



Mill Creek Nature Park Development Master Plan 2013

for: The Town of Riverview
by: CollabPlan & Genivar

final report
april 2013



Note of Thanks.....

17 April 2013

CollabPlan would like to thank Town of Riverview council, staff and residents for their guidance and assistance in developing this master plan. In particular, we would like to thank the following project steering committee members for their leadership and excitement throughout plan development.

Gerry Cole, Director of Parks, Recreation and Community Relations

Michel Ouellet, M.A.Sc., P.Eng, Director of Engineering and Public Works

Shane Thomson, Director of Economic Development

Meghan Walsh, Communications Coordinator

We wish the Town of Riverview the very best of luck with implementation of this plan.

Sincerely,



Jim W. Scott, CSLA

Table of Contents

- 1.0 The Mill Creek Nature Park.....3
 - 1.1 Project Process3
 - 1.2 Study Area3
 - 1.3 Key Development Themes3
- 2.0 The Mill Creek Context4
 - 2.1 Natural Context.....4
 - 2.2 Recreation Context5
 - 2.3 Transportation and Servicing6
 - 2.4 Contextual Lessons6
- 3.0 Consultation and Concept7
 - 3.1 Development Themes7
 - 3.2 Consultation Concept.....8
- 4.0 The Mill Creek Nature Park Master Plan9
 - 4.1 Things to Know9
 - 4.2 Master Plan Layout11
 - 4.3 Key Master Plan Projects11
 - 4.4 Trail Projects14
 - 4.5 Park Amenity16
- 5.0 Master Plan Implementation17
 - 5.1 Implementation Theory17
 - 5.2 Administrative Steps.....18
 - 5.3 Park Development Steps18
 - 5.4 Projects Budget21
- Appendix A - Implementation Chart & Budget Estimates22
- Appendix B - Genivar Stormwater Figure.....25
- Appendix C - Signage Concepts27

1.0 The Mill Creek Nature Park

The Mill Creek area of Riverview has the opportunity to become the next regional residential, commercial and, most importantly, recreation destination. The Town of Riverview recognized this fact and commissioned this document, the Mill Creek Nature Park Master Plan, to explore and establish future recreational amenity within the unique ecological setting. Thus, *this master plan proposes an approach to developing Riverview's Mill Creek area in a manner that integrates mixed-use development within the context of nature and recreation.* The Town expects that this integration will create a highly sought after destination that establishes a regional development tone for the next twenty years.

The Town of Riverview has assembled 536-acres on lands adjacent to, and inclusive of, the Mill Creek Stream (see figure 1.0). The parcel is within a regional growth area and is serviced to immediately support this growth.

Given planned growth within Riverview, the new recreation asset will become a central park to which all adjacent local development must bow. Size and transportation network proximity ensures broad attraction; thus, park products must yield to this regional context. Park attraction is both local and regional; therefore, this facility is a significant catalyst for regional growth. This master plan sets a platform for this purpose.

1.1 Project Process

Creating a central park master plan requires careful thought relative to existing setting, regional development planning, recreation trends as well as resident desire for both active and passive recreational activities and products. Creating this master plan involved iterative and concurrent master planning processes - as follows:

- a. baseline data.** This includes the creation of site maps that articulate natural and cultural assets within the study area and greater region where relevant. Also, data describing all important planning is collected to ensure contextually appropriate plans are proposed.
- b. consultation.** This includes working sessions with Riverview elementary, middle and high school students to talk about recreational, natural and cultural values.



Regional stakeholders are asked to expand on the youth ideas by developing themes with which the master plan should be contextualized. All consultation work is validated and expanded during public workshop and steering committee review sessions.

c. synthesis. This includes combining place and desire to create the master plan.

1.2 Study Area

The Town's 536 acre land assembly provides a powerful launching point for master planning (see figure 1.0). Although the land was assembled irrespective of ecological or recreational contexts, the assembly provides sufficient base to either locate future recreation assets within or for trade to acquire land in adjacent areas (to satisfy resident requirements).

During a review of the initial project requirements, future growth plans, the acquired land-base, as well as the present ecological setting, a master plan study area was identified that included land parcels extending south from the future Bridgedale Boulevard and the Mill Creek Stream (where indicated on figure 1.0). Land to the north of the future boulevard is contextually considered relative to landform and growth pattern. Although a significant portion of the study area is located beyond the Town's boundary, some of this land is owned by the Town of Riverview.

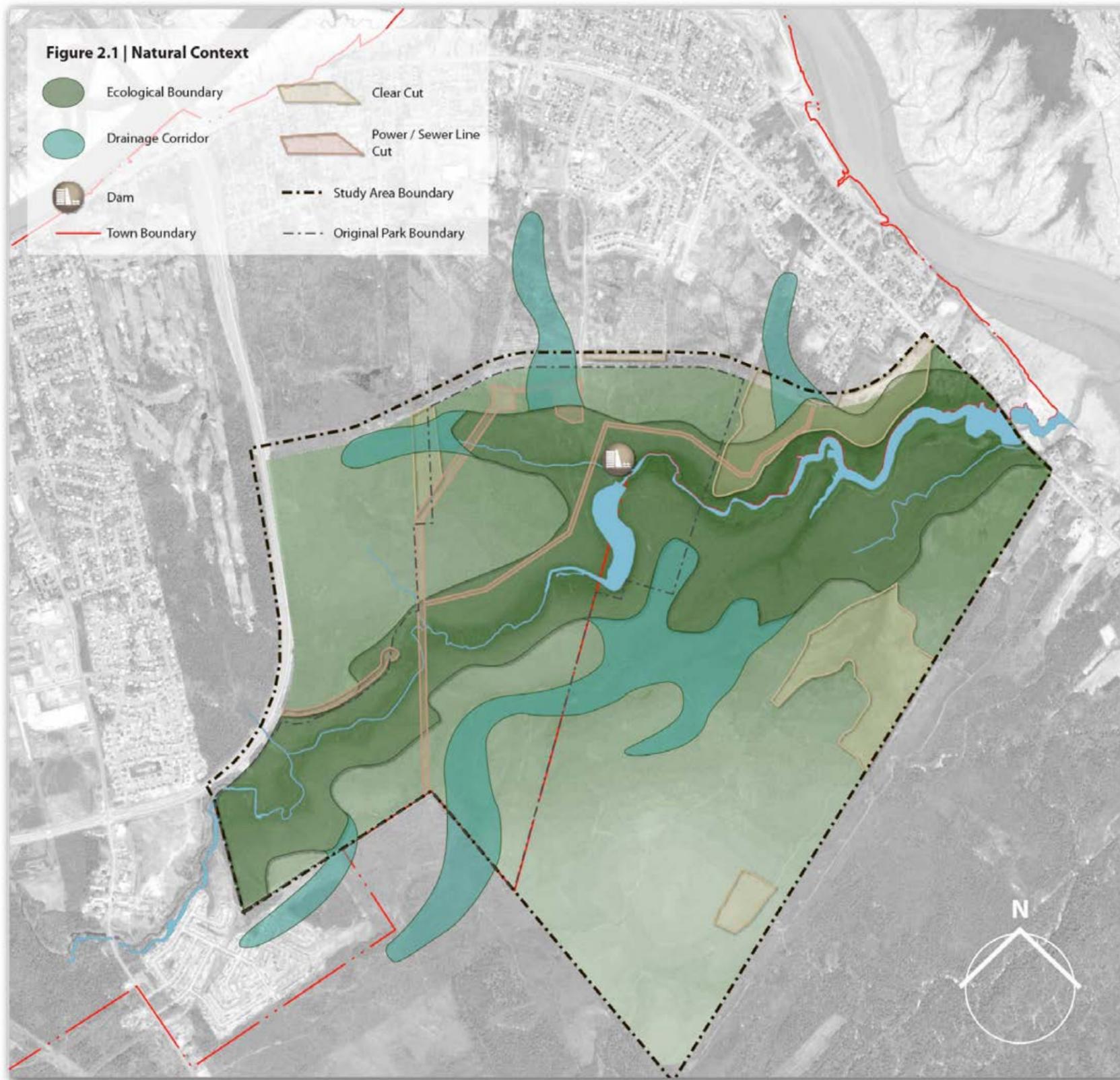
1.3 Key Development Themes

It is important to review this master plan within context of the following development themes determined through consultation.

Theme One - Nature. Above all else, the natural assets as well as the natural and built elements that sustain these assets are to be conserved in perpetuity. For example, the headpond as well as the dam that sustains the dimensional and ecological pond aspects must be sustained to ensure the long-term health and usability of the park.

Theme Two - Play. Integrating play into the natural setting within the context of nature is critical to ensuring sustainable park use.

Theme Three - Sport. The fact that this park will redefine Riverview for future generations, combined with the evolving nature of Riverview's core areas, provides an opportunity for a new "Town Centre". For this reason, residents have chosen Mill Creek as a location for future core recreation assets where themes one and two are not impacted.



2.0 The Mill Creek Context

This section describes the important physical and cultural contexts that influence the master plan.

2.1 Natural Context - General

The natural context considers the habitat directly related to the stream course, the upland areas that flow into the stream course (primarily during storm events), forest cover, as well as areas where forest cover has been removed for varied reasons. At a minimum, the ecological boundary must be conserved and must be incorporated into the park.

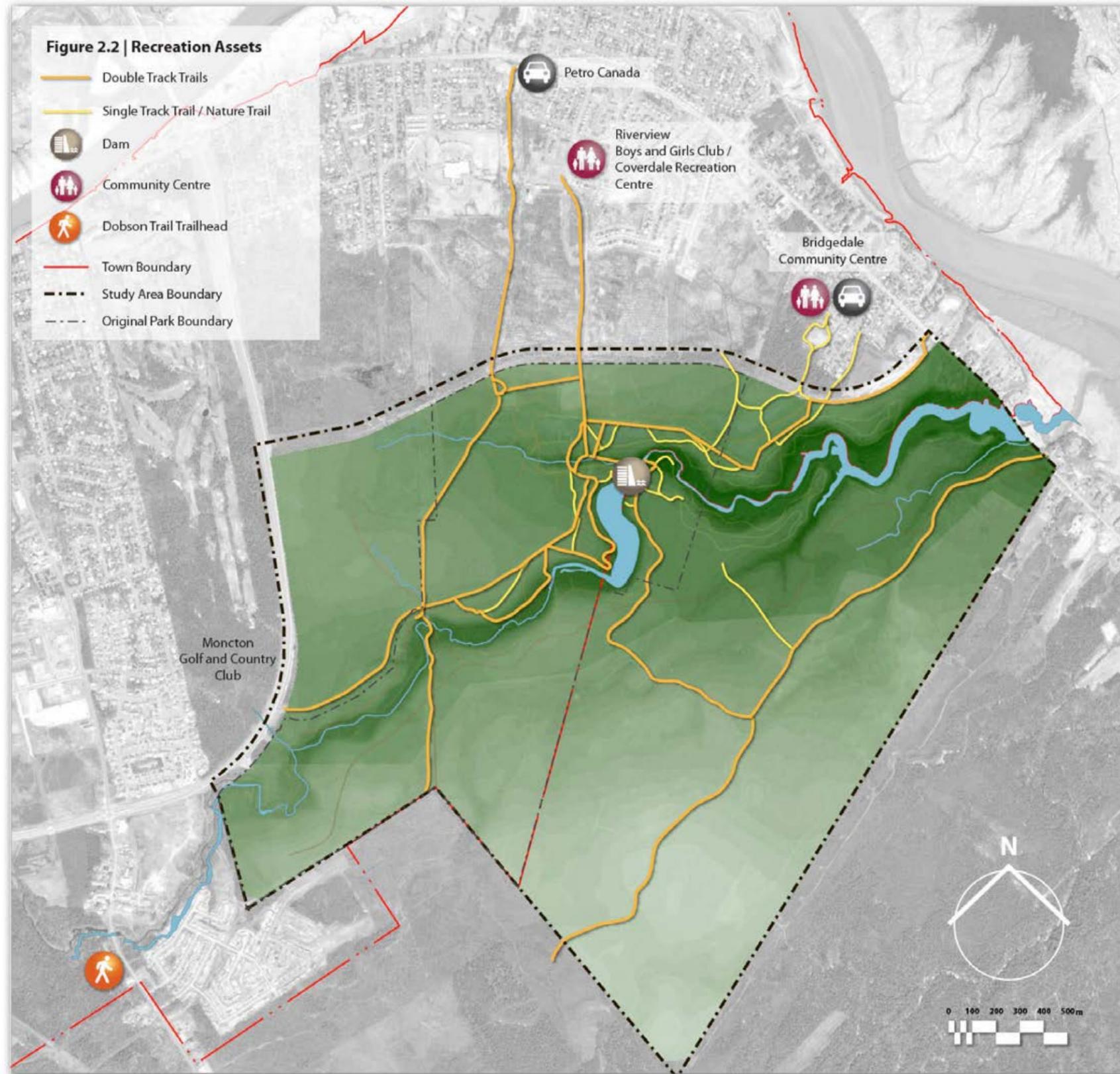
a. Ecological Boundary. This is the core ecological boundary of the stream body inclusive of the the water body, the riparian corridor (shoreline zone interface between land and the stream where plant habitats and communities along the shoreline are characterized by stream dependent plant and animal life), and finally, the upland areas where slope and significant plant species should be conserved to sustain the unique character of the stream corridor. There is no maximum dimension for this boundary while the minimum stream setback for any built objects (unless directly water related) is 30 meters.

b. Drainage Corridor. These are overland drainage corridors that direct stormflows to the Mill Creek. These corridors should be enhanced as retention and flow corridors within the context of 'zero-net' development.

c. Mill Creek Dam. The dam is a town-owned remnant of a former Canadian Forces Base. This 65-year old structure is beginning to age and will require repairs to sustain the structure and headpond.

d. Clear Cutting. Portions of the study area have been clear cut and leave significant open space. This is problematic for active recreation uses such as cross-country skiing. The once beautiful trail corridors that extend from the Bridgedale Community Centre to the dam have been seriously impacted by the clearing. The inherent beauty of the experience is lost with the loss of trail corridor edge. Also, wind conditions now make it impossible to sustain trail snow. Thus, cross country ski trails will need to be relocated.

e. Utility Corridors. These corridors provide power and sanitary sewer service to the park area and the adjacent lands. In both cases, these corridors may provide opportunity to create trail linkages within existing corridors.



