

CAR PARK FEASIBILITY:

CRESCENT DRIVE PARK / CRESCENT DRIVE GOLF COURSE / THERMEA

by:

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A Practicum submitted to the Faculty of Graduate and Postdoctoral Studies of

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The University of Manitoba

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THANK YOU TO
EVERYONE, I AM
PROUD TO SAY

CHAPTER CLOSED

ON TO THE NEXT.....

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ABSTRACT

The practicum is a car park feasibility study of Crescent Drive Park/ Thermea/ Crescent Drive golf course in Winnipeg, Manitoba. The intention is to thoroughly investigate and propose solutions to the neighborhood's multi-layered concerns. These include providing designs for convenient parking for Thermea, reducing safety concerns in the neighborhood, controlling street parking, enhancing the entrance of the park, the golf course, and Thermea, retaining the mature and healthy tree canopies, and reducing car traffic in the neighborhood.



CHAPTER 1:

INTRODUCTION

From a landscape architecture perspective, parking lots are often regarded as underutilized spaces that offer limited ecological value while contributing to the urban heat island effect. Yet, as cities continue to expand, parking lots remain an essential component of urban infrastructure. The challenge, therefore, lies not in eliminating them, but in reimagining how these spaces can be designed to support sustainability, enhance community well-being, and contribute positively to the urban landscape.

This practicum undertakes a feasibility study of the shared parking lot serving Thermea and the Crescent Drive Golf Course, located in the Crescent Drive neighborhood of Winnipeg, Manitoba. The study aims to explore design strategies that improve site functionality, optimize traffic flow, and address existing safety and accessibility issues.

The selected site presents an opportunity to enhance vehicle circulation and pedestrian connectivity through thoughtful design interventions, such as potential lot expansion or the redirection of nearby transit routes. Thermea is a destination spa offering a range of relaxation experiences.

It is located adjacent to Crescent Drive Park, a well-used recreational area that attracts both local residents and visitors throughout the year. This close proximity enhances the appeal of both destinations but also places pressure on shared infrastructure. Currently, Thermea and the golf course share a single parking lot, which often reaches capacity. When this occurs, visitors resort to on-street parking along Crescent Drive, creating congestion and safety challenges for pedestrians, cyclists, and drivers alike.

The growing popularity of Thermea, combined with limited on-site parking capacity, has amplified issues related to traffic flow, pedestrian safety, and overall neighborhood accessibility. These conditions highlight the need for a coordinated approach to parking and site design that will:

- Improve circulation for vehicles accessing Thermea, the golf course, and Crescent Drive Park.
- Reduce safety risks associated with pedestrians walking along streets without sidewalks.
- Minimize parking overflow and congestion on neighborhood streets.
- Enhance the overall safety, accessibility, and visual character of the area.

In 2016, the late Ron Mazur, a respected community leader and head of the volunteer organization Crescent Park Rescue (CPR), submitted a petition advocating for restrictions on on-street parking along Crescent Drive. The petition raised several neighborhood concerns, particularly regarding the safety of pedestrians and cyclists accessing the south side of Crescent Drive Park.

The absence of sidewalks along Crescent Drive and at the South Drive entrance continues to pose safety risks, especially when parked vehicles narrow the roadway while traffic flows in both directions. To mitigate these hazards, Crescent Park Rescue proposed implementing a two-hour parking limit, enforceable 24 hours a day, seven days a week. Although temporary signage was installed, the restrictions were later removed, and enforcement was discontinued.

Traditional parking lot design often prioritizes maximizing vehicle capacity over ecological and social value. As a result, designated green areas are typically minimal and insufficient to sustain healthy vegetation, while pedestrian safety and comfort are frequently overlooked. These design shortcomings contribute to uncoordinated streetscapes and environments that lack visual appeal and ecological function.

Landscape architecture offers an opportunity to rethink the role of parking lots. By integrating green infrastructure, prioritizing pedestrian circulation, and designing spaces that are both functional and aesthetically cohesive, parking lots can evolve from purely utilitarian facilities into multifunctional landscapes that balance environmental performance, user safety, and community identity.



Fig. 1 Parking Lot of Crescent Drive Park.

CHAPTER 2:

STUDY AREA

CRESCENT PARK NEIGHBOURHOOD



Fig. 2 Aerial view of
Crescent Park Neighborhood.

GREEN SPACES



Fig. 3 Green spaces mapping of Crescent Park.

SURFACE PARKING OFF-STREET

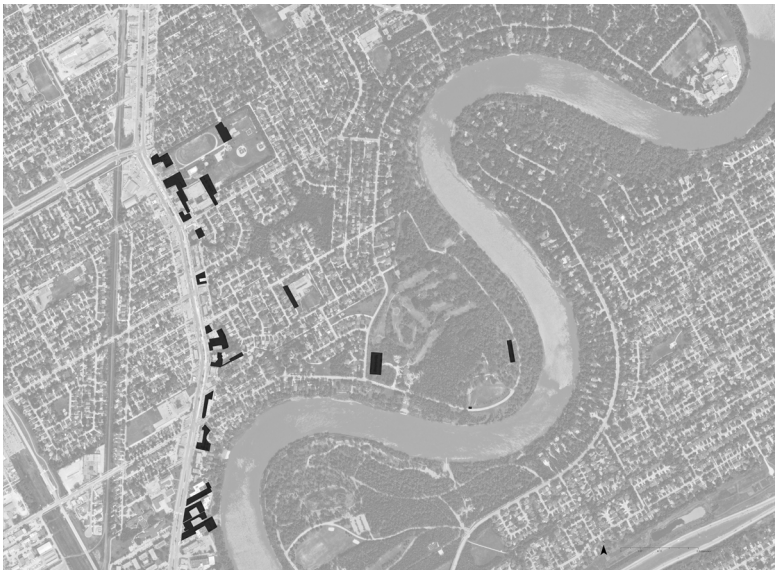


Fig. 4 Surface parking off- street mapping of Crescent Park.

The study area is located in the Fort Rouge - East Fort Garry Ward, within the Crescent Park neighborhood on the west side of the Red River. According to the 2021 census, the Crescent Park neighborhood has a total population of 2,585. A review of the available green spaces, vacant lots, and surface parking in the study area reveals limited off-road parking stalls in the neighborhood, leading residents to park on the street. However, there are vacant lots available that could be transformed into usable areas.

VACANT LOTS



Fig. 5 Vacant lots mapping of Crescent Park.

TRANSPORTATION

The primary modes of transportation in the neighborhood include cars, buses, cycling, and walking, with cars being the most prevalent. Reviewing the few designated bike lane near the Crescent Drive Park, it becomes evident that cyclist have no other options than sharing the road with vehicles (refer to the map below). The transit line 694 illustrate a route that encircles the Crescent Park neighborhood, yet they do not extend to include Crescent Drive Park and Thermea.

Additionally, the existing sidewalk is discontinuous throughout the study area, raising safety concerns for pedestrians who must navigate alongside bicycles and vehicles.



Fig. 6 Images of People walking on the road and on the grass.

CYCLING PATHS



Fig. 8 Cycling paths mapping of Crescent Park.

TRANSIT LINE



Fig. 9 Transit line mapping of Crescent Park.

2021 CENSUS DATA STATISTICS

	Male	Female	% of Total
Car, truck or van - as a driver	455	260	68.1%
Public transit	65	65	12.4%
Car, truck or van - as a passenger	25	60	8.1%
Walk	20	40	5.7%
Bicycle	15	15	2.9%
Other method	10	20	2.9%
TOTAL	590	460	100%

Fig. 7 Table of the transportation data of Crescent Park from 2021 Census Data.

PEDESTRIAN PATHS



Fig. 10 Pedestrian paths mapping of Crescent Park.

ROADS



Fig. 11 Roadway mapping of Crescent Park.

CRESCENT DRIVE PARK



Fig. 12 Aerial view of Crescent Drive Park.

Crescent Drive Park is located on the south side of Winnipeg, within the Crescent Park neighborhood, along the west bank of the Red River. This regional park is cherished by the community for its natural character, dense tree cover, and tranquil atmosphere. Its extensive vegetation and minimal paved surfaces help mitigate the urban heat island effect, offering visitors a refreshing escape from the city and experience the wilderness¹.

Covering approximately 25.6 hectares, the park features a diverse landscape that includes wooded areas, open lawns, a pavilion, a playground, a boat launch, and a golf course. A network of walking trails weaves through these varied environments, supporting a range of biodiversity and providing visitors with opportunities for both recreation and nature appreciation.

Much of the park remains unprogrammed, allowing for flexible, multipurpose use. Visitors can rent designated areas through the City of Winnipeg website, including open picnic sites, picnic shelters with adjacent park space, or scenic locations for photography and ceremonies.

Historically, Crescent Drive Park was established under the Metropolitan Corporation of Greater Winnipeg commonly referred to as "Metro" which was created in 1960. This two-tiered regional system was responsible for managing large parks across the city rather than operating under separate municipal jurisdictions². Following Metro's dissolution in 1970, the City of Winnipeg assumed ownership and continues to oversee the park's maintenance and management today.

TREE SPECIES

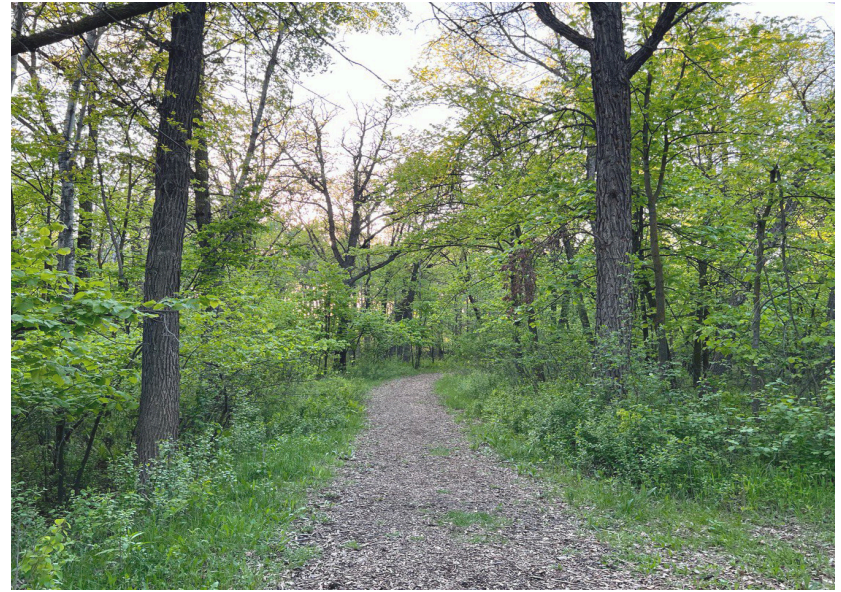


Fig. 13 Images of the woodland areas in Crescent Drive Park.
13



The tree canopies at Crescent Drive Park give shade to people using the park and filter the air. Elm trees are susceptible to **Dutch Elm Disease**. The forest and riparian corridor is a habitat for different species of birds, deers, rabbits, and coyotes.

FOREST

- Colorado Blue Spruce (*Picea pungens*)
- American Elm (*Ulmus americana*)
- Green Ash (*Fraxinus pennsylvanica*)
- Manitoba Maple (*Acer negundo*)
- Amur Maple (*Acer ginnala*)
- Silver Maple (*Acer saccharinum*)
- American Basswood (*Tilia americana*)
- Siberian Elm (*Ulmus pumila*)
- Peach Leaf Willow (*Salix amygdaloides*)
- Paper Birch (*Betula papyrifera*)
- Japanese Elm (*Ulmus parvifolia*)

RIPARIAN CORRIDOR

- Siberian Crabapple (*Malus baccata*)
- Silver Maple (*Acer saccharinum*)
- Scotts Pine (*Pinus sylvestris*)
- American Elm (*Ulmus americana*)
- Green Ash (*Fraxinus pennsylvanica*)
- Colorado Blue Spruce (*Picea pungens*)

CRESCENT DRIVE GOLF COURSE



Fig. 14 Aerial view of Crescent Drive Golf Course.



The Crescent Drive Golf Course is a municipally owned, nine-hole, par-3 course located adjacent to Crescent Drive Park. Occupying approximately 11.8 hectares, the course was designed by landscape architect Gunter Schoch. Although its grand opening was initially scheduled for May 1966, it was postponed due to flooding and officially opened in September 1966³. Today, the golf course shares a parking lot with Thermëa Spa, creating a dynamic yet occasionally congested shared-use space.

The course's design provides a balance between challenge and accessibility. Dense tree coverage and strategically positioned greens require precise play, making it a rewarding course for experienced golfers⁴. At the same time, its shorter distances make it approachable for beginners and senior players, contributing to its enduring popularity among the local community.

During the construction of Thermea, the original clubhouse was removed and replaced with a new pro shop and a 40-seat dining area integrated with the spa.

This new facility enhances the overall visitor experience by connecting leisure, recreation, and wellness activities within the same landscape.

The golf course is managed and maintained by the Special Operating Agency (SOA), established by the City of Winnipeg in 2002. The SOA oversees the city's golf course assets, manages leases, and ensures the maintenance and operation of publicly owned courses⁵. As a public facility, Crescent Drive Golf Course operates on a pay-per-play basis, eliminating membership fees and ensuring accessibility for all residents.

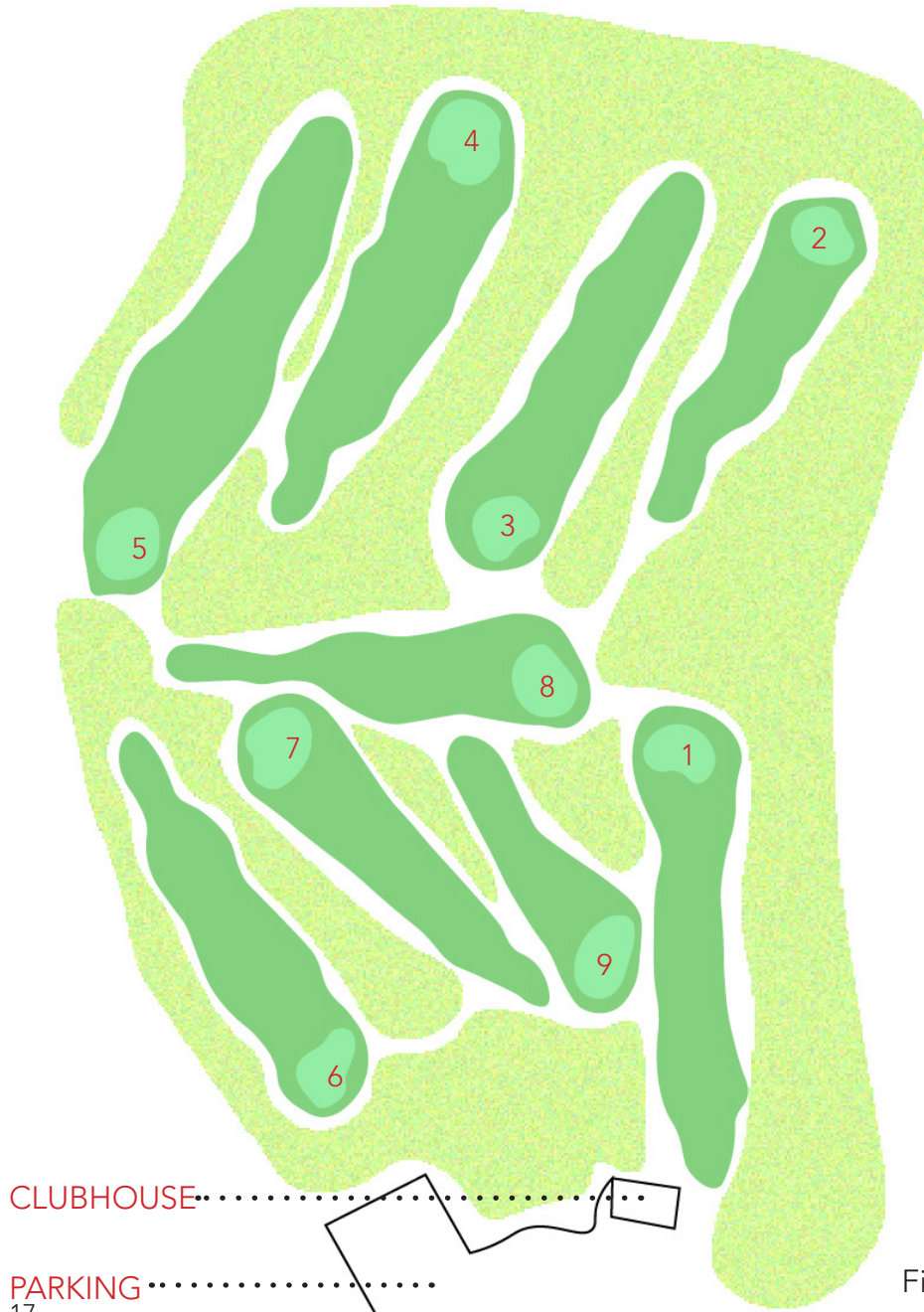
Current green fees are as follows:

Adults: \$25

Seniors: \$22

Juniors (17 and under): \$16

GOLF COURSE LAYOUT



Additional amenities include power cart rentals, equipment rentals, and a fully equipped pro shop. The course operates Monday through Sunday, from 6:00 a.m. to 9:30 p.m., and is closed on statutory holidays. Due to seasonal conditions, operations are suspended annually from September 30 to April 11.

Overall, Crescent Drive Golf Course remains a valued recreational asset within the neighborhood, offering an inclusive and scenic environment that contributes to both the social and ecological fabric of Crescent Drive Park.

9 HOLE BREAKDOWN

- Hole 1: PAR 3, Total of 176 yards
- Hole 2: PAR 3, Total of 124 yards
- Hole 3: PAR 3, Total of 158 yards
- Hole 4: PAR 3, Total of 172 yards
- Hole 5: PAR 3, Total of 192 yards
- Hole 6: PAR 3, Total of 153 yards
- Hole 7: PAR 3, Total of 145 yards
- Hole 8: PAR 3, Total of 162 yards
- Hole 9: PAR 3, Total of 94 yards

Fig. 15 Diagram of the layout of Crescent Drive Golf Course.



Fig. 16 Image of the pathway of Crescent Drive Golf Course.



Fig. 17 Images of the holes of Crescent Drive Golf Course.

THERMEA



Fig. 18 Aerial view Thermea.

Thermea Nordik Spa is part of Groupe Nordik, a wellness company founded in Chelsea, Quebec, in 2005. Since its establishment, Groupe Nordik has experienced continuous growth and is now recognized as the largest spa organization in North America⁶. In 2015, the company expanded westward by opening Thermea Nordik Spa-Nature in Winnipeg, Manitoba, located adjacent to the Crescent Drive Golf Course.

The spa offers a range of thermotherapy and relaxation treatments, providing immersive, multisensory experiences designed to help visitors relax, unwind, and improve both physical and mental well-being⁷. Thermea operates seven days a week, from 8:30 a.m. to 10:00 p.m., serving as a year-round destination for local residents and visitors.

Despite its popularity and economic contribution, Thermea's location has created several operational and community challenges. The spa shares its parking lot with the Crescent Drive Golf Course, and due to limited capacity, many visitors resort to on-street parking, which often occupies one traffic lane and restricts vehicle flow.

Observations indicate that Thermea primarily occupies the parking lot from fall through winter, while golf course users occupy from late spring to summer. The increasing year-round demand for parking, combined with limited street capacity and the absence of sidewalks, has amplified concerns related to pedestrian safety, traffic congestion, and accessibility.



Fig. 19 Aerial view of the different areas of the spa.

RESTING AREAS



BATHS



SAUNAS



MASSAGES

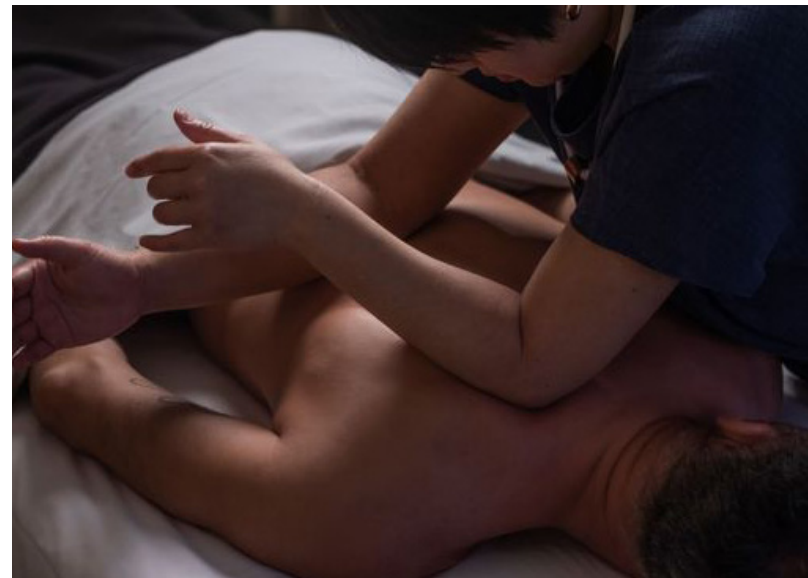


Fig. 20 Images of the different Thermotherapy treatments.

CHAPTER 3:

VEHICLE PARKING RESEARCH

Winnipeg By-Laws

The City of Winnipeg Parking Standard: Parking space minimum dimensions.

