





Braemar Park Master Plan

CityofEdina,MN



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SRF

with

AppliedEcologicalServices

and

Trail Source LLC



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BACKGROUND

INTRODUCTION

MASTER PLAN INITIATIVES

EXISTING PARK CONDITIONS ASSESSMENT

ISSUES AND OPPORTUNITIES

Introduction

In 2016 the City of Edina Parks & Recreation Department explored the opportunity of developing nordic ski trails with machine-made snow and mountain bike trails at Braemar Park. After completing the feasibility study, it was determined a more comprehensive master plan for the entire park should be developed to explore additional opportunities for incorporating new trail, site, and natural resource improvements throughout the park.

Master Plan Initiatives

Outcomes and recommendations of this master planning effort have focused on the following key initiatives to improve recreational amenities, programming, and land use management for the park. These include:



1. *Improving the connectivity of trail systems, access, and wayfinding to park amenities and facilities*
2. *Providing separated use trail systems to accommodate walkers, mountain bikers, and cross country skiers*
3. *Identifying new site improvements and recreational amenities to enhance existing facilities*
4. *Developing recommendations and priorities for improving the quality of natural resources in the park*
5. *Incorporating sustainable site and trail improvements which promote good stewardship of the parks land and water resources*

Existing Conditions Assessment

Braemar Park's approximately 500 acres of park land serves a wide variety of recreational activities, programming, and user groups throughout the year. The park also contains a large and diverse natural resource environment which visitors can explore along existing trail systems located along the east, west, and south perimeter areas of the golf course.

The newly reconstructed golf course is a Certified Audubon Cooperative Sanctuary through its continued commitment to enhance wildlife habitat and protect environmental quality. It preserves and enhances wildlife habitat and maintains a strong water quality and chemical use reduction program. Future park improvements should also be compatible with natural resource management initiatives set forth as part of the golf course renovation.

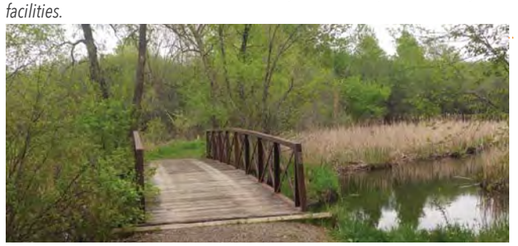
To begin the Master Plan process, an assessment of the park's existing conditions was inventoried. The following images identify issues to be addressed in the park.



Maintain natural resource buffer zones with golf course and residential properties adjacent to park



Maintain buffers and avoid conflicts with adjacent Municipal and County facilities.



Identify east/west trail alignment connection along south edge of park



Improve accessibility and provide better sense of entry to park facilities



Improve park identification and wayfinding signage throughout park property



Enhance appearance and sustainability of surface parking lots through landscape and paving surface improvements



Identify park amenities which can be added to park open space areas to enhance visitor experience.



Improve entry experience and provide accessible walkways to park facilities from adjacent parking



Realign existing trail system to improve accessibility, sustainability, and to accommodate new trail user groups.



Identify new public uses and activities to be accommodated within golf course property



Improve bike and pedestrian trail connections along Hillary Lane and Braemar Boulevard

Issues and Opportunities

As an initial step to evaluating issues and opportunities to be addressed in the park, five focus study areas were identified to be studied which provide different recreational uses, facilities, and programming within the park (Figure 1). The following issues were identified to be addressed based on comment and feedback gathered from park stakeholder groups, City Staff, and community residents.



Figure 1: Issues and Opportunities

ZONE 1

COURTNEY FIELDS1 BASEBALL COMPLEX

- Upgrade Field #1 with new lighting & side line fencing
- Provide expanded grand stand seating on Field #1
- Improve storage facilities in concession/restroom building
- Identify opportunities for adding new park amenities near ballfield area (play area, picnic shelter, patio/ seating area)

BUILDING & PARKING FACILITIES

- Upgrade building entry experience to Braemar Arena
- Identify opportunities for improving landscape/storm water treatment areas for parking lots
- Provide gateway park entry/ wayfinding signage at frontage road intersection

ZONE 2

PUBLIC SAFETY & WORKS FACILITIES

- Maintain adequate buffers with maintenance facilities
- Identify opportunities for expanding trail circulation within natural resource areas
- Develop management recommendations for improving the quality of natural resource areas

ZONE 3

TRAIL SYSTEM

- Create looped perimeter pedestrian trail system around perimeter of golf course
- Identify connections to be made to surrounding trail systems
- Maintain adequate buffers with golf course and adjacent residential properties
- Expand winter recreational use activities for mountain biking, cross country skiing, snow shoeing, sledding, and platform tennis
- Natural resource interpretation
- Identify mountain bike trail development opportunities

ZONE 4

GOLF COURSE

- Identify opportunities for expanding public use of Braemar Club House
- Identify reuse opportunities for remnant golf course land

ZONE 5

BRAEMAR BOULEVARD

- Improve bike, pedestrian circulation, and lighting to create "parkway" feel for roadway
- Provide park entrance and wayfinding signage at entrance and roadway intersections



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MASTER PLAN RECOMMENDATIONS

OVERALL MASTER PLAN
PEDESTRIAN TRAIL SYSTEM
MOUNTAIN BIKE TRAIL SYSTEM
SKI TRAIL SYSTEM

Overall Master Plan



Figure 2: Overall Master Plan

Pedestrian Trail System

With a variety of paved and unpaved trail systems present throughout the park, this master plan proposes to establish a more cohesive and interconnected trail system which visitors can use as a recreational amenity and be more easily connected to other park destinations. The following trail design criteria and implementation initiatives have been identified for creating a new pedestrian trail system in the park:

1. Created a contiguous 3 mile looped pedestrian trail system around perimeter of golf course
2. Maintain a minimum 50' native vegetation buffer between golf course field of play and trail system
3. Strive to maintain an accessible gradient of less than 5% throughout the trail system
4. Install class 2 crushed stone accessible surfacing as part of trail improvements
5. Incorporate a grade separated trail along Braemar Boulevard and Hillary Lane from Gleason Road to the 169 Frontage Road
6. Install crosswalks and stop sign at Valley View Road and Braemar Boulevard to slow traffic
7. Incorporate trail wayfinding signs and map kiosk at trailhead parking lot located adjacent John Harris Drive
8. Minimize shared use trails and crossings between pedestrian and mountain bike user groups
9. Establish a new wetland boardwalk and bridge crossing over Nine Mile Creek on the south end of the park to connect the east and west side trail system
10. Utilize and integrate existing trail alignments where possible to minimize natural resource impacts on natural resources.
11. Create a new high point trail access overlook on the west side of the park.
12. Maintain pedestrian trail spur connections to neighborhoods on the east side of the park and to commercial properties on the south side of the park.

