

Sinton Parks Advisory Board

March 25, 2024

Good morning, Parks Advisory Board members.

My name is Ricardo Ramirez, President of Third Coast Disc Golf of Corpus Christi, Texas. I come to you with a proposal for building a disc golf course in your local park. Third Coast Disc Golf has annual tournaments at Rob and Bessie Welder Park every year and would love to continue to do so. Disc Golf is a growing sport that attracts a great number of players every year. In turn, these players use Sinton's restaurants and other places of business while at these tournaments. When we have two-day tournaments in corpus and ingleside, they stay at hotels or Airbnb's. Sinton can benefit from this as well. Third Coast brings temporary baskets (Targets) for these tournaments and can't have two-day tournaments for this reason. Having permanent baskets would allow Third Coast Disc Golf and other clubs to throw Sanctioned Professional Disc Golf Association Tournaments in Sinton Texas.

Disc Golf is a sport that you can play for free. The community will also benefit from having a disc golf course that utilizes a part of the park that is not commonly used on a daily basis. The course does not require any other new maintenance. Once built, just lawn care is needed for play. Third Coast Disc Golf maintains courses in the Corpus Christi area, Ingleside Texas in the past, and now building a championship course at Oso Creek Park (Corpus Christi).

I would love to come forward with this proposition of an 18 hole Disc Golf Course in Sinton Texas. I appreciate your time and efforts in this matter. I look forward in speaking with the Advisory Board in this matter. I also attached a piece that was written in great detail about Disc Golf Courses in other cities.

An 18 hole disc golf course requires cement tee pads and baskets (targets):

18 (5x12) Cement Tee Pads: \$5,400

18 Targets: \$8,000

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Adding to the Disc-course:

The Case for Urban Disc Golf



via Dix Park, 2020

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Department of City and Regional Planning
April 2023

Acknowledgments

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Abstract

This Master's Project serves as a "playbook" style resource guide to help communities and local governments navigate the decision-making and implementation processes related to disc golf course development. By collecting information such as the demand for disc golf, the benefits of disc golf for the community and players, and the cost, spatial requirements, and environmental impact of courses, this report serves as a justification for the implementation of disc golf courses. This report does so by compiling existing research, illustrative overviews of various types of courses in the Triangle region of North Carolina, and a series of nine semi-structured interviews with those involved in course creation and maintenance. The subjects of these interviews include course designers, planners, parks and recreation staff, and industry professionals. Lastly, by providing the reader with a collection of resources, including course design best practices and actionable next steps for course implementation, this guide is intended to be a useful resource for those advocating for disc golf across the country.

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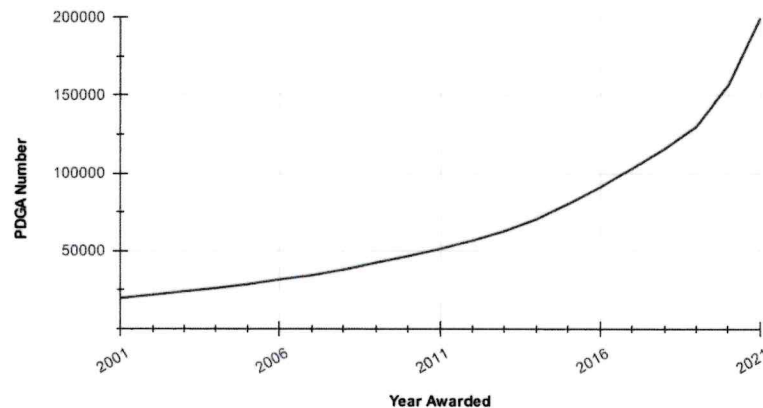
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What is Disc Golf? The History and Growth of the Sport

Disc golf is a sport in which players throw a disc at a target, a pole extending up from the ground with chains and a basket, where the disc comes to rest. An early version of the game was played at a youth camp as early as 1965. However, disc golf became much more formalized in the 1970s with the installation of the first official disc golf course and the invention of the disc golf basket in 1975.¹ It is structured similarly to golf, in that courses are generally 9 or 18 holes, and the goal is to get the disc in the basket from the tee pad in the least number of throws, or strokes. In other ways, it resembles other flying disc sports like ultimate frisbee. Disc golf can be played by one or more players of any age or gender, recreationally or competitively.

Disc golf is currently one of the fastest-growing sports in the US.² The Professional Disc Golf Association (PDGA) estimates that over a million people regularly play disc golf, and that over 12 million people have played at least once.³ A 2020 study similarly estimated that 3.3 million Americans had played disc golf in the last year, up from an estimated 2.5 million in 2018.⁴

PDGA Member Growth Since 2001

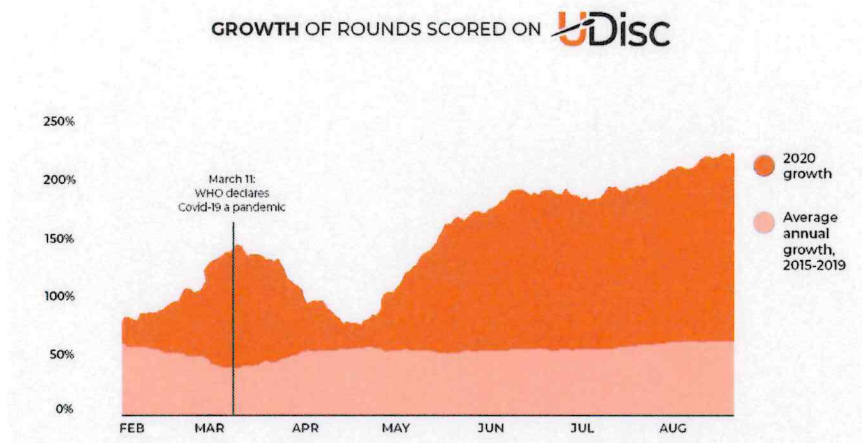


Disc golf has exploded in popularity in the last twenty years. Via PDGA.

The 2020 Disc Golf Pro Tour Championship, which took place in Charlotte, North Carolina, was aired on ESPN2 and received over 225,000 viewers. Not only was the coverage of the event the most watched program on ESPN2 that day, but its viewership exceeded that of any other Tuesday night primetime programming on the channel going back over a month, including programs such as College Football, UFC, and the NFL.⁵

Much of the growth can be attributed to a pandemic boom in which many new players took up playing disc golf as a way to get exercise outside in a safe and socially distanced manner; as many other sports saw declines in players due to lockdown restrictions and health concerns, disc golf flourished as a healthy alternative form of recreation.

However, as COVID restrictions eased, disc golf continued to gain popularity. Initial research indicates that player retention remains high – on UDisc, the most popular scoring app, over 19 million rounds were recorded in 2022, representing nearly a 70% increase from 2020.⁶ It is worth mentioning that UDisc greatly undercounts the actual number of players worldwide. A 2020 study found that only one out of every five rounds of disc golf are recorded on UDisc; a more accurate estimate of the number of rounds played in 2022 is roughly 95 million.⁷



A graph illustrating the extreme growth of disc golf in 2020. Via UDisc.

“I would say that we're probably averaging 25 to 30,000 rounds, per course, per year... we have 20 courses, so 600,000 rounds.”

