

TOWN OF OKOTOKS
OFF-SITE LEVY DISCUSSION

Defining a Potential New Community Recreation Centre



JUNE 4, 2020





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Introduction

The intent of this memo is to provide support information for the development of the Off-Site Levy Bylaw. The modernized Municipal Government Act (MGA) requires that an Off-Site Levy for a community recreation facility include a description of specific infrastructure and facilities, associated estimated capital costs, and a description of the benefiting area.

The facility program related to the new community recreation centre described below was developed based upon the recommendations and direction put forth in the Town of Okotoks Recreation, Parks, and Leisure Master Plan of 2017. The Master Plan was based on thorough public engagement, research and direction from the Town's Culture, Parks and Recreation Committee and Town Council.

It is important to note that the facility program has been developed for purposes of the revised Bylaw. It has not been developed following standard facility development processes whereby feasibility studies have been completed. Future planning processes will more thoroughly investigate amenity and space needs which, in turn, may have an impact upon the facility program, amenity spaces, and ultimately capital estimates. The current market conditions at the time the facility is built will influence the facility program too. The draft program presented herein does not take into account the efforts of the private sector or community partners to address space needs nor potential partnerships with regional municipalities that may emerge through the Calgary Metropolitan Regional Board or other means.



Potential Community Recreation Facility Program

The facility program that follows, and the associated areas, is based upon the community need and provision ratios presented in the 2017 Master Plan. It is also based on general or generic guidelines for the different recreation amenities and / or reflects similar types of spaces in other facilities in other communities. **The program offers two phases with the full build out (both phases) to service the needs of the Town when it reaches 60,000 residents.**

Amenity	Description
Phase One (timing: when the Town's population reaches 45,000)	
Indoor child play	Indoor playground equipment, two storey
Climbing gym	Indoor climbing and bouldering walls
Leisure swimming	Zero depth entry tank, waterslides, lazy rivers, hot tubs, etc.
25m swim tank	Rectangular program tank
Fitness / wellness facilities	Cardio and strength training areas
Gymnasium type space	Multipurpose dry land areas, dividable into three areas
Walking / running track	Indoor track spaces
Community hall / banquet facility	Banquet facilities to accommodate 450 people with kitchen
Multi-purpose program rooms	Meeting / program rooms
Foyer / circulation / social gathering	Social gathering and circulation (hallways, stairways, etc.)
Administration space	Facility administration and operations work areas
Support Space	Mechanical and operation support space
Phase Two (timing: when the Town's population reaches 50,000)	
Ice arena	NHL sized ice surface, 300-400 spectator capacity
Indoor field	Non-boarded indoor turf accommodating all field activities

Capital Cost Estimates

The capital estimates are Class D (+/- 30%), order of magnitude figures. They are based on construction estimates that reflect late 2019 early 2020. The impact of the economic downturn and the Coronavirus pandemic of 2020 on these costs is unknown and has not been reflected in the following estimates.

Components	Area (sq ft)	Area (sq m)	Cost (sq ft)	Construction Cost	Design fees and contingency	Total cost of amenity
Phase One (timing: when the Town's population reaches 45,000)						
Indoor child play	3,000	280	\$350	\$1,050,000	\$210,000	\$1,260,000
Climbing gym	2,000	180	\$500	\$1,000,000	\$200,000	\$1,200,000
Leisure swimming	25,000	1,800	\$800	\$20,000,000	\$4,000,000	\$24,000,000
25m swim tank	15,000	900	\$700	\$10,500,000	\$2,100,000	\$12,600,000
Fitness / wellness facilities	10,000	560	\$350	\$3,500,000	\$700,000	\$4,200,000
Gymnasium type space	20,000	1,400	\$300	\$6,000,000	\$1,200,000	\$7,200,000
Walking / running track	7,000	650	\$300	\$2,100,000	\$420,000	\$2,520,000
Community hall / banquet facility	12,000	1,100	\$400	\$4,800,000	\$960,000	\$5,760,000
Multi-purpose program rooms	5,000	180	\$350	\$1,750,000	\$350,000	\$2,100,000
Foyer / circulation / social gathering	15,000	900	\$500	\$7,500,000	\$1,500,000	\$9,000,000
Administration space	3,000	280	\$275	\$825,000	\$165,000	\$990,000
Support Space	2,000	180	\$275	\$550,000	\$110,000	\$660,000
Sub total Phase One	119,000	8410		\$59,575,000	\$11,915,000	\$71,490,000
Phase Two (timing: when the Town's population reaches 50,000)						
Indoor arena	25,000	1,800	\$500	\$12,500,000	\$2,500,000	\$15,000,000
Indoor field	25,000	1,800	\$400	\$10,000,000	\$2,000,000	\$12,000,000
Sub total Phase Two	50,000	3,600		\$22,500,000	\$4,500,000	\$27,000,000
Total	132,000	12,010		\$82,075,000	\$16,415,000	\$98,490,000
Design Fees (15%)				\$12,311,250		
Site acquisition and servicing (unknown)				\$-		
Contingency (5%)				\$4,103,750		
Total project cost				\$98,490,000		

Benefiting Area

Identifying to what extent a potential community recreation facility will be used is not a simple black and white exercise. Many factors have an influence on this. Certainly the type of amenities included in a facility are a significant driver of utilization as is proximity of other recreation facilities and opportunities. The mix of amenities plays a factor as people may frequent one facility or site because of a unique combination of spaces that accommodate their needs (think a swim tank with appropriate dryland training facilities). Other factors need to be considered. Among them are the following.

- **Modern and contemporary options** – novelty can be an important attraction for people as can new and updated amenities.
- **Nearby amenities** – the ability to visit a variety of places and complete several tasks in a single trip can be impetus to visit one facility over another.
- **Proximity to residential areas** – facilities close to people's homes can bring in users from these nearby areas.
- **Utilization of existing facilities** – if existing facilities are at capacity then users may be more likely to travel to another facility.
- **Amenity type** – different spaces will have different drawing areas. People will have different appetites to travel to use a leisure pool than they would a program room (depending on the specific activity occurring).