ESTABLISHING A PARKWAY EXPERIENCE ALONG HILLARY LANE AND BRAEMAR BOULEVARD

Hillary Lane and Braemar Boulevard serve as the main roadway corridor connecting all park destinations. Creating a new parkway character for the roadway by narrowing lane widths using curb and gutter, pedestrian scale lighting, and a grade separated trail will all reduce traffic speeds and create a safer pedestrian and bicycle trail environment. Additional study for assessing wetland impacts, storm water treatment and conveyance, and impacts on the adjacent golf course will be needed to determine final feasibility for implementing parkway improvements in the park.



Parkway Trail

Pedestrian Trail Layout Plan

The following types of trail systems are proposed to be implemented in the park to improve pedestrian circulation and access to park facilities.



Soft Surface Trail



Paved Trail



Boardwalk

KEY TO MAP

- Soft Surface Trail (2.4 mi)
- Paved & Parkway Trail (2.1 mi)
- Other trails
- Existing and Proposed On Street Bike Lane
- Wetland
- Forest
- Golf Course
- Entrance & Wayfinding Signage



Mountain Bike Trail System

The planning and development of a single-track mountain bike trail system in the park will focus on having minimal vegetation and grading impacts within the natural resource environment of the park. Mountain bike trail design and implementation guidelines will adhere to the following design criteria:

1. Locate trails a minimum 100' setback from all adjacent private property lines and golf course edges.

2. Follow design specifications outlined in two of the leading trail building guidelines currently utilized in the United States. These include: "IMBA's guidelines to building sweet single track trails." IMBA's book "Managing Mountain Biking" and the Minnesota DNR "Trail Planning, Design, and Development Guidelines."

3. Design trails that will bring the rider back frequently to increase their skill level as well as enjoy outdoor physical activity.

4. Design trails that will accommodate all age and skill levels and encourage utilization by entire families.

5. Utilize safety and sustainability as two of the most important considerations for designing and implementing a mountain bike trail system.

6. During construction, incorporate grade or obstacle features on either side of trail alignment to challenge more advanced riders.

7. A trail feature that would attract an experienced rider might include a "rock garden" on an uphill, a small drop from a wooden feature or a roller that if taken at a higher speed would provide the opportunity to get a small amount of "air" under their tires.

8. Incorporate a more difficult climb or a climb of greater duration for fitness training.

9. Incorporate a slightly wider trail width and clear zone for family riders on straighter alignments to accommodate riders two abreast.

10. Accommodate high school league riders who need an adequate trail length and variety of trail features and terrain to accommodate challenging climbs, technical features, and areas where they can practice passing as well as maneuvering to simulate race courses they will ride during the season.

Mountain Bike Trail Layout Plan

Mountain bike trail systems are proposed to be implemented within both natural resource areas on the east and west sides of the park. A portion of the trail system and boardwalk crossings on the south edge of the park are designated as shared use trails with pedestrians and bikers to avoid wetland impacts and the need for additional creek bridge crossings. Mountain bike trails are also proposed to be used during the winter months by fat tire bikes to encourage more year round use of the park.



Mountain Bike Trails

KEY TO MAP

- Single Track Mountain Bike Trails (5.8mi)
- Other trails
- Existing and Proposed On Street Bike Lane
- Wetland
- Forest
- Golf Course
- Entrance & Wayfinding Signage



Ski Trail System

The newly configured Braemar golf course property offers opportunities for developing an extensive ski trail system when natural snow conditions can provide a solid base for grooming trails. The following design criteria was used for developing an alignment for ski trails on and around the perimeter of the golf course.

- Create one way looped trail systems which lead back to clubhouse warming facility
- Locate and align ski trails around tee boxes and on the edges of fairways to avoid damage to sensitive turf areas
- Groom trails to accommodate both skating and classic skiing techniques on the golf course with some classic only ski trails aligned along pedestrian trails located in natural resource areas
- Align a portion of ski trails on walking trails in wooded areas along perimeter of golf course to provide more trail variety in trail.
- Groom trails 14'-16' wide to accommodate winter walkers along outside edge of trail
- Maintain separated use trails with fat tire winter mountain bike trails
- Final ski trail alignments may need to be modified to respond to final green and fairway layouts to avoid adverse impacts to golf course.

Ski Trail Layout Plan

Ski trail alignments have been primarily designated on the golf course to avoid conflicts with fat tire bike riders and avoid the need for removing trees and vegetation in natural resource areas to accommodate wider trails required for cross country skiing.



Ski Trails

KEY TO MAP

- Skate & Classic Ski Trail (7.1 km)
- Classic Only Cross Country Ski Trail (1.1 km)
- Other trails
- Existing and Proposed On Street Bike Lane
- Wetland
- Forest
- Golf Course
- Entrance & Wayfinding Signage



3

SITE IMPROVEMENTS

BRAEMAR GOLF COURSE SITE IMPROVEMENTS

COURTNEY FIELDS SITE IMPROVEMENTS

BRAEMAR ARENA AND PARKING LOT IMPROVEMENTS

Braemar Golf Course Site Improvements

John Harris Drive functions as the main entrance drive to the golf course, building entries, and parking lot facilities. Separate drive lanes direct visitors to drop off areas in front of the golf academy, clubhouse, and service entry areas. To simplify drive circulation and reduce pedestrian crossing conflicts, a new pull-off drop off area is proposed in front of the golf academy building and a new turn around and plaza entry adjacent to the club house. With some reconfiguration and grading of the adjacent parking area, a new accessible walk system can be established to all building entries. A separated service access drive to the clubhouse is also proposed to avoid pedestrian conflicts and establish a better entry experience to the clubhouse and restaurant.

As a part of providing more recreational amenities at the golf course for the general-public, a new lawn games court area will be installed on the west side of the clubhouse as part of golf course improvements. Master plan recommendations also include adding four pickleball or platform tennis courts on the southeast corner of the parking lot.

To further reinforce implementing more sustainable site improvements in the park, permeable paving parking bays are also proposed to be installed to reduce storm water runoff from the site.

