2021-04-19

CSRD Aquatic Feasibility Study

Technical Memo #4

GDH Solutions HCMA

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Reports

Introduction

This memo summarizes the concept design for the proposed Golden Aquatic Centre and is based on the preferred program option identified in the previous phase of work (Tech Memo #3). The scope of the concept study was expanded to include reports by mechanical, structural, electrical and civil engineers in order to provide a greater level of cost certainty for the Class D estimate, and to identify and significant challenges or opportunities. These reports are appended to this memo.

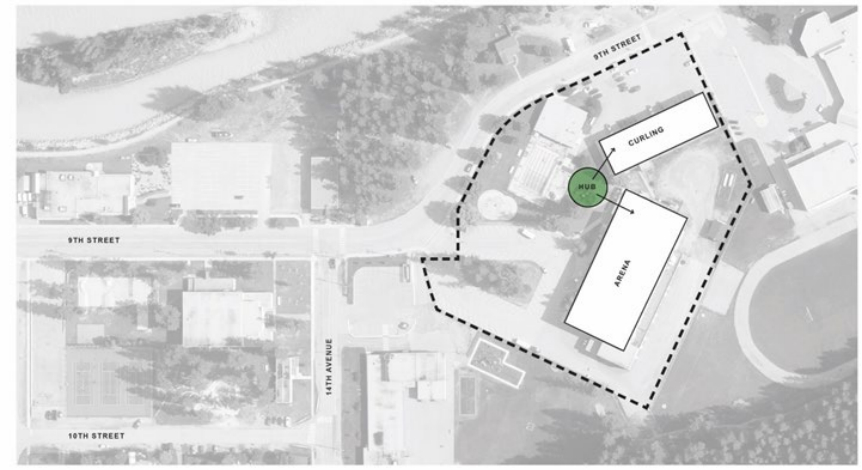
Building Site

The proposed site is shared with an existing arena, curling club (both expected to remain) and with the outdoor pool (not expected to remain). The existing spray park is intended to be replaced as part of the project. The proposed location aligns well with the overall goal of creating a centralized community hub, and a centre of activity that includes a range of both indoor and outdoor programming uses. The following were key considerations on the proposed location of the building on the site:

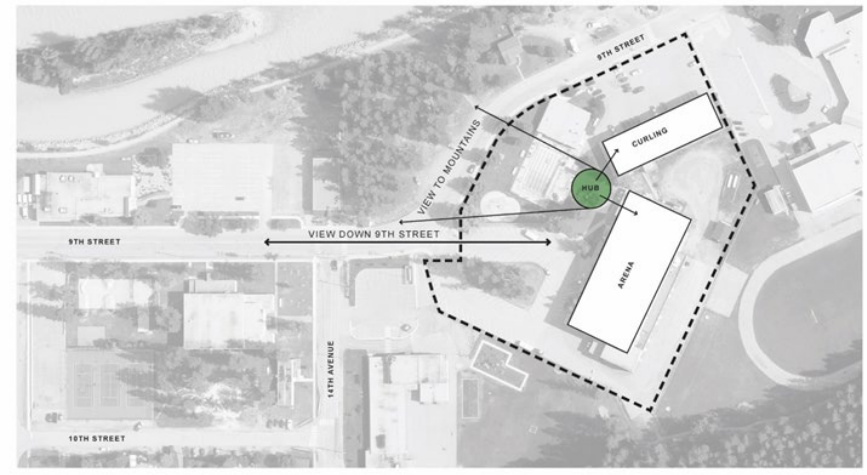
- Connect with and share a common lobby with the existing arena
- Allow the existing outdoor pool to remain operational during construction
- Capitalize on key views and sightlines
- Maintain the informal vehicle drop-off area that services the school
- Accommodate existing service entries to the arena and the curling club
- Provide a welcoming presence to the site arrival sequence
- Allow for the future addition of a gymnasium

The proposed location is adjacent to the existing arena and accomplishes all of these key objectives. The building orientation aligns with key views up and down 9th Street and captures long distance views of the mountains to the north west. It allows for an outdoor patio space to function as a buffer between the road and the aquatic centre, and an outdoor civic plaza that will allow gatherings of all scales to occur. Service and loading would occur from the rear of the facility, with access from the existing roadway.

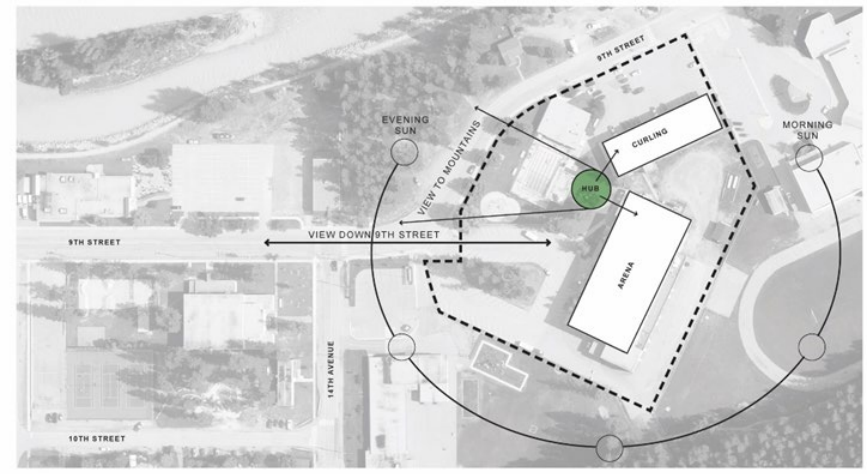
Particular care has been given to ensure that the existing pool can remain operational during the construction of the new facility to ensure continuity of service.