– Mark Huether - Director of Operations, Charlotte Disc Golf Club

Despite this huge player base, there are thousands of current and potential players who lack adequate facilities to play disc golf across the United States and worldwide. Though there are currently roughly 14,000 courses in the United States, they are neither distributed equitably, nor is there an equity of quality.⁸ Disc golf courses are primarily in the upper Midwest, the mid-Atlantic I-95 corridor, New England, and the Pacific Coast.⁹ In addition, the majority of courses are located in non-urban areas, and disc golf courses are being constructed in non-urban regions at a rate of nearly 1.5 times that of urban regions.¹⁰

Furthermore, a 2020 study found that counties are less likely to have a disc golf course as poverty and the percentage of residents of color increases. Moreover, the study found that there are more courses where educational attainment and the percent of residents under age 25 is higher.

Currently, disc golf courses are located in communities that are not racially and economically diverse, furthering the need for deliberate course creation in these underserved communities. Not only would an increased investment in the creation and maintenance of disc golf courses allow for

increased access for the myriad of current and potential players, but it has the potential to reduce racialized inequities of park access and health as well.

Research has indicated that there is a strong desire of disc golfers to play. One study found that over half of players interviewed reported they were willing to travel over 50 miles on a given weekend to play disc golf. Eighty percent said they were willing to travel 26 or more miles.¹¹ If there is a course, people will play. If there isn't a course, people will drive to find one. And if you build a course, players will come. One study found that the opening of a new park in a previously underserved area led to increased physical activity among residents, with those living closer to the park being more likely to use it. The study also found an improvement in the overall health and well-being of residents.¹² Similarly, one study found that counties with proximity to disc golf courses were healthier than counties without access.¹³

"I'd say it's something that comes up in just about every new park master plan that we work on. It is something that either gets brought up by the design team or by the community, having a desire for [disc golf]... we're seeing disc golf courses climbing to the top more and more often these days."

– T.J. McCourt, AICP - *Planning Supervisor, City of Raleigh Parks, Recreation, and Cultural Resources*

However, to increase the accessibility and appeal of disc golf beyond wealthy, suburban, and predominantly white communities, disc golf courses must be deliberately constructed to serve communities it does not currently reach. In addition, programming such as youth instructional camps may be employed to further connect with currently underserved populations.

This report was compiled to help raise awareness of the value of disc golf course creation and to inform decisions by cities and towns in support of this activity. The next section provides an illustrative case for disc golf as a recreational land use, through the lens of financial benefits, environmental and ecological benefits, community benefits, and individual physical and mental health benefits, among others. After that, the report provides an example of a large, medium, small, and temporary disc golf course; in doing so, I provide an overview with information on the courses' history, cost, size, and quantity of players. Located in the appendix of the report is an additional collection of resources, including course design best practices, steps for course implementation, and areas where further research is still needed.ⁱ

ⁱ The following research was conducted using a mixed-methods qualitative approach. This approach included a review of the existing literature surrounding the demand for disc golf and the benefits of course creation and maintenance, as well as a review of the information and data from local governments on the history, size, cost, and impact of their disc golf courses. Lastly, this research was supplemented by a series of nine semi-structured interviews with planners, course designers, parks and recreation staff, and industry professionals. Such interviews offered expert knowledge and perspectives which helped to frame the research and answer many of the research questions posed.

It is clear that the demand for disc golf is there – a crucial first step for any advocate of disc golf would be to familiarize themselves with the arguments for the creation and maintenance of disc golf courses in order for courses to gain political feasibility.



Hole 15 and 9 of Diavolo Disc Golf Course. Via UDisc.

Making the Case for Disc Golf

In this section, I will make an illustrative case for disc golf as a recreational land use, through the lens of financial benefits, environmental and ecological benefits, community benefits, and individual physical and mental health benefits, among others. Developing a disc golf course requires convincing those with resources and decision-making authority to take action. It is necessary that proponents of disc golf familiarize themselves with the benefits of public investment in the sport in order to help all involved parties to realize the positive impact of course creation and maintenance.

Personal and community benefits

Disc golf courses are **relatively cheap** to create and maintain, especially as compared to other recreational land uses, such as football fields, basketball courts, or tennis courts, among others. The Professional Disc Golf Association (PDGA) estimated that a quality 18-hole course can be installed for under \$25,000 in most places where intensive land clearing is not required.¹⁴

The table below illustrates the construction costs and annual maintenance costs of disc golf courses and a number of other recreational land uses.ⁱⁱ

Recreational Land Use	Construction Costs	Annual Maintenance Costs
Disc Golf Course	\$25,000-\$300,000 ⁱⁱⁱ	\$1,500 - \$90,000 ^{iv}
Turf Soccer/Football Field	\$550,000 - \$1,200,000	\$10,000
Natural Grass Soccer/Football Field	\$400,000 - \$820,000	\$18,000 - \$44,000
Turf Baseball Field	\$420,000 - \$1,140,000	\$10,000
Natural Grass Baseball Field	\$400,000 - \$820,000	\$18,000 - \$44,000

The initial construction costs of a disc golf course is just 4.5% to 25% of required costs of a turf soccer/football field. This large discrepancy of maintenance costs is highly dependent on the course size and quality, as well as the amount of volunteer labor. The higher end of this range is due to championship level courses with longer fairways and more complex designs that require extensive year-round work, that are not aided by significant volunteer labor. One course designer noted that modern courses with advanced sustainability practices will also have higher construction and maintenance costs.

ⁱⁱ The construction costs for all uses other than disc golf are from the Sports Venue Calculator.

ⁱⁱⁱ The minimum cost identified is from the PDGA estimate, and the maximum cost identified is the maximum cost found in my research, for Marsh Creek, a planned course set to be located in Northeast Raleigh, NC.

^{iv} This estimate is from my interviews with parks and recreation departments. The lowest maintenance cost identified is for Dogwood at Southern Village, in Chapel Hill, NC. The highest maintenance cost identified is for Diavolo at New Hope, in Cary, NC.

“One tennis court costs the same as putting in the entire disc golf course. You know, lights, concrete, fencing... all that costs the same as putting in 18 holes for disc golf... a tennis court where ten people can get on a \$100,000 court in a day. And we can get 400 people through the disc golf course in a day.”

– Mike Sink - *Parks, Recreation & Cultural Resources, Operations and Program Supervisor, Town of Cary*

Many park planners are starting to embrace disc golf as a more cost-efficient recreational land use, due to the much lower initial capital investment required. Though the maintenance costs may be higher than other recreational uses for larger championship caliber courses, most courses have significantly lower maintenance costs, as much of the required groundskeeping work is done by local volunteers.

Disc golf courses also often **utilize a wide variety of terrain compared to other recreational investments**. Land unsuitable for other developments or park activities is often the perfect terrain for a disc golf course. Many of the best courses utilize rocky, hilly, or very wooded terrain. Relatedly, there is very **little development or land clearing** required for course creation; existing trees, rocks, bodies of water, and other obstacles are used as natural hazards for the course. This not only keeps the cost of course construction low, but a lack of required development results in disc golf being much **less environmentally and ecologically harmful** than nearly every single other recreational land use.

“They're a great fit for a lot of spaces that couldn't support other kinds of development.”