DESIGN RECOMMENDATIONS

- Establish ADA walk access and turnaround area to clubhouse and restaurant
- Add platform tennis and/or pickleball courts
- Add multi use lawn game area near clubhouse
- Add permeable paving in parking bays to infiltrate storm water runoff

KEY DESIGN FEATURES



Pickle ball courts



Multi-use lawn area



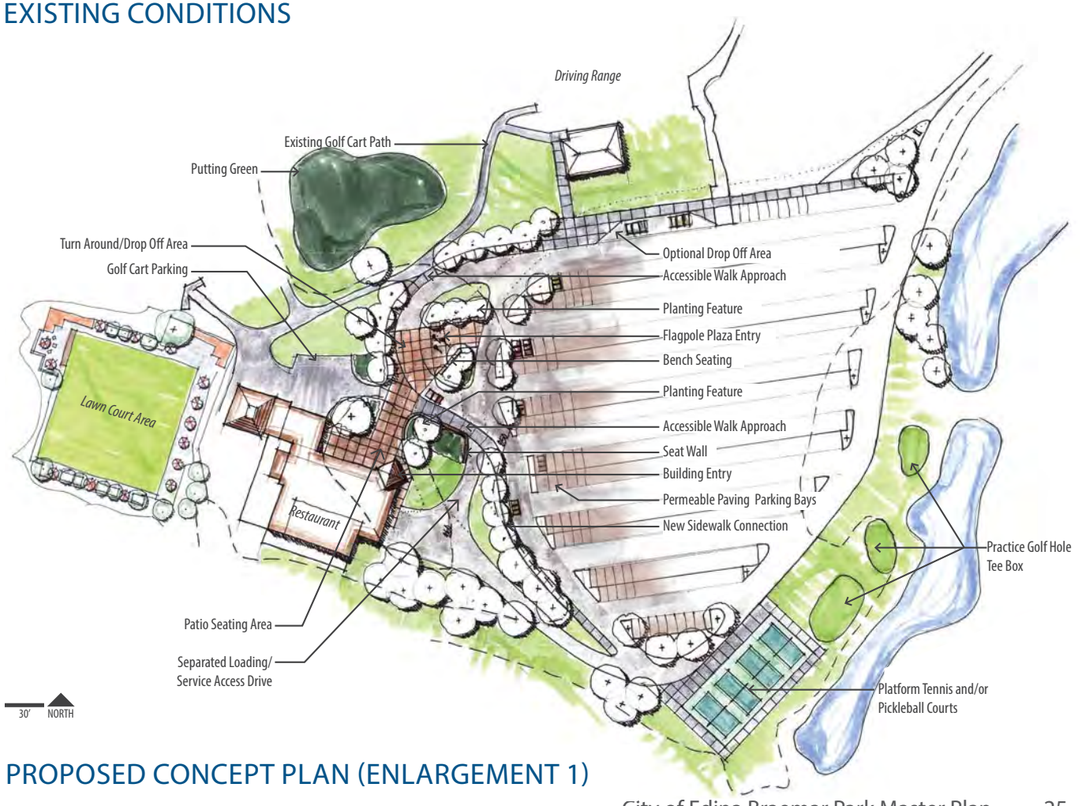
Platform tennis courts



Permeable parking bays



EXISTING CONDITIONS



PROPOSED CONCEPT PLAN (ENLARGEMENT 1)

Courtney Fields Site Improvements

The Courtney Fields ballfield complex is a well-used recreational facility within Braemar Park. To further enhance the quality of the playing experience on the premier field, the addition of grandstand seating, LED field lighting, and sideline netting will all contribute to better meeting the needs of spectators and players. To improve pedestrian circulation around the complex, a new paved trail is proposed around the playing fields and a new accessible path access connecting to the north end parking lot. A new drop off area and sidewalk edge has also been added to create a better sense of entry to the ballfield complex. A new playground facility has also been located adjacent to the existing maintenance facility to better serve the needs of player families with younger children and residents who live north of the park.

DESIGN RECOMMENDATIONS

- Establish ADA access trail route to athletic fields
- Provide a new playground facility for adjacent neighborhood
- Implement a new grandstand seating area and lighting upgrades on premier field #1
- Establish a paved perimeter trail loop around ballfield complex
- Create a better sense of entry to ballfield complex from adjacent parking areas
- Install hillside bench seating



Bleacher shade structure



Playground



Baseball field grandstand



Shade Shelter



EXISTING CONDITIONS



PROPOSED CONCEPT PLAN (ENLARGEMENT 2)

Braemar Arena and Parking Lot Improvements

The Highway 169 Frontage Road serves as the main front door entrance to the park and parking lot facilities for the Braemar Field and Arena facilities. To create a better park entry experience, additional landscape enhancements along the frontage road right-of-way and within parking lots and the addition of new park identification and wayfinding signage will create a better sense of arrival to the park.

Implementing building facade improvements at the Arena entrance to match building materials and signage used at the Braemar Field entry will also help establish a more uniform and updated look for the complex of building facilities at the park.

To implement more sustainable best management practices for treating storm water run-off from parking lots, the addition of permeable paving in parking lot bays will dramatically reduce site run off and reduce the potential for erosion during large storm water events. Considerations for protecting ground water aquifers will require further study to determine the viability of using permeable paving systems in the park.

DESIGN RECOMMENDATIONS

- Add architectural elements to Arena building façade which mimic Braemar Field Building entry.
- Add parking lot island and boulevard landscape treatments
- Add park identification and wayfinding signage
- Add permeable paving in parking bays to infiltrate storm water runoff



