

Multifunctionality at the Prairie Dunes Golf Course

by

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A REPORT

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Abstract

Golf courses have been a pressing issue in environmental and land planning studies over the past twenty years. However, while studies have shown that golf courses can have a positive impact, less attention has been paid to the multifunctionality of these courses. This research addresses this issue by examining how multifunctional interventions can happen in North America. More specifically, this study investigates Prairie Dunes Country Club using a mapping experience and scorecard to collect information for this golf course in Hutchinson, Kansas. The primary finding is that Prairie Dunes would benefit from implementing multifunctional interventions in the course. The projective design for these proposed interventions was developed based on a literature review, five precedent studies, a mapping experience, and a suitability analysis completed for the Prairie Dunes Country Club. Finally, a projective design is established to guide the exploration and development of the projective interventions at Prairie Dunes.



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Sam Coup
Master's Report
2023

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Master's Report

2022-2023

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Abstract

Golf courses have been a pressing issue in environmental and land planning studies over the past twenty years. However, while studies have shown that golf courses can have a positive impact, less attention has been paid to the multifunctionality of these courses. This research addresses this issue by examining how multifunctional interventions can happen in North America. More specifically, this study investigates Prairie Dunes Country Club using a mapping experience and scorecard to collect information for this golf course in Hutchinson, Kansas. The primary finding is that Prairie Dunes would benefit from implementing multifunctional interventions in the course. The projective design for these proposed interventions were developed based on a literature review, five precedent studies, a mapping experience, and suitability analysis completed for the Prairie Dunes Country Club. Finally, a projective design is established to guide the exploration and development of the projective interventions at Prairie Dunes.

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Glossary

Multifunctional Golf Courses: a golf course that is a multifaceted facility in which both landscape and programs (golf and non-golf) address broader community needs and interests, including environmental concerns. (Strandberg 2011).

Biodiversity: is the variety of life on Earth, it includes all organisms, species, and populations; the genetic variation among these; and their complex assemblages of communities and ecosystems (Benn 2010).

Ecosystem: a holistic concept of plants, animals, fungi, and microorganisms and their associated non-living environment interacting as an ecological unit (Peck 1998, 191).

Buffer Zone: an area of low ecological value, surrounding or adjacent to an area of higher ecological value, whose purpose is to lower the risk of impacts to the latter area (Peck 1998, 190).

Pesticides: Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Use as a plant regulator, defoliant, or desiccant. (EPA 2022).

Public Golf Course: a golf course open to the general public; public courses are broken down into two subtypes: Municipal Courses run by the municipality and Daily-Fee courses, which are privately owned but fully opened to the public (C. D. Club 2019).

Private Golf Course: a golf course for golfers who want to join a club and are willing to pay a membership fee. The membership cost varies depending on the club and comes with perks and privileges only members have (C. D. Club 2019).

Semi-Private Golf Course: a golf course that provides the perks of a private course with the ability to still be open to the general public. Limited number of memberships which allow members to play at discounted rates with preferred tee times. It also allows the public to play (Mandell 2008).

Project Introduction

Problem
Scope
Process
Methods



*How can the
Prairie Dunes Golf
Course show that
a multifunctional
landscape can
bring changes
that can benefit
the surrounding
community in both
an educational and
environmental way?
How can a mapping
experience tool lay
the groundwork for
these multifunctional
interventions?*

Problem and Potential

The game of golf grew in popularity worldwide due to the global pandemic, COVID-19, with the number of people wanting to golf rising four percent over the last year (Stachura 2021). However, with the game's growth comes concerns from some believing they have a negative impact on the ecosystems they are built in. In addition, golf courses have faced criticism due to their negative environmental impact for several decades (Colding and Folke 2008).

Prairie Dunes Golf Course sits within the Greater Central Plains' ecoregion in the Midwest. This region is home to a mosaic of native grassland and croplands 450 miles east of the Rocky Mountains (Kansas Wildlife Federation 2014). In addition, Prairie Dunes lies within the Great Bend Sand Prairie, with Sand Hills State Park located near the course (Kansas Geological Survey n.d.). The Great Bend Sand Prairie region has varied vegetation and wildlife that call this landscape home (Kansas Wildlife Federation 2014). With this in mind, we can begin to use the Prairie Dunes Golf Course as more than just a recreational resource. By introducing multifunctionality into the golf course, the owners and managers can bring education and biodiversity to the forefront (Szczepanski and Strandberg 2022; Strandberg 2011; Caspersen et al. 2015).

Multifunctional landscapes in landscape architecture are not a new idea. The goal of multifunctional landscapes is to provide a wide range of environmental, social, and economic functions while also considering the interests of those already using the land (Lovell and Johnston, 2009). However, multifunctional golf courses are a new concept. This idea began in Nordic countries to boost golf course usage during winter (Szczepanski and Strandberg 2022; Strandberg 2011; Caspersen et al. 2015).

Multifunctionality breaks the stigma that most golf courses are just wasted land made for only golfing as it brings different elements onto the course. Some of these elements can be for humans, but often multifunctionality looks at ways to make the course more biodiverse in all aspects (Szczepanski and Strandberg 2022; Strandberg 2011; Caspersen et al. 2015).

Furthermore, multifunctionality can introduce new aspects to the golf community, such as education, biodiversity, cultural history, and gathering spaces. In addition, multifunctionality can bring innovative ideas and people to visit the course, hopefully introducing them to the game of golf, the regional ecosystem, and history (Caspersen et al. 2015; Caspersen, O.H. et al. 2014).

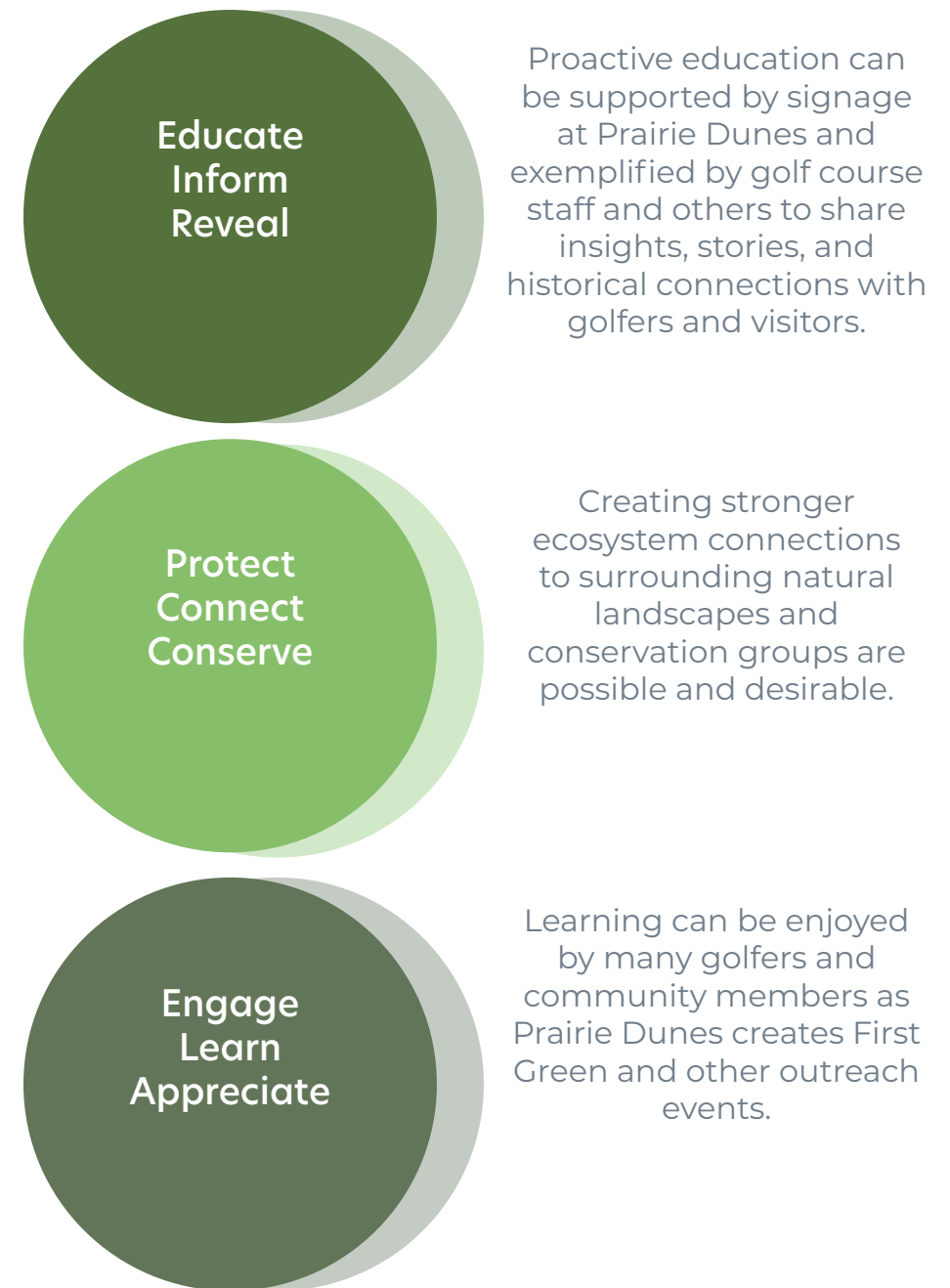


Figure 1.1: Project Goals Envisioned



Figure 1.2: Hole 14 at Prairie Dunes



Figure 1.3: Hole 2 at Prairie Dunes

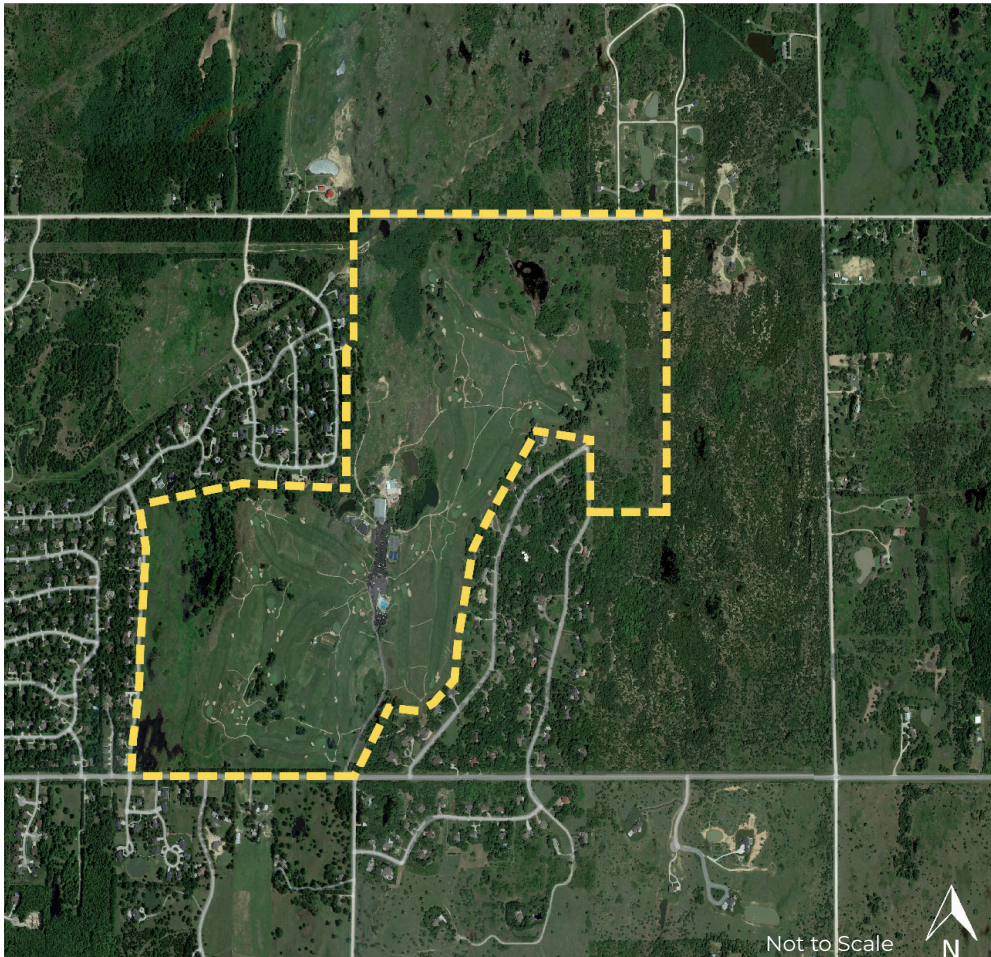


Figure 1.4: Project Boundary (Adapted from Google Earth, 2023)

Scope

This project's focus is designing multifunctionality at Prairie Dunes Country Club located in Hutchinson, Kansas. The project examined the course layout and the clubhouse using a mapping experience from the authors Casper, Caspersen, Jensen, and Jensen (2015). This mapping experience leads to knowledge of where interventions can take place. Some interventions include signage, gathering spaces, seating, wayfinding, and winter activity. Along with this, a conceptual master plan was created to consider educational and environmental interventions. Figure 1.4 above shows an aerial view of Prairie Dunes and its property boundaries. Prairie Dunes has an eighteen-hole course, a swimming pool, indoor and outdoor tennis and pickleball courts, an indoor fitness center, dining, a pro shop, a practice facility, and lodging accommodations. Prairie Dunes's current multifunctionality can be expanded to benefit more people and the land.

Process

A multifunctional golf course is seen as essential because it allows a course to serve as a community resource for all who may be interested in 1) learning about a region and site, 2) gathering together to enjoy companionship within a park-like setting, and 3) playing golf in a diverse, ecologically sound landscape. In developing a typical eighteen-hole golf course, the course itself consumes more than a quarter of the whole site's developable area.

Most people who live by golf courses have little interest in the game but enjoy the open space opportunities that the golf course brings (Arendt 1996). Making a course multifunctional brings more opportunities to the community and the golf course. With the addition of trails, educational spaces, and environmental corridors, the course can serve more than just the game of golf. The golf course begins to serve the entire local community and overall ecoregion (Caspersen et al. 2015; Caspersen, O.H. et al. 2014).

Prairie Dunes Golf Course has a unique opportunity to highlight locally what a multifunctional course can do for the—community in Hutchinson, Kansas and this relatively unheralded region in North America. As such it can become a precedent for how to bring about multifunctional interventions in United States Golf courses.

Methods Process

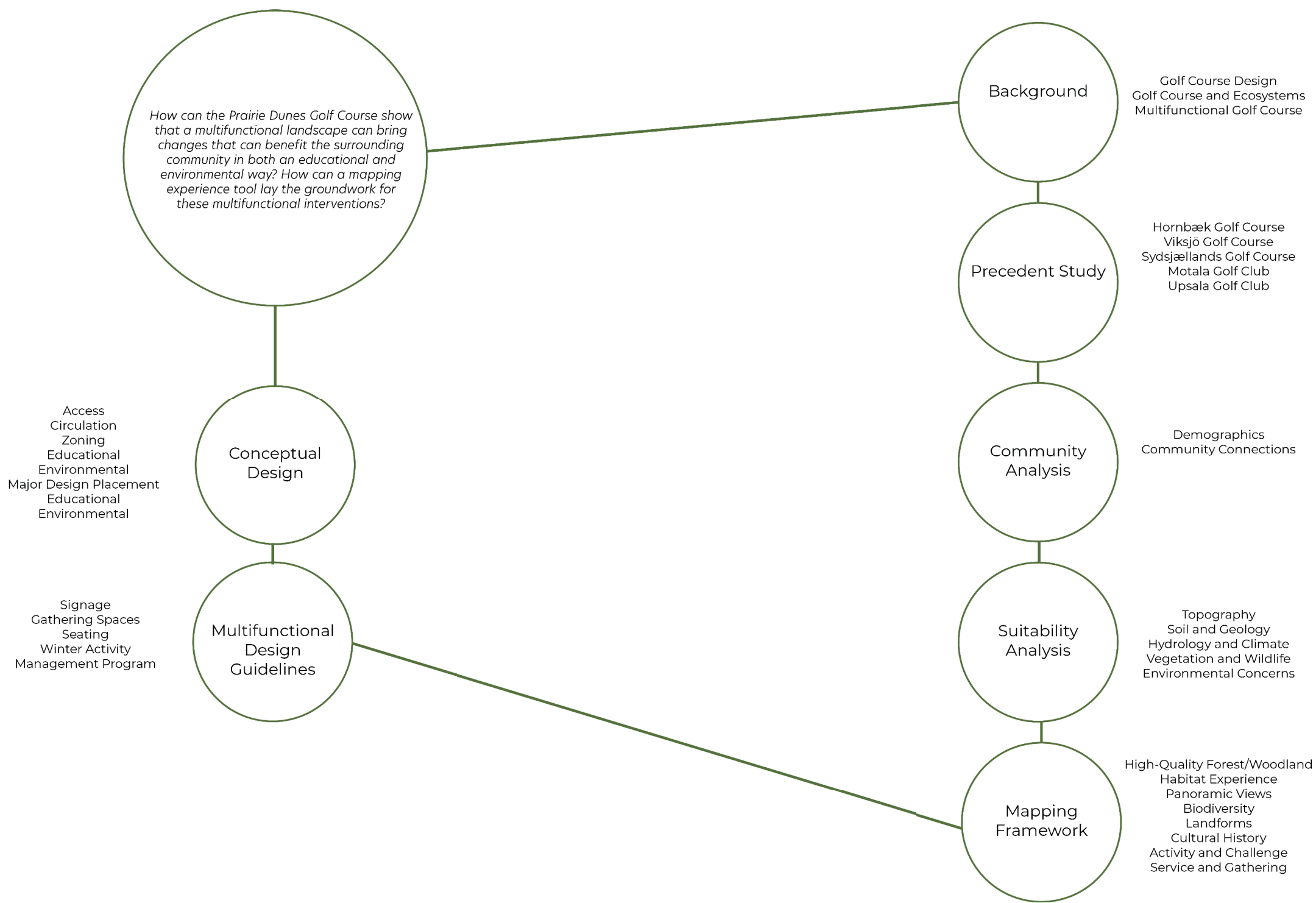


Figure 1.5: Method Process Visualized

Background

Introduction
Golf Course Design
Golf Course and
Ecosystem
Multifunctional Golf
Courses

2

Introduction

Introduction

Multifunctional golf courses are a relatively new idea in the world of golf. (Strandberg 2011). Starting in more Nordic European countries, it has only grown as the world has realized how much value outdoor spaces have post-pandemic (Szczepanski and Strandberg 2022; Caspersen et al., 2015). Besides being a valued outdoor space, multifunctionality can also mean the biodiversity and effective management of that biodiversity on the course. Golf courses are home to unique ecosystems, and through multifunctionality, users can begin to see these golf courses blossom into what they can be.

Through this report, the reader will first see the unique history of golf courses worldwide and how they became what they are today. Secondly, the reader will see the issues that today's golf courses issues regarding the ecosystems they are situated. Lastly, readers will be introduced to the multifunctionality of golf courses, along with a framework that will set the baseline for the rest of the report. This framework introduces a mapping exercise that leads to a design process for an integrated and comprehensive course design (Caspersen et al. 2015; Caspersen, O.H. et al. 2014).

Golf Course Design

History

The golf that we know today was started in St. Andrews in 1774, composed of five playing areas: greens, tees, fairways, practice areas, and rough (Guzmán and Fernández 2014; Mandell 2008). The early game of golf had extraordinarily little maintenance done to the course, with rain and bird droppings helping to keep the grass healthy. Grazing sheep and other animals kept the grass clipped, and if the grass areas were too long, the golfers would avoid the areas, leading to what we know today as fairways (Mandell 2008; Shackelford 2003). By the latter half of the 1800s, turf management practices began to grow to what we see today in modern golf. In this initial period, golf began to make its way worldwide.

As love for the game grew, diverse ways of thinking about the course design and how the game was played appeared (Mandell 2008). Each school of design was built off the other, with the “Natural School” being the first minimalist and let the landscape do the work, as at St. Andrews. The natural school holes were built on whatever land was available and with whatever hazards were already present. As time progressed, design

ideas evolved; the natural school continued to work around all features, even manufactured features like the eighteenth fairway at St. Andrews, where out-of-bounds shots could end up in front of homes or stores. However, designers moved away from this naturalist design in favor of a more scenic design (Shackelford 2003). As a result, newer, more manicured courses required less strategy by golfers and have become less popular as time passes, with golfers wanting the more rewarding older course. The strategic design possibilities with every hole providing hundreds of possibilities are what brings reward to the old course of both Europe and the United States (Shackelford 2003; Richardson 2002; Shackelford 1999; Doak 1992).



Figure 2.1: The home hole at St. Andrews during the 1920 (Ralph W. Miller Golf Library, Shackelford 1999)

Prairie Dunes Country Club

Prairie Dunes Country Club, founded in 1935 and designed by legendary golf course architect Perry Maxwell, is an eighteen-hole design initially laid out as a nine-hole course. Maxwell's successful resume has two Midwestern staples with Southern Hills in Oklahoma and Prairie Dunes. Perry also redesigned courses at Augusta National, Colonial, Pine Valley, and The National Golf Links. He was the first architect to promote grass greens in the Midwest, and the later years would be best known for the contouring of his greens called “Maxwell greens” (Shackelford 1999).

At Prairie Dunes, Maxwell and his superintendent Dean Woods used the existing landscape to craft the course, and they even designed it without maps because Maxwell preferred to walk along the property. Moving extraordinarily little earth, the team (with help from Works Progress Administration) used horses, mules, slips, and Franson scrapers, with no mechanized equipment, to craft the original nine holes (Link Magazine n.d.; Morrison 2019).

Unfortunately, Maxwell could not build the original eighteen-hole course due to a hard freeze in 1940, followed by World War II. Maxwell's son, Press Maxwell, finished the second nine holes in June 1957 (Link Magazine, n.d.; Morrison, 2019). With the change in designers and a lack of written records, the club will never know if Press Maxwell followed his dad's original design for Prairie Dunes (Morrison, 2019). However, Perry Maxwell's original design (i.e., holes one, two, six, seven, nine, ten, seventeen, and eighteen) now sits embedded within the new eighteen hole course. (Morrison, 2019).



Figure 2.2: Original Hole 7 at Prairie Dunes now the famous Hole 10 (Prairie Dunes Golf Club, Shackelford 1999)

Prairie Dunes Country Club

Prairie Dunes sits in the Great Bend Sand Prairie ecoregion. The land around the course remains very undeveloped, consisting of windblown sand, undulating sandy plains, sandy outwash, and dunes. The area's natural vegetation consists of sand bluestem, sand dropseed, and sand reed grasses that thrived here until the necessary dryland framing of winter wheat took over the region. Large areas of center-pivot irrigation for grain and alfalfa crops dominate the landscape (Burke et al. 1991).