– T.J. McCourt, AICP - *Planning Supervisor, City of Raleigh Parks, Recreation, and Cultural Resources*

The environmental impact of disc golf courses is often compared to those of hiking trails; the primary negative impacts include soil compaction and erosion, minor land clearing, and light tree damage. These impacts are very minimal when compared to the intensive land clearing, ground leveling, and concrete paving required of most other recreational land uses. Furthermore, municipal golf courses and sport fields require intensive mowing and fertilization, which creates significant pollutants and greenhouse gas emissions.

Disc golf course creation has the potential to **revitalize an underutilized park** with deteriorating facilities. For example, the Paul McBeth Foundation, a nonprofit organization whose mission is to bring disc golf to underserved locations, recently created a disc golf course at Jackson Park, a formally neglected park located in the Southside of Chicago. Tommy Inglis, the founder of Hyde Park Disc Golf, stated that before the course implementation, Jackson Park was “a park that was not accessible... it [was] not somewhere you wanted to walk alone.” He noted that now, it’s not just disc golfers who come to the park – he says they now see people who “have been walking by for years, just wait[ing] for this to get cleaned up”.¹⁵



Jackson Park after the installation of the disc golf course. Via Paul McBeth Foundation.

A previous study similarly found that the creation of a disc golf course in a park in Richmond, Virginia revived a public space that had fallen into disrepair, and by attracting an influx of park users, **vandalism and crime was also deterred**.¹⁶ As seen in both Chicago and Richmond, disc golf course creation has the ability to revitalize a park by connecting park users to the park itself; by offering local participants a place to play, they subsequently have a stake in the maintenance of the park. For this reason, nearly every disc golf course is connected to a local disc golf organization, which volunteers their labor to the ongoing maintenance of the course.

Furthermore, disc golf has a very **low financial barrier to entry**, with the vast majority (91%) of courses being free to play. The equipment is also much cheaper than that of many other sports – a starter set of disc golf discs, complete with a putter, midrange, and driver, only costs around \$20.¹⁷ This by nature makes disc golf less exclusionary than many other sports and allows for more diversity in the socioeconomic status of players.

“You know, it’s a very inexpensive sport to pick up. Usually, you can just walk onto a course and play. It is very similar to basketball where you can grab a ball and go. Here, you can grab a disc and go.”

– Frank Sidoti - *Recreation Assistant Supervisor, Athletics Parks and Recreation, City of Durham*

As noted earlier, by creating disc golf courses in areas without access to them, parks planners have the ability to combat socioeconomic and racial inequities in access to green space, and relatedly,

health. In addition to supporting diversity and inclusion, disc golf also can **increase community engagement** through formal and informal clinics, games, and tournaments. Many local disc golf clubs host youth clinics, with the goal of getting children involved in the sport from a young age. Some of these clinics specifically target children from low-income or disadvantaged backgrounds; in 2022, the disc golf education non-profit Uplay, in conjunction with the Paul McBeth Foundation, installed a permanent disc golf course in Guatemala and taught over 500 participants how to play.¹⁸ The Charlotte Disc Golf Club frequently holds youth programming all across the city, including a youth camp just for girls, in which afterward, every attendee got to choose a disc to keep. The City of Raleigh is planning on having discs for checkout in the community center in Marsh Creek Park, the site of a future disc golf course in Northeast Raleigh, as a way to introduce the game to individuals who do not own discs.



One of the four youth clinics held by Hyde Park Disc Golf (HPDG) in Chicago in 2021. Via HPDG.

Disc golf is also one of the best **lifetime fitness sports**, as it is relatively easy to learn and is accessible to people of all ages and fitness levels. This **low physical barrier to entry** allows for a greater diversity in gender, age, and physical ability than most other sports. The PDGA's 2021 demographic report found that 31% of members were older than the age of 40.¹⁹ Local parks and recreation staff note seeing players of all ages and physical abilities playing disc golf.

“Disc golf is lifetime fitness for five-year-olds to 85-year-olds and above... Anyone who wants to play? We’re welcoming them wholeheartedly.”

– Jay Pontier - President, Capital Area Disc League; Course Designer; Professional Disc Golfer, Team Innova

The **physical benefit** of playing disc golf is clear; a 2016 study found that players walk an average of 5,613 steps per 18-hole round of disc golf.²⁰ This equates to around three miles of walking per round. In comparison, the average American takes only 5,117 steps per day.²¹ It is well-documented that walking has physical health benefits including, but not limited to, reduced body fat, increased cardiovascular and pulmonary fitness, reduced risk of heart disease and stroke, increased muscle strength and endurance, and improved management of conditions such as hypertension, high cholesterol, and diabetes.²²

The **mental and social benefits** of spending time in green spaces are starting to emerge as well. Scientific research found that access to parks and other green spaces has a positive effect on emotional wellbeing, helping to reduce depression and anxiety, and helping to improve mood and self-esteem. Furthermore, cognitive health can be improved, through increased mental alertness, memory recall, productivity, and a reduction of cognitive decline, including dementia. Access to green spaces is also shown to help with symptom management of a number of mental health problems including schizophrenia, ADHD, and PTSD. Exposure to nature as a child is also proven to reduce the risk of experiencing mental health problems later in life.

What sets disc golf apart from many other sports is its intimacy with nature. The ability to interact with a calming natural setting has proven psychological and physical benefits, including improving one's emotional state, and reducing cardiac stress.²³ Furthermore, the act of 'being away' from one's usual setting (particularly their place of work) is proven to reduce stress and alleviate mental fatigue²⁴. Disc golf has all the physical and mental benefits of hiking, but with the added benefit of acting as a mindfulness exercise.²⁵

Lastly, access to nature increases social wellbeing and social cohesion; increased access to green spaces is shown to result in an increase in social interaction, place belongingness, and sense of community.²⁶ If local parks and recreation departments were to invest in the creation and maintenance of disc golf courses, the public would greatly benefit in terms of their physical, mental, and social wellbeing.

