up the sun, a hot tub area, tennis courts, and a basketball court. Once the entry road passes by the main building, it loops back on itself, passing by the screened entry to the maintenance building area. The parking area is terraced down the slope in the interior of the entry road loop. Finally, the road passes by the entry to the clubhouse and event venue. The clubhouse and event venue are sited at the edge of the rise in order to provide a view of the 18th hole as it approaches from the south. The building's position at the edge of the rise also allows it to take advantage of outward views towards the valley, potentially with a picture window backdrop for the venue stage.

A trail begins where the entry road loops back on itself. This trail is an out and back route to the south that accesses the overlook on the southern hilltop. East of the trail, the deciduous woods are designated a disc golf terrain park, similar to a terrain park at a ski resort or a putt-putt ball golf course. To the west of the trail and the majority of the south portion of the site lies the disc golf course.

Figure 8.6 Springer Ranch Conceptual Design (Author, 2015)

The Springer Ranch disc golf course has very few constraints and very few signature features visible from the planning level. This exercise will not go into detail on the 18-hole disc golf course as the Reunion Ranch application will explore a similar design challenge. Instead, the terrain park concept is developed. The idea of a disc golf terrain park represents a possible addition to the sport that could attract visitors in the same



way as a distinctive hole. The disc golf terrain park is a new idea, and has the potential to reach new players and even change the way the sport is played. The disc golf terrain park will focus on short, accurate throws. The short, controlled nature of the throws may help a terrain park appeal to users who do not have the physical ability to throw a golf disc the long distances characterizing many disc golf courses. A shorter hole with greater accuracy required provides a level of challenge for current players, but adds another way they can introduce potential players to the sport. In addition to the potential appeal to those outside the sport, a disc golf terrain park could appeal just as much or more to current players of the sport by providing a different type of challenge with the same benefits of regular disc golf.

TERRAIN PARK

The disc golf terrain park has a variety of short throws to disc golf baskets. All of these holes are par 2, and can be played with any disc, including an ultimate disc. These holes have unusual obstacles between the tee and the basket, such as hoops, walls, and tricky Mandos. They will require detailed signage to explain how the hole is supposed to be played, visually describing the shots players will need to make. The resort could also record videos demonstrating the techniques used for the various shots and make these available to the public as a promotional piece for the resort. Each hole uses a different concept, so instead of being numbered the holes are named.

Hoops (hole 1)

The first hole has hoops suspended above the ground that disc must pass through before reaching the basket (Figure 8.7). These hoops are steel rings of different sizes, suspended above the ground by cables attached to the surrounding trees. Players can choose any of the hoops to pass through, but they must pass through at least one. The hoops are also color coded by difficulty. If a player's shot flies past the intended hoop it is considered out of bounds, and the player must re-throw from the drop zone (in front of the hoop) and assess a penalty stroke to their score.

Figure 8.7 Hoops Concept (Author, 2015)

Chute (hole 2)

The second hole has a steel chute that players must hit from 30 feet away (Figure 8.8). The Disc must hit the chute at a shallow angle, yet still have sufficient force and accuracy to carry itself up the chute and directly into the basket.

Figure 8.8 Chute Concept (Author, 2015)

Wall Ride (hole 3)

The wall ride is a classic Frisbee trick shot. This hole uses the wall ride shot as a means of navigating the disc around the barrier and into the basket (Figure 8.9). If players hit their line perfectly, the wall will direct their disc into the basket. If they miss their line or execute the shot poorly they will have to finish out with an extra putt.

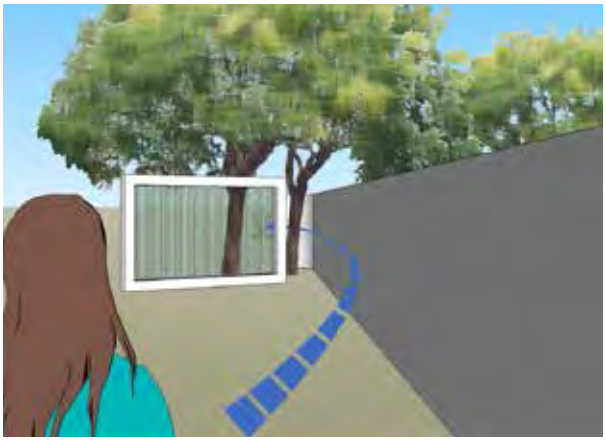


Figure 8.9 Wall Ride Concept (Author, 2015)

Up and Over (hole 4)

The elevator shot is another classic disc throw in which the disc is thrown at an upward angle, and then floats almost straight down. This hole uses the elevator shot to clear a bar set 15 feet above the ground and 20 feet in front of the basket (Figure 8.10). Shots that fly under the bar are considered out of bounds, but may be re-thrown from the tee as the player's second shot.

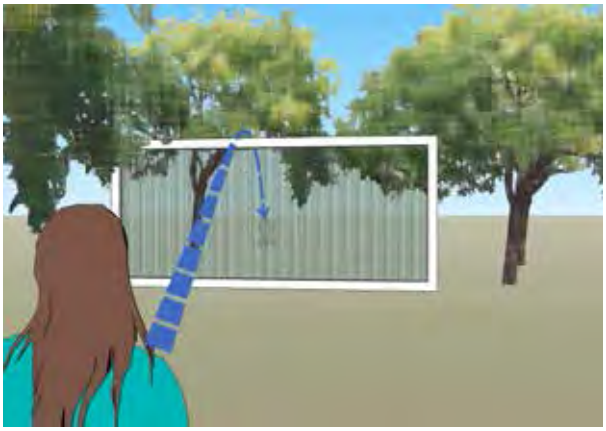


Figure 8.10 Up and Over Concept (Author, 2015)

Boomerang (hole 5)

This hole requires players throw a shot at an upward angle so that the disc flies back towards the thrower's left, around the Mando set in front of the tee (Figure 8.11). Multiple tees add difficulty to the shot. This hole will need sufficient vertical clearance for shots.

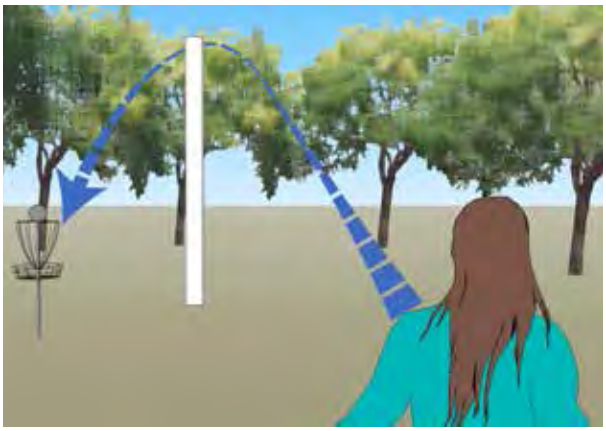


Figure 8.11 Boomerang Concept (Author, 2015)

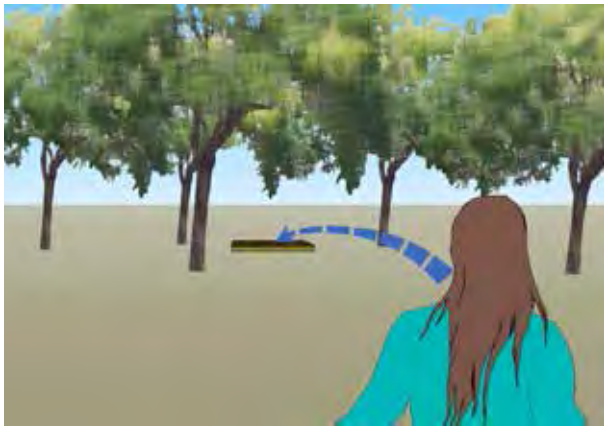


Figure 8.12 Ball Golf Concept (Author, 2015)

Ball Golf (hole 6)

This hole requires players to land their shot on top of a hole in a platform, as opposed to hitting the basket from the side (Figure 8.12). This downhill shot requires touch control from players.

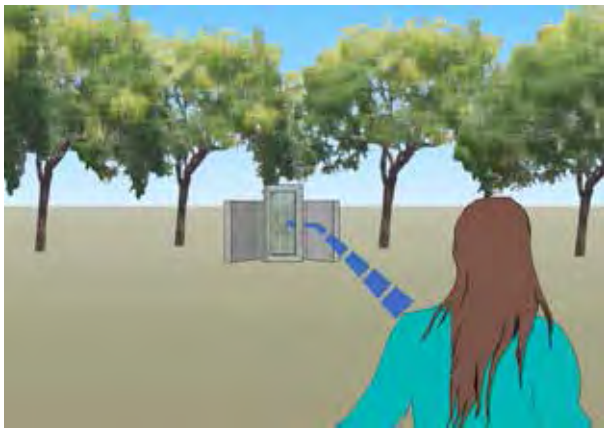


Figure 8.13 Bounce Shot Concept (Author, 2015)

Bounce Shot (hole 7)

This hole requires players to bounce their shot off of a wall into the basket, which is behind a barrier (Figure 8.13). The wall to the right is set closer to the basket so that it is easier to hit. The wall to the left is set further away, adding difficulty to the shot.

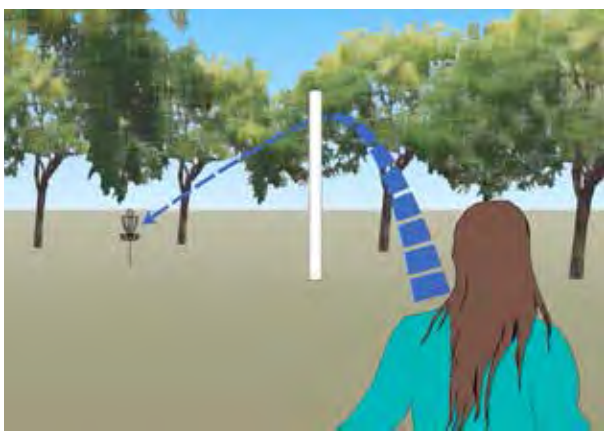


Figure 8.14 Fishhook Concept (Author, 2015)

Fishhook (hole 8)

This shot is similar to the boomerang, but at less of an angle. Players are required to throw around a Mando set 30 feet to the right of a direct line between the tee and basket (Figure 8.14). A small landing area beneath the Mando provides an escape route for players unable to throw this shot.

Pendulum (hole 9)

The final hole of the terrain park utilizes a swinging pendulum in front of the basket, requiring players to time their shots in order to not be deflected by the pendulum (Figure 8.15). Multiple tees for this hole can provide multiple difficulty levels.

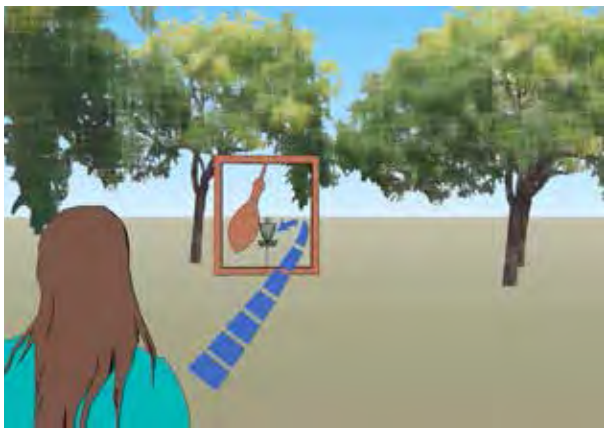


Figure 8.15 Pendulum Concept (Author, 2015)

Exercise 2 Summary

Selah Ranch responds well to each of the eight principles espoused by golf course architect Desmond Muirhead (Muirhead & Rando, 1994). It is likely the value landscape architects add to disc golf resort design lies chiefly in their ability to innovate. The disc golf "terrain park" idea represents an innovation to the sport that mimics similar sub-sports in skiing and golf. In addition to their precedence in golf and skiing, disc golf terrain parks could also appeal to wider segments of the Frisbee culture population, such as freestyle or ultimate players. It also seems likely that a terrain park, similar to a putt-putt course, could appeal to a larger audience that would not be attracted to disc golf because of the difficulty. In any case, the introduction of a terrain park would push the boundaries of the sport.

The possible design permutations for a disc golf resort on Springer Ranch are endless. The design presented here is one concept, intended to capture as many ideas as possible about what a disc golf resort could be. A diverse set of amenities besides disc golf will help ensure that a critical mass of visitors is attracted to make this type of resort financially viable.

09

Exercise 3: Community

A disc golf residential community could be designed and marketed as a conglomeration between a golf residential community and conservation community. With supporting trails and open space, and with the future growth of disc golf, it is plausible that disc golf communities could appeal to entire families even more than golf communities.