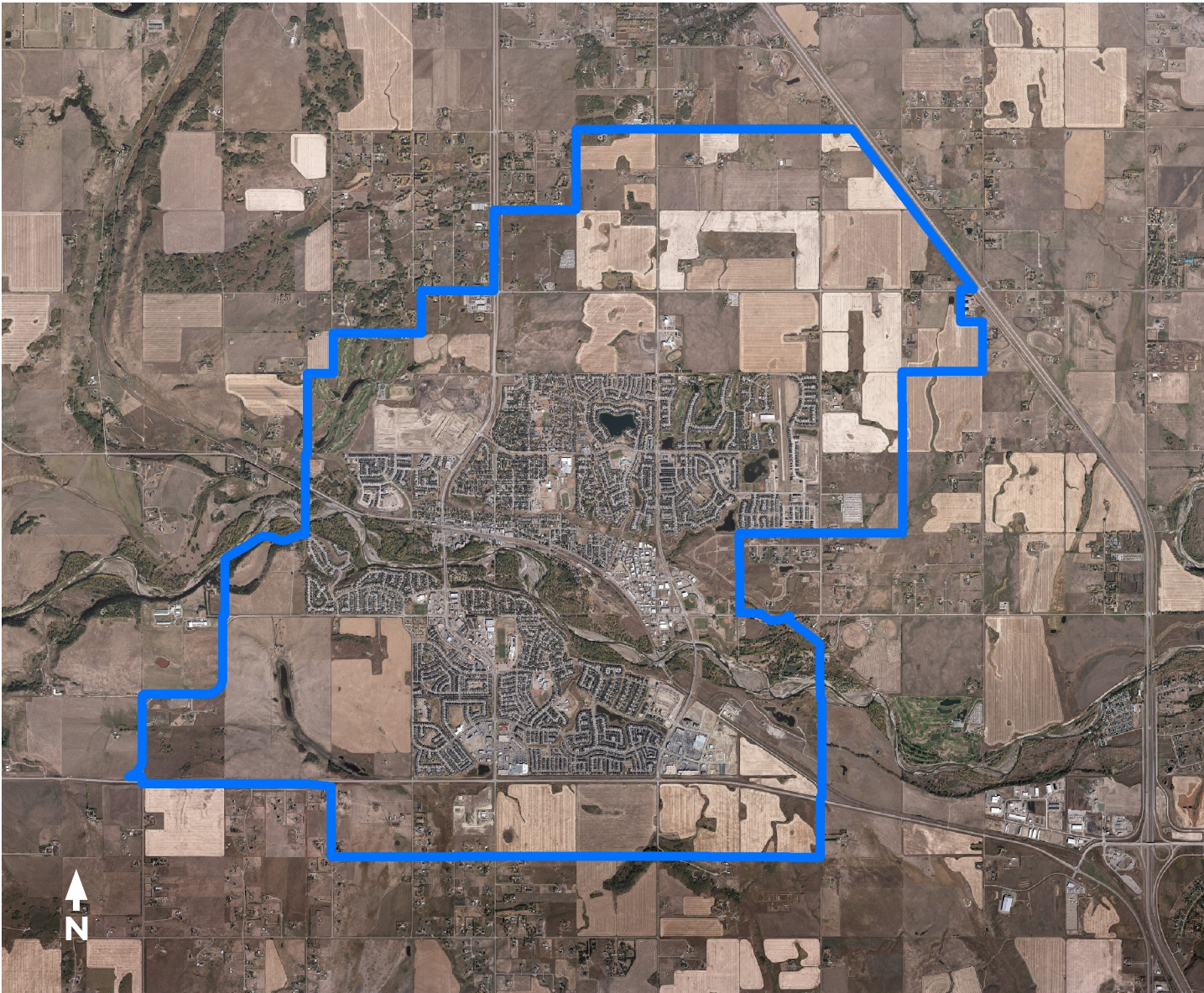
It has been studied that participants are willing to travel between 15-40 minutes to access recreation opportunities depending on the type of activity and the other circumstances above. Some of this literature is provided in the appendix.

Due to this information, it is assumed that the town boundary will constitute the benefitting market areas for this new community recreation facility as well as those that already exist.

It is also important to note that the benefits of recreation facilities are both direct, to those who use facilities, and indirect to everyone in the community. These concepts are better explained in the Master Plan however they relate that all residents cannot escape the benefits of having recreation facilities in the town.

It is possible that a potential new community recreation facility will be located in the south and east edges of Okotoks (as outlined in the Recreation, Parks, and Leisure Master Plan).

Okotoks Town Boundary



Conclusion

It is impossible to depict benefiting market areas for existing or new community recreation facilities that do not overlap geographically. Users visit facilities due to program requirements (i.e. ice allocation, competitions, etc.), the unique amenities a facility offers, and a variety of other reasons. For this reason, the following conclusions are made.

1. The benefiting market area for existing and new community recreation facilities will be the entire town both now and as the community approaches 60,000 residents*.
2. The benefits of recreation facilities are accrued to both users (direct) and non-users (indirect), therefore entire populations should be responsible for them.
3. Current recreation amenities in the Town are meeting needs and are used at or near capacity therefore more of what already exists in the Town will be servicing new residents as the Town grows.
4. Amenities that are desired by Town residents that do not exist currently will benefit both existing and future populations.

These statements are consistent with the findings of the 2017 Recreation, Parks and Leisure Master Plan.

Any additional amenities that already exist in the Town will be built to satisfy the needs of the Town's new residents - new residents will be the sole beneficiary of additional amenities developed. Amenity spaces included in the new facility that are entirely new to Okotoks will benefit all residents (existing and new). With the facility program developed to serve a Town population of 60,000 and with a current population of 29,002, new residents would comprise 52% of the population. Although regional benefits are not well understood nor negotiated at this stage of planning, it is important to note that regional population may impact the following.

** The population figures that accompany service levels are self defined based on comparisons to other communities and to reflect the unique circumstances in Okotoks. The provision ratios were defined in the Recreation, Parks, and Leisure Parks Master Plan (2017) and subsequently accepted by the Town.*



For example, the facility program indicates that a new ice arena will be included in the full build-out. This ice arena is included in the facility program to meet the demand that comes solely from the population growth. Indoor child play however is an amenity that currently does not exist publicly in Okotoks. As such the entire Town will equally receive this benefit meaning that the costs can be allocated over all residents. The new growth (30,998) represents 52% of the total population of 60,000; as such the new growth will be looked upon to fund 52% of the cost of the indoor child play.

Components	Total cost of amenity	% to Existing	% to New	% Regional
		48%	52%	TBD
Phase One (timing: when the Town's population reaches 45,000)				
Indoor child play	\$1,260,000	\$604,800	\$655,200	n/a
Climbing gym	\$1,200,000	\$576,000	\$624,000	n/a
Leisure swimming	\$24,000,000	\$-	\$24,000,000	n/a
25m swim tank	\$12,600,000	\$-	\$12,600,000	n/a
Fitness / wellness facilities	\$4,200,000	\$-	\$4,200,000	n/a
Gymnasium type space	\$7,200,000	\$-	\$7,200,000	n/a
Walking / running track	\$2,520,000	\$-	\$2,520,000	n/a
Community hall / banquet facility	\$5,760,000	\$-	\$5,760,000	n/a
Multi-purpose program rooms	\$2,100,000	\$-	\$2,100,000	n/a
Foyer / circulation / social gathering	\$9,000,000	\$4,320,000	\$4,680,000	n/a
Administration space	\$990,000	\$475,200	\$514,800	n/a
Support Space	\$660,000	\$316,800	\$343,200	n/a
Sub total Phase One	\$71,490,000	\$6,292,800	\$65,197,200	
Phase Two (timing: when the Town's population reaches 50,000)				
Arena	\$15,000,000	\$-	\$15,000,000	n/a
Field	\$12,000,000	\$-	\$12,000,000	0
Sub total Phase Two	\$27,000,000	\$-	\$27,000,000	0
Total	\$98,490,000		\$92,197,200	

As can be seen above, of the \$98,490,000 (early 2020 capital cost estimate), 93.6% of it is to service new populations as the Town grows from approximately 29,000 to 60,000.