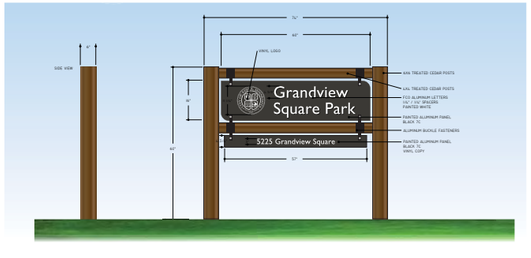
Braemar Field Entry



Braemar Arena facade enhancements



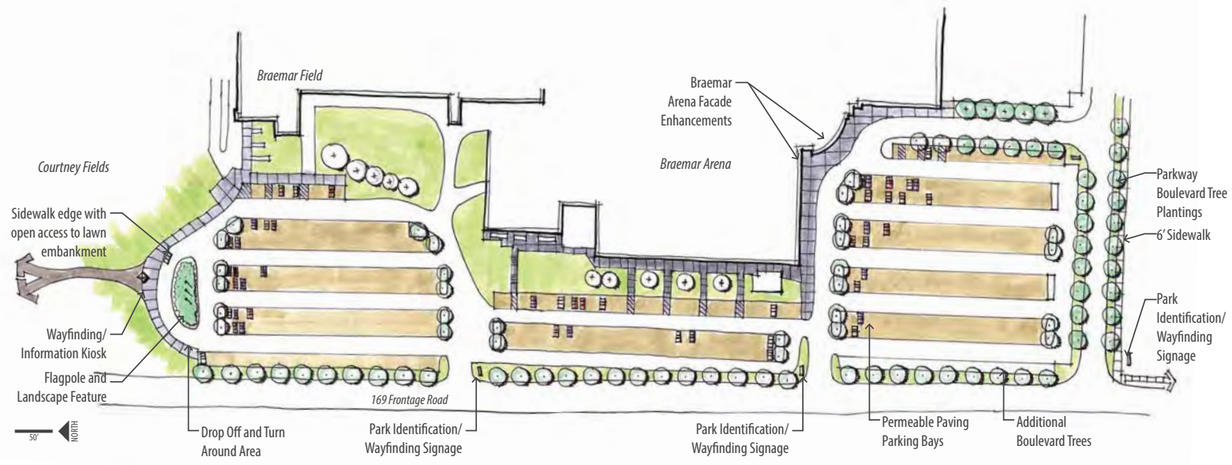
Permeable parking lot bays



Representative City Park Identification and Wayfinding Signage



EXISTING CONDITIONS



PROPOSED CONCEPT PLAN (ENLARGEMENT 3)

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NATURAL RESOURCES

MAJOR PLANT COMMUNITIES

NATURAL RESOURCE ISSUES AND OPPORTUNITIES

NATURAL RESOURCE RESTORATION AND MANAGEMENT ACTIONS

NATURAL RESOURCES

Historic Conditions

The Wisconsin glaciation ended about 10,000 years ago and created the region's major landforms. The glaciers left a rolling and hilly landscape with lakes and wetlands in depressions. Soils formed primarily from sandy and gravelly glacial outwash on level plains and are generally well drained. Other deposits called moraines appear today as mounds of mixed-up rock, gravel, sand and clay—such as those present in the west and southeast portions of the park. Low spots—or "kettles"— are common in the region, and historically occupied the central portion of the park.

According to the Original Vegetation of Minnesota (Marschner 1974), prior to European settlement (circa the mid-1800s), Braemar Park was dominated by wet prairie, with oak savanna and "big woods" forest occupying the park's upland ridges and hills. According to a custom soil survey report (USDA/NRCS 2017), the park's soils are dominated by fill placed in wetlands; this constitutes the majority of the golf course. The park's higher ground (including current oak woodland and savanna areas) consists of a mixture of soils dominated by sandy loam. The large, open-grown bur oaks on the park's ridges and hills support that Braemar Park's uplands were once dominated by fire-maintained woodlands and savannas. Review of historical aerial photographs (the oldest from 1947) shows the majority of the park under agricultural production (e.g., row crops and hayfields), and the park's higher areas were characterized by savanna and woodlands with a more open canopy than today.

Existing Conditions

Today, the majority of the park is golf course, including maintained turf, rough areas, rows and patches of trees, and scattered wetlands and drainageways. The perimeter of the park is dominated by wooded areas, including oak woodland and savanna, as well as lowland forest and swamp. Two Minnesota Department of Natural Resources (MnDNR) Public Waters exist on the park: the South Fork of Nine Mile Creek (which flows through the southern portion of the park) and a public water basin (in the south-central portion of the park). Additional wetlands exist throughout the park, with the largest along the forested northern edge (north of Braemar Blvd/Hilary Ln) and along the southern edge of the park (including the South Fork of Nine Mile Creek). Federal Emergency Management Agency (FEMA) mapping identifies significant portions of the park within the 100-yr and/or 500-yr floodplain.

MnDNR data did not identify any rare natural features, Sites of Biological Significance, or higher quality native plant communities on the park; however, Hennepin County identifies the park within a regional open space corridor. Large stands of oak woodland and savanna (such as those found in the west and southeast portions of the park) are regionally uncommon; based on Minnesota Land Cover Classification System mapping (MLCCS 2004), Braemar Park contains the largest blocks of oak forest/woodland in the City. Larger habitats often provide more valuable habitat (or greater potential), so there are likely plant species and wildlife species (including uncommon or declining species) that use the park's woodlands and savannas that are less likely to use smaller ones. Of note, the park's oak savannas represent an opportunity to restore a particularly rare habitat in the region.

The ecological assessment for this master plan focused on the site's major natural areas, presented in Figure 3. All of these natural areas are generally in poor condition due to significant invasion by invasive vegetation and other historical and ongoing disturbances.



Major Plant Communities

Oak woodland



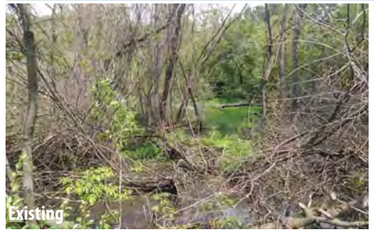


Oak Savanna



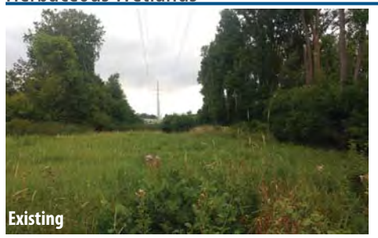


Wooded Wetlands





Herbaceous Wetlands





Herbaceous Upland





Figure 3: Major Plant Communities



Natural Resource Issues and Opportunities

NATURAL RESOURCE ISSUES

Natural resource management is a key component to the Braemar Master Plan. The management approach to amend the natural resource issues described in the following pages will occur as an integral part of site and trail improvements proposed to be implemented in the park.

Invasive plants present the greatest threat to maintaining healthy natural areas at Braemar Park. The park is dramatically and negatively affected by several invasive plant species, which often establish and thrive in disturbed habitats, usually crowding out native plants and animals. Invasive plant species typically have the following characteristics:

- Tolerant of a variety of habitat/environmental conditions
- Grow and reproduce rapidly, with good seed dispersion
- Compete aggressively for resources, such as nutrients, water, and sunlight
- Lack natural enemies or effective competitors

Invasive plants can lead to low plant diversity, poor wildlife habitat and lessened resilience in the face of disturbances and environmental change. Controlling invasive plants is often the foundation of most ecological restoration and management efforts. Figure 4 lists the invasive plants that pose the greatest threat to Braemar Park.