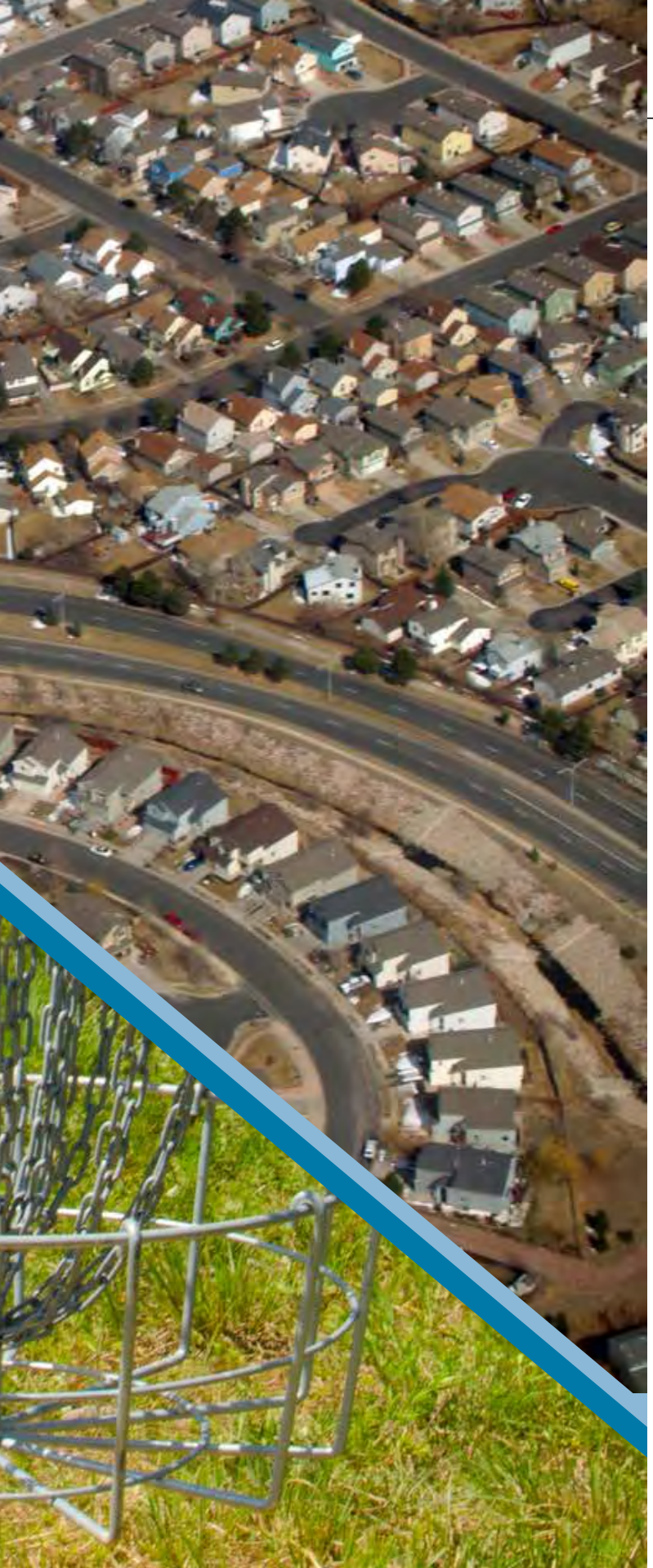


Figure 9.1 Residential Community and Recreation (Author, 2015)

Precedents

Traditional golf community design literature provides four principles for design: 1) design for four experiences, 2) focus on the first impression, 3) foster an awareness of environmental features and amenities, and 4) maintain a constant sense of style (Mulvhill, 2001). This application uses these principles to test the design of a hypothetical disc golf course on a conservation community development in Austin, Texas, called Reunion Ranch; which is currently being developed.

The four experiences from the first principle are entry, use, residence, and play. This application will focus on the entry and play experiences. The entry sequence is highly important in a golf course community, setting the tone for the entire project. The entry helps establish the community as a unique place to live. The entry sequence includes monumentation at the project entry, the entry drive leading up to the amenity center, and entrance to individual neighborhoods. Good communities make the entry sequence a seamless experience (Mulvhill, 2001). The play experience of the disc golf course should be excellent. This exercise will use design principles from traditional golf community design to route and lay out the disc golf holes.

The first impression of the project is crucial in setting the tone for the project. The level of detail of the first impression and the message that it sends must be carefully considered by the designer. The overall concept for the project should be embodied in the first impression and reiterated throughout the project. This concept might include materials, shapes, logos, proportions, plantings, colors, or unique structures. For Reunion Ranch, the entry to the project is located in Phase 1 and includes a large entry sign and plantings. For Phase 2 it will be necessary to indicate that the user is entering a different part of the project, one that is defined not only by the aesthetic set up in Phase 1, but also by the disc golf course. The separation between the phases provided by Bear Creek will help indicate this change, but some visibility of the disc golf course should be achieved as well.

An awareness of environmental features and site amenities can be created through the course design, but it should also be reflected in the road layout of the community. The Reunion Ranch site features some steep slopes and thick vegetation. Some of this vegetation is less desirable cedar trees, but interspersed throughout are the desirable live oak trees that the Texas Hill Country is known for. The lot layout for Reunion

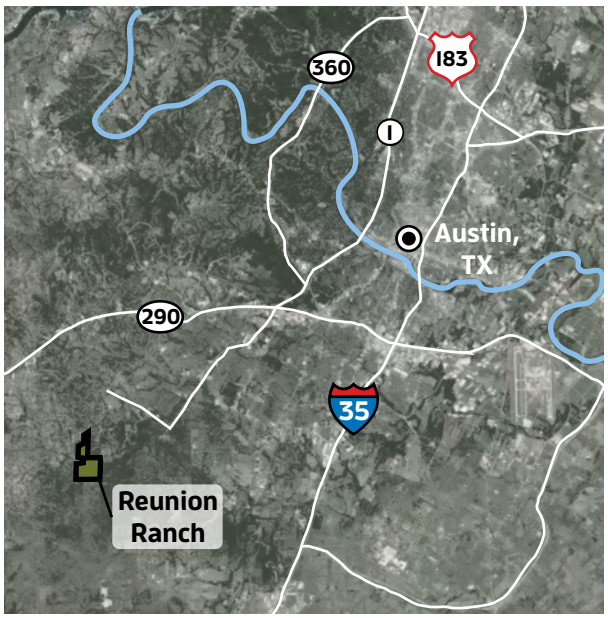


Figure 9.2 Reunion Ranch Location Map (Author, 2015)

Figure 9.3 Reunion Ranch Phase 2 (Author, 2015)

Ranch is designed to preserve the hilltops and drainage ways of the site, setting home sites on the sides of the hills. Gaps in the roadside lots provide views for drivers and pedestrian into the surrounding hill country, while the extensive trail system winds around home sites and native vegetation. The disc golf course will need to build on this by highlighting specimen trees and topographical features, and by connecting the community amenities.

The entire project should maintain a constant sense of style. For Reunion Ranch this style is described as “steel and stucco”. This concept comes from the project entry sign, which is a beige stucco wall with dark steel letters mounted on the face. For the disc golf course, this style can translate to signs on the course, benches, paths, tee pads, and even basket finishes. Disc golfers playing at Reunion Ranch should be unable to separate the style of the course from Reunion Ranch itself.

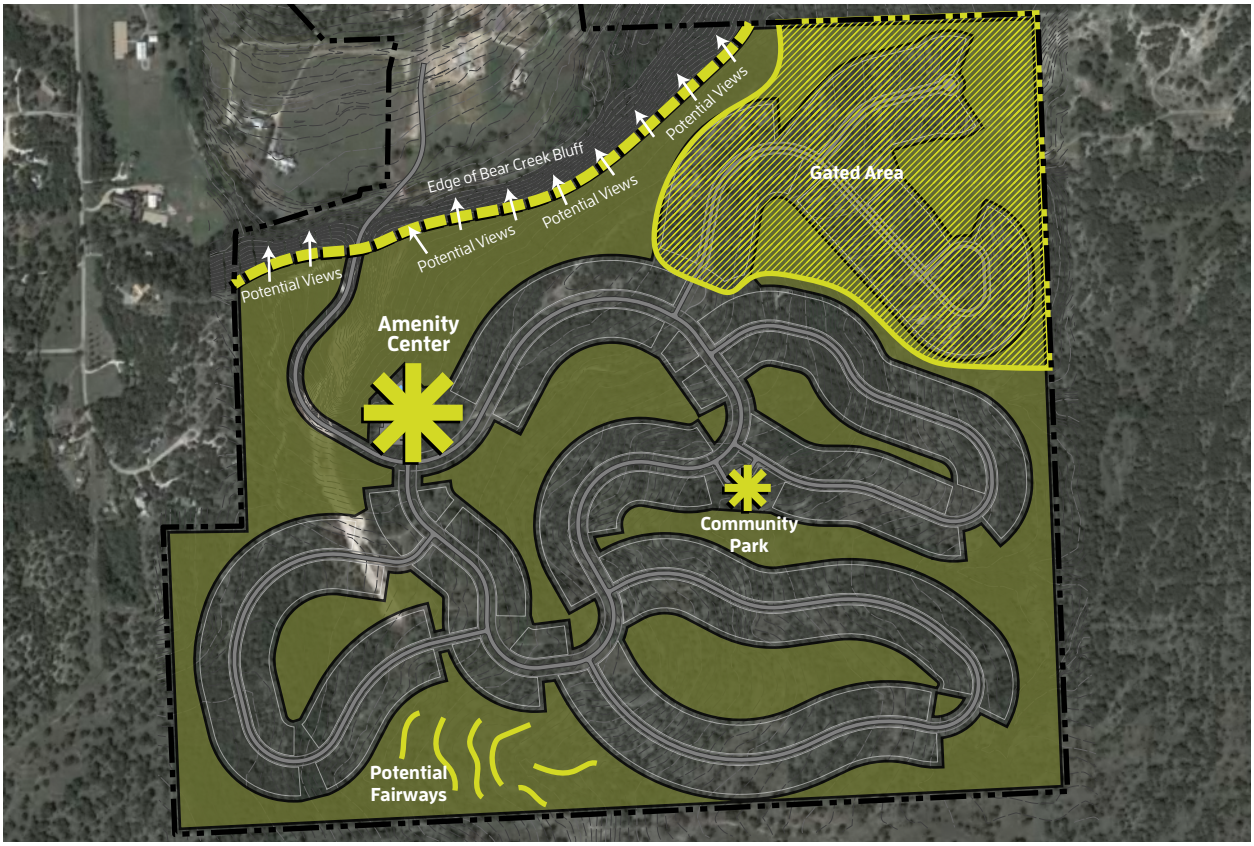


Figure 9.4 Reunion Ranch Site Inventory (Author, 2015)

Design

This application uses Phase 2 of Reunion Ranch, located southwest of Austin, Texas, as the site for a disc golf residential community. The lot layout used for this exercise was previously developed by the author for a conservation community design studio course. The conservation community principles of the lot layout leave ample room between the backs of lots for disc golf holes.

SITE INVENTORY

Site inventory has two steps: 1) identify areas unsuitable for disc golf, and 2) identify features for disc golf to capitalize on. Figure 9.4 depicts the areas unsuitable for disc golf. This includes areas designated for lots and amenities, and areas too steep for disc golf holes. Figure 9.4 also shows features for the disc golf course to capitalize on. These include the amenity center (which will be the clubhouse), the steep slopes around the entry drive, the small pond on the southeast part of the site, the park next to that pond, and the bluff above Bear Creek.