The original land on which the course was built was on Hutchinson's outskirts on an Ice Age-forged Duneland. There were wild grasses, yucca, sandhill plum, and cottonwood trees, all vegetation that still can be found on the course today (Link Magazine, n.d.). The greens initially consisted of 'seaside' creeping bentgrass found in Coos Bay, Oregon on the greens, with bermudagrass fairways sowed into place (Link Magazine, n.d.). Today the course still sits full of native grasses, plum thickets, yucca plants, and other flora. Native cottonwoods line parts of the course in and many have withstood



Figure 2.3: Hole 10 at Prairie Dunes



Figure 2.4: Hole 11 at Prairie Dunes



Figure 2.5: Hole 17 at Prairie Dunes

Public vs Private Golf Courses

Throughout the world, there are different types of golf courses that golfers play. For example, golf in the United States has three primary levels of course: public, private, and semi-private golf. In the United States, private courses and semi-private courses are more prevalent. The National Golf Foundation 2020 said that there are roughly 4,025 private courses in the United States (Nickel 2022). Members of these clubs are broken into two primary types. The first are founding members, and the second are members the club founders think can bring a specific economic requirement (C. D. Golf Club 2019).

However, in Europe, private courses are not as prevalent as in the United States. European courses are much different from those in the United States. For example, St. Andrews, the oldest course in the world, is closed on Sundays and has become a public park for the city. This tradition dates to the early sixteenth century due to religious laws making Sunday a day of rest (Borden 2015). Not all European courses are like St. Andrews, but most of the town has a deep

connection with the golf courses in them. That is why when Donald Trump tried to build a private golf resort as he had done in the United States, the idea was unfamiliar to the Scottish government and people and initially was denied by the Scottish government. This course was eventually approved and included two 18-hole courses, a 5-star hotel, golf villas, holiday homes, and a golf academy, all of which were vehemently opposed by the local community (Jönsson 2016).

Golf Courses and Ecosystems

Problems Associated with Golf Courses

Construction

Environmentalists have scrutinized the game of golf because of the waste of space and resources. Additionally, some believe that golf courses also harm the earth through the pesticides used, the quality of water, and the destruction of surrounding habits (Doytchev, 2019; Love, 2016; Sewell, 2019). These issues with the environment begin with course construction. Elimination of natural vegetation, deforestation, destruction of habitat, and change in local hydrology, soils, and landforms frequently occur during construction. The destruction of habitat and deforestation can cause soil erosion, landslides, and flooding downstream and impact a range of fauna, including birds, butterflies, insects and other pollinators, amphibians, mammals, and fishes. (Guzmán & Fernández, 2014; Love, 2016; Platt, 1994).

The course should be built to draw upon all that a site offers. It should be laid out so that both playability (including sporting challenge and visual interest) and nature of the habitat types including all of the present landscapes are incorporated (R.S. Taylor, B.Sc. Hons., 1995).

Water Usage

Once the course is built, additional problems for the environment begin. First, water usage is a big issue; for example, in Tampa, Florida, three municipal golf courses use about 560,000 gallons of water daily, enough to meet more than 5,000 residents' daily water needs (Platt, 1994). Additionally, the use of pesticides on a golf course can negatively impact or even destroy the natural ecosystems that golf courses set out to preserve or create (Guzmán & Fernández, 2014; Platt, 1994). Some pesticides were banned after it was realized that human contact with certain pesticides could lead to life-changing effects and even, in the worst case, death (Platt, 1994).

Education

Along with this, superintendents of golf courses, some may be unaware of the methods needed to make them sustainable. Thus, superintendents should be given proper education on how to run a course with a plan that follows the area's environmental principles (Dodson, 2005; Doytchev, 2019). An example of this would be the areas of a course that are left without management as they "benefit the environment." That area can lose its ecological diversity and environmental appeal if left unmanaged, as invading woody plants, forbs, and grasses can alter the soil, allowing for dominance by one or more species. Conversely, well managed areas can support botanical diversity and potentially many insects and birds as well (R.S. Taylor, B.Sc. Hons., 1995).

Golf Courses and Ecosystems

Environmental Solutions

Audubon International

Golf courses can play a critical role in the area's ecosystem. Audubon International wants to ensure that the impact of golf courses is positive. As a golf course focused environmental organization, Audubon International offers certification for the Audubon Cooperative Sanctuary Program for Golf Courses (ACSP) to superintendents of golf courses. The certification course explores six standards: Environmental Planning, Wildlife and Habitat Management, Outreach and Education, Chemical Use Reduction and Safety, Water Conservation, and Water Quality Management. When courses are appropriately managed, it provides a green space for people and wildlife and can conserve the space for future generations (Audubon International, n.d.).

There are eight ACSP-certified courses in Kansas, with Prairie Dunes being one of them (Audubon International, n.d.). Audubon International also provides different fact sheets laying out guidelines for courses, superintendents, and golfers. For example, "Golf and Talk"; is about the issues we see in today's Environment on a golf course and the opportunities these golf courses have. The guidelines also detail *Environmental Etiquette for Golfers*, which educates golfers about the need for golfers to stay out of natural areas, educating others on environmentally sound golf, repairing ball marks, and replacing divots to maintain playability (Audubon International, n.d.).

Another idea that Audubon International suggests for golf courses is allowing grasses in the rough and out-of-play areas to grow tall. There are many environmental and economic benefits to tall grasses. From an environmental perspective, tall grasses create a habitat for plants and wildlife, reduce pesticides and fertilizers, and add diversity (Audubon International, n.d.; Love, 2016). Additionally, various plant species create a mosaic effect and provide animals using the course with cover; these areas can function as buffer zones for wildlife (Doytchev, 2019; Love, 2016). Finally, from an economic standpoint, having tall grass lowers maintenance costs for gas, pesticides, fertilizers, and water and reduces the wear and tear on the course's equipment (Audubon International, n.d.).

USGA and GCSAA

Along with Audubon International, the Golf Course Superintendents Association of America (GCSAA), in partnership with the United States Golf Association (USGA), requires each state to complete the best management practices (BMP) report

for their state. (GCSAA & USGA, 2007). Superintendents, university extension and research faculty, and regulatory agency personnel strictly review these reports. The BMP Index has twelve sections, ranging from construction to surface water quality, pesticide management, pollinator protection, and many other actions to protect the course (GCSAA & USGA, 2007).

The Kansas Chapter of the GCSAA best management practices focuses on various aspects to bring good practices to the course. For example, in Kansas, the GCSAA suggests that fifty to seventy percent of the non-playable area remains natural cover, with native vegetation planted in these zones (K. C. GCSAA, 2007). Along with this, the Kansas chapter has wildlife considerations that a course should take, including identifying habitat requirements on site and accommodating wildlife movement (K. C. GCSAA, 2007).

Golf Courses and Ecosystems

Maintenance Practices

From the start of the construction process of a golf course, a maintenance plan must be established to guide the course through effective environmental management. These management plans are one way that superintendents can strategize environmental management. These maintenance plans allow golf courses to measure and control the environmental effect, especially regarding water usage (Dodson, 2005). In addition, these management plans are tailored to the course and should have certain authorities that will conduct inspections of the course to ensure that the plan is being implemented (Dodson, 2005). This course management plan is required to follow the state's best management practices. Management plans are a critical tool that courses can take to stay on top of the environmental challenges of running a golf course (Dodson, 2005; Doytchev, 2019).

First Green

First Green is a Science, Technology, Engineering, and Mathematics (STEM) education and environmental outreach program in the United States and Canada started in 1997 by the GCSSA. First Green uses the golf courses as a learning laboratory, pairing the golf course with local schools for science, technology, engineering, and mathematics STEM learning opportunities. First Green curriculum hopes to benefit young students by helping them apply their knowledge in a classroom to an outdoor setting (First Green n.d.). First Green identifies six benefits this program brings to learning. The first is applying lessons; First Green brings the classroom to life on the golf course. The second is inspiring students through hands-on learning experiences. Third, by building community, First Green raises awareness for conservation efforts. Fourth is strengthening futures by bringing about more interest in STEM education. Fifth is the advancement of golf, as the future of golf depends on sustainability. Finally, having fun, such as field trips to golf courses, brings school lessons to life. First Green has resources for superintendents and teachers to lead field trips (First Green n.d.).

Golf Courses and Ecosystems

Wildlife and Golf Course

As stated earlier, golf courses provide habitat-quality areas for wildlife in the ecosystems in which they are placed (Mandell, 2008; Dodson, 2005; Dodson, 2000). Animals need four fundamental things to survive: food, water, shelter, and space, all of which a golf course can provide. Natural landscaping, native plant selection, turfgrass selection, and biofilters are all part of the design process that can affect the wildlife in the area. Biofilters are one of the most critical design aspects because they function as a transitional zone between high golf course maintenance and sensitive environmental areas (Dodson, 2000). These sensitive environmental areas can be used as a corridor to connect adjacent land. This idea is most common when there is lots of agricultural land around the golf-course development. A study by Colding and Folke (2008) showed that golf courses in agricultural regions had higher ecological value relative to the surrounding land types.

Additionally, planting the golf course will also dictate the type of wildlife that will be found. Organizing and managing by season, the golf course can provide primary food and shelter to the wildlife (Dodson, 2005; Dodson, 2000). This idea can only happen if, just like with a maintenance plan, the golf course sets out to have a well-conceived and implemented management and wildlife plan that connects the golf course back to the overall region it sits within. In places with riparian streams and ponds this will require very careful management to maintain high water quality in aquatic habitats. Ecological value (including for wildlife) naturally depends on the types of land cover and land use as well as the specific ecosystems conserved and how they are managed through time (Dodson, 2005; Dodson, 2000).



Figure 2.6: Deer on Santa Teresa Golf Course (Don DeBold, Flickr, 2008)



Figure 2.7: Elk on Estes Park municipal golf course (Kimon Berlin, Flickr, 2006)

Multifunctional Golf Courses

Introduction

Many believe that golf courses in the United States and Europe only harm their natural habitats due to their heavy modifications of natural habitats through chemicals (Love, 2016; Colding & Folke, 2008). The same cannot be said in Nordic countries, as they are the driving force of collaboration to increase accessibility and biological diversity on the golf course (Caspersen et al., 2015; Strandberg, 2011; Szczepanski & Strandberg, 2022). As defined in the glossary, multifunctional golf courses envision their operations as providing high-quality golf while simultaneously growing human and environmental health.

Multifunctional design makes a golf course more than just a golf course (Strandberg, 2011). Multifunctional design is an interdisciplinary approach that must address multiple stakeholders' needs. Some of these stakeholders are interested in the golf course locally, while others are interested in the regional aspects surrounding the golf course (Caspersen et al., 2015; Strandberg, 2011; Szczepanski & Strandberg, 2022).

Multifunctional design can unlock the environmental possibilities of a course. As stated in previous sections, environmental problems have plagued golf courses (Colding & Folke, 2008; Love, 2016). Several golf courses in Nordic countries have found that by switching to a multifunctional golf course, they have seen an increase in biodiversity (Wissman et al., n.d.). These Nordic golf courses have also increased people's interaction with nature. Recent studies have shed light on the fact that golfers enjoy their interaction with nature on a golf course more than playing the game of golf (Strandberg, 2011; Szczepanski & Strandberg, 2022).

Multifunctional Golf Courses

Mapping Experience

To be multifunctional, a golf course must break previously established patterns (Wissman et al., n.d.). There are seven framework patterns to establish and map the multifunctionality of a golf course (Caspersen et al., 2015; Caspersen et al., 2014). Pristine environments offer the user a serene, undisturbed, and untouched environment with no noise. A Pristine environment can be within an intact forest or other protected ecosystem types. Within a forest, this environment is usually surrounded by old-growth forests with an absence of noise and technical installations. On the coast, a pristine environment is untouched. The following framework is habitat experience, which is how one can experience a single habitat without artificial installations. This framework focuses on four sub-categories: forest, park experience, common, and meadow. The third category of the framework looks at panoramic views, an attraction that users of the landscape will seek. Category number four looks at the biodiversity and the landform of the course. It allows the user to get close and discover the animals

and plants hidden on a golf course, if conditions are right. The fifth category is the cultural history of the land on which the golf course is located. The idea of historical aspects of a golf course allows those who play the course to be exposed to cultural relics from the past, promoting feelings of time and depth. The sixth part of the framework considers supporting elements for human activity and supports the possibilities of physical activities on the site (especially walking during all seasons and cross-country skiing when snow depths allow for this). Framework six aims to find where activities can be best utilized. The seventh and final framework is service and social gathering, which can be utilized throughout the course. Service and gathering promote gathering and recreation with family and friends. Through this framework, golf course superintendents can set the goal of where and what needs to be addressed to promote a social gathering experience (Caspersen et al., 2015; Caspersen et al., 2014).

Multifunctional Golf Courses

Case Studies

Introduction

Caspersen and colleagues show how these framework patterns can benefit the beginning stages of a multifunctional design process (Caspersen et al., 2015; Caspersen et al., 2014). The mapping exercise is designed to lead to a conversation on where the design process goes next. The idea of the mapping exercise, done in five different courses, became part of an ambitious plan for multifunctionality.

Nordic Golf Course Mapping

The first course is the Hornbæk golf course, which uses a more local approach to its multifunctionality design. After a mapping experience at Hornbæk, the authors found that the course was suitable for multifunctionality, adding that trails could enhance cooperation with two schools in the area to provide a platform for outdoor learning, which in recent years has become an integral part of Danish elementary education.

The second course is the Viksjö Golf Course, which uses a more local approach to mapping. The Viksjö Golf Course is on Stockholm's "green finger" and thus focuses more on recreational and ecosystem experiences along the golf course (Caspersen et al., 2015; Caspersen et al., 2014). Along with the recreational experiences, the mapping exercise finds that the historical aspects of the course can begin to show throughout the course (Caspersen et al., 2015; Caspersen et al., 2014).

The third course laid out a mapping experience was Sydsjællands Golf Course, which focused on a local and regional approach. Locally, the course lies close to a nearby village, so there is greater cooperation between the golf course and the school. Regionally the course sits on the Fladså stream; thus, the stream can be restored, which will require the reconstruction of some greens and fairways associated with the course (Caspersen et al., 2015; Caspersen et al., 2014).

Nordic Golf Course Multifunctionality

Several Scandinavian golf courses have gone about multifunctionality differently. For example, Motala Golf Club, located in Sweden, has become a pilot for what outdoor education can look like in the town post-COVID. In addition, the Swedish National Curriculum has begun to advocate for the development of cognitive skills, making outdoor learning an integral part of the learning experiences (Szczepanski & Strandberg, 2022). As part of this, teachers have gone through training with guidelines created to help develop personal and social development, team building, and leadership. Since the pilot program started, more schools throughout Stockholm have become more prevalent in the city schools (Szczepanski & Strandberg, 2022).

Multifunctionality does not just have to be for educational purposes; it can also have an environmental aspect to it as well. Wissman and colleagues illustrated the environmental aspects by

surveying three golf courses near Sweden's largest cities. Through this study, the authors looked at three grassland management types: greens, fairways, and high rough at six holes on each course. In addition, the authors looked at management practices, plant types, pollinator resources, the landscape, carbon sequestration, and the social aspects of golf courses (Wissman et al., n.d.). The findings showed that in the heavy rough, there was a constant increase in biodiversity across all the courses. The authors also found ways to improve the overall quality of these more diverse environments and move toward environmentally friendly management.

Overall, it proves that a multifunctional golf course can be a habitat for biodiversity and wildlife preservation as well as a place for formal learning and outdoor education.. U.S. golf course managers have much to learn from these innovative Scandinavian planning and management practices. (Wissman et al., n.d.).

Multifunctional Golf Courses

Multifunctionality at Different Levels

Through these case studies, the most significant idea of multifunctionality is how it can span across different levels and different types of interests. Multifunctionality happens through collaboration developed to meet the challenges faced by a golf course and its surrounding region. The collaboration brings interdisciplinary ideas, thus pushing the multifunctionality to different levels as it will encompass stakeholders such as local authorities, government authorities, clubs and societies, landowners, residents, businesses, and others. These can range from economic, social, environmental, cultural, regional, and historical aspects of multifunctionality (Strandberg, 2011). These different aspects and levels of commitment push multifunctionality into a deeper level of thinking and show how different types, ages, and groups of people can use a golf course (Caspersen et al., 2015).

Conclusion

Key Takeaways

In conclusion, multifunctionality can bring golf courses into a new era of protecting the environment and ecosystems in which they are located. Using multifunctionality, golf courses can provide educational opportunities for the surrounding community while offering opportunities for wildlife to flourish. Working with Prairie Dunes, we can utilize a multifunctionality framework to find what works best for the course, as there are no formally designated multifunctional experiences to date at this facility. Other golf courses in Kansas and throughout the U.S. would be greatly benefited by considering ways to incorporate integrated multifunctionality into their bio-physical structure and operational functions. Golf courses are places users can connect to nature, and through multifunctionality, we can allow users to experience the golf course in a whole new way (Love, 2016).

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Methods

Precedent Study
Community Analysis
Suitability Analysis
Mapping Experiences
and Scorecard

3

Methods Process

Multifunctional golf courses are a new idea in the world of golf. Starting in more Nordic European countries, it has only grown as the world has realized how much value outdoor spaces have post-pandemic (Strandberg 2011; Szczepanski and Strandberg 2022; Caspersen et al., 2015). Besides being a valued outdoor space, multifunctionality can also mean the biodiversity and upkeep of that biodiversity on the course. Golf courses are home to unique ecosystems, and through multifunctionality, users can begin to see these golf courses blossom into what they can be.

Through this report, the reader first sees the unique history of golf courses worldwide and how they became what they are today. Secondly, the reader reads about the issues that today's golf courses are faced with. Lastly, readers are introduced to the multifunctionality of golf courses, along with a framework that establishes the baseline for the rest of the report. This framework introduces a mapping exercise that leads to a design process for the comprehensive course (Caspersen et al. 2015; Caspersen, O.H. et al. 2014).

Methods Process

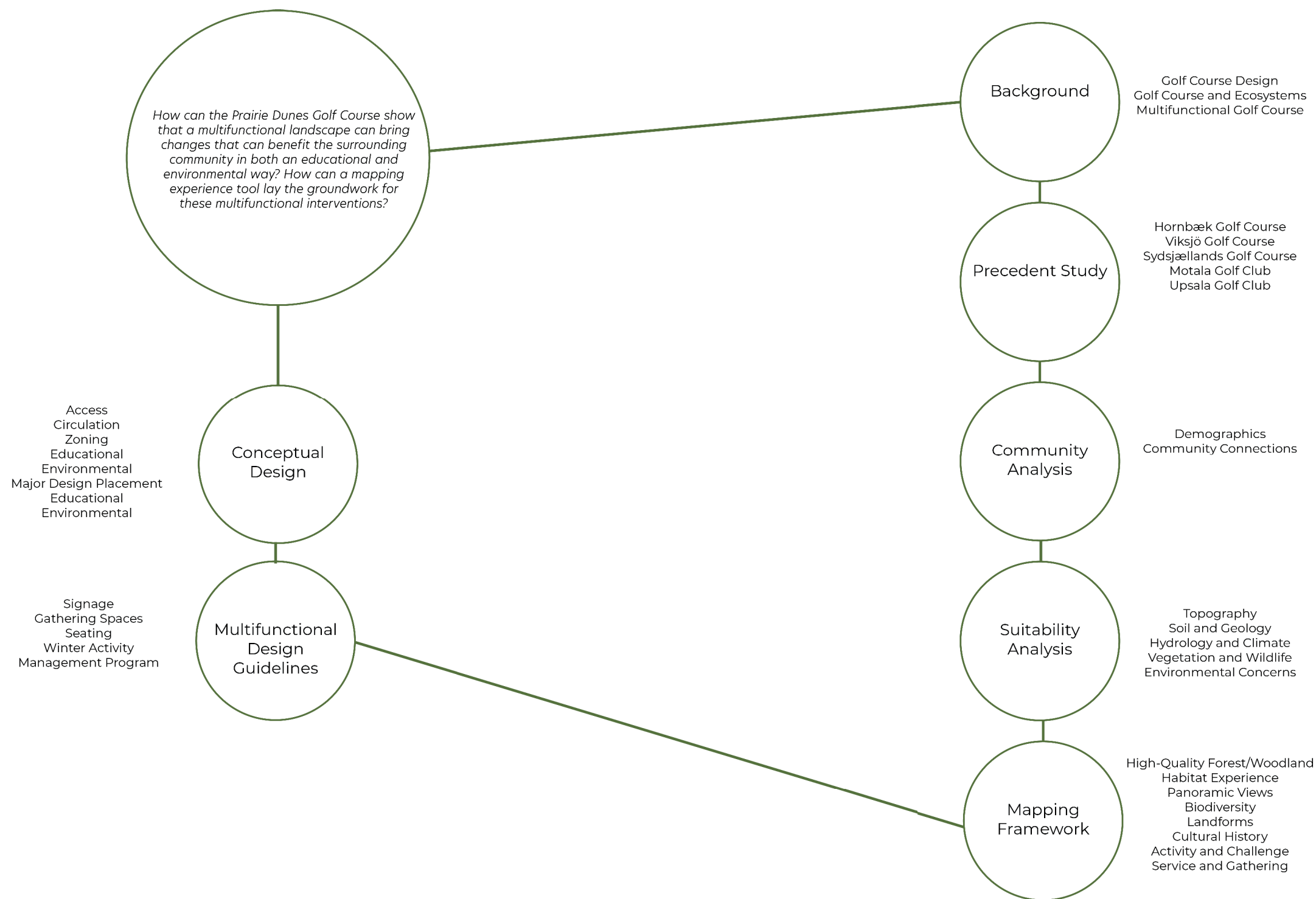


Figure 3.1: Method Process Visualized

Method One: Precedent Study

This precedent study focuses on the five golf courses that implemented multifunctionality or completed mapping analysis for multifunctionality. The purpose of the study is to show how the mapping experiences have been used on five golf courses in Scandanavia. For example, the mapping experiences established by Casper, Caspersen, Jensen, and Jensen (2015) and used on the first three golf courses also are used at Prairie Dunes Country Club to help explore the best multifunctional interventions. The last two precedents show how multifunctionality can be educational or environmental.