2.2 Recreation Context - General

This context considers existing recreational use of the study area and the assets presently supporting this use.

It is important to note these assets as possible master plan future corridors. This will provide both resident recognition and possible cost saving (by developing on existing cleared and grubbed corridors).

a. Double Track Trails. These are the wider trails presently used for walking, cross country skiing, snowmobile and ATV use and, in many cases, automobile access. Snowmobiles and ATVs presently access and pass through the study area from the Hillsborough Road Petro Canada Service Station (see figure 2.2).

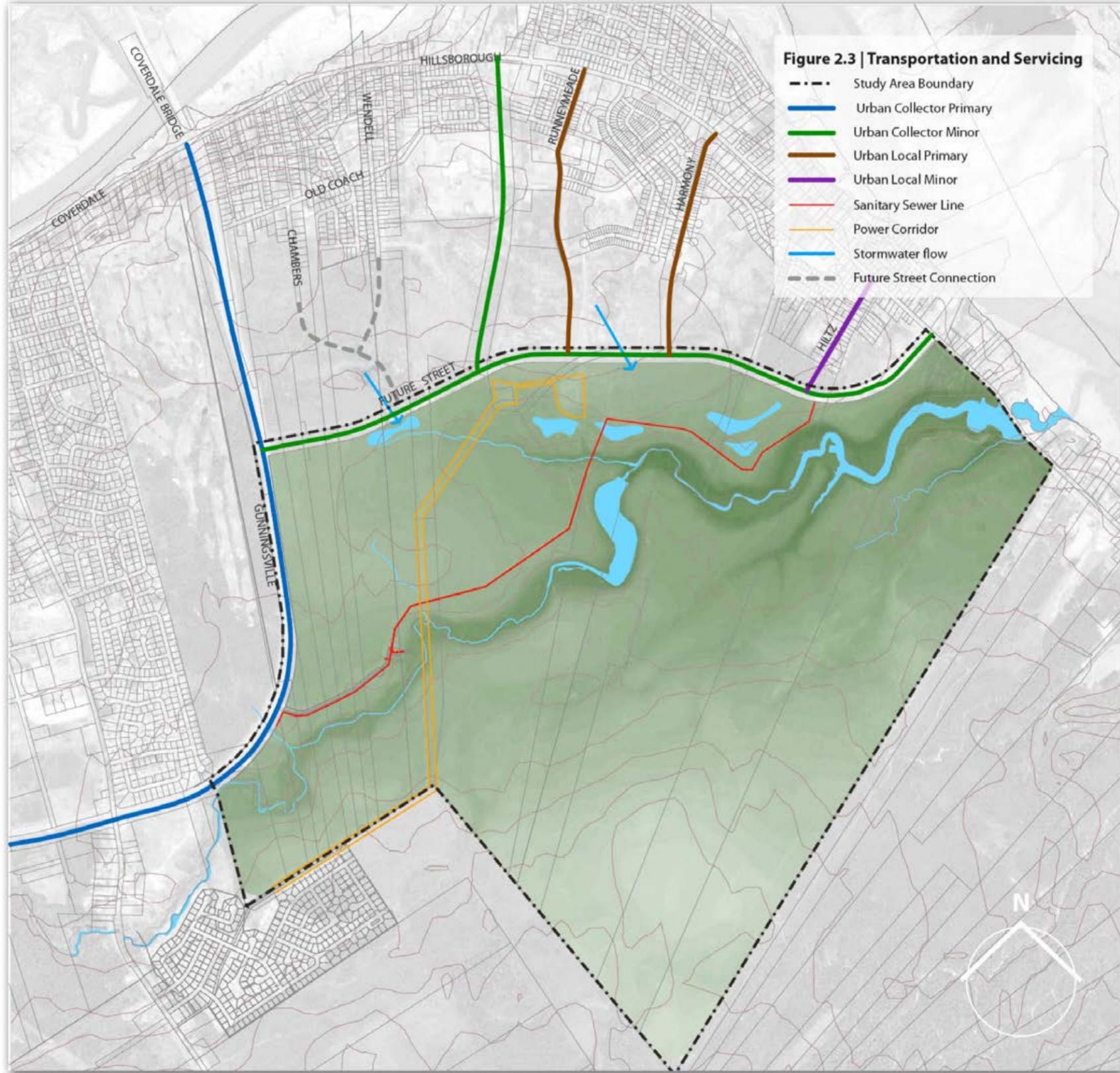
The double track trails are largely based on historical use of the site, including access to the dam and former/existing agricultural areas (including blueberry fields located along the eastern edge of the study area). Most of the surfaces are granular with intermittent exposed ground surface.

b. Single Track Trail. These trails are presently used primarily for recreation use (passive walking/hiking). These surfaces are exposed ground with minimal granular cover in a few areas.

c. Mill Creek Dam. This asset appears in both the ecological and recreation asset mapping due to its contribution to both. In this case, the dam retains the headpond for existing and future all-season recreation activity.

d. Community/Recreation Centre. The Coverdale Recreation and Bridgedale Community Centres function as existing study area gateways. Coverdale Recreation Centre is a walking, cycling and vehicle gateway while the Bridgedale Community Centre is a walking, cycling and cross country skiing gateway (from the Riverview Ski Clubhouse adjacent to the Community Centre).

e. Dobson Trail. This important regional trail asset is planned for linkage to the Mill Creek area; thus, its significance and identification in this plan.



2.3 Transportation and Servicing

Figure 2.3 illustrates existing and future collector and future arterial and collector road connections adjacent to the study area. It is very likely that at least one of these linkages will extend through the park to provide good regional linkage between the future Bridgedale Boulevard and lands to the south of Mill Creek.

It is also important to note the previously identified sanitary sewer and power line corridors. These will need to be considered in association with future street linkages to ensure servicing to both park and other development forms are served.

2.4 Contextual Lessons

This chapter teaches us the following lessons for consideration during consultation and master plan development.

- a. **Natural Context Lessons.** At a minimum, park size and boundaries should include all of the ecological boundary with natural/recreational corridors extending into adjacent developing areas along the identified drainage corridors. It is important to note that the ecological corridor does not recognize formal municipal boundaries or existing town-owned land holdings.
- b. **Recreation Context Lessons.** Sustaining the existing dam is critical to the ecological and recreation life of the future park. The existing trail network provides a starting framework that may, or may not, be retained; however, the dam must be retained.
- c. **Transportation and Servicing Lessons.** The proposed future street linkages to the boulevard should be combined with the drainage corridors to provide multi-use access to the park at the locations identified on both figure 2.1 and 2.3.

3.0 Consultation and Concept

The public consultation phase of master plan development included three components. First, youth groups, attending each level of public school, were consulted to talk about possible projects and development themes for the Park. Second, community stakeholders were consulted to review the development themes and “project list”, and asked to revise where required.

Finally, community workshop attendees discussed and agreed with the development themes prior to creating a concept plan that placed existing and additional projects on a plan of the study area within the context of the development themes.

This chapter discusses the themes and provides general project organization in the form of a development concept. The following chapter (4.0) provides project descriptions.

3.1 Development Themes & Projects

a. Development Theme One - Nature. Although some forestry work has been conducted, the Mill Creek study area is a largely unspoiled. The area’s watercourse has not been significantly impacted by forestry practice and no further work should be conducted that impacts the “core ecology” of the park and headpond.

Consulted students described the Mill Creek area as Riverview’s only pristine landscape capable of supporting recreation activity without significantly impacting important core ecology. As described earlier, above all else, the natural aspect of the park must be identified, understood and conserved prior to placing active or passive activities. Section 2.1 provides appropriate background to this end (at the master plan level of implementation).

There are two physical projects that support this theme. First, the former CFB headpond dam is the watercourse structure that sustains the unique Mill Creek habitat (from the headpond to inland locations). The dam must be conserved through revitalization efforts that see the structure stabilized. Thus, the core habitat is retained for plant and animal species alike, and the ‘park jewel’ remains for future generations.

Second, several trails have been laid out by all session attendees to capitalize on nature setting and physical activity desire. These include ski/bike and multi-use trails that extend around the headpond. Rest/interpretive stops provide on-trail amenity while ‘trail stacking’ extends both trail types where desired.

Secondary projects related to this theme include snowshoe and camping destinations, canoe, skating and other water-based activity (in the headpond),

b. Development Theme Two - Play. A variety of play types are contextually appropriate when considered “nature reliant” or “nature related” play. Reliant play requires the natural setting in support of its activity (i.e. canoeing on a lake, elevated platforms in trees). Related play utilizes nature to enhance its activity (i.e. mountain biking or paintball in the forest, jogging beside the headpond).

Other unrelated or un-reliant play may be important to creating a significant park or to meet community desire. Where required, this play may be associated with another theme. If not, the play activity does not belong in the Mill Creek Nature Park.

Primary, or reliant, projects in play include all-season activities on the headpond (skating and boating), and an elevated tree platform activity similar to Centennial Park’s Treego (Moncton). Related events include adventure-based play such as extreme cycling events, playgrounds, climbing events and dog play space.

c. Development Theme Three - Sport. Team-based active recreation is a very important element of Riverview culture. This fact became apparent immediately as youth talked about their life in Riverview, the importance of sport to their life, and how this aspect of community living is not central to Riverview life. This fact was verified during each consultation session.

The fact that the Mill Creek study area is bounded by two community arterial streets, as well as the inevitability of arterial-side commercial development, creates an opportunity to develop a strong town focal point where recreation and commercial activity combine to create a unique regional destination. This idea originated with youth and continually expanded throughout the consultation process.

Activities proposed by residents include new ice surfaces to replace aging facilities, artificial turf/track, tennis, fitness, social, indoor adventure play, indoor waterplay and court fieldhouse facilities.

d. Development Theme Four - Services. All work session attendees discussed services as comfort and security elements that enhance the visitor experience. This includes washrooms, lighting, wayfinding, parking, event/activity supporting retail service and interpretation that provides directional and location-based information. These elements must be carefully planned within each project.

Another important aspect of “service” is local provision for park space. Generally, community park space functioning at the neighbourhood level covers a 10 minute walking (or 750 meters) service area radius. The Mill Creek Nature Park can provide local park space at gateway locations that serve residential





addresses within 750 meters of the gateway. Thus, gateways to the park must incorporate usable community park space to serve local park function.

3.2 Consultation Concept

Figure 3.2 (adjacent) illustrates the location of the various project types within the study area. The following describes these projects - other project ideas are described on the figure.

The Gunningsville and future Bridgedale Boulevard intersections will become a strong regional commercial destination that will extend south along the Gunningsville Boulevard. This land should be retained for economic development purposes with park extensions into the commercial area.

The commercial area is reinforced with a civic/recreation centre that, when considered with commercial development, becomes a significant regional destination. The centre will include the previously described active and passive recreation events as well as service amenities.