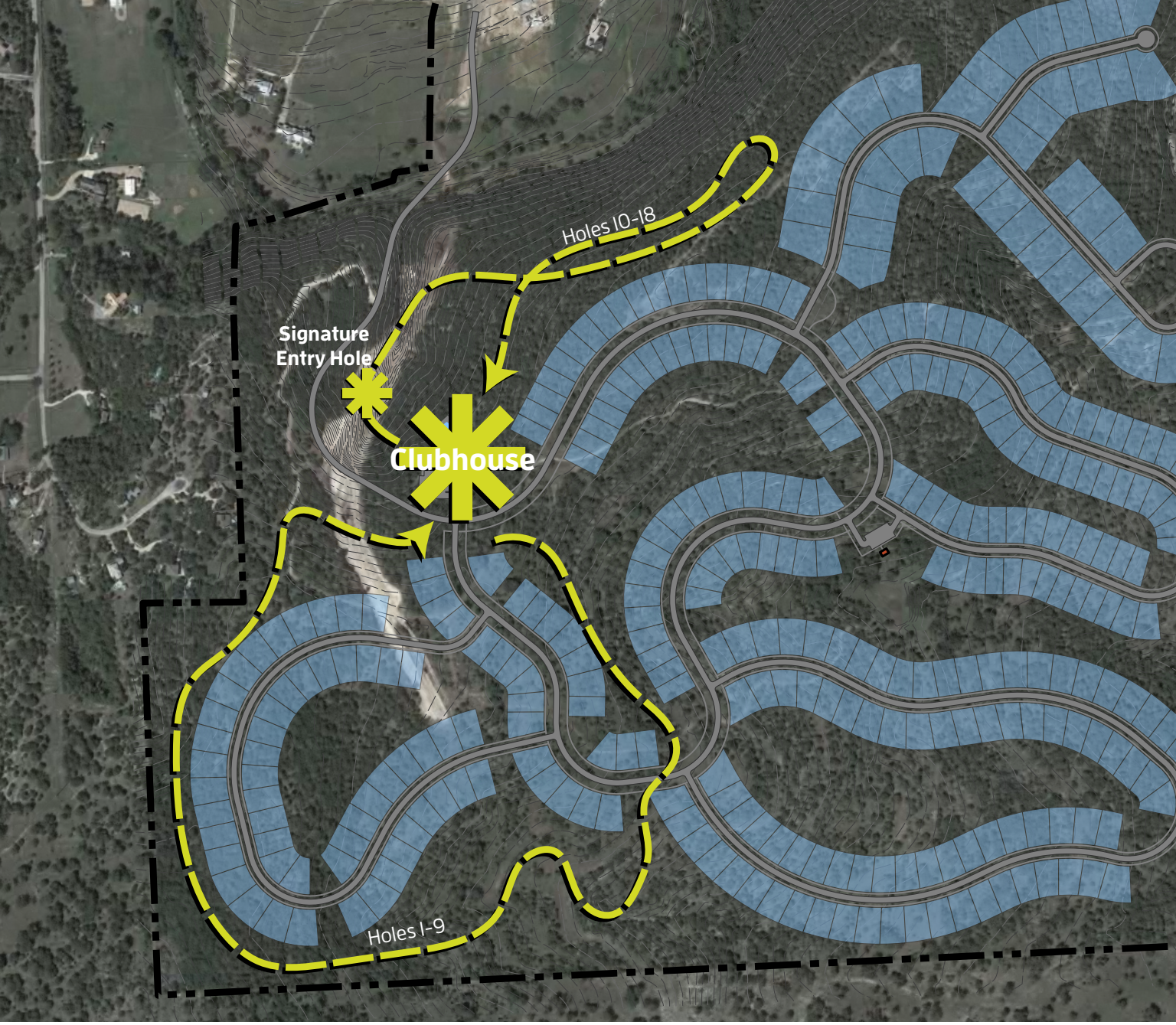
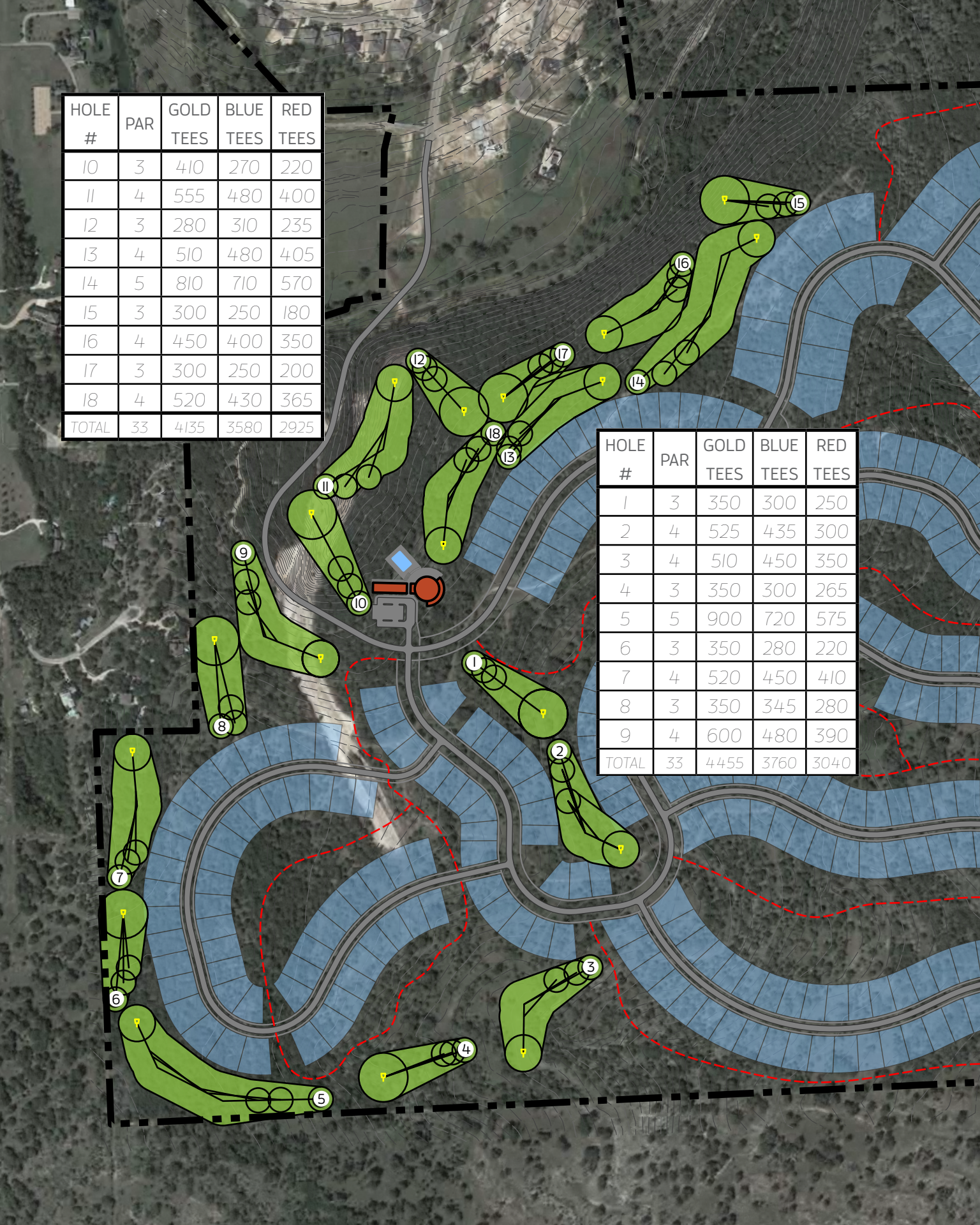


Figure 9.5 Reunion Ranch Design Concept (Author, 2015)

CONCEPTUAL DESIGN

The disc golf course is divided into two 9-hole loops that begin and end at the clubhouse (Figure 9.5). The first loop begins south of the parking area and works its way across the hilltop to the open areas and drainages toward the southern edge of the site. From there it follows the west edge of the site back to the clubhouse area, using the heavy vegetation, drainages, and old farm road to build interesting holes. The second loop begins west of the clubhouse and immediately drives straight down a 25 foot drop to the basket,



HOLE #	PAR	GOLD TEES	BLUE TEES	RED TEES
10	3	410	270	220
11	4	555	480	400
12	3	280	310	235
13	4	510	480	405
14	5	810	710	570
15	3	300	250	180
16	4	450	400	350
17	3	300	250	200
18	4	520	430	365
TOTAL	33	4135	3580	2925

HOLE #	PAR	GOLD TEES	BLUE TEES	RED TEES
1	3	350	300	250
2	4	525	435	300
3	4	510	450	350
4	3	350	300	265
5	5	900	720	575
6	3	350	280	220
7	4	520	450	410
8	3	350	345	280
9	4	600	480	390
TOTAL	33	4455	3760	3040

which is visible from the entry drive. The loop then travels along the drainage for a hole before climbing back up the massive slope and playing in the thick vegetation behind the northern-most lots, frequently playing along the edge of the bluff. The 18th hole ends right in front of the clubhouse viewing deck.

SCHEMATIC DESIGN

The same target distances, safety buffers, and processes that were used at Stagg Hill, Wildcat Creek, and Springer Ranch were used for Reunion Ranch (Figure 9.6). For the shot breakdown, see Appendix G. It was important to consider the slope when determining hole distances. An uphill throw will require more force than a downhill throw of the same horizontal distance. Because of this, the distances used to determine par lengths are adjusted for large elevation changes. Accordign to the PDGA, every foot of vertical elevation change should translate to three feet of horizontal distance change (Professional Disc Golf Association, n.d.-d). For example, a 100' throw that drops 10' should be considered as if it were a 70' throw. If the same shot climbed 10' instead it would be considered as if it were 130'. The adjusted distances are only for use in determining par, and are not shown on course signage.

Figure 9.6 Reunion Ranch Schematic Design (Author, 2015)

Analysis

APPLICABILITY TO CONSERVATION COMMUNITIES

Lot counts for residential communities are critical for the profitability of the community. The course design proposed for Reunion Ranch does not require the removal of lots, leaving the total lot count of 350 single family lots intact. While not an issue for this application, it is likely that a disc golf course could cause a loss of lots if disc golf is not integrated from the inception of the project. It is difficult to determine whether or not the addition of a disc golf course to the community would make up for the loss of residential lots, but because Reunion Ranch is located in an area full of competition from other residential communities it is likely it would be worthwhile. The addition of a disc golf course to the community can help it stand out from the rest of the competition. Other communities should be designed from the outset with disc golf in mind.

LAND UTILIZATION

Table 9.1 is a breakdown of conservation area in Reunion Ranch Phase 2. The disc golf course safety buffers cover 11% of the total conservation

ITEM	AREA	%
Total Area	370.3 Ac.	100%
Developed Area	163.9 Ac.	44%
Conservation Area	206.5 Ac.	56%
Disc Golf Safety Buffer Area	39.1 Ac.	11%
Fairway Area Estimate (40' Average Width)	7.9 Ac.	2%
Lot Area	120. Ac.	32%
ROW Area - open	22.1 Ac.	6%
ROW Area - paved	21.5 Ac.	6%

Table 9.1 Land Utilization (Author, 2015)

area. The potential impact of disc golf on the habitat for animals living in this area has not been studied.

MAINTENANCE

The disc golf course at Reunion Ranch will require maintenance to keep the fairways, tee, and basket areas clear of brush. The paths will likely also require maintenance to keep tree branches clear. Some of the fairways may require mowing once a month to keep grass at a walkable height. Young trees directly in front of tees will require protective barriers, and basket and tee areas will require applications of wood mulch to cut down on compaction and erosion from disc golfer foot traffic (BMPs, see Appendix B).

A four-inch layer of mulch for a fifteen foot radius around the tee pads and baskets translates to 157 CF of mulch per hole, or 2,826 CF for the entire course. Mulch will also be required for the drip area of any trees on the fairway that are likely to be walked under. The exact figure for this amount cannot be calculated from the aerial. As an estimate, the design budget allows for one 30' diameter tree per stroke. The disc golf course is a par 66 course, thus the estimate for mulch for tree drip lines is 15,543 CF of mulch. It is unknown how often mulch will need to be reapplied for tees, basket areas, and tree drip lines.

The PDGA disc golf course design recommendations state that typical fairways in the woods average from 15' to 40' wide (Professional Disc Golf Association, 2014). To estimate the mowing area of the course the larger figure (40') is used as the average fairway width at Reunion Ranch. Using the total course length of 8,590 feet, this amounts to a fairway area of 7.9 Ac. For comparison, the unpaved area of the ROW, which will also likely be mown, totals 22.1 Ac.

Application 3 Summary

The four principles borrowed from traditional golf community design (Mulvhill, 2001) are good examples of how landscape architects can add value to disc golf course design in residential areas. A landscape architect's ability to be involved in the entire process translates directly into added value from holistic planning and holistic site analysis as discussed in Chapter 4. Landscape architects can also enhance aesthetics by creating a unified style for each disc golf course, drawing on the forms and materials used in the rest of the development. The entire process can be improved and streamlined through the design, analysis, and visualization technology used by landscape architects. Finally, the use of technology supports landscape architect accountability by providing records of how design decisions were made.


12

10

Findings

The goal of this project was to assess the relevance of landscape architecture to disc golf course design. To this end, the project has illustrated several reasons for landscape architects to be involved in disc golf course development. For landscape architects, disc golf has intrinsic value as a sport that can be used in their projects as a program element. For disc golf, landscape architects have the expertise to add valuable input to disc golf course development. Opportunities for input were explored in three applications. This chapter synthesizes the combined findings of each step of the project process.

Figure 10.1 Disc Golf Basket (Wikimedia user Windsurfl7, 2009) (Public Domain)

Added Value

The potential value that landscape architects can bring to disc golf course development was projected from the Landscape Architecture Body of Knowledge (LABOK) study's core competencies. The core competencies from LABOK and how they could be applied to disc golf were developed and summarized in matrix form (Appendix D). This study then cross-referenced the results of the matrix with the results of a survey of services offered by members of the Disc Golf Course Designers group. The resulting additional value that landscape architects can bring to disc golf was synthesized into five categories:

- holistic site analysis
- holistic planning
- technology use
- enhanced aesthetics
- consistency of professional licensure

Each of these five categories emerged from the knowledge and expertise a landscape architect brings to design projects.