1. **Standard Space** : These are dimensions for that are stated in the By-law 200/2006

- 8 feet wide; 20 feet long, See Figure 21

2. **Accessible Space**: These are dimensions for that are stated in the By-law 100/2004

- 10 feet wide, 20 feet long, See Figure 22.

3. **Van Accessible Space**: These are dimensions for that are stated in the By-law 100/2004

- 8 + 8 feet wide, 20 feet long, See Figure 23.

4. **Small Car Space**: These are dimensions for that are stated in the By-law 200/2006

- 8 feet wide; 16 feet long, See Figure 24.

Fig. 21

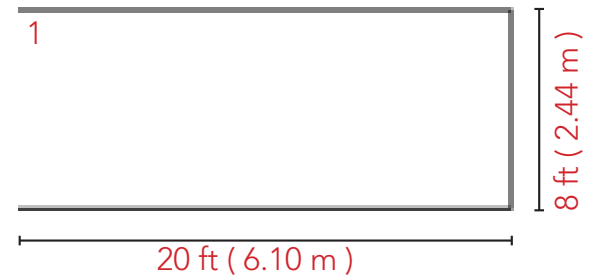


Fig. 22

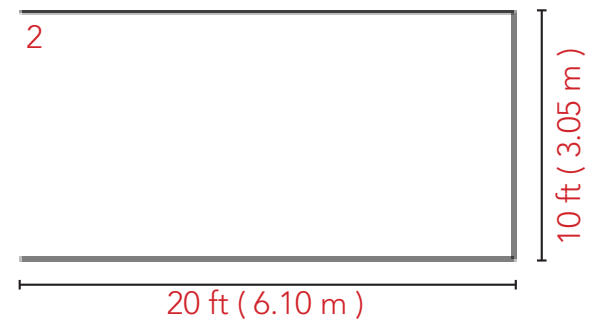


Fig. 23

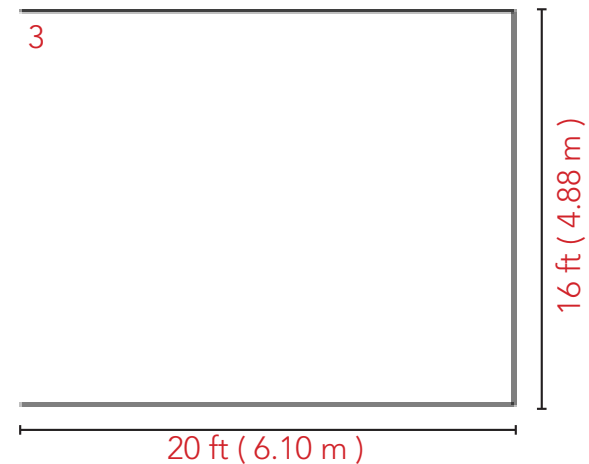
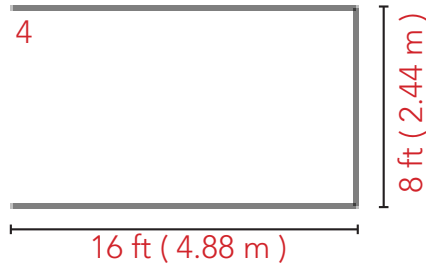


Fig. 24



The table below shows the minimum accessible space for each standard space in a parking lot. See Figure 25.

By Law- 100/2004 No. 34/2014: (19) subsection 230 (3)

Standard Spaces	Accessible Spaces	Van Accessible
2-25	1	0
26-50	3	1
51-75	4	1
76-100	5	2
101-150	6	2
151-200	7	2

Fig. 25

- Each space should be indicated by a signage to reserve spots for people with disabilities.
- Accessible space should not exceed more than 30 % of the total number of parking space.
- An adjacent clear space measuring 8 feet in width must accompany the 8-foot-wide wheelchair loading and maneuvering zone to ensure adequate accessibility.

By Law- No. 200/2006

- Off-street parking must include a universally accessible route that connects all accessible parking stalls to an accessible building entrance or sidewalk.
- Parking areas should be designed with clear pedestrian connections that limit pedestrian exposure to vehicle conflicts, particularly by minimizing crossings between parking aisles and movement behind parked cars.
- Off-street parking areas shall include a driveway with a minimum width of 8 feet for one-way circulation and 16 feet for two-way circulation, providing access to a street or, where permitted, a public lane⁸. See Figure 26.

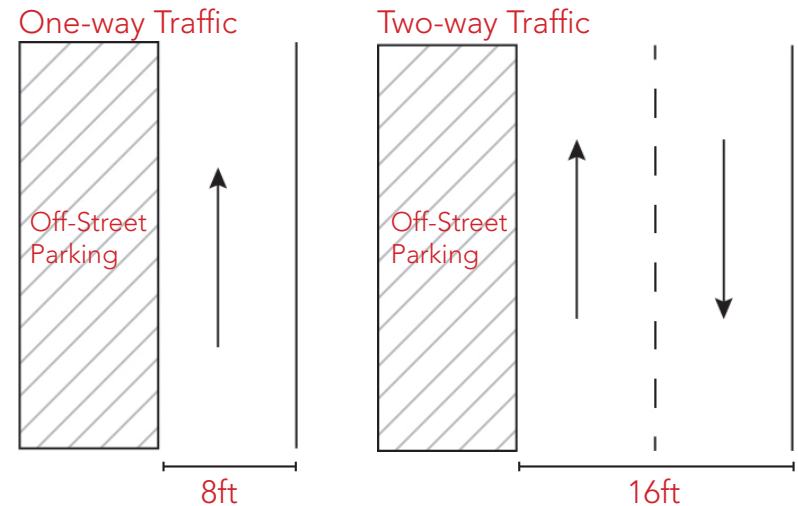


Fig. 26

- Parking areas must be designed avoiding isolated parking in which cars is not seen from either at the entrance of the building or from at least 2 other parking spaces located more than 50 feet away from the subject space⁹. See Figure 27.

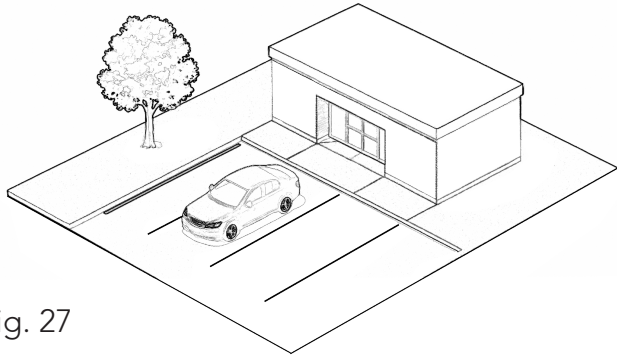


Fig. 27

- All spaces are visible from the building entrance while the parking on the side are seen from the other spaces of the lot.

By Law- 100/2004 No. 34/2014:
(g) Landscaping

- Plant materials must be capable of withstanding the site's local climatic conditions and must comply with the most recent edition of the Canadian Standards for Nursery Stock. Species located near public streets should be selected for their salt tolerance¹⁰.

- Small trees must be provided with a minimum of 8 cubic metres of soil for individual planting sites, and at least 6 cubic metres of soil per tree where planting sites are shared.

- Medium trees must be provided with a minimum of 20 cubic metres of soil for individual planting sites, and at least 15 cubic metres of soil per tree where planting sites are shared.

- Large trees must be provided with a minimum of 35 cubic metres of soil for individual planting sites, and at least 30 cubic metres of soil per tree where planting sites are shared.

- The goal is to plant fewer trees with proper soil volume rather than planting dense trees with inadequate soil volume, fertility and soil structure should be adequate¹¹. See Figure 28.

Inadequate Soil Volume

Proper Soil Volume

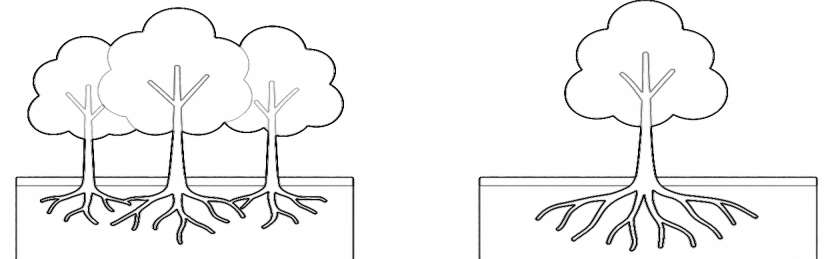


Fig. 28

Tree Planting Standards: Downtown Region

- Surface parking areas adjacent to the public street must contain a minimum of one tree for each 20 feet of linear street frontage. See Figure 29.

- The parking lot interior landscaping should be between a height of 30 inches and a height of 6 feet above preserve sightlines between public streets and adjacent properties¹². See Figure 30.

Fig. 29

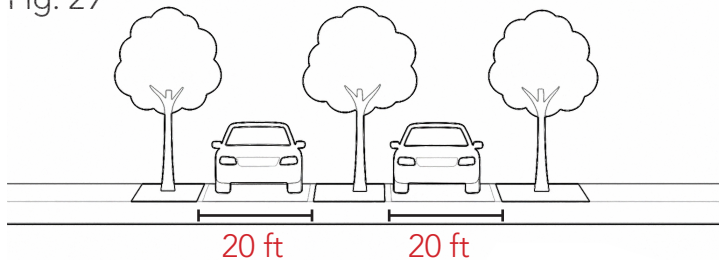
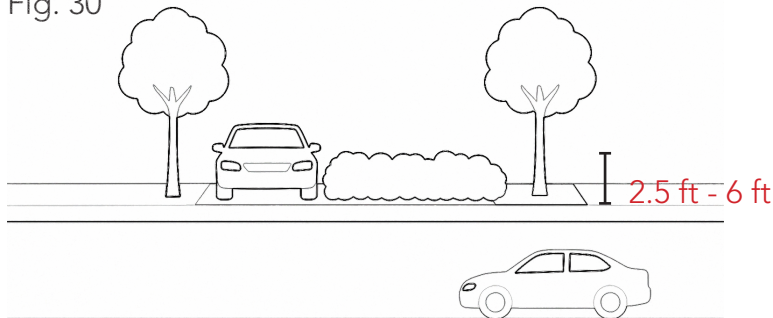


Fig. 30



- The landscape must not let any disturbance on the pedestrian walkways and to maintain a minimum clearance of 9 feet above the all of pedestrian walkways¹³.

2.5.3 Drainage and Irrigation Systems

- The site should be evaluated for drainage conditions before selecting planting locations. Adequate drainage is essential to support healthy plant growth and to prevent surface water accumulation.

- The drainage should be free from any disturbance such as debris to allow a free flowing drain.

- Should have a subdrainage incorporated into the planting system to ensure that no excess water would surface from plants.

- Water source should be identified such as watering truck and hydrant to be used during dry periods.

- If budget permits, a water-efficient automatic irrigation system should be considered when watering the trees through integrated stormwater management fails.

Design Guidelines for a safe and accessible bus stops (130-2018 Appendix A)

The design of bus shelters have a typical dimensions that is used city-wide:

- 1.2m (4') wide X 2.4m (8') length (non-heated, one opening/no door)
 - 1.5m (5') wide X 3.8m (11') length (non-heated, one opening/no door)
 - 2.4m (8') wide X 4.5m (15') to 12.2m (40') length (heated, two doors)
- The openings of shelters should have a minimum width of 800 mm wide enough for a wheelchair to pass through¹⁴.
- Doorways of unheated shelters should be designed in accordance to the Manitoba Building code
- Seating should be provided and oriented in the incoming bus.



Fig. 31 Image of a bus shelter in Winnipeg, Manitoba.

Seating

- Accessible seats should have a seat height of 450 to 550mm and a seat depth of 400 to 500mm¹⁵.
- The front edge of a seat should be at least 600mm from the nearest travel path

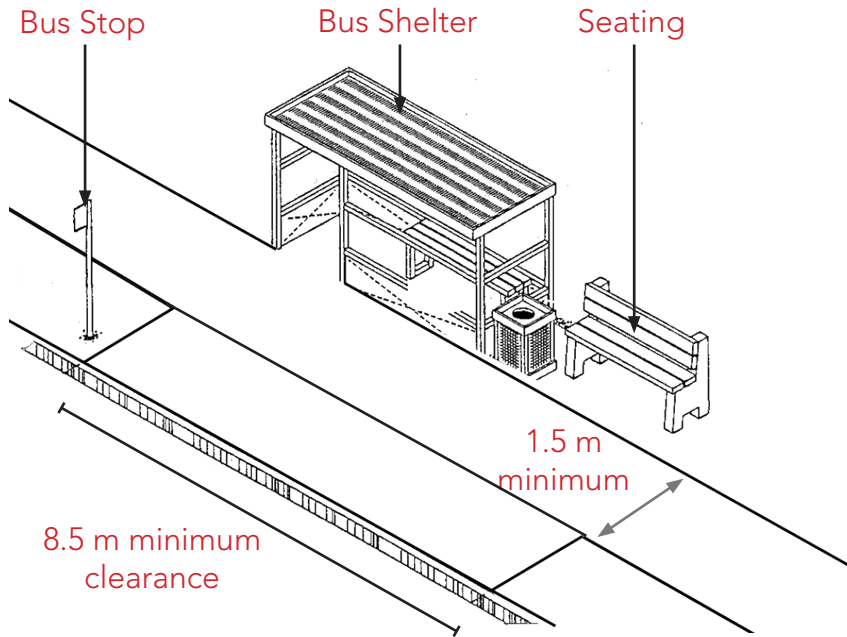


Fig. 32 Dimension distances from the road with bus shelter.

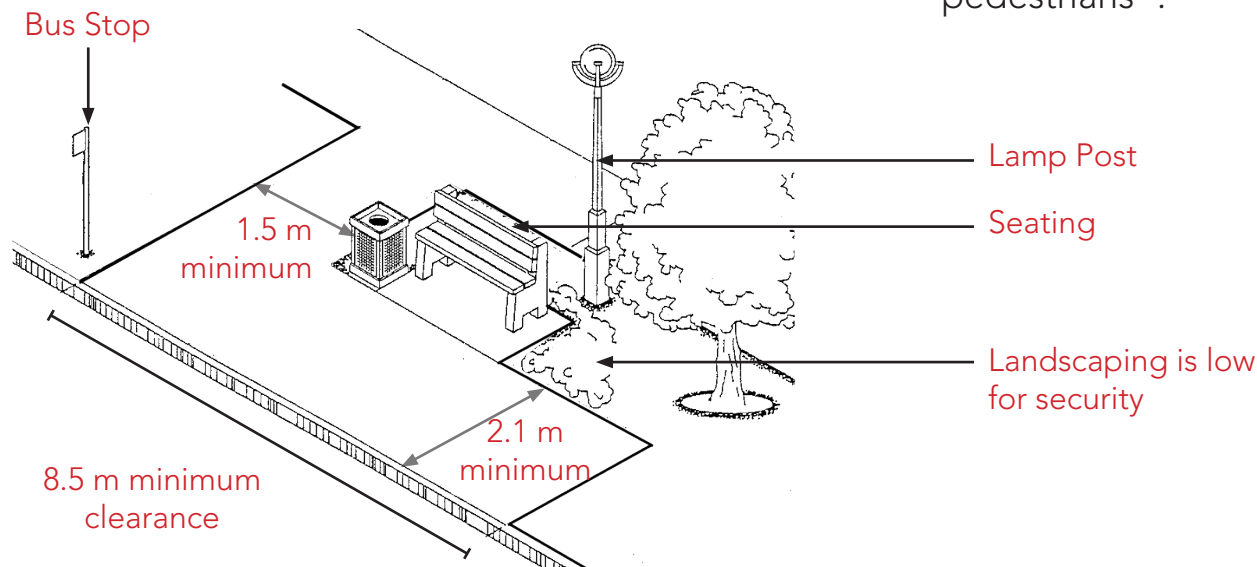


Fig. 33 Dimension distances from the road w/o bus shelter.

General Points of Bus Shelters

- Accessible travel paths should follow the shortest distance between two points
- Walkways must be well maintained (stable pavement, level, and well drained)
- Walkways must be clear of snow, ice and other debris.
- Street furniture and signage, such as posts, benches, newspaper boxes, garbage receptacles should be located out of the travel path of transit passengers and pedestrians¹⁶.

PRECEDENT STUDIES



Calvados-Honfleur Business Park

Location: France

Designed by: La Compagnie du Paysage

Year Built: 2010 to present



Fig. 34 Green spaces of the parking lot of Calvados-Honfleur Business Park.

The Calvados-Honfleur Business Park was established to capitalize on the economic benefits stemming from the ongoing development of the ports at the Port de Normandie in France. This initiative is a collaborative effort between the General Council of Calvados, the City of Honfleur, the Autonomous Port of Rouen, and the Pays d’Auge Chamber of Commerce and Industry. The goal is to enhance the existing Pourdreux Park, transforming it into a focal point of the Calvados Honfleur Business Park¹⁷.

This project transcends mere business development; it emphasizes the preservation of the area’s environment and architectural heritage. Committed to sustainability, the design integrates environmental ecosystems into future buildings, utilizing green roofs and wood as primary construction materials¹⁸. The Business Park will serve as a vibrant urban space that features a logistics hub, a high-end shopping center, community services, hotels, and restaurants. This diverse array of attractions will provide users with numerous options while navigating the park.

The Business Park is more than just a physical location; it is a well-connected hub. Pedestrian and cycling networks are seamlessly woven into the public transportation system, promoting alternative modes of transport. The parking area is designed with permeable surfaces to enhance water management. Additionally, the ditches and pools within the urban landscape play a vital role in rainwater treatment and floodwater management, contributing to the park’s sustainability¹⁹.

In conclusion, incorporating specific elements from the business park into the Thermea parking lot, such as channeling water into the ground while redirecting excess into woodland areas that the plants cannot absorb, can significantly reduce surface water pooling. Furthermore, the project explores how interconnected pedestrian, cycling, and transit networks can enhance accessibility and strengthen the relationship between the surrounding community.

Florida Aquarium Parking Lot and Queuing Garden

Location: Tampa, Florida

Built: 1995

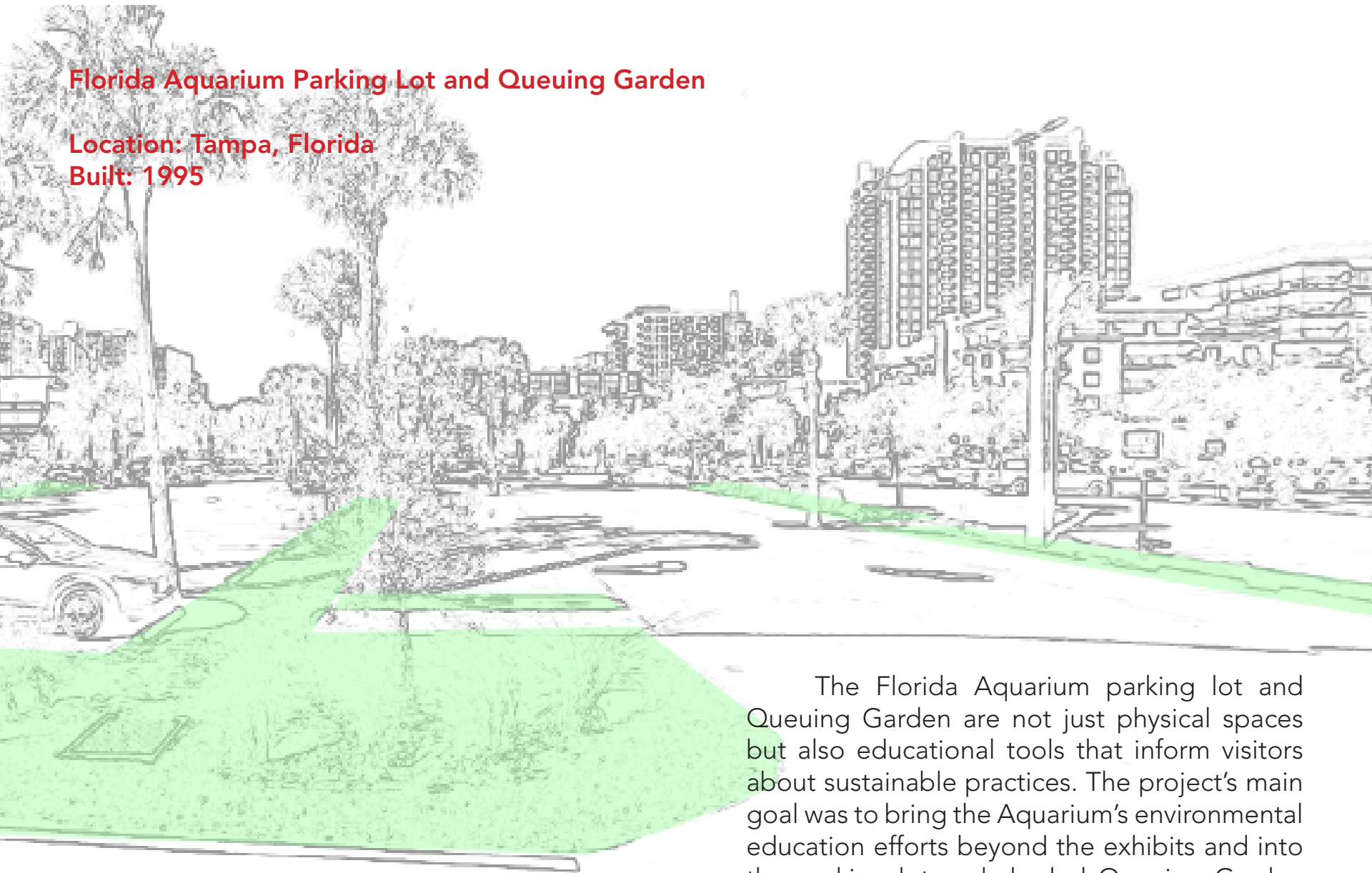


Fig. 35 Green spaces of the parking lot of Florida Aquarium and Queuing Garden.