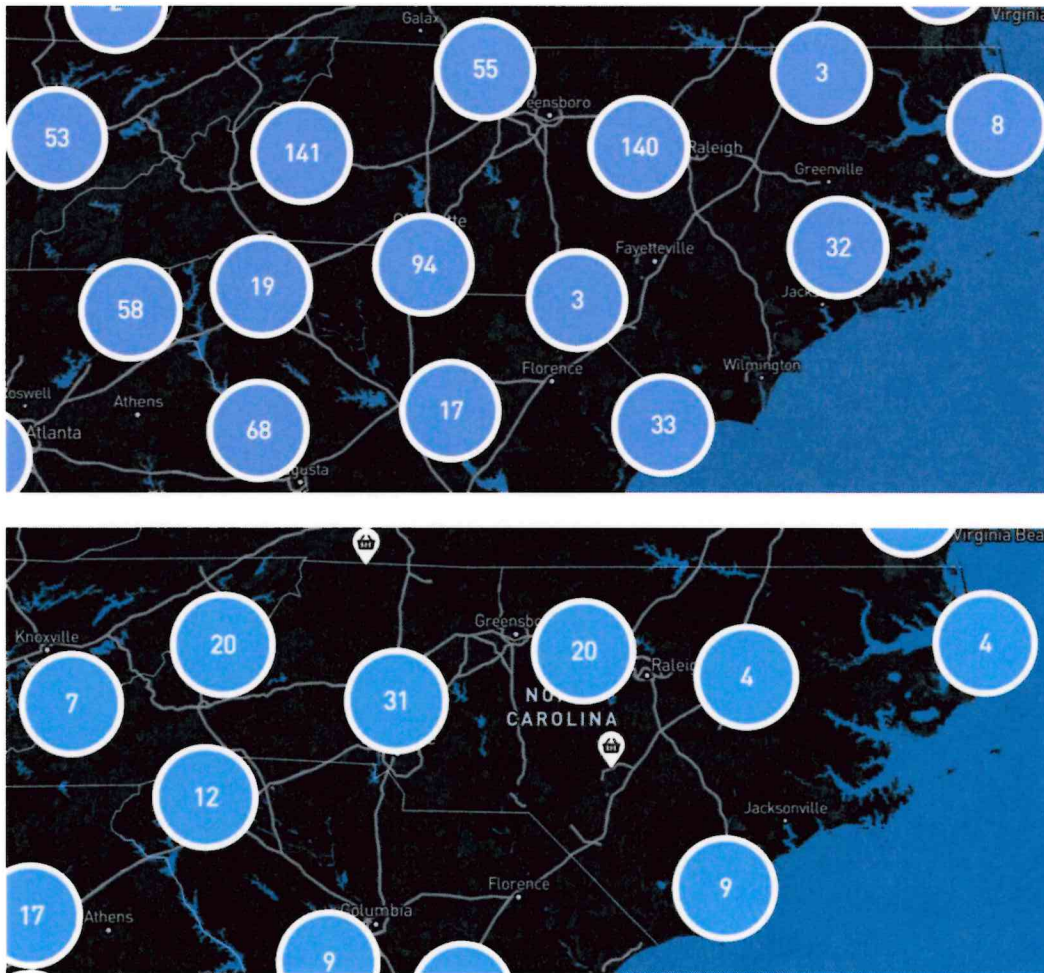
"It is important to promote disc golf in these areas, because we believe it impacts their communities in a better way. Disc golf can help clean up parks, get people outside and exercising, encourage community, and can help lower crime for just a few reasons."

– Zachary Smith - Director of Operations, Paul McBeth Foundation

Not only would the general public benefit, but **municipalities would also see a positive economic effect** from course creation, driven primarily by people traveling to their municipality for the sole purpose of playing or watching disc golf. An example of economic growth driven by disc golf can be seen in Peoria, Illinois, home of the 2019 Disc Golf World Championships. The tournament drew thousands of players and spectators, most of whom purchased lodging, food, and other

services for the five-day-long event. The tournament had an estimated direct economic impact of \$3,240,312.²⁷ Peoria also hosts a smaller tournament, the Ledgestone Insurance Open, which is estimated to bring roughly \$2 million in direct economic impact yearly.²⁸

In addition, the creation of disc golf courses (as well as green space, more broadly) has been shown to increase property values and economic development in the surrounding area.²⁹ Furthermore, course creation leads to a **proliferation of disc golf stores**, which further bring revenue and jobs to a municipality. As of April 2023, there were 395 courses in North Carolina, and 84 stores that sell disc golf gear.³⁰ As seen below, these stores are typically located near clusters of courses.



A map of disc golf courses (top) & disc golf stores (bottom) in North Carolina. Via UDisc.com.

“Communities have had great economic impact from them... you could see the economic growth and development in that little town because of it... I can tell you, it feels really good in our shoes to sit back and say, yeah, we did some good there. We did some good there, because we can see it.”

Another example of disc golf bolstering the economy of a municipality comes from the Åland Islands, an autonomous archipelago off the coast of Finland, roughly half the size of Rhode Island, with a population of only 30,000 people. Åland saw a significant decline in their tourism-based economy during the early stages of COVID-19. To try to combat this loss in tourism-driven revenue, they decided to implement 16 disc golf courses in the span of four months, with the goal of attracting visitors to come play disc golf. This plan in particular targeted visitors from neighboring Nordic countries, where disc golf is extremely popular. For instance, in Finland, over 6% of their adult population regularly plays disc golf, and disc golf is more popular than basketball, golf, and tennis, and many other ‘mainstream’ sports.³¹

The plan was extremely successful – a survey found that over 3,000 tourists visited Åland in 2021 with the primary purpose to play disc golf, and the average tourist stayed for four nights. In July alone, nearly 19,000 rounds were played in Åland, of which over 9,000 were logged by tourists. The **economic value of disc golf-related tourism** in Åland in 2021 was estimated to be roughly one million euros. And the cost of this investment? Only 150,000 euros. Costs were kept low primarily due to local volunteers who contributed an estimated 3000 hours of labor to make the vision a reality.³² Åland officials intend to host a major tournament in the future, which would draw hundreds of players and staff, and potentially thousands of visitors.



There is a disc golf course in each of the 16 municipalities in Åland. Åland has the most disc golf courses per capita and per land area of any State. Via DiscGolfPark.

Potential Concerns

Like all other forms of recreational land use, disc golf is not without a number of critiques and concerns. These include concerns of environmental damage caused by course creation and use, liability concerns, and concerns of land scarcity, particularly in urban areas without large amounts of available park land. It is important to familiarize oneself with these concerns, both to increase awareness and to help anticipate these critiques and have solutions prepared to address them.

Environmental impact

Research has found that disc golf is known to increase rates of soil compaction, which yields an increase in soil erosion and a decrease in vegetative cover.³³ Further research has also found that flying discs cause damage to trees, including bark damage and a loss of lower branches.³⁴ While the environmental impact of disc golf courses is certainly less than that of most other recreational land uses, such as baseball fields or basketball courts, these impacts are worth noting and mitigating as much as possible.

Many strategies to lessen these impacts have been identified:³⁵

- rotating baskets to allow for a dispersion of tree and erosion damage while allowing previously damaged areas to recover
- erosion control efforts (such as vegetation planting, building rock dams and bridges, and mulching)
- protective covers of vulnerable trees (such as metal wiring or mesh netting)
- course layouts that avoid sensitive terrains and tree types
- planting erosion- and impact-resistant tree species (with deeper roots and harder barks)
- using artificial or natural objects to mitigate damage in high impact zones
- behavioral management strategies, as detailed below³⁶

One of the most effective strategies is educating course visitors with materials which inform them of potentially harmful environmental impacts of playing.³⁷ A 2008 study identified two player behaviors that contribute to environmental degradation that can be reduced without affecting the game:

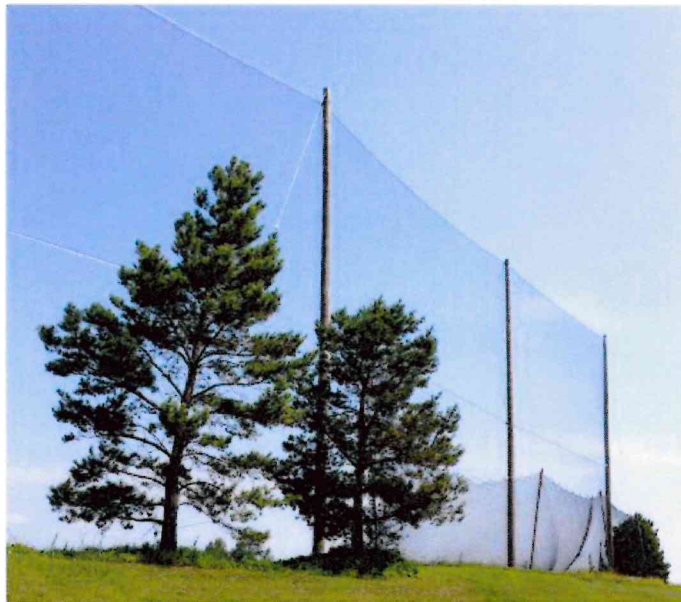
- dragging wheeled disc golf equipment carts
- using trees as practice targets

The study also researched players' values. Disc golf players reported placing a high value on the parks in which they play, and reported feeling a strong sense of ownership and attachment to the park. However, as a whole the players were unaware of the effects of their behaviors. When brochures detailing the environmental damage of these behaviors were distributed to the players,

the behaviors were “virtually extinguished”.³⁸ Further information on sustainability practices can be found in the collection of further resources in the appendix.