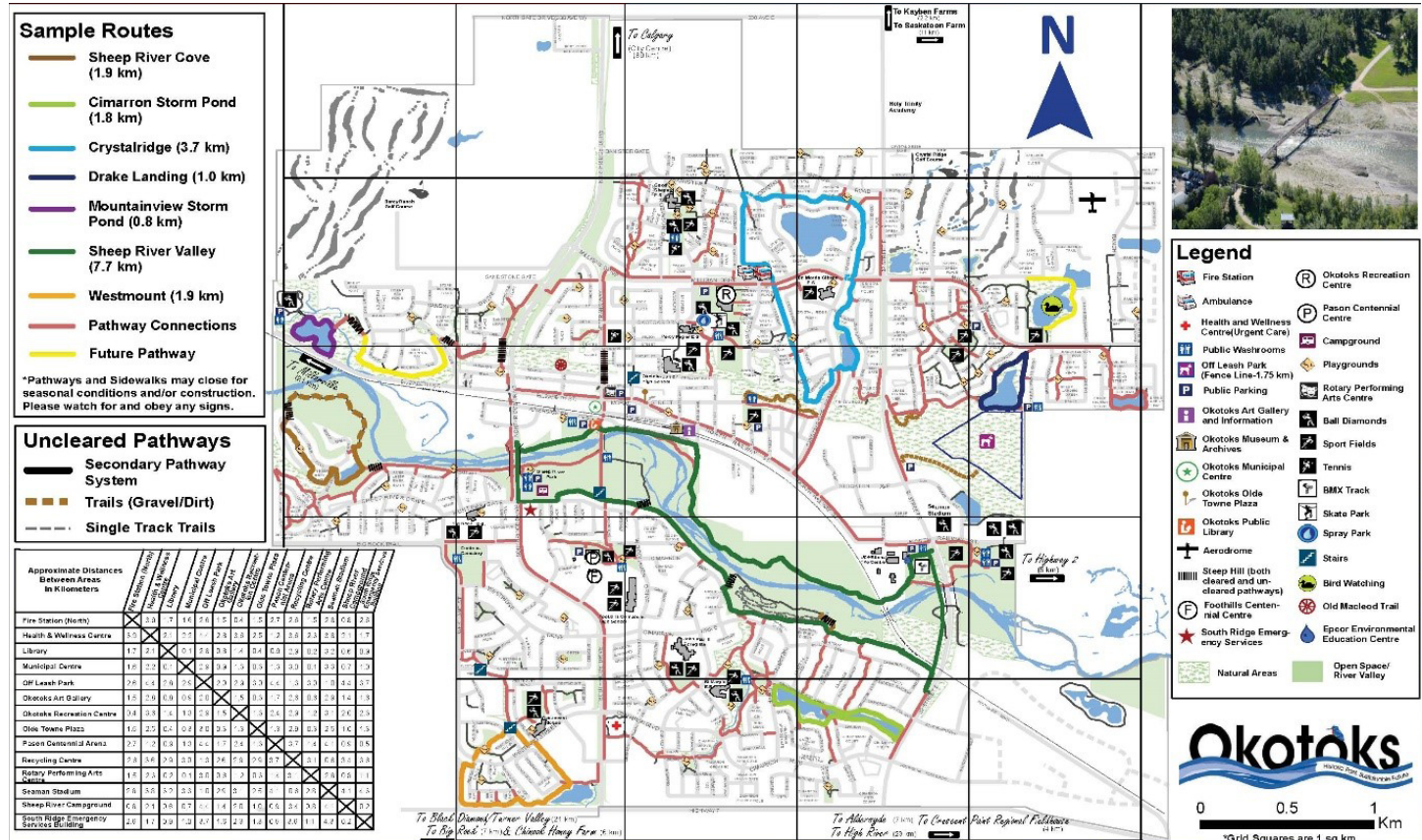
Although these figures can be used as inputs to the Off Site Levy Bylaw and subsequent negotiation process, it is important to note that funding for community recreation facilities typically comes from municipal debentures (spreading the costs over future years of service amongst all taxpayers), government grants (sometimes accounting for up to 15% or more of capital costs), sponsorships (sometimes accounting for up to 5% or more of capital costs) and through other forms of capital partnerships (with adjacent municipalities, non-profit groups or the private sector). It is expected that the funding sources for future facilities will include all of these sources in addition to reserves built up from contributions related to Off Site Levies.

Appendices

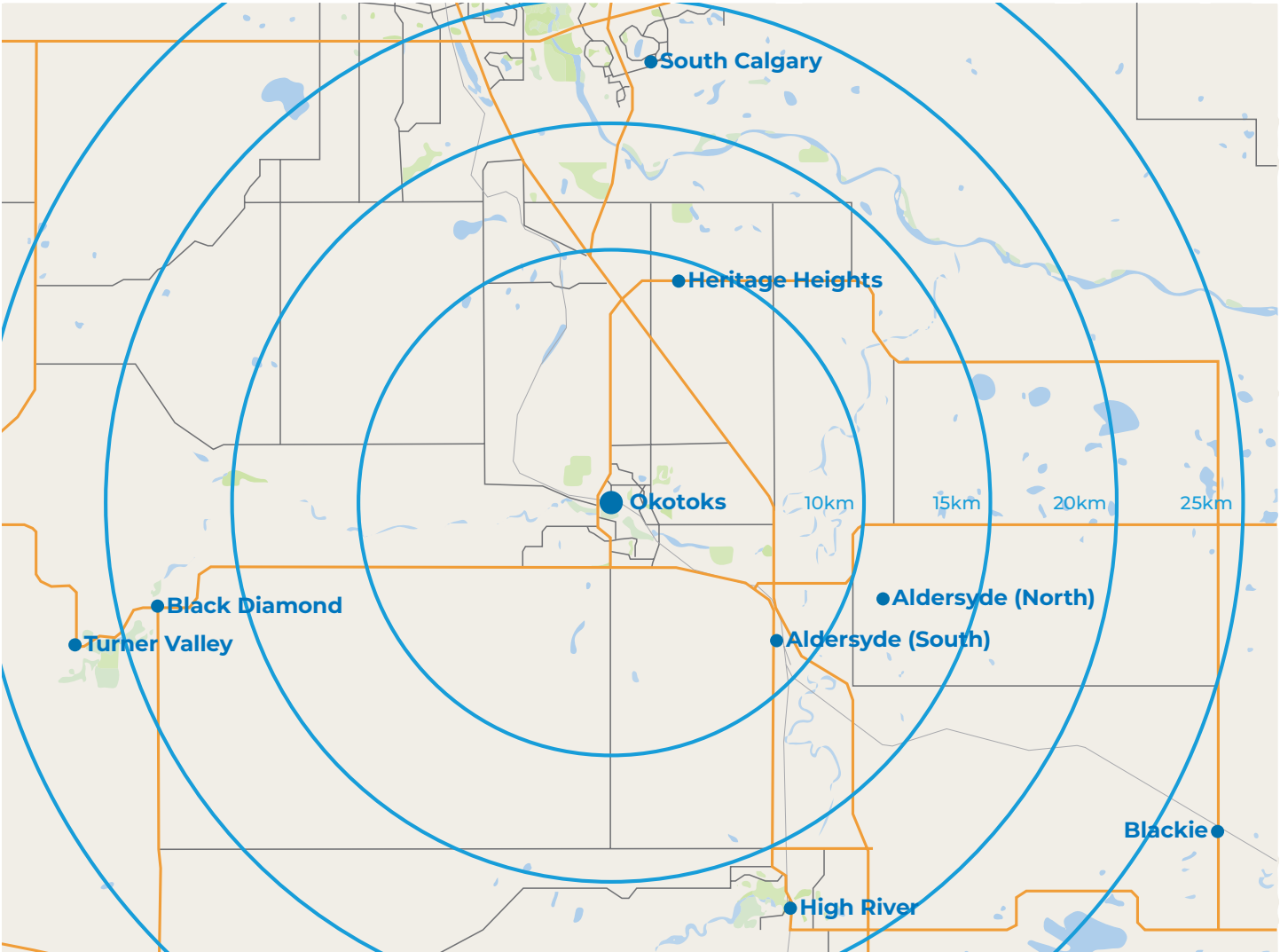
Appendix A: Recreation Facilities in Town and in the Region