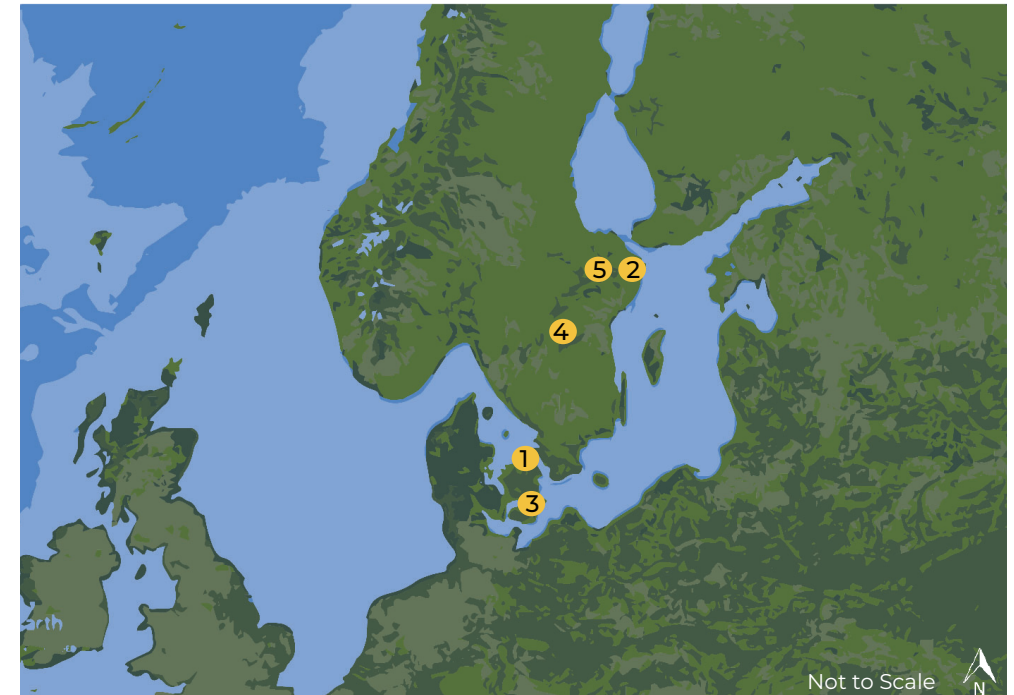


Figure 3.2. Map of Precedent Location (Adapted from Google Earth, 2023)

- 1 Hornbæk Golf Course
- 2 Viksjö Golf Course
- 3 Sydsjællands Golf Course
- 4 Motala Golf Course
- 5 Uppsala Golf Course

Hornbæk Golf Course

Course Information:

Hornbæk Golf Course is a public-private course located in Hornbæk, Denmark. The course length at 6,651 yards, a par 72. The course has been described as a parkland golf course (Hornbæk Golfklub n.d.).

History:

Hornbæk Golf Course is in the Kongernes Nordsjælland region, and was founded in 1999 after a ten-year effort to find land suitable for a golf course. Designed by Henning Rolf-Jensen, the golf course is located near Kongernes Nordsjælland, a varied nature preserve that the kings of Denmark used for hunting (Hornbæk Golfklub n.d.).

Facilities:

Hornbæk Golf Course has the main eighteen-hole golf course along with Lærkeager, a par three nine-hole golf course designed by the head greenkeeper of the course. The course also has a driving range and putting range on the golf course that offers training. Along with everything they have for golf, Hornbæk Golf Course has a pro shop and an on-site restaurant that golfers and guests can use all year round (Hornbæk Golfklub n.d.).

Figure 3.3: Course layout of Hornbæk Golf Course (Adapted from Google Earth, 2023)

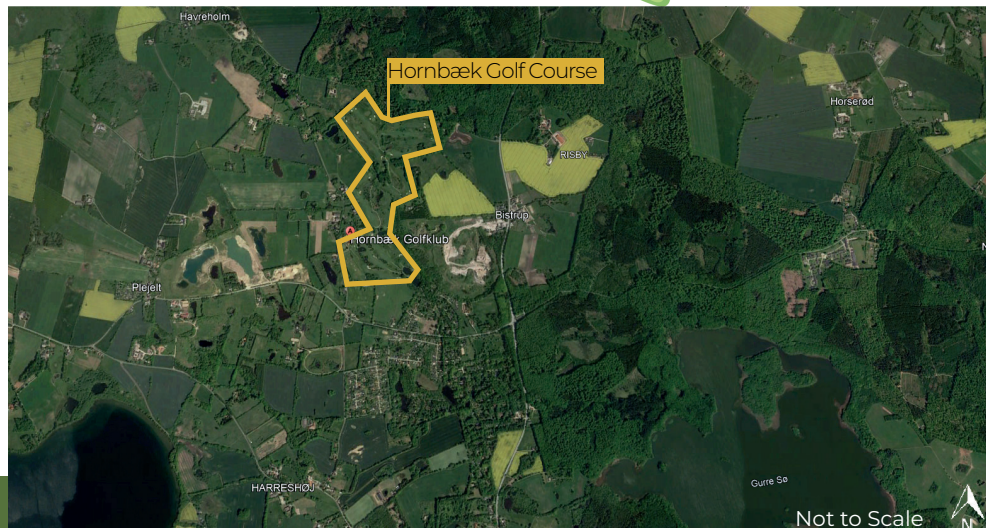
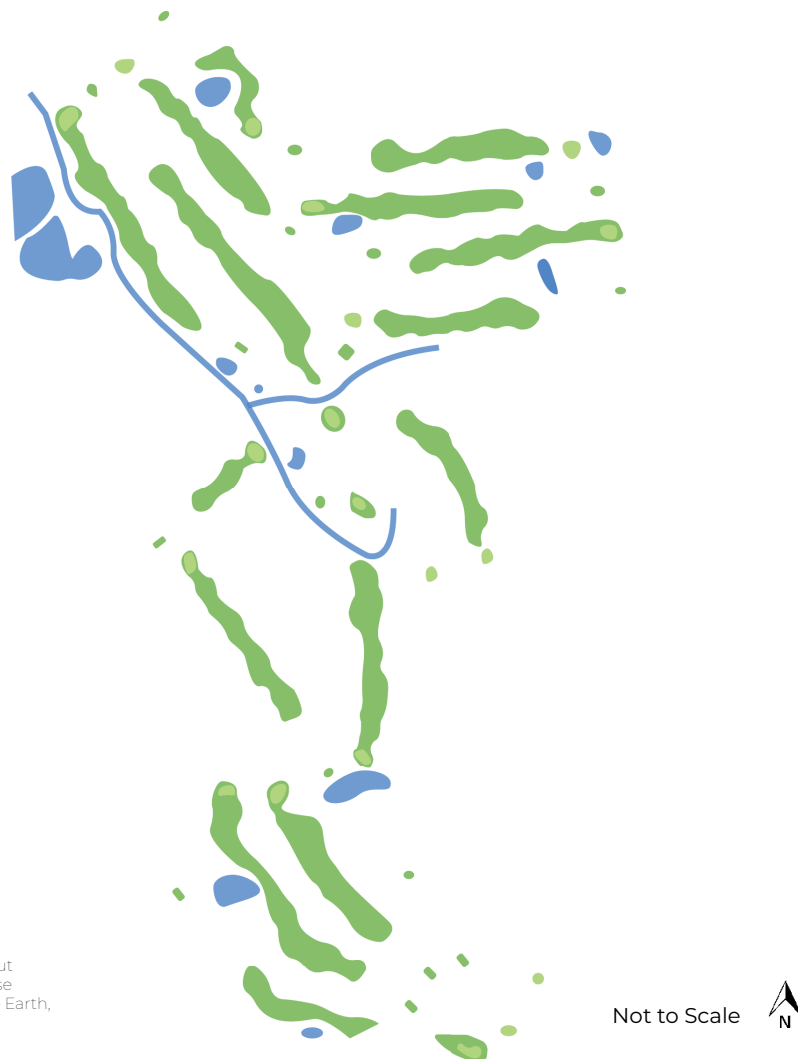


Figure 3.4: Context Map of Hornbæk Golf Course (Adapted from Google Earth, 2023)

Multifunctionality- Hornbæk

Hornbæk Golf Course's multifunctionality development starts with a deeper dive into experience values in the area. Using experience mapping in the course, it was found that golfers use few trails. It was also found that members of the club wanted a greater connection with nature. The course has a diverse ecology, and the golf course could connect with the more extensive network of trails in the Klosterris forest. Further, with these trails, cooperation with the two schools in the nearby area provides the ideal setup for outdoor learning. This, along with the environmental tourists that come to the area, makes the golf course ideal for promoting unique environmental issues and biodiversity (Caspersen et al., 2015).

Hornbæk Golf Club's members positively responded to the idea of the multifunctionality of a golf course. They believe that it is vital that a course be managed so it can contribute to the region's habitat. It is important to note that the course found that walking and dog walking on the course was the basic multifunctionality design idea. Additionally, two-thirds of the respondents found that organizing events at night and during the winter would benefit the course. However, there is negativity toward a find-your-way route for walkers, and it would make more sense for trails to be guided and directed (Caspersen et al., 2015).

Figure 3.5: Multifunctionality of Hornbæk Golf Course (Adapted from Google Earth, 2023)



Viksjo Golf Course

Course Information:

Viksjo Golf Course is a public-private golf course located in Järfälla, Sweden. The course plays at 6,649 yards and is a par 72. The course has been described as a parkland golf course (Viksjo Club n.d.).

History:

Viksjo Golf Course just outside Stockholm. The course sits on land that was old farmland during the Viking age. As time passed, the land continued to be farmland, with new owners coming a going. In 1921 the land became part of the Viksjo gardens in the city. In July of 1963, the land was bought to be turned into a golf club. The driving range was completed in 1969, and shortly after, in August of 1970, the first nine holes were completed. The club took over the clubhouse in 1969, and in May of 1993, it was rebuilt into what it is today. The final nine holes were constructed in 1995, and the land the course sat on, which was previously leased, was bought by the club in December 1997 (Viksjo Club n.d.).

Facilities:

Viksjo Golf Course has a main eighteen-hole golf course and a nine-hole golf course. In addition, the course has multiple practice areas, with two areas solely meant for children to grow their golf game. Along with this, Viksjo Golf Course has a driving range, three practice putting greens, and two practice short game areas, where golfers can work on their wedges and bunker game in a controlled area. Viksjo Golf Course is also home to a pro shop and a restaurant on the property both are open year-round (Viksjo Club n.d.).

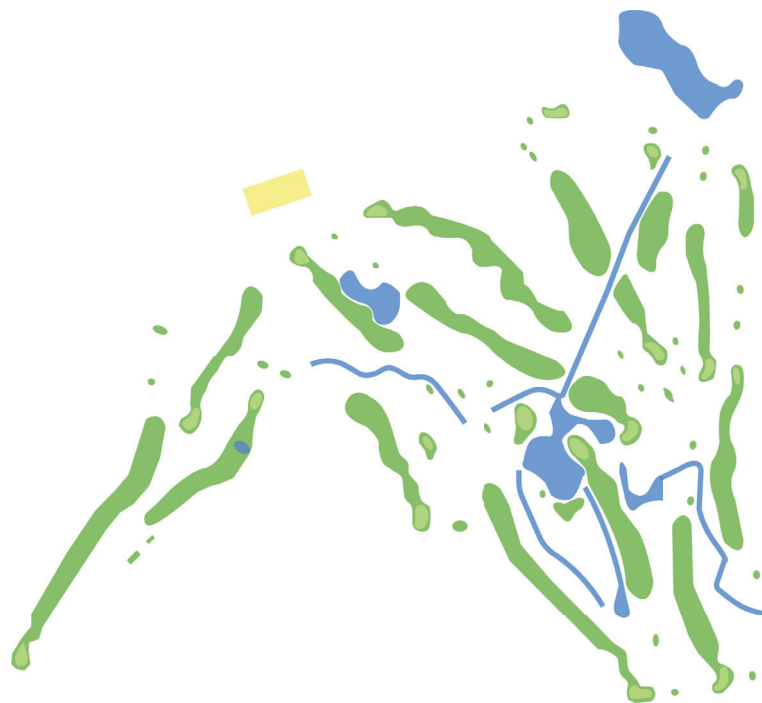


Figure 3.6: Course layout of Viksjo Golf Course (Adapted from Google Earth, 2023)

Not to Scale

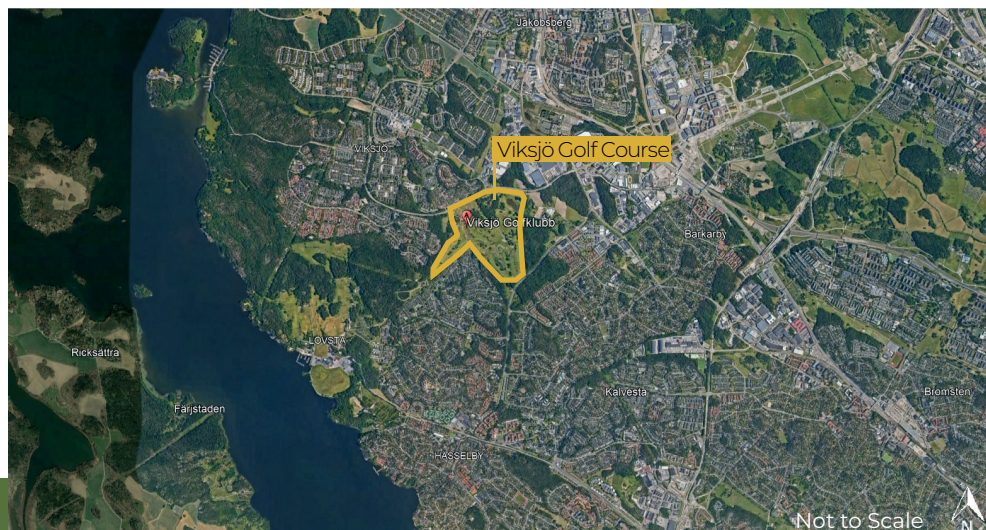


Figure 3.7: Context map of Viksjo Golf Course (Adapted from Google Earth, 2023)

Not to Scale



Multifunctionality- Viksjo

Viksjo Golf Course experience mapping revealed that the course is closely located to the Görvåln nature reserve, thus providing crucial ecological function in a more significant regional aspect. Furthermore, the mapping experiences noted that walking might not be the safest due to the course's rolling hills. The other part of the experience is the cultural history of the area. A significant example is the rune stone Skylstahällen, located in the central part of the golf course. From a multifunctionality perspective actions proposed began with developing posters and maps that illustrate the recreational experience of the region. Along with this, informational signs relate to the course management's environmental activities from a historical perspective and start to improve the information and visibility of Skylstahällen stone. Finally, the possibility of cooperation with local authorities for a new trail that can be developed from a historical perspective was recommended (Caspersen et al., 2015).

From the golfer's perspective at the Viksjo Golf Course, the members took an optimistic viewpoint about the environmental ideas being proposed. The members that carefully believe managing the course in ways that conserve contributing to the flora and the fauna is essential. Sixty-eight percent of members believe that initiatives focusing on cultural, natural, and environmental conditions must be implemented throughout the course. Finally, most members believe the clubhouse and the club restaurant can bring forward new initiatives and activities that would make the local community more in contact with the game of golf, thus bringing more members to the club (Caspersen et al., 2015).

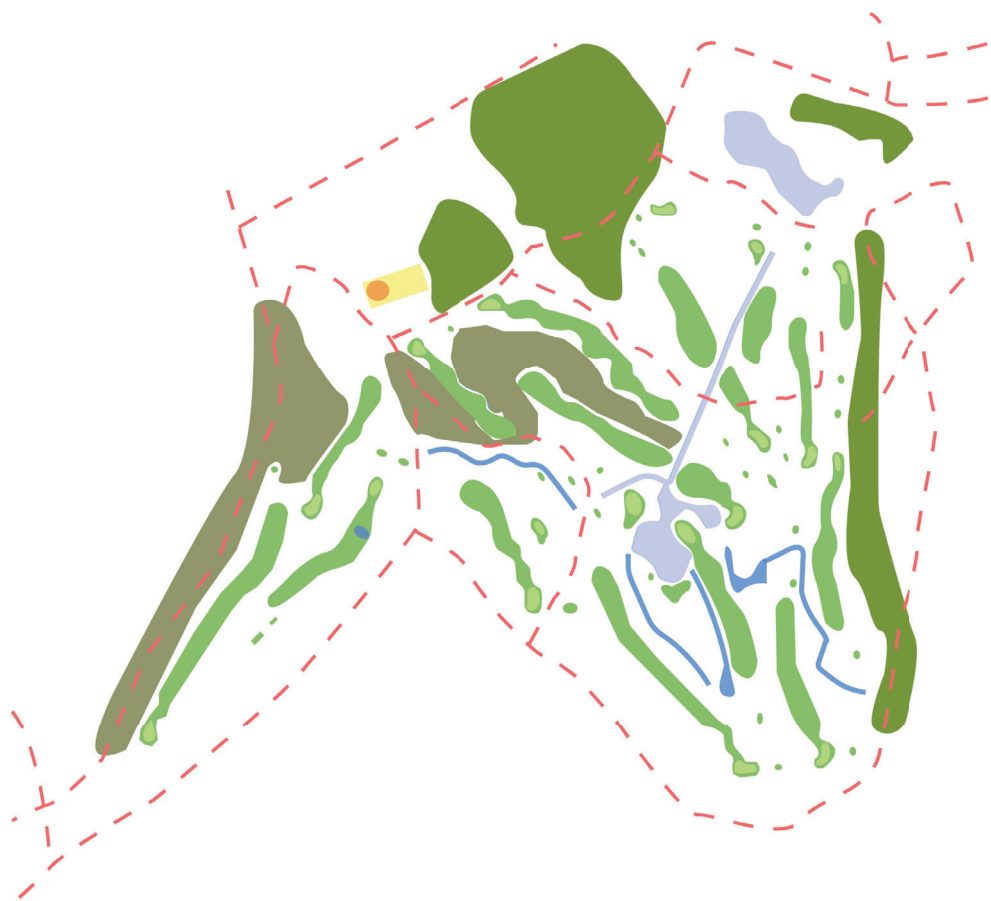


Figure 3.8: Multifunctionality of Viksjo Golf Course (Adapted from Google Earth, 2023)

Not to Scale

- Forest
- Park Experience
- Buildings
- ⋯ Path (Only Open when Course is Closed)
- Biodiverse area
- Service and Gathering
- Water

Sydsjællands Golf Course

Course Information:

Sydsjællands Golf Course is a public-private course in Mogenstrup in South Zealand, Denmark. The course is 6,573 yards long and is par 72. The course has been described as a park-land style design (Sydsjællands Golfklub n.d.).

History:

Sydsjællands was built in 1974 as a parkland-style golf course with a strong regional environmental profile. The course is run by the association Sydsjællands Golfklub Mogenstrup. The course itself has exceptionally low rough and is hugely green-fee player friendly. The course also has a six-hole par three course open to everyone (Sydsjællands Golfklub n.d.).

Facilities:

Sydsjællands Golf Course has the main eighteen-hole golf course and a six-hole par three golf course. In addition, Sydsjællands Golf Course has a driving range and a practice putting green. Sydsjællands Golf Course also has a pro shop, along with a café and restaurant that can be used by golfers and guests all year round (Sydsjællands Golfklub n.d.).

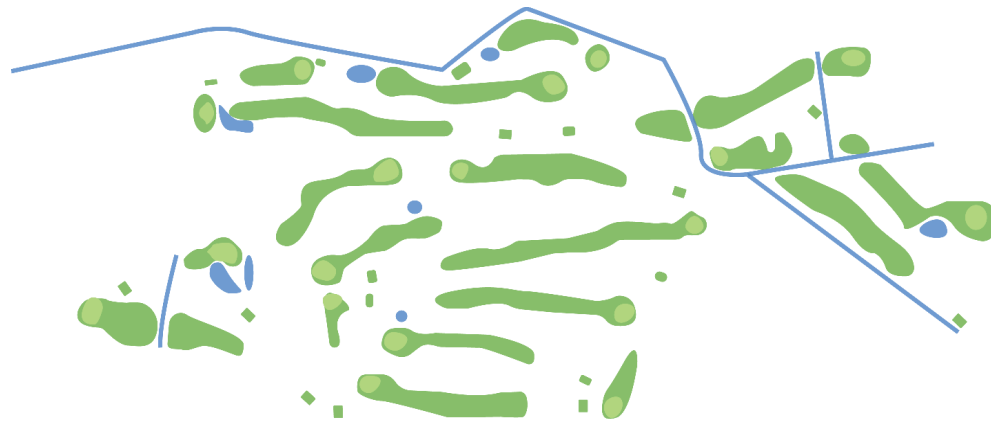


Figure 3.9: Course layout of Sydsjællands Golf Course (Adapted from Google Earth, 2023)

Not to Scale



Not to Scale



Multifunctionality- Sydsjællands

From experiencing mapping, Sydsjællands Golf Course took a local and regional approach. Locally the course already had a nearby school in the village for a partnership to form. From a regional perspective, the golf course sits on the Fladså stream, and the club works with the local municipality in nature restoration to bring more natural conditions to the stream. Due to this location along the stream, an abundance of birds use the course and surrounding areas. Along with this, a better-connected trail system with the local municipality to account for new visitors that the club may attract (Caspersen et al., 2015).

From a local standpoint, multifunctionality at Sydsjællands Golf Course starts with the Fladså stream being the main point that will be changed. Holes eleven, twelve, and thirteen must be reconstructed to accommodate the ever-changing stream. This reconstruction would allow for an extension of the existing trail system and allow visitors to take a twenty-minute walk around the course. Along with this upgrade, the clubhouse and the restaurant become more appealing to visitors while allowing for more office space for local organizations. Furthermore, the local school nearby should have improved cooperation with the par-three course to all for more possibilities in outdoor education, which has become a part of the Danish school system. Lastly, from a local standpoint working with the municipality to add more bird and nature aspects to the course and creating a new hiking and trail system is expected to educate local golfers on the existing ecosystems. This idea connects the course to the city and their intentions of a implementing “green plan” (Caspersen et al., 2015).

From a regional standpoint, Sydsjællands Golf Course can develop into a center for visitors with the golf course development of several facilities to accommodate regional tourism. The club’s homepage can be developed to show the multifunctionality that is taking place at the club. The club should work with the local municipality to incorporate a connection with the two bicycle paths that come near the clubhouse. The clubhouse could become a rest stop and a visitor’s launching point. Along with this, the clubhouse can invest in bicycles for rental with maps and brochures to show the area’s local bike routes (Caspersen et al., 2015).