Liability concerns

Municipalities may be apprehensive of course creation due to liability issues, such as concerns over the safety of park users, especially when disc golf courses are mixed-use (doubling as a walking trail, for instance). However, research has found that the likelihood of a disc causing severe internal head injury is minimal, and is much less than the of injury posed by a flying baseball, for instance. The study ultimately concluded that although disc golf poses a much lower risk than most other sporting activities, rules and regulations should still be posted to caution players to look out for people before they throw, and to inform park users about the risk of being struck by a flying disc.³⁹ Courses should be designed to avoid throwing towards other trails, holes, or places where people congregate. Vegetative and artificial barriers (such as mesh netting) should be employed to separate park uses and to prevent potential flying disc injuries. For example, fast-growing and dense hedges were planted at Diavolo in order to separate a disc golf hole from a greenway that runs parallel to it.



An example of a caution sign for park users, as well as protective netting used to prevent potential injuries. Via Michael O'Keene and Turf Net Sport Supplies.

Land scarcity

Another potential concern that has been expressed is that urban areas often cannot have disc golf simply because land is too sparse. For example, New York City and Boston do not have a single

disc golf course within their city limits. Similarly, San Francisco and San Diego have only one course each, which has resulted in these parks receiving many complaints of overcrowding.⁴⁰ However, they all have municipal golf courses, which are far larger, more land-intensive, and costly to maintain.

One unique solution to a lack of available land in urban environments is the use of combination holes, in which there are multiple tee pads and baskets for each hole. North Park, in Seattle, Washington, utilizes this technique to have 18 unique holes on only 2.5 acres of land.⁴¹ For comparison, a soccer field is roughly 1.8 acres. With a limited amount of land, one can still build micro disc golf courses with combination holes and a mix of par 3's and par 2's – such courses are increasingly being constructed at breweries and similar businesses with limited land.



The spectators of the 2022 European Open, in Nokia, Finland. Via opendiscgolf.com.

Course Overviews

The course overviews provide course designers and parks and recreation staff with an example of a large championship level course, a quality medium length course, a smaller, more spatially conscious course, and a more budget-friendly temporary course. These courses have been selected as they are comparable in terms of location, in that each course is in the Research Triangle region of North Carolina. Furthermore, each course is highly rated, with the lowest ranked course receiving a rating of 4.1 out of 5 on UDisc as of April 2023.

Such overviews provide the most pertinent information for such individuals, such as an estimate of the cost of implementation and maintenance, the tract size required for the different course types, and an estimate of the number of players the course can draw, if implemented successfully. A limitation of the course overviews is that only four courses were analyzed, and all courses analyzed are in the Research Triangle region of North Carolina. The cost of courses varies based on many factors, including the location, topography, quality, and size of the disc golf course. Though the course overviews offered a range of course types and designs, many course typologies are excluded, including open ‘golf course’ style courses and micro disc golf courses.

[Course overviews begin on the next page]

Diavolo at New Hope, Cary, NC

Background and history

Diavolo is a large (6,919-10,026 foot) 22-hole championship caliber course located in northwest Cary, North Carolina. Diavolo sits on two parcels of land, divided by the American Tobacco Trail, totaling roughly 46 acres. The course contains a mix of open and wooded holes, as well as two water holes. Beginner, intermediate, and advanced tee pads allow for the course to be accessible to all skill levels.



Diavolo was approved as part of a 2012 Community Investment Bond. The course was designed by Jay Pontier, the Capital Area Disc League President (CADL), and Mike Sink, a member of the Town of Cary's Parks, Recreation, & Cultural Resources (PRCR) staff. Construction of the course was a joint collaboration between the Town of Cary and CADL, and officially began in 2018. The course opened to the public in October 2020, and was an instant success; in 2021, Diavolo was ranked as UDisc's 7th best disc golf course in the world.

"Ten years to dream, five years to plan, and two years to dig."

– Mike Sink - Parks, Recreation & Cultural Resources, Operations and Program Supervisor, Town of Cary

Cost

Diavolo had a budget of \$120,000 for implementation. Of this, \$32,632 was for land clearing, which included tree clearing, stump grinding, and mulching for 22 holes. CADL contributed thousands of hours of volunteer labor, helping to install the tee pads, benches, and sign posts.

The budget for maintenance is \$90,000 yearly. Most of the maintenance work is contracted, and primarily includes mowing, keeping the fairways clear of debris, maintaining the tee pads, and re-mulching a third of the course every three years.

Usership

In 2022, pedestrian counters located at the course indicate that 35,647 people played disc golf at Diavolo. According to UDisc data, players from 48 different states and 13 different countries played at Diavolo in 2022. Diavolo is slated to be the featured course for the 2024 PDGA Tim Selinske US Masters Championships, which will bring hundreds of spectators from all across the country.



Pictured is a layout of Diavolo, and images of hole 9 and hole 15. Via Town of Cary and UDisc.

Cedar Hills, Raleigh, NC

Background and history

[Cedar Hills](#) disc golf course was designed by Raleigh Parks and Recreation, and was established in 1984. Cedar Hills is a medium length (4,870-5,843 foot), mostly wooded course located in North Raleigh. Cedar Hills sits on a 39-acre parcel, which also includes a restroom, a basketball court, a playground, four tennis courts, and a baseball field.



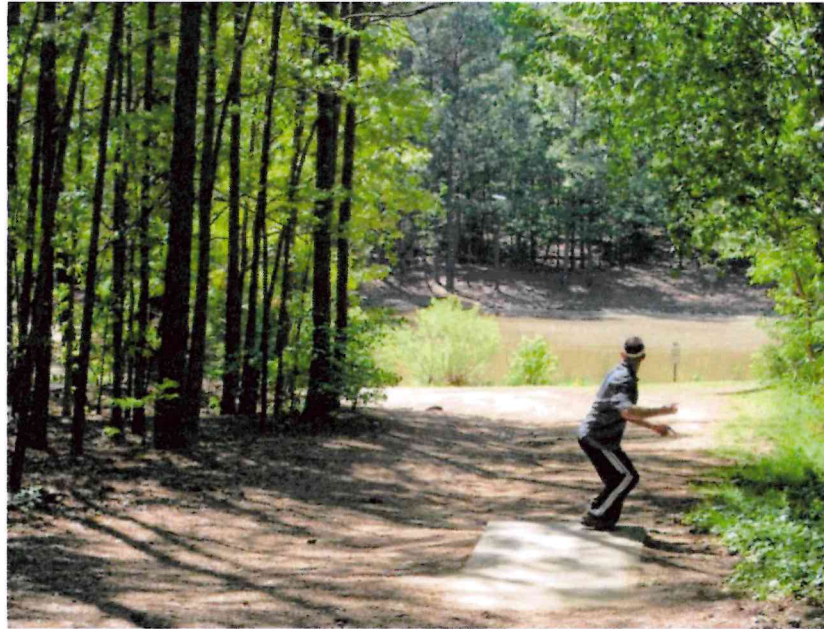
Cost

There is no available information on the original cost of Cedar Hills due to the age of the course. The maintenance budget of the park could not be identified either, as the City could not separate the costs of maintenance and operation for the disc golf course alone. Rather, they maintain such information at the park level, which includes maintenance for the other amenities as well. The maintenance work for the disc golf course includes mowing and pruning every two weeks during the growing season, leaf removal during the fall, and trail work on the course year-round. The City has partnered with local clubs and organizations, who volunteer their time and labor for maintenance of the course, including trail repair and rotating the baskets.