Community Hub



Key Views



Solar Orientation

Parking Capacity

It is noted that the existing parking capacity on the site is 183 stalls. The proposed parking count based on the revised site layout is 188 stalls. It is anticipated that the new centre will generate additional demand, however, further analysis should be conducted and a traffic study commissioned to determine what current parking demands exist and how these might be optimized.

Floodplain

The building site currently sits on a floodplain which would require the building elevation to be raised per bylaw requirements. Because the building is connecting to the existing arena it is likely that a variance to this bylaw would be required to allow these buildings to be properly connected at the same floor level.

Building Planning

The concept proposes that all primary, publicly accessible uses be located on the ground floor, with the second floor reserved for mechanical space. The following design features have been included:

- Large, welcoming lobby space that will allow for formal and informal gathering to happen and will benefit both the aquatic centre and the existing arena.
- Centralized reception area for both the arena and the aquatic centre that will streamline operational costs.
- Clear accessible sightlines allowing for ease of wayfinding.
- Universal and gendered change room spaces.
- Multi-purpose room that fronts onto the plaza, allowing it to support outside activities.

Care has been taken to ensure that the existing exit stairs from the second floor of the north arena wall have been accommodated in the building layout.

Natatorium

The aquatic zone features a six lane, 25m lap tank, a large leisure pool, hot pool and sauna/steam rooms. All of the aquatic tanks will be fully accessible, featuring zero entry ramps and appropriate deck clearances. Other key features of the natatorium include:

- Connection to an outdoor patio from the natatorium, allowing for an indoor/outdoor experience.
- Large leisure pool with spray features, beach entry, tot's zone, and lazy river.
- Carefully considered windows that take advantage of views to the mountains and the exterior plaza.
- Best practice considerations for pool filtration and air quality.
- Large scale mass timber roof structure built from locally sourced wood products.

The current cost estimate has assumed that pool tanks are constructed as conventional, cast in place concrete. Future consideration could be given to prefabricated stainless steel tanks, which may prove competitive from a pricing standpoint depending on the availability of skilled concrete trades in the Golden area.

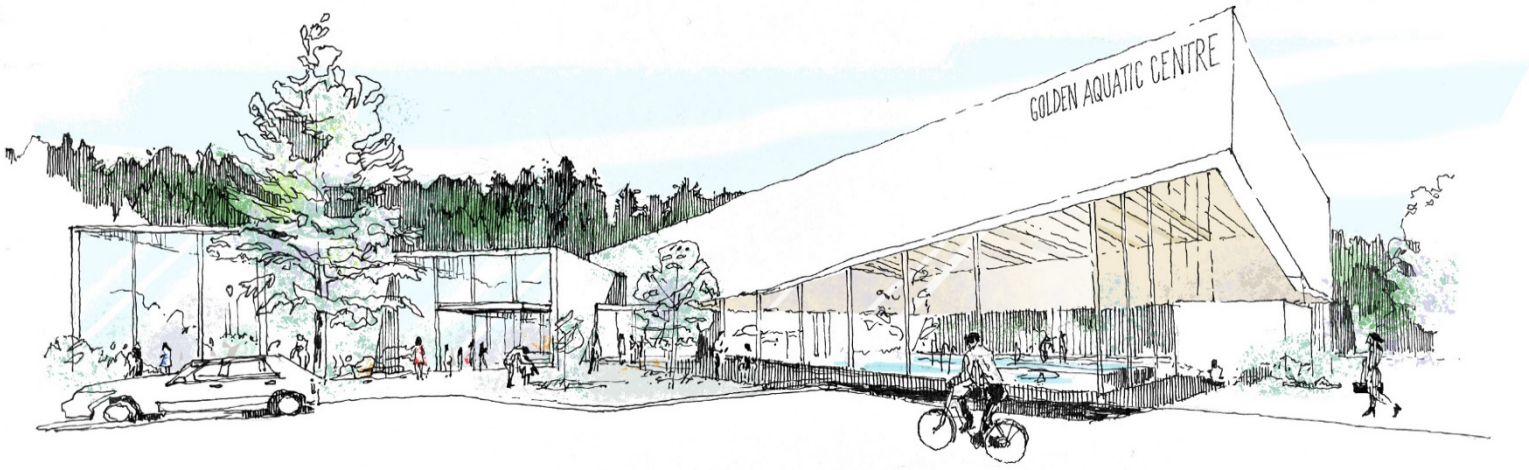
Building Massing

The building massing is preliminary in nature and will require more detail in upcoming design phases.