Currently, there is little opportunity for landscape architects to apply their technological and aesthetic expertise to disc golf course development. The greatest opportunity for landscape architects right now is their ability to holistically plan for disc golf courses as part of other projects in their design portfolio, which ranges from parks to office complexes to day camps. Using the basic knowledge provided in Chapter 5 of this report, landscape architects can designate areas for disc golf in these projects and hire established course designers to design the course. This process allows any landscape architect to propose disc golf, regardless of their knowledge of the sport. It also capitalizes on the inexpensive nature of the sport, which is one of disc golf's greatest assets. However, there is still potential for landscape architects to evolve the sport using the other three categories of potential added value. Further exploration of the potential for landscape architecture and disc golf was the purpose of the three design applications.

INTEGRATION

The integration exercise showed that disc golf and traditional golf are not ideally compatible with each other. The primary reasons for this are the differences in the fairways and the safety concerns involved. Disc golf and ball golf can coexist on the same site, but if they are to both be played simultaneously on the same fairways, the quality of play will suffer. The best solution, it

appears, is for disc golf to exist on the periphery of the course outside the safety buffers for the golf holes. This is only possible on courses with sufficient undeveloped land available for a disc golf course. Alternatively, for some facilities, the ball golf course can be closed temporarily so that disc golfers can safely play a course across the golf fairways. This second option can make use of OB (out of bounds) areas and Mandos (mandatory throws, see Chapter 6) to add challenge to the open fairways and protect the sensitive areas of the golf course. In either of these methods for integration, the two sports can share a clubhouse, pro shop, maintenance equipment, and any other amenities offered by the facility. Landscape architects in particular can provide holistic planning and design practices that allow for better integration between these two activities. Landscape architects can also promote the cultural integration of the two sports. The aesthetic enhancement landscape architects can provide would go a long ways toward dispelling the negative reputation that disc golf has in some areas.

RESORT

The resort application showed that the principles of traditional golf resort design can be applied to the design of a disc golf resort. The major supporting argument is the precedent of Selah Ranch, the world's first disc golf resort, which follows these principles. The difference between Selah Ranch and a traditional golf resort lies primarily in image. Selah Ranch is branded as a retreat center, whereas the image of a traditional golf resort tends to lean more toward luxury and unique experiences. For disc golf resorts to thrive luxury may not be a necessity, but they must provide truly unique course experiences. One potential for adding a unique experience to a resort is the possibility of a disc golf aerial terrain park. The challenge of a disc golf terrain park could be enough to keep experienced players occupied, and yet also provide a less physically challenging play experience, thereby opening up the sport to a wider audience. It also seems likely that the extra amenities of a disc golf resort could help ensure visitation and revenue. A diverse mix of amenities could draw a wider audience to the resort, including non-disc golfers.

COMMUNITY

The residential community application showed that traditional golf community design principles can also be used to design disc golf oriented residential communities. A disc golf community designed like a traditional golf

community would either be very long or would not provide very many golf lots. Disc golf takes up very little room compared to traditional golf, so a disc golf course can be supplemented with conservation area to provide more open space. Creating conservation areas allows for more lots to adjoin to open space while upholding the course design principle of creating nine-hole loops. Disc golf course communities can also provide the manicured experience of traditional golf for a smaller cost, thanks to disc golf's smaller footprint. In this way a disc golf course community could be marketed as a hybrid between a traditional golf community and a conservation community. Landscape architects are ideally suited to design these communities using their expertise in community design. The advantage of this type of community is that it can be designed in an environmentally friendly manner, depending on the level of manicure desired. Because the level of manicure does not directly influence the gameplay of disc golf, it can be scaled back for less visible parts of the course. All of these aspects could benefit greatly from the ability of landscape architects to provide holistic site analysis and planning, enhanced aesthetics, and professional accountability.

Summary

A closer relationship between landscape architecture and disc golf course development has the potential to benefit both parties. The knowledge and expertise of landscape architects can bring a holistic perspective and new opportunities to disc golf course development. At the same time, the growth of disc golf represents a potential new market for landscape architects. If landscape architects propose disc golf courses in their projects it is likely that the sport will grow, gain a larger user base, and cycle the benefit back to landscape architecture. The findings of this study support the potential for a mutually beneficial relationship between landscape architecture and disc golf.

Figure 10.2 Craig's hole-in-one (Wikimedia User Nyenyec, 2006) (Licensing: Creative Commons Attribution-Share Alike Unported 3.0)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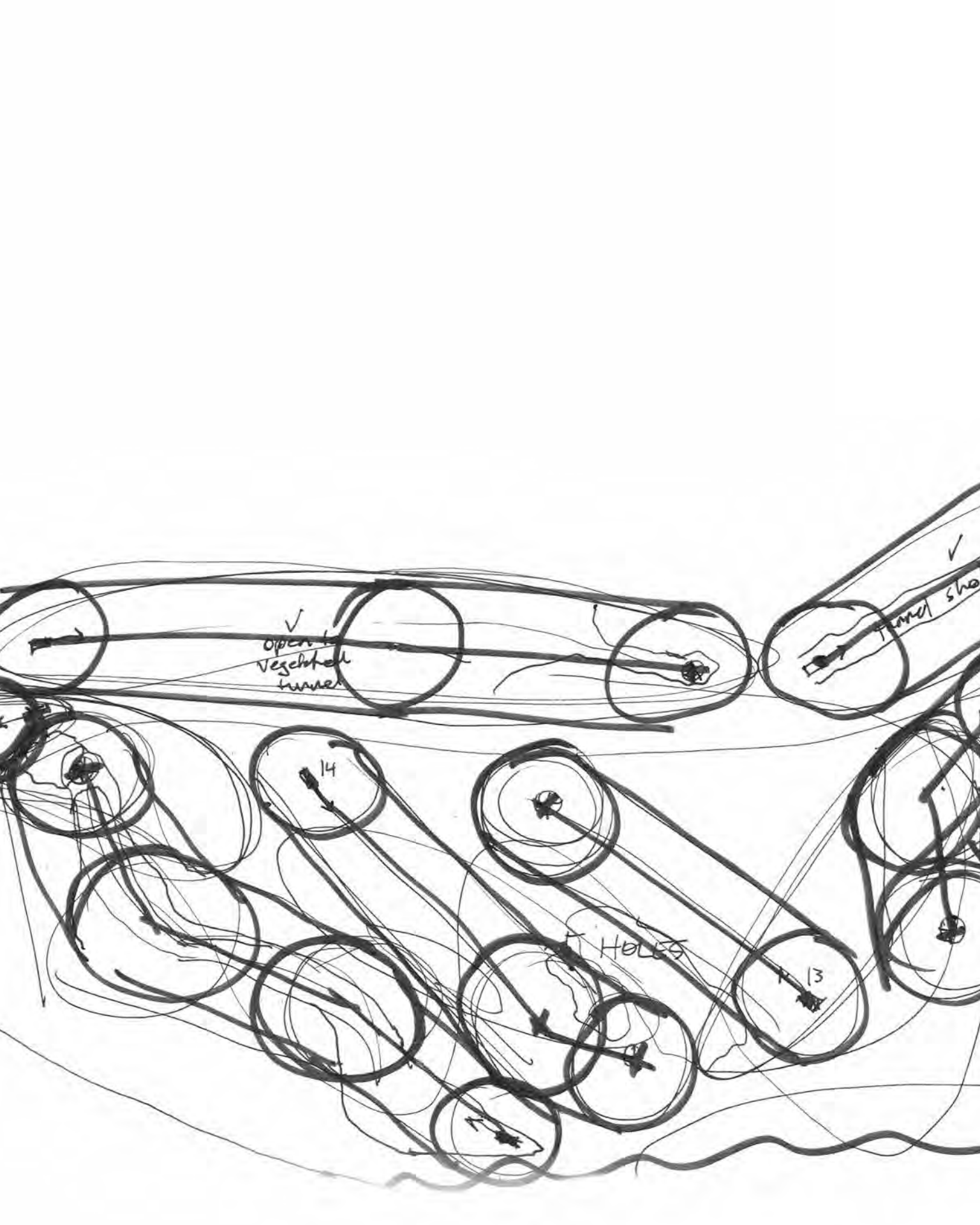
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14
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II

Discussion

In order for landscape architects to be fully involved in disc golf course design, it will be necessary for the sport of disc golf to undergrow significant economic growth. This study cannot predict the time it will take for disc golf to become a mainstream sport. However recommendations will be made to move the sport in that direction. Areas will also be highlighted that need further study by researchers.

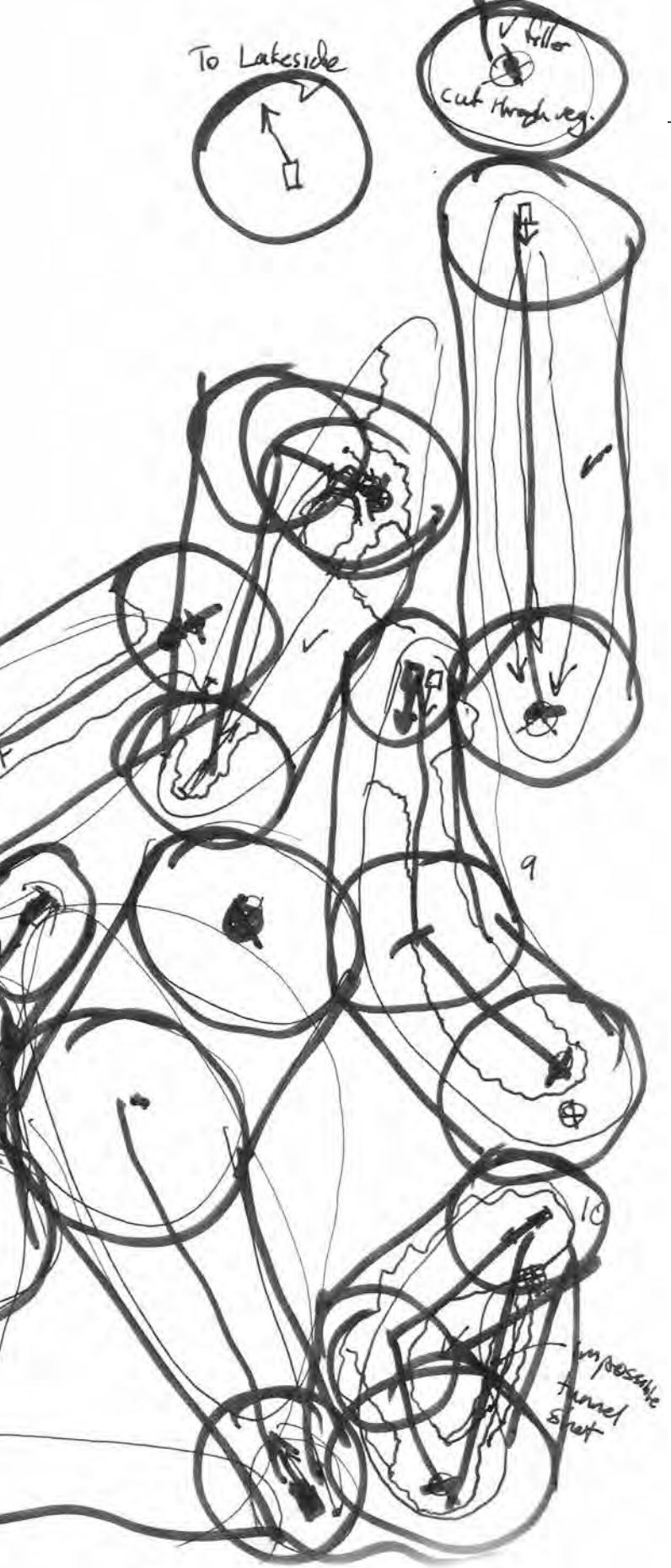

Figure II.I Stagg Hill DGC Process Sketch (Author, 2015)

Recommendations

FOR THE DISC GOLF COURSE DESIGNERS GROUP

These recommendations are for the Disc Golf Course Designers group (DGCD). It seems that the DGCD has the potential to bolster the research supporting course design methods. This would be cooperatively accomplished with the Professional Disc Golf Association (PDGA) and dgcoursereview.com. Through data sharing and analysis there is huge potential to understand more of what makes great disc golf courses great. The DGCD also has the ability to provide a platform to disseminate this research to course designers.

Better communications

The PDGA defines helpful standards for par lengths and course lengths by difficulty level, but the Disc Golf Course Design Guidelines are sorely lacking in descriptions of design processes and strategies. Better communication of disc golf course design practices and principles would be extremely beneficial to the state of course design. For example, best management practices (BMPs) such as wood chip mulch for preventing compaction and barriers for tree protection have been around for nearly a decade (see Appendix B), yet there is no mention of them in the course design resources published by the PDGA. The PDGA could do a better job of consolidating course design literature. Part of this consolidation could be a repository of studies and a collection of links to articles by course designers, and the other part could be a newsletter or magazine focused specifically on course design. Although the Disc Golfer magazine put out by the PDGA occasionally features design articles, no communication device specifically for disc golf course design exists. Similarly, the DGCD group could provide a platform for publishing articles on their website that are organized into different categories. This would promote educated course designers and course design, in addition to providing a platform for disseminating design knowledge. As the sport grows, the platform could evolve from a website repository to a newsletter, and eventually to a journal. Currently, the basic stage of having a common repository for course design knowledge would be immensely helpful not only to DGCD members, but to course designers as a whole.