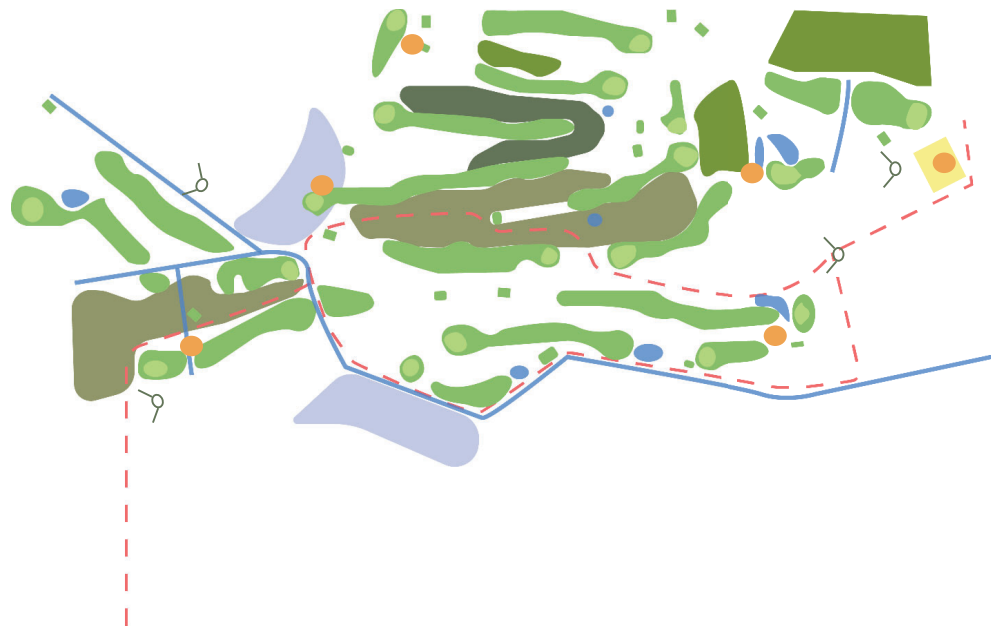


Figure 3.11: Multifunctionality of Sydsjællands Golf Course (Adapted from Google Earth, 2023)

- Forest
- Park Experience
- Commons
- - - Path (Only Open when Course is Closed)
- Biodiverse area
- Service and Gathering
- ⊕ Views
- Water
- Building

Not to Scale



Motala Golf Club

Course Information:

Motala Golf Club is a golf club located in Motala, Sweden. Motala is a resort-style club with three different styles of nine-hole courses. The Park Course is a par 37 and 3,360 yards. The Moorland Course is a par 35 and 3,398 yards. The last course, Forest Course, is a par 34 and 2,892 yards long (Motala Club n.d.).

History:

Motala Golf Club is made up of three nine-hole courses. The first was built in 1962 and is called the parkway course. The second nine-hole course, built-in 1980, called the forest track, is a more traditional hilly than the parkway course. Finally, the last nine holes were built in 2007, called the heath railway; this is a more modern course and well-bunkered course design (Motala Club n.d.).

Facilities:

Motala Golf Club consists of three nine-hole loops. The courses are the parkway, the forest track, and the heath railway. Each course has a unique aspect that brings a different aspect and design. In addition, the course has a new driving range and a training area that can be used year-round. The Motala Golf Club clubhouse has a pro shop and restaurant open only during the golfing season April-September (Motala Club n.d.).



Figure 3.12: Course layout of Motala Golf Course (Adapted from Google Earth, 2023)

Not to Scale



Figure 3.13: Context Map of Motala Golf Course (Adapted from Google Earth, 2023)

Not to Scale



Multifunctionality- Motala

The Motala golf club takes a different approach to multifunctionality. The course and the local school partnered with Linköping University to bring outdoor learning to the golf course. A dialogue was established between the course staff and the teachers, with the course staff finding the perfect location for the classroom and the teachers finding the best methods for outdoor teaching. From there, the teachers began to be trained in the art of outdoor teaching. From 2017 to 2018, teachers from grades one through six were trained in the spring of 2018. In addition, the students could visit their new outdoor classrooms at the golf course (Szczepanski and Strandberg, 2022).

The golf course saw multiple benefits in allowing the course to become an outdoor classroom. The first is that they saw improvements in school education and strengthened their relationships with the local community. Second, it became an excellent example of the region's biological diversity and natural and cultural asset preservation. Third, this idea helped enhance the idea of golf as an environmentally healthy sport. Fourth, the course could reach and recruit young people to the game of golf as they would have otherwise not found their way to the course. Finally, the course produced active learning examples and took advantage of the training activities being taught (Szczepanski and Strandberg 2022).

From the learning side, the teachers said that the student's learning improves in the outdoor environment. Teachers noted that the student's language development significantly improved, with two teachers saying that students with special needs showed significant improvement. Sweden's concept of a golf course as an outdoor class has taken off. The concept is now being implemented in Stockholm, Jönköping, and Älvkarleby municipalities, with over 140 schools (Szczepanski and Strandberg 2022).



Figure 3.14: Multifunctionality
of Motala Golf Course
(Adapted from Google Earth,
2023)

Not to Scale 

Location of the Classroom not found

Upsala Golf Club

Course Information:

Upsala Golf Club is located in Upsala, Sweden. Upsala Golf Club is a public-private course that is a par 72 and is 6,748 yards. The course is a parkland design course (Upsala Golf Course n.d.).

History:

Upsala Golf Club, formed in 1937, is on land originally leased from the king. The land became a nine-hole course a year later. The club's finances went under great strain during World War II with military exercises, including shooting live ammunition on the course; the members of Upsala realized they needed to buy new land. The new land was bought in 1962, and a new eighteen-hole course was built in 1964. By the early 2000s, a new nine-hole course was constructed after renovations on the original eighteen in 1992. In 2008 the course was renovated again; this time, even the clubhouse got an upgrade. In 2011 there was a total reconstruction of the driving range and replacing irrigation and bridges on some nine-hole courses. Today the course is home to more than 2,000 members and is constantly ranked one of Swedes' top fifty places to play golf (Upsala Golf Course n.d.).

Facilities:

The Upsala Golf Club is home to a thirty-six-hole golf course. The eighteen-hole championship course, called the Big Banana, was built in 1964. The nine-hole forest course is called the middle lane. The final nine-hole course is called the little banana and is made to play for all. Upsala Golf Club is home to a driving range and a golf studio that opens all year round with a golf simulator inside the studio. In addition, the Upsala Golf Club clubhouse has a pro shop and is home to a restaurant open only for the golf season (Upsala Golf Course n.d.).

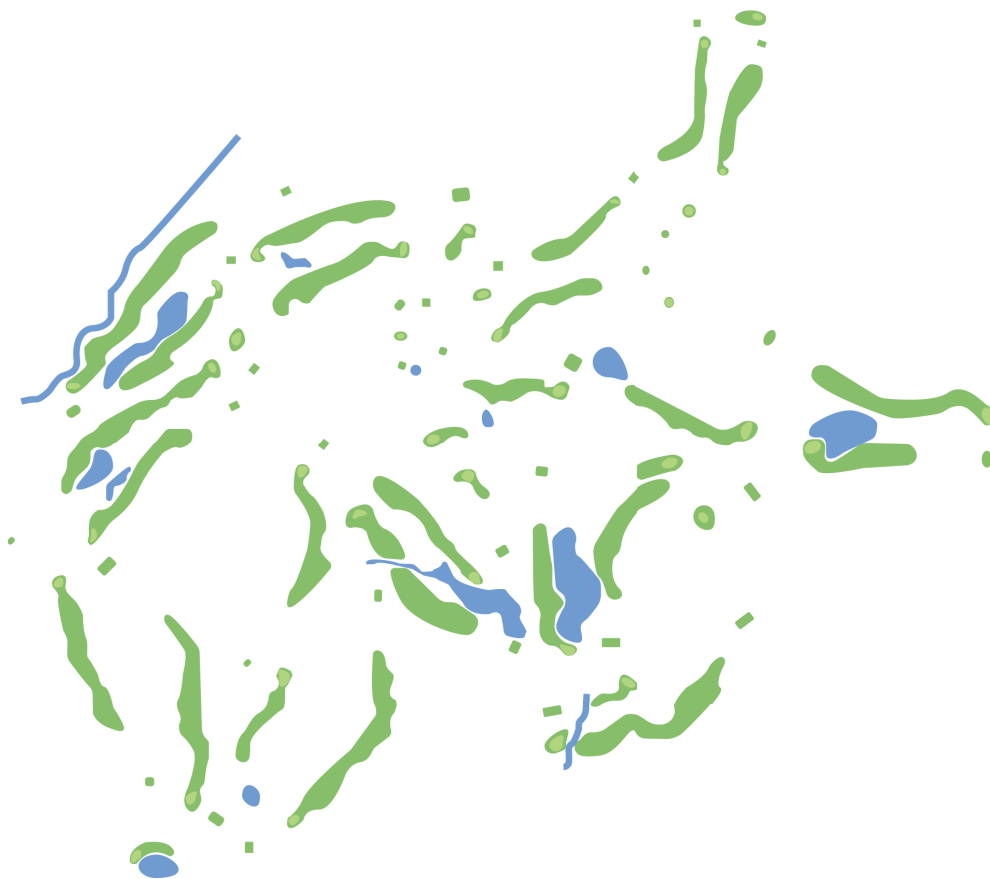


Figure 3.15: Course layout of Upsala Golf Club (Adapted from Google Earth, 2023)

Not to Scale



Figure 3.16: Context Map of Upsala Golf Course (Adapted from Google Earth, 2023)

Not to Scale



Multifunctionality

The Upsala Golf Club's multifunctionality took a different view than the other golf clubs. Upsala looked at the environmental side only for multifunctionality. Looking at plant life, insects, productivity, carbon sequestration, and the surrounding landscapes, Upsala Golf Club considers how it can function as an environmentally friendly multifunctional golf club. First, plant life on the course was found by looking at four-meter plots looking for reproduction units of plants in the high rough, rough, and fairway areas. At Upsala Golf Club, it was found that it followed a general pattern of high rough having lots of reproductive plants, the rough having some, and the fairways having next to none. Second, insect-wise, Upsala Golf Club had a high number of visiting species in the four-meter plots, in the high rough areas, but most of these visitors were not visiting flowers in the plotted areas. Third, the course dived into looking at carbon sequestration of the greens, fairway, and rough. The greens, as expected, had the lowest amount of carbon sequestration out of the three grass types, with the rough being the best carbon sequestration out of the three. Lastly, the study looked at the surrounding landscape and the proportion of the semi-open grasslands. Upsala Golf Club does not have much open space surrounding its course. Overall, this study of Upsala Golf Club is doing its best to be an environmentally friendly golf course, yet the course has much room for improvement (Jörgen Wissman n.d.).

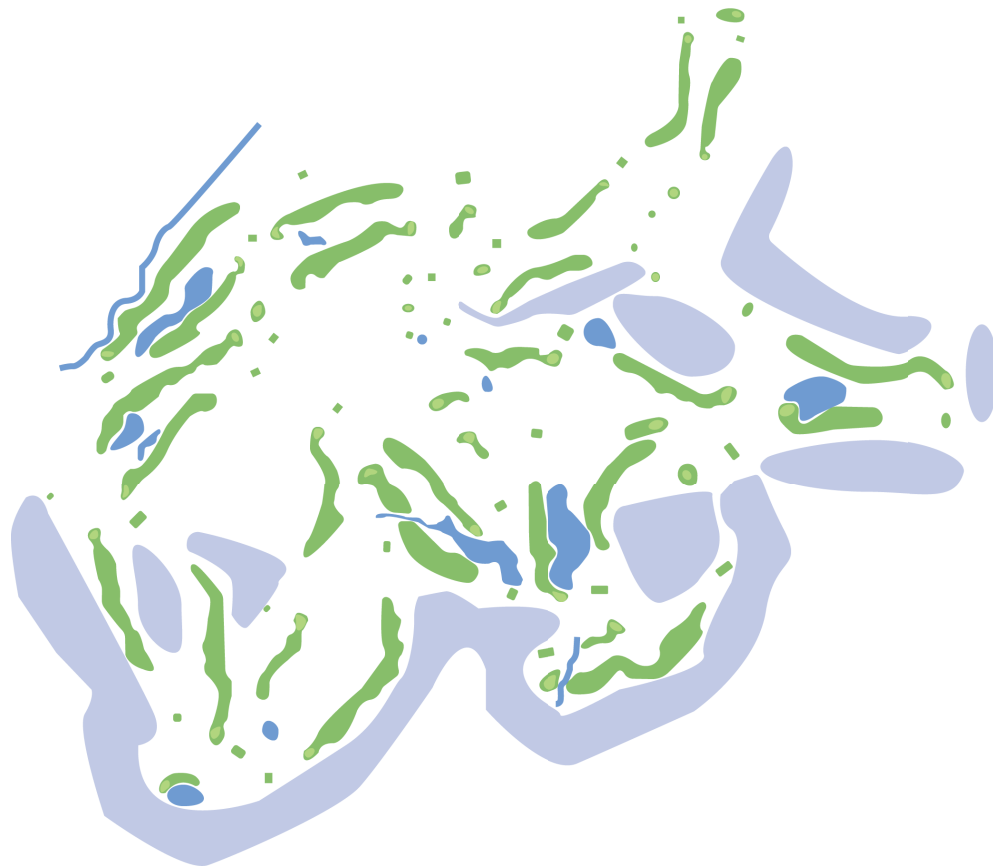


Figure 3.17: Multifunctionality of Upsala Golf Course (Adapted from Google Earth, 2023)

■ Biodiverse area

Not to Scale



Precedent Synopsis

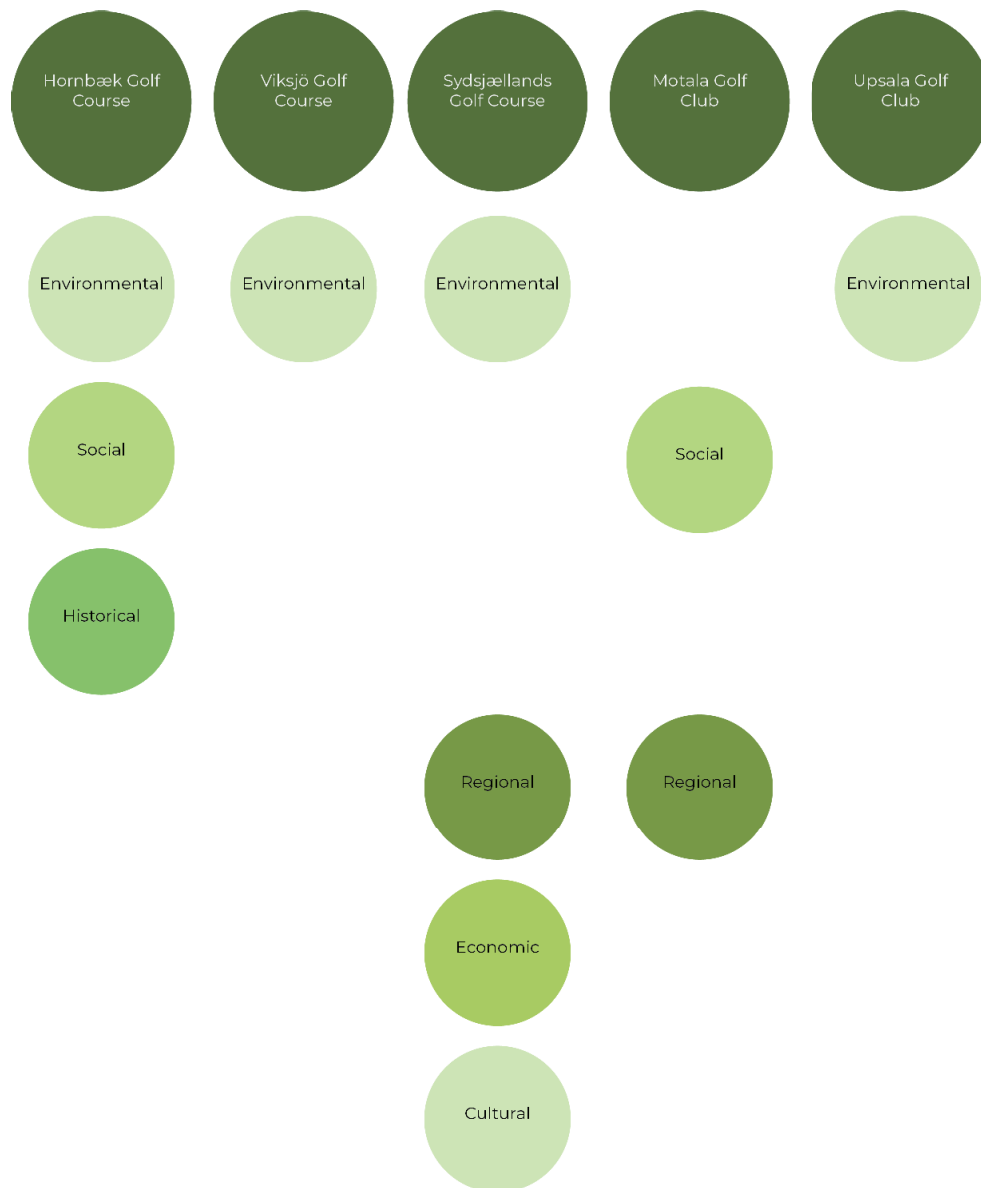


Figure 3.18: Visualized Breakdown of Precedent Study

Overall, in these five northern European precedents, a wide range of options are revealed for creating multifunctional golf courses. Five northern European precedents reveal a ecological, socio-economic, cultural, and historic options.

For four of the five, there is a straightforward use of environmental multifunctionality. These four golf courses show their ecological commitments and how they are helping more than just the golf course. The social side of golf is a multifunctional idea that two courses take similar approaches. Motala Golf Club and Hornbæk Golf Course looked to use the golf course as an educational space; with outdoor learning on the rise, courses can become great outdoor classrooms for the surrounding communities.

From a historical perspective, only Hornbæk Golf Course has any prominent historical features on the course. From a regional perspective, both Sydsjællands Golf Club and Motala Golf Club worked with the regional community to show how their course is multifunctional. Both did this in diverse ways, with Sydsjællands Golf Club opting to work with the local government on incorporating a bike path with the clubhouse becoming a rest spot on the bike path. In contrast, Motala Golf Club worked with regional schools to become an outdoor

classroom. From an economic standpoint, only Sydsjællands Golf Club is turning the clubhouse into a bike rental area through the investment of bicycles that can be used on the city's bike routes. Finally, from a cultural standpoint, only Sydsjællands Golf Club had done anything specifically cultural on their golf course.

These five precedents set the stage for multifunctional aspects on a golf course at Prairie Dunes. Prairie Dunes can take elements from all these courses to build a multifunctional course in the United States. Precedent studies inform the guidelines and design process, providing ideas to help make a multifunctional golf course successful. Through the mapping framework, the precedent studies show how to implement the experiences and how the experiences can reveal where multifunctional interventions can take place. Using these precedent studies, the design guidelines of Prairie Dunes can showcase different and more important opportunities for multifunctionality.

Method Two: Community Analysis

The community analysis aims to find information about Hutchinson's demographics and community connections. The information will help guide partnerships that can help build the First Green program. For example, through the First Green Program, the elementary and middle schools in the area can be introduced to golf at an early age. There are fewer golf course management programs, universities, and many students (as one example, between 2000-2005 K-State had 120-145 students studying golf course management; however in the past few years, the numbers are down to 20-30 students). With an increasing Latino population and greater demographic diversity it is important that golf clubs reach out to young people of all ethnic backgrounds if golfing is to be supported over time. Partnering with First Green, the game of golf can grow, hopefully bringing the numbers of these programs and the number of students interested in golf. Additionally, partnerships can be formed with the State Park and the Dillion Nature Reserve near the site. These partnerships can provide a different introduction to the local ecoregion and deepen children and adult perspectives on the place they live.