There are a number of recreation facilities in the town. As illustrated in the map below, there is a lack of indoor recreational facilities on the south side of Okotoks. It is assumed however that this new facility will satisfy the indoor recreational needs for all new residents of Okotoks.

Town of Okotoks website (Okotoks.ca/discover-okotoks/community-resources/maps)



The inventory of regional facilities will have an impact on the utilization of a new recreation facility in Okotoks. As illustrated on the following map, there are several locations hosting a variety of indoor recreation facilities. Residents outside of Okotoks currently use the facilities to some degree and will when a new one is built.



Appendix B: Indoor Amenity Strategies

Indoor Amenity Strategies

Amenity Prioritization Framework Ranking	Indoor Amenity	Research Indicators	Future Strategy	Current #	Population	Current Provision Ratio (Number of Residents per Amenity)	Targeted Service Level	Anticipated Future Need (Based on Targeted Service Level and Population Growth Projections) Short Term (30k–35k) Mid Term (35k–45k) Long Term (45k+)	Order of Magnitude Costing
1	Indoor child playgrounds	- Community Priority #2 #5 household survey priority - Top 10 community group questionnaire priority	- Consider including as part of retrofitted or new facility development. - Include private sector opportunity in Town materials (e.g. leisure guide) as deemed appropriate. - Ensuring that indoor playgrounds are accessible should be considered during the design process.	0	28,016	N/A	1 per 30,000 residents	Short Term (2017 – 2025)	\$1M
2	Leisure ice surfaces (non-hockey, non-boarded ice surface)	Community Priority #3	Included as part of future new ice sheet development at the Pason Centennial Arena.	1	28,016	28,016	1 per 30,000 residents	Long Term (2030+)	\$2M
3	Fitness/wellness facilities	- Community Priority #4 #10 household survey priority - Top 10 community group questionnaire priority	- Continue to provide at the Okotoks Recreation Centre through a lease arrangement. - Work with private sector provider to meet identified needs and priorities for fitness and wellness programs.	2	28,016	14,008	1 per 15,000 residents (public/partner provision)	Mid Term (2025 – 2030)	\$3M
4	Gymnasium type spaces	- Community Priority #4 #12 household survey priority - Top 10 community group questionnaire priority	Continue to maximize use of existing spaces (schools, field house).	2	28,016	14,008	1 per 15,000 residents	Short Term (2017 – 2025)	\$7M
5	Climbing gyms	- Community Priority #1 #2 household survey priority - Top 10 community group questionnaire priority	- Identify opportunities to include as part of retrofitted or new facility development. - Continue to monitor potential private sector provision.	0	28,016	N/A	1 per 30,000 residents	Short Term (2017 – 2025)	\$1.5M

Amenity Prioritization Framework Ranking	Indoor Amenity	Research Indicators	Future Strategy	Current #	Population	Current Provision Ratio (Number of Residents per Amenity)	Targeted Service Level	Anticipate d Future Need (Based on Targeted Service Level and Population Growth Projections) Short Term (30k–35k) Mid Term (35k–45k) Long Term (45k+)	Order of Magnitude Costing
5	Leisure swimming pools	- Community Priority #2 #1 household survey priority #9 household survey priority	- Continue to identify cost effective methods to further animate existing aquatics facility to meet leisure demand. - Conduct a feasibility study to further explore costs (operating and capital), potential synergies, development approaches (expansion of existing vs new facility) and potential downstream impacts on existing facilities. - Use Amenity Prioritization Framework to guide decision making. - Ensure proper life-cycle and maintenance program is in place for existing facility.	1	28,016	N/A	1 per 20,000 residents	Mid Term (2025 – 2030)	\$20M
7	Walking/running tracks	- Community Priority #4 #4 household survey priority	Continue to promote use of existing track at the Pason Centennial Arena and Crescent Point Field House.	2	28,016	14,008	1 per 15,000 residents	Long Term (2030+)	\$1M
8	Community hall/ banquet facilities	- Community Priority #5 #13 household survey priority - Top 10 community group questionnaire priority	Assist the Foothills Centennial Centre board with strategic and business plan to ensure sustainability and protect Town investment.	1	28,016	28,016	1 per 25,000 residents	Long Term (2030+)	\$8M
8	Indoor field facilities (# of surfaces)	- Community Priority #5 - Highest level of overall utilization by residents (household survey) #15 household survey priority - Top 10 community group questionnaire priority	- Continue to support operations of the Crescent Point Regional Field House. - Work with partners to ensure access is available for new and emerging groups.	3	28,016	9,339	1 per 15,000 residents	Long Term (2030+)	\$8M
10	Seniors centres	- Community Priority #6 #8 household survey priority	Continue to engage with existing Seniors Centre and support as required and deemed appropriate.	1	28,016	28,016	1 per 20,000 residents	Mid Term (2025 – 2030)	\$2M
10	Youth centres	- Community Priority #6 #14 household survey priority	- Promote use of existing Youth Centre and identify opportunities to expand reach and utilization. - Consider expanded youth programming at Town facilities.	1	28,016	28,016	1 per 20,000 residents	Mid Term (2025 – 2030)	\$2M
12	Gymnastics spaces/ parkour rooms	- Community Priority #6 #16 household survey priority	- Include private sector opportunity in Town materials (e.g. leisure guide) as deemed appropriate. - Continue to monitor community demand.	1	28,016	28,016	Dependent upon partnership opportunities	Dependent upon partnership opportunities	\$3M