The regional core extends east along the Bridgedale Boulevard, and into the study area, with the placement of the Mill Creek Nature Park Visitor Centre. This facility is the primary gateway to the park with gateway and park services, as well as education and community use space. All park users will find a gateway relevant to their use at this facility.

The headpond provides a significant natural and all-season asset that requires gateway services to support water-based park uses. It is important to note that this facility is not immediately accessible from the nature centre or any adjacent street. This facility is not planned as a regional facility; rather, it is planned as a 'natural jewel' for Riverview residents adjacent to the Mill Creek dam.

The core park area will host a variety of environmental conservation and recreational activities. At the surface, this may seem somewhat diametric; however, this is only true if not planned and designed properly. Also important, any impact caused through the creation of trails can be remedied within the creation of the trail.

4.0 The Mill Creek Nature Park Master Plan

The Mill Creek Master Plan (next page) is a mitigation of place, context and resident desire. All development approaches and proposed projects are founded in consultation and expanded throughout the plan creation process. Thus, readers of this document should understand that this master plan is created to meet the future needs of Riverview's residents first. Regional benefit is ancillary.

4.1 Things to Know

Prior to reviewing the plan and projects, the following project criteria are to be applied to 'themed' projects when moving from site planning to site design.

a. All Season Active and Passive Assets. The master plan proposes several projects that capitalize on cultural and natural contexts. All projects must provide both active and passive experiences to broaden appeal and use (i.e. trails should be usable for both runners and walkers and not exclusive to either). Any project not capable of these are best located elsewhere in the town.

b. Regional and Local Products and Access. This master plan will provide significant recreational amenities to Riverview residents and the surrounding local area, as well as the greater Atlantic Canadian region. Projects must consider both local and broad amenity by creating gateways and adventures for each. Local and regional visitors will access the park and its amenities through main gateways; however, local residents will also access the park through neighbourhood gateways and active transportation connections, ensuring a 'neighbourhood park' atmosphere and access to local amenities.

c. Water, not Wires! Students consulted sent an immediate message by stating that the natural setting must be retained and, unless absolutely necessary, non-natural interventions should exist elsewhere. This was discussed and clarified throughout the consultation process - The park's natural core should only be disturbed by trail, comfort/learning stations, limited structural access to the headpond or water treatment areas that improve stormwater quality prior to entering the stream.

With this in mind, sustainable approaches to support services will be required. For example, lighting within the park will require photovoltaic power source luminaries with energy efficient fixtures. During repairs to the dam, hydro power generation should be considered as well.

d. Exploration, Adventure and Education. For the Mill Creek Park, environmental-based recreation is not based on the idea that 'the park is here -

come make your own recreation'. Instead, every element of the park is designed to create a special feeling and sense of exploration and adventure within the context of education. Thus, trail networks are to be carefully designed to use canopy, slope, edge treatments, views and a sense of prospect to support the notion of exploration and adventure.

Also, trail locations are carefully routed to move visitors through the park's varied ecological zones. Visitors will see and feel zone change and when absolutely necessary, interpretation should support the experience to ensure an educational experience that fosters appreciation and protection.

e. Blending Ecology and Economy. One of the most difficult aspects of developing this facility is creating a park edge that blends with adjacent development edges in a manner that does not result in a hard and conflictive boundary. For this reason, the master plan proposes an ecologic and economic relationship that dissolves boundaries in a way that has real meaning to both sides.

Ecologically, adjacent areas provide valuable storm water flows that feed lands where rain water falls as well as the Mill Creek corridor. The existing landforms that support the collection and distribution of rainfall should be conceived and enhanced in a manner that creates environmental 'extensions' of the park into adjacent development. Where possible, development stormflows should enter the extensions; thus, extensions should be enhanced to create bioswales that collect, treat and distribute storm flows. Where this is not possible, ponds will be created within the park.

Economically, ponds that are created within the park serve two purposes. First, developers will not be required to place stormwater retention within their projects. The cost of this work is to be transferred to the Town; thus, the developer can utilize lands previously set aside for retention. The Town builds ponds within the park with the developer's financial contribution.

In addition to this, development areas set aside as lands for public purposes can be deferred within 750 meters of the park boundary. Instead, developers may contribute as cash-in-lieu which will be immediately invested into the park to support trail development. The retention and trail contribution can be formed into single projects that combine the two to create large portions of the park.

f. Connectivity and Thoroughfare. The storm flow corridors will combine with active transportation infrastructure to provide functional connectivity to adjacent areas. Carefully planned entries will provide both local and regional connectivity accessible by varied transportation modes. Connectivity is planned and ensured.

The Mill Creek Park covers a very large and linear area. Although it is not preferable to bisect the park, a corridor is necessary. The master plan illustrates a north-south multi-modal corridor that provides access to in-park events as well as a transportation link through the park (at a location that ensures minimal impact and maximum function).

g. Park Evolution. The primary focus of the master plan is the north side of the core park boundary, as well as enhancements within the boundary itself. A boundary for south edge of the park is established, but events within this boundary are not fully defined. It is important to allow for cultural changes that influence recreation requirements/desires by not fully planning all park areas.

The Town will need to re-explore community park enhancements in this area as residential development expands on areas adjacent to the boundary. The previous six points must be incorporated into this planning.

h. Partnership. Creating this park will require partnerships with adjacent land owners to ensure compliance with this plan. The approaches proposed in this master plan are based on ‘win-win’ scenarios for both the Town and developer. This approach should be sustained through to park creation - municipal planning and by-laws must support this. Section 5.2 discusses land assembly to support Town and developer relationships.

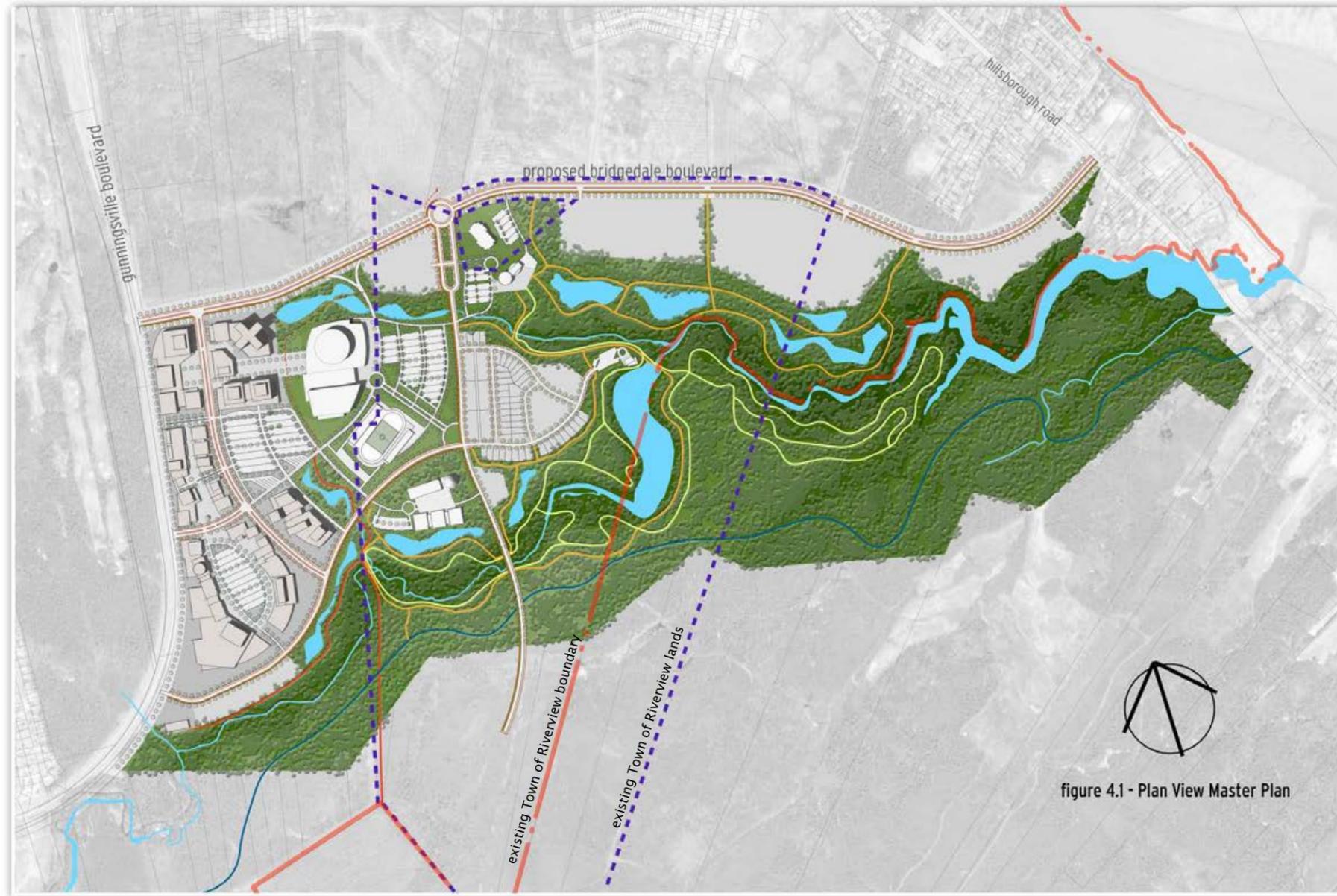


figure 4.1 - Plan View Master Plan

4.2 Master Plan Layout

Planning for this project requires consideration for the Mill Creek Park as well as adjacent areas to ensure a contextually appropriate plan. The recently built Gunningsville Boulevard and planned Bridgedale Boulevard provide the west and north study area boundaries (see figure 4.1). It is important to consider these arterial streets as valuable Town economic development assets that, when located where core park areas are not affected, will take precedent over park creation. This plan proposes a “reasonable” harmony of economic development and park.

It is also important to consider all lands graphically articulated on the master plan as Mill Creek Nature Park. Although retail and residential land uses will not exist within that formal park boundary, they are within the park zone and must be developed within this context. Therefore, planning, design and construction must articulate this location - design and construction guidelines must ensure this.

The following describes the development areas that lend to master plan layout.

a. Gunningsville Boulevard - Regional Commercial Zone. The western edge of the park is retained for commercial and mixed-use development to capitalize on the Gunningsville Boulevard’s regional traffic flow.

b. Proposed Bridgedale Boulevard - Mixed Use Zone. The park’s northern edge meets the boulevard with commercial, civic and residential land uses. Park uses bordering on the boulevard are limited to maximize developer contribution to boulevard construction. This boulevard will be created within the context of active transportation and will provide an important multi-modal transportation route to the park.

c. Mill Creek Nature Park. Figure 4.1 illustrates the proposed master plan. Lands illustrated as “green space” form the park. The scope of this area simply includes the ecological corridor expanded to include desired park activities, gateways and local stormwater retention.