COMMON NAME	SCIENTIFIC NAME	GENERAL ABUNDANCE IN PARK AND CONTROL STRATEGY
UPLANDS		
Common & glossy buckthorn	*Rhamnus cathartica & Frangula alnus*	Very common shrub (also in lowlands). Remove all.
Non-native honeysuckles	*Lonicera tatarica, L. morrowii & L. x bella*	Common shrub. Remove all.
Garlic mustard	*Alliaria petiolata*	Common herb (also in lowland forests). Remove all.
Spotted knapweed	*Centaurea stoebe subsp. micranthos*	Common herb (in areas). Remove all.
Canada thistle	*Cirsium arvense*	Uncommon herb (also in lowlands). Remove all.
Siberian elm	*Ulmus pumila*	Uncommon tree. Selective removal where it can spread easily.
Black locust	*Robinia pseudoacacia*	Uncommon tree. Selective removal where it can spread easily.
Smooth brome	*Bromus inermis*	Uncommon grass. Remove where it threatens active restoration/ management areas.
LOWLANDS/WETLANDS		
Reed canary grass	*Phalaris arundinacea*	Common grass. Remove where it threatens active restoration/ management areas.
Invasive cattails	*Typha angustifolia and T. x glauca*	Common herb. Remove where it threatens active restoration/ management areas.
Purple loosestrife	*Lythrum salicaria*	Uncommon herb. Remove where it threatens active restoration/ management areas (biological control options).

Figure 4: Invasive Plants that Pose Greatest Threat to Braemar Park

Non-native earthworms, common buckthorn, and non-native honeysuckles invade natural areas, initiating a cascade of negative effects. Oak regeneration is suppressed, native shrubs decline, ground vegetation is shaded which leads to the loss of soil-anchoring plants and increasing erosion, and flower resources for pollinators are eliminated, reducing the amount and variety of food for other wildlife and depressing wildlife populations. Non-native and hybrid cattails and Eurasian reed canarygrass are dense in some of the park's wetlands. These invasive plants often suppress native wetland vegetation, reducing biodiversity and the resiliency of natural areas. However, with ecological management, the situation can be stabilized and even improved. Improving the variety of and vegetation cover by native plants is a good strategy to resist the spread of invasive plants, because native plants have the ability to compete with invasive plants if environmental conditions are favorable.

Invasive animals also have adverse effects on ecosystems. For example, non-native earthworms are likely present in the park's oak woodlands. These (and many other) invasive animal species cannot be cost-effectively removed or controlled. In these cases, it is advisable to manage the effects of an invasive species, rather than try to eradicate it.

During park management activities, including ecological restoration and management, invasive species may accidentally be introduced or spread across a site. Guidelines have been developed by the MnDNR to avoid introducing or spreading invasive species.

NATURAL RESOURCE OPPORTUNITIES

Braemar Park contains some of the City's largest oak woodlands/forests, and as part of a mosaic with other natural areas, the park represents an important natural area complex in Edina. Throughout the Braemar Park master plan project, natural resources have been considered. While multiple demands are placed on urban parks such as Braemar, there is a firm commitment by the City to improve the park's natural areas through investment in ecological restoration and management. Years ago, the City took steps to protect Braemar Park's environment by becoming a Certified Audubon Cooperative Sanctuary. Recent work in the Academy 9 portion of the golf course included ecological restoration and native plantings, and this work will continue to expand throughout the remainder of the park's natural areas in years to come. These efforts will further improve the park's native vegetation and habitat for a wide variety of wildlife species and will enhance human enjoyment of this important City park.

Restoration Potential

Given the site's natural and cultural history, and recent field observations of remnant native plants, it appears that the restoration potential of the site's upland natural areas is quite good. While often requiring a substantial initial investment (followed by dedicated management and perpetual stewardship), removal of invasive vegetation alone can greatly improve the health of natural areas. For instance, removal of buckthorn (which at Braemar Park will require a substantial initial commitment over several years), will greatly reduce shading of the ground layer, which can "release" dormant native seeds and plants that have been shade-suppressed for years. Continued management and remedial overseeding (where necessary) will result in much improved woodlands and savannas.

While ecological restoration will also benefit the park's lowlands and wetlands, these areas pose a greater challenge. The primary invasive species in the park's wetlands (cattails and reed canary grass) spread aggressively. Since many of these invasive plant populations are located along the South Fork of Nine Mile Creek and adjacent to off-site wetlands,

there will be ongoing invasion pressure, making control more challenging. For this reason, strategic wetland areas may be selected for restoration, while others are not actively managed.

Community Engagement, Education and Volunteers

Many benefits can be gained from engaging "citizen scientists", schools, and other volunteers to assist with observations, data collection, analysis, and ecological management. Benefits of engaging the public and partners are:

- The public learns about natural resources, increasing awareness and appreciation of natural areas and the natural world;
- Valuable data can be collected for baseline and trend monitoring;
- Cost-savings to the City through volunteer labor and in-kind match for grants; and
- People will form friendships and form networks to advance the pursuit of natural resource protection, restoration, and management.

Volunteer efforts may involve physical labor (e.g., planting trees, removing invasive species) or monitoring/research (e.g., field observations, data collection, and data analysis). Many volunteer activities require oversight by trained volunteers, City staff, or outside experts. Volunteer monitoring or research advances knowledge and builds public support for natural resource programs. One form of citizen engagement that has benefited many communities is organizing and conducting a "bioblitz." A bioblitz is a 24-hour period when volunteers, supported by experts, document all living species in a given area (e.g., within Braemar Park). Bioblitzes help gather baseline data on plants and animals, while letting people discover the natural world around them. It also gives participants an opportunity to participate in scientific research.

MANAGEMENT TASK	VOLUNTEER ROLE		
	GENERALLY APPROPRIATE	APPROPRIATE WITH TRAINING & OVERSIGHT	GENERALLY NOT APPROPRIATE
Native seed collection & sowing	*X*		
Installation of live trees, shrubs, herbaceous plugs	*X*		
Hand-pulling invasive plants	*X*		
Dragging buckthorn/brush	*X*		
Cutting buckthorn/brush		X	
Simple ecological monitoring		X	
Management mowing		X	
Herbicide application			X
Prescribed burning			X
Slope stabilization			X
Construction of water projects and best practices			X
Technical ecological monitoring			X

Figure 5: Use of Volunteers for Different Management Tasks.

Bioblitzes also bolster more systematic monitoring of vegetation, water and wildlife resources.

Volunteers can assist in a variety of tasks, and with additional training and oversight they can accomplish even more. Some volunteer tasks may be one-time events, and other tasks may be repeated over time by dedicated volunteer stewards. Figure 5 summarizes natural resource management tasks for which volunteers can provide assistance.