Demographics of Hutchinson

Gender

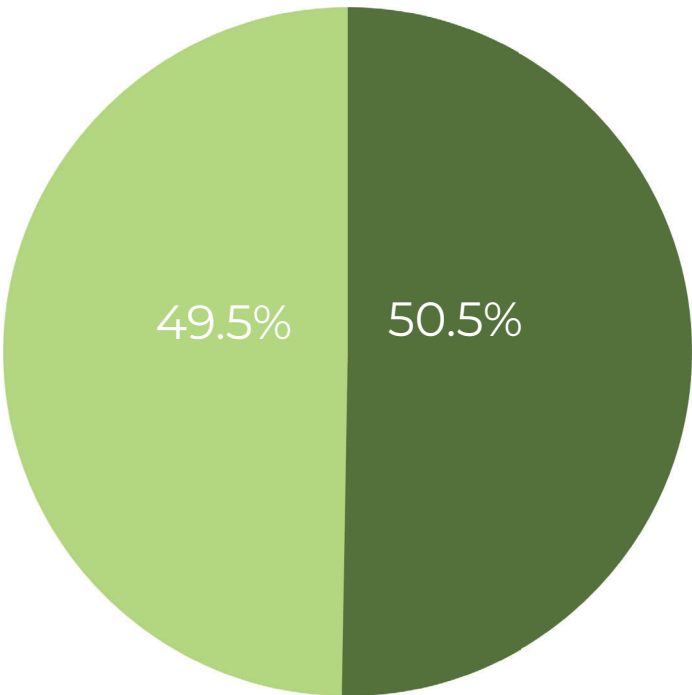


Figure 3.19: Breakdown of Gender in Hutchinson Kansas. (Data From United States Census Bureau)

- Male
- Female

Hutchinson's population is 39,712

Age

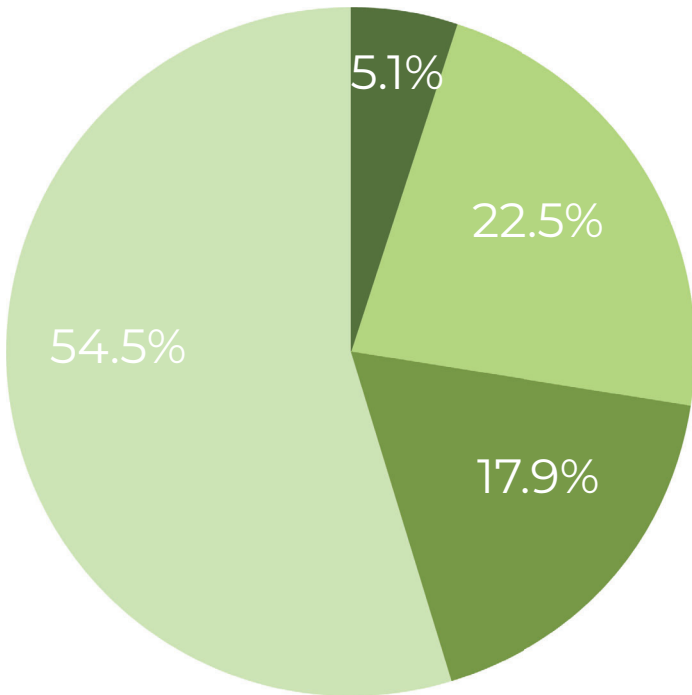
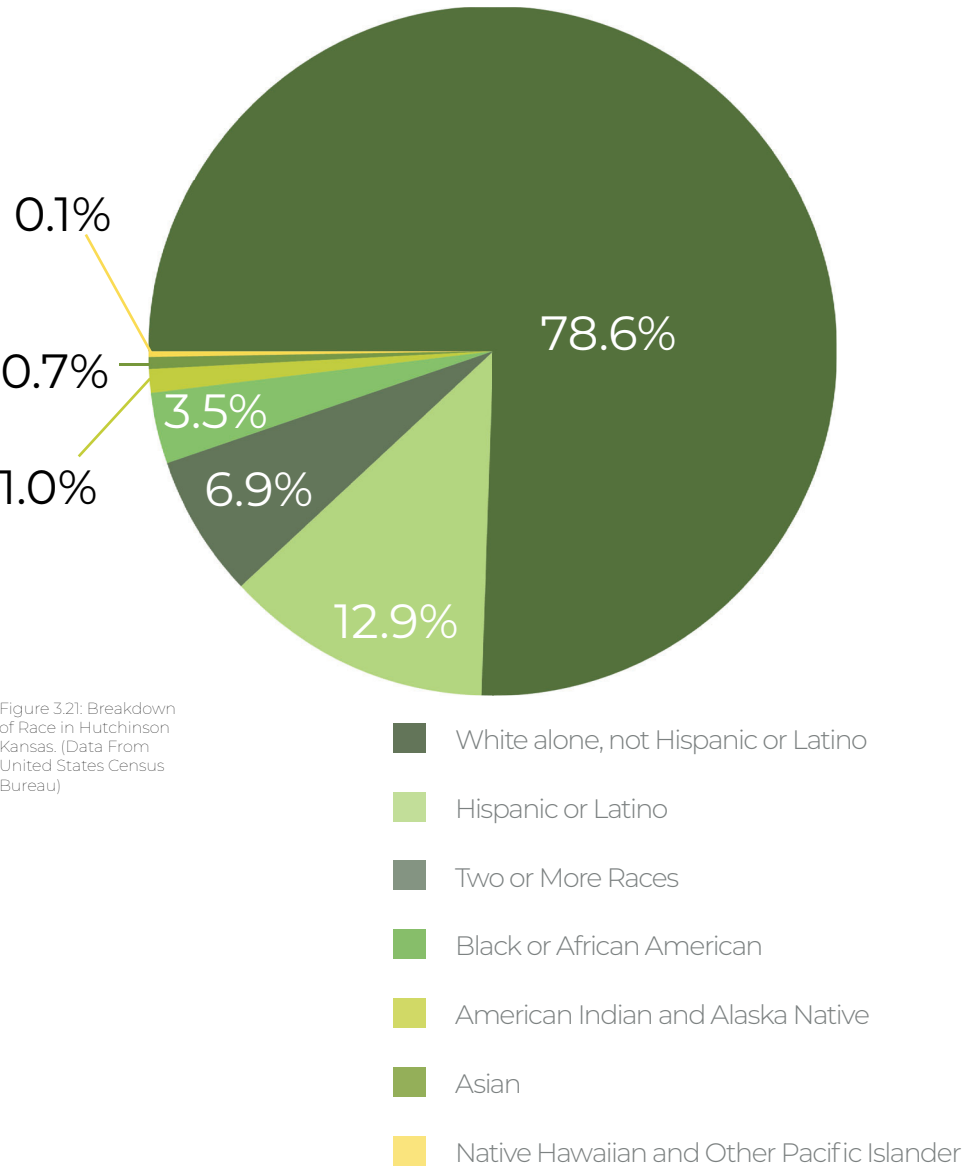


Figure 3.20: Breakdown of Age in Hutchinson Kansas. (Data From United States Census Bureau)

- Persons under 5 years
- Persons under 18 years
- Persons between 19 to 65 years
- Persons 65 years and over

Demographics of Hutchinson

Race and Ethnicity



Community Connections

Six Area Elementary and Middle Schools

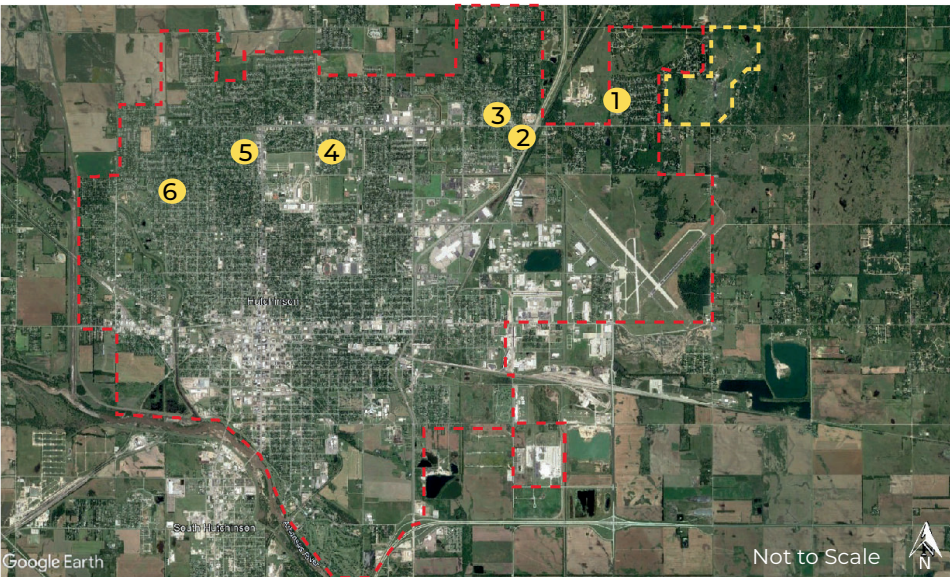


Figure 3.22: Map location of Grade Schools and Middle Schools in Hutchinson Kansas

- 1 Prairie Hills Middle School
- 2 Union Valley Elementary School
- 3 Central Christian School
- 4 Morgan Elementary School
- 5 Wiley Elementary School
- 6 Reno Valley Middle School

High Schools and Colleges

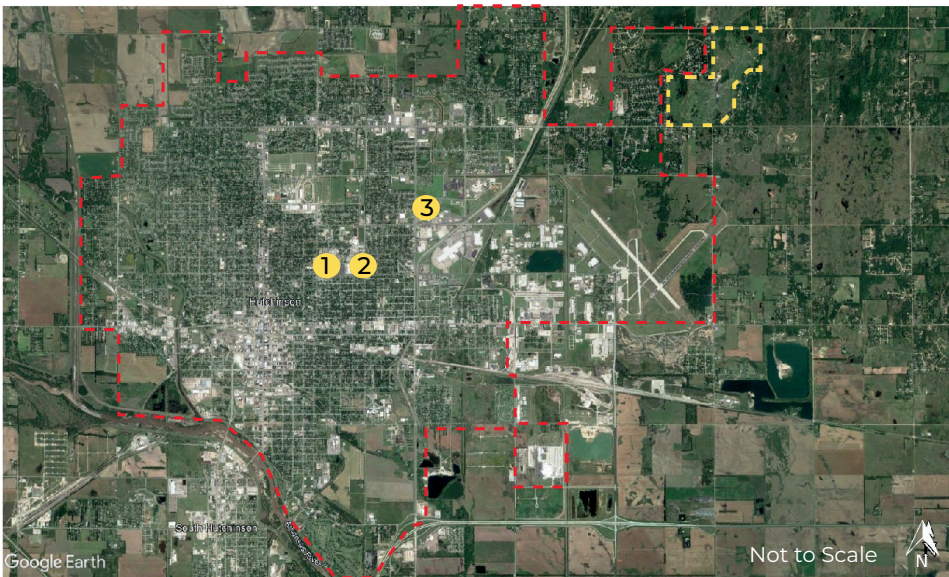


Figure 3.23: Map location of High Schools and Community College in Hutchinson Kansas

- 1 Hutchinson Community College
- 2 Hutchinson High School
- 3 Trinity Catholic JR/SR High School

Not all schools are shown on the map

Community Connections

Nature Destinations

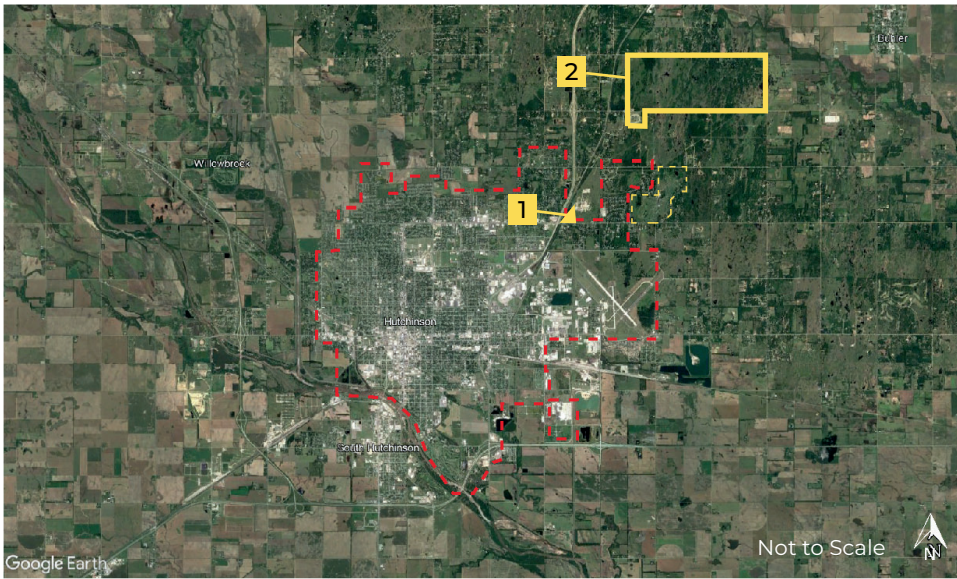


Figure 3.24:
Locations
of Nature
Destinations
in Hutchinson,
Kansas

- 1 Dillon Nature Reserve
- 2 Sand Hills State Park

Dillon Nature Reserve

Dillon Nature Center is a 100-acre urban sanctuary located in northeast Hutchinson. Visitors enjoy outdoor recreation experiences along three miles of National Recreation trails, fishing on a stocked pond, canoeing, bird watching, and exploring plant and wildlife. Youth can use all five senses in exploration and open nature play. All visitors can participate in nature education indoors with “A Closer Look at Nature” exhibit. (<https://www.hutchrec.com/dillon-nature-center/>)

Sand Hills State Park

Sand Hills State Park is a 1,123 acre natural area that has been preserved for its sand dunes, grasslands, wetlands, and woodlands. Popular activities at the park include hiking and horseback riding. Other activities include hunting, bird watching, wildflower walks, jogging, and relaxation away from the city. (<https://ksoutdoors.com/State-Parks/Locations/Sand-Hills>)

Method Three: Suitability Analysis

The suitability analysis examines at the physical site, including the site's topography, soil, geology, and hydrology patterns. This analysis assesses the golf course's physical elements, whereas the mapping framework looks at the human side of the course. The analysis is done using GIS and the City of Hutchinson's GIS system. For information that cannot be found on GIS, looking at what Prairie Dunes has on file will be vital in moving the analysis forward. The analysis uses the mapping framework to find those locations and settings that are most suitable for multifunctionality.

Site Location

Kansas

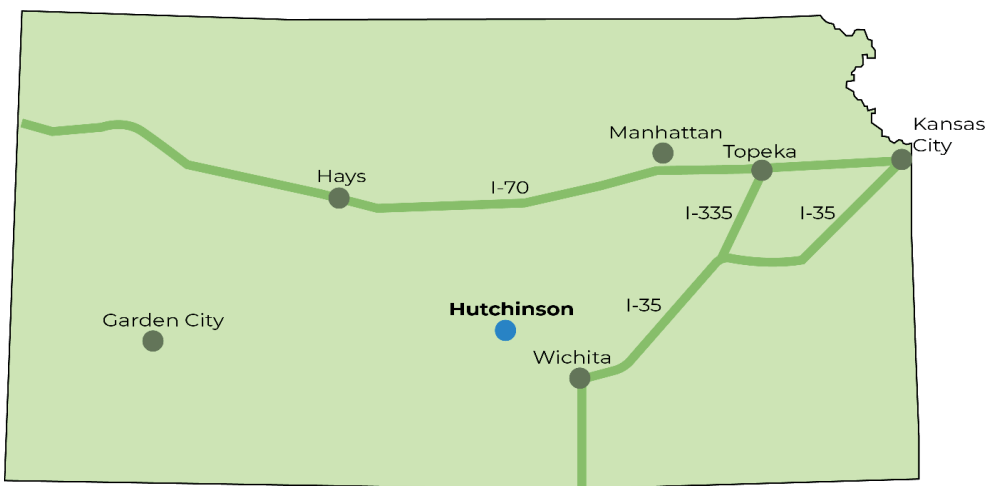


Figure 3.25: Map of Kansas

Hutchinson

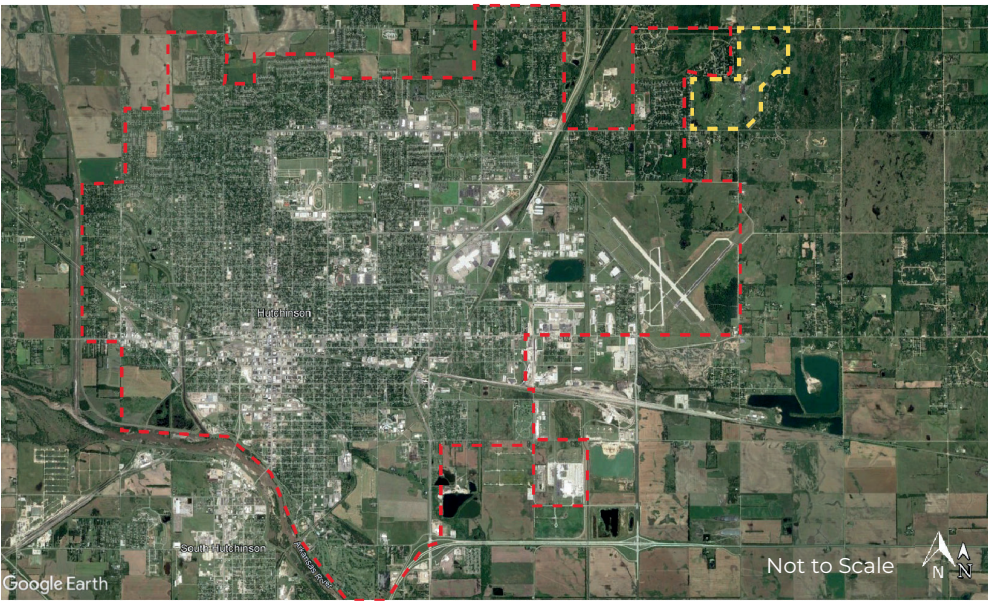


Figure 3.26: Map of Hutchinson Kansas (Adapted from Google Earth, 2023)

Yellow square: Prairie Dunes Country Club
Red square: Hutchinson

Site Location

Parcel Boundary of Prairie Dunes

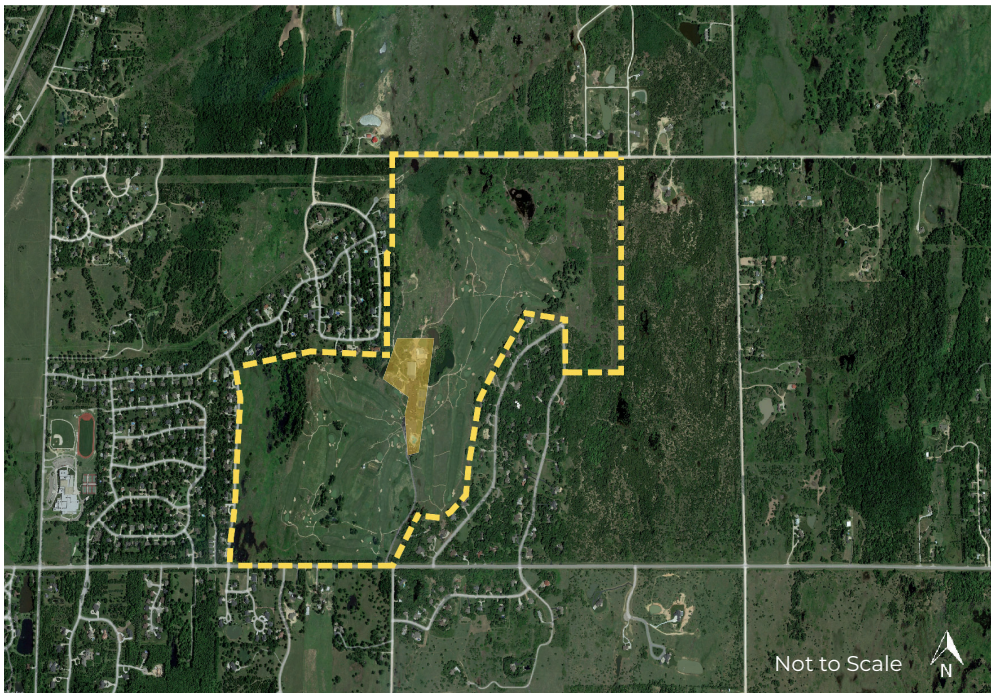


Figure 3.27: Project Boundary
(Adapted from Google Earth, 2023)

- Parcel Boundary
- Amenity Zone

Existing Amenities at Prairie Dunes Golf Course



Figure 3.28: Existing Amenities of Prairie Dunes
(Adapted from Google Earth, 2023)

- 1 Pool
- 2 Restaurant and Golf Proshop
- 3 Tennis Courts
- 4 Cottages
- 5 Fitness Center
- 6 Golf Course Maintenance
- Amenity Zone

Existing Topography at Prairie Dunes Golf Course

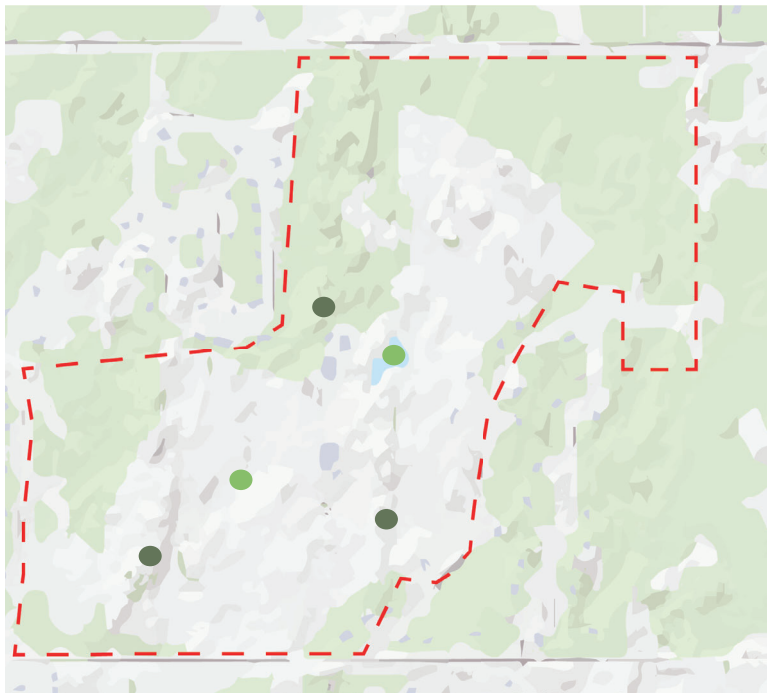


Figure 3.29:
Existing
Topography
(Adapted from
Hutchinson GIS,
2023)

- High Point
- Low Point
- Hill Shade

Watershed

Kansas

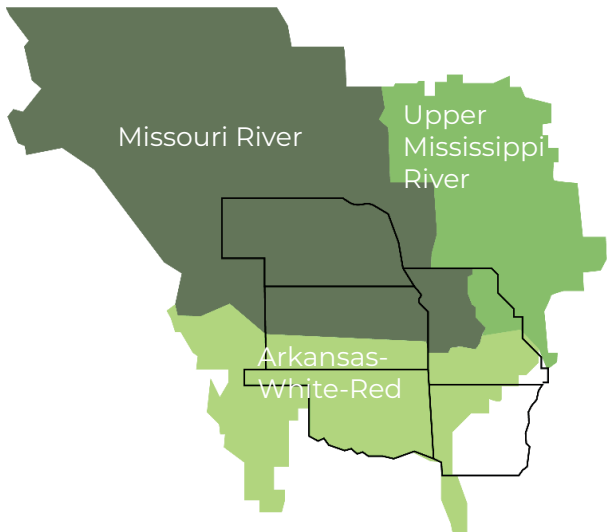
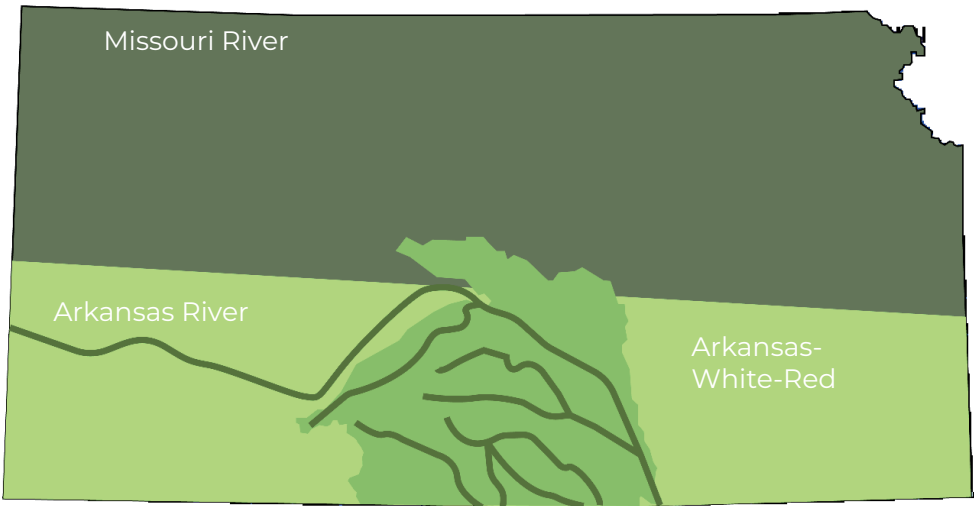


Figure 3.30: Kansas and neighboring states and their associated watersheds



Hutchinson Kansas is in the Lower Arkansas Watershed

Hutchinson



Not to Scale
Figure 3.32: Hutchinson Steams

Water Bodies on Site

Water at Prairie Dunes Golf Course

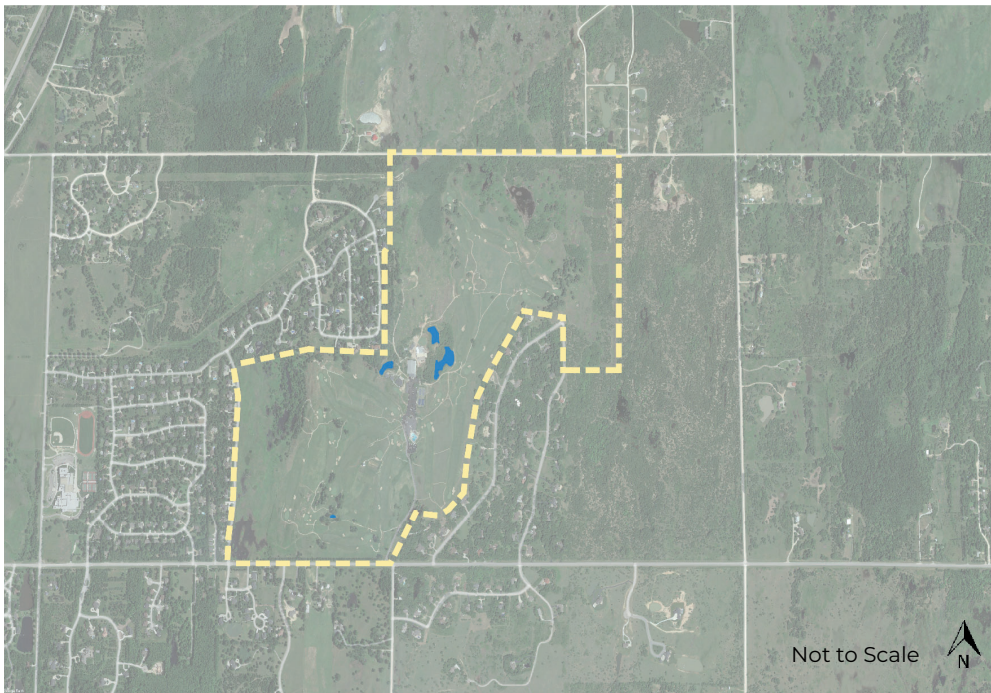


Figure 3.33:
Existing water on
site (Adapted from
Google Earth,
2023)

Existing Water on site

Water on the course is never in play for the golfers. The water is tucked away from any part of the golf course. Water is more in place for drainage on the course.