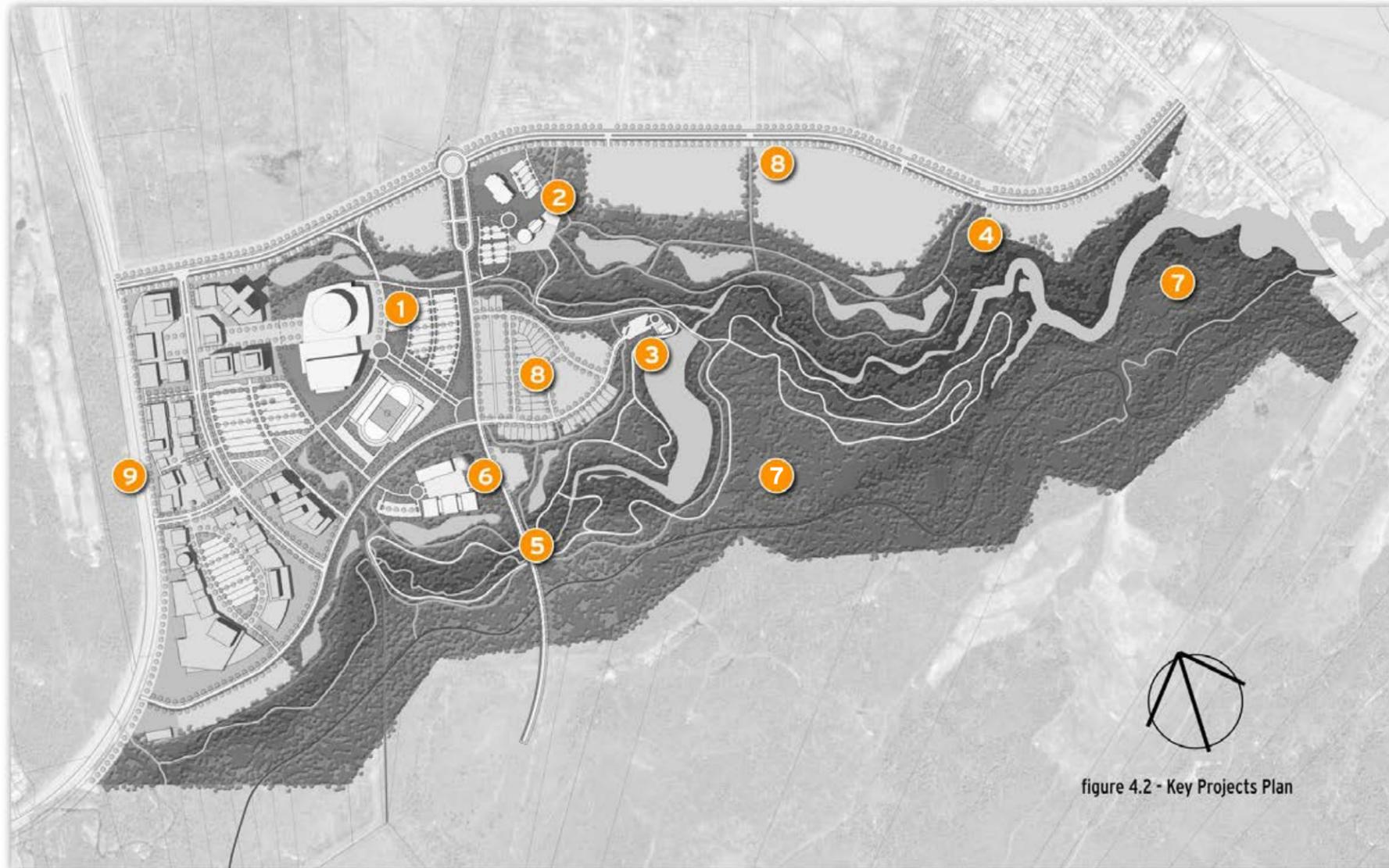


figure 4.2 - Key Projects Plan

4.3 Key Capital Budget Master Plan Projects

This section presents the key capital projects that form the park's 'anchor destinations'. The location, organization and relationship of these projects to each other, as well as their adjacencies, is based on the results of community consultation. Although physical park implementation will not start with these projects, their location must be considered and administratively articulated to provide a basis for landscape projects (such as trails - see section 4.5).

Project 1 - The Riverview Civic Centre - The Activity Centre. This project, initially formed during youth consultations sessions, is about Riverview and the

perception of a missing cultural core. Discussions included Riverview life, what residents gather for, as well as what they do when they gather. As consultation moved into stakeholder and broad community discussion, the notion of a civic centre placed within the context of a carefully planned/designed retail district and a nature park would satisfy the town centre creation desire.

The Mill Creek Master plan provides a location and development concept for the centre from which the Town can springboard. The location results from resident desire to blend boulevard side retail into the nature park with a significant civic destination. Thus, the centre both blends and buffers the park from the intense commercial environment. Together with park amenities and retail setting, the Mill Creek Nature Park becomes a significant regional asset.

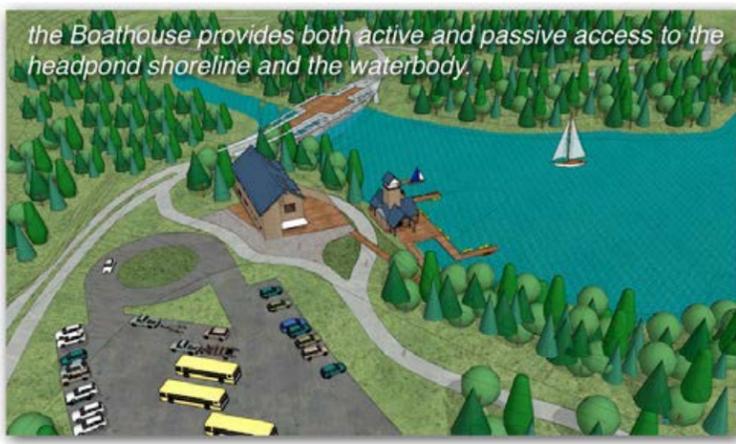
Due to the nature of this facility type, several town-core projects will locate here. All of these projects will be created within the notion of town-centre. The projects are:

*A two-pad arena that replaces aging infrastructure elsewhere in the Town,
Multi-purpose fieldhouse with walking track,
Wellness and fitness centre,
Indoor tennis centre,
Indoor water and play park with adjacent climbing wall,
Food service and lounge space,
Senior's activity centre with indoor and outdoor events (i.e. lawn bowling),
Artificial turf and track stadium with 3500 viewing capacity and,
An outdoor extreme park with skateboard and bike amenity.*

Project 2 - Mill Creek Visitor Centre - The Nature Park Entry Campus. Whereas the civic centre is placed with the retail district to form a strong regional asset, the visitor centre is placed within the natural context to form a strong Riverview asset first, and a strong regional asset second (when associated with the civic and retail centres). For this reason, the Mill Creek Visitor Centre is located on the Bridgedale Boulevard (a future minor urban collector), rather than the Gunningsville Boulevard (a primary urban collector).

The visitor centre is the primary gateway to the Mill Creek Nature Park. The recreation assets located at this facility are based within the natural context and, therefore, themed within nature. The projects are:

*Clubhouse space for various community groups utilizing the park (ski club, scouts, nature groups, etc),
Provincial school district school 'outlet' inclusive of educational facilities and nature laboratory,*



- Community meeting space,*
- Nature and cultural interpretation relative to the ecological setting and prior use of the park lands as a Canadian Forces Base,*
- Gateway services to the park's trail network (washrooms, trail entries, parking, storage, wayfinding, etc.),*
- Food service and associated lounge space.*
- Outdoor adventure playground with structured play and splash pad formed from ground spray events (not structural spray structures),*
- Outdoor adventure activities such as rock climbing wall and zip-lines,*
- Mountain bike/cross country ski centre,*
- Snowball/paintball games facility,*
- Community gardens,*
- Outdoor performance space and,*
- Sliding hill.*

As previously mentioned, this facility is primarily located within the local context. As an extension to this, residents identified a community market as well as upper-level residential development, as a means to enhance the local context. A Bridgedale Boulevard-side location also places a market centre within the regional context when necessary.

Project 3 - The Boathouse - Water Activity Centre. This project is 'a given' when considering the Mill Creek dam and headpond. Although limited pressure to remove the dam occurs, removing the structure would ignore the 50-years of natural habitat that has formed around and upstream from the headpond, ignore the beauty and recreational amenity of the headpond, and ignore the fact the park exists solely because of the headpond. For these reasons, the dam must be conserved. The following projects support this destination and preservation.

- Human powered boating centre (complete with multi-use reception centre and docking facility),*
- Gateway services for the trails around the headpond,*
- Natural and cultural interpretation,*
- "Outback" gateway to nature paths, snowshoeing and camping areas,*
- Community meeting space,*
- Food service and lounge space to support all season activity (such as boating and skating),*
- A restored dam that stabilizes the structure and places multi-modal and all season trails over the dam (to provide human-powered access to southern park areas and possible hydro power to park amenities) and,*

Installation of a fish ladder.

Another aspect of headpond area enhancement that should be explored during dam restoration is the notion of increased storage capacity. This has two benefits: first, this will result in greater headpond water volumes for stormwater management, erosion prevention and flood prevention. Second, pond dimensions and recreation use capacity is increased. Thus, the headpond can be lengthened to create a 'canal' style winter skating asset for the town and region.

Project 4 - Secondary Park Entries. Figure 4.2 locates one secondary park entry; however, future secondary entries will be required at residential development/park interfaces along the south park boundary. Without an idea of where development will reach toward the park, or where transportation routes will support this development, secondary entries can not be located at the south boundary; however, it is possible to state what assets will be located within these park entries as identified for the north boundary entry. These are:

- Park entry signage,*
- Granular parking area with wayfinding signage,*
- A modest dog park,*
- A modest play structure with seating and shade,*
- Trail access to at least two trail types and,*
- Services such as lighting and washrooms.*

The planning and design component of this project provides an opportunity to explore the image of built objects, both in theme and application. The Town should request an 'applications palette' from the design consultant to create a benchmark for park objects which will be considered and evolved as master plan implementation proceeds.

Project 5 - Secondary Park Entry/Crossing. Whereas project 4 located a secondary entrance that serves local needs, this project promotes the trail network at a highly visible location, provides access to this network, and resolves a trail/street intersection with a bridge crossing that allows both trail and stream to pass under the multi-modal roadway. Another important variation from the project 4 entry is that the trail network is only accessible by human-power (foot, bicycle, etc). No vehicle access or parking is available and no gathering space is provided (play structure, dog park, etc.). Thus, the assets located here are:

- Park entry signage,*
- Trail access to all trail types and,*

Lighting and seating.

Project 6 - Municipal Operations Centre. Although the requirement for this project lies largely outside of this master plan's scope, this facility is located relative to municipal requirement as well as placement within the park. The facility is placed immediately adjacent to all facilities/events to aid with cost efficiency and provide access to a road network with linkages in all four directions.

Project 7 - Future Park Projects. Primary park entry and activity projects should be located at the south and east boundaries when local residential and commercial development support expansion. These are:

Primary park entry adjacent to the Hillsborough Road with access to nature-based activity such as a wetland park, stream confluence interpretation, trail access to the Dobson and park trails and 'outback experiences',

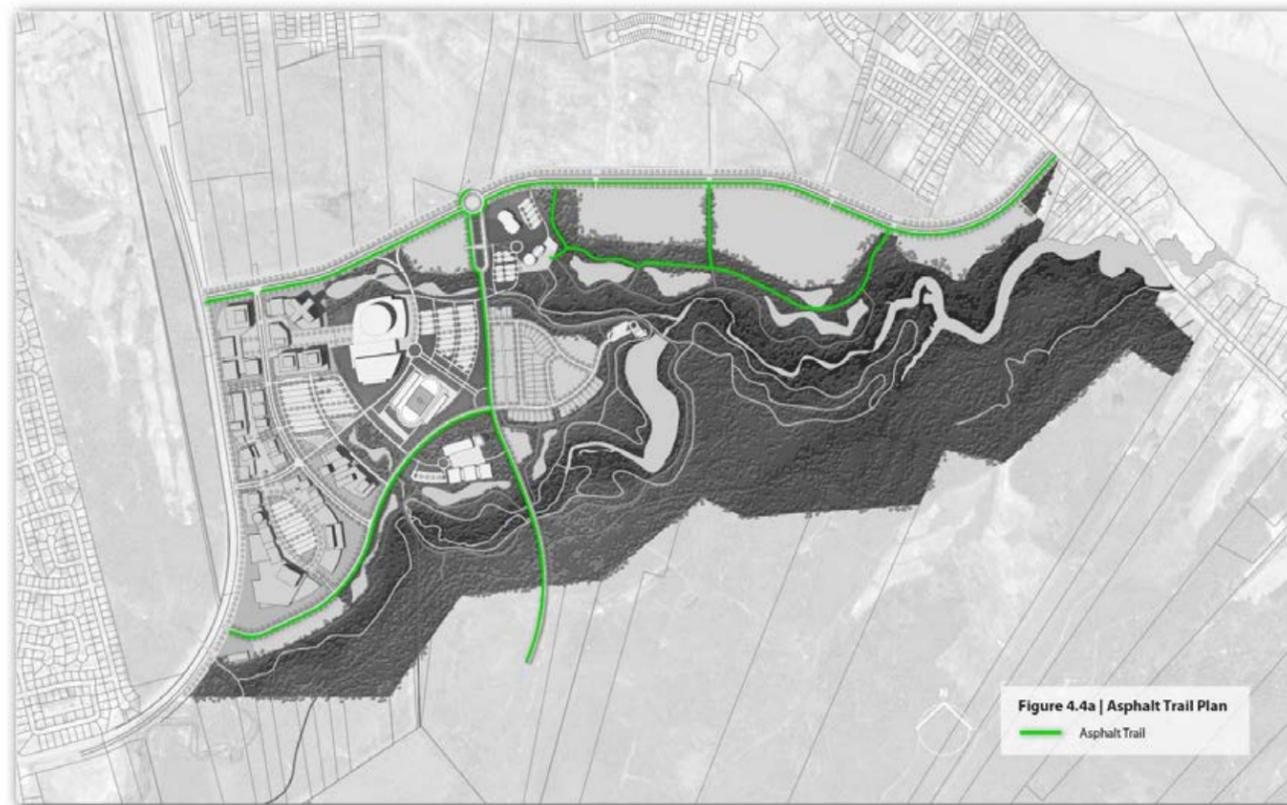
Interior and south edge park activities to support passive enjoyment or adventure-based activity such as snowshoeing, camping, biking and skiing and,

Services required to support a safe and comfortable visit.