Although assistance by volunteers has no direct cost, the staff time for organizing, training, equipping, and supervising volunteer events is a cost, as are materials (e.g., tools, safety equipment, food and beverage). Thoughtfully planned and executed volunteer programs will help reach the desired audience of potential volunteers, engage them in safe and productive work, and have them return to volunteer with the City again.

Regarding implementation of field restoration and management activities, specialized training, oversight, and guidance often involves licensing or certification where required by local, state, or federal law. Personnel involved in ecological restoration and management, especially prescribed burning, herbicide application, brush control, erosion control, and ecological monitoring should receive training commensurate with the activity in which they would be involved. Training is especially important for those activities that may have risk and safety implications to people, property, and sensitive resources.

While useful data can be collected by amateurs, ecological monitoring protocols often require a moderate level of expertise to implement accurately and consistently. Implementing monitoring programs may require expertise in plant and wildlife identification, as well as a working understanding of erosion processes and potential solutions. The City may wish to partner with Hennepin County, schools, conservation non-profits, and others to assist with monitoring and reporting. Private consulting ecologists can also be used to provide these services.

Pilot Projects

Pilot or demonstration projects can be an effective way to advance natural resources restoration and management programs. Pilot projects can be a learning opportunity for City staff and citizens, and improve methods for use in future projects (i.e., adaptive management). Pilot projects should be sited where the community will be able to observe the restoration process and the response of plant communities over time. Temporary or permanent interpretive signage (discussed further below) can make a pilot project more educational for the public.

Interpretation

Interpretation can take a variety of forms: signs, self-guiding booklets, mobile applications, and expert-led presentations and tours. While some interpretive signage already exist at Braemar, this could be expanded to further address the park's natural and cultural history, important natural resources, invasive species and other threats to natural areas, stormwater runoff issues and best management practices, and of course ecological restoration and management methods and expected results.

Monitoring and Adaptive Management

The most successful restoration programs use regular monitoring and reporting as feedback on the program's effectiveness. Adaptive management (a cycle of implementation, monitoring, evaluation, adjustment, and implementation) is central to the best restoration programs and should begin with the restoration work and continue indefinitely as part of the stewardship of the project area.

Monitoring provides an objective measurement of project-specific criteria. Ecological criteria should be measured repeatedly in the field over time and compared with baseline data; this allows tracking of progress and helps direct management to most cost-effectively achieve City goals.

A variety of criteria can be monitored to assess restoration and management success. Ecological

monitoring criteria typically include attributes of the site's vegetation, but criteria can also address wildlife at the site, condition of erosion features, water quality, and other characteristics. Ecological monitoring should be simple and relatively easy to implement, although plant or animal identification skills are usually required. Criteria should be selected in direct response to City goals and restoration and management practices. Monitoring and reporting should be done more frequently at the onset of project implementation, after which frequency can be reduced over time to an intermittent level.

NATURAL RESOURCE ISSUES AND OPPORTUNITIES SUMMARY

In summary, issues and opportunities associated with each major plant community are presented in the following table.

PLANT COMMUNITY	ISSUES	OPPORTUNITIES
Oak Woodland	*Moderate to very dense invasion by common buckthorn; some invasive non-native honeysuckle*	Good restoration potential, based on remnant native species observed; good access for people; relatively large size of southeast woodland could support regionally uncommon forest wildlife
Oak Savanna	*Light to moderate invasion by common buckthorn; some invasive non-native honeysuckle*	Very good restoration potential, based on remnant native species observed; good access and views for people; oak savannas are one of the most imperiled native plant communities in MN and very rare in the metro area
Wooded Wetlands	*Light to moderate invasion by common buckthorn; some glossy buckthorn; history of altered hydrology*	Moderate restoration potential; poor access for people
Herbaceous Wetlands	*Dense invasion by invasive reed canary grass and cattails; history of altered hydrology*	Moderate restoration potential; poor access for people
Herbaceous Uplands	*Generally weedy*	Good restoration potential; good access for people

Figure 6: Braemar Park Major Plant Communities – Issues and Opportunities

Natural Resource Restoration and Management Actions

Given the City's goals and the park's current conditions, it is important to proceed strategically in order to maximize success and control costs. Therefore, natural resource restoration and management at Braemar Park should:

- Focus on removal of invasive plant species and promotion of diverse, native species
- Prioritize efforts in higher quality natural areas
- Integrate and phase in restoration efforts with trail improvements
- Establish native vegetation buffer screening with golf course and adjacent residential properties
- Focus on areas where invasive plants can be controlled
- Be guided by regular monitoring of site conditions
- Provide opportunities for natural resource interpretation

Based on the principles and guidelines above, the following ecological restoration and management priorities have been established for Braemar Park. Figure 8 shows where each priority area is located in the park.

Priority #1 – Restore Large Oak Woodlands and Savannas

Being the park's largest natural areas with the highest restoration potential, these areas (i.e., west woodlands and savannas and southeast woodland) should be restored first. This should entail the following tasks:

a) Remove invasive woody vegetation

b) Remove invasive herbaceous vegetation

c) Install native buffer screening

d) Install diverse, native species

e) Conduct perpetual monitoring and adaptive management

a) Remove invasive woody vegetation. The primary invasive woody species designated for removal are provided in Figure 4 above; however, additional invasive species exist on the site and should be controlled as well. If feasible, invasive woody species (primarily buckthorn) should be removed before or simultaneous with any nearby trail construction; this will facilitate field adjustment of trail alignments and make construction easier. If a phased approach is required (e.g., due to funding limitations), removal should first be conducted along the proposed pedestrian trail, extending to the golf course edge as well as 25 feet toward the center of the woodland.