Soils on Site

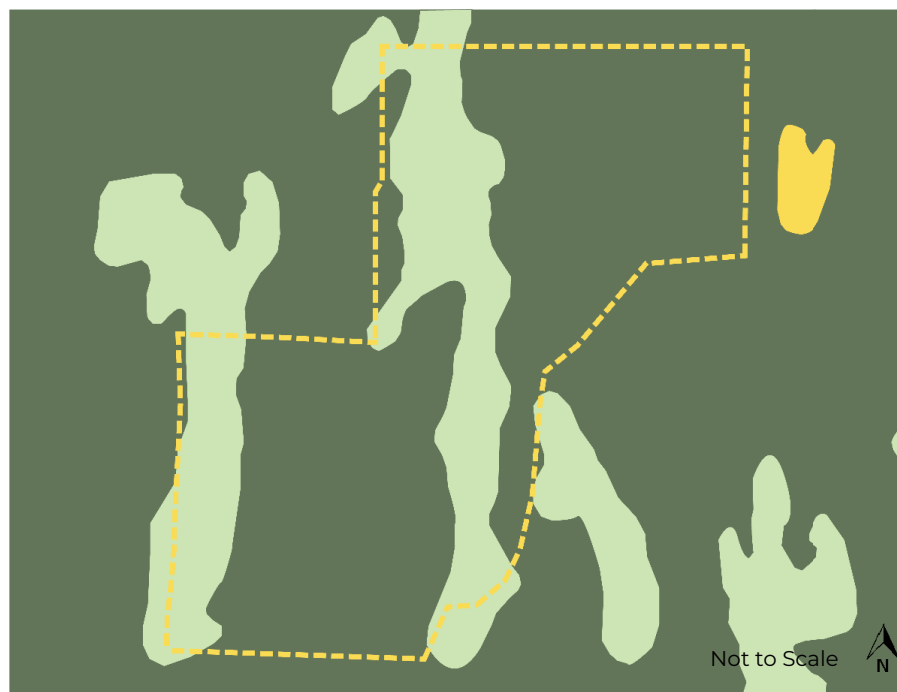


Figure 3.34:
Existing soil on site
(Adapted from US
Web Soil, 2023)

- 5971 Tivin fine sand, 10 to 30 percent slopes
- 5973 Tivin-Dillhut fine sands, 0 to 15 percent slopes
- 5883 Dillhut-Solvary complex, 0 to 3 percent slopes

Soils Characteristics

5971 Tivin fine sand, 10 to 30 percent slopes- 22.6% of the Site

Slope: 10 to 30 percent
 Depth to restrictive feature: More than 80 inches
 Drainage class: Somewhat excessively drained
 Runoff class: Low
 Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
 Depth to water table: More than 80 inches
 Frequency of flooding: None
 Frequency of ponding: None

5973 Tivin-Dillhut fine sands, 0 to 15 percent slopes- 76.6% of the Site

Slope: 1 to 15 percent
 Depth to restrictive feature: More than 80 inches
 Drainage class: Somewhat excessively drained
 Runoff class: Low
 Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
 Depth to water table: More than 80 inches
 Frequency of flooding: None
 Frequency of ponding: None

5883 Dillhut-Solvary complex, 0 to 3 percent slopes- 0.9% of the Site

Slope: 0 to 3 percent
 Depth to restrictive feature: More than 80 inches
 Drainage class: Moderately well drained
 Runoff class: Very low
 The capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
 Depth to water table: More than 80 inches
 Frequency of flooding: None
 Frequency of ponding: None

Vegetation



Figure 3.35: Hole 6 at Prairie Dunes



Figure 3.36: Hole 13 at Prairie Dunes



Figure 3.37: Hole 15 at Prairie Dunes

Vegetation

Property Information

Property Acreage: 390 acres

Golf Course Acreage: 100 acres

Non-Golf Course Acreage: 290 acres of native tall grass and short grass prairie

Major Plant Species:

Sand prairie bunch grasses: sand bluestem, sand dropseed, and sand reed grass. little bluestem, and switchgrass.

Wildflowers: yucca, purple milkweed, golden rod, black-eyed susan, prairie cone flower

Monarch Milkweed areas designated in native.

No chemical apps or mowing in areas to allow milkweed plants to thrive.

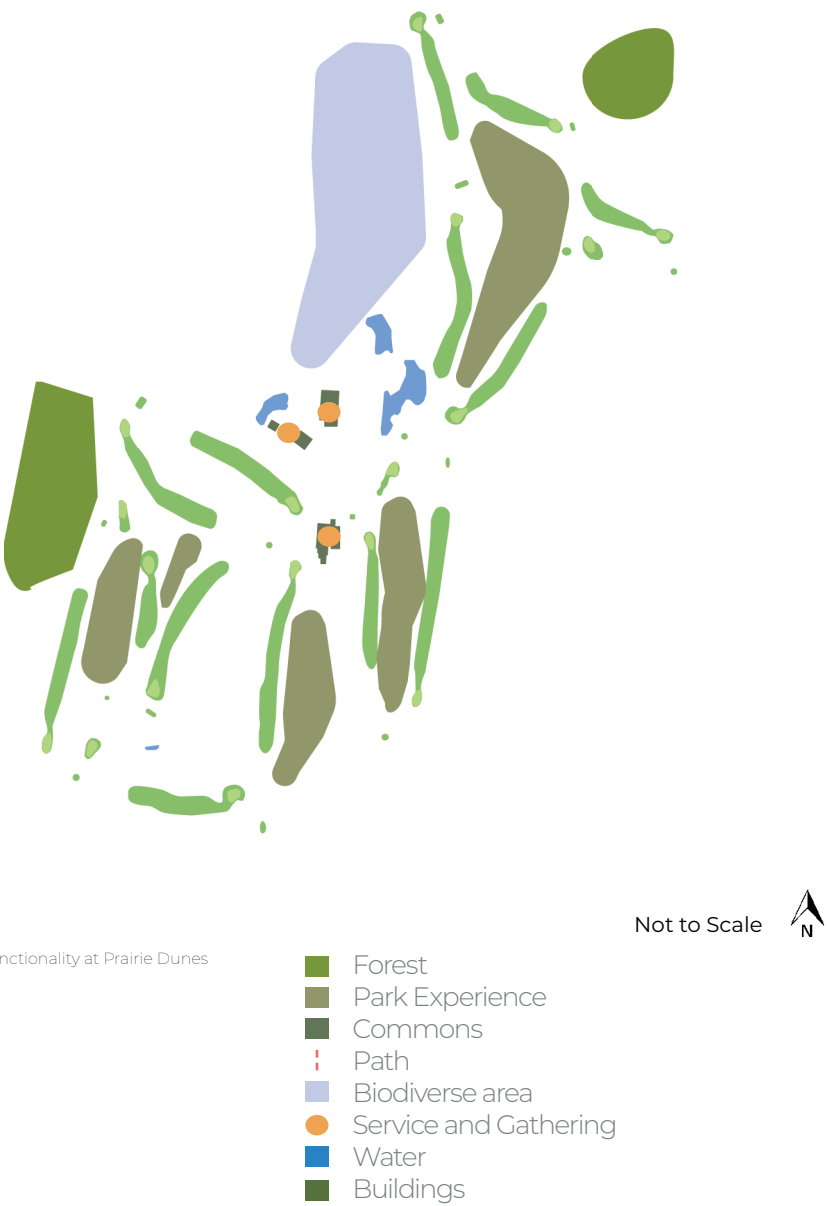
Maintenance

Burn rotation: every 3-4 years.

Yearly mowing of native areas to control woody plants and large grass species.

Spot chemical sprays for noxious weeds and invasive wood plants.

Existing Multifunctionality



Existing Multifunctionality



Figure 3.39: Blue Bird House, Hole 6 at Prairie Dunes



Figure 3.40: Rescued beehive at Prairie Dunes



Figure 3.41: Owl/Hawk habit at Prairie Dunes

- Environmental:**
- Supporting Pollinator Presence and Survival: Two rescued beehives started Spring of 2022
 - Supporting Habitat: 20+ bluebird houses around the property are recorded, maintained, and managed by area club member
 - Supporting Habitat: Two different owl/hawk habits lofted into trees around the front and back nine
- Social:**
- Tennis Courts
 - Restaurant
 - Fitness Center
 - Pool
 - On-Site Lodges

Method Three:

Mapping Experiences and Scorecard

Prairie Dunes Country Club and Golf Course was mapped using the framework developed by Caspersen, Jensen, and Jensen (2015). This “mapping experience” tool helped establish potential multifunctional interventions that can be implemented at the Prairie Dunes clubhouse and golf course. To support this mapping, Google Earth was used to obtain aerial photos of the site, and these photos were marked to indicate where notable experiences happen on the course. Finally, a photo registration of the golf holes was used to document all experiences and notable features that each hole encompasses (including the characteristics and important features associated with tees, fairways, adjacent rough, greens, etc.). Each golf hole had at least five to seven photos taken, depending on the length and character of the hole and their surroundings.

Holes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	DR
Forest/Woodland Environments:																			
Habitat Experience																			
Panoramic Views																			
Biodiversity																			
Landforms																			
Cultural and History																			
Activity and Challenge																			
Service and Gathering																			
Totals																			

Figure 3.42: Scorecard not filled out

Hole: 1 Score: 11

**High-Quality Forest/Woodland
Environments:** 0

Habitat Experience: 1

Panoramic Views: 3

Biodiversity: 2

Landforms: 2

Cultural History: 3

Activity and Challenge: 0

Service and Gathering: 0

Hole 1 at Prairie Dunes Country Club has a lot going for it from a historical perspective, as it was part of the original nine holes designed by Perry Maxwell when the course was first built. However, it also needs more multifunctionality with more woodland and habitat experience on hole 1.



Figure 3.43: Hole 1 at Prairie Dunes



Figure 3.44: Hole 1 at Prairie Dunes



Figure 3.45: Hole 1 at Prairie Dunes

Hole: 2 Score: 12

**High-Quality Forest/Woodland
Environments:** 0

Habitat Experience: 1

Panoramic Views: 3

Biodiversity: 3

Landforms: 2

Cultural History: 3

Activity and Challenge: 0

Service and Gathering: 0

Hole 2, from a multifunctional standpoint, has a lot going for it with views, landforms, and history, as it is one of the original nine holes. However, from a multifunctional standpoint, the hole needs more woodland and service or gathering spaces.



Figure 3.46: Hole 2 at Prairie Dunes



Figure 3.47: Hole 2 at Prairie Dunes



Figure 3.48: Hole 2 at Prairie Dunes

Hole: 3 Score: 9

High-Quality Forest/Woodland Environments: 0

Habitat Experience: 1

Panoramic Views: 2

Biodiversity: 3

Landforms: 3

Cultural History: 0

Activity and Challenge: 0

Service and Gathering: 0

Hole 3 has a great deal of biodiversity and landforms, especially down the left-hand side of the tee box (right side in the picture); this provides the section of the course with significant environmental multifunctional aspects. However, the hole needs to include more other categories, including history.



Figure 3.49: Hole 3 at Prairie Dunes



Figure 3.50: Hole 3 at Prairie Dunes



Figure 3.51: Hole 3 at Prairie Dunes

Hole: 4 Score: 9

High-Quality Forest/Woodland Environments: 0

Habitat Experience: 1

Panoramic Views: 3

Biodiversity: 2

Landforms: 2

Cultural History: 0

Activity and Challenge: 0

Service and Gathering: 1

Hole 4 has a weak score on the multifunctional scorecard but does have an area for service and gathering in the bathroom on this hole. However, this hole needs more wildlife habitat and biodiversity compared to other holes on the course.



Figure 3.52: Hole 4 at Prairie Dunes



Figure 3.53: Hole 4 at Prairie Dunes



Figure 3.54: Hole 4 at Prairie Dunes

Hole: 5 Score: 10

**High-Quality Forest/Woodland
Environments:** 0

Habitat Experience: 1

Panoramic Views: 3

Biodiversity: 3

Landforms: 3

Cultural History: 0

Activity and Challenge: 0

Service and Gathering: 0

Hole 5, from a multifunctional standpoint, is solid in views, biodiversity, and landforms, as you can see in the pictures. However, the hole lacks many other multifunctional categories compared to the other holes.



Figure 3.55: Hole 5 at Prairie Dunes



Figure 3.56: Hole 5 at Prairie Dunes



Figure 3.57: Hole 5 at Prairie Dunes

Hole: 6 Score: 15

High-Quality Forest/Woodland Environments: 1

Habitat Experience: 2

Panoramic Views: 3

Biodiversity: 3

Landforms: 3

Cultural History: 3

Activity and Challenge: 0

Service and Gathering: 0

Hole 6 has scored one of the highest of any holes on the course with multifunctionality, great views, biodiversity, landforms, and history, as this is one of the original nine holes. However, the hole still lacks multifunctional aspects.



Figure 3.58: Hole 6 at Prairie Dunes



Figure 3.59: Hole 6 at Prairie Dunes



Figure 3.60: Hole 6 at Prairie Dunes

Hole: 7 Score: 9

**High-Quality Forest/Woodland
Environments:** 0

Habitat Experience: 0

Panoramic Views: 2

Biodiversity: 2

Landforms: 2

Cultural History: 3

Activity and Challenge: 0

Service and Gathering: 0

Hole 7, while it is one of the original nine holes designed by Perry Maxwell, lacks a lot of multifunctional aspects. The hole lacks many multifunctional aspects, with habitat lacking throughout the hole and no areas for service or gathering.



Figure 3.61: Hole 7 at Prairie Dunes



Figure 3.62: Hole 7 at Prairie Dunes



Figure 3.63: Hole 7 at Prairie Dunes

Hole: 8 Score: 11

**High-Quality Forest/Woodland
Environments:** 1

Habitat Experience: 1

Panoramic Views: 2

Biodiversity: 2

Landforms: 2

Cultural History: 3

Activity and Challenge: 0

Service and Gathering: 0

Hole 8, while being the most famous hole at Prairie Dunes from a historical perspective, needs more basic multifunctional needs like activity and gathering spaces. In addition, hole 8 needs more habitat, woodland.



Figure 3.64: Hole 8 at Prairie Dunes



Figure 3.65: Hole 8 at Prairie Dunes



Figure 3.66: Hole 8 at Prairie Dunes

Hole: 9 Score: 12

High-Quality Forest/Woodland Environments: 1

Habitat Experience: 2

Panoramic Views: 2

Biodiversity: 2

Landforms: 2

Cultural History: 3

Activity and Challenge: 0

Service and Gathering: 0

Hole 9 has an excellent multifunctional rating due to good rankings through habitat, views, biodiversity, and landforms spread throughout the hole. However, hole 9 could be better in a multifunctional aspect to provide areas of gathering and service while also providing spaces for activity on the hole.



Figure 3.67: Hole 9 at Prairie Dunes



Figure 3.68: Hole 9 at Prairie Dunes



Figure 3.69: Hole 9 at Prairie Dunes

Hole: 10 Score: 16

**High-Quality Forest/Woodland
Environments:** 1

Habitat Experience: 3

Panoramic Views: 3

Biodiversity: 3

Landforms: 3

Cultural History: 3

Activity and Challenge: 0

Service and Gathering: 0

Hole 10 scored one of the highest on multifunctional on the course, mainly due to the different habitats, views, biodiversity, and landforms. Along with that, hole 10 is part of the original design by Perry Maxwell. However, it can still grow multifunctional, especially in service and gathering.



Figure 3.70: Hole 10 at Prairie Dunes



Figure 3.71: Hole 10 at Prairie Dunes



Figure 3.72: Hole 10 at Prairie Dunes

Hole: 11 Score: 14

**High-Quality Forest/Woodland
Environments:** 2

Habitat Experience: 3

Panoramic Views: 3

Biodiversity: 3

Landforms: 3

Cultural History: 0

Activity and Challenge: 0

Service and Gathering: 0

Hole 11 scored high with woodland environments and habitat experience compared to other holes at Prairie Dunes. However, from a historical standpoint, hole 11 needs multifunctional aspects and areas for gathering.



Figure 3.73: Hole 11 at Prairie Dunes



Figure 3.74: Hole 11 at Prairie Dunes



Figure 3.75: Hole 11 at Prairie Dunes

Hole: 12 Score: 11

**High-Quality Forest/Woodland
Environments:** 2

Habitat Experience: 3

Panoramic Views: 3

Biodiversity: 3

Landforms: 0

Cultural History: 0

Activity and Challenge: 0

Service and Gathering: 0

Hole 12, from a multifunctional environmental standpoint, hole 12 scored very high compared to other holes on the course due to the habitat experiences and the views. However, for people hole 12's multifunctionality lacks any amenities for users of the course.



Figure 3.76: Hole 12 at Prairie Dunes



Figure 3.77: Hole 12 at Prairie Dunes



Figure 3.78: Hole 12 at Prairie Dunes

Hole: 13 Score: 10

**High-Quality Forest/Woodland
Environments:** 0

Habitat Experience: 2

Panoramic Views: 3

Biodiversity: 3

Landforms: 2

Cultural History: 0

Activity and Challenge: 0

Service and Gathering: 0

Hole 13 scored well with views and biodiversity in the multifunctional score. However, hole 13 needs more multifunctional features than other holes at Prairie Dunes.



Figure 3.79: Hole 13 at Prairie Dunes



Figure 3.80: Hole 13 at Prairie Dunes



Figure 3.81: Hole 13 at Prairie Dunes

Hole: 14 Score: 13

**High-Quality Forest/Woodland
Environments:** 3

Habitat Experience: 3

Panoramic Views: 3

Biodiversity: 3

Landforms: 1

Cultural History: 0

Activity and Challenge: 0

Service and Gathering: 0

Hole 14 is one of the only holes at Prairie Dunes with a very high quality of woodland surrounding the hole; along with that, the hole has a very strong habitat, views, and biodiversity. However, the hole could have better gathering and history regarding multifunctionality.



Figure 3.82: Hole 14 at Prairie Dunes



Figure 3.83: Hole 14 at Prairie Dunes



Figure 3.84: Hole 14 at Prairie Dunes

Hole: 15 Score: 9

High-Quality Forest/Woodland Environments: 1

Habitat Experience: 2

Panoramic Views: 1

Biodiversity: 3

Landforms: 2

Cultural History: 0

Activity and Challenge: 0

Service and Gathering: 0

Hole 15, from a multifunctional standpoint, has slimmer options for multifunctionality than most holes on this course, with biodiversity being the only real option. This hole has less scenic value as the golfer will see lots more homes along the course and fewer habitat spaces than on other holes.



Figure 3.85: Hole 15 at Prairie Dunes



Figure 3.86: Hole 15 at Prairie Dunes



Figure 3.87: Hole 15 at Prairie Dunes

Hole: 16 Score: 9

High-Quality Forest/Woodland Environments: 1

Habitat Experience: 2

Panoramic Views: 1

Biodiversity: 3

Landforms: 2

Cultural History: 0

Activity and Challenge: 0

Service and Gathering: 0

Hole 16, like hole 15, has a minimal multifunctional aspect to it with minimal habitat, woodland, and views due to the homes close to the course. However, biodiversity on this hole is much higher than on hole 15, given that hole 16 has more environmental options.



Figure 3.88: Hole 16 at Prairie Dunes



Figure 3.89: Hole 16 at Prairie Dunes



Figure 3.90: Hole 16 at Prairie Dunes

Hole: 17 Score: 7

**High-Quality Forest/Woodland
Environments:** 0

Habitat Experience: 1

Panoramic Views: 0

Biodiversity: 2

Landforms: 1

Cultural History: 3

Activity and Challenge: 0

Service and Gathering: 0

Hole 17, from a multifunctional standpoint, only brings the historical aspect to the table as it is one of the original holes of Prairie Dunes. However, hole 17 has other fundamental multifunctional elements that the scorecard is looking for.



Figure 3.91: Hole 17 at Prairie Dunes



Figure 3.92: Hole 17 at Prairie Dunes



Figure 3.93: Hole 17 at Prairie Dunes

Hole: 18 Score: 1

**High-Quality Forest/Woodland
Environments:** 0

Habitat Experience: 1

Panoramic Views: 2

Biodiversity: 3

Landforms: 2

Cultural History: 3

Activity and Challenge: 0

Service and Gathering: 1

Hole 18, the last hole on the course, has areas for gathering at the end of the hole; it also has incredible biodiversity and history. However, the hole needs to be improved in many other multifunctional aspects, including views, as the fitness building shows.