Project 8 - In-Park Residential Development. It can be argued that residential development does not belong within a large municipal park; however, there are three very good arguments to support it. First, in this case, there is sufficient space to meet resident desire for park amenity and still provide residents to live within the park (at a premium cost). Second, the municipality will benefit from additional and higher than average tax revenue from in-park development and, finally, the burden of creating an in-park road network to support the operations centre and various recreational amenity will not fall solely on the town where street-edge residential development shares street development cost.

Project 9 - Gunningsville Commercial Zone. Although this zone falls outside of park boundary, inclusion within this master plan is very important for two reasons. First, the park creates a unique identity that can be significantly impacted by a large retail/commercial project. It is very important that the character of the park be extended into the commercial zone to ensure the opposite does not occur. This means that the built form and landscape image of the commercial zone appear as "retail within a park".

Second, this image of commercial zone will result in a unique retail product that, when considered with the park, adjacent residential development and active transportation network, will provide Riverview with a powerful economic development tool expressive of contemporary lifestyle.



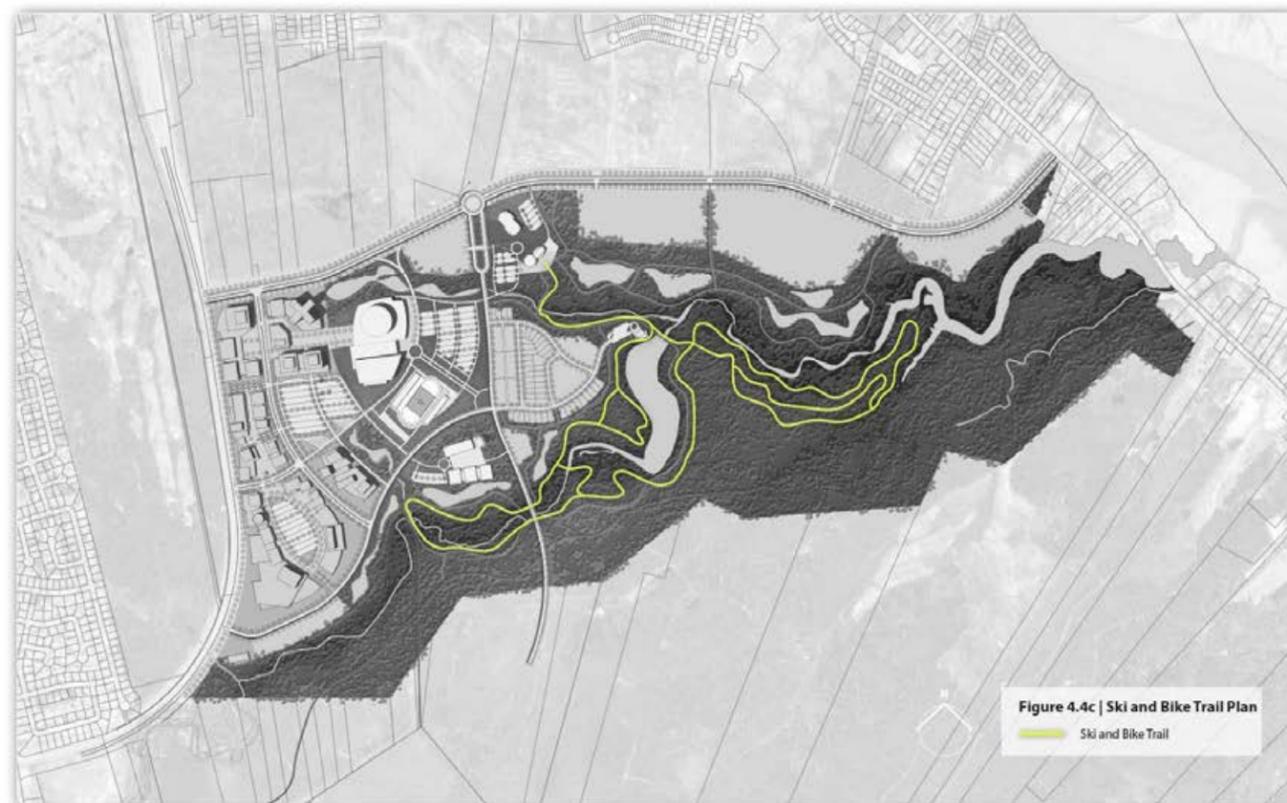
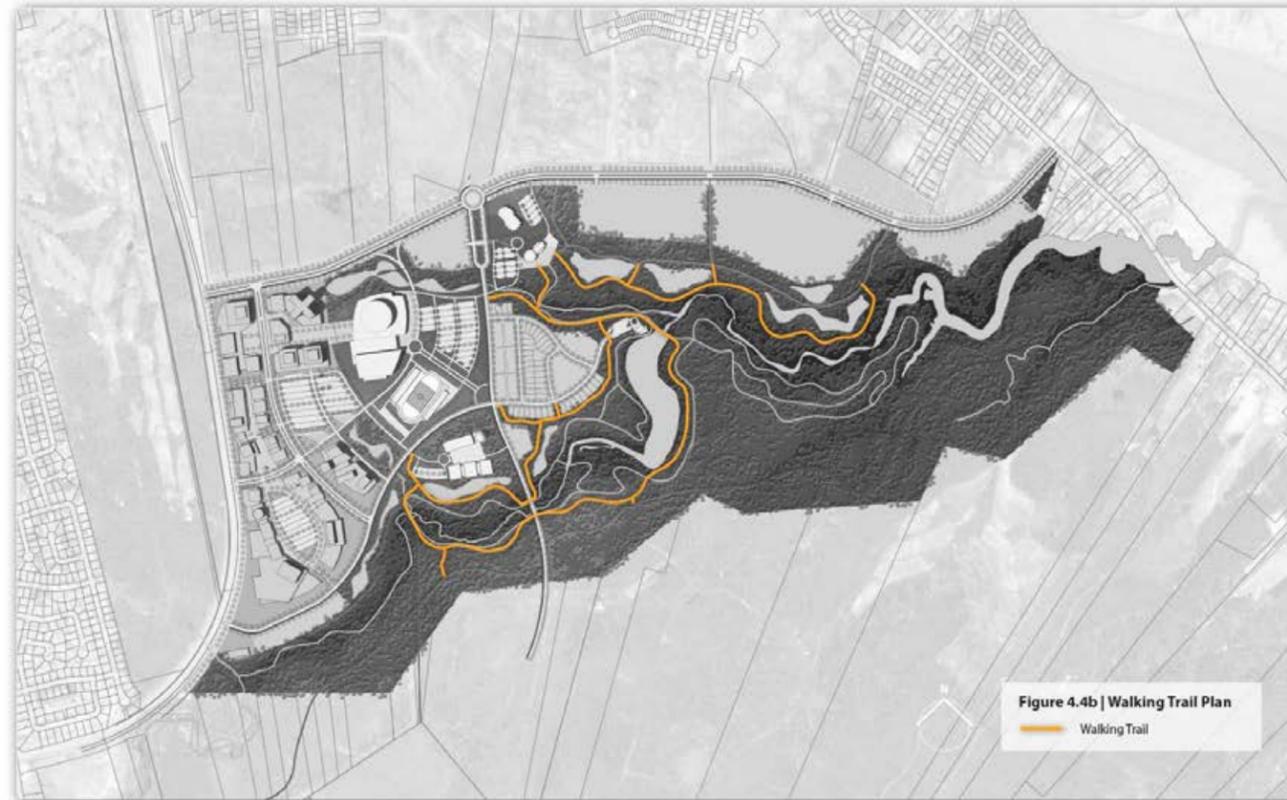
4.4 Trail Projects

The Mill Creek Nature Park trail network, and inclusive support amenities, are the park's fabric. The previous mentioned section 4.3 projects are the destinations placed on the fabric. The projects rationalize the location(s) of the trail network.

The following provides an overview of the trail network components.

Trail Type One - Active Transportation Trail. This trail receives its name from its key linkage - the Bridgedale Boulevard-side active transportation trail (see figure 4.4a).

This 7.7 kilometer (1.4 km within the park) / 3.0 meter wide asphalt trail that when linked to the active transportation trail, becomes a multi-use loop, accessible from the visitor centre. This is an exciting all-season walking, cycling or rollerblading track that provides opportunities to enjoy both nature and the



well-designed boulevard.

Seating, lighting and other comfort amenity is to be placed in accordance to Riverview's active transportation requirements. Signage will be placed as per this master plan.

Trail Type Two - Nature Trail. This is a stacked 5.6 kilometer/3.0 meter wide granular trail that functions as the primary walking surface from all destinations into all areas of the park. The trail is an all-season surface that receives constant surface upgrades from winter maintenance - washed tailing safety surface drops to trail surface in the spring to form a "new trail coat".

At no point, is this trail any surface other than granular (to sustain the image of nature dominant setting). Seating is placed at 500 meter intervals and is complimented with interpretation where appropriate, trash receptacles and photovoltaic light standards. Wayfinding signage is applied as required.

Trail Type Three - Active Trail. This trail has visitor attraction well beyond Riverview and central New Brunswick. When combined with the visitor centre gateway and retail centre (complete with hotel), this trail creates an all-season destination for mountain biking and cross country skiing (see figure 4.4c).

The trail is a stacked 7.1 kilometer /10.0 meter wide unsurfaced trail corridor that provides primary active recreation. The trail is an all-season surface, sized to accommodate two-way cross country skate and classic ski use, which requires winter grooming and occasional summer clearing to maintain the corridor's canopy setback and surface grass length.

The primary access for this trail is the visitor centre. The services provided here, as well as training/event launching areas, create a strong active trail gateway. The varied corridor lengths and slopes cater to a variety of athlete skill levels. Also the looped network will be designed to provide varied natural and athletic experiences without creating user fear.

Wayfinding signage is the only required amenity on the active trails. Lighting is not required, but should be considered for night skiing on the trail loop around the pond.

Trail Type Four - Snowmobile/ATV Trail. Like the active trail, this has visitor attraction well beyond Riverview and central New Brunswick. In fact, when considered with the the retail core and associated hotel, gas service and other amenities, this location provides an optimal launching point to the Province's

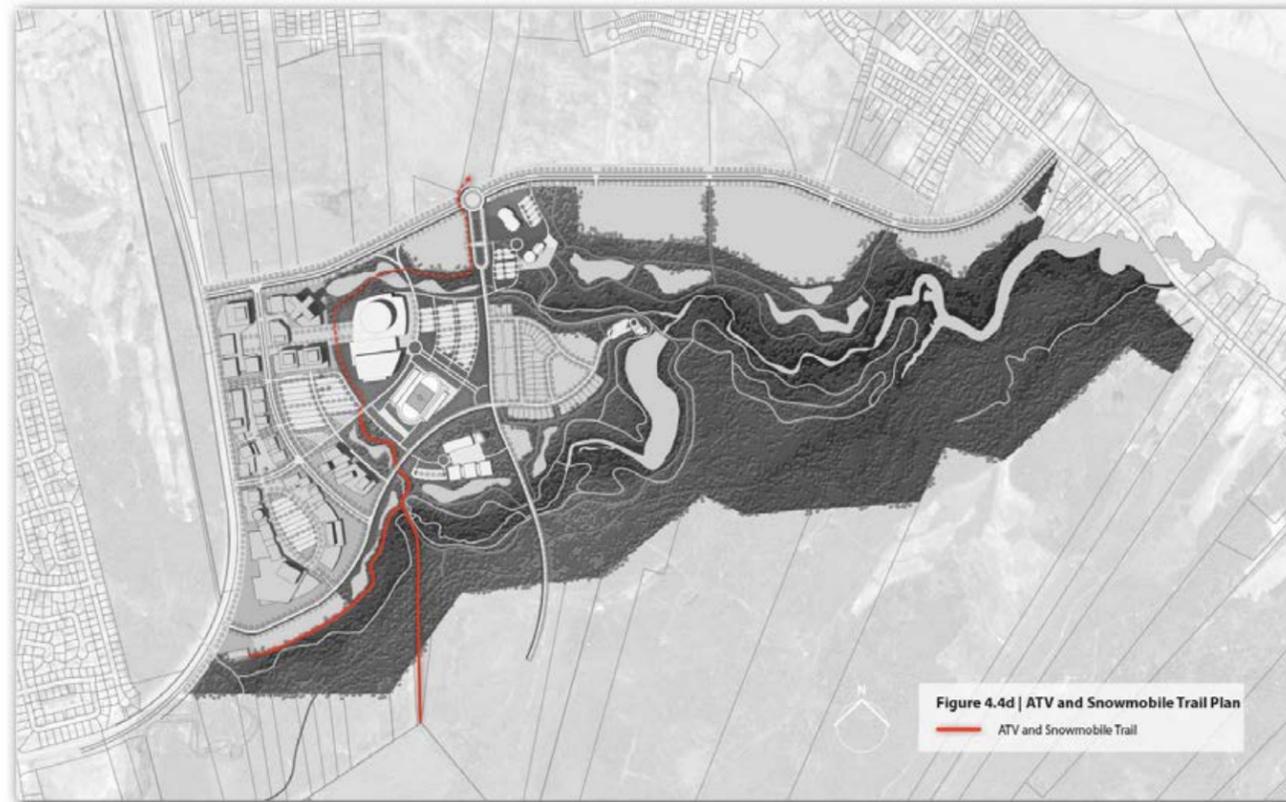


Figure 4.4d | ATV and Snowmobile Trail Plan
 — ATV and Snowmobile Trail

Four amenity components are important to discuss at the master plan level. These are lighting, wayfinding, interpretation, comfort stations and associated technologies. Although rest area seating is important, this is a component of detailed design and will not be discussed here.