The City noted that erosion control measures they might take at Cedar Hills include building a rock dam, a log dam, filling topsoil and mulching, building a wooden bridge, matting turf, and seeding and fertilizing, among other measures.

Usership

11,780 people recorded playing at Cedar Hills on UDisc in 2022. It is estimated that the actual number of players in 2022 is around 58,900.^v In 2022, players from 40 states and six countries reported playing disc golf at Cedar Hills on UDisc.



Pictured is the layout of the Cedar Hills disc golf course, as well as an image of hole 6 and 7. Via Disc Golf Course Review, Rohrbaugh Visual and Photo Art, and UDisc.

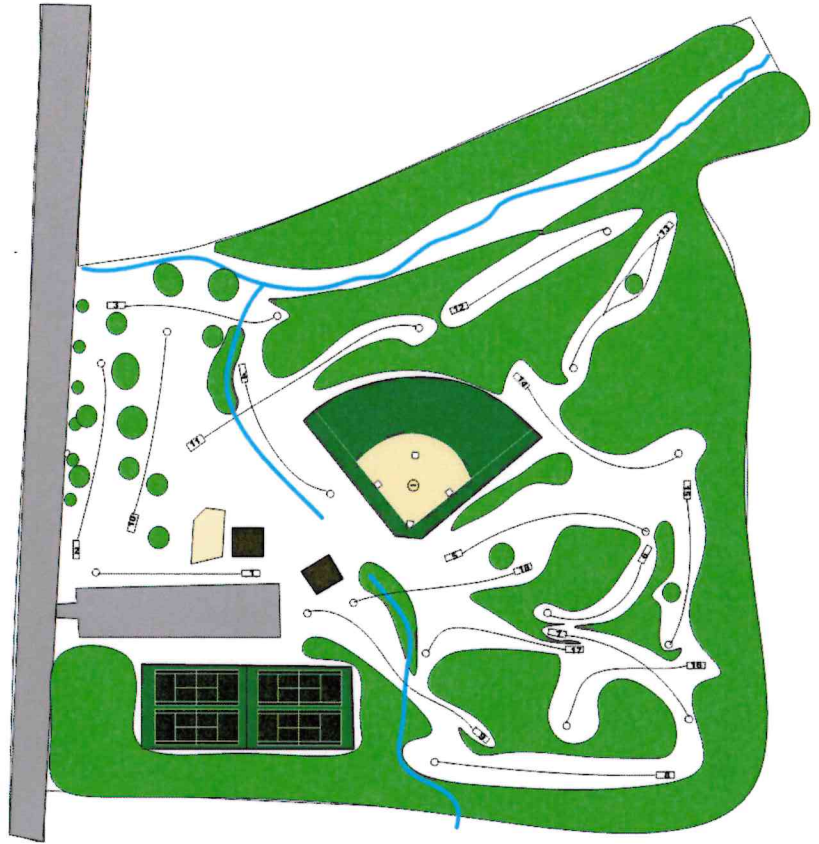
^v A 2020 study found that approximately one out of every five rounds of disc golf is logged on UDisc. This estimate was calculated using by multiplying the number of rounds at Cedar Hills logged on UDisc in 2022 by five.

Kentwood, Raleigh, NC

Background and history

Kentwood is a small (4,085 foot) 18-hole course located about three miles west of downtown Raleigh, North Carolina.

Kentwood Park was established in 1966, and rests on a 14.8-acre parcel, which also includes four tennis courts, a playground, a picnic shelter, a youth baseball field, restrooms, and a parking lot. Kentwood's disc golf course was designed by Raleigh Parks, Recreation, and Cultural Resources (PRCR), and was retrofitted in the park in 1983, making it the second-oldest public disc golf course in the state.⁴² Though the course is beginner-friendly, tight fairways and elevation changes present a challenge for new and seasoned players alike.



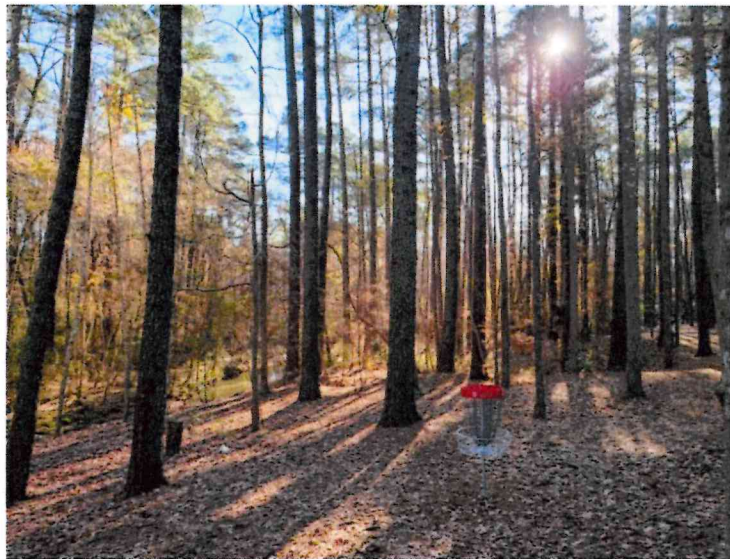
Cost

Similar to Cedar Hills, there is no available information on the original cost of Kentwood due to the age of the course. Furthermore, the maintenance costs could not be disaggregated from the maintenance and operation costs of the park as a whole, but they are kept low by ongoing volunteer groundskeeping efforts. New baskets and tee pads were installed between 2020 and 2021, which were largely funded by donations, sponsorships, and auctioning off the previous baskets to the community.

Usership

Kentwood is immensely popular and is rated North Carolina's most popular disc golf course on UDisc. 18,262 people recorded playing at Kentwood on UDisc in 2022 alone, and it is estimated

that the actual number of players in 2022 is around 91,310.^{vi} In 2022, players from 42 states and seven countries reported playing disc golf at Kentwood. Weekly doubles tournaments are hosted by the local disc golf club at Kentwood every Friday during the summer, which typically attract over 100 players. The Summer Doubles tournament series is one of the longest running in the nation.