Figure 3.94: Hole 18 at Prairie Dunes



Figure 3.95: Hole 18 at Prairie Dunes



Figure 3.96: Hole 18 at Prairie Dunes

Driving Range Score: 1

**High-Quality Forest/Woodland
Environments:** 0

Habitat Experience: 0

Panoramic Views: 1

Biodiversity: 1

Landforms: 0

Cultural History: 1

Activity and Challenge: 0

Service and Gathering: 3

The driving range at Prairie Dunes lacks many multifunctional features, but it has areas of growth, including a very high score in service and gathering spaces.



Figure 3.97: Driving Range at Prairie Dunes



Figure 3.98: Driving Range at Prairie Dunes

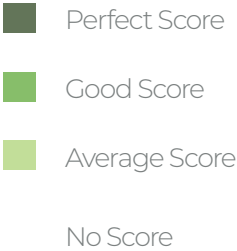


Figure 3.99: Driving Range at Prairie Dunes

Final Scorecard

Holes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	DR
Forest/Woodland Environments:	0	0	0	0	0	1	0	1	1	1	2	2	0	3	1	1	0	0	0
Habitat Experience	1	1	1	1	1	2	0	1	2	3	3	3	2	3	2	2	1	1	0
Panoramic Views	3	3	2	3	3	3	2	2	2	3	3	3	3	3	1	1	0	2	1
Biodiversity	2	3	3	2	3	3	2	2	2	3	3	3	3	3	3	3	2	3	1
Landforms	2	2	3	2	3	3	2	2	2	3	3	0	2	1	2	2	1	2	0
Cultural and History	3	3	0	0	0	3	3	3	3	3	0	0	0	0	0	0	3	3	1
Activity and Challenge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Service and Gathering	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
Totals	11	12	9	9	10	15	9	11	12	16	14	11	10	13	9	9	7	12	6

Figure 3.100: Filled out scorecard



With the scorecard being done just by myself, there are some limitations compared to if a multidisciplinary team did the scorecard. However, being done with a multidisciplinary team would lead to conversations that would deepen the overall findings of the scorecard.

The scorecard can also help develop other golf course multifunctionality around Kansas. For example at, Colbert Hills in Manhattan Kansas, multifunctionality can be carefully considered once a scorecard is completed, and findings give designers and golf course personnel clues about where and how key features and activities can be placed, implemented, and managed over time.

Projective Multifunctional Design

Design Locations
Design Processes
Outdoor Classroom
Indoor Classroom/
Snack Hut
Signage



Educate
Inform
Reveal

Proactive education is supported by an integrated system of signs at Prairie Dunes and facilitated by golf course staff, scientists, historians, and others who share insights, stories, and historical connections with golfers and visitors.

Protect
Connect
Conserve

Stronger ecosystem connections are created with surrounding natural landscapes and conservation groups in support of ecoregional landscape needs.

Engage
Learn
Appreciate

Learning is enhanced and enjoyed by many golfers and community members as Prairie Dunes hosts First Green and other engaging outreach events, building greater appreciation for this facility and its ecoregional context.

Figure 4.1: Project Goals Applied

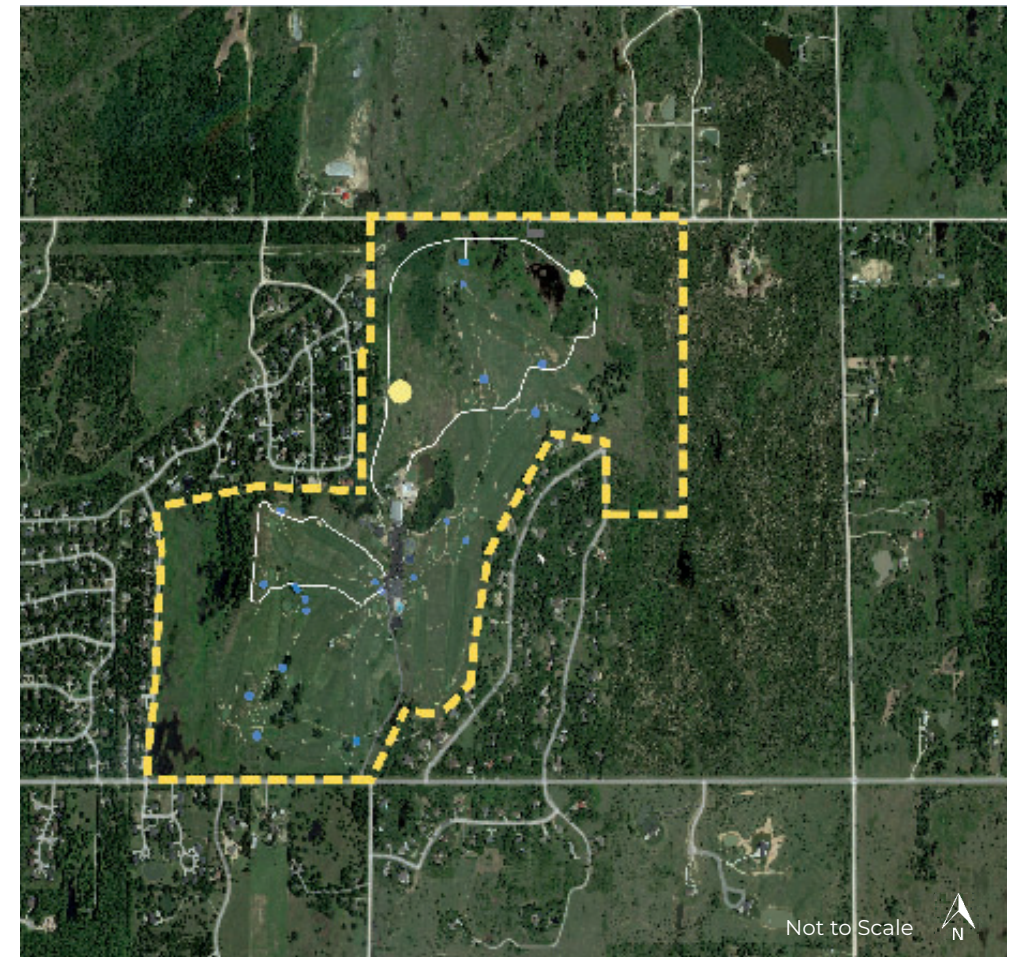


Figure 4.2: Locations of Multifunctional Interventions
(Adapted from Google Earth, 2023)

Design Locations

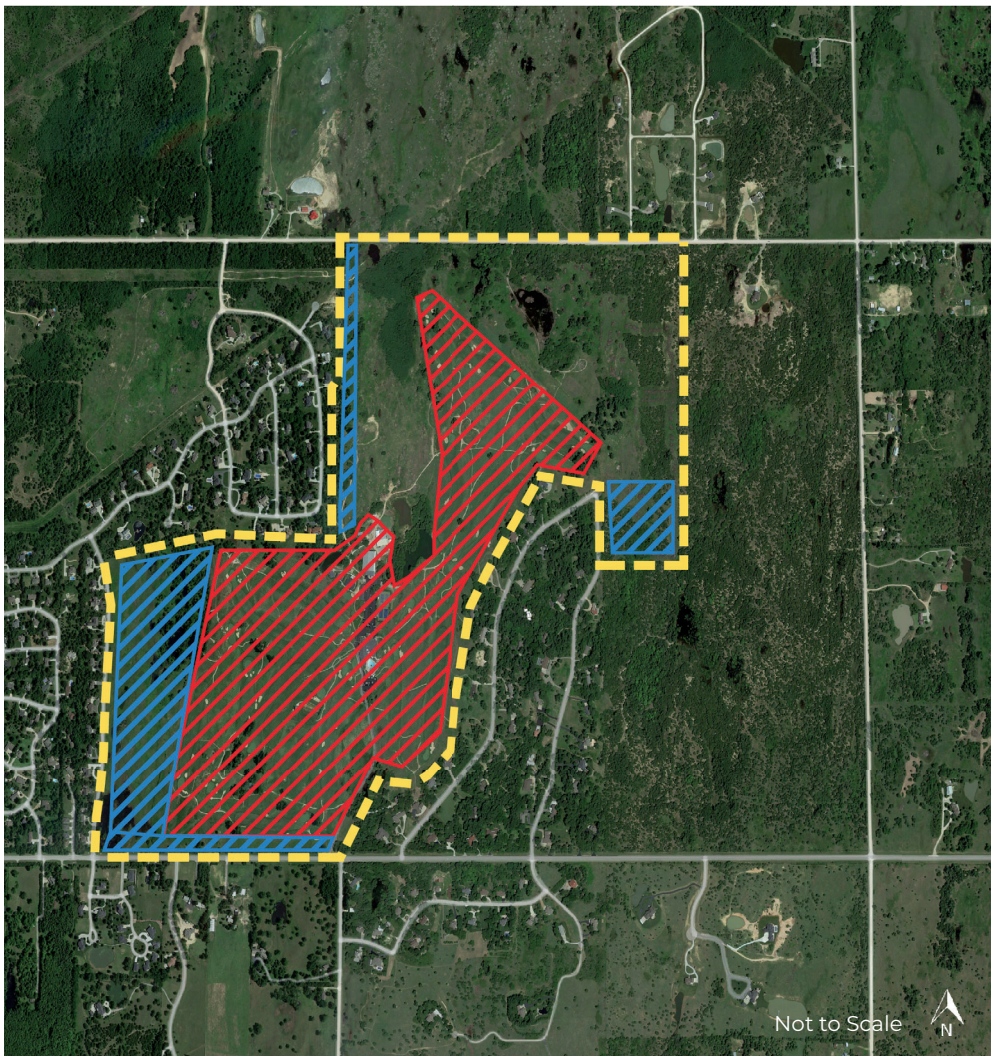
The mapping experiences on the course dictated the primary placement of design-suggested locations. The outdoor classrooms are placed where they are, out of shot from any stray golf balls that may be hit. This is to be able to hold events at these spaces, even during the golf season. Along with this, the placement of Outdoor Classroom One, there are existing beehives already on the course. Building on this, the placement of Outdoor Classroom One makes the most sense there. Along with this, the location of the building on site is placed on holes 4 and 14 as these holes are where service and gathering are already happening; thus, the intervention can build on existing aspects. Lastly, the sign placement is placed in very strategic spots along the course.

Design Process

The design process of the multifunctional interventions starts with a deeper understanding of what is needed on the course. Through the mapping experience, I determined that service and gathering spaces are the most significant need on site. With the addition of service and gathering space at Prairie Dunes Country Club, the course can start to host more educational opportunities on-site and can begin to host events through First Green. The design process outlining important guidelines related to bringing more people (especially non-golfers) into the course, then finding suitable locations for key features and activities, builds upon the multifunctional features and activities that already exist at Prairie Dunes. Signage for the site learns from what is already there and then develops a new signage system using a more modern design vocabulary. Overall the design process builds off what is already at Prairie Dunes and can turn it into a multifunctional golf course.

Site Selection-Outdoor Classroom

Non-Buildable Area



Not to Scale



Figure 4.4: Non-Buildable Area Golf Course (Adapted from Google Earth, 2023)



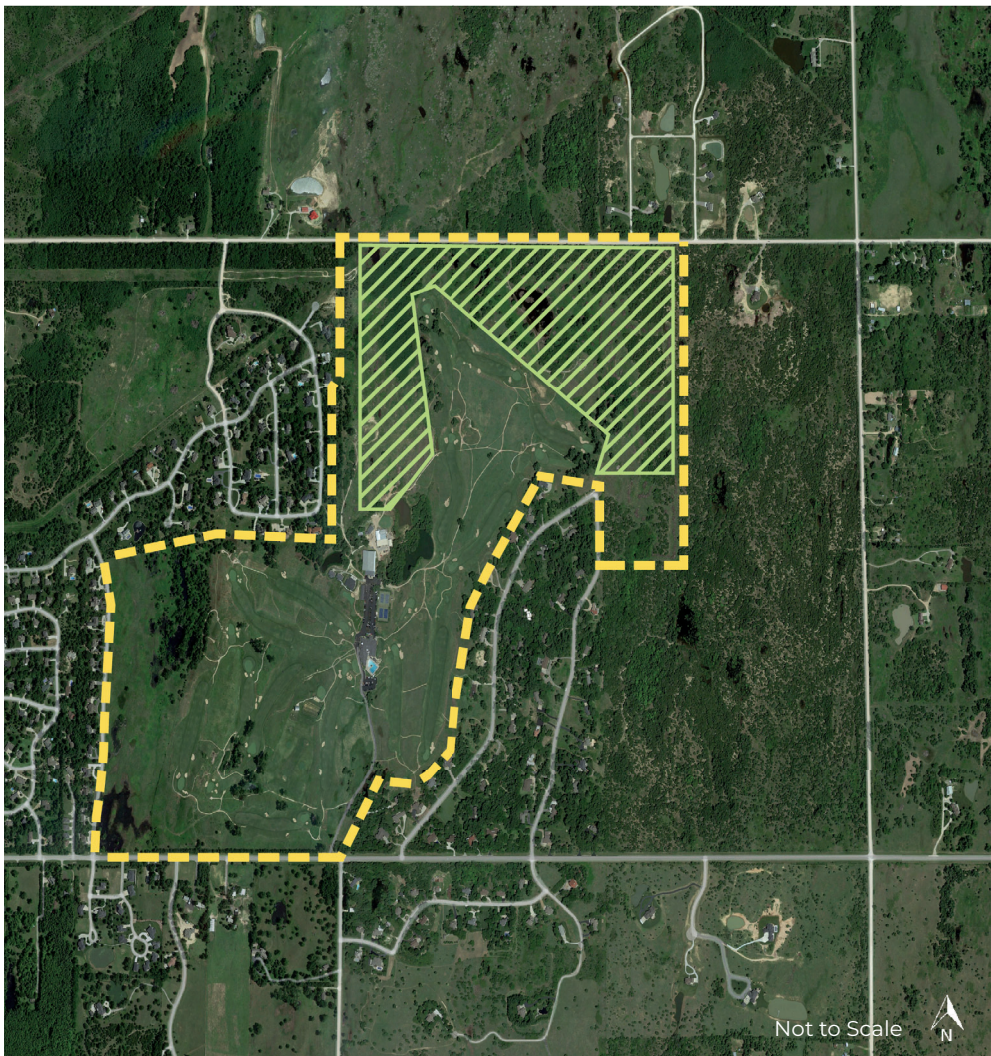
The first non-buildable area for the outdoor classroom is excluded because it is the golf course making the area unusable (unsafe for non-golfers).



The second non-buildable area is excluded because it sits too close to the road and the homes along the property line.

Site Selection-Outdoor Classroom

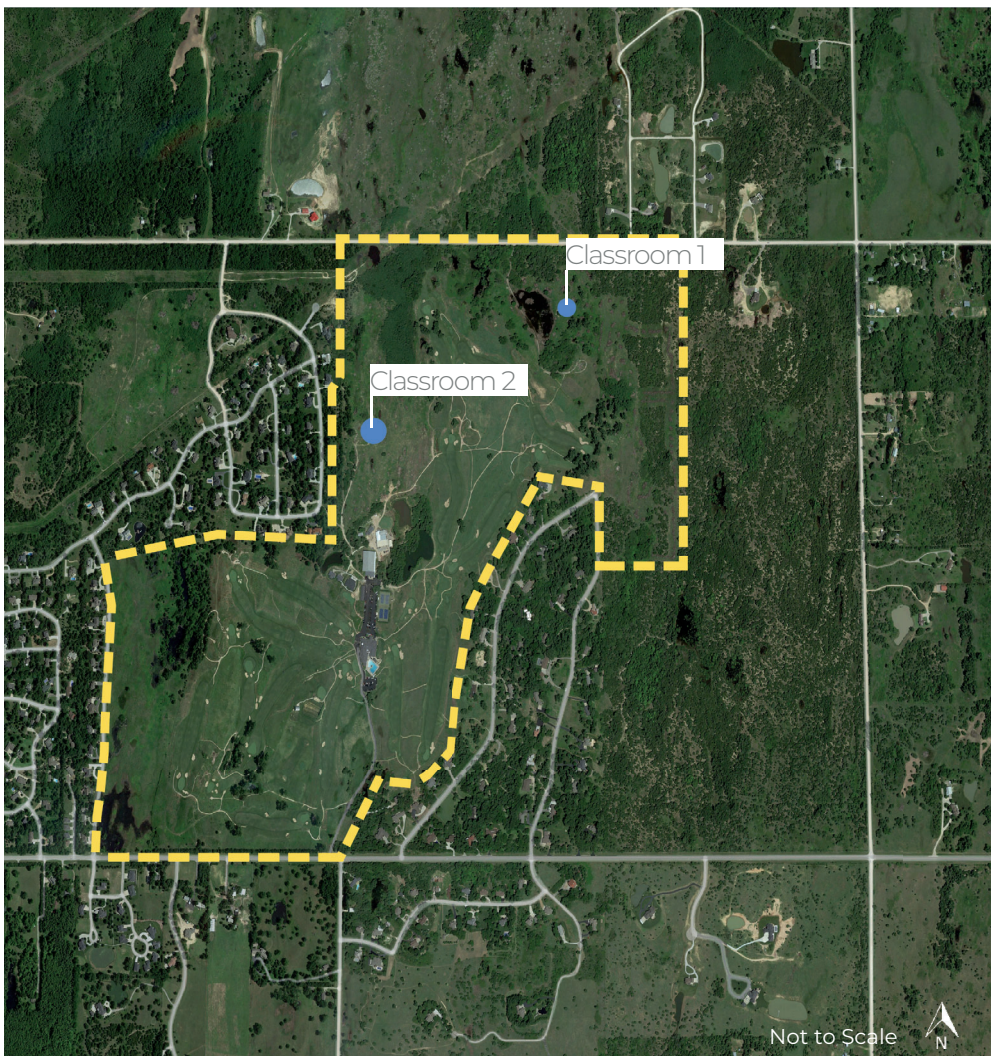
Buildable Area



The area shown in green is deemed most buildable based on accessibility, safety, and context.

Figure 4.5: Buildable Areas
(Adapted from Google Earth, 2023)

Outdoor Classroom Location Selection



The two outdoor classrooms were selected as locations because they are out of the way of any stray golf ball.

Figure 4.6: Location of outdoor classroom
(Adapted from Google Earth, 2023)

Outdoor Classrooms

The outdoor classrooms are placed where they are, out of shot from any stray golf balls that may be hit. This is done to be able to hold events at these spaces, even during the golf season.

Outdoor Classroom One, safely located near hole 13, has a pavilion, learning area, small gathering space demo garden for burning prairie that Prairie Dunes does in part with Hutchinson Community College but can also be an education for First Green.

Outdoor Classroom Two has all the same programming as one, but the demo garden here becomes a pollinator garden for the beehives on the course while keeping these hives close to other patches of native prairie.

From a multifunctional standpoint, the two outdoor classrooms are placed in areas that build off what already exists at Prairie Dunes. Those existing conditions, like existing rescued beehives, can become part of a new First Green program that Prairie Dunes can effectively implement. Both First Green and the local and regional schools can use these outdoor classrooms. In Outdoor Classroom One a prairie burning demonstration garden can be used to demonstrate the benefits of burning the prairie and educate youth and adults about how and why burning renews the prairie.

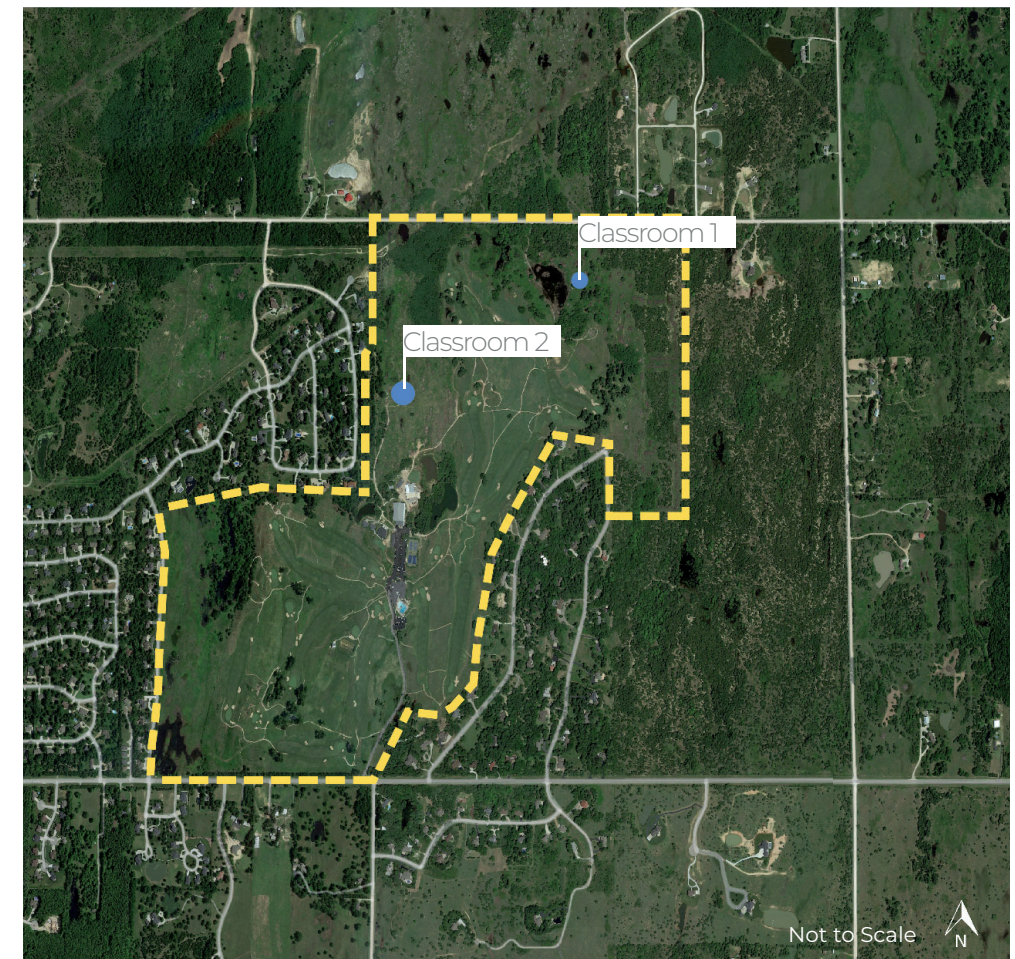


Figure 4.7: Location of outdoor classroom
(Adapted from Google Earth, 2023)

Outdoor Classrooms

Outdoor Classroom One Plan



Figure 4.8: Plan of Outdoor Classroom One (Adapted from Google Earth, 2023)

Outdoor Classroom One is strategically located behind the maintenance area for Prairie Dunes. Here it is safely out of the way of any errant golf balls from holes ten and eleven. Located in this space are an outdoor learning classroom, a small covered gathering space, and a native planting area where existing beehives will be located.