Amenity Prioritization Framework Ranking	Indoor Amenity	Research Indicators	Future Strategy	Current #	Population	Current Provision Ratio (Number of Residents per Amenity)	Targeted Service Level	Anticipate d Future Need (Based on Targeted Service Level and Population Growth Projections) Short Term (30k–35k) Mid Term (35k–45k) Long Term (45k+)	Order of Magnitude Costing
12	25m swimming tanks	- Community Priority #3 #3 household survey priority - Top 10 community group questionnaire priority	- Continue to optimize use of existing facility. - Feasibility study conducted for a potential new or enhanced aquatics facility to measure the viability, need, impacts and associated costs of a 50 metre tank. - Ensure proper life-cycle and maintenance program is in place for existing facility.	1	28,016	28,016	1 per 20,000 residents	Mid Term (2025 – 2030)	\$10M
14	Ice arena facilities (regulation size boarded ice surface)	- Community Priority #4 #7 household survey priority - Top 10 community group questionnaire priority	- Develop additional sheet at the Pason Centennial Arena. - Ensure proper life-cycle and maintenance program is in place for existing facility.	4	28,016	7,004	1 per 12,500 residents	Mid Term (2025 – 2030)	\$15M
15	Classroom/meeting spaces	- Community Priority #6 #17 household survey priority - Top 10 community group questionnaire priority	- Promote use of existing spaces. - Ensure that existing spaces are accessible and available for community organizations.	6	28,016	4,669	To be included in facility development projects	To be included in facility development projects	\$250k
15	Dance/program/ martial arts rooms	- Community Priority #6 #11 household survey priority	Maximize use of existing spaces by supporting the promotions and awareness of existing community programs.	2	28,016	14,008	To be included in facility development projects	To be included in facility development projects	\$250k
17	Curling rinks	- Community Priority #6 #18 household survey priority	- Sustain existing facility. - Support the efforts of the Curling Club with a focus on sustainability and growth of the sport.	1	28,016	28,016	1 per 40,000 residents	Long Term (2030+)	\$8M

Appendix C: Facility Example Construction Costs

The following table outlines the construction cost per square foot of some recent recreation facility development projects in the province. This information is provided as context for the construction cost estimates found in the report.

Project	Amenities	Square Feet (approximate)	Construction Cost (approximate)	Year complete	Cost Per Square Foot (approximate)
Morinville Leisure Centre	Ice Arena, Indoor Field, Fitness Centre	76000	\$29,000,000	2019	\$381.58
Greenview Regional Multiplex	Indoor Gymnasium, Indoor Pool, Fitness Centre	82043	\$35,000,000	2018	\$426.61
Beaumont Aqua-fit Expansion	Indoor Ice, Indoor Field, Gymnasium, Fitness *addition	118274	\$29,500,000	2020	\$249.42
Rocky Ridge Recreation Centre	Indoor Pool, Gymnasia, Ice Arenas, Fitness Centre, Arts Theatre	285000	\$191,000,000	2018	\$670.18
Blackfalds Multiplex Expansion	Indoor Ice, Library *addition	87780	\$24,000,000	2021	\$273.41
Average		129819	\$61,700,000		\$400.24



Appendix D: Research Abstracts Related to Willingness to Travel to Access Recreation

- Research examining recreational behaviors in Halifax suggests that individuals are willing to travel between 14 and 30 minutes to participate in an activity (e.g. 30 minutes for golfing, closer to 15 minutes for activities such as exercising, swimming, skating, etc.). Within the Halifax region, this equates to a total travel distance of between 4 and 24 km. Individuals who travel further for activities (90th percentile) report spending between 25-40 minutes travelling distances that range between 13 and 48 kilometres. Overall, different recreational activities have different sized travelsheds (time and distance), with activities such as golfing and skiing having among the larger travelshed sizes (Spinney & Millward, 2012).
- Research examining water and environmental quality effects on user willingness to travel suggests that users may travel upwards of 60 minutes farther “for every one-metre increase in water clarity” (Keeler et al., 2015, p.76). This finding suggests that quality is also an important consideration in terms of understanding user willingness to travel to access recreational amenities, particularly when it comes to water bodies and water courses.
- Individuals are willing to spend different amounts of time to access recreational facilities depending on the type of activity that they are participating in. A study examining travel time behavior of recreational users in Germany suggests that individuals are willing to spend a maximum of 18 -35 minutes travelling to access facilities or amenities, depending on the type of activity. Running and general fitness (18 minutes and 22 minutes respectively) have the lowest maximum time travel thresholds, whereas activities such as volleyball, soccer, basketball and handball have the highest (between 32 and 35 minutes) (Pawlowski et al., 2009).

(Table adapted from Pawlowski et al., 2009, p.229-230: descriptive statistics, time variables; combined MTIME variables for Stuttgart & Cologne, Germany; mean maximums for both cities combined and divided by 2, based on a data set of approximately 6,000 survey responses)

- Research out of Germany suggests that for every 5% increase in the amount of time a user must spend accessing a facility, demand for spaces decreases by between 7-11% depending on the activity. Based on a sample size of 5,000 German recreation facility users, different facilities have different distance thresholds: around 7 km for basketball facilities, around 8 km for tennis facilities and around 5.7 km for swimming facilities. Users reported greater willingness to travel further to access handball (14 km) and volleyball facilities (Pawlowski, Breuer & Wicker, 2007).
- Research out of the Netherlands examining proximity of recreation facilities (gym spaces, sports grounds, tennis courts and indoor pools) suggests that children that have a gym facility within 2.5 kilometres of their home are more than likely to join a sports club (approximately 13% greater likelihood than those not within 2.5 km of such a facility). This proximity effect is also observed between urban/rural households, with children in rural households that live close (i.e. 2.5 km) to gym facilities approximately 10% more likely to participate in sports (Steinmayr, Felfe & Lechner, 2011).
- Conflict between user groups or crowdedness of amenities are also factors that help explain user travel behavior. A survey of 1,200 forest users in Denmark explored willingness to travel to forested areas for recreational activities. The study found that certain population groups (i.e. mountain bikers, horse riders, the elderly) are willing to travel an additional 4 km to access forests they perceive to be less busy, in addition to the base preferred distance of 6 km (Bakhtiari, Jacobsen & Jensen, 2014).
- Research examining user travel thresholds to access water recreation environments in Helsinki suggests that individuals are willing to travel further (1.7 km or 24 minutes on foot) to access water environments than is generally assumed to be the standard distance threshold for green spaces within the academic literature (around 3-400 m walking distances). This finding helps to support the notion that different recreational amenities have different time/distance thresholds. Residents of Helsinki reported being willing to travel approximately 13 km (27 minutes) via car, 10 km (54 minutes) via public transit and 4 km (15 minutes) via bicycle to access water recreational environments. Transportation mode may also affect user willingness or ability to travel further distances to access amenities (Laatikainen et al., 2017).
- A study of Western Australian adults examined variables associated with different distances individuals travel to reach various recreational amenities. The mean distance study participants travelled to reach recreational amenities (i.e. rec. centre, beaches/rivers, parks) was approximately 5.5 km,

Sport/Activity	Mean Maximum Time in Minutes Users Are Willing to Travel To Access a Facility
Running	17.6 minutes
Swimming	28.8 minutes
Fitness	21.7 minutes
Soccer	31.5 minutes
Gymnastics	24.1 minutes
Tennis	27.9 minutes
Dancing	33.2 minutes
Volleyball	30.1 minutes
Badminton	28.7 minutes
Basketball	33.1 minutes
Handball	34.4 minutes
Bodybuilding	22.5 minutes
Track & Field	29.2 minutes

+/- approximately 5.2 km. Younger adults travelled further to access beaches and rivers than older adults (7.3 km vs 6.0 km), individuals in socioeconomically lower areas travel further than those in more affluent areas (8.1 km vs 7.3 km) and members of clubs travel further than non-members to use parks or ovals (4.2 km vs. 3.4 km)(McCormack et al., 2006).