The Florida Aquarium parking lot and Queuing Garden are not just physical spaces but also educational tools that inform visitors about sustainable practices. The project's main goal was to bring the Aquarium's environmental education efforts beyond the exhibits and into the parking lot and shaded Queuing Garden near the entrance. "The Aquarium tells Florida's water story across its entire site, following the path of a drop of water from underground springs to the open sea"²⁰.

Florida is known for its annual high rainfall and humid subtropical climate; stormwater runoff is a primary issue that needs to be addressed. As part of the urban development, the Florida Aquarium is near places that draw people to the area, such as entertainment venues, restaurants, and shops, next to the Ybor Channel. The parking lot accommodates approximately 700,000 visitors annually²¹.

The parking lot of the aquarium features a Queuing Garden at the entrance, which incorporates sustainable practices in its design. The primary objective of the design is to manage stormwater runoff by utilizing elements of native wetland trees, bioswales, and small ponds throughout the site. During storm events, the stormwater runoff is directed into a series of bioswales, then into smaller basins that lead to larger ones²². The ultimate destination is the wetlands, which act as filtering zones, removing the remaining sedimentation from the water. The water is then directed into the ponds within the parking lot before it is released into the Ybor Channel²³. Part of the design was to increase the site's vegetation cover without compromising the number of parking spaces. This balance between sustainability and practicality is a

hallmark of the project, reassuring the audience about the feasibility of sustainable design, reducing the dimensions of the individual stalls by 2 ft, and allowing bioswales to be incorporated into the parking lot layout²⁴. The native vegetation planted at the site reduced stormwater runoff. The Queuing Garden at the entrance of the aquarium provides comfort for the visitors by providing seasonal shade and seating.

In conclusion, this case study serves as a model for effective stormwater management in an urban environment, using vegetation to treat runoff water. By reducing the dimensions of the parking stalls, vegetation cover increased without affecting the number of parking spaces. This not only enhances the aesthetic appeal of the area but also provides a more comfortable and enjoyable experience for visitors. The project can inspire similar initiatives, demonstrating how stormwater can be effectively managed and reused to water vegetation, thereby contributing to a healthier and more sustainable urban environment.

Giromagny Social and Cultural Center

Location: Giromagny, France

Designer: Territoires

Built: 2016



Fig. 36 Green spaces of the parking lot of Giromagny Social and Cultural Center.

The Girogmany Social and Cultural Center, a distinctive outcome of a rehabilitation initiative, provides a variety of cultural activities. Among its offerings are a theater, exhibition space, media library, and a sports area specifically designed for children from the nearby school. Notably, the cultural center's parking lot is a unique aspect of its design; it was not solely intended for vehicles but was also conceived as an extension of the walking path. This innovative design creates the impression that the parking lot seamlessly blends into the esplanade, elevated slightly above the roadway to ensure the safety of pedestrians from vehicular traffic²⁵.

The project's layout harmoniously connects with the natural hillside and the site's existing pedestrian pathways, enhancing its distinctiveness. The landscape vegetation, featuring mature linden and pine trees, has been thoughtfully arranged along the garden's perimeter, creating a tranquil environment²⁶. A silver fir tree stands as the permanent Christmas tree, bringing a festive charm during the holiday season.

The distinctive bollard structures incorporated into the design serve multiple functions: they protect plants from vehicular traffic, provide hooks for bicycles, and offer seating opportunities thanks to the irregular rhythm of their structure.

In conclusion, this case study clearly demonstrates the critical importance of designing spaces that prioritize not only vehicles but also pedestrians and cyclists. The strategic incorporation of greenery effectively provides a necessary buffer from vehicular traffic, significantly enhancing the safety of pathways. By eliminating parking stall lines from the design, the site achieves a seamless integration with the natural environment. Moreover, the constructed bollards powerfully reinforce the concept of multi-use constructed material, serving both as barriers for the pathway and seating. Their simple yet effective design leaves a lasting impression. The project shows how greenery can help harmonize a constructed parking lot with its surroundings.

PLANT SPECIES

LARGE TREES

Common Name	Scientific Name	Hardiness Zone	Height: ft (m)	Width: ft (m)	Drought Tolerant	Salt Tolerant	Notes:
"Hulk" Manitoba Maple	<i>Acer negundo</i> 'Hulksun'	2	40 (12)	33 (10)	High	Medium	Very hardy, yellow fall color, male (no seed)
"Trailblazer" Manitoba Maple	<i>Acer negundo</i> 'ByPSN705'	3	40 (12)	33 (10)	High	Medium	Reddish tinge to leaves, fast grower, male (no seed)
"Prairie Horizon" Alder	<i>Alnus hirsta</i> 'Harbin'	2	40 (12)	20 (6)	High	Medium	Very fast, drought tolerant, needs large space
Green Ash	<i>Fraxinus pennsylvanica</i>	1	65 (20)	33 (10)	High	Medium	Historically used as a shade/ street tree, not recommend in Manitoba due to Emerald Ash Borer
White Spruce	<i>Picea glauca</i>	1	65 (20)	40 (12)	Medium	Medium	Good form and density, commonly used as shelterbelts around farmsteads
"Admiration" Oak	<i>Quercus x jackiana</i> 'Jefmir'	2	40 (12)	30 (9)	High	Medium	Attractive glossy leaves and bark
Bur Oak	<i>Quercus macrocarpa</i>	2	65 (20)	50 (15)	High	High	Yellow fall color, impressive long shade tree
"Fargo Express" Bur Oak	<i>Quercus macrocarpa</i> 'By 1801'	2	40 (12)	13 (4)	High	Medium	Fast growing glossy leaves, good disease resistance
"Curb Appeal" American Linden	<i>Tilia americana</i> 'Jordsun'	2	40 (12)	23 (7)	Medium	Medium	Improved cold hardiness, good growth rate, retains strong leader
"Lone star" Little Leaf Linden	<i>Tilia cordata</i> 'BySkinner'	2	40 (12)	23 (7)	Medium	Medium	Very symmetrical branching, hardiest of all the little leaf lindens
"Lighthouse" Linden	<i>Tilia x flavescens</i> 'Jefhouse'	3	40 (12)	30 (9)	Medium	Medium	Attractive upright growth, dense crown

MEDIUM TREES

Common Name	Scientific Name	Hardiness Zone	Height: ft (m)	Width: ft (m)	Drought Tolerant	Salt Tolerant	Notes:
Amur Cork Tree	<i>Phellodendron amurense</i>	3	26 (8)	33 (10)	Medium	High	Attractive compound leaves and fall color, outstanding bark characteristics

Fig. 37 Table of plant species that can survive in paved surface conditions.

SMALL TREES

Common Name	Scientific Name	Hardiness Zone	Height: ft (m)	Width: ft (m)	Drought Tolerant	Salt Tolerant	Notes:
"Hot Wings" Tatarian Maple	<i>Acer tataricum 'Gar Ann'</i>	3	23 (7)	20 (6)	Medium	Medium	Hardest of Tatarian types, attractive seeds in summer
"Gladiator" Ornamental Crabapple	<i>Malus 'Durleo'</i>	2	26 (8)	16 (5)	Medium	Medium	Improved resistance to leaf scab
"Green Wall" Columnar Crabapple	<i>Malus 'Jefwall'</i>	2	20 (6)	6 (2)	High	High	Excellent choice for live screen in yard with green color
"Midnight Spire" Columnar Crabapple	<i>Malus 'Jefnite'</i>	2	20 (6)	6 (2)	High	High	excellent choice for live screen in yard with purple color

PRAIRIE GRASSES

Common Name	Scientific Name	Hardiness Zone	Height: ft (m)	Width: ft (m)	Drought Tolerant	Salt Tolerant	Notes:
Big Bluestem	<i>Andropogon gerardii</i>	4-9	8 (2.4)	3 (0.9)	High	Medium	Essential for grassland restoration and prairie gardens
Tufted Hair Grass	<i>Deschampsia caespitosa</i>	4-9	3 (0.9)	2 (0.6)	Low	High	Good for restoring and stabilizing disturbed soils

SHRUBS

Common Name	Scientific Name	Hardiness Zone	Height: ft (m)	Width: ft (m)	Drought Tolerant	Salt Tolerant	Notes:
Redosier Dogwood	<i>Cornus sericea</i>	2	10 (3)	10 (3)	High	Medium	Red stems are visible in the winter and it has outstanding fall foliage
Russian Sage	<i>Perovskia atriplicifolia</i>	4-9	3 (0.9)	3 (0.9)	Low	High	Good for restoring and stabilizing disturbed soils

PERENNIAL

Common Name	Scientific Name	Hardiness Zone	Height: ft (m)	Width: ft (m)	Drought Tolerant	Salt Tolerant	Notes:
Rose Glow Barberry	<i>Berberis thunbergii</i>	3	3 (0.9)	3 (0.9)	Low	High	Attractive pink-variegated burgundy foliage color

CONCLUSION

The vegetation discussed above is well-suited to thrive in paved surface conditions and the plant hardiness zone of Winnipeg, Manitoba. The species has been evaluated for its tolerance to drought and salt, which are common in such environments. Tree species were sourced from a presentation by Rick Durand, a prominent figure in Canadian horticulture in Manitoba, delivered at the annual meeting of the Manitoba Horticultural Association in March 2023.

Healthy trees and vegetation play a crucial role in mitigating the urban heat island effect associated with paved surfaces that tend to absorb heat. They also contribute to air filtration, particularly in areas with high levels of greenhouse gas emissions, such as parking lots. Furthermore, in areas with inadequate drainage, the addition of trees and vegetation can assist in absorbing water and managing irrigation needs.

GLADIATOR CRABAPPLE



AMUR CORK TREE



BIG BLUESTEM GRASS



ADMIRATION HYBRID OAK



Fig. 38 Plant species that will be use for the proposals.

MATERIALS



A challenge in constructing and developing parking lots is choosing what material best fit in the space. Materials commonly used on parking lots in the city of Winnipeg are concrete and asphalt due to its suitability and durability but other aspects that needed to be considered are the cost of the materials, how it will be maintained, and the aesthetic appeal on the site. These materials are:

Concrete: These materials is known for its strength and durability in the construction industry. It is made from sand and other small rocks and uses Portland cement for binding²⁷. Due to its reliability, it is commonly used on commercial parking lot and residential driveways. It can withstand a heavy weight, extreme weather, and can last for a long time.

Pro:

-Durability : It is resilient with heavy vehicles, high traffic areas

-Longevity: Proper maintenance can last up to 30 40 years

-Resistant: resistance to wind and water

-Very low maintenance: concrete requires low maintenance once it is installed and cured.

Cons:

- Cost: Installing and the labor cost can be high compared to asphalt and gravel

- Installation time: installing and the curing of concrete can make the parking lot unavailable for a long time during construction.

- Cold weather challenges: Places like Winnipeg, with occasional harsh winter, concrete is susceptible to freeze-thaw cycle of repair

- Repair: overtime concrete degrades and repairs on concrete can be costly with its labor and materials

Asphalt: It is a materials that is known for its balance with cost effectiveness, durability and flexibility. It is made out from crushed minerals such as rocks, gravel and sand. Using bitumen or tar as the binding material due to its viscosity and ability to hold the components together²⁸. It is commonly used in parking lot of commercial areas like grocery stores, offices, or in some residential areas.

Pro:

- Cost effective: It is less expensive in installing compared to concrete and more budget friendly
- Quick installation: Can be installed quickly and minimizing the time of not using the parking lot
- Repair: maintenance and repair can be done as easy as filling and sealing the cracks and potholes without replacing the sectioned areas.
- Recyclable: When an asphalt reach at the end of its life the materials can be recycled to produce a new asphalt

Cons:

- Lifespan: asphalt have shorter lifespan; it can last up to 20-25 years with consistent maintenance
- Load restriction: It can crack or rut under persistent heavy load and limits the use of the parking lot
- Maintenance: asphalt requires a regular maintenance to prevent water seep through the material, fix the cracking and prolong the lifespan
- Heat absorption: Asphalt absorbs more heat due to its darker color, which contributes to the urban heat island

Gravel: This material is cost- efficient and a quicker installation than concrete and asphalt. This material is commonly used in a particularly large spaces and parking lots. Gravel parking lot does not require extensive groundwork, but it does need to be ensured that is leveled and properly drained foundation before the gravel is laid²⁹.

Pro:

- Affordability: Gravel is affordable and the cost of installation are low
- Quick installation: after the area has been graded, gravel can be spread and compacted right away
- Drainage: water can easily pass through the stones and reduces the pooling of water above the surface
- Maintenance: gravel does not crack or need sealing, it just need occasional grading to level up the surface

Cons:

- Dust and debris: gravel parking can produce dust during dry season that can be nuisance or hazard

- Snow Removal: removing snow during the winter months can be challenging without disrupting the grading

- Regular maintenance: gravel requires constant maintenance such as regrading and filling the potholes to keep the surface leveled

- Limited lifespan: Gravel can be washed away during heavy rainfall or sink from constant usage

- Mobility Issues: accessibility can be a challenge for people on wheelchairs or crutches/ cane to navigate due to its uneven surface

CONCLUSION

The construction and development of parking lots present a complex design challenge, with material selection serving as one of the most critical factors influencing both performance and sustainability. In the context of Winnipeg, where climatic conditions and urban growth patterns play a significant role, the choice of materials such as concrete, asphalt, or gravel must be carefully evaluated in relation to durability, cost, maintenance requirements, and long-term usability.

By adopting a comprehensive and context-sensitive approach, parking lots can be designed to serve as more than utilitarian infrastructure, instead becoming functional, sustainable, and integrated components of the urban landscape.

For the shared parking lot at Thermea and the Crescent Drive Golf Course, a feasibility analysis suggests that asphalt represents the most practical and balanced solution. Its cost-effectiveness, rapid installation, recyclability, and ease of repair make it well-suited to a high-traffic location that must remain accessible year-round.

While asphalt does contribute to heat absorption, it addresses the immediate functional challenges of the site more effectively than either concrete or gravel, reducing the risks of surface degradation and minimizing the need for disruptive regrading.

Furthermore, its repairability ensures that maintenance can be carried out in a timely and cost-efficient manner, which is critical in the Winnipeg context where climatic variability frequently impacts pavement conditions. As such, asphalt offers the best alignment between structural requirements, community needs, and long-term functionality for this particular site.

CHAPTER 4:

SITE ANALYSIS

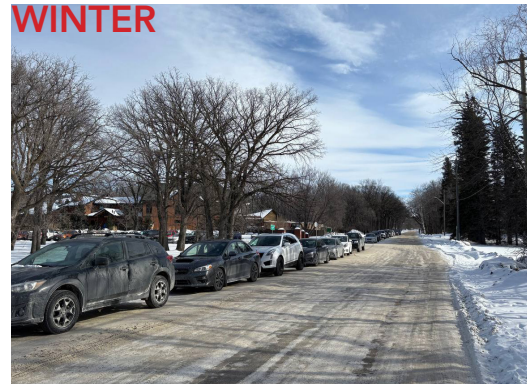


Fig. 39 Seasonal pictures of the parking conditions.
51

SPRING



EXISTING PARKING LOT

The shared parking lot serving Thermëa Nordik Spa and the Crescent Drive Golf Course currently accommodates 89 parking stalls, with an additional 20 spaces located along the driveway leading into the lot. When the lot reaches full capacity, approximately 17 on-street parking spaces become available along Crescent Drive. However, many visitors still choose to park on the street even when spaces remain open in the lot. This behavior is largely influenced by the perceived convenience of exiting directly onto Crescent Drive, as the existing one-way entrance and exit configuration of the lot can create delays during peak periods. This condition highlights both a functional limitation and an opportunity to redesign the lot as an improved entryway into Crescent Drive Park.

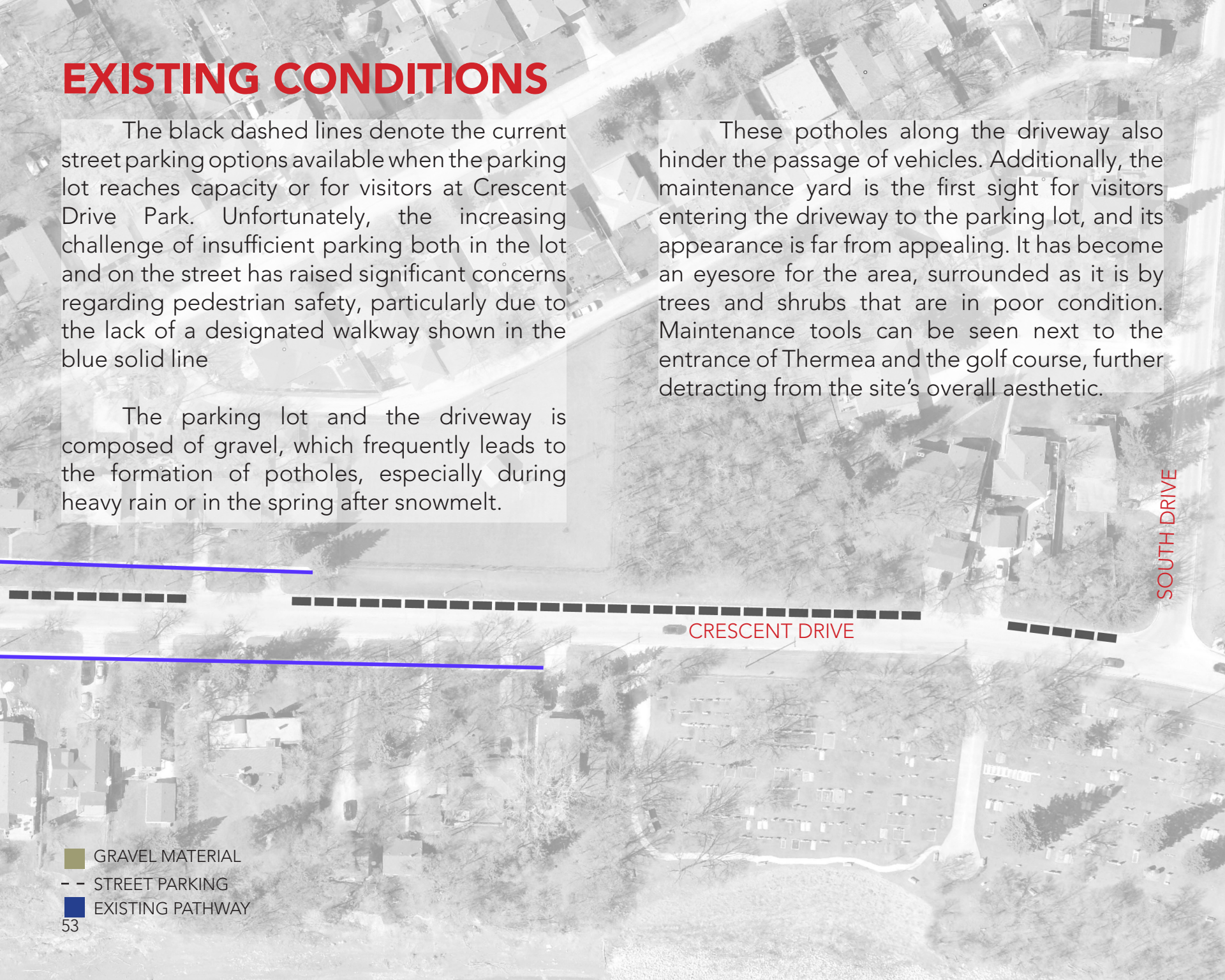
At the south entrance of Crescent Drive Park, the growing number of vehicles parked along the street has increased safety concerns for pedestrians and cyclists. On-street parking reduces the effective roadway width, particularly during winter months, when snow accumulation further constrains space. This narrowing limits the safe coexistence of two-way traffic, transit routes, and cycling lanes, forcing vehicles, cyclists, and pedestrians to share the same corridor. The situation poses a significant safety risk that underscores the urgent need for a comprehensive redesign of the parking and circulation systems in the area.

EXISTING CONDITIONS

The black dashed lines denote the current street parking options available when the parking lot reaches capacity or for visitors at Crescent Drive Park. Unfortunately, the increasing challenge of insufficient parking both in the lot and on the street has raised significant concerns regarding pedestrian safety, particularly due to the lack of a designated walkway shown in the blue solid line

The parking lot and the driveway is composed of gravel, which frequently leads to the formation of potholes, especially during heavy rain or in the spring after snowmelt.

These potholes along the driveway also hinder the passage of vehicles. Additionally, the maintenance yard is the first sight for visitors entering the driveway to the parking lot, and its appearance is far from appealing. It has become an eyesore for the area, surrounded as it is by trees and shrubs that are in poor condition. Maintenance tools can be seen next to the entrance of Thermea and the golf course, further detracting from the site's overall aesthetic.



CRESCENT DRIVE

SOUTH DRIVE

- GRAVEL MATERIAL
- - STREET PARKING
- EXISTING PATHWAY

GOLF COURSE

Fig. 40 Parking lot existing conditions graphic.