Although no confirmation study has been conducted, it seems that landscape architects are largely unaware of the disc golf phenomenon

in many parts of the country. An article in Landscape Architecture Magazine or on the American Society of Landscape Architects website could present disc golf to landscape architects as an amenity that can easily be added to a wide variety of projects for very little cost. The same article could link to the findings of this study, especially to disc golf course requirements guide in Chapter 6. Communicating the potential for disc golf to landscape architects would go a long way to raise awareness of the sport.

Course certification program

There is no standard currently for course design other than the PDGA backed course design guidelines. A more comprehensive rating system based on easily measured factors could be a huge asset to further research in disc golf by providing a larger data set for comparison. For example, a rating system could catalogue what BMPs a course implements. That data could then be cross referenced with user reviews, landscape types, or difficulties to provide insight into how BMPs affect the disc golf experience. The data available on dgcoursereview.com is a good start, but the current data collected relates only to the play experience of a course, and does not comprehensively cover other aspects of course design. In addition to more data for research, a comprehensive course rating system could promote the use of BMPs and bring a measure of accountability to reduce environmental damage and shared course conflicts.

Research dissemination mechanism

Lastly, the only apparent method for disseminating research is the PDGA website. A small handful of articles on disc golf are on the website, but there could be many more. If the PDGA curated these articles it could be extremely helpful to disc golf course designers and landscape architects. Not only would it allow the PDGA to act as a gatekeeper for knowledge on course design, but it could also encourage more research on disc golf by making future study needs, often expressed at the end of a paper, more readily accessible.

FOR LANDSCAPE ARCHITECTS

This strategy intends to foster a closer relationship between landscape architects and disc golf through articles published in popular landscape architecture magazines, technical reports prepared through trusted venues, and networking. The strategy can be implemented

by anyone interested in seeing the relationship between landscape architecture and disc golf grow.

Magazine Article

The first step is to raise awareness of disc golf among landscape architects. This could be accomplished through an article in a popular magazine (i.e. not a scientific journal) such as the Landscape Architecture Magazine published by the American Society of Landscape Architects (ASLA). These articles will need to cover an introduction to disc golf and why landscape architects should be involved. The articles should also provide information for learning more, such as a reference to a LATIS report (see below) or contact information for any of the resources suggested in the DGCD recommendations (see above). These articles would introduce disc golf to a wide range of landscape architects, and encourage more involvement by landscape architects already familiar with the sport.

LATIS Report

Landscape Architecture Technical Information Series (LATIS) reports are published by the ASLA. They are provided to educate landscape architects on the technical aspects of new and evolving practices (American Society of Landscape Architects, 2015). The LATIS report format is ideal for distributing information on the design requirements for a disc golf course to landscape architects. In addition, LATIS reports can be used by landscape architects to earn continuing education credits, a yearly requirement for licensure. This would likely mean that landscape architects who would not normally research disc golf requirements would be exposed to the sport through a familiar dissemination outlet.

Networking

Finally, individuals can promote landscape architecture and disc golf through networking. This is as simple as proposing disc golf courses in appropriate projects. This does not require a complete knowledge of how to design disc golf courses. A landscape architect with a basic knowledge of the site and budget requirements of a disc golf course (discussed earlier in this report, see Chapter 6) can propose a course and hire a respected designer to provide the actual course design. From the disc golf side, individuals can network with other professionals and clients through disc golfing together, replacing traditional golf as a means for getting to know other professionals.

Limitations

This initial did not interview disc golfers or disc golf course designers. The opinions of disc golf course designers would be particularly interesting to know relative to the services they offer. Disc golfers as a whole may not react favorably to what could be perceived as a commercialization of the sport.

The study also did not survey landscape architects to understand exactly how well disc golf is currently known among the profession, or interview landscape architects that have designed disc golf courses to better understand their experience. This study also did not address the financial sustainability of new course operations, or address whether the market for more disc golf exists in all parts of the country. Finally, this study is limited by the fact that the applications were only pursued through schematic design, and were not implemented.

Future study

This project uncovered multiple avenues for further research that could be accomplished by either landscape architects or other disc golf advocates. More research on course development types, BMPs, market research methods, safety buffers, shot lengths, demographics, and disc golf demand mapping would be beneficial to landscape architects and course designers alike. Course development types could be researched through the data available on dgcoursereview.com. There is ample opportunity for cross analysis and understanding what makes a great disc golf course through studying the data and user reviews.

The topic of BMPs (best management practices) is a relatively new area of study with several opportunities for research. This study found no mention of the BMPs uncovered in literature by the PDGA, DGA, or DGCD groups. It is unclear if BMPs are widely used, completely unheard of, or somewhere in between. The effectiveness of BMPs at reducing course impacts also needs to be more effectively assessed.

On the topic of market research, there is ample room for studies addressing the feasibility of various applications of disc golf, including

those studied in Chapters 6-9 of this report. On the topic of safety buffers, further study should be completed to confirm or adjust the distances used for the design applications of this project. Additionally, more research on target shot lengths for various skill levels would also be useful, although it appears that current course designers have learned these distances through experience. On the topic of disc golfer demographics, ways to further involve minorities in the sport could reap social benefits for disc golf courses and contribute to the argument for additional courses. It would also be beneficial to have a published method for mapping disc golf demand at the planning scale. Landscape architects in particular could use this information to understand what types of courses could be in demand and where they would be most used. Finally, studies on the economic impact of disc golf and the potential for growth could support current anecdotal evidence for the positive economic impact of disc golf. It could also help developers understand whether a disc golf course is worth the expense for their development, and allow them to formulate budgets and decide what type of course is most suitable for their projects.

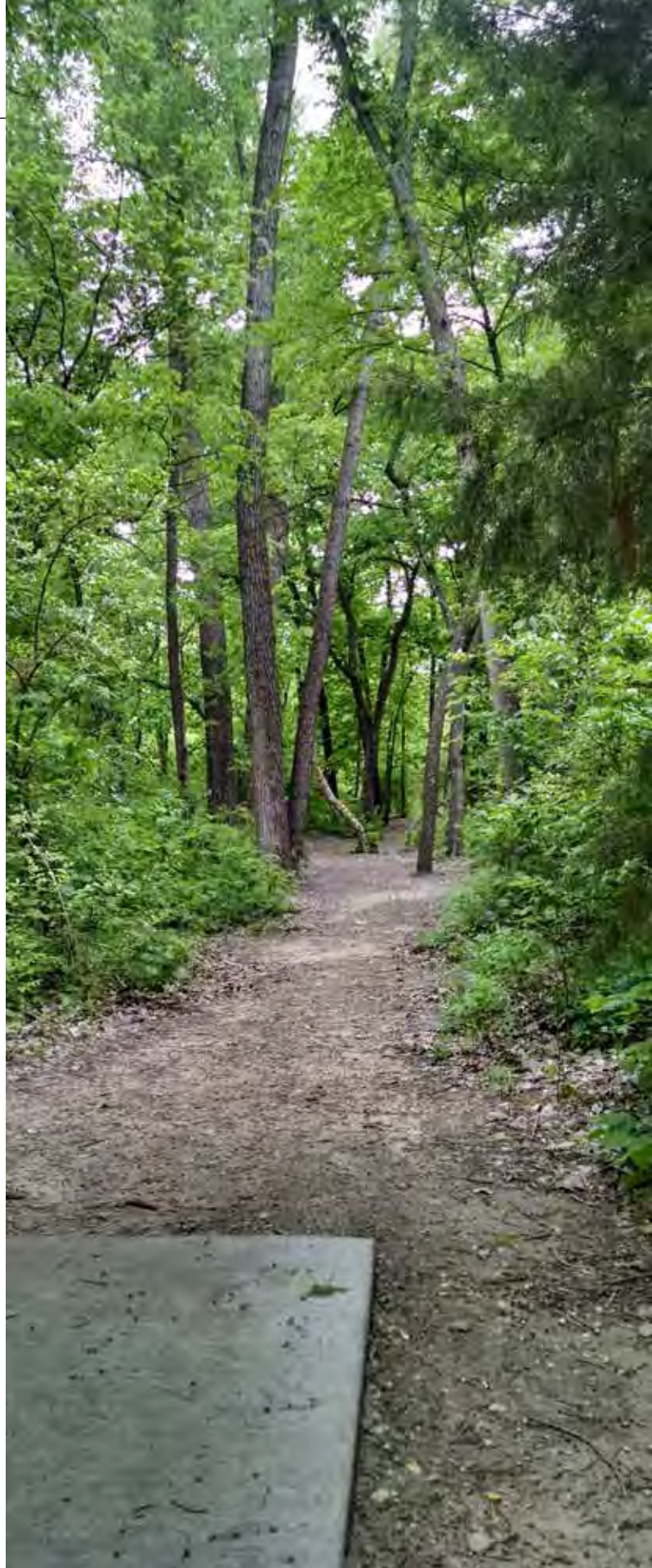

Figure II.I Fairmont #6 (Author, 2015)

Conclusion

Landscape architecture and disc golf do not enjoy a close relationship at present. The findings of this study support that a closer relationship between the two would be mutually beneficial. This relationship should begin with landscape architects proposing disc golf courses integrated into their projects. To that end, the first step is to raise awareness of disc golf as an amenity for landscape architectural projects. Proposing disc golf courses in landscape architecture projects will simultaneously raise awareness of the sport within landscape architecture circles, and awareness of landscape architects within disc golf circles. Over time, the relationship between the sport and the profession has the potential to evolve to the point that landscape architects are designing courses, simultaneously growing the sport of disc golf and increasing the practice domain of landscape architecture. The terrain park concept is one example of the potential available for this relationship, and represents the potential value of adding landscape architects to the design discourse on disc golf courses. The sport of disc golf is growing fast, yet much of the course design knowledge is still in its infancy. Landscape architecture's research background, holistic planning, holistic site analysis, use of technology, enhanced aesthetics, and licensure all provide valuable expertise to grow disc golf course design. The expertise landscape architects can offer is uniquely suited to solidifying disc golf course design knowledge, simultaneously promoting a more consistent disc golfing experience and maintaining the uniqueness of individual courses.

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Figure 8.7 Wilcox, Joshua (Author). (2015). Hoops Concept [Computer Graphic]

Figure 8.8 Wilcox, Joshua (Author). (2015). Chute Concept [Computer Graphic]

Figure 8.9 Wilcox, Joshua (Author). (2015). Wall Ride Concept [Computer Graphic]

Figure 8.10 Wilcox, Joshua (Author). (2015). Up and Over Concept [Computer Graphic]

Figure 8.11 Wilcox, Joshua (Author). (2015). Boomerang Concept [Computer Graphic]

Figure 8.12 Wilcox, Joshua (Author). (2015). Ball Golf Concept [Computer Graphic]

Figure 8.13 Wilcox, Joshua (Author). (2015). Bounce Shot Concept [Computer Graphic]

Figure 8.14 Wilcox, Joshua (Author). (2015). Fishhook Concept [Computer Graphic]

Figure 8.15 Wilcox, Joshua (Author). (2015). Pendulum Concept [Computer Graphic]

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IMAGE LICENSES USED:

Appendix A

PDGA Disc Golf Course Acreage Estimator

(Professional Disc Golf Association, n.d.)