Program:

Pavilion

Learning Area

Small Gathering Space

Demo Garden:
Burning Garden

Outdoor Classroom Two Plan

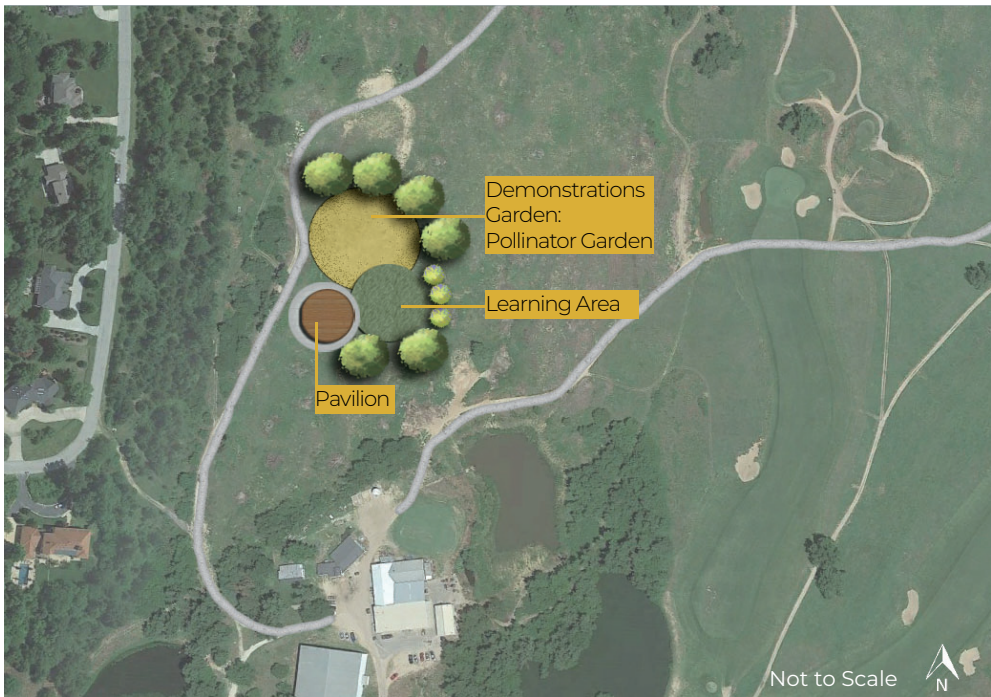


Figure 4.9: Plan of Outdoor Classroom Two (Adapted from Google Earth, 2023)

Outdoor Classroom Two is strategically located in an unused area at Prairie Dunes. Here it is safely out of the way of any errant golf balls from holes 10 and 11. Located in this space are an outdoor learning classroom, a small covered gathering space, and a native planting area where burn management practices can be shown and taught to anyone interested in learning about scheduled late fall or early spring controlled prairie burns.

Program:

Pavilion

Learning Area

Demo Garden:
Pollinator Garden

Outdoor Classrooms

Pavilion



Figure 4.10: Main Pavilion

The main covered gathering space in the classroom area can host a range of events in this space. This space will host events such as First Green, so tables and chairs can be arranged for each activity in the area. Overall this space will be utilized as a multifunctional space throughout the year.

Learning Area



Figure 4.11: Outdoor learning area

The outdoor learning area is set up at both locations. At both locations, the classroom area will act as the catalyst for Prairie Dunes and First Green to become a mainstay of the course. The classroom has an elevated seating area where kids and parents can sit and listen to the presentation. Overall this area will become a multifunctional destination and a learning space for all.

Outdoor Classroom Amenities

Demonstration Garden 1: Burning Garden



Figure 4.12: Demonstration Garden 1: Burning Garden

The prairie burn area in Outdoor Classroom Two can become a focal point of multifunctionality in the course. Prairie Dunes is already on a burn rotation every three to four years. This area would be burned more frequently due to the educational aspect of the area. This area can also become a learning experience in how to burn and what happens when you do burn.

Note: burning should be done to promote biodiversity and reduce invasive species -- and every 2-4 years seems about right. If you consistently burn prairie every year grasses will likely dominate and wildflowers diminish.

Demonstration Garden 2: Pollinator Garden



Figure 4.13: Demonstration Garden 2: Pollinator Garden

The beehive area is located in Outdoor Classroom One. This area will be a place where people can learn about what bees can do, along with the care of bees and beehives. Unfortunately, many native bees are at risk of extinction due to the use of pesticides and loss of habitat, so this is an important area to spotlight these concerns and the ways people can help conserve and create pollinator habitats. With additional pollinator plantings at Prairie Dunes, the hives can be well supported at the golf course.

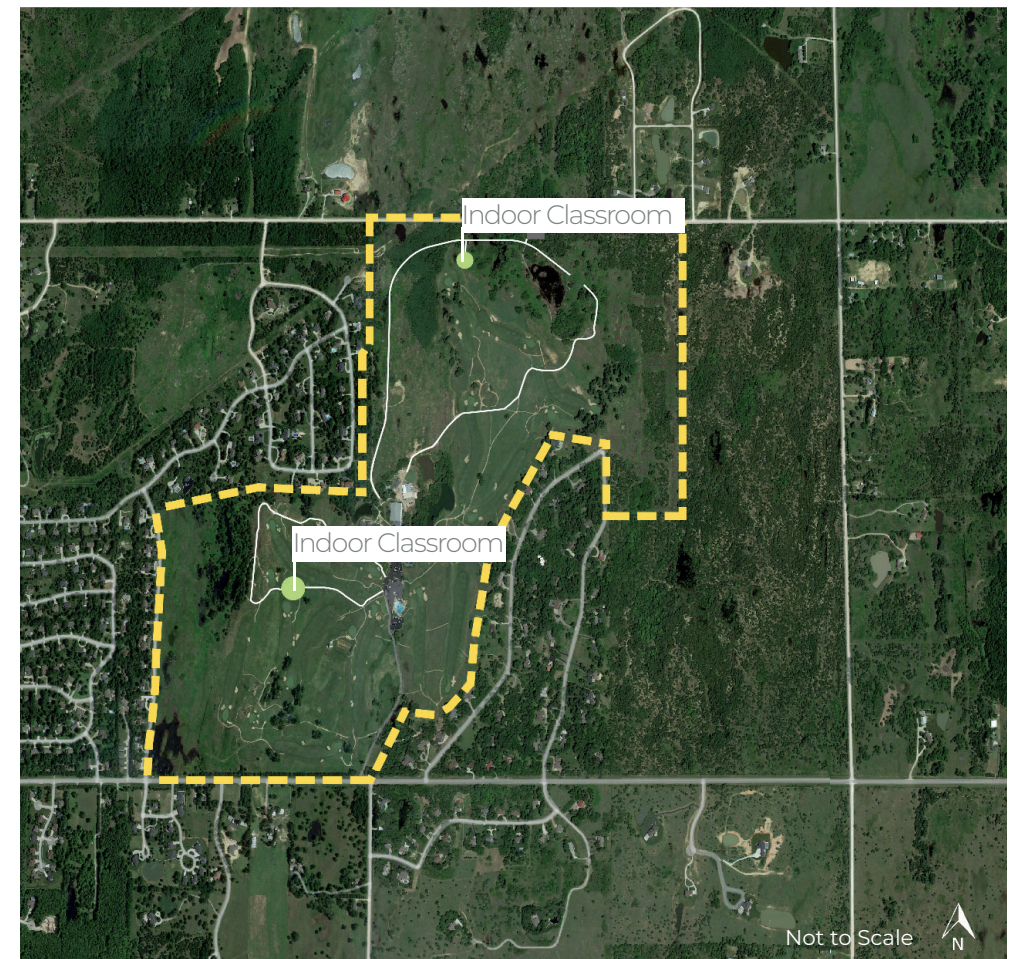


Figure 4.14: Indoor Classroom/Snack Hut locations
(Adapted from Google Earth, 2023)

Indoor Classroom/ Snack Hut

The Indoor snack area will be a new addition to Prairie Dunes Golf Course. Along with being a snack hut for the course, the hut will act in a multifunctional aspect as an indoor classroom that can be used as an educational space when Prairie Dunes has First Green events on the course. In addition, this space can become part of a more extensive educational trail that First Green can use when it holds events. Overall this space will benefit the course as it adds another financial aspect that Prairie Dunes can benefit from and the First Green educational that is important to the overall golf community.

Indoor Classroom/ Snack Hut

Floor Plan

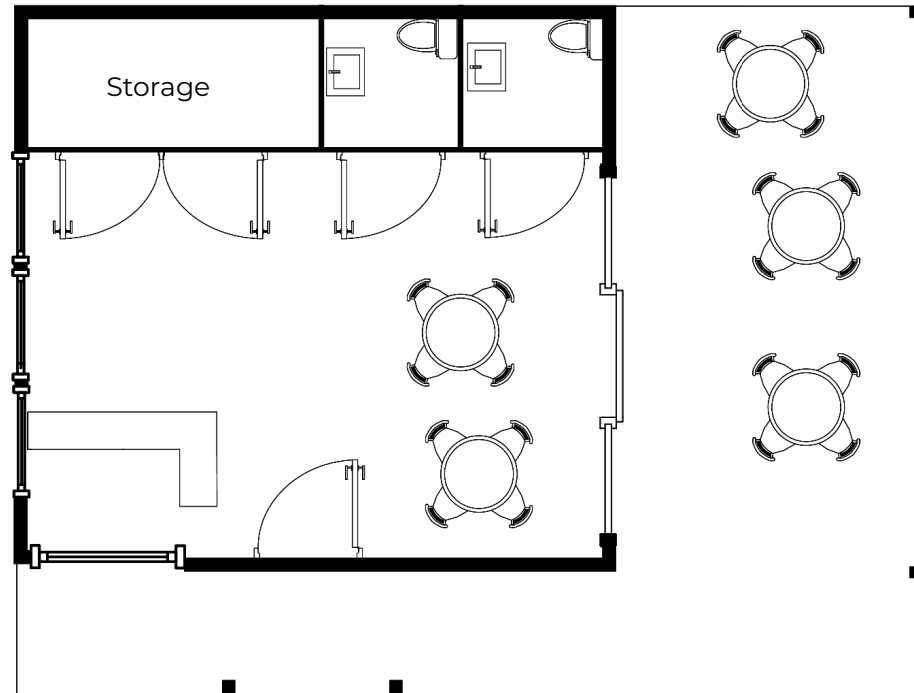


Figure 4.15: Floor Plan of Snack Hut/Indoor Classroom

The snack hut/ indoor classroom floor plan is set up to allow for quick change from one programming to the next. In addition, a small patio allows for indoor-outdoor connection when the weather is nice.

Scale: 1/8"=1'-0'

Outside Perspective



Figure 4.16: Outside Perspective

Ideally the building would be designed to fit well with the prairie landscape and provide all of its own power using solar PVs and good materials and insulation. Providing shade from rain and hot summer sun is important. A septic tank and drainfield will likely be needed to reduce the need for long sanitary lines.

Indoor Classroom/ Snack Hut

Snack Hut



Figure 4.17: Snack Hut Perspective

This indoor facility should be designed for different kinds of activities -- with chairs and tables and other features that can be moved around and safely stored.

Indoor Classroom



Figure 4.18: Indoor Classroom Perspective

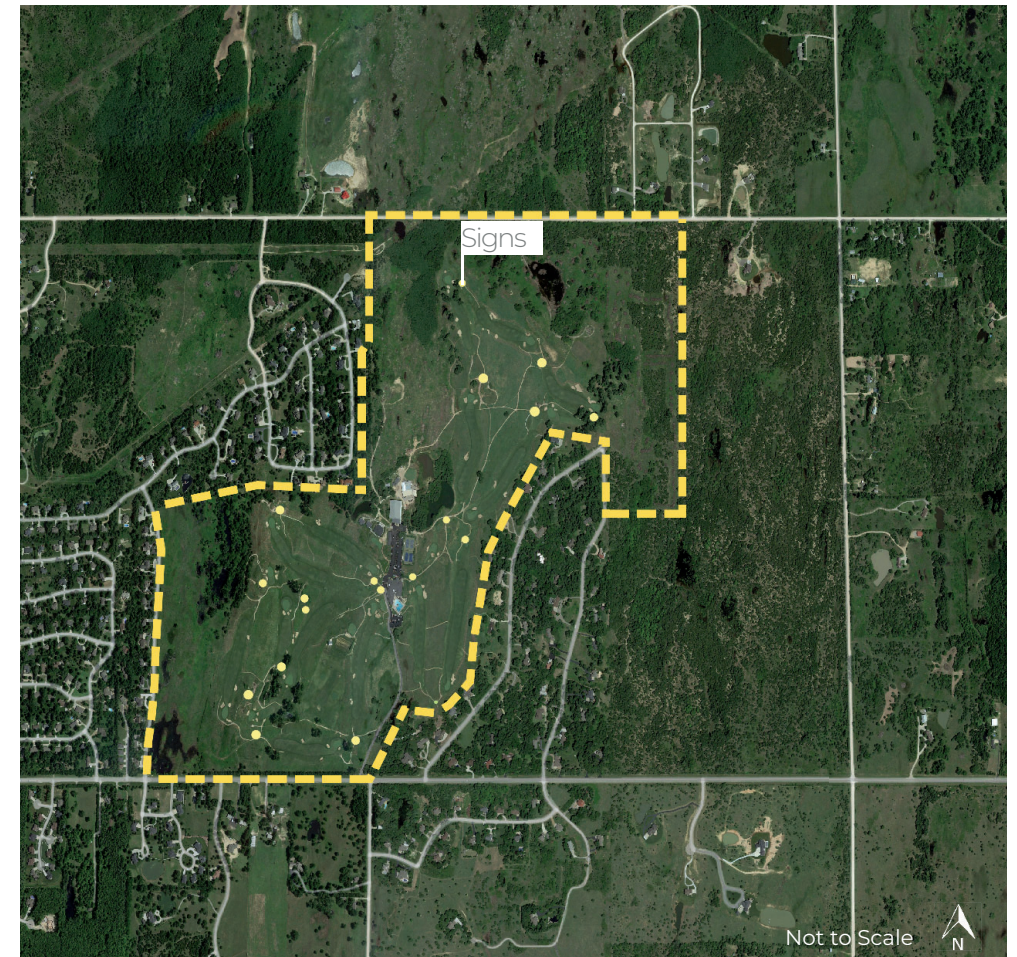


Figure 4.19. Signage locations
(Adapted from Google Earth, 2023)

Signage

Signage on-site is essential to the educational aspect of multifunctionality and vital to how a golf course is run. From a signage perspective, Prairie Dunes can bring an educational aspect to the course signs. Prairie Dunes has a remarkable history of both the course and the ecosystem it sits in. Along with this, the maintenance practices at Prairie Dunes should also be highlighted. The signs will be placed at each hole with the original nine holes showing the history of the course in how it was built. The other nine holes will be split between the history of the ecoregion and Prairie Dunes' maintenance practices.

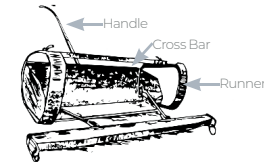


Figure 4.20: Front View of Sign



Figure 4.21: Side View of Sign

History



Pictured is a Franson Scraper, which designer Perry Maxwell used to shape the first nine holes of Prairie Dunes. Maxwell and his superintendent Dean Woods used the existing landscape to craft the course, and they even designed it without maps because Maxwell preferred to walk along the property. Moving extraordinarily little earth, the team (with help from Works Progress Administration) used horses, mules, slips, and Franson scrapers, with no mechanized equipment, to craft the original nine holes.

Figure 4.22: History Example of Signage

Maintenance Practices



Did you know:

Prairie Dunes host 20+ bluebird houses around the property that are all recorded, maintained, and managed by area club members.

Look for bird and pollinator habitats as you go about your round of golf!

Figure 4.23: Maintenance Practice Example of Signage

Ecoregion



Prairie Dunes Sits within the Great Bend Sand Prairie. Here are some facts about the region:
 Physiography: Undulating to rolling sandy plains/dune areas.
 Geology: Sandy eolian deposits, dune sand, and loamy Quaternary sediments over sandy alluvium.
 Potential Natural Vegetation: Sand prairie bunch grasses; sand bluestem, sand dropseed, and sandreedgrass.
 Land Use and Land Cover: the dryland and irrigated cropland. Winter wheat is main dryland crop used by cattle, bison, and wildlife. Large areas of center pivot irrigation support grain sorghum and alfalfa crops. Also supports areas of range land.

Figure 4.24 : Ecoregion Example of Signage

Signage on the course is broken down into three different categories. The three categories range from the history of the course and showing the original nine holes designed by Perry Maxwell. The next group of signage is to educate members on the maintenance practices that Prairie Dunes does. Prairie Dunes has a unique maintenance plan that needs to be shared with those who play and visit the course, and a section on the sign does this. Lastly, the final section of signs spotlights the ecoregion. The ecoregion is a major reason for how the course was designed, and showing the history would give golfers more knowledge on the larger landscape setting they are playing within.

Project Conclusion

Implementation
Limitations
Personal Reflection

5

Implementation Strategies

The implementation of the multifunctional interventions at Prairie Dunes will be challenging since it is a private course. As a private course Prairie Dunes the course must have the members' approval. But Prairie Dunes can become a role model for other private course throughout the United States.

Throughout this design process, the ideas that have been suggested are more design guidelines than ideas that can be immediately implemented. The purpose of this research and the conceptual design suggestions are to show how multifunctionality on a golf course can become more than an idea done on a course in Europe. This project shows that golf courses can be used as more than just golf courses in the United States. Implementation will take time, but through this project, the idea of multifunctionality can start getting people to see the course differently. This project will take time, with Prairie Dunes beginning to open up through the First Green Program.



Limitations and Future Opportunities

The most significant limitation of this project is that the scorecard and mapping experiences of the course are a solo effort. With the scorecard being done just by myself, there are some limitations compared to if a multidisciplinary team did the scorecard. If completed by a multidisciplinary team this engaging process would lead to conversations that would deepen the overall findings of the scorecard.

Another limitation is where this project is being done. With Prairie Dunes being a private golf club, it is unlikely that the club will quickly implement these ideas. Private golf courses are a lot less likely to allow outside people on their golf courses. Public golf courses owned mainly by a city or municipality, would be much more likely to allow for multifunctionality on their course.

The scorecard can also help develop other course multifunctionality around Kansas. For example, Colbert Hills in Manhattan, Kansas, despite extensive surrounding residential development, can incorporate multifunctionality in strategic ways that will build stronger community support for protection and management of prairie remnants, adequate riparian corridors, and places for community members to gather for special events such as First Green and other educational activities. Colbert Hills can build on existing multifunctionality that already exist there.

Personal Reflection

Reflecting on this project has opened my eyes to how we, as landscape architects, can bring multifunctional features and programming to other landscape projects. This idea of multifunctionality can be carried past just the golf course and applied across multiple projects. While a golf course becoming multifunctional seems like a one-dimensional idea, the same principles can be applied to parks and urban environments. Along with the multifunctionality scorecard and mapping, the experience can also help with the analysis. While the mapping experience is set up to find the multifunctional aspect of the existing site, it can lead to the discovery of aspects throughout the site that can be beneficial to the larger landscape, ecoregion, and site as a whole. Overall this project has been very beneficial to my overall thinking about the power of creative design thinking and landscape architecture and has helped me understand different ideas that can bring positive aspects to the landscape you are working in.

Appendix

Appendix A

Complete Mapping Experiences from Caspersen, Jensen, and Jensen (2015).

I. Pristine Environment

a. Pristine Forest

- i. Indicator: Old trees > 100 years, natural forest, forest bogs, and ponds
- ii. Absence of: Noise and technical installations (power lines, wind turbines), clearly managed areas
- iii. Visualization on Map
 - 1. Color
 - 2. Marker

b. Pristine coast

- i. Indicator: Pristine Coast without a view of housing and industry
- ii. Absence of: Noise and technical installations (power lines, wind turbines)
- iii. Visualization on Map
 - 1. Color
 - 2. Marker

II. Habitat Experience

a. Forest

- i. Indicator: trees, conifers or deciduous, unmanaged forest floor, scrubs, minimum width twenty-five meters
- ii. Absence of: technical installations (power lines, wind turbines), busy roads
- iii. Visualization on Map
 - 1. Color
 - 2. Marker

b. Park Experience

- i. Indicator: trees, conifers or deciduous, unmanaged forest floor, scrubs, minimum width twenty-five meters
- ii. Absence of: technical installations (power lines, wind turbines), busy roads
- iii. Visualization on Map
 - 1. Color
 - 2. Marker

c. Common/Prairie

- i. Indicator: trees, conifers or deciduous, unmanaged forest floor, scrubs, minimum width twenty-five meters
- ii. Absence of: technical installations (power lines, wind turbines), busy roads
- iii. Visualization on Map
 - 1. Color
 - 2. Marker

d. Meadow

- i. Indicator: trees, conifers or deciduous, unmanaged forest floor, scrubs, minimum width twenty-five meters
- iii. Absence of: Noise and technical installations (power lines, wind turbines), clearly managed areas
- iv. Visualization on Map
 - 1. Color
 - 2. Marker

III. Panoramic Views

- a. Indicator: trees, conifers or deciduous, unmanaged forest floor, scrubs, minimum width twenty-five meters
- b. Absence of technical installations (power lines, wind turbines), busy roads
- c. Visualization on Map
 - i. Color
 - ii. Marker

IV. Biodiversity

- a. Indicator: trees, conifers or deciduous, unmanaged forest floor, scrubs, minimum width twenty-five meters
- b. Absence of: technical installations (power lines, wind turbines), busy roads
- c. Visualization on Map
 - i. Color
 - ii. Marker

V. Landforms

- a. Indicator: topography maps, landforms from photos
- b. Absence of:
- c. Visualization on Map
 - i. Color
 - ii. Marker

VI. Cultural History

- a. Indicator: trees, conifers or deciduous, unmanaged forest floor, scrubs, minimum width twenty-five meters
- b. Absence of: technical installations (power lines, wind turbines), busy roads
- c. Visualization Map
 - i. Color
 - ii. Marker

VII. Activity and Challenge

- a. Indicator: trees, conifers or deciduous, unmanaged forest floor, scrubs, minimum width twenty-five meters
- b. Absence of: technical installations (power lines, wind turbines), busy roads
- c. Visualization on Map
 - i. Color
 - ii. Marker

VIII. Service and Gathering

- a. Indicator: trees, conifers or deciduous, unmanaged forest floor, scrubs, minimum width twenty-five meters
- b. Absence of: technical installations (power lines, wind turbines), busy roads
- c. Visualization on Map
 - i. Color
 - ii. Marker

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