MAINTENANCE
YARD

PARKING
LOT

THERMEA

CRESCENT DRIVE
PARK

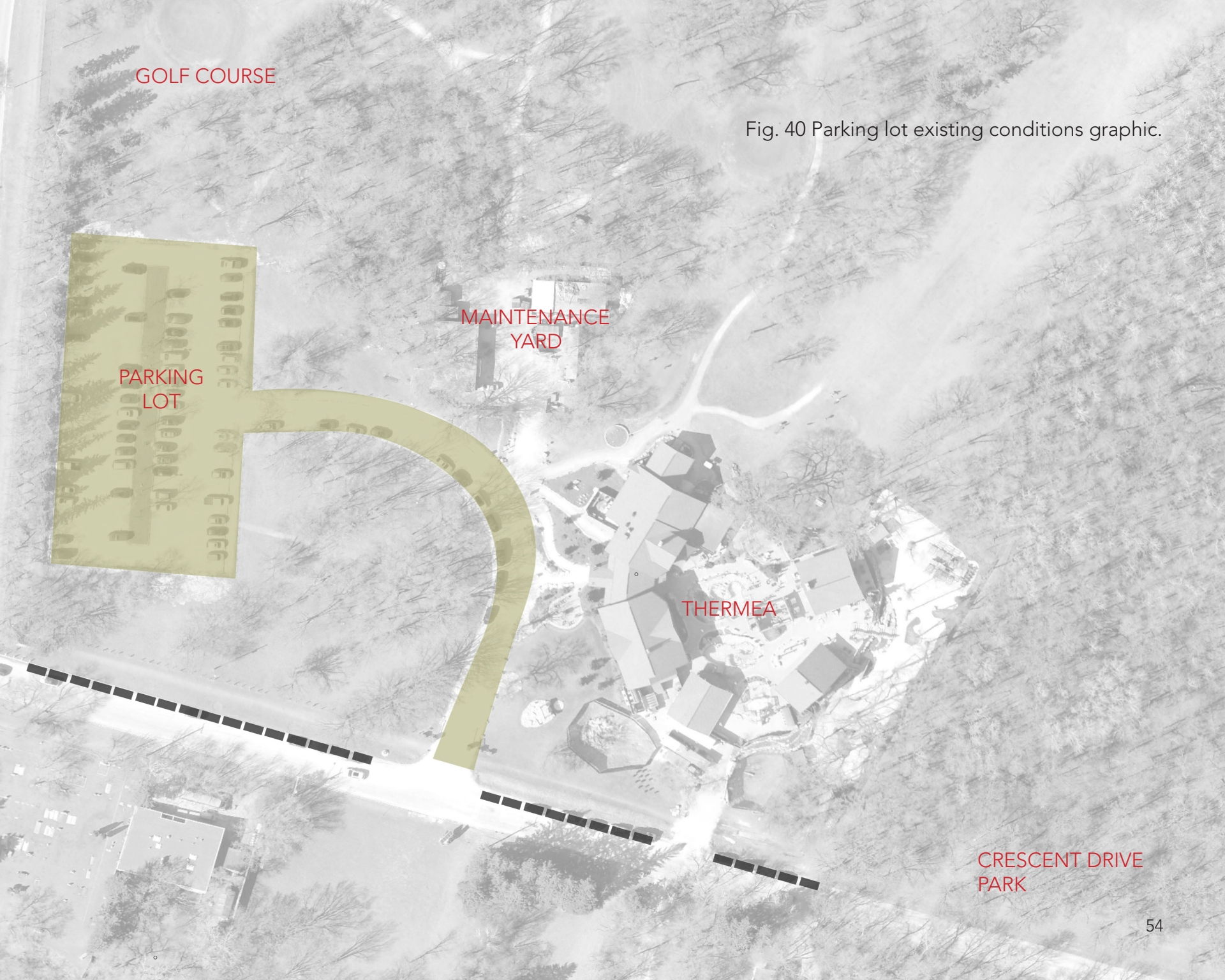






Fig. 41 Images of the concerns at the parking lot.

CONCERNS

In addition to the issues with street parking, the parking lot has several concerns that affect visitors' experiences at the golf course and the spa. For instance, when the parking lot is full, some guests resort to parking on the grass. Other issues include the presence of dead trees, inadequate drainage in certain areas of the parking lot, and having only one access point for entering and exiting the lot.



EXISTING TREES

- HEALTHY TREES, NOT NATIVE SPECIES
- HEALTHY TREES, NATIVE SPECIES
- UNHEALTHY TREES
- DEAD TREES





In collaboration with Dr. Philip Ronald, a plant specialist, we conducted a visual survey of the trees of the parking lot of Thermea to assess their condition in the fall 2024. The survey uncovered a notable number of dead trees, indicated in red on the accompanying map. Areas marked in blue represent trees that are still alive but in poor condition. Trees outlined in purple are those identified for removal, primarily windblown species that were not originally part of the area's ecosystem. Finally, areas highlighted in green are woodland zones that contain native tree species, which we consider vital to protect and preserve to the greatest extent possible.

Fig. 42 Plant survey mapping.

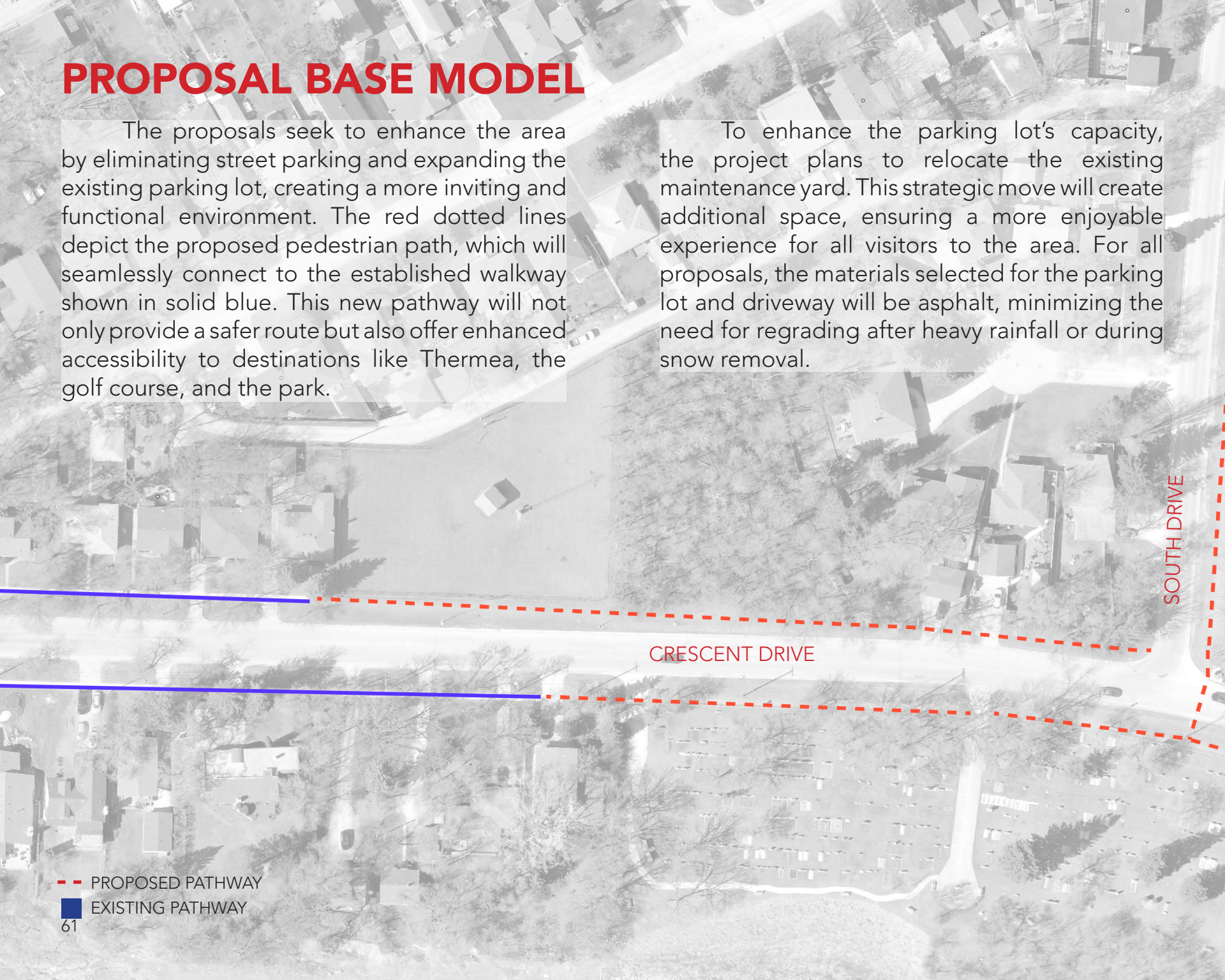
CHAPTER 5:

PROPOSALS

PROPOSAL BASE MODEL

The proposals seek to enhance the area by eliminating street parking and expanding the existing parking lot, creating a more inviting and functional environment. The red dotted lines depict the proposed pedestrian path, which will seamlessly connect to the established walkway shown in solid blue. This new pathway will not only provide a safer route but also offer enhanced accessibility to destinations like Thermea, the golf course, and the park.

To enhance the parking lot's capacity, the project plans to relocate the existing maintenance yard. This strategic move will create additional space, ensuring a more enjoyable experience for all visitors to the area. For all proposals, the materials selected for the parking lot and driveway will be asphalt, minimizing the need for regrading after heavy rainfall or during snow removal.

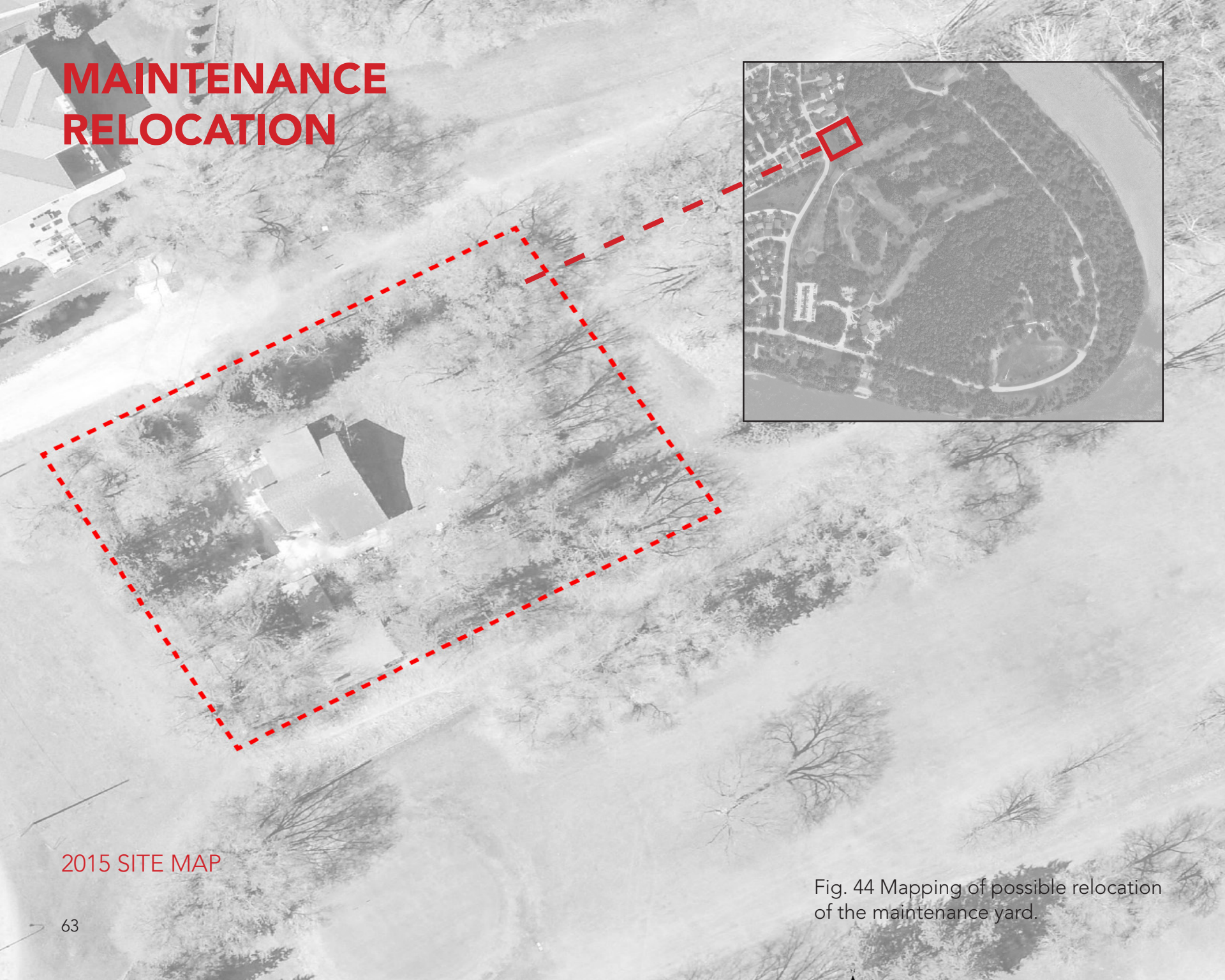


- - - PROPOSED PATHWAY
- EXISTING PATHWAY

Fig. 43 Pedestrian paths proposal graphic.



MAINTENANCE RELOCATION



2015 SITE MAP

Fig. 44 Mapping of possible relocation of the maintenance yard.

2024 CURRENT SITE PICTURES



Fig. 45 Images of the possible relocation area.

For all proposals, the maintenance area will be relocated to a site just northwest of the Crescent Drive golf course. This site is designated as a vacant lot within the city of Winnipeg's assessment parcel and now currently for sale. In 2015, there was an abandoned building on this property, but it was demolished in 2024. Although this new area is smaller than the current maintenance facility, it will have sufficient space to store the equipments.

PROPOSAL INTRODUCTION

Each proposal will build upon a base plan that includes the addition of new sidewalks, which will connect to existing ones. This initiative aims to reduce the necessity for pedestrians to share the road with vehicles and cyclists. Additionally, all proposals will involve the removal of current street parking near the entrance of Crescent Drive Park, extending up to the stop sign on Crescent Drive.

The primary objective of these proposals is to increase parking capacity from 89 to a minimum of 150 stalls, accommodating vehicles both on the street and along the driveway. This series of proposals will enhance vehicle circulation while preserving the native trees in the area. The developed proposals will adhere to these guidelines, each presenting its own advantages and disadvantages.

**PROPOSAL 1
(WEDGE HYBRID OAK LOT)**

In Proposal 1, the parking lot is designed in a wedge shape, inspired by a golf wedge. This shape allows the design to avoid and preserve the healthy trees situated between the golf course and Thermea.

BIOSWALES

BIOSWALES

PATHWAY

PRAIRIE GRASS

PATHWAY

EXIT

ENTRANCE

ENTRANCE/
DROP-OFF

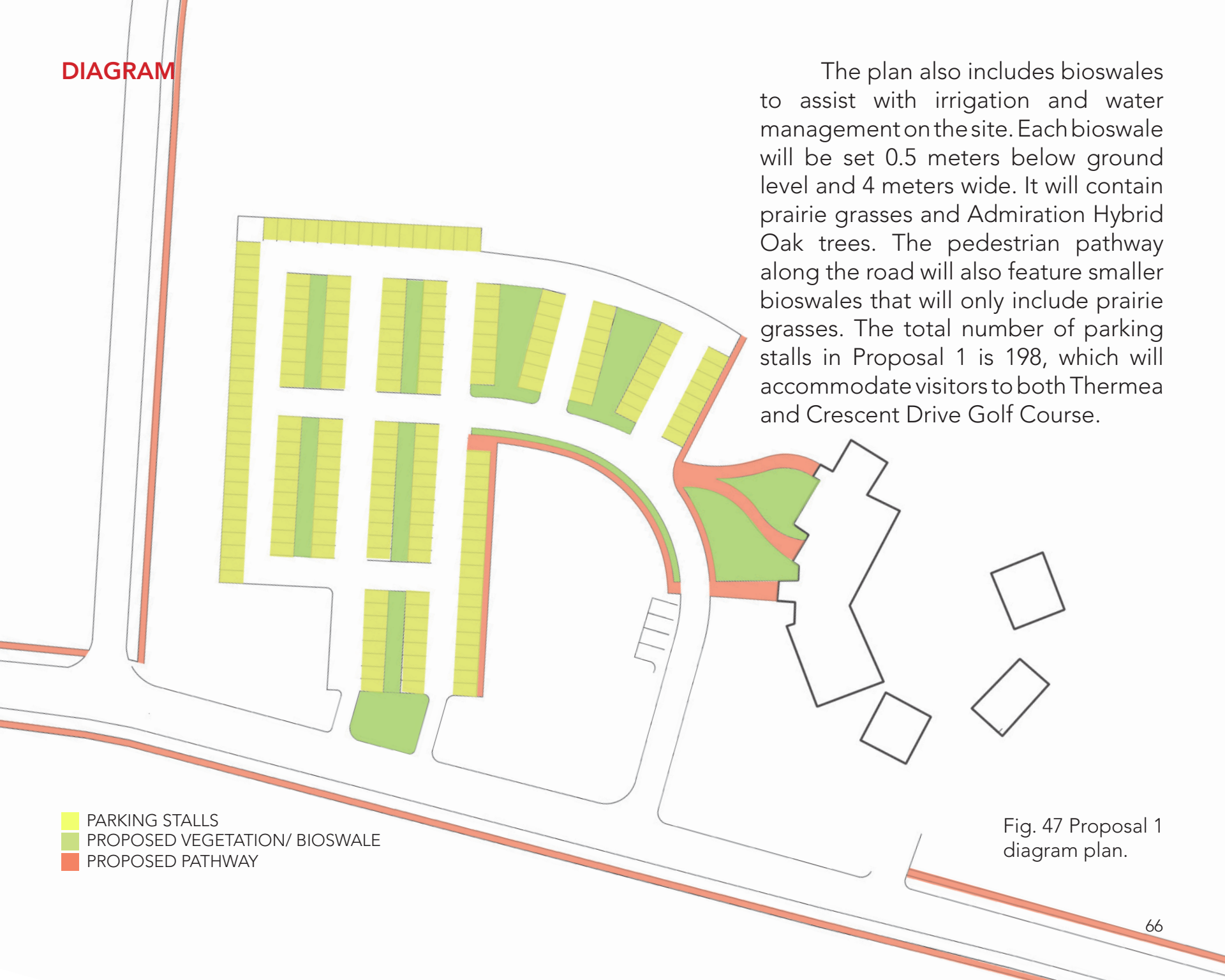
TOTAL PARKING STALLS: 198

Fig. 46 Proposal 1 plan.



DIAGRAM

The plan also includes bioswales to assist with irrigation and water management on the site. Each bioswale will be set 0.5 meters below ground level and 4 meters wide. It will contain prairie grasses and Admiration Hybrid Oak trees. The pedestrian pathway along the road will also feature smaller bioswales that will only include prairie grasses. The total number of parking stalls in Proposal 1 is 198, which will accommodate visitors to both Thermea and Crescent Drive Golf Course.



- PARKING STALLS
- PROPOSED VEGETATION/ BIOSWALE
- PROPOSED PATHWAY

Fig. 47 Proposal 1 diagram plan.

PROPOSAL 1 PLANTING REMOVAL

Dead Trees that will be removed: 9

Live Trees that will be removed: 34

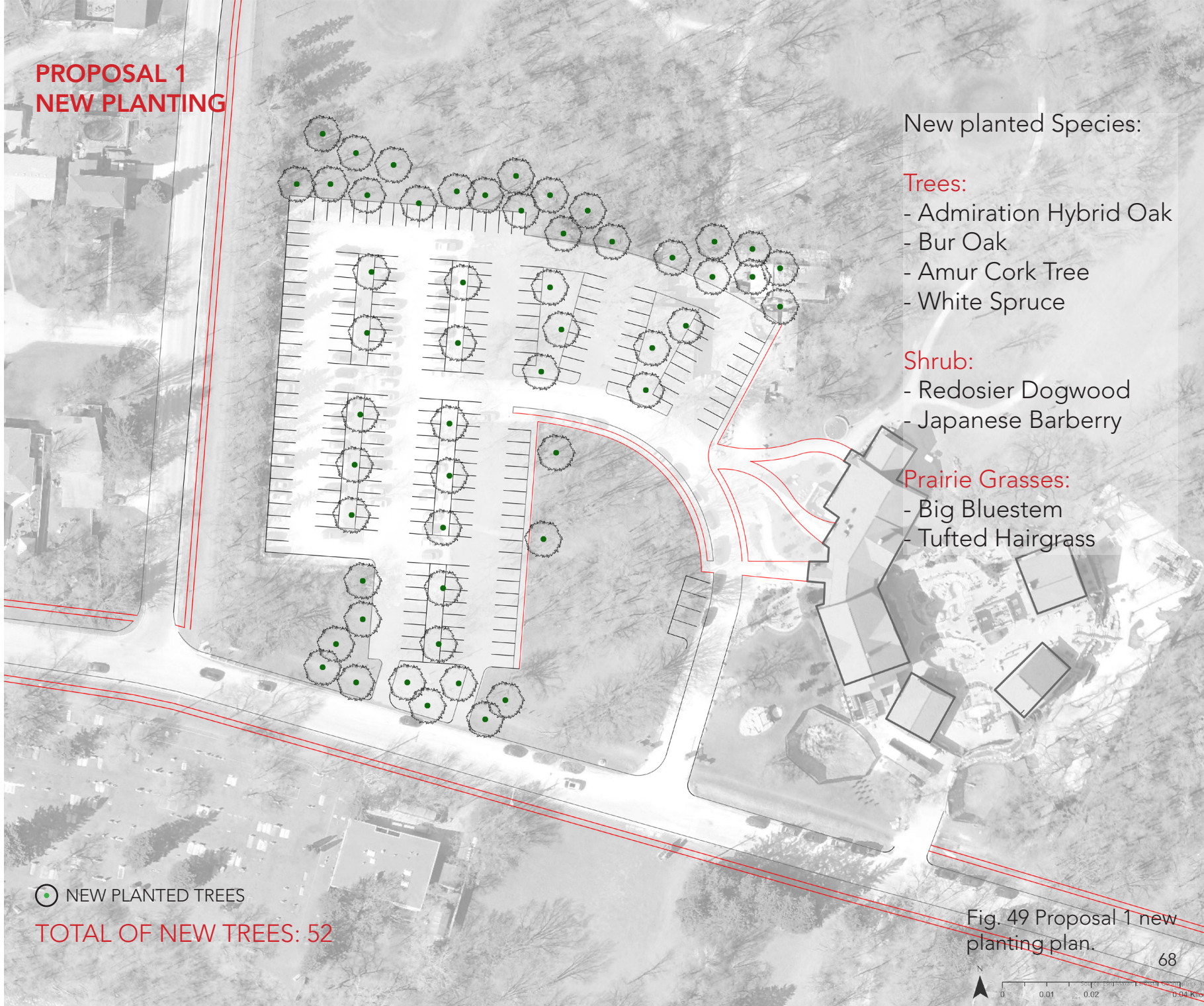
- HEALTHY TREES, NOT NATIVE SPECIES
- HEALTHY TREES, NATIVE SPECIES
- UNHEALTHY TREES
- DEAD TREES

TOTAL TREES REMOVED: 43

Fig. 48 Proposal 1 planting removal plan.