If native shrubs are absent or clearly marked and protected in a given area, it may be appropriate to use vehicle-mounted brush cutting equipment in portions of the site. However, at all times care must be taken to protect desirable native vegetation (woody and herbaceous) and minimize soil disturbance and erosion. Removal should preferentially be done during the winter when soils are frozen and native vegetation dormant. Follow-up treatment will be required for at least 3 to 5 years to address woody invasive resprouts and seedlings.

b) Remove invasive herbaceous vegetation. While much less significant in the park's woodlands and savannas, invasive herbaceous vegetation should also be controlled. The primary invasive herbaceous species designated for removal are provided in Figure 4 above; however, it is possible that other problematic species exist on the site, and they should be controlled as well. Removal of woody invasive vegetation may result in a flush of new ground layer vegetation, including invasive herbaceous plants. As with removal of invasive woody vegetation, care must be taken to protect desirable native vegetation and minimize soil disturbance and erosion.

c) Install native buffer screening. Buffer screening should use native species selected for the particular planting location and screening goals. Wild genetic stock from within a 200-mile radius of the park is

preferred over cultivars and more distant genetic strains. Some research suggests that wild strains benefit wildlife to a greater extent than cultivated strains of the same species. Some research also suggests that local genetic strains of certain species are better able to survive local soil, climate, disease and competitive conditions than more distant genetic strains. Woody plantings can be installed as ball & burlap, container, or bare root stock. Direct seeding can be used as well, such as planting of acorns. Protection from rodent and deer browsing may be warranted. Woody species, stock availability, season of planting, browsing pressure, and installation and maintenance budget will influence the best stock and planting techniques to use.

COMMON NAME	SCIENTIFIC NAME
Subcanopy Trees and Shrubs	
Low Serviceberry	*Amelanchier humilis*
Smooth Serviceberry	*Amelanchier laevis*
Black Chokeberry	*Aronia melanocarpa*
Pagoda Dogwood*	*Cornus alternifolia*
Gray Dogwood*	*Cornus racemosa*
Red-twig Dogwood	*Cornus sericea*
American Hazelnut*	*Corylus americana*
Fireberry Hawthorn	*Crataegus chrysocarpa*
Fleshy Hawthorn	*Crataegus succulenta*
Bush Honeysuckle	*Diervilla lonicera*
Witch Hazel	*Hamamelis virginiana*
Winterberry	*Ilex verticillata*
Ironwood*	*Ostrya virginiana*
Ninebark	*Physocarpus opulifolius*
Wild Plum	*Prunus americana*
Chokecherry*	*Prunus virginiana*
Smooth Sumac	*Rhus glabra*
Smooth Rose	*Rosa blanda*
Prairie Willow	*Salix humilis*
Red-berried Elder*	*Sambucus racemosa (pubens)*
American Mountain Ash	*Sorbus americana*
Southern Arrowroot	*Viburnum dentatum*
Nannyberry	*Viburnum lentago*
Highbush Cranberry	*Viburnum opulus var. americanum (trilobum)*

COMMON NAME	SCIENTIFIC NAME
Canopy Trees	
Black Maple*	*Acer nigrum*
Red Maple	*Acer rubrum*
Sugar Maple*	*Acer saccharum*
River Birch	*Betula nigra*
Hackberry*	*Celtis occidentalis*
Eastern Red Cedar*	*Juniperus virginiana*
White Spruce	*Picea glauca*
Eastern White Pine	*Pinus strobus*
Big-toothed Aspen	*Populus grandidentata*
Quaking Aspen	*Populus tremuloides*
Black Cherry*	*Prunus serotina*
Swamp White Oak	*Quercus bicolor*
Northern Pin Oak	*Quercus ellipsoidalis*
Bur Oak	*Quercus macrocarpa*
Red Oak	*Quercus rubra*
Eastern White Cedar	*Thuja occidentalis*
Basswood	*Tilia americana*

** Most appropriate for buffer screening within woodlands.*

Figure 7: Native Trees and Shrubs for Woodland Buffer Screening(*) and Native Landscaping.

Native trees and shrubs appropriate for buffer screening and native landscaping at Braemar Park are provided in Figure 7. Asterisks denote species most appropriate for buffer screening within the woodlands along the edge of the golf course and on the southeast edge of the park. Figure 8 depicts where native buffers will be used.

d) Install diverse, native species. Once invasive woody brush is under control, installation of diverse, native species will help prevent re-invasion, stabilize soils, provide attractive blooms and berries, and provide improved habitat for more native species. In addition to buffer screening plantings discussed above, additional live woody and herbaceous plantings and seeding can be used to increase native cover and diversity. Plantings should be designed to achieve the desired native plant community, including appropriate dominant species in each stratum (i.e., canopy, subcanopy, shrub/sapling, and ground layer species) as well as other species appropriate for the plant community. The MnDNR's Field Guide to the Native Plant Communities of Minnesota: The Eastern Broadleaf Forest Province (MnDNR 2005) is useful for selecting species appropriate for particular native plant communities. For Braemar Park's woodlands, see the description and species list for FDs37 Southern Dry-Mesic Oak (Maple) Woodland (see Appendix B).

e) Conduct perpetual monitoring and adaptive management. As with all natural areas, perpetual monitoring and management will be required to address ongoing pressure by invasive species and other issues that warrant intervention (e.g., dumping, erosion). Ecological monitoring should be conducted annually (more frequently immediately following restoration and management actions), and management should be conducted as needed. It is estimated that annual natural resource management will cost $200-$400 per acre per year for a three year time period after initial restorations. More detailed/quantitative monitoring is beneficial for more accurate tracking of trends and to better guide adaptive management; such monitoring should be conducted every three to five years.

Priority #2a – Establish Prairie Beds

Because they will have high visibility and have high restoration potential, these areas (i.e., upland herbaceous areas on east-central and southeast edges of the golf course) should be restored. This should entail the following tasks:

a) Remove invasive herbaceous vegetation

b) Install diverse, native species

c) Conduct perpetual monitoring and adaptive management (see Priority #1 above)

a) Remove invasive herbaceous vegetation. Initial preparation of the planting bed will likely warrant multiple treatments with broadcast herbicide to remove invasive species and other weeds. It is critical to establish good weed control prior to installing native seed, or it is likely the resulting prairie will be of poor quality and/or a management burden.

b) Install diverse, native species. Following appropriate weed removal and soil preparation, install one or a combination of the following State of Minnesota Seed Mixes (see Appendix C):

- 35-541 Mesic Prairie Southwest
- 36-211 Woodland Edge South & West Mix (when near woodland edge)
- Beneficial Insects South West (pilot seed mix)
- Little Bluestem Urban Prairie (pilot seed mix)
- Mesic Short Urban Buffer South West (pilot seed mix)
- Pollinator Plot Urban Southeast (pilot seed mix)

Priority #2b – Restore Small Oak Woodlands

Similar to Priority #1, these smaller areas of oak woodland should be restored. This should entail the following tasks:

a) Remove invasive woody vegetation (see Priority #1 above)

b) Remove invasive herbaceous vegetation (see Priority #1 above)

c) Install diverse, native species (see Priority #1 above)

d) Conduct perpetual monitoring and adaptive management (see Priority #1 above)