- However, it is important to recognize that there is little consensus within the literature as to specific time/distance thresholds for facilities. However, there is recognition that distance effects vary based on geography and sport type. In general, distance likely negatively affects sports participation frequency, but this is more acutely observed within certain sports over others, for example, swimming (Deeleen, Ettema & Dijst, 2006).
- Geographic research into 'sports geographies' suggest that concepts such as range (maximum distance users are willing to travel to access a facility) and threshold (minimum number of participants needed to provide services at a facility) are not only affected by physical location of facilities relative to populations, but that factors such as the "quality/state of the infrastructure...city size...perceived versus actual distance...availability of sport facilities...gender...and school location" are important determinants of user behavior as well (O'Reilly et al., 2015, p. 295). Whether a facility is designed for regional use (e.g. larger facility, multi-sport amenities, higher quality/intensity amenities) or neighbourhood (e.g. single-sport, lower quality/intensity) impacts a facility's catchment area, but quality of design and amenities, are also important 'pull factors' for users that can act against distance constraints. Users are willing to travel further to access higher quality infrastructure.
- Research examining adolescent perceptions of access to parks and physical activity facilities within their neighbourhood finds that perception and individual motivation are potentially more important factors explaining adolescent participation rates in sports than objective distance to facilities alone (Prins et al., 2009).

Background Literature

Spinney, J.E.L., & Millward, H. (2012). Investigating travel thresholds for sports and recreation activities. *Environment and Planning B: Planning and Design*, 40, 474-488.

This study examined time-diary, individual GPS device data and national (Canadian) time-use data (General Social Survey – Time Use) to examine both distance and time thresholds associated with a variety of recreation and sport activities. Findings based on data provided by approximately 2,000 respondents over a two-day travel time diary period, with respondents living in the Halifax, NS region.

The study examines respondent willingness to travel to participate in several activities: exercising/yoga, golfing, swimming, football/basketball/baseball, bowling/billiards, skating/skiing and walking. Findings suggest that individuals are willing to travel between 14 and 30 minutes depending on the activity (e.g. 30 minutes for golfing, closer to 15 minutes for every other activity), or, between 4.2 and 24 km when examining distance (again, further for some activities such as golf, football/basketball/baseball and skating/skiing). Respondents within the 90th percentile (i.e. travel the longest time or distance) travel for longer time periods (between 25-40 minutes) and distances (13 – 48 km). The authors conclude that golfing, skating and skiing have the largest travelsheds (i.e. time and distance) among activities examined.

Quotes/Highlights

- "duration-based and distance-based travelsheds are generally in the order of 15-30 minutes and 4-20 km, respectively." (474)
- "it is also useful to consider the type of services or size of a facility, because they may also affect the drawing power of the facility and hence its travel-distance threshold (ie, service range)" (475)
- "rural residents are conditioned to travel longer distances" (475)

Keeler, B.L., Wood, S.A., Polasky, S., Kling, C., Filstrup, C.T., Downing, J.A. (2015). Recreational demand for clean water: evidence from geotagged photographs by visitors to lakes. *Frontiers in Ecology and the Environment*, 13 (2), 76-81.

This study examined recreational users' geotagged photographs to determine the effect of water and environmental quality on willingness to travel to access high quality rivers and lakes. The authors discovered that "users were willing to travel 56 minutes farther (equivalent to US\$22 in travel costs) for every one-meter increase in water clarity" (76). The authors compared geotagged information contained in photos with user-reported 'hometowns' to determine distance travelled to access lakes in Minnesota and Iowa.

Pawlowski, T., Breuer, C., Wicker, P., & Poupaux, S. (2009). Travel Time Spending Behavior in Recreational Sports: An Econometric Approach with Management Implications. *European Sport Management Quarterly*, 9 (3), 215-242.

Sport	Mean Maximum Time in Minutes Users Are Willing to Travel To Access a Facility
Running	17.6 minutes
Swimming	28.8 minutes
Fitness	21.7 minutes
Soccer	31.5 minutes
Gymnastics	24.1 minutes
Tennis	27.9 minutes
Dancing	33.2 minutes
Volleyball	30.1 minutes
Badminton	28.7 minutes
Basketball	33.1 minutes
Handball	34.4 minutes
Bodybuilding	22.5 minutes
Track & Field	29.2 minutes

Table adapted from Table 5, p.229-230: descriptive statistics, time variables; combined MTIM variables for Stuttgart & Cologne, divided by 2

Quotes/Highlights

- "Based on detailed city-specific information about recreational sports demand (i.e., determinants of travel time spending behavior) it is possible to develop a sport-specific facility allocation model (decentralized versus centralized) subject to the socio-demographic status of the sport

consumers...management decisions regarding the closing/restoring/renovation of sports facilities (e.g., gyms) already in existence should be based on information about sport consumers' travel time behavior to increase efficiency."

- Data was gathered from sports users in Cologne and Stuttgart Germany, with more than 6,500 responses analyzed. Users were asked to provide a time estimate for how long it takes to reach a sport facility of their most practiced sport, as well as the maximum time they were willing to travel to reach such a facility.
- Study suggests that different activities have different time-travel thresholds, that factors such as age and other socio-economic variables affect maximum distances individuals are willing to travel and that those that more regularly practice a sport are more willing to travel further to do so (suggesting that those that practice less regularly are more sensitive to time/distance increases).

Pawlowski, T., Breuer, C., & Wicker, P. (2007). Time and space elasticities of sports demand – A contribution to efficient sports facility allocation. 15th EASM Conference, Turin, Italy. [Conference Paper]

The authors analyzed data collected from 5,000 "German sport service consumers" examining how much time was needed for users to reach sports facilities and "maximum willingness to spend if necessary" (238). The data suggests that "for small changes in time (e.g. plus 5 percent)" (239) to reach a facility, demand decreases by around 7-11% depending on the sport (6.7% for basketball, 7.7% for swimming, up to 10.6% for handball). The authors examined willingness to travel to access sports facilities and found mean distances of around 7 km for basketball facilities, around 8 km for tennis facilities and around 5.7 km for swimming facilities. Users reported willingness to travel further to access handball (14 km) and volleyball (10 km) facilities (239).

The article suggests that centralizing certain sports facilities (e.g. "basketball, soccer, tennis and swimming" (240)) may produce greater efficiencies/participation, whereas decentralizing other facilities (e.g. handball, volleyball) may be more appropriate given user willingness to travel further to reach these destinations.

Kim, J., & Nicholls, S. (2015). Influence of the measurement of distance on assessment of recreation access. *Leisure Sciences*, 38 (2), 118-139.

Quotes/Highlights

- “A survey conducted by the Strategy Institute on behalf of the East Bay Regional Park District estimated that 10-20 miles was the distance residents were willing to drive for beach-based recreation activities” (120).