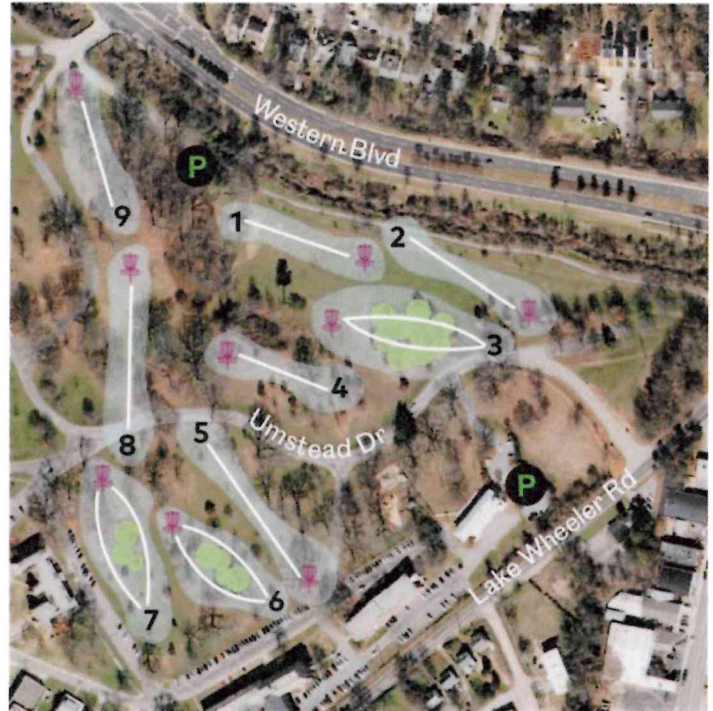
Pictured is the layout of the Kentwood disc golf course, and a view of Kentwood on hole 1 and 11. Via www.kentwooddiscgolf.com and UDisc.

^{vi} A 2020 study found that approximately one out of every five rounds of disc golf is logged on UDisc. This estimate was calculated using by multiplying the number of rounds at Kentwood logged on UDisc in 2022 by five.

Dorothea Dix Temporary Course, Raleigh, NC

Background and history

The [Dorothea Dix](#) temporary course is a medium length 9-hole course located at Dorothea Dix Park, roughly a mile west of downtown Raleigh, North Carolina. The course varies in layout, and is sometimes designed as a recreational level course (2,855 feet in length), accessible to all skill levels, and is sometimes designed as an advanced layout (4,805 feet in length), for more experienced players. Both course layouts have a mix of longer open holes and lightly wooded holes on the grounds of the park. The course was first implemented in 2020 and is typically open to play for a month to a month and a half every year.



Cost

The course was designed and installed by Raleigh Parks and Recreation staff. The initial equipment costs were estimated to be \$4,500 and can be found below. Raleigh Parks and Recreation staff noted that the ongoing maintenance costs are minimal and mainly include installing new signage when the holes are changed.^{vii}

Nine Innova DISCatcher Pro Targets with portable bases	\$4,000 (including freight)
Materials for securing baskets	\$200
Signage	\$200
Materials for tee pad markers	\$100
Total cost	\$4,500

^{vii} Durham Parks and Recreation similarly installed a 9-hole temporary course, Forest Hills Park, about a mile south of downtown. Between April 2021 and April 2022, 28,839 people used the course (approximately 80 people a day). Durham Parks and Recreation reported that the baskets cost roughly \$2,100 and the other costs were minimal.

Usership

Parks staff stated that the temporary course has been a huge success, and they plan to keep re-instating the course yearly. Information on the course use was collected with pedestrian counters and can be viewed below.

Course	Dates of Operation	Average Daily Users	Total Players
Fall 2020 Dix Park East (Recreational)	9/2/20 – 10/4/20	330	10,890
Spring 2021 Dix Park West (Advanced)	2/4/21 – 4/4/21	116	6,960
Spring 2022 Dix Park East (Recreational)	4/14/22 – 5/31/22	208	9,984

The discrepancies of use can be explained primarily by the length in which the temporary courses were open, as well as the time of the year when the temporary courses have been in operation. Raleigh Parks and Recreation noted they saw much fewer people in 2021 due to poor winter weather; they also noted that the course being advanced level may have discouraged some recreational players.

“In our opinion, the Dix Park temporary courses have been a success and the model we have used could be easily replicated in other communities to provide a great recreational experience and temporary land use.”

– Matt Scheffel - *Forest Ridge Park Assistant Manager*, City of Raleigh Parks, Recreation, and Cultural Resources Department



Pictured is the course layout for the 2022 Dix Park East temporary course, and an image of hole 6. Via www.dixpark.org/discgolf and Dix Park Twitter.

Conclusion

Disc golf has exploded in popularity in the wake of COVID-19, and trends suggest that the number of players will keep increasing. The creation and continued maintenance of courses is necessary for increasing accessibility for the thousands of current and potential players who lack adequate facilities presently. Disc golf brings a myriad of personal and community benefits; disc golf courses are much cheaper to create and maintain and are much less environmentally and ecologically damaging than most other recreational land uses. Course creation is shown to revitalize underused parks and to decrease crime, and can bring economic growth to a municipality primarily through a related increase in tourism. Personal benefits include increased physical and mental health well-being, as well as a greater sense of community and increased social interaction. Disc golf's low financial and physical barrier uniquely creates an opportunity for the sport to have a greater diversity of players in terms of demographics including age, gender, and socioeconomic status.

The course overviews indicate that a temporary course provides a cost-effective way for a local parks department to test out disc golf in their community, without much commitment. However, if a municipality wants to provide an adequate course that can attract and accommodate more park users, a permanent course is required. Though the construction costs and maintenance costs of permanent courses are significantly higher than those of a temporary course, maintenance costs can be partially offset by volunteer labor. Furthermore, a permanent course can attract more visitors, and enables more tournaments and programming, which will generate revenue for the community.

In the appendix, this paper provides a number of course design best practices, steps for course implementation, and areas for further research, driven by insights given by course designers, parks planners, and other related practitioners. It is my hope that this research will serve as a useful playbook for those promoting disc golf across the country, from the early stages of advocacy to the final stages of course design.

“Why shouldn't communities also be offered better quality designs and better-quality land, since disc golf has gained so much momentum and grown so much? It only makes sense that the value placed on the sport is now also elevated.”

Appendix

Detailed below is a collection of resources that will further help course designers, parks planners, and parks staff in the creation and ongoing maintenance of disc golf courses. Through my research and a series of nine semi-structured interviews with planners, course designers, parks staff, and industry professionals, I have identified a number of course design best practices, as well as resources for course implementation, and areas where further research is required.

Course design best practices

In my research, I talked with a number of course designers, including the designers of Diavolo, which is currently the 19th highest rated course in the world⁴³, and a course designer who has designed or re-designed 20 courses in the Charlotte area.

Use existing contractors when possible:

The designers of Diavolo stated the Town used the same contractor who clears plots of land for sewer and power easements for clearing their fairways; they noted this was an efficient and cost-effective way to clear tracts of land while working with a contractor they already have an existing relationship with.

Integrate disc golf in state parks:

One designer noted that type of land use and maintenance required for a disc golf course is in line with the work of state parks, who regularly work to maintain trails and mitigate the impact of soil compaction and erosion. As state parks typically charge a fee for admission, this can be a great way to attract new park users and generate revenue. One such course is currently underway in the Falls Lake State Park, in Wake Forest, North Carolina.