Disc Golf Course Acreage Guide

Player Skill Level	Foliage Density	Minimum (P56)* 16-Par 3, 2-Par 4 Feet	Minimum (P56)* 16-Par 3, 2-Par 4 Acres	Average (P61) 12-P3, 5-P4, 1-P5 Feet	Average (P61) 12-P3, 5-P4, 1-P5 Acres	Championship (P67) 8-P3, 7-P4, 3-P5 Feet	Championship (P67) 8-P3, 7-P4, 3-P5 Acres	Acre Factor
Gold Tees 1,000 Rating	Scattered	6,900	26	8,450	32	10,350	39	165
	Average	6,400	18	7,750	22	9,350	27	125
	Corridor	5,900	14	7,150	16	8,650	20	100
Blue Tees 950 Rating	Scattered	5,500	21	6,900	26	8,600	33	165
	Average	5,000	14	6,250	18	7,750	22	125
	Corridor	4,500	10	5,650	13	7,050	16	100
White Tees 900 Rating	Scattered	4,150	16	5,475	21	7,025	27	165
	Average	3,650	10	4,875	14	6,325	18	125
	Corridor	3,550	8	4,575	11	5,825	13	100
Red Tees <850 Rating	Scattered	3,200	12	4,450	17	5,950	23	165
	Average	3,100	9	4,100	12	5,300	15	125
	Corridor	2,600	6	3,525	8	4,675	11	100

* (P56) = estimated course par for that player level

Professional Disc Golf Association. (n.d.). Disc Golf Course Acreage Guide. Retrieved from http://www.pdga.com/files/AcreageChart_0.pdf

Appendix B

Disc Golf Course Best Management Practices

(Compiled by Joshua Wilcox, 2015)

BEST MANAGEMENT PRACTICE	FIRST RECORD OF PROPOSAL IN LITERATURE	NUMBER OF CITATIONS
Mulch around baskets	*Clark, 2005*	*2*
Mulch around tees	*Lichter, 2005; Clark, 2005*	*3*
Mulched paths	*Lichter, 2005*	*3*
Defined paths	*Lichter, 2005*	*3*
Pervious tees	*Plansky, 2013*	*1*
Tree protection	*Lichter, 2005; Clark, 2005*	*3*
hard surface tees (not dirt)	*Lichter, 2005; Clark, 2005*	*3*
connector paths between holes and tees	*Plansky, 2013*	*1*
vegetated fairway dividers	*Plansky, 2013*	*1*
mulch tree drip zones in fairway, 20' from tees, baskets	*Lichter, 2005*	*2*
monitoring program using photos	*Clark, 2005*	*2*
OB areas to limit impact	*Clark, 2005*	*2*
alternate pin locations	*Trendafilova, 2011*	*2*
tees located 20' from tree driplines	*Lichter, 2005*	*1*
educational signage	*Plansky, 2013*	*1*
routine maintenance for vegetation	*Clark, 2005*	*1*
retatining walls to level tee and pin areas	*Harrington, n.d.*	*1*
stairways and bridges to minimize impact on slopes	*Harrington, n.d.*	*1*
erosion control planning	*Harrington, n.d.*	*1*

CITED FROM	CATEGORY	IMPLEMENTATION TYPE
Trendafilova, Clark	*soil compaction prevention*	*Add-on*
Plansky, Lichter, Clark	*soil compaction prevention*	*Add-on*
Plansky, Lichter, Clark	*soil compaction prevention*	*Add-on*
Trendafilova, Plansky, Lichter	*soil compaction prevention*	*Add-on*
Plansky	*erosion prevention*	*Add-on*
Plansky, Lichter, Clark	*vegetation protection*	*Add-on*
Trendafilova, Lichter, Clark	*erosion prevention*	*Add-on*
Plansky	*soil compaction prevention*	*Add-on*
Plansky	*vegetation protection*	*Design*
Plansky, Lichter	*soil compaction prevention*	*Add-on*
Plansky, Clark	*General strategies*	*Add-on*
Plansky, Clark	*General strategies*	*Design*
Plansky, Trendafilova	*soil compaction prevention*	*Design*
Lichter	*vegetation protection*	*Design*
Plansky	*General strategies*	*Add-on*
Clark	*vegetation protection*	*Add-on*
Harrington	*erosion prevention*	*Design*
Harrington	*erosion prevention*	*Add-on*
Harrington	*erosion prevention*	*Add-on*

Appendix C

Disc Golf Course Designer Services Survey

(Compiled by Joshua Wilcox, 2015)

STATE	CITY	LAST NAME	FIRST NAME	RANK	CONTACT
NE	*Lincoln*	*Chisholm*	*Andrew*	*Designer*	*Web page*
WI	*Menomonie*	*Hendrickson*	*Jason*	*Designer*	*Web page*
MI	*Marquette*	*Kopacz*	*Tim*	*Senior Designer*	*Web page*
IN	*Fishers*	*Byrne*	*Dennis*	*Designer*	*Web page*
WI	*Wauwatosa*	*Harrington*	*Mike*	*Designer*	*Web page*
MN	*North Oaks*	*West*	*Steve*	*Senior Designer*	*Web page*
CA	*Ontario*	*Dunipace*	*Dave*	*Senior Designer*	*Web page*
SC	*Rock Hill*	*Duvall*	*Harold*	*Master Designer*	*Web page*
NC	*Raleigh*	*Vigoda*	*Michal*	*Designer*	*Web page*
TX	*Austin*	*Houck*	*John*	*Master Designer*	*Web page*
MO	*St. Louis*	*McCormack*	*Dave*	*Senior Designer*	*Web page*
MA	*Amherst*	*Giggey*	*Brian*	*Designer*	*Web page*
OR	*Bend*	*Lane*	*Ryan*	*Designer*	*Web page*
NY	*Warwick*	*Doyle*	*Dan*	*Senior Designer*	*Web page*
TX	*Houston*	*Lehmann*	*Andi*	*Designer*	*Web page*
TX	*Spring*	*Young*	*Don*	*Designer*	*Web page*
TN	*Nashville*	*Boutte*	*Daniel*	*Designer*	*Web page*
KY	*Bowling Green*	*Clark*	*H. B.*	*Senior Designer*	*Web page*
FL	*Orlando*	*Hosfeld*	*Gregg*	*Senior Designer*	*Web page*
MN	*Richfield*	*Gill*	*Timmy*	*Designer*	*Web page*
HI	*Captain Cook*	*Pascarelli*	*Kenny*	*Designer*	*Web page*
ND	*Fargo*	*Schmit*	*Joey*	*Designer*	*Web page*
AL	*Hoover*	*Monroe*	*Tom*	*Master Designer*	*Web page*
FL	*Orlando*	*Greer*	*Chad*	*Designer*	*Web page*
MN	*Inver Grove*	*Kennedy*	*Chuck*	*Master Designer*	*Web page*
TX	*Austin*	*Houck*	*Dee*	*Designer*	*Web page*
IN	*New Albany*	*Embrey*	*Adam*	*Designer*	*Web page*
MO	*Columbia*	*Babcock*	*Skyler*	*Designer*	*Web page*
PA	*Pittsburgh*	*Dropcho*	*J. Gary*	*Senior Designer*	*Web page*
TX	*Austin*	*Olse*	*Michael*	*Designer*	*Web page*
WI	*Osseo*	*Ticknor*	*Don*	*Designer*	*Web page*

COURSE DESIGN SERVICES
typical
typical
typical + install
typical + ADA and blind/low vision specialty
None
typical, specializes in golf and disc golf courses
None
None
typical + international designer
typical
typical + install
typical + environmental education and signage, business development, staff training
typical + evaluation and install
typical
typical
typical
typical + site selection, CA work, install
typical + install, marketing
typical + install
typical + site selection, CA, marketing, install
artwork, fundraising, course promotion
typical
None
signs
typical + install
Dead Link
Dead Link
Dead Link
Dead Link
Dead Link
Dead Link

DATA	COUNT	PERCENT
Designers listed	179	100%
With websites	31	17%
With functioning websites	25	14%
Typical Services	19	11%
Typical + Other	12	7%
Typical + Install	8	4%
Other	2	1%

* *The table to the left only lists the designers which listed a website in their contact information. The total number of designer listings is shown in the table above.*

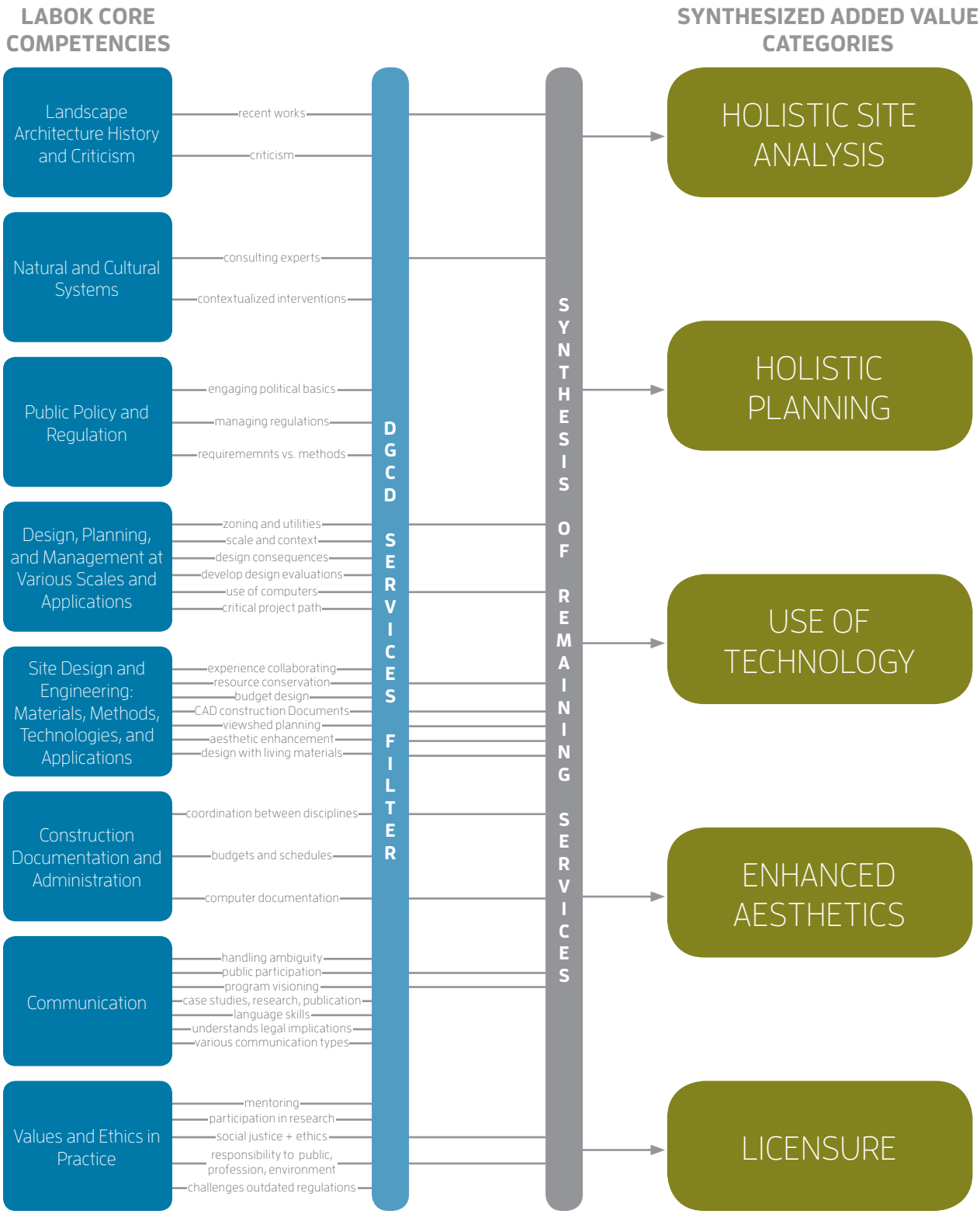
* *"Typical" Services is defined as course design services that include hole routing, basket and tee placement, and fairway configuration.*

* *All data is courtesy of dgcoursereview.com. Used with permission.*

Appendix D

Landscape Architect Services Matrix

(Compiled by Joshua Wilcox, 2015)


LABOK CORE COMPETENCIES
SYNTHESIZED ADDED VALUE CATEGORIES
Landscape Architecture History and Criticism
recent works
criticism
Natural and Cultural Systems
consulting experts
contextualized interventions
Public Policy and Regulation
engaging political basics
managing regulations
requirememnts vs. methods
Design, Planning, and Management at Various Scales and Applications
zoning and utilities
scale and context
design consequences
develop design evaluations
use of computers
critical project path
Site Design and Engineering: Materials, Methods, Technologies, and Applications
experience collaborating
resource conservation
budget design
CAD construction Documents
viewshed planning
aesthetic enhancement
design with living materials
Construction Documentation and Administration
coordination between disciplines
budgets and schedules
computer documentation
Communication
handling ambiguity
public participation
program visioning
case studies, research, publication
language skills
understands legal implications
various communication types
Values and Ethics in Practice
mentoring
participation in research
social justice + ethics
responsibility to public, profession, environment
challenges outdated regulations
DGCD SERVICES FILTER
SYNTHESIS OF REMAINING SERVICES
HOLISTIC SITE ANALYSIS
HOLISTIC PLANNING
USE OF TECHNOLOGY
ENHANCED AESTHETICS
LICENSURE

Explanation of the Synthesized Added Value Diagram (Left)

The diagram on the left is a simplified, synthesized version of the matrix on the following pages. The blue rectangles on the left side of the diagram are eight core competencies taken from the Landscape Architecture Body of Knowledge (LABOK) study. The dotted lines extending to the right from blue rectangles represent the core landscape architecture services extrapolated from the questions contained in each of the eight core competencies from LABOK. The number of lines relates directly to the number of services in each core competency. The disc golf course designer services (DGCD) filter uses the results of the DGCD services survey to filter out landscape architecture services that are also offered by members of the DGCD group. The lines that extend through the filter relate directly to the services that are not filtered out. For example, the first, second, and fifth lines (from the top down) of the values and ethics core competency (on the bottom) do not pass through the filter. In the matrix on the following pages, the first, second, and fifth landscape architect services overlap at least partially with DGCD services. The third and fourth landscape architect services (and the third and fourth lines on the diagram to the left) pass through the DGCD services filter. Finally, the services that pass through the filter are synthesized into five categories where landscape architects can add value to disc golf course design and development. For simplicity, the dotted lines passing through the DGCD services filter do not relate directly to the arrows that point to the five categories of added value. The full matrix on the following pages adds the full detail to each of the elements in the diagram to the left. The size of the matrix and the data involved is prohibitive for easy reading (and would not fit on a single page in any case), thus; the diagram to the left was synthesized.