Prior to discussing the various components, it is important to note the image of amenity. The Mill Creek Nature Park is a modern facility and should appear contemporary and, therefore, relevant. Lighting, signage, interpretation, building design and associated technologies should be 'up-to-date'. Any amenity that pretends to articulate heritage belongs elsewhere.

Lighting. As previously mentioned, no wires should be visible within the park. Therefore, technologies that provide power where power is required is a preferred alternative. LED lighting powered by 'on-fixture' photo voltaic panels will provide suitable lighting for periods when lighting is required.

Wayfinding and Interpretation. Directional and educational signage within the park should be limited to use only where required. As indicated by students during consultation, anything added to the nature park must be on an as-required basis only. Thus, contemporary interpretation, wayfinding and reassurance signage should be placed only where absolutely necessary in a manner that minimizes visual impact while provide directional comfort.

Comfort Stations. Although detailed site design is required to locate washrooms, we can estimate 1 station for every 2 kilometers of trail (at locations accessible from public streets). All park gateways should include a comfort station).

Like lighting, these are to be 'off-the-grid' structures with compostable toilets, personal sanitizer cleaners and photovoltaic powered light fixtures.

Technologies. Although developing primary structures as 'off-the-grid' facilities is not feasible, the ability to utilize contemporary applications to balance environmental impact and capital cost is constantly challenged by advances in material and integrated technologies.

Due to the expected lifespan of implementation, this master plan does not promote a specific approach to sustainable building or integrated technology application. Instead, the plan promotes constantly challenging landscape architects, architects and engineers with the task of applying leading edge thinking to ensure contemporary sustainability. At no point should any person or group charged with plan implementation settle for any approach other than sustainable building.



White Gold and ATV trail networks for visitors from various Eastern Seaboard home locations.

This is a 10 meter wide non-surfaced trail that extends through the park from an existing service station (Hillsborough Road) to the motorized trail network located at the southern edge of the park (see figure 4.4d - next page). Detailed specifications and road crossing requirements fall within the mandate of user clubs and the Province of New Brunswick.



Trail Type Five - The Dobson Trail Extension. The Dobson Trail serves two purposes in this master plan. First, the extension will result in a gateway to the Dobson from the Hillsborough Road, thus extending the trail to a significant regional arterial street. Second, the natural image of the Dobson Trail will form a theme for south park development.

The trail specification for the extension will be determined in association with Dobson Trail representatives and the Town. The master plan illustrates 4.2 kilometers of trail within the park.

4.5 Park Amenity

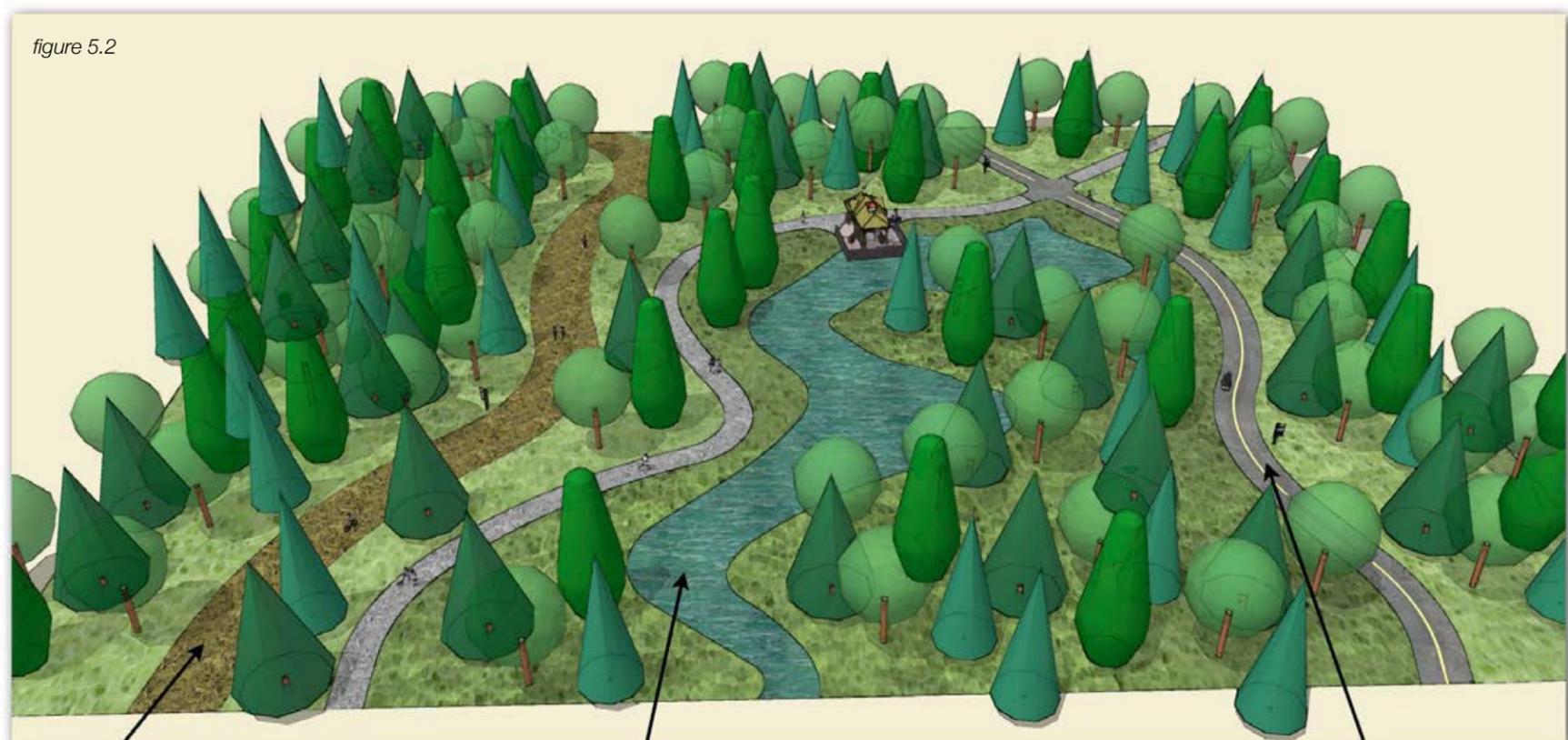
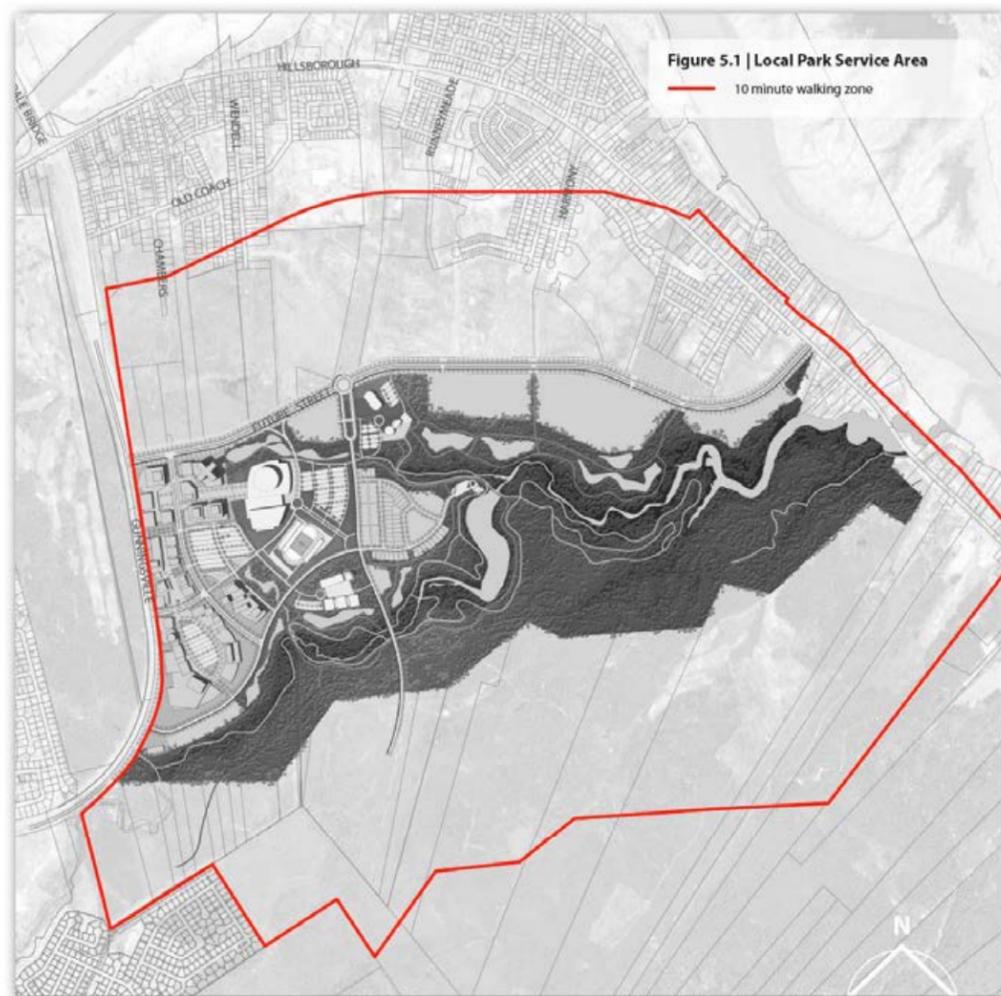


figure 5.2

a 10 meter wide active recreation trail corridor will be built with municipal investment. no surface is required for this trail beyond stability remediation (created by cut and fill work).

development within the park and adjacent lands (where possible) can place stormwater retention within park (where physically possible). where retention is placed within the park, developer retention contribution is applied to creating pond systems and landscaped edges.

retention landscaped edges will be modified to support granular and asphalt trails. developers will not be required to place community-level parks within 1 km of the Mill Creek Park - developer lands for public purposes funds will be diverted to the park to combine with municipal investment to complete trail surfaces.

5.0 Master Plan Implementation

Master plan implementation will require significant funding over an extended period. The Town of Riverview should view project funding within local and regional growth contexts. Thus, park investment will be based on Town growth, rationalized investment of growth tax funds and developer contribution. This chapter proposes a creative approach to combining these variables to implement the master plan.

5.1 Implementation Theory

The Mill Creek Nature Park is a significant facility that will include several of Riverview's large scale recreation projects (over the next several years). It is important to propose a reasonable theory to support implementation. This section discusses this theory.

All aspects of this master plan are proposed within the context of local or regional growth. Trail and trail related ('the fabric') projects are planned within the context of local residential development. Recreation destination projects are planned within the context of regional growth. Both project types are funded based on their contexts.

a. Funding the Fabric. The Mill Creek area is a growing residential district that will see increased demand when viewed within the context of this park and adjacent planned amenity. The residential district will support initial stages of park creation by moving recreation and environmental projects into the park (from the adjacent residential district as developed).

Figure 5.1 illustrates the local recreation/retention service area. Areas within this boundary will utilize the park as community park. Thus, developers will not be required to provide lands for public purposes within this boundary. Instead, developers will be required to provide cash-in-lieu - this will be invested into the park as indicated on figure 5.2.

Also, developers may place stormwater retention within the park where slope permits access to in-park retention. Retention ponds, landscaped edges and structured stormwater delivery pipes (to property edge) may be built by the Town on developer cost recovery.