PROPOSAL 1 NEW PLANTING



New planted Species:

Trees:

- Admiration Hybrid Oak
- Bur Oak
- Amur Cork Tree
- White Spruce

Shrub:

- Redosier Dogwood
- Japanese Barberry

Prairie Grasses:

- Big Bluestem
- Tufted Hairgrass

● NEW PLANTED TREES

TOTAL OF NEW TREES: 52

Fig. 49 Proposal 1 new planting plan.

PROS

CONS

- Parking stalls are increased to 198 from 89	- There will be some grass areas excavated to expand the parking lot
- Vegetation is increased to provide better shading at the lot. Total of 52 new trees.	- There will be a total of 43 trees that will be removed: 9 dead trees, 34 live trees.
- Car circulation is improved by designating an entrance and exit. There is also another entrance with drop-off.	- Minimal areas to store snow piles during winter season
- The added pedestrian path will provide a safer way to Thermea	- Pathways are more to the edge of the lot but none in the lot
- Bioswales help improve water drainage	

Fig. 51 Proposal 1 Pro / Con table.

	Parking Stalls	Total Footprint (sqm)	New Trees	Dead Trees Removed	Live Trees Removed	Total Trees Removed	New Hardsurface (sqm)	Total Softscape (sqm)	Rough Cost for Hardscape, New Trees, Softscape and Removal of Trees
Proposal 1 (Wedge Hybrid Oak Lot)	198	9374.4	52	9	34	43	8058.74	1315.66	\$1 352 528.90

Fig. 52 Proposal 1 summary table.

PROPOSAL 2 PLAN (WAVE ALLEE LOT)

PATHWAY

BIOSWALES

GREEN ISLAND

PATHWAY

EXIT

In Proposal 2, the parking lot features a design that incorporates bioswales, elegantly resembling the natural flow of waves. This approach not only enhances the visual appeal but also preserves healthy trees while removing those in poor condition between Thermea and the golf course. The bioswales will play a crucial role in improving water management and addressing irrigation challenges on the site.

BIOSWALES

PRAIRIE GRASS
BARRIER

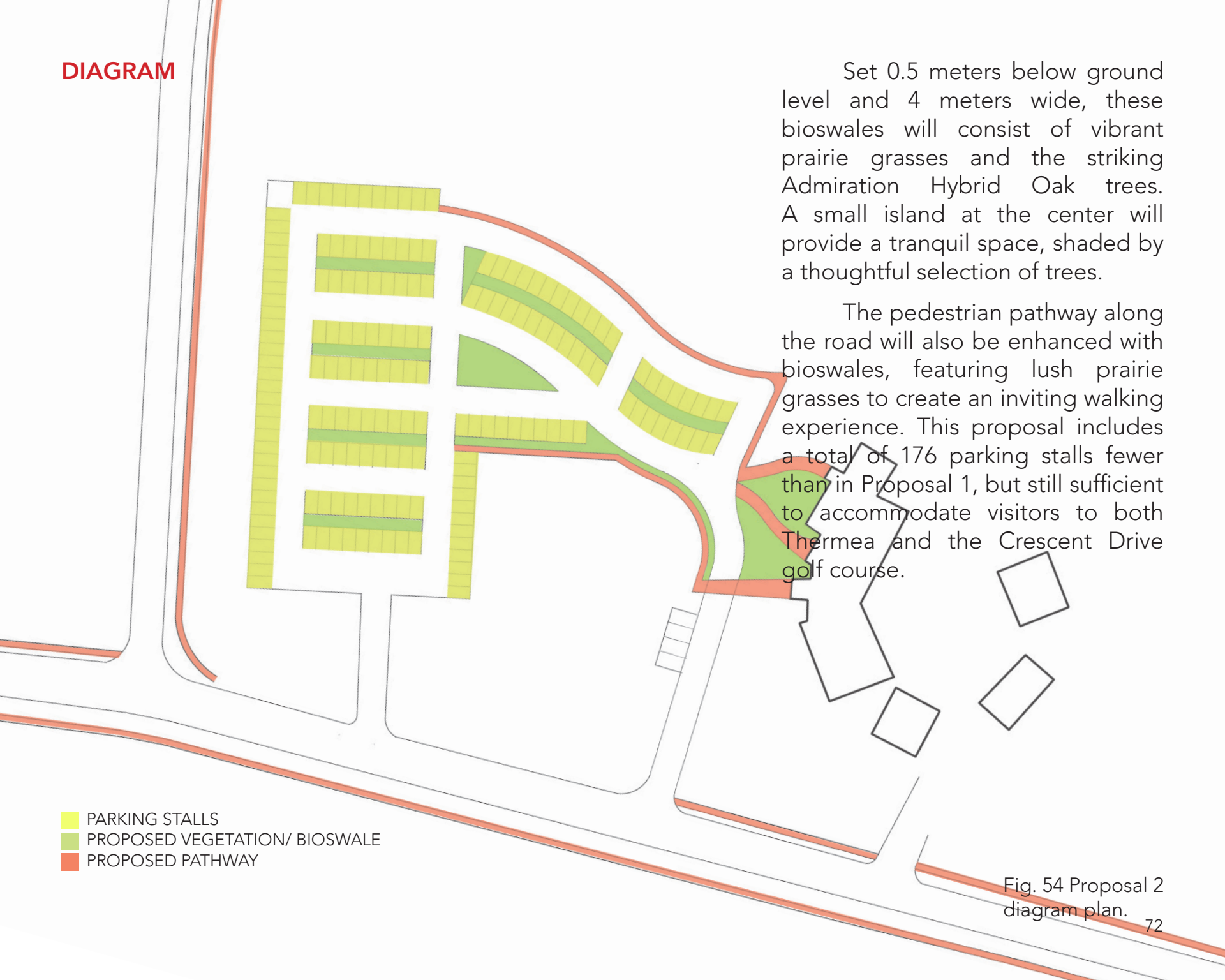
ENTRANCE

TOTAL PARKING STALLS: 176

Fig. 53 Proposal 2 plan.



DIAGRAM



Set 0.5 meters below ground level and 4 meters wide, these bioswales will consist of vibrant prairie grasses and the striking Admiration Hybrid Oak trees. A small island at the center will provide a tranquil space, shaded by a thoughtful selection of trees.

The pedestrian pathway along the road will also be enhanced with bioswales, featuring lush prairie grasses to create an inviting walking experience. This proposal includes a total of 176 parking stalls fewer than in Proposal 1, but still sufficient to accommodate visitors to both Thermea and the Crescent Drive golf course.

- PARKING STALLS
- PROPOSED VEGETATION/ BIOSWALE
- PROPOSED PATHWAY

Fig. 54 Proposal 2 diagram plan.

PROPOSAL 2 PLANTING REMOVAL

Dead Trees that will be removed: 18

Live Trees that will be removed: 26

- HEALTHY TREES, NOT NATIVE SPECIES
- HEALTHY TREES, NATIVE SPECIES
- UNHEALTHY TREES
- DEAD TREES

TOTAL TREES REMOVED: 44

Fig. 55 Proposal 2 planting removal plan.



PROPOSAL 2 NEW PLANTING

New planted Species:

Trees:

- Admiration Hybrid Oak
- Bur Oak
- Amur Cork Tree
- White Spruce

Shrub:

- Redosier Dogwood
- Japanese Barberry

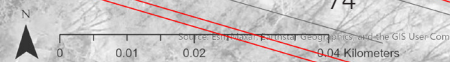
Prairie Grasses:

- Big Bluestem
- Tufted Hairgrass

● NEW PLANTED TREES

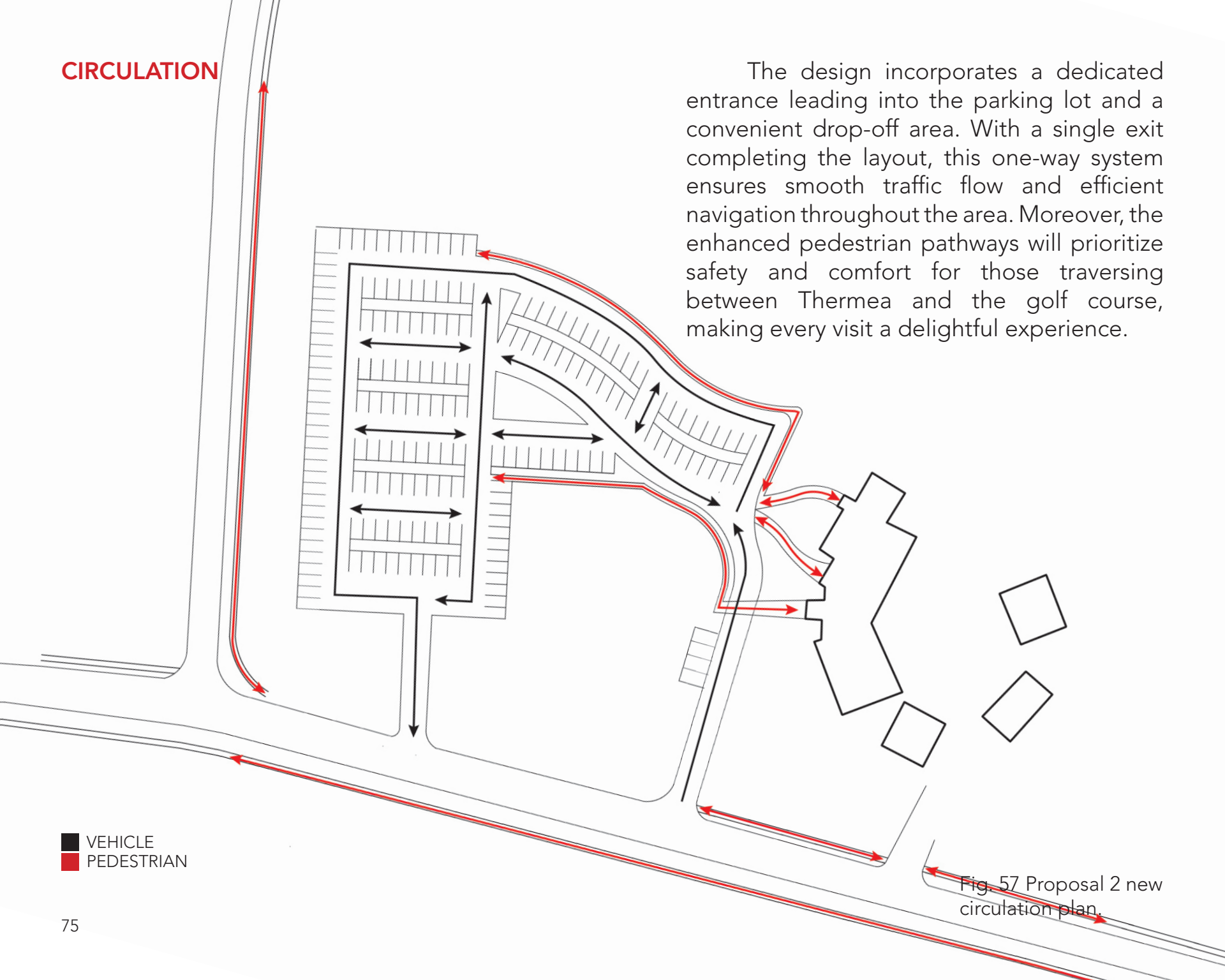
TOTAL OF NEW TREES: 74

Fig. 56 Proposal 2 new planting plan.



CIRCULATION

The design incorporates a dedicated entrance leading into the parking lot and a convenient drop-off area. With a single exit completing the layout, this one-way system ensures smooth traffic flow and efficient navigation throughout the area. Moreover, the enhanced pedestrian pathways will prioritize safety and comfort for those traversing between Thermea and the golf course, making every visit a delightful experience.



■ VEHICLE
■ PEDESTRIAN

Fig. 57 Proposal 2 new circulation plan.

PROS

CONS

- Parking stalls are increased to 176 from 89	- There will be some grass areas excavated to expand the parking lot
- Vegetation is increased to provide better shading at the lot. Total of 74 new trees.	- There will be a total of 44 trees that will be removed: 18 dead trees, 26 live trees.
- Car circulation is improved by designating an entrance and exit.	- Minimal areas to store snow piles during winter season
- The added pedestrian path will provide a safer way from the lot to Thermea	- Pathways are more to the edge of the lot but none in the lot
- Bioswales help improve the water drainage	- Lack of color during the winter months

Fig. 58 Proposal 2 Pro / Con table.

	Parking Stalls	Total Footprint (sqm)	New Trees	Dead Trees Removed	Live Trees Removed	Total Trees Removed	New Hardsurface (sqm)	Total Softscape (sqm)	Rough Cost for Hardscape, New Trees, Softscape and Removal of Trees
Proposal 2 (Wave Allee Lot)	176	8270.21	74	18	26	44	7470.81	799.4	\$1 239 982.50

Fig. 59 Proposal 2 summary table.

PROPOSAL 3 PLAN (CRABAPPLE ALLEE LOT)

BIOSWALES

PATHWAY

EXIT

In Proposal 3, presents a refined design that continues the theme of our previous proposals with the inclusion of bioswales. The expanded parking lot will take the place of the existing maintenance yard after its relocation, enhancing the overall flow and functionality of the area.

PATHWAY

GREEN ISLAND

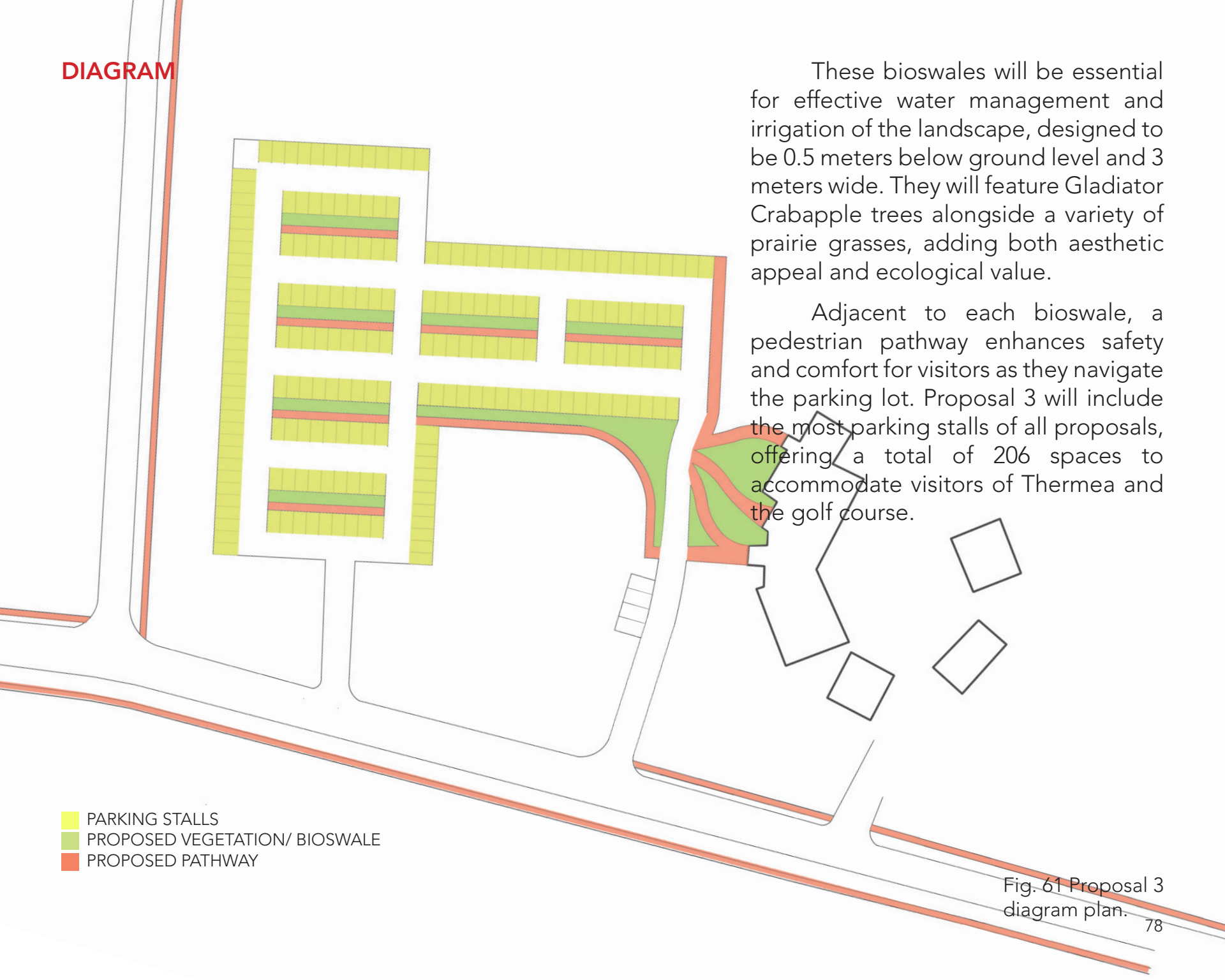
ENTRANCE

TOTAL PARKING STALLS: 206

Fig. 60 Proposal 3 plan.



DIAGRAM



These bioswales will be essential for effective water management and irrigation of the landscape, designed to be 0.5 meters below ground level and 3 meters wide. They will feature Gladiator Crabapple trees alongside a variety of prairie grasses, adding both aesthetic appeal and ecological value.

Adjacent to each bioswale, a pedestrian pathway enhances safety and comfort for visitors as they navigate the parking lot. Proposal 3 will include the most parking stalls of all proposals, offering a total of 206 spaces to accommodate visitors of Thermea and the golf course.

- PARKING STALLS
- PROPOSED VEGETATION/ BIOSWALE
- PROPOSED PATHWAY

Fig. 61 Proposal 3 diagram plan.