8 Core L.A. Competencies from the LABOK study

Core Services derived from the questions under each core competency of the LABOK study

General ways these core services could be applied to disc golf course design and development

LA CORE COMPETENCIES	LA CORE SERVICES	POTENTIAL CONTRIBUTIONS
Landscape Architecture History and Criticism	*Offers cognizance of recent works as well as historic ones*	*can design "state of the art" courses*
	Brings ability to accept criticism and overcome objections with logical explanations	*can provide a reason for every design decision*
Natural and Cultural Systems	*Offers ability to work with other professions for site inventory and analysis of natural and cultural features*	*can provide comprehensive environmental analysis*
	Brings ability to contextualize landscape architecture interventions within larger cultural systems	*can defend design decisions against cultural critiques*
Public Policy and Regulation	*Offers engaging the basics of the political system*	*can navigate the politics of implementing a course and can create a course that adapts to local regulations*
	Brings ability to manage multiple, overlapping, or conflicting regulations and resulting implications	
	Brings ability to distinguish between legal requirements and operational methodology	*can bring new methods of meeting established goals*

Specific ways landscape architects can add value to disc golf course design and development

DGCD Services are used to filter specific additions landscape architects can make to disc golf course design and development, removing overlap

Added value not offered by DGCD services

Category the filtered contribution is synthesized into

SPECIFIC CONTRIBUTIONS	DGCD SERVICES	FILTERED CONTRIBUTIONS	SYNTHESIZED CATEGORY
can use BMPs, strategic hole design, and leverage course to enhance other program elements	*strategic hole design*	*leverage course to enhance rest of program*	*holistic planning*
can support design moves, especially controviersial ones, with solid reasoning and persuade opponents	*possibly*		
can use overlay analysis to determine how to route course that accounts for flora, fauna, geological, hydrological, and cultural features		*Site analysis of environmental, geological, hydrological, cultural features*	*holistic site analysis*
can support the use of disc golf in areas of opposition and meet critiques of disc golf with design solutions	*possibly*		
can acquire the necessary political approvals and can adapt course design and even play style of the game in order to meet requirements of local regulations	*yes*		
can propose new methods of meeting goals and back up with logical reasoning and research	*possibly*		

CONTINUED NEXT PAGE...

LA CORE COMPETENCIES	LA CORE SERVICES	POTENTIAL CONTRIBUTIONS
Design, Planning, and Management at Various Scales and Applications	*Offers working with community planning, zoning, and private utilities*	*can propose courses on developing land in various landscape architectural projects*
	Brings ability to design to scale, context	*can analyze the disc golf demand for the area*
	Offers ability to evaluate consequences of design solutions to the user, economics, maintenance, ecological, etc.	*can evaluate the safety, economic viability, maintenance, and environmental impact of the course*
	Brings ability to develop evaluative criteria, such as project goals, to evaluate design	*can set course goals including target audience, visual character, environmental impact level, etc.*
	Brings use of computers and design software applications	*can use for analyzing, planning, and designing various courses elements*
	Brings ability to analyze, synthesize and evaluate critical path	*can plan the critical tasks necessary for implementation*

	SPECIFIC CONTRIBUTIONS	DGCD SERVICES	FILTERED CONTRIBUTIONS	SYNTHESIZED CATEGORY
	can propose courses on new development in conjunction with various landscape architectural projects		*Can propose courses on new development*	*holistic planning*
	can design courses of various scales and scopes	*yes*		
	can create design that is not only safe, but also feels safe. Can design for minimal maintenance and environmental impact and negotiate tradeoffs between various factors	*possibly*		
	can set course goals including target audience, visual character, environmental impact level, strategic/ penal/heroic/visual holes, and potential ancillary benefits	*possibly*		
	can use computers and technology to analyze a site, design the course, and create management maps		*use of technology for design and communication*	*use of tech*
	can develop and execute critical path plan	*yes*		

CONTINUED NEXT PAGE...

LA CORE COMPETENCIES	LA CORE SERVICES	POTENTIAL CONTRIBUTIONS
Site Design and Engineering: Materials, Methods, Technologies and Applications	*Brings experience working with architects and engineers*	*Can integrate course more fully into rest of project, allowing architectural and engineering elements to play off of the strengths of the course*
	Offers design for energy conservation and resource recovery	*can design low-maintenance courses, integrate stormwater management*
	Offers ability to create the most inexpensive design that still meets clients criteria	*can value engineer a course to meet budget*
	Offers use of computer aided design programs to assisst in development of construction documents	*can develop construction documentation using CAD*
	Offers viewshed planning	*can use viewshed planning to create views to and from tees, baskets, and critical site features*
	Offers design for aesthetic enhancement	*can add planting design, furniture design, feature design*
	Offers design using living materials in keeping with management goals, climate and microclimate	*can add low management, climate adapted planting design*

SPECIFIC CONTRIBUTIONS	DGCD SERVICES	FILTERED CONTRIBUTIONS	SYNTHESIZED CATEGORY
can integrate course design into surrounding development, including utilizing empty land, water quality ponds and areas, and orchestrating views of tees and baskets from roads and buildings	*possibly*		
can integrate stormwater management into course, design course for minimal management, develop cyclical management programs		*integration of other systems with course*	*holistic planning*
can value engineer a course to meet client budget and prioritize design elements	*yes*		
can develop CAD construction documents for entire course		*CAD construction documents*	*use of tech*
can use viewshed planning to create views to and from tees, baskets, and critical site features		*Viewshed Planning*	*holistic planning*
can add planting design, furniture design, feature design	*furniture design (signs)*	*more custom design*	*enhanced aesthetics*
can add low management, climate adapted planting design		*planting design*	*enhanced aesthetics*

CONTINUED NEXT PAGE...

LA CORE COMPETENCIES	LA CORE SERVICES	POTENTIAL CONTRIBUTIONS
Construction Documentation and Administration	*Offers coordination between design disciplines*	*can coordinate between course designer, site designer, engineering, architecture, project branding and marketing, etc.*
	Offers cost breakdowns, itemized budgets, sequenced schedules	*can document detailed construction budgets and schedules*
	Offers use of computer aided software programs to assist in the documentation process	*can use CAD, GIS and other tools to communicate construction intent and document outcomes*
Communication	*Brings ability to handle ambiguous situations*	*can handle ambiguous situations*
	Offers guiding public participation for resolving design and program direction	*can conduct public workshops to address potential concerns*
	Offers development of program visioning techniques	*can conduct workshops with local disc golfers to understand demand*
	Offers communication of work experiences such as case studies, design research, and publication of results of work	*can present past precedents of courses and document course design experience in a publishable format*
	Brings excellent language skills	*can effectively communicate with all users*
	Brings an understanding of the legal implications of different types of communication	*can ensure communications do not become problems later in the project life cycle*
	Offers various communication appraoches and the media to present professional approaches that are pros and cons on projects	*can work with many different communication methods and media types to accomplish project goals*

SPECIFIC CONTRIBUTIONS	DGCD SERVICES	FILTERED CONTRIBUTIONS	SYNTHESIZED CATEGORY
can coordinate between course designer, site designer, engineering, architecture, project branding and marketing, etc.		*coordinate between disciplines on project*	*holistic planning*
can document detailed construction budgets and schedules	*possibly*		
can use CAD, GIS and other tools to communicate construction intent and document outcomes, and refer to documents		*use of technology for design and communication*	*use of tech*
can handle ambiguous situations	*possibly*		
can conduct public workshops to address potential concerns		*communication with local communities*	*holistic site analysis*
can conduct workshops with local disc golfers to understand demand			
can present past precedents of courses and document course design experience in a publishable format	*possibly*		
can effectively communicate with all users	*possibly*		
can ensure communications do not cause legal problems later in the project life cycle	*possibly*		
can work with many different communication methods and media types for course branding, signs, and marketing	*possibly*		

CONTINUED NEXT PAGE...

LA CORE COMPETENCIES	LA CORE SERVICES	POTENTIAL CONTRIBUTIONS
Values and Ethics in Practice	*Use skills to train, educate and mentor other professionals at the time of degree*	*can mentor other landscape architects in disc gol course design*
	participate in publishing and research efforts of the profession	*can conduct and publish post-occupancy evaluations of the designed course*
	apply principles of social justice and social ethics	*can design with ADA and gender considerations*
	acts responsibly toward the public, profession, and environment	*can responsibly implement best practices, etc.*
	challenges normative regualtions and standards that no longer should be best practices	*can work to have outdated regulations replaced*

SPECIFIC CONTRIBUTIONS	DGCD SERVICES	FILTERED CONTRIBUTIONS	SYNTHESIZED CATEGORY
can mentor other landscape architects in disc golf course design	*yes*		
can conduct and publish post-occupancy evaluations of the designed course	*possibly*		
can design with ADA and gender considerations		*designing for minority groups*	*holistic planning*
can responsibly implement best practices, propose disc golf courses responsibly, etc.		*accountability from licensure*	*licensure*
can work to have outdated regulations replaced			

Appendix E

Survey of Austin TX Courses

(Compiled by Joshua Wilcox, 2015)

LOCATION	HOLES	TERRAIN	VEGETATION	RATING	P2P	PRIVATE
Lago Vista, TX	*18*	*moderately hilly*	*moderately wooded*	*2.5*	*no*	*yes*
Austin, TX	*20*	*very hilly*	*heavily wooded*	*4*	*no*	*yes*
Austin, TX	*15*	*moderately hilly*	*lightly wooded*	*2.5*	*no*	*no*
Leander, TX	*18*	*mostly flat*	*moderately wooded*	*2.5*	*no*	*no*
Leander, TX	*9*	*mostly flat*	*lightly wooded*	*2*	*no*	*yes*
Briarcliff, TX	*9*	*moderately hilly*	*lightly wooded*	*1*	*no*	*yes*
Round Rock, TX	*18*	*moderately hilly*	*heavily wooded*	*3.5*	*no*	*no*
Cedar Park, TX	*9*	*moderately hilly*	*heavily wooded*	*3*	*no*	*no*
Austin, TX	*9*	*moderately hilly*	*moderately wooded*	*3*	*no*	*yes*
Giddings, TX	*18*	*mostly flat*	*lightly wooded*	*2*	*no*	*yes*
Cedar Park, TX	*9*	*mostly flat*	*lightly wooded*	*not rated*	*no*	*no*
Round Rock, TX	*9*	*mostly flat*	*lightly wooded*	*2*	*no*	*yes*
Austin, TX	*18*	*moderately hilly*	*moderately wooded*	*4.5*	*no*	*no*
Manor, TX	*18*	*moderately hilly*	*heavily wooded*	*4*	*no*	*no*
Pflugerville, TX	*18*	*mostly flat*	*lightly wooded*	*2.5*	*no*	*no*
Georgetown, TX	*9*	*mostly flat*	*lightly wooded*	*2*	*no*	*no*
San Marcos, TX	*9*	*moderately hilly*	*moderately wooded*	*2*	*no*	*no*
Leander, TX	*9*	*mostly flat*	*lightly wooded*	*0.5*	*no*	*yes*
Lockhart, TX	*9*	*mostly flat*	*moderately wooded*	*2.5*	*no*	*no*
Lost Pines, TX	*9*	*mostly flat*	*lightly wooded*	*1.5*	*no*	*yes*
Austin, TX	*18*	*mostly flat*	*moderately wooded*	*4*	*no*	*no*
Red Rock, TX	*18*	*moderately hilly*	*moderately wooded*	*4*	*yes*	*yes*
Pflugerville, TX	*18*	*mostly flat*	*moderately wooded*	*3*	*no*	*no*
Round Rock, TX	*21*	*moderately hilly*	*lightly wooded*	*3.5*	*no*	*no*
Austin, TX	*9*	*mostly flat*	*lightly wooded*	*2*	*no*	*no*
San Marcos, TX	*9*	*mostly flat*	*moderately wooded*	*2.5*	*yes*	*yes*
Georgetown, TX	*9*	*moderately hilly*	*lightly wooded*	*2*	*no*	*no*
Austin, TX	*9*	*mostly flat*	*lightly wooded*	*2.5*	*no*	*no*
Smithville, TX	*18*	*mostly flat*	*moderately wooded*	*3*	*no*	*no*
Georgetown, TX	*18*	*moderately hilly*	*heavily wooded*	*3.5*	*no*	*no*
Austin, TX	*18*	*mostly flat*	*moderately wooded*	*4*	*no*	*no*
Georgetown, TX	*9*	*mostly flat*	*lightly wooded*	*3*	*no*	*no*
Austin, TX	*18*	*moderately hilly*	*moderately wooded*	*3.5*	*no*	*no*