Deeleen, I., Ettema, D., & Dijst, M. (2016). Too busy or too far away? The importance of subjective constraints and spatial factors for sports frequency. *Managing Sport and Leisure*, 21 (4), 239-264.

There is lack of consensus within the literature to what extent distance to facilities affects participation, but there is recognition that effects vary based on geography and sport type. In general, distance likely negatively affects sports participation frequency, but this is more acutely observed within certain sports over others, for example, swimming.

Quotes/Highlights

- “The literature suggests that travel distance to sports facilities may affect sports participation, but the extent to which this is the case seems to vary significantly between geographical settings and types of sports.” 241
- “Travelling longer distances translates into experiencing accessibility constraints to a higher degree and that this occurs for relatively short distances.” 255
- “Found that travel distance to sports facilities also negatively affected sports frequency, compared to participants using public space.” 257

O'Reilly, N., Berger, I.E., Hernandez, T., Parent, M.M., & Seguin, B. (2015). Urban sportscares: An environmental deterministic perspective on the management of youth sport participation. *Sport Management Review*, 18 (2), 291-307.

Quotes/Highlights

- “The geography of sport is not only about where sport venue built-forms are located, but also what types of sport infrastructure are available...it is important to assess the capacity and quality of the sportscape along with other supporting structures and facilitators.” 291
- “Not all swimming pool facilities are the same (i.e., they can range from low to high order goods), they can differ in terms of single or multi-sport facilities, the number and type of pools, depths and dimensions...these factors could impact the attractiveness of the facility and therefore the range and threshold of on-going activities.” 292
- “The ‘build it and they will come approach’ underlies much of the sport participation debate and politics surrounding sport facility provision.” 294
- “Distance decay is a term used to describe the probability of interaction between a demand point and supply point as a function of the distance between the two points...In a sport facilities context, the greater the distance, and therefore cost (i.e., travel time, monetary cost of travel) between a household and the facility, the less likely that the household will use the facility.” 294
- “In a sport facility context, central place theory can be used to account for (i) the range – the maximum distance a given participant is willing to travel to a sport facility...and (ii) the threshold – minimum number of participants needed in order to offer services at the facility.” 294
- “This combination of range and threshold can then be used to explain the development of major multi-sport facilities serving regional markets (large range and threshold) compared to single sport facilities (e.g., a local ice rink) serving a local neighborhood (small range and threshold). The threshold can be further conceptualized as either the entire population (e.g., family multi-sport market) or specific target populations (e.g., single ‘niche’ sport market).” 294
- Other important factors to consider: “quality/state of the infrastructure, distance decay, within/outside a sport club setting...city size...perceived versus actual distance...availability of sport facilities...gender...and school location.” 295
- “The relationship between the existence of sport facilities and sport participation is not simple, straightforward or direct... need to better understand how [to] utilize geographical notions of distance decay, range, and threshold to better understand the nature of sport engagement.” 296
- Identifies that youth divers in the GTA travel an average of 27 km to access a facility, reaching upwards of 80 km in some instances.

Steinmayr, A., Felfe, C., & Lechner, M. The closer the sportier? Children's sports activity and their distance to sports facilities. *European Review of Aging and Physical Activity*, 8, 67-82.

Quotes/Highlights

- "In the case of tennis courts, children's club participation only starts decreasing when the distance exceeds 4 km, and in the case of indoor pools only at a distance of 6 km and more."
- "Children that have a gym close by [that is, within 2.5 km] are more likely to join a sports club...average impact amounts to 13 percentage points."
- "Differences in distances to facilities do not matter much in larger cities, which is probably not surprising given the high density of facilities in such locations. However, in smaller cities and villages, they matter substantially. Moving closer to a facility may easily increase a child's likelihood to participate in some sports (organized by a sports club) by more than 10 percentage points."
- Examined children between the ages of 3 and 10 in Germany and relationship between distance children and gym spaces, sports grounds, tennis courts and indoor pools.

Prins, R.G., Oenema, A., van der Horst, K., & Brug, J. (2009). Objective and perceived availability of physical activity opportunities: differences in associations with physical activity behavior among urban adolescents. *International Journal of Behavioral Nutrition and Physical Activity*, 70 (2009).

This study examined adolescent perceptions of access to parks and physical activity facilities within their neighbourhood, objective accessibility to such amenities based on a 1500 metre radius from home locations and resulting impacts on physical activity levels. The authors find that adolescent perceptions of availability of physical activity facilities is more strongly linked to increased levels of physical activity than actual, objective availability of such facilities. This suggests that perception and individual motivation are potentially more important than physical accessibility to facilities, at least within a 1.5 km radius from individuals' homes.

Bakhtiari, F., Jacobsen, J.B., Jensen, F.S. (2014). Willingness to travel to avoid recreation conflicts in Danish forests. *Urban Forestry & Urban Greening*, 13 (4), 662-671.

Study surveyed 1200 users of forest users in Denmark to determine degree of willingness to travel to less crowded forested areas for recreational activities. The study finds that certain population groups (i.e. mountain bikers, horse riders, the elderly) are willing to travel an additional 4 km to access forests they perceive to be less busy, in addition to the base preferred distance of 6 km.

Laatikainen, T.E., Piironen, R., Lehtinen, E., & Kytta, M. (2017). PPGIS approach for defining multimodal travel thresholds: Accessibility of popular recreation environments by the water. *Applied Geography*, 79 (2017), 93-102.

Examining accessibility to popular water environments in Helsinki, this study reveals that individuals are willing to travel further (1.7 km, 24 minutes on foot, median measures) to access water environments for recreation than is generally assumed to be standard distance thresholds for green spaces within the literature (300- to 400 m walking). This finding may also support the notion that different recreational amenities have different time/distance thresholds. However, user preferences/perceived barriers were not elaborated upon in text, leaving a gap in terms of other factors impacting willingness to travel to access amenities.

As transportation mode intensity increases (e.g. cycling, transit, car), distances individuals are willing travel to access water environments also increases. However, travel times associated with certain modes (i.e. transit) are significantly higher than other modes. In this study, individuals would travel approximately 13 km (27 mins) via car, 10 km (54 minutes) via transit, and 4 km (15 minutes) via bicycle to access water environments.

Quotes/Highlights

- Study examines distances/durations individuals travel via multiple modes of transportation to access water environments in metro Helsinki, Finland, exploring thresholds that account for transportation networks, land uses and "requirements and preferences of individuals and their capacity to access and participate." (93)
- Finds that walking is the most common mode people surveyed used to access water sites in Helsinki, travelling approximately 1.7 km (median) or 24 minutes to reach sites. This distance is significantly longer than the 300- to 400 m distance threshold often identified within literature examining accessibility of urban parks.
- Median travel distances and times increase by transportation mode: 4.1 km and 15 minutes for cycling, 9.8 km and 54 minutes for public transportation, and 12.9 km and 27 minutes for car.