Priority #3a – Restore South Wetland Complex

Because the proposed pedestrian trail will pass through it, the southern wetland complex (at least sections near the trail) should be restored. This should entail the following tasks:

a) Remove invasive woody vegetation (see Priority #1 above, but only aquatic-approved herbicides should be used in wetlands or near open water)

b) Remove invasive herbaceous vegetation (see Priorities #1 and #2 above, but only aquatic-approved herbicides should be used in wetlands or near open water)

c) Install diverse, native species

d) Conduct perpetual monitoring and adaptive management (see Priority #1 above, but only aquatic-approved herbicides should be used in wetlands or near open water)

c) Install diverse, native species. Due to the variability of this wetland complex (shade, soil type, moisture regimes, etc.), appropriate species and type of propagule (e.g., seed, live planting) will need to be selected on an area-specific basis. The MnDNR's Field Guide to the Native Plant Communities of Minnesota: The Eastern Broadleaf Forest Province (MnDNR 2005) is useful for selecting species appropriate for particular native plant communities, and State of Minnesota Seed Mixes can be used as well.

Priority #3b – Restore North Wetland Complex

Because Braemar Blvd passes through it, the northern wetland complex (at least sections near the road) should be restored. This should entail the following tasks:

a) Remove invasive woody vegetation (see Priority #1 above, but only aquatic-approved herbicides should be used in wetlands or near open water)

b) Remove invasive herbaceous vegetation (see Priorities #1 and #2 above, but only aquatic-approved herbicides should be used in wetlands or near open water)

c) Install diverse, native species (see Priority #3a above)

d) Conduct perpetual monitoring and adaptive management (see Priority #1 above, but only aquatic-approved herbicides should be used in wetlands or near open water)

Figure 8: Natural Resource Restoration Priorities



5

IMPLEMENTATION

PRELIMINARY COST ESTIMATE

Preliminary Cost Estimate

The following preliminary cost estimates has been prepared identifying proposed trail and site improvements to be implemented in the park. Additional design and survey investigation will be required to determine more accurate cost estimates and funding needs for construction. Additional stakeholder partners may also need to be identified to assist with funding identified improvements.

Braemar Park Master Plan Preliminary Cost Estimate 11/30/2017 City of Edina					
Braemar Boulevard/Hillary Lane Parkway Conversion					**$3,161,500**
Removals	6,550	LF	$15	$98,250	
Bituminous paving, storm sewer, curb and gutter	6,550	LF	$225	$1,473,750	
10' wide bituminous parkway trail	6,550	LF	$140	$917,000	
Stormwater treatment and conveyance	1	LS	$100,000	$100,000	
Pedestrian scale lighting	65	EA	$7,500	$487,500	
Wayfinding and roadway signage	1	LS	$10,000	$10,000	
Site restoration and landscape improvements	1	LS	$75,000	$75,000	
Courtney Fields Site and Parking Lot Improvements					**$1,925,070**
New LED lighting and electrical - (Premier field #1 only)	1	LS	$300,000	$300,000	
Premier field grandstand	1	LS	$665,000	$665,000	
Premier field sideline netting	1	LS	$50,000	$50,000	
Premier right outfield spectator bench seating	1	LS	$10,000	$10,000	
Play area and picnic shelter	1	LS	$250,000	$250,000	
Turn around drop off area and wayfinding kiosk	1	LS	$30,000	$30,000	
Permeable paving parking lot bays	38,400	SF	$10	$384,000	
Saw cut bituminous pavement	2,130	LF	$2	$4,260	
Remove bituminous pavement	1,422	SY	$5	$7,110	
Shade trees/landscape improvements	25	LS	700	$17,500	
Bitumninous loop trail	1,480	LF	$140	$207,200	
Pedestrian Hiking Trail Improvements					**$604,250**
Class 2 gravel hiking trail	8,975	LF	$20	$179,500	
Relocate and reinstall existing pedestrian bridge and footings	1	LS	$20,000	$20,000	
Remove existing plastic boardwalk	700	LF	$5	$3,500	
New 12' wide boardwalk	475	LF	$750	$356,250	
Picnic shelter and seating overlook	1	LS	$15,000	$15,000	
Wayfinding signage	1	LS	$10,000	$10,000	
Site restoration	1	LS	$20,000	$20,000	
Mountain Bike Trail Improvements					**$229,584**
Mountain bike trail system	28,512	LF	$7	$199,584	
Golf course trailhead improvements (kiosk, bike racks, and drinking water)	1	LS	$20,000	$20,000	
Wayfinding signage	1	LS	$10,000	$10,000	
Site restoration	1	LS	$20,000	$20,000	
Braemar Golf Course Parking Lot and Site Improvements					**$1,267,102**
Site removals	1	LS	$25,000	$25,000	
Parking lot reconfiguration and grading	1	LS	$250,000	$250,000	
Turn around, drop-off, and entry plaza	1	LS	$60,000	$60,000	
Permeable paving parking bays	66,315	SF	$10	$663,150	
Saw cut bituminous pavement	3,836	LF	$2	$7,672	
Remove bituminous pavement	2,456	SY	$5	$12,280	
Pickleball courts	2	EA	$12,000	$24,000	
Platform tennis courts with lighting	2	EA	$75,000	$150,000	
Site restoration and landscape improvements	1	LS	$75,000	$75,000	
Braemar Arena Site, Parking, and Building Improvements					**$929,695**
Permeable paving parking bays	70,875	SF	$10	$708,750	
Saw cut bituminous pavement	3,910	LF	$2	$7,820	
Remove bituminous pavement	2,625	SY	$5	$13,125	
Tree and landscape improvements	1	LS	$50,000	$50,000	
Arena building facade and signage improvements	1	LS	$150,000	$150,000	
Natural Resource Improvements					**$547,000**
*Oak woodland restoration	65	AC	$4,000	$260,000	
*Oak savanna restoration	8	AC	$3,000	$24,000	
*Wooded wetland restoration	48	AC	$2,500	$120,000	
*Herbaceous wetland restoration	28	AC	$2,500	$70,000	
*Prairie restoration	9	AC	$2,000	$18,000	
*Native vegetation buffering	15	AC	$3,000	$45,000	
Natural resource interpretative signage	1	LS	$10,000	$10,000	
Estimated Subtotal					**$6,491,404**
25% Contingency, Design, and Administration					**$1,622,851**
****Total Estimated Construction Costs**					**$8,114,255**
***Natural resource improvements will also require 3 years of follow up maintenance of $200-$400 per acre per year.**					
****Add 5% inflation cost for construction every year beyond 2017.**					



SRF