DESIGNER	YEAR	DEVELOPMENT	HOLE TYPE	TEE TYPE	DGCD?
unknown	2001	Neighborhood	StrokeSavers	Dirt	no
John Houck	2009	Church	DISCatcher	Concrete	yes
unknown	1982	Park	Baskets	Dirt	no
unknown	2008	Park	Mach 3	Grass	no
unknown	2007	Park	DISCatcher	Grass	no
unknown	2007	Residential Park	Baskets	Natural	no
John Houck	2003	Residential Park	DISCatcher	Concrete	yes
John Houck	2009	Park	DISCatcher	Dirt	yes
Jud	2009	Church	Lightning DB-5	Dirt	no
unknown	unknown	Summer Camp	Home Made	Dirt	no
Jay Reading	2014	School Campus	Baskets	Grass	no
unknown	2009	School Campus	Mach New 2	Mixed	no
Mike Olse	1993 / 2009	Park	DISCatcher	Concrete	yes
Mike Olse	2008	Park	DISCatcher	Concrete	yes
unknown	unknown	Residential Park	DISCatcher	Concrete	no
FBCgT Youth	2011	Church	DISCatcher	Concrete	no
unknown	2011	Apartment Complex	DISCatcher	Gravel	no
unknown	2002	Residential Park	Mach 3	Gravel	no
unknown	2013	Park	DISCatcher	Dirt	no
unknown	2008	Resort	Baskets	Grass	no
John Houck	2009	Business Park	DISCatcher	Concrete	yes
unknown	unknown	None	Baskets	Natural	no
unknown	2011	Residential Park	Mach 5	Concrete	no
John Houck	1991	Park	Mach 3	Concrete	yes
unknown	2003	Church	Baskets	Dirt	no
unknown	2009	Campground	DISCatcher	Natural	no
unknown	2008	Residential Park	DISCatcher	Gravel	no
Joel Kelly	2013	Church	Baskets	Natural	no
unknown	2008 / 2012	Park	Mixed	Concrete	no
John Houck	2001	Park	DISCatcher	Concrete	yes
Mike Olse	2012	Park	DISCatcher	Concrete	yes
unknown	1997	Park	DISCatcher	Dirt	no
unknown	1992	Park	DISCatcher	Concrete	no

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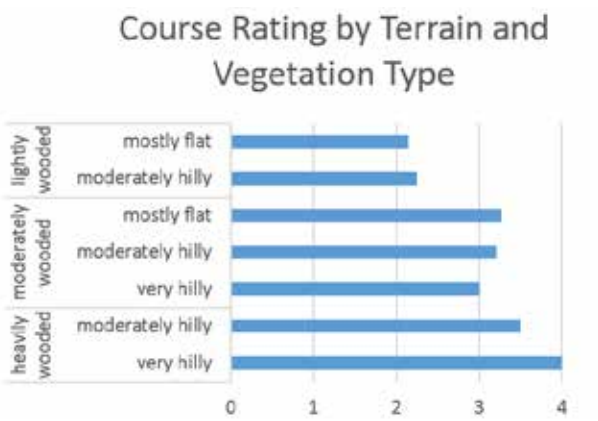
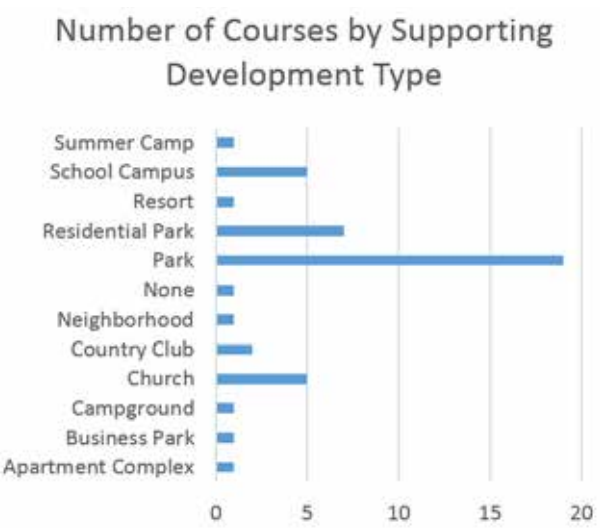
LOCATION	HOLES	TERRAIN	VEGETATION	RATING	P2P	PRIVATE
Kyle, TX	*18*	*mostly flat*	*moderately wooded*	*3*	*no*	*no*
Round Rock, TX	*9*	*mostly flat*	*lightly wooded*	*not rated*	*no*	*no*
Austin, TX	*9*	*moderately hilly*	*lightly wooded*	*not rated*	*no*	*yes*
Leander, TX	*18*	*mostly flat*	*lightly wooded*	*3*	*no*	*no*
Elgin, TX	*9*	*mostly flat*	*lightly wooded*	*1*	*no*	*no*
Dripping Springs, TX	*18*	*very hilly*	*moderately wooded*	*3*	*yes*	*yes*
Dripping Springs, TX	*18*	*mostly flat*	*moderately wooded*	*4*	*yes*	*yes*
San Marcos, TX	*21*	*moderately hilly*	*moderately wooded*	*3*	*no*	*no*
Austin (Wells Branch), TX	*18*	*mostly flat*	*lightly wooded*	*3*	*no*	*no*
Marble Falls, TX	*9*	*mostly flat*	*moderately wooded*	*3.5*	*no*	*no*
Leander, TX	*18*	*mostly flat*	*moderately wooded*	*4*	*yes*	*no*
Austin, TX	*18*	*mostly flat*	*lightly wooded*	*3*	*no*	*no*

DESIGNER	YEAR	DEVELOPMENT	HOLE TYPE	TEE TYPE	DGCD?
John Houck	*2006*	*Park*	*DISCatcher*	*Concrete*	*yes*
unknown	*2015*	*School Campus*	*DGA*	*Natural*	*no*
unknown	*unknown*	*School Campus*	*Baskets*	*Natural*	*no*
unknown	*2009*	*Residential Park*	*Mach 5*	*Gravel*	*no*
unknown	*unknown*	*Park*	*Mach 5*	*Grass*	*no*
Park Jarret	*2004*	*Country Club*	*DISCatcher*	*Concrete*	*no*
Park Jarret	*2004*	*Country Club*	*DISCatcher*	*Concrete*	*no*
Texas State University Disc Golf Club	*1994*	*School Campus*	*Baskets*	*Gravel*	*no*
unknown	*1996 / 2012*	*Park*	*DISCatcher*	*Concrete*	*no*
John Houck	*2009*	*Park*	*DISCatcher*	*Concrete*	*yes*
John Houck	*2006*	*Park*	*DISCatcher*	*Concrete*	*yes*
unknown	*1987*	*Park*	*DISCatcher*	*Concrete*	*no*





Appendix F

Golf Course SWOT Analysis

(Compiled by Joshua Wilcox, 2015)

Disc Golf and Golf SWOT Analysis

Fort Snelling Disc Golf Course and Theodore Wirth Disc Golf Course are both located in Minnesota and designed by disc golf and golf specialist Steve West. User reviews for both courses from the website dgcoursereview.com were compiled into the following points:

- Long holes
- Few obstacles, boring, simple
- Poorly kept
- Trees in play
- Too open
- No map on tee signs
- Some safety concerns
- Mostly just long holes
- Flat
- Boring
- Safety issues
- Tees hard to find
- Poorly labelled mandos
- Too flat
- Too long, no technicality
- Safety issues
- No punishment for inaccurate shots
- Confusing to navigate
- Reserving tee time
- Safety
- Flat
- Clashing cultures?
- Great for integration with ball golfers
- Too short with too little challenge
- Natural tees (moved every week)
- Difficult to navigate
- Very little challenge
- Too easy
- Natural tees
- Short holes with no challenges
- Safety
- Boring
- Not challenging
- Bland, seems like an afterthought
- Scorecard map was useless

These points were synthesized into a table of strengths, weaknesses, opportunities, and threats. Strengths and weaknesses are defined as internal pros and cons of the course. Conversely, opportunities and threats are defined as external influences on the success of the course. Together they make up the SWOT analysis (see diagram right, also in chapter 7).

The majority of the factors listed in the SWOT framework are influenced by two factors: shared fairways between golf and disc golf, and safety players of both sports.

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
safety from disc golf and golf flow being integrated	a little boring	proximity to downtown areas	competing courses are free and more fun to play
variety of multiple tees/pins	too long/not very technical	better maintained than competing courses	potential backlash from ball golfers
extreme length of holes	not completely safe	opportunities to introduce disc golf to ball golfers	
high level of maintenance		disc golf pro shop	

Appendix G

Application Shot Length Breakdowns

(Compiled by Joshua Wilcox, 2015)

STAGG HILL DISC GOLF COURSE SHOT BREAKDOWN TABLE										
HOLE #	GOLD TEES					WHITE TEES				
	Length	Par	1st shot	2nd shot	3rd shot	Length	Par	1st shot	2nd shot	3rd shot
1	550	4	360	190		410	4	250	160	
2	360	3	360			260	3	260		
3	540	4	340	200		400	4	250	150	
4	720	5	280	250	190	600	5	220	230	150
5	290	3	290			190	3	190		
6	900	5	350	350	200	730	5	300	280	150
7	390	3	390			300	3	300		
8	580	4	390	190		470	4	300	170	
9	400	3	400			280	3	280		
10	610	4	350	260		470	4	300	170	
11	410	3	410			310	3	310		
12	530	4	310	220		450	4	290	160	
13	330	3	330			230	3	230		
14	595	4	375	220		450	4	300	150	
15	950	5	330	380	240	770	5	300	300	170
16	375	3	375			290	3	290		
17	325	3	325			230	3	230		
18	555	4	330	225		400	4	250	150	
TOTAL	9,410					7,240				

WILDCAT CREEK DISC GOLF COURSE SHOT BREAKDOWN TABLE										
HOLE #	GOLD TEES					WHITE TEES				
	Length	Par	1st shot	2nd shot	3rd shot	Length	Par	1st shot	2nd shot	3rd shot
1	580	4	390	190		395	4	270	125	
2	310	3	310			215	3	215		
3	630	4	400	230		450	4	300	150	
4	310	3	310			220	3	220		
5	605	4	400	205		430	4	300	130	
6	520	4	330	190		380	4	260	120	
7	350	3	350			250	3	250		
8	660	4	400	260		460	4	290	170	
9	800	5	300	300	200	660	5	300	250	110
10	600	4	400	200		420	4	300	120	
11	610	4	400	210		450	4	300	150	
12	370	3	370			270	3	270		
13	545	4	340	205		440	4	300	140	
14	820	5	390	250	180	650	5	260	240	150
15	560	4	340	220		440	4	270	170	
16	550	4	390	160		460	4	300	160	
17	610	4	350	260		595	5	285	210	100
18	385	3	385			300	3	300		
TOTAL	9,815	69				7,485	70			

REUNION RANCH DISC GOLF COURSE SHOT BREAKDOWN TABLE										
HOLE #	GOLD TEES					BLUE TEES				
	Length	Par	1st shot	2nd shot	3rd shot	Length	Par	1st shot	2nd shot	3rd shot
1	350	3	350			300	3	300		
2	525	4	365	160		435	4	275	160	
3	510	4	310	200		450	4	250	200	
4	350	3	350			300	3	300		
5	900	5	400	300	200	720	5	300	270	150
6	350	3	350			280	3	280		
7	520	4	300	220		450	4	250	200	
8	350	3	350			345	3	345		
9	600	4	350	250		480	4	240	240	
10	410	3	410			270	3	270		
11	555	4	280	275		480	4	300	180	
12	280	3	280			310	3	310		
13	510	4	300	210		480	4	300	180	
14	810	5	400	250	160	710	5	300	250	160
15	300	3	300			250	3	250		
16	450	4	210	240		400	4	200	200	
17	300	3	300			250	3	250		
18	520	4	310	210		430	4	250	180	
TOTAL	8,590					7,340				

REUNION RANCH (CONT.)				
RED TEES				
Length	Par	1st shot	2nd shot	3rd shot
250	3	250		
300	4	200	100	
350	4	200	150	
265	3	265		
575	5	250	250	75
220	3	220		
410	4	250	160	
280	3	280		
390	4	200	190	
220	3	220		
400	4	250	150	
235	3	235		
405	4	225	180	
570	5	225	225	120
180	3	180		
350	4	200	150	
200	3	200		
365	4	225	140	
5,965				

GOLD TEE TARGET LENGTHS	
Drives	300′–400′
Approaches	180′–250′

BLUE TEE TARGET LENGTHS	
Drives	250′–350′
Approaches	130′–200′

WHITE TEE TARGET LENGTHS	
Drives	200′–300′
Approaches	100′–170′

RED TEE TARGET LENGTHS	
Drives	175′–250′
Approaches	80′–150′