- Utilizes public-participatory geographic information systems technology to collect user data and conduct accessibility analyses – provides access to individual requirements and preferences, in addition to more straightforward physical distances/networks.
- Randomly sampled 30,000 residents of Helsinki, asking them to identify water locations they use and what sorts of activities they participated in at those locations; also asked how they accessed those places (e.g. car, public transit), which places were particularly important to them, which places they felt were 'inaccessible' and preferences for future land uses along shore areas.
- Walking is the most common mode to access the water, with respondents traveling approximately 1.7 km on average to do so; cars are the second most popular transportation mode, making most popular water amenities accessible to participants within the area.
- Found that most popular water areas were accessible via car with a median time of 27 minutes, or, 54 minutes via public transit; 15 minutes on average via bicycle.
- The study suggests that users are willing to travel much further than 300- to 400 m (often identified as a walking distance threshold to access sites such as parks) to access water environments, suggesting that different recreational amenities have different time/distance thresholds.
- Study does not go into detail on the preferences or perceived barriers that individuals face that may also affect willingness to travel.

McCormack, G.R., Giles-Corti, B., Bulsara, M., & Pikora, T.J. (2006). Correlates of distances traveled to use recreational facilities for physical activity behaviors. *International Journal of Behavioral Nutrition and Physical Activity*, 3 (18), 1-10.

This study presents the findings of a secondary analysis of data from Western Australian adults, examining variables associated with different distances individuals travel to recreation destinations. The study finds that the mean distance individuals travelled to reach a recreational destination (i.e. rec. centre, beaches/rivers, parks) was around 5.5 km, +/- around 5.2 km. Younger adults travelled further to access beaches and rivers than older adults (7.3 km vs 6.0 km), individuals in socioeconomically lower areas travel further than those in more affluent areas (8.1 km vs 7.3 km) and members of clubs travel further than non-members to use parks or ovals (4.2 km vs. 3.4 km).

Some work within physical activity studies "has defined neighborhood boundaries as geographical areas of 400-1000 m from respondent's homes representing the distance individuals are likely or willing to walk" (p.8). This study suggests that individuals often travel much further outside the neighbourhood boundary to access physical activity amenities.

Quotes/Highlights

- "Our own data suggest use of public open space is sensitive to distance from home, but that adults are willing to travel further to use other recreational facilities used for vigorous activities and team sport (e.g., beaches, formal recreational facilities)." (p.2)
- "Some evidence suggests travel distances may vary according to the type of activity, rather than the type of facility." (p.2)
- "Trip making (i.e., travel distance, time, and mode) as a function of money or time cost of travel, individual income, sociodemographic characteristics and built environmental characteristics." (p.2)
- "Hanson and Hanson found that men visited recreational destinations that were on average 1.3 kilometres further away than those visited by women. Bagley and Mokhtarian, not considering the destination type used, reported that men traveled further compared with women regardless of mode (walking/cycling, transit, and vehicle)." (p.2)
- "Having limited opportunities available in their immediate areas may force people to travel outside their neighbourhoods." (p.2)
- "The desire to undertake an activity combined with demographic attributes of the traveler might be sufficient to overcome distance such that an individual is prepared to use destinations outside their local neighborhood." (p.2)
- "Information about how far people are willing to travel to use destinations for different types of physical activity behaviors, and whether demographic characteristics are associated with travel distance to specific recreational facilities is limited." (p.3)
- Used GIS to conduct a road network analysis of destinations/user origin points.
- Total of 1006 survey respondents. Just over 56% of respondents reported visiting a formal recreation centre, 40% visited a beach or river and 39% visited a park or oval.
- Mean number of formal destinations within a respondents' neighbourhood was 2.47, 0.65 for beaches and river opportunities and 4.93 for parks/ovals. Mean distance to all destinations was 5.5 km.
- Respondents that travelled to reach a formal recreational facility travelled between 4.1 km to 6.3 km depending on intensity of activity (i.e. moderate versus vigorous; respondents report travelling further to engage in moderate physical activities at recreational facilities.)
 - » "For each additional formal recreational facility located in a respondent's neighborhood, the distance reduced by [approximately 500 m] between the respondent's household and the formal recreational facility used for physical activity." (p.5)
 - » Defines "formal facilities" as health clubs, rec/leisure centres, swimming pools, halls, gymnasiums and sports stadiums. (p.4)
- "Physical activity behavior undertaken at a destination was consistently associated with the distances respondents were prepared to travel, regardless of the type of facility." (p.7)

- “Those who participated in vigorous physical activity generally travelled further than non-vigorous exercisers to use the same type of destination (i.e. to use parks and ovals, and beaches and rivers.” (p.7)
- “Moreover, travel distances decreased as a function of the number of destinations available within the respondent’s neighbourhood regardless of the type of destination examined.” (p.7)
- “Younger adults, those with a higher income and those from socioeconomically disadvantaged areas also tended to travel further to use recreational physical activity destinations.” (p.7)
- “The purpose for which a recreational destination is used (i.e., for walking, vigorous, moderate, other activity and multiple activities) may influence preparedness to travel, more so than the type of destination.” (p.7)
- “Respondents who used destinations in this study had many destinations closer to their home than those they actually used...because of personal preferences, individuals may access recreational destinations further from home...many people perceived less proximate destinations to be more convenient” (p.7) – many factors explain, including lack of knowledge of alternatives, convenience of location to accomplish multiple errands with minimal travel, etc.
- “Local neighbourhood parks and ovals generally only attract users from local surrounding areas, whereas regional and district parks and ovals attract patrons from a larger hinterland.” (p.7)
- “Lobo who reported that people travel further than their local neighborhoods to use indoor sports and tennis facilities. Moreover, as our group reported previously use of some facilities (e.g., sporting and recreational centres, and gyms/ health clubs and exercise centres) appears to be less sensitive to distance than use of other types of facilities such as public open spaces, rivers, tennis courts and beaches.” (p.8)
- “The spatial distribution of homes, recreational destinations, and demographic groups are likely to differ between cities and hence influence generalizability. Thus, the findings from this study may not be transferable to other spatial settings or physical environments. Also noteworthy is that people may make decisions about whether to use a destination based on information other than proximity.” (p.8) – limitations of study
 - » Quality of facility/amenity also influences willingness to travel to destinations, but was not measured within this study.
- “Simply adding more recreational facilities to neighborhoods without considering other built environmental factors (i.e., population density, connectivity) and the possible tradeoffs (e.g., potential loss and fragmentation of residential land), may not have the desired affect on travel or physical activity behavior.” (p.9)

Humpel, N., Owen, N., & Leslie, E. (2002). Environmental factors associated with adults’ participation in physical activity: A review. American Journal of Preventative Medicine, 22 (3), 188-199.

- “Bandura argues that when environmental attributes exercise powerful constraints on behavior, they emerge as the over-riding determinants. Environmental attributes, in the case of physical activity, may be particularly influential.” (188)
- “A central focus of ecologic models is the role of the physical environment, recognizing that environments themselves and people’s behavior within them are shaped by social and organizational influences.” (189)
- “Booth et al. found accessibility of local facilities to be positively associated with older adults being categorized as sufficiently physically active in their leisure time for health benefits...reported access to a park and perceiving footpaths as safe for walking were significantly associated with being categorized as sufficiently physically active for health benefits.” (190)