The pond network provides the trail base required for initial park development stages. As residential growth occurs, Town trail development investment can be supported by LFPP funds and tax revenue from adjacent growth areas.

b. Funding the Destinations. The Town of Riverview can capitalize on partnerships with private developers that are created on the notion that both the Town and private partner are invested into project success. For example, a

facility such as the gateway nature visitor centre can be developed under a partnership model that requires the financing partner is also invested into the success of the residential portions of the project. Thus, financing partners are investing into success, and not just a bank. Also, by definition, all projects are mixed-use.

This model of public-private partnership is more attractive to provincial and funding sources for two reasons. First, required investment is decreased with greater private investment where greater private contribution is required to create a project (i.e. residential components). Second, mixed-use projects can generate higher tax revenues - which offset capital investment.

5.2 Administrative Steps

This section describes the initial administrative steps that set a platform for park creation.

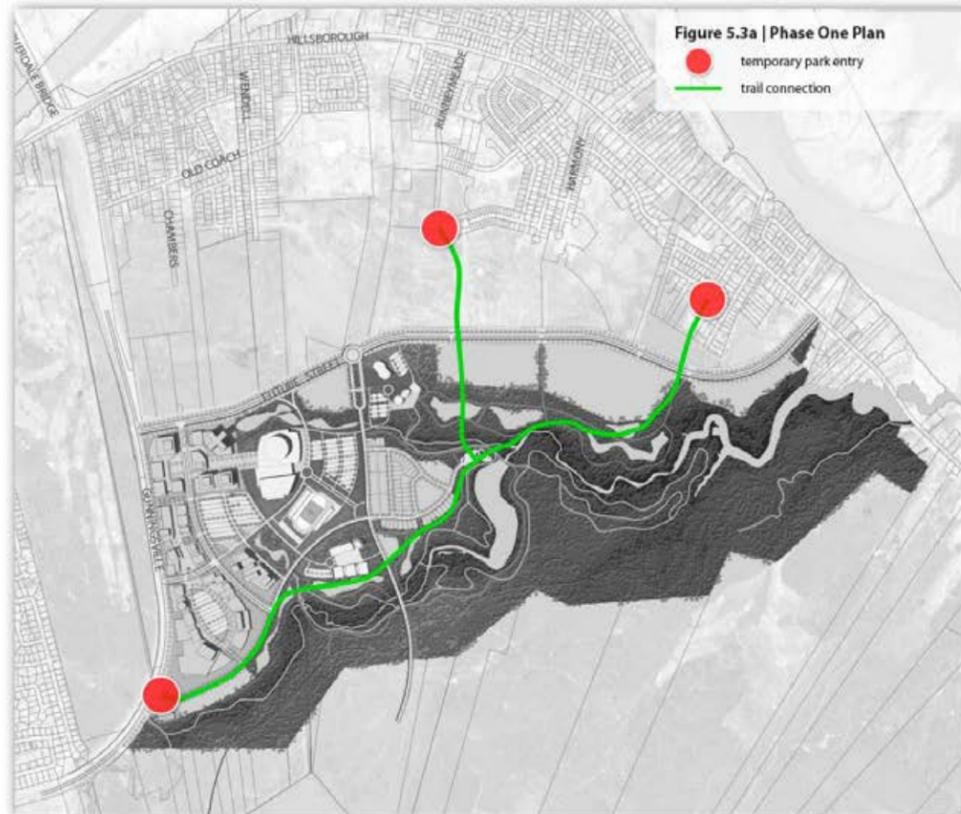
a. Achieve an Implementation Mandate. The first implementation task involves meeting with all administrative partners to present and distribute this master plan. At a minimum, this should include provincial and federal elected and staff representatives, recreation groups and business representatives. Municipal representatives should present the plan within relative context and solicit further involvement within this context.

b. Create Municipal Policy. The Town of Riverview should provide a copy of this master plan to the Urban Planning Department for incorporation into Riverview's land use planning and policy. The Department will determine where, and how, to implement initiatives such as stormwater retention investment, LFPP assignments and zoning to support the park and adjacent development.

c. Assemble the Land-Base. Much of the land required for park creation falls within existing Town of Riverview land holdings and environmental corridor setbacks required under municipal and provincial requirement.

The Town presently holds 536 acres of land. The master plan park area encompasses 663 acres of land. Much of this land can be acquired through LFPP designation for lands existing within the park boundary as well as land swaps that provide developers with Town owned lands outside of the park boundary.

The master plan identifies residential development parcels within the park boundary. This land should not be included in any trade discussions - the land value is significantly higher than adjacent parcels and should be issued under a 'request for proposal' format that sees maximum Town benefit when required.



The previously discussed figure 5.1 illustrates lands that directly relate to the park. The Town should commission a land assembly analysis that will clarify all land required for park creation. Related lands existing outside of this boundary, as well as all lands within the proposed park should be annexed into the Town to ensure a win-win scenario for the municipality and developer. As well, the Town should purchase land within the park boundary when it becomes available (figure 4.1 illustrates the Town's existing land and boundary).

d. Mill Creek Investment, Planning and Design Guidelines.

The Mill Creek development zone (inclusive of recreational, civic, commercial and residential development) is very unique, and will require very unique and contemporary thinking relative to investment planning, and development and design guidelines to ensure maximum residential municipal benefit.

The Town of Riverview should commission a study that incorporates feasibility, planning and design thinking that results in a 'guidelines document' that establishes a roadmap to Mill Creek investment and image over the next ten years of development. This document should provide design approaches to all development areas within the core Mill Creek zones (commercial, civic and park).

5.3 Park Development Steps

The administrative steps set a platform for the long-term development of the park. This section describes short-term projects that begins the park creation process - to be concurrently realized with the implementation steps. Specifically, this section provides implementation steps for the first three phases of park creation. A longer term view of park creation is provided in Appendix C (cost-benefit analysis based on long-term implementation).

It is important to note that these are not intended as annual implementation phases. They are phases that may take 2 or more years for each; thus, phase relates to the creation of a park component rather than a period of time.



Phase One - Existing Gateways and Connectivity. Three gateways presently exist into the park - at the sanitary sewer line corridor/Gunningville Boulevard Intersection, the Coverdale Recreation Centre and the Bridgedale Community Centre (see figure 5.3a). These gateways as well as the trail linking each should be enhanced to provide the first image of Mill Creek Park. The following projects complete this phase.

a. Primary Trail Enhancement. Several trail and back country roads presently provide a network of park connectivity. Much of this network is not in keeping with the notion of nature park.

As a starting point, the Town should develop a primary park corridor based on the granular nature trail network illustrated on the master plan. This new trail will use existing and new trail corridors, and will form a linkage between all three gateways from where residents can access the park's 'crown jewel' - the headpond.

b. Forestation Planning. Some portions of the proposed park have been cleared of forest cover (adjacent to the Bridgedale Community Centre). The Town should work with the landowner(s) to re-establish forest in areas where the master plan's trail network extends through cleared lands.

c. Gateway Development. The Coverdale Recreation and Bridgedale Community Centres both provide gateway points to park lands. Neither of these should receive significant investment due to the fact that both will be abandoned as primary park gateways when the Bridgedale Boulevard is built. Thus, only signage enhancements at these locations will establish park gateway.

A temporary gateway is required at the sanitary sewer line/Gunningville Boulevard intersection. This will require shared access use of the sanitary sewer line entry, a comfort station, parking space and a formalized park entry. Signage will support wayfinding.

d. Wayfinding Signage. Each gateway location requires signage that provides information relative to accessing the headpond and adjacent gateways, safety and guideline information and current activity information. In addition to this, wayfinding and reassurance signage should be minimally placed along the primary trail to provide residents with location and distance information.

Phase Two - Headpond and Active Recreation Network. The Town should commence an upgrade, or creation of, trails circumnavigating the headpond with linkages to the phase one primary park trail (see figure 5.3b). At this point, trail work along the north park boundary should be conducted with retention work.

Also, the existing ski trails accessed from the Bridgedale Community Centre are no longer sustainable for active recreation use (due to tree clearing). Thus, the active trail network gateway should be moved to the Gunningsville Park entry with a new trail network where located on the master plan.

The following projects complete this phase.

a. Detailed Headpond Trail Plan. The Town should commission a detailed trail plan to finalize exact locations for the nature and active trail network circumnavigating the headpond. This will require assistance from a skilled cross country ski facility planner to develop a mix of appropriate trail types relative to varied skillsets and event hosting.

This work will also require engineering assistance for the creation of storm retention ponds and the adjacent nature trail.

b. Temporary Ski/Bike Gateway Facility. The Town should work with ski and



bike groups to locate a temporary Gunningsville gateway facility suitable for hosting active trail use - probably a rental trailer. Mapping and signage will be required for both the nature and active trails.

c. Interpretive Plan. The town should commission an interpretive plan that explores, in detail, the cultural and natural history and setting of the Mill Creek Nature Park lands. This plan should articulate where and how interpretation should be placed within the park (in keeping with this master plan). The Town can install interpretive materials when desired.

Phase Three - Bridgedale Boulevard Gateway Planning. This phase is only required upon completion of the Bridgedale Boulevard from the Gunningsville Boulevard to the primary park gateway (see figure 5.3c - next page). This phase will move the park from a local to regional recreation asset; thus, planning should incorporate the adjacent retail district and civic centre, and should include a broad partnership base.

The following steps commence this local to regional phase.

a. Develop a Phased Primary Gateway Plan. The Town should commission a detailed and phased primary gateway plan that incorporates the components described in this master plan. This will include initial development tasks such as moving the active recreation trailer to this location, and creating trail linkages from internal park locations to the gateway. At this point, the Gunningsville gateway becomes a secondary park entry.



temporary entries will provide access, parking, comfort and wayfinding information. in some cases, these gateways will become secondary park entries (i.e. the Gunningsville Boulevard/Sanitary Sewer line intersection entry).

Gateway planning should also include a detailed concept plan for the Visitor Centre. All possible partnership and master plan components for this facility should be explored within the context of adjacent development area.

5.4 Projects Budget

As previous mentioned, the first three phases proposed in this master plan bring the existing setting to a regional asset. This is not all work required to create the park; however, this plan provides a reasonable approach and initial steps that the Town of Riverview can follow to meet resident desire for the creation of a new town centre (complete with civic centre) and a park that meets recreation requirements for the next several years.

Appendix A of this report provides an overlapping implementation phase chart and phased budget. It is important to note the following:

1. The Mill Creek Park Master Plan was created with the notion that revenues from adjacent residential development would pay for park construction. Under this scenario, the Town of Riverview would invest in park construction phases and allow for adjacent property tax revenues to pay for construction as adjacent areas build-out.
2. Major capital projects, such as the artificial turf field, boathouse and nature park entry campus are budget based on 50% support from other funding/partnership sources.
3. Residential buildout for the park service area is estimated at 10 years. As shown, the estimated park construction build-out is 10 years relative to the tax revenues; however, this may increase or decrease based on build-out periods.
4. The master plan illustrates significant commercial development; however, revenues from this area should be allocated to civic centre cost recovery.
5. You will notice that each phase has a single-year “buffer period” to allow for completion of projects and/or planning and design of upcoming projects.