PROPOSAL 3 PLANTING REMOVAL

Dead Trees that will be removed: 18

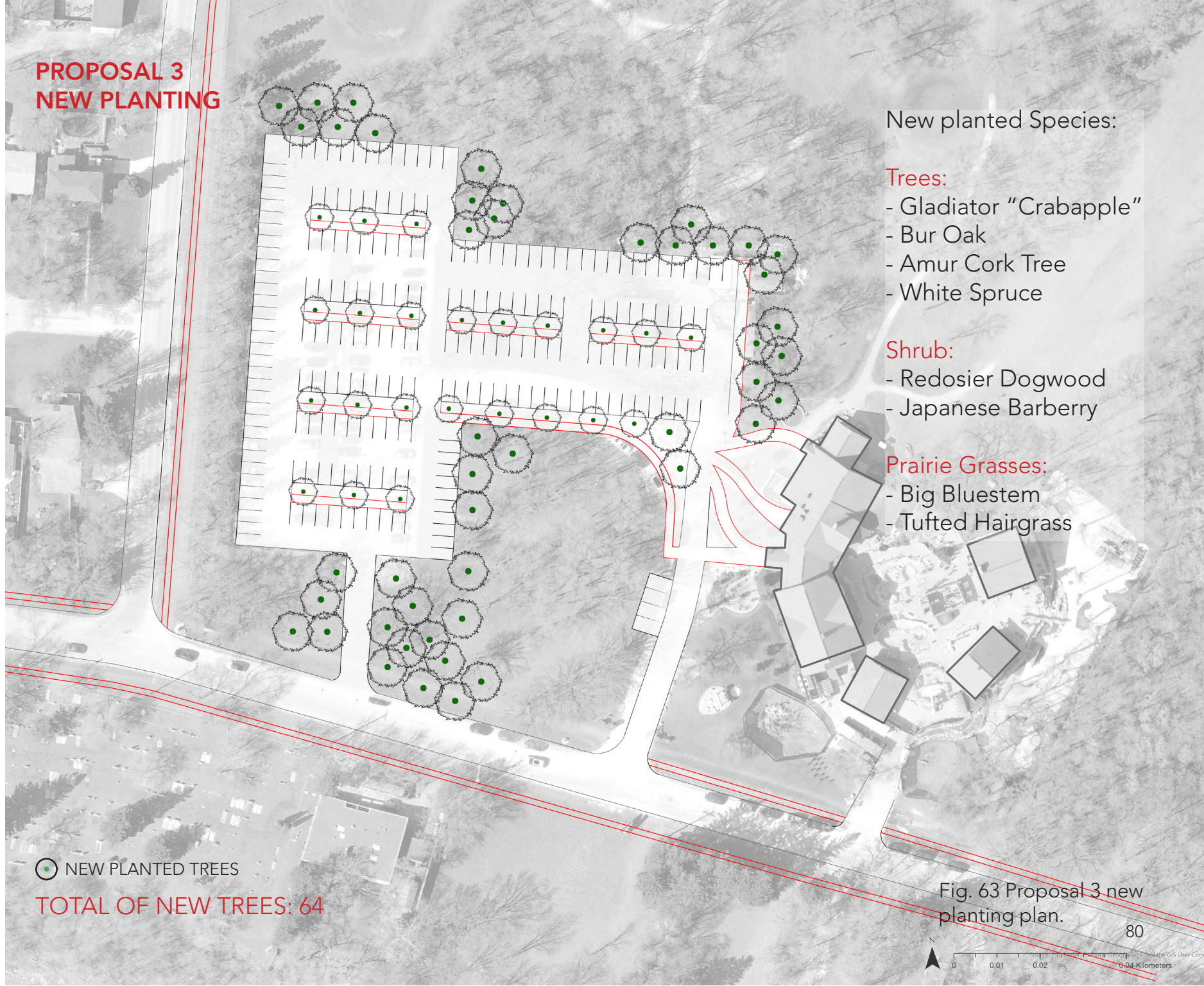
Live Trees that will be removed: 30

- HEALTHY TREES, NOT NATIVE SPECIES
- HEALTHY TREES, NATIVE SPECIES
- UNHEALTHY TREES
- DEAD TREES

TOTAL TREES REMOVED: 48

Fig. 62 Proposal 3 planting removal plan.

PROPOSAL 3 NEW PLANTING



New planted Species:

Trees:

- Gladiator "Crabapple"
- Bur Oak
- Amur Cork Tree
- White Spruce

Shrub:

- Redosier Dogwood
- Japanese Barberry

Prairie Grasses:

- Big Bluestem
- Tufted Hairgrass

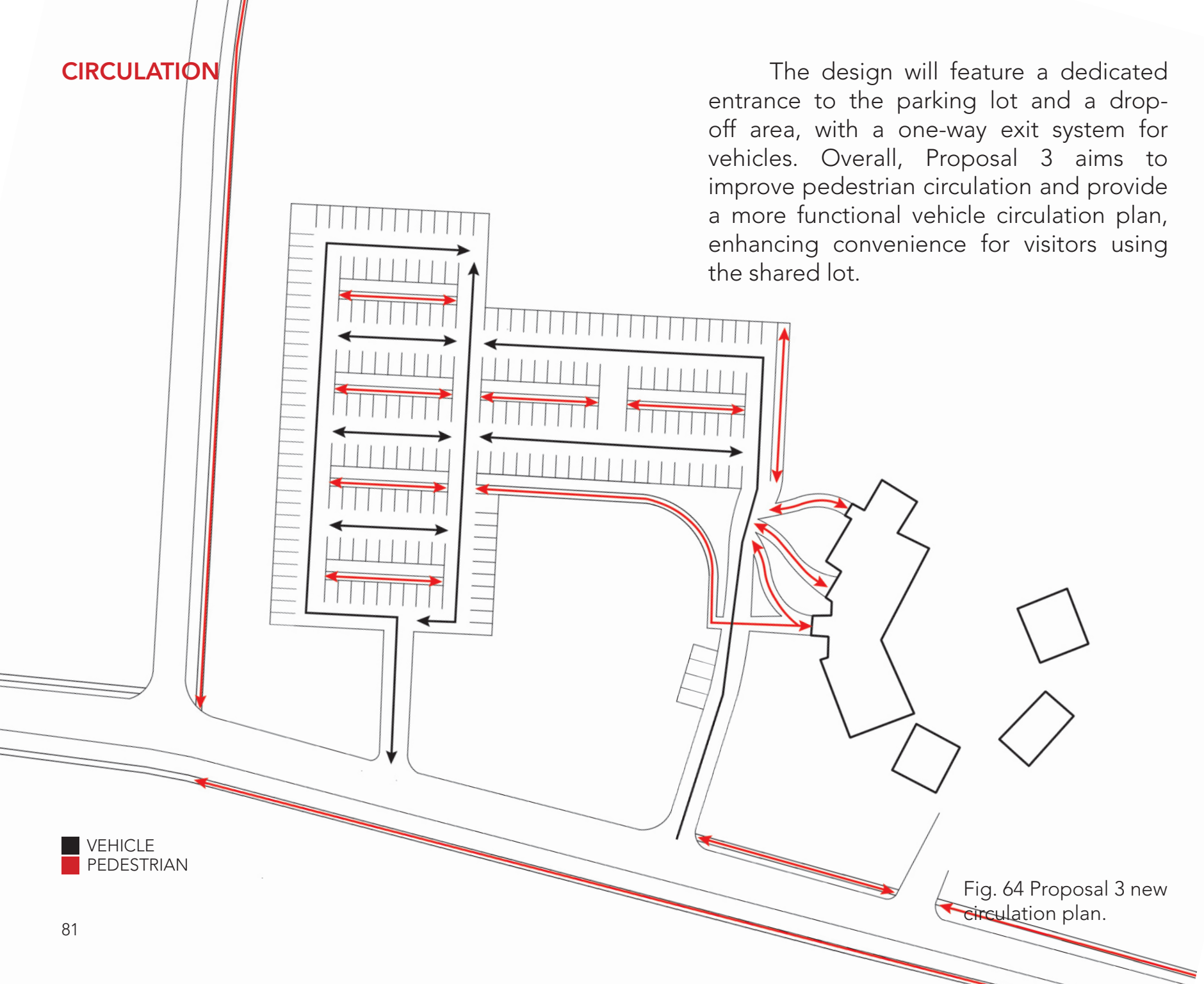
● NEW PLANTED TREES

TOTAL OF NEW TREES: 64

Fig. 63 Proposal 3 new planting plan.

CIRCULATION

The design will feature a dedicated entrance to the parking lot and a drop-off area, with a one-way exit system for vehicles. Overall, Proposal 3 aims to improve pedestrian circulation and provide a more functional vehicle circulation plan, enhancing convenience for visitors using the shared lot.



■ VEHICLE
■ PEDESTRIAN

Fig. 64 Proposal 3 new circulation plan.

PROS

CONS

- Parking stalls are increased to 206 from 89	- There will be more green spaces taken out to expand the parking lot
- Vegetation is increased to provide better shading at the lot. Total of 64 new trees.	- There will be a total of 48 trees that will be removed: 18 dead trees, 30 live trees.
- Car circulation is improved by designating an entrance and exit.	- Minimal areas to store snow piles during winter season
- The added pedestrian path will provide a safer path from the lot to Thermea	- More expensive to construct.
- Bioswales help improved water drainage	

Fig. 65 Proposal 3 Pro / Con table.

	Parking Stalls	Total Footprint (sqm)	New Trees	Dead Trees Removed	Live Trees Removed	Total Trees Removed	New Hardsurface (sqm)	Total Softscape (sqm)	Rough Cost for Hardscape, New Trees, Softscape and Removal of Trees
Proposal 3 (Crabapple Allee Lot)	206	9938.74	64	18	30	48	8718.86	1219.89	\$1 450 521.85

Fig. 66 Proposal 3 summary table.

PROPOSAL 4 PLAN (TRANSIT THROUGH LOT)

TWO-WAY
TRAFFIC W/
TRANSIT

SMALL
ISLANDS

BUS STOPS

GREEN
PATCH

PRAIRIE
GRASSES

PATHWAY

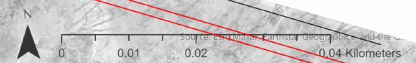
In Proposal 4, we propose a complete transformation of the parking lot through careful reorganization and reorientation. The parking stalls will be aligned parallel to the main road, supplemented green spaces featuring Gladiolus and "Ornamental Crabapple" trees, which will provide shade and improve water management.

PRAIRIE
GRASSES

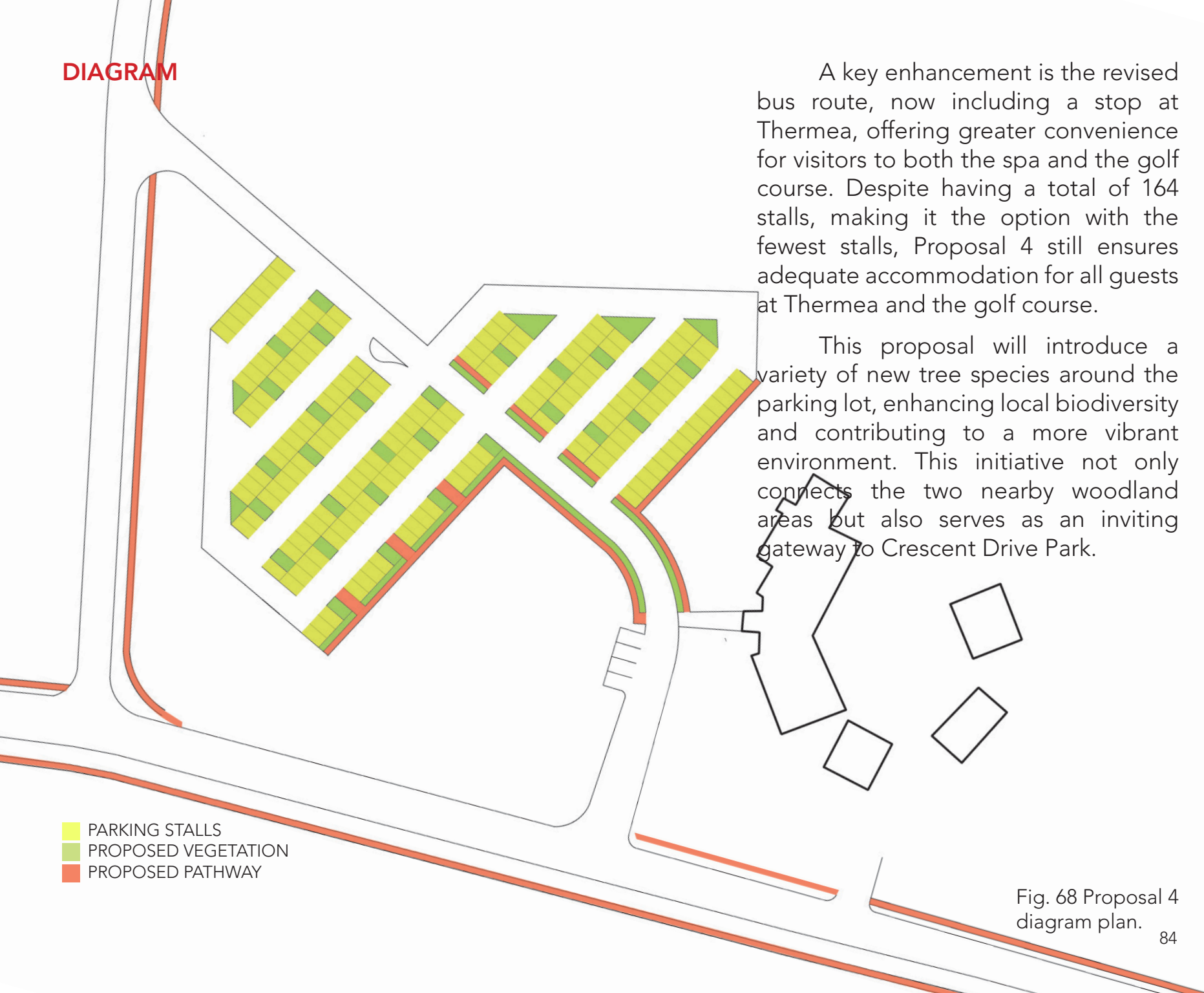
PATHWAY

TOTAL PARKING STALLS: 164

Fig



DIAGRAM



- PARKING STALLS
- PROPOSED VEGETATION
- PROPOSED PATHWAY

A key enhancement is the revised bus route, now including a stop at Thermea, offering greater convenience for visitors to both the spa and the golf course. Despite having a total of 164 stalls, making it the option with the fewest stalls, Proposal 4 still ensures adequate accommodation for all guests at Thermea and the golf course.

This proposal will introduce a variety of new tree species around the parking lot, enhancing local biodiversity and contributing to a more vibrant environment. This initiative not only connects the two nearby woodland areas but also serves as an inviting gateway to Crescent Drive Park.

Fig. 68 Proposal 4 diagram plan.

PROPOSAL 4 PLANTING REMOVAL

Dead Trees that will be removed: 11

Live Trees that will be removed: 41

- HEALTHY TREES, NOT NATIVE SPECIES
- HEALTHY TREES, NATIVE SPECIES
- UNHEALTHY TREES
- DEAD TREES

TOTAL TREES REMOVED: 52

Fig. 69 Proposal 4 planting removal plan.



PROPOSAL 4 NEW PLANTING

New planted Species:

Trees:

- Gladiator "Crabapple"
- Bur Oak
- Amur Cork Tree
- White Spruce

Shrub:

- Redosier Dogwood
- Japanese Barberry

Prairie Grasses:

- Big Bluestem
- Tufted Hairgrass

● NEW PLANTED TREES

TOTAL OF NEW TREES: 82

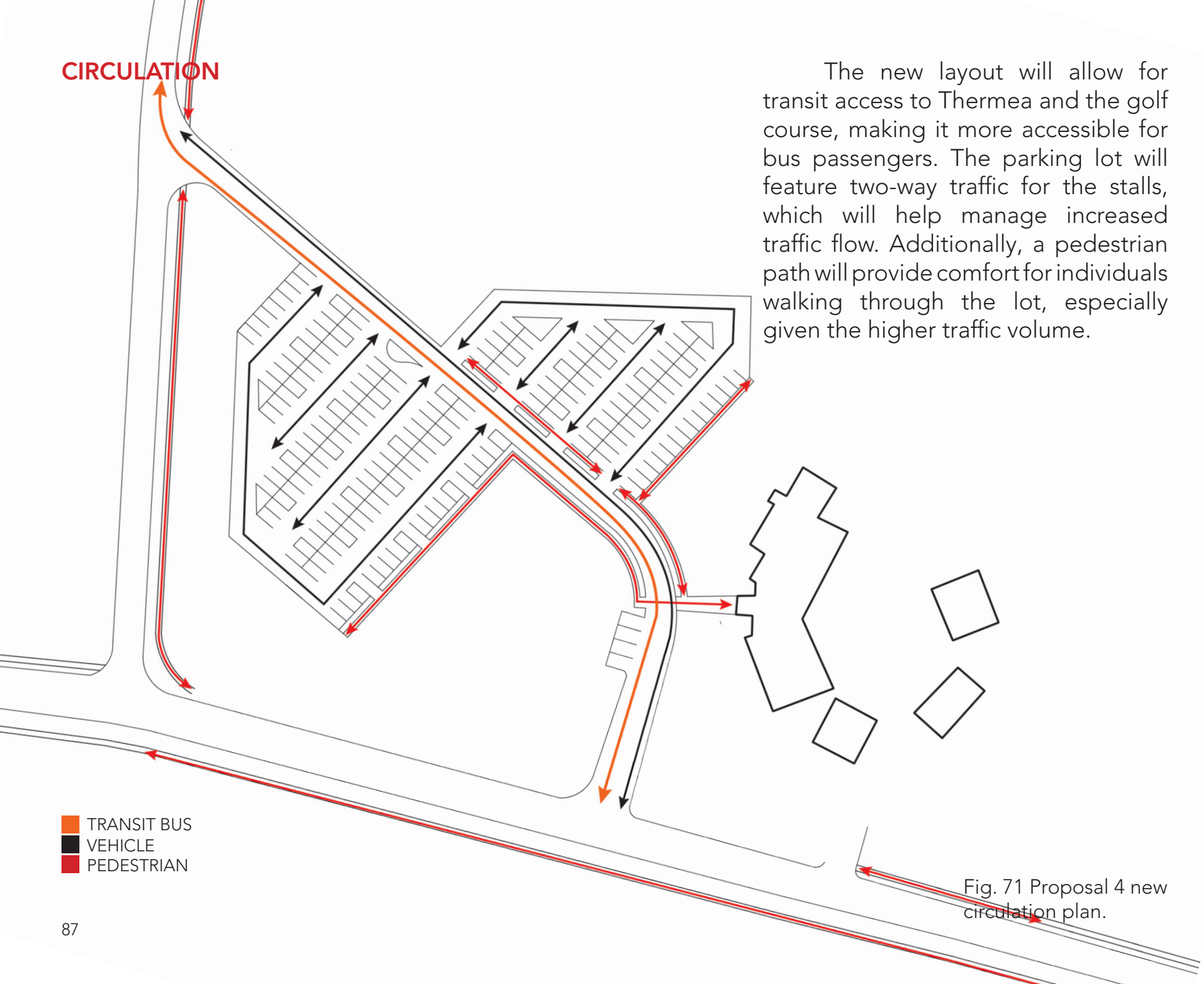
Fig. 70 Proposal 4 new planting plan.

CIRCULATION

The new layout will allow for transit access to Thermea and the golf course, making it more accessible for bus passengers. The parking lot will feature two-way traffic for the stalls, which will help manage increased traffic flow. Additionally, a pedestrian path will provide comfort for individuals walking through the lot, especially given the higher traffic volume.

- TRANSIT BUS
- VEHICLE
- PEDESTRIAN

Fig. 71 Proposal 4 new circulation plan.



PROS

CONS

- Parking stalls are increased to 176 from 89	- There will be some grass areas excavated to expand the parking lot
- Vegetation is increased to provide better shading at the lot. Total of 82 new trees.	- There will be a total of 52 trees that will be removed: 11 dead trees, 41 live trees.
- Entrance and exit has been established for better car circulation. Bus route is added into the vehicle circulation.	- The parking lot will have more vehicular traffic
- Biodiversity is increased and acts as a gateway to Crescent Drive Park.	- Minimal areas to store snow piles during winter season
- More convenient for visitors of the spa and golf course with the added transit route	- Less pedestrian paths in the lot.

Fig. 72 Proposal 4 Pro / Con table.

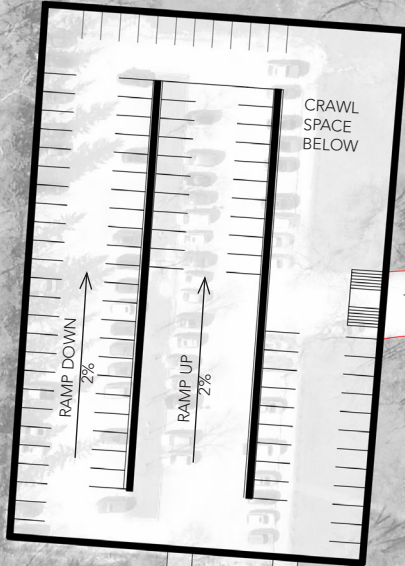
	Parking Stalls	Total Footprint (sqm)	New Trees	Dead Trees Removed	Live Trees Removed	Total Trees Removed	New Hardsurface (sqm)	Total Softscape (sqm)	Rough Cost for Hardscape, New Trees, Softscape and Removal of Trees
Proposal 4 (Transit Through Lot)	164	8620.41	82	11	41	52	7751.18	869.23	\$1 298 876.95

Fig. 73 Proposal 4 summary table.

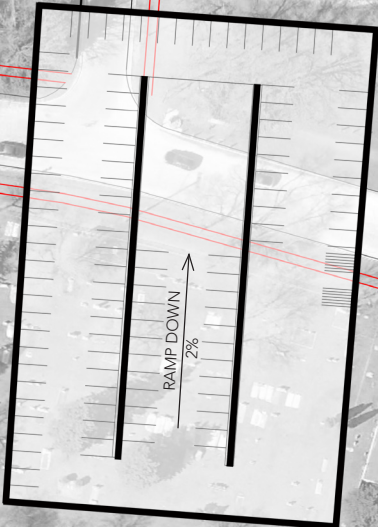
PROPOSAL 5 PLAN (PARKADE)

In Proposal 5, we will convert the parking lot into an appealing parkade. This new two-story building, each floor reaching three meters in height with a modern closed roof, will be a noteworthy addition to the community.