Work with a course designer, landscape architect, and other disc golf experts:

Though it will add to the cost of course construction, working with an expert disc golf course designer will ensure that the course has a safe, sustainable, and cohesive design, and that it will attract plenty of new and returning players. Having a higher quality course also provides potential for hosting tournaments, which can be a great way to engage the local player base and raise revenue for a community.

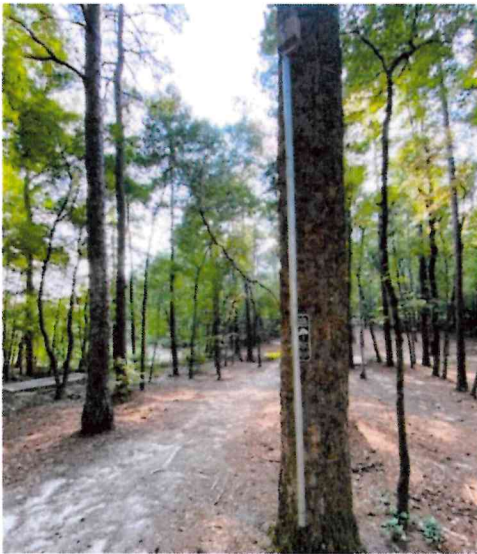
One course designer noted the benefit of having a landscape architect on board, who can navigate the process of performing a tree survey, creating a topographical map, getting an erosion control permit, and getting a stormwater permit, among other necessary steps. Having such experts will greatly speed the process of course implementation along.

Cater to all skill levels:

Courses can be made to suit the skill level of beginners as well as more advanced players through the provision of multiple tee pads, similar to distance handicaps seen on golf courses. A more cost-efficient way to do this could be to have one tee pad, but multiple basket placements, which can be rotated on a regular basis.

Sustainability practices:

Continued maintenance, particularly on areas of high traffic, such as around the tee pads and the baskets, will ensure the course maintains a high level of safety and quality. Anticipate soil erosion and compaction of these high traffic areas; soil compaction and erosion can be combatted through regular mulching and by planting vegetation. One should also anticipate which trees will get frequently hit, and work to mitigate this damage. A unique solution to this has been implemented at Diavolo, in which ‘bad shot bells’ were placed in front of the most vulnerable and exposed trees on the course to mitigate damage from discs. These bells are an artistic alternative to the usual methods of protecting trees, such as bulky padding, mesh netting, or metal wiring. Be prepared to recommend proven mitigations for potential problems as they arise, and be prepared to adjust the location of course features as necessary.



An example of the ‘bad shot bells’ at Diavolo, as well as wire mesh to protect sensitive saplings. Via Town of Cary and TWP Inc.

Integrate artwork with the course: Artwork along the course, such as murals or sculptures, add a unique charm to the course. In some cases, they can even act as protective barriers as well!



Statue art at Diavolo. Via Town of Cary.

Utilize unused land:

Disc golf is unique in that it can operate on land that is unsuitable for other recreational land uses. For example, disc golf holes are often placed along the perimeter of a baseball field, or in areas that cannot otherwise be developed on (such as floodplains).

Many mixed-use parks are retrofit with disc golf courses, as they do not require much additional land development and cost to implement. Furthermore, many jurisdictions are starting to retrofit municipal golf courses with disc golf as well, as disc golf continues to increase in popularity and golf decreases in popularity. By having both uses on the same plot of land, or by replacing golf altogether, jurisdictions are able to regain users of the land.

Ensure the community's recreational needs fit the course:

A course should be designed with its potential users in mind. For example, if a course is targeting youth, a long and difficult course would not be the best design. If a community wants to host tournaments and draw more serious players, then a short beginner course would not be the best design.

Market disc golf to the public:

It is not enough to simply construct a course and expect a large number of players. Disc golf can be marketed to a jurisdiction through hosting events such as instructional camps for children, recreational tournaments, or family-oriented programming. One such example is a youth disc golf camp offered through the city of Charlotte, North Carolina, where children are shown the basics

of playing by a professional, and then are able to try their hand at playing. Afterwards, the children are given a disc to keep. The Capital Area Disc League (CADL) similarly hosts youth, beginner, and advanced clinics, and sets up booths at festivals and other events in order to promote disc golf to the public.

“Community opening and public engagement events for the course are huge, otherwise it’s just disc golfers that are propagating that course... If you demystify it for people and get them in the door and have them feel like they have a stake in it, then you’re going to get more unique users and not just the disc golfers you would’ve gotten anyway.”⁴⁴

– Ben Smith - *Course designer*

Fundraise:

Many courses contract with local businesses to sponsor part of the course. For example, in return for advertising on the course (often on course signage), a business can pay for baskets and/or tee pads. Such sponsorships can greatly reduce the cost of the course.

Furthermore, money can be raised through hosting tournaments, having a pro shop on site (with discs, drinks, and food), or charging greens fees. As noted earlier, some municipalities are starting to incorporate disc golf in state parks, which typically charge a fee for admission. The city of Santee, California transformed an underused and decrepit park by installing a 9-hole disc golf course and charging a \$4 per day greens fee - within six months, the course earned over \$72,000.⁴⁵

Lastly, an organization can apply for a number of related grants, such as the PDGA’s [Diversity and Outreach Grant](#), the broadly applicable PDGA [Innovation Grant](#), or grants from [EDGE](#), an organization which has awarded over \$300,000 in funding to schools and youth programs for disc golf programming since it was established in 2002. It is estimated that over 2 million youth have been introduced to disc golf through EDGE funded programming.⁴⁶



An example of sponsored advertising on a course. Via UDisc.

Get involved with your local disc golf club:

Most jurisdictions have a local disc golf club, with members who can serve as trusted ambassadors and supporters of a course. Such members often are more than willing to help fundraise for a course, or to volunteer their labor for course installation and maintenance. Jay Pontier and Mike Sink, the course designers of Diavolo, noted that the local club, the Capital Area Disc League, offered thousands of hours of volunteer labor in the creation of the course, which saved the Town thousands of dollars and accelerated the process of constructing the course.

Resources for course implementation

Any course proponent should first review UDisc's guide on [how to get a disc golf course](#) as well as their information on [how disc golf can benefit a community](#). The PDGA has a further [collection of resources](#) for course development, including [course design elements](#), [skill level guidelines](#), an [acreage guide](#), and [par guidelines](#). Further resources for design assistance include a [list of approved baskets](#), a [link to contact basket manufacturers](#), [signage templates](#), and [information on selecting a course designer](#). Parks planners in particular might find the [sample course proposal](#) useful, as well as a [general pitch](#) that can be used when discussing the implementation of disc golf with decision makers.

Further Research

This paper advances the field of research around the sport of disc golf, particularly in regard to the benefits of course creation experienced by both players and municipalities. The course overviews provide information on the expected costs and acreage needed for different course archetypes, and the course design best practices offer important considerations for parks planners and course designers.

However, there is still much research to be done, as disc golf is such an emerging sport. For example, further research on the cost of construction and maintenance of other course typologies around the county would be useful to help a jurisdiction quantify the necessary investment in course creation. Furthermore, there is currently research on the impact of the proximity of parks on property value and economic development, but not on the proximity of disc golf courses in particular. Such research would be useful in further demonstrating the economic benefits of course implementation. Lastly, further research is needed to determine the best and most effective ways to further diversify the sport of disc golf and ensure equitable access for all demographics.

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