Appendix A

Implementation Chart & Budget Estimates

Implementation Chart

This chart illustrates the implementation plan in a graphic format that highlights where projects can, and should, overlap. It is important to note that the phases are considered relative to adjacent residential buildout. The budget estimate chart (next page) provides estimated buildout periods.

projects										
Trail Development Projects										
clearing and grubbing for new trails	Red	Red		Red	Red			Dark Red	Dark Red	
trail excavation & grading	Red	Red		Red	Red			Dark Red	Dark Red	
granular trail construction	Red	Red		Red	Red			Dark Red	Dark Red	
granular trail upgrades to existing surfaces	Red	Red								
active trail construction				Red	Red			Dark Red	Dark Red	
Special Study Projects										
land assembly analysis	Red									
design guidelines										
interpretation plan				Red						
gateway plan					Red					
General Amenity Projects										
entry and parking area at gunningsville	Red	Red						Dark Red	Dark Red	
park entry sign at gunningsville		Red							Dark Red	
wayfinding panels at entry and in-park areas		Red							Dark Red	
reassurance panels throughout park		Red			Red			Dark Red	Dark Red	
comfort station at gunningsville		Red			Red			Dark Red	Dark Red	
comfort station within park		Red			Red					
general landscape improvements	Red	Red	Red	Red	Red	Red				
Civic Facility Projects										
nature centre/primary park gateway							Dark Red			
artificial turf stadium						Red				
bouthouse & dock systems										Dark Red
phase one projects	Red									
phase two projects	Dark Red									
phase three projects	Dark Red									

Mill Creek Master Plan Phased Budget Estimates

Final Version 29 April 2013

Mill Creek Projects	unit cost	units	cost	units	cost	units	cost	units	cost	units	cost	units	cost	units	cost	units	cost	units	cost	units	cost		
		year one	two	three	four	five	six	seven	eight	nine	ten	eleven	twelve	thirteen	fourteen	fifteen	sixteen	seventeen	eighteen	nineteen	twenty		
Trail Development Projects		phase one projects						phase two projects						phase three projects									
clearing & grubbing (sq.m.)	\$4.00	5,604	\$22,416	5,604	\$22,416		\$0	39,604	\$158,416	39,604	\$158,416		\$0		\$0	1,750	\$7,000	1,750	\$7,000		\$0		
common excavation/shaping (cu.m.)	\$3.50	1,750	\$6,125	1,750	\$6,125		\$0	4,250	\$14,875	4,250	\$14,875		\$0		\$0	1,250	\$4,375	1,250	\$4,375		\$0		
granular trail (lin.m.)	\$38	900	\$34,200	900	\$34,200		\$0	1,402	\$53,276	1,402	\$53,276		\$0		\$0	75	\$2,850	75	\$2,850		\$0		
granular trail upgrade (lin.m.)	\$28	600	\$16,800	600	\$16,800		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0		
active trail bed	\$25		\$0		\$0		\$0	3,550	\$88,738	3,550	\$88,738		\$0		\$0	750	\$18,750	750	\$18,750		\$0		
Special Study Projects																							
land assembly analysis	\$15,000	1	\$15,000		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0		
design guidelines	\$18,500	1	\$18,500		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0		
interpretation plan	\$35,000		\$0		\$0		\$0	1	\$35,000		\$0		\$0		\$0		\$0		\$0		\$0		
gateway plan	\$25,000		\$0		\$0		\$0		\$0	1	\$25,000		\$0		\$0		\$0		\$0		\$0		
General Amenity Components																							
granular entry & parking (sq.m.)	\$25	720	\$18,000	720	\$18,000		\$0		\$0		\$0		\$0		\$0	500	\$12,500	500	\$12,500		\$0		
park entry sign (per)	\$2,650		\$0	1	\$2,650		\$0		\$0		\$0		\$0		\$0		\$0	2	\$5,300		\$0		
wayfinding panel (per)	\$450		\$0	8	\$3,600		\$0		\$0	25	\$11,250		\$0		\$0		\$0	2	\$900		\$0		
reassurance panel (per)	\$150		\$0	24	\$3,600		\$0		\$0	150	\$22,500		\$0		\$0	100	\$15,000	100	\$15,000		\$0		
comfort station (sq.ft.)	\$190		\$0	400	\$76,000		\$0		\$0	400	\$76,000		\$0		\$0	400	\$76,000	400	\$76,000		\$0		
interpretation station	\$7,500		\$0	2	\$15,000		\$0	4	\$30,000		\$0		\$0		\$0	6	\$45,000	0	\$0		\$0		
general landscape	\$25,000	1	\$25,000	1	\$25,000	2	\$50,000	1	\$25,000	1	\$25,000	2	\$50,000		\$0		\$0		\$0		\$0		
Large Projects			\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0		
nature centre & site	\$2,800,000		\$0		\$0		\$0		\$0		\$0		\$0	50%	\$1,400,000		\$0		\$0		\$0		
artificial turf stadium	\$2,650,000		\$0		\$0		\$0		\$0		\$0	50%	\$1,325,000		\$0		\$0		\$0		\$0		
boathouse, docks & site	\$725,000		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0	50%	\$362,500		
contingencies			\$10,923		\$15,637		\$3,500		\$28,371		\$33,254		\$96,250		\$98,000		\$12,703		\$9,987		\$25,375		
design & project management			\$16,696		\$23,903		\$5,350		\$43,368		\$50,831		\$147,125		\$149,800		\$19,418		\$15,266		\$38,788		
special project totals			\$183,660		\$262,931		\$58,850		\$477,043		\$559,139		\$1,618,375		\$1,647,800		\$213,596		\$167,928		\$426,663		

Appendix B

Genivar Stormwater Management Figure

Appendix B | Stormwater Management

Zone One

Area: 57.5 hectares
Pond Storage Volume: 27,300 cubic meters

Zone Two

Area: 43.0 hectares
Pond Storage Volume: 20,700 cubic meters

Zone Three

Area: 15.7 hectares
Pond Storage Volume: 7,150 cubic meters

Zone Four

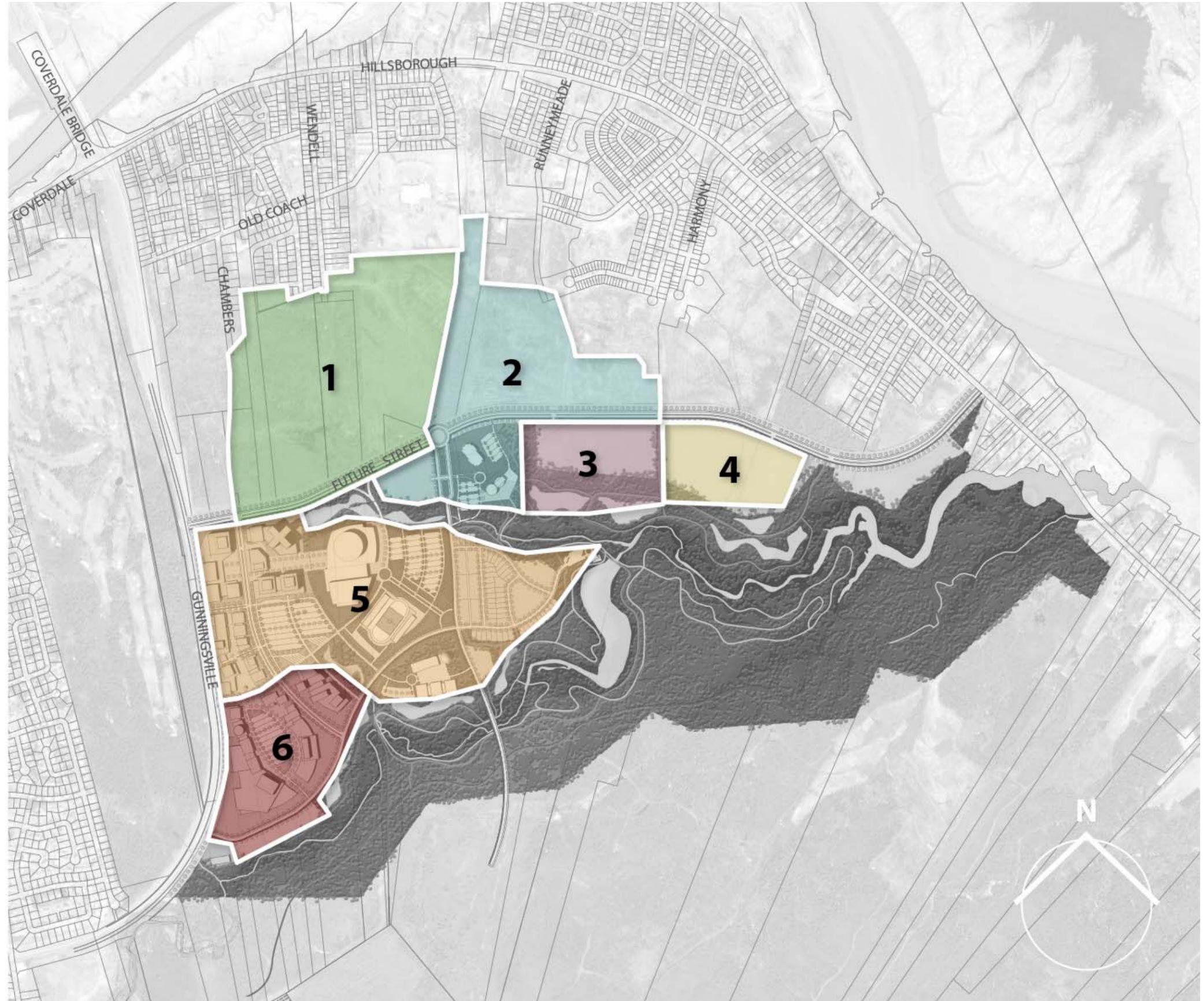
Area: 12.2 hectares
Pond Storage Volume: 5,700 cubic meters

Zone Five

Area: 66.9 hectares
Pond Storage Volume: 35,100 cubic meters

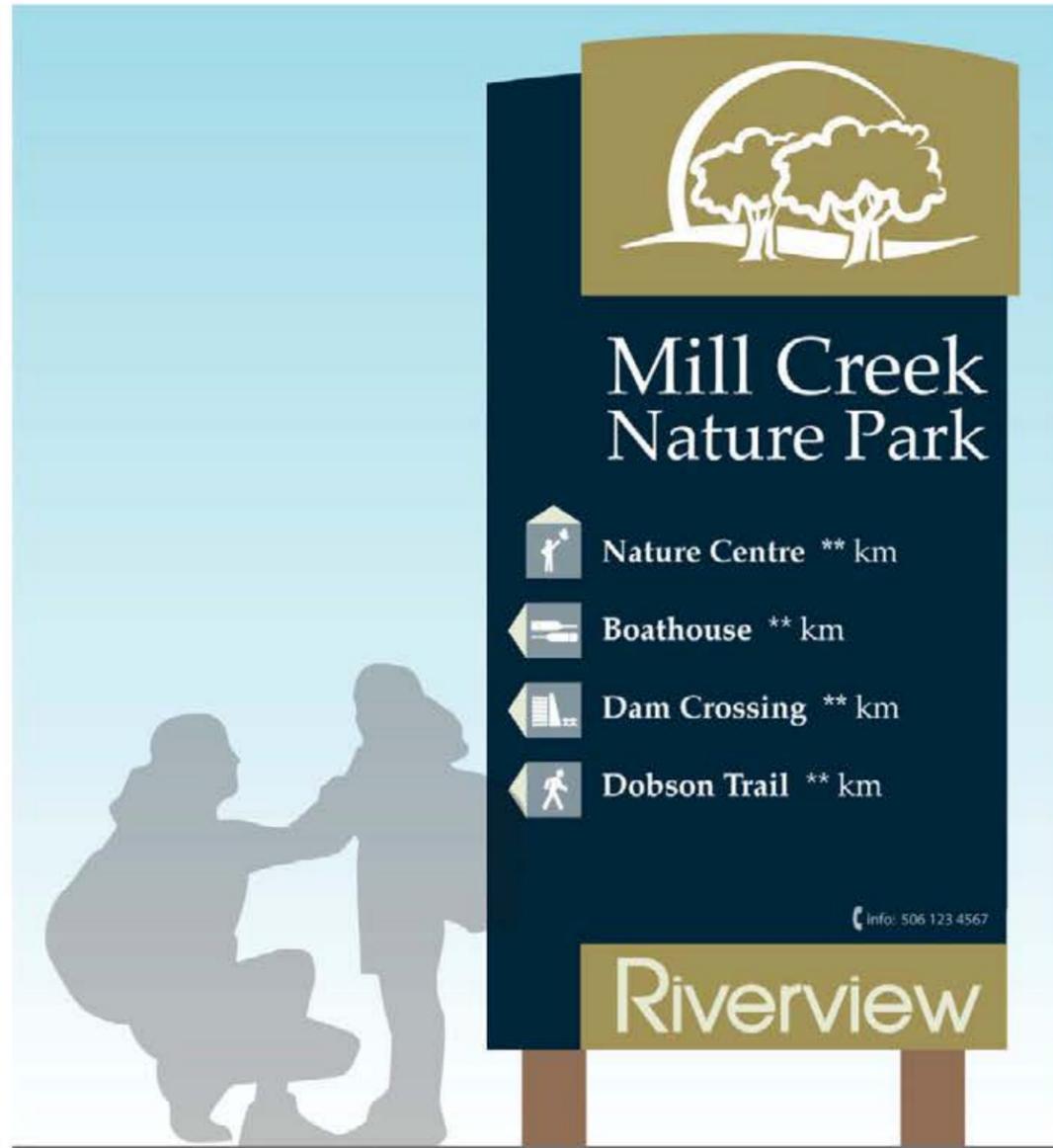
Zone Six

Area: 24.6 hectares
Pond Storage Volume: 14,500 cubic meters



Appendix C

Signage Concepts



Main Entry Sign
 • located at major trail entries, shows distances to major attractions



Secondary Entry Sign
 • located at secondary entries with map / attraction information



Distance Reassurance Sign
 • located at trail junctions with attraction distances from that location