MAIN FLOOR



2ND FLOOR



TOTAL PARKING STALLS: 204

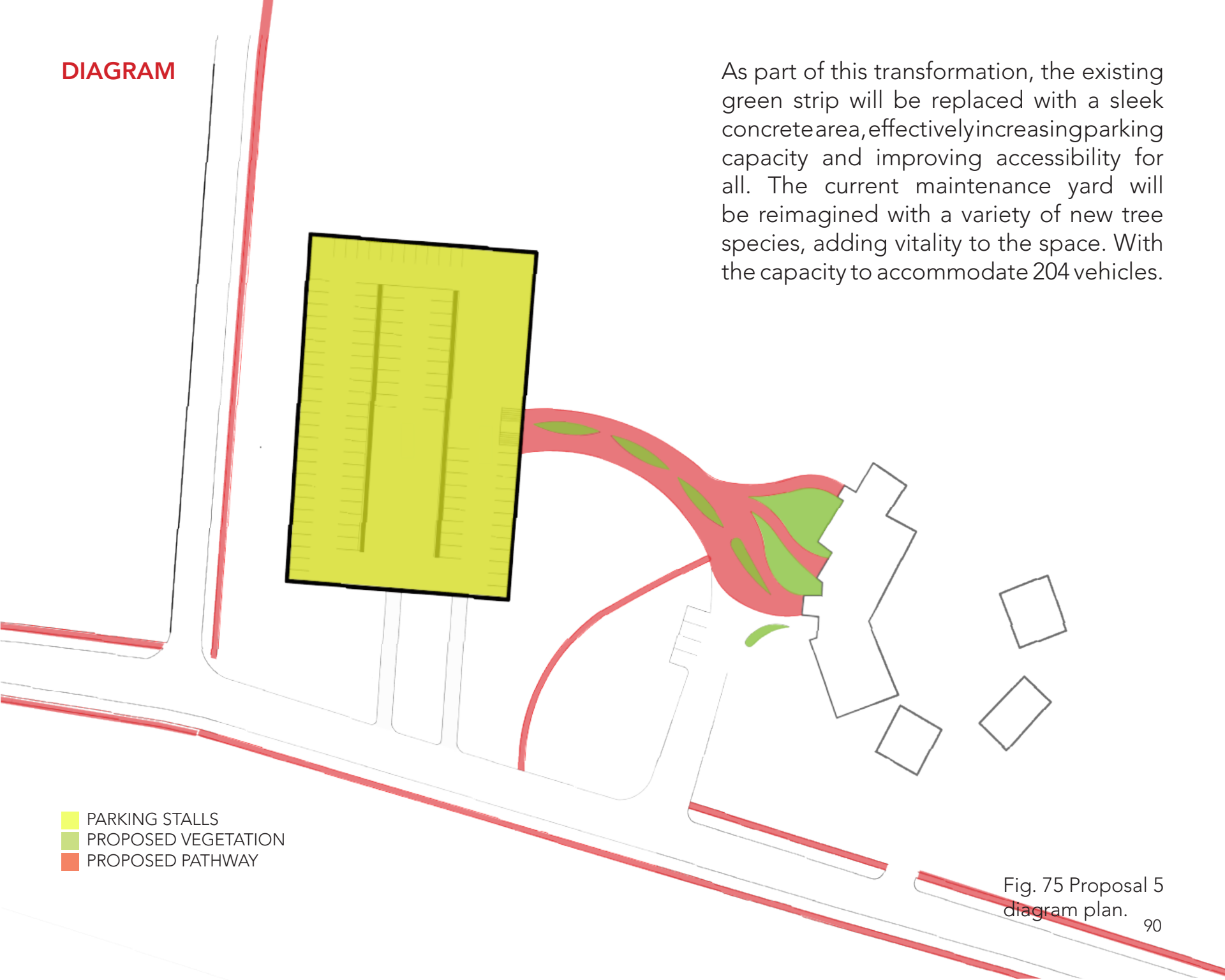
GREEN PATCHES

PATHWAY

Fig. 74 Proposal 5 plan

DIAGRAM

As part of this transformation, the existing green strip will be replaced with a sleek concrete area, effectively increasing parking capacity and improving accessibility for all. The current maintenance yard will be reimagined with a variety of new tree species, adding vitality to the space. With the capacity to accommodate 204 vehicles.



- PARKING STALLS
- PROPOSED VEGETATION
- PROPOSED PATHWAY

Fig. 75 Proposal 5 diagram plan.

PROPOSAL 5 PLANTING REMOVAL

Dead Trees that will be removed: 6
Live Trees that will be removed: 16

- HEALTHY TREES, NOT NATIVE SPECIES
- HEALTHY TREES, NATIVE SPECIES
- UNHEALTHY TREES
- DEAD TREES

TOTAL TREES REMOVED: 22

Fig. 76 Proposal 5 planting removal plan.



PROPOSAL 5 NEW PLANTING



New planted Species:

Trees:

- Gladiator "Crabapple"
- Bur Oak
- Amur Cork Tree
- White Spruce

Shrub:

- Redosier Dogwood
- Japanese Barberry

Prairie Grasses:

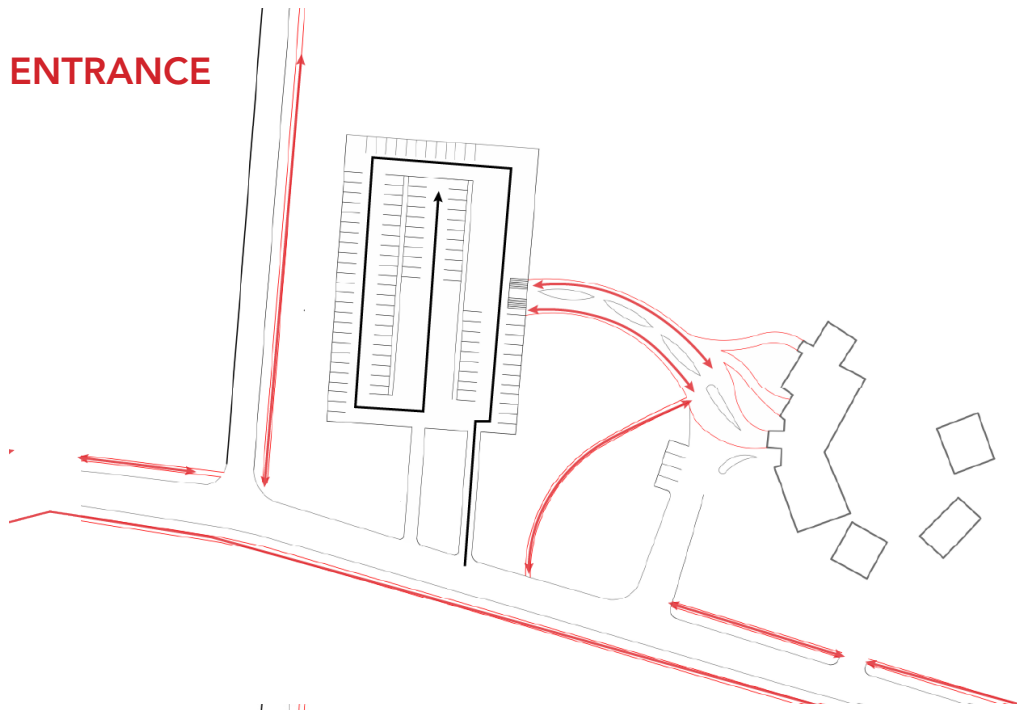
- Big Bluestem
- Tufted Hairgrass

● NEW PLANTED TREES

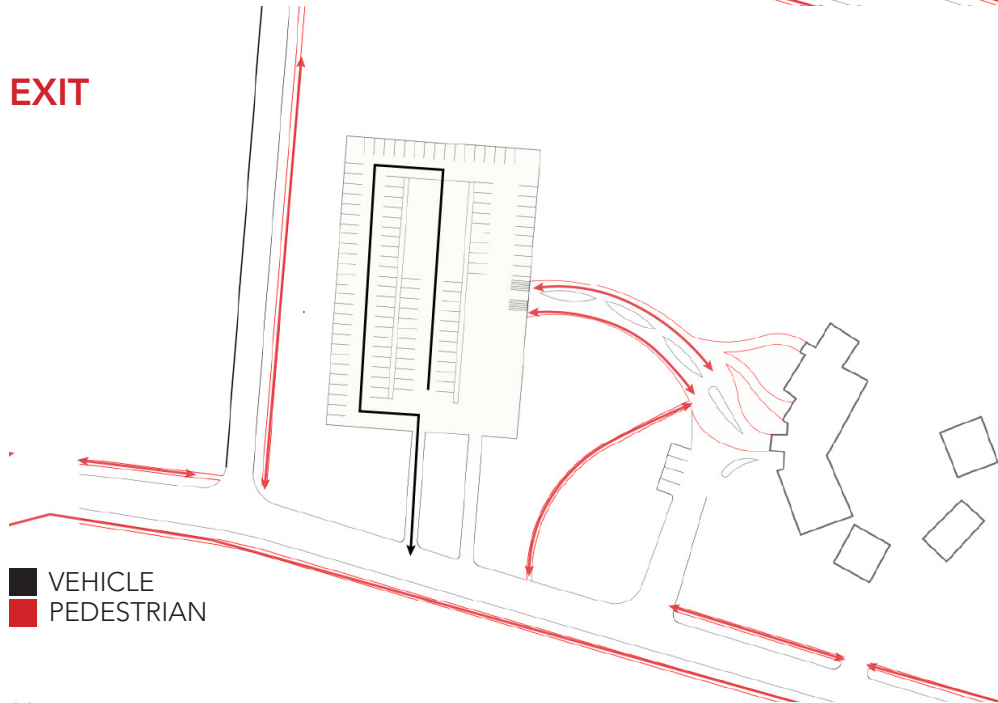
TOTAL OF NEW TREES: 40

Fig. 77 Proposal 5 new planting plan.

ENTRANCE



EXIT



■ VEHICLE
■ PEDESTRIAN

Half of the existing entrance path will be designated as a drop-off zone only, with a newly designed entrance and exit ensuring smooth one-way traffic flow. Stairs will gracefully connect the second floor directly to the new pedestrian path, encouraging strolls and inviting visitors to explore the area without the worry of oncoming traffic.

Fig. 78 Proposal 5 new circulation plan.

PROS

CONS

- Parking stalls are increased to 204 from 89	- There will be green spaces excavated to provide a path for the entrance and exit.
- Vegetation is increased to provide better shading at the lot. Total of 40 new trees.	- There will be a total of 22 trees that will be removed: 6 dead trees, 16 live trees.
- Car circulation is improved by designating an entrance and exit.	- Minimal areas to store snow piles during winter season
- The pedestrian path will provide a safer path from the lot to Thermea	- The building structure is not complementing the surrounding context.
- Improved water drainage	- The cost of constructing the parkade making it the most expensive proposal

Fig. 79 Proposal 5 Pro / Con table.

	Parking Stalls	Total Footprint (sqm)	New Trees	Dead Trees Removed	Live Trees Removed	Total Trees Removed	New Hardsurface (sqm)	Total Softscape (sqm)	Rough Cost for Hardscape, New Trees, Softscape and Removal of Trees
Proposal 5 (Parkade)	204	6230.47	30	6	16	22	6230.47	494.55	\$11 436 405.75

Fig. 80 Proposal 5 summary table.

PROPOSAL COMPARISON

	Parking Stalls	Total Footprint (sqm)	New Trees	Dead Trees Removed	Live Trees Removed	Total Trees Removed	New Hardsurface (sqm)	Total Softscape (sqm)	Rough Cost for Hardscape, New Trees, Softscape and Removal of Trees
Proposal 1 (Wedge Hybrid Oak Lot)	198	9374.4	52	9	34	43	8058.74	1315.66	\$1 352 528.90
Proposal 2 (Wave Allee Lot)	176	8270.21	74	18	26	44	7470.81	799.4	\$1 239 982.50
Proposal 3 (Crabapple Allee Lot)	206	9938.74	64	18	30	48	8718.86	1219.89	\$1 450 521.85
Proposal 4 (Transit Through Lot)	164	8620.41	82	11	41	52	7751.18	869.23	\$1 298 876.95
Proposal 5 (Parkade)	204	6230.47	30	6	16	22	6230.47	494.55	\$11 436 405.75

Fig. 81 Proposals comparison table.

Includes building

CONCLUSION

Each proposal presents advantages and disadvantages, including the number of parking stalls, the trees that will be removed, the new trees that will be planted, and the distribution of hard surfaces and softscapes within each design. The proposals will also provide estimated construction costs for the parking lot, which will be essential for guiding the decision-making process, particularly if a budget is available.

The primary objective is to thoughtfully expand the parking lot to accommodate more visitors to the spa and golf course while eliminating street parking. Additionally, each proposal aims to connect with the existing pathway, enhancing safety for pedestrians and allowing them to enjoy their surroundings without concerns about nearby traffic. By balancing aesthetics and functionality, it aims to create a space that enhances the natural beauty of the area while meeting the needs of the community.



Fig. 82 Image of Thermea parking lot.

CHAPTER 6:

SITE DESIGN

FINAL DESIGN

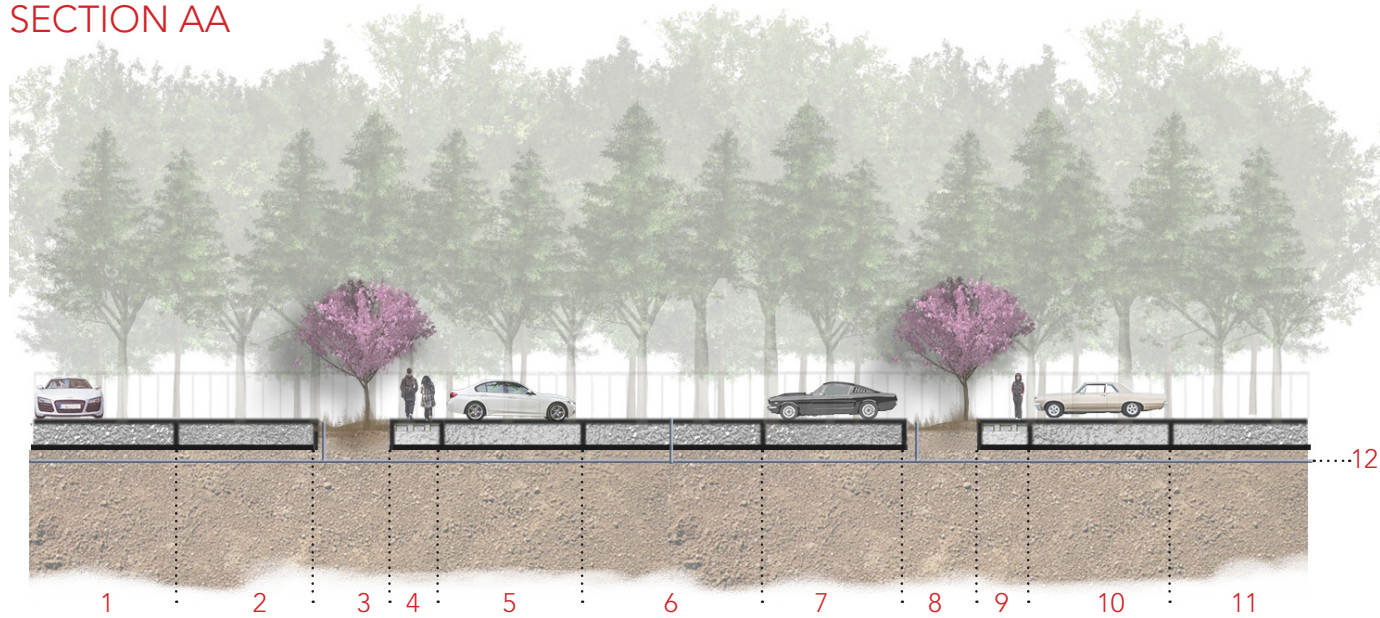
It provides the highest number of parking stalls among all design options, eliminates on-street parking, and enhances pedestrian safety through improved circulation and clearly defined pathways.

In addition, the design optimizes traffic flow within the site and incorporates enhanced water management strategies, including improved irrigation and drainage systems. Collectively, these elements make Proposal 3 the most balanced and sustainable solution for the site's functional and environmental needs.

The final design selected for implementation is Proposal 3: The Crabapple Allée Lot. This proposal was chosen because it effectively addresses the key objectives established in the feasibility study.

Fig. 83 Rendered plan of the chosen proposal.

SECTION AA



- AA**
1. Driving Aisle
 2. Parking Stall
 3. Crabbapple Bioswale
 4. Pedestrian Pathway
 5. Parking Stall
 6. Driving Aisle
 7. Parking stall
 8. Crabbapple Bioswale
 9. Pedestrian Pathway
 10. Parking Stall
 11. Driving Aisle
 12. Perforated Pipe

Fig. 84 Bioswales and the parking stalls.

SECTION BB



- BB**
1. Driving Aisle
 2. Parking Stall
 3. Crabbapple Bioswale
 4. Pedestrian Pathway
 5. Redosier Dogwood Barrier
 6. Woodland Areas

Fig. 85 Bioswales and the woodland areas.



Fig. 86 View looking at Thermea and the woodland areas from the parking lot.



Fig. 87 View of the bioswales and the pathways.



Fig. 88 View looking at the golf course from the parking lot.

The design intent behind Proposal 3 emphasizes creating a welcoming and visually cohesive landscape that complements the character of Crescent Drive Park. The introduction of a Crabapple Allée serves as both a defining aesthetic feature and a functional element, guiding visitors through the site while framing views toward the park and spa.

The flowering crabapple trees provide seasonal color and shade, enriching the sensory experience for pedestrians and reinforcing the site's connection to its natural surroundings. By integrating green infrastructure such as bioswales and native plantings the design not only enhances ecological performance but also transforms the parking lot into a multifunctional landscape that balances functionality, environmental responsibility, and visual appeal.

DETAILS

The materials selected for the parking lot will be asphalt, chosen for its cost-effectiveness, durability, and flexibility. Given that the parking lot for Thermea and the golf course is a high-traffic area, it may develop cracks over time; however, these can be repaired and replaced quickly.

The pedestrian pathways will be constructed using concrete pavers to effectively prevent pooling on the surface and direct water to the bioswales, particularly since most of the paths are located adjacent to the bioswales.

Fig. 89 A section plan of parking stalls.



1 TREE DETAIL

1:50

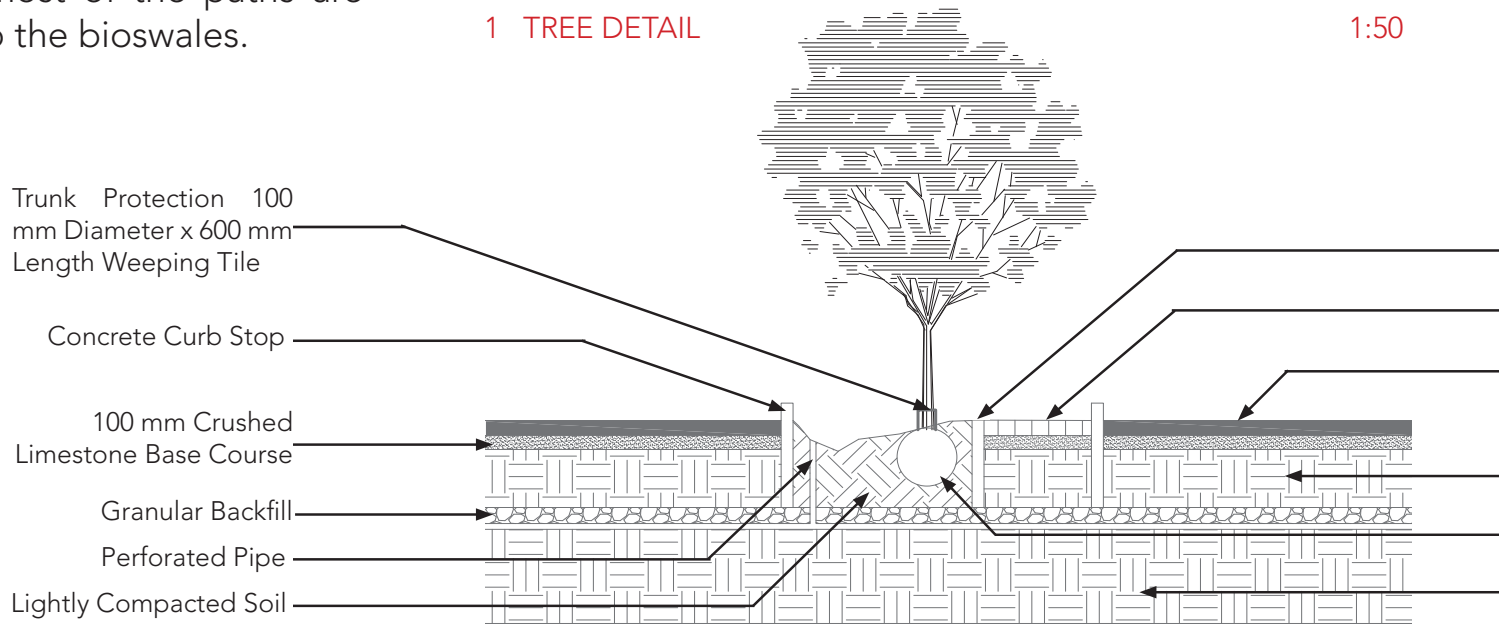
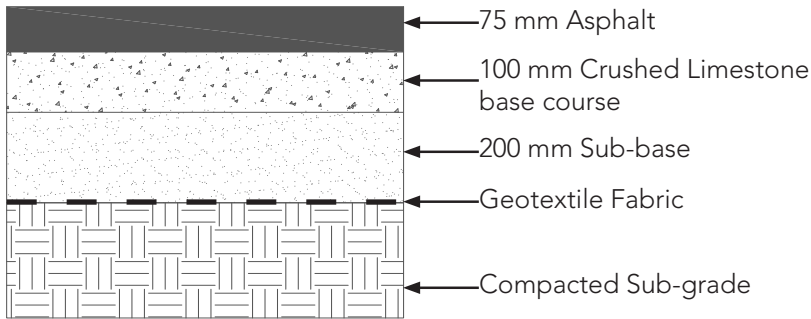


Fig. 90 Construction drawings of the parking stalls.

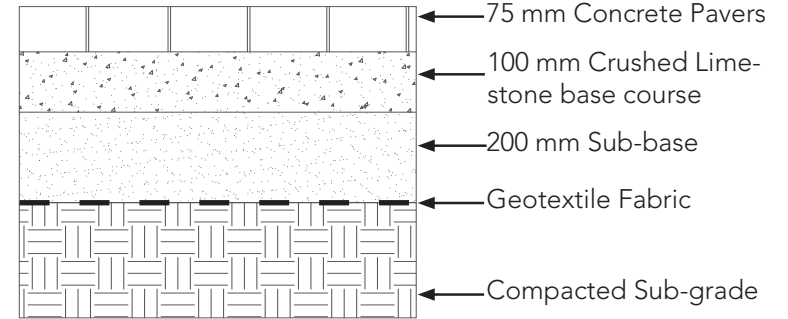
2 ASPHALT SURFACE

1:25



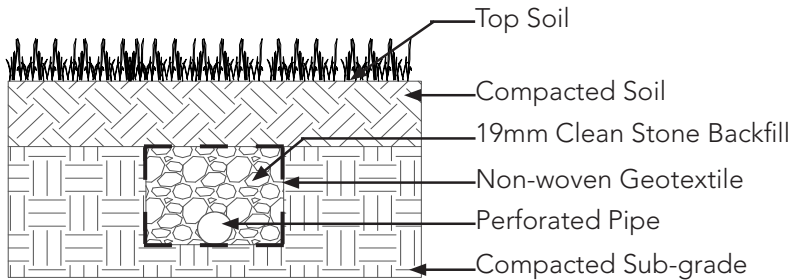
3 CONCRETE PAVERS

1:25



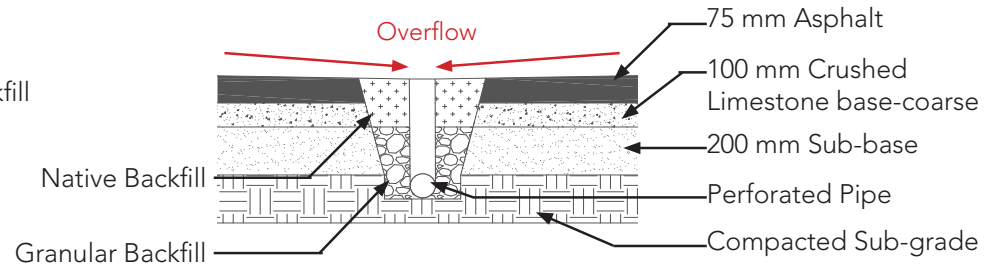
4 PERFORATED DRAINAGE PIPE

1:10



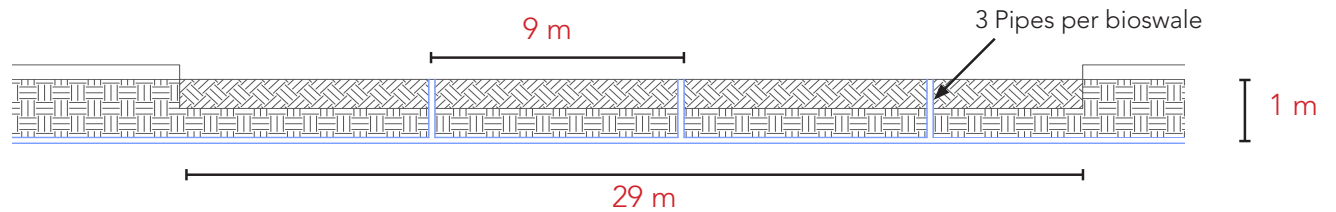
5 SURFACE DRAINAGE

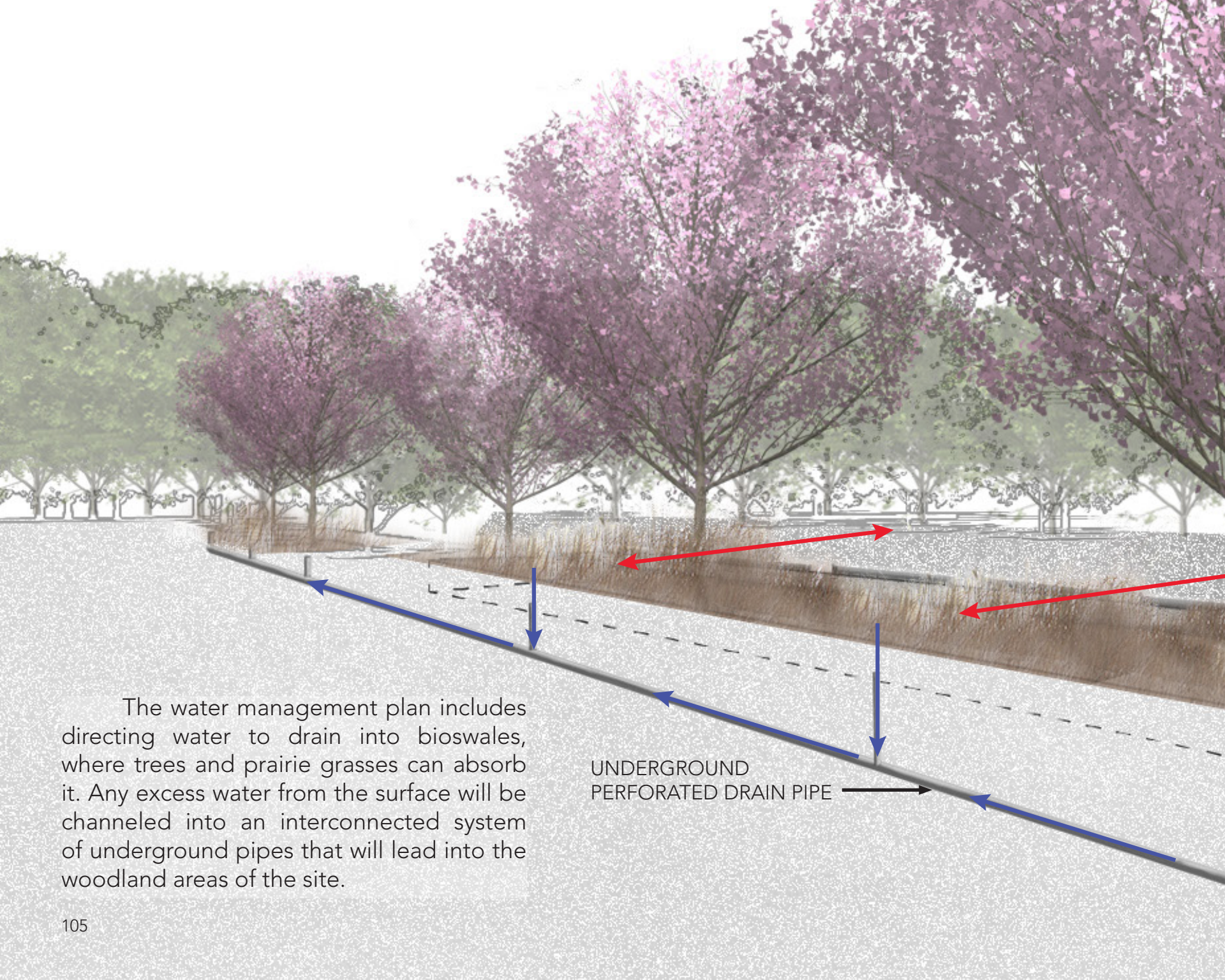
1:10



- Reinforced Concrete
- 75 mm Concrete Pavers
- 75 mm Asphalt
- Compacted Soil
- Tree Bulb
- Undisturbed Soil

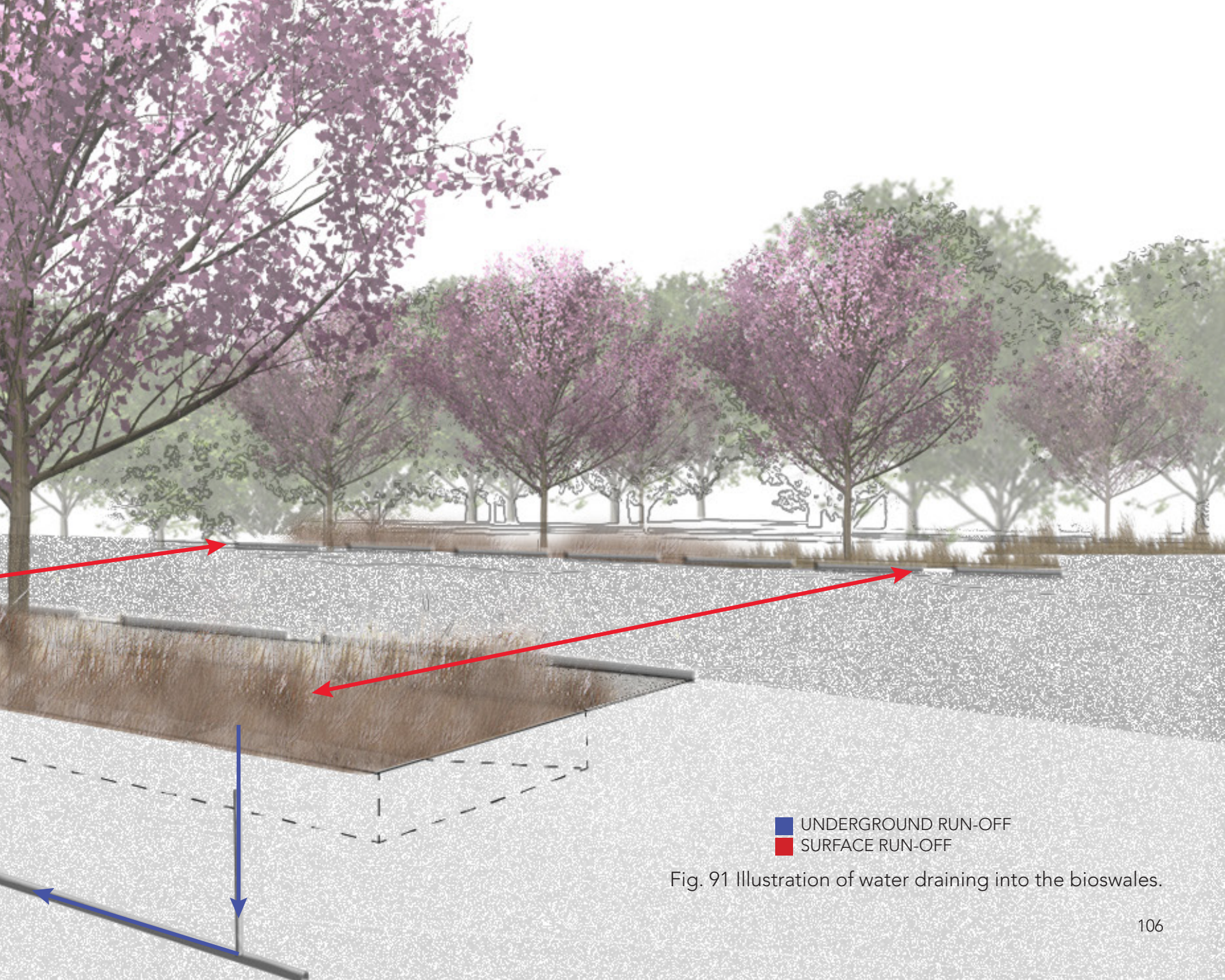
BIOSWALE DRAINAGE PIPES SPACING AND DEPTH





The water management plan includes directing water to drain into bioswales, where trees and prairie grasses can absorb it. Any excess water from the surface will be channeled into an interconnected system of underground pipes that will lead into the woodland areas of the site.

UNDERGROUND
PERFORATED DRAIN PIPE



■ UNDERGROUND RUN-OFF
■ SURFACE RUN-OFF

Fig. 91 Illustration of water draining into the bioswales.

SURFACE DRAINAGE

This map illustrates both the existing and proposed site elevations. All catch basins within the parking lot are designed with a 2% slope to ensure efficient drainage, directing runoff toward the basins and preventing surface pooling. In select areas, excess water will be directed toward adjacent woodland zones to support natural infiltration and reduce strain on the stormwater system.

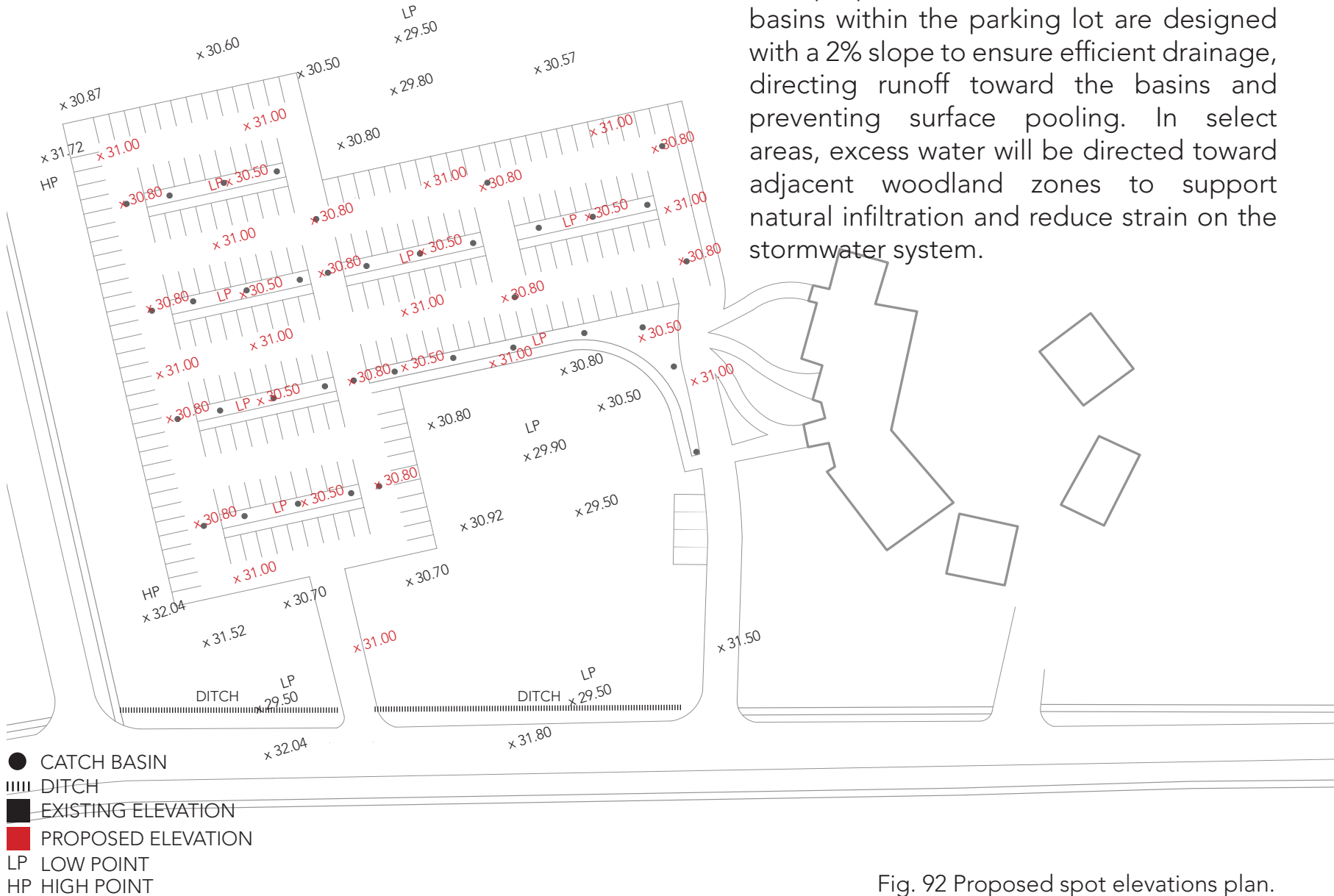


Fig. 92 Proposed spot elevations plan.

SUB-DRAINAGE NETWORK



This diagram illustrates the underground network of perforated drainage pipes and runoff channels, designed to manage overflow from the bioswales and parking lot. Water collected by the pipes is redirected to infiltration areas, such as the existing low points of the site and ditches supporting natural absorption and reducing surface runoff.

- PERFORATED PIPES
- ← WATER RUN-OFF
- INFILTRATION AREA

Fig. 93 Proposed water- off and infiltration plan.

FINAL CONCLUSION





Overall, Proposal 3 presents the most effective and balanced solution among the design alternatives. It provides the highest number of parking stalls, eliminates existing street parking, and reorganizes the site into a more efficient, safe, and welcoming environment. The proposed layout enhances both vehicular and pedestrian circulation, improving overall accessibility and reducing congestion within the lot.

In addition, the integration of new vegetation increases canopy coverage and supports improved stormwater management during spring runoff and periods of heavy rainfall. By achieving a strong balance between functionality, aesthetics, and environmental performance, Proposal 3 aligns well with community objectives.

Furthermore, this feasibility study can serve as a foundation for continued dialogue between the community, Thermea, and the golf course regarding ongoing parking challenges and the need for improved pedestrian infrastructure. Such collaboration will be essential in developing a coordinated and sustainable approach to accessibility and safety in the surrounding area.

Fig. 94 Final look of the Crabapple Allee Lot.

Endnotes:

- 1 Cassidy, Christian. "Jun 2023: Crescent Drive Park Is a Jewel." Free Press Community Review, June 7, 2023. <https://www.winnipegfreepress.com/our-communities/correspondents/2023/06/07/crescent-drive-park-is-a-jewel#:~:text=The%20origins%20of%20the%20park,housing%20boom%20of%20the%201940s>.
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- 4 "Crescent Drive Golf Course." City of Winnipeg. Accessed September 19, 2024. <https://www.winnipeg.ca/recreation-leisure/golf-courses/crescent-drive>.
- 5 Dawkins, Glen. "Green Fees to Golf at City Courses to Raise This Year | Winnipeg Sun." The Winnipeg Sun, March 8, 2024. <https://winnipegsun.com/news/green-fees-to-golf-at-city-courses-to-raise-this-year>.
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- 8 City of Winnipeg. Zoning By-law No. 200/2006. pg. 146, accessed January 10, 2024. City of Winnipeg. Zoning By-law No. 100/2004. pg. 6, accessed January 10, 2024. <chrome-extension://efaidnbmnnnibpcajpcgclfindmkaj/https://clkapps.winnipeg.ca/dmis/documents/docext/bl/2014/2014.34.pdf>
- 9 City of Winnipeg. Zoning By-law No. 200/2006. pg. 147, accessed January 10, 2024. <https://clkapps.winnipeg.ca/dmis/docext/viewdoc.asp?documenttypeid=1&docid=3943&doctype=c>
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- 11 City of Winnipeg. Zoning By-law No. 100/2004. pg. 6, accessed January 10, 2024. <chrome-extension://efaidnbnmn-nibpcajpcglclefindmkaj/https://clkapps.winnipeg.ca/dmis/documents/docext/bl/2014/2014.34.pdf>
- 12 City of Winnipeg, Tree Planting Standard for Downtown & Regional Streets, (Winnipeg: City of Winnipeg, 2022), accessed November 20, 2025, https://legacy.winnipeg.ca/finance/findata/matmgt/std_const_spec/current/Docs/tree-planting-standards-downtown-regional-streets.pdf
- 13 City of Winnipeg, Tree Planting Standard for Downtown & Regional Streets, (Winnipeg: City of Winnipeg, 2022), accessed November 20, 2025, https://legacy.winnipeg.ca/finance/findata/matmgt/std_const_spec/current/Docs/tree-planting-standards-downtown-regional-streets.pdf
- 14 City of Winnipeg, 130-2018 Appendix A, Document ID 130-2018, accessed November 21, 2025, https://legacy.winnipeg.ca/finance/findata/matmgt/documents/2018/130-2018/130-2018_Appendix_A.pdf
- 15 City of Winnipeg, 130-2018 Appendix A, Document ID 130-2018, accessed November 21, 2025, https://legacy.winnipeg.ca/finance/findata/matmgt/documents/2018/130-2018/130-2018_Appendix_A.pdf
- 16 City of Winnipeg, 130-2018 Appendix A, Document ID 130-2018, accessed November 21, 2025, https://legacy.winnipeg.ca/finance/findata/matmgt/documents/2018/130-2018/130-2018_Appendix_A.pdf
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- 19 “Calvados-Honfleur Business Park, Designed by La Compagnie du Paysage,” Landezine, Nov. 18, 2019, accessed November 21, 2025, <https://landezine.com/calvados-honfleur-business-park-by-la-compagnie-du-paysage/>
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- 27 "Common Paving Materials for Commercial Properties," K E Flatwork, accessed November 21, 2025, <https://keflatwork.com/blog/common-paving-materials-for-commercial-properties/>
- 28 "Common Paving Materials for Commercial Properties," K E Flatwork, accessed November 21, 2025, <https://keflatwork.com/blog/common-paving-materials-for-commercial-properties/>
- 29 "Five Materials for Building a Parking Lot: A Comprehensive Guide," Earthtek Paving, accessed November 21, 2025, <https://earthtekpaving.com/five-materials-for-building-a-parking-lot-a-comprehensive-guide/>

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