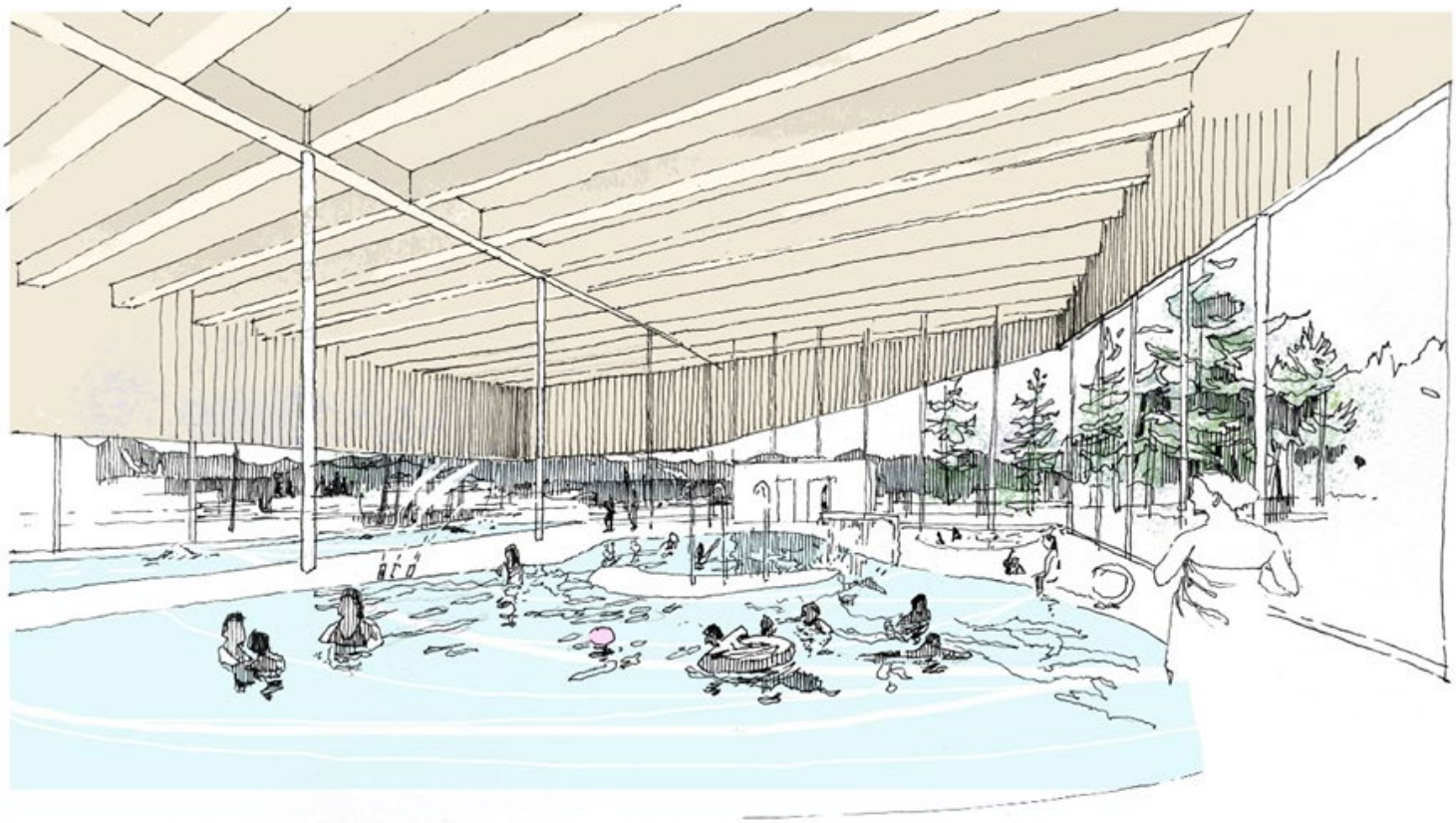
Preliminary ideas include:

- Prioritizing glazing where it is visible from both pedestrian and vehicular arrival points.
- Creating visual connections between the aquatic centre and the exterior spaces.
- Creating a welcoming front door to the site by screening the largely blank arena walls.
- Creating a focal point on the north east corner of the building that acts as a beacon to those traveling down 9th street as well as a landmark for those entering the site.

Exterior perspective



Interior perspective



Sustainability

Aquatic centres are very energy intensive building types and care must be given to optimize mechanical approaches. The cost estimate assumes a green building standard and the mechanical report identifies different options for pursuing more aggressive energy targets for consideration in future design phases along with a detailed energy modeling exercise.

The following project priorities should be considered in detailed design phases include the following:

- Determination of green building standards
- Extensive daylighting and natural ventilation strategies
- High indoor air quality targets, particularly for the natatorium
- Use of locally sourced materials wherever possible
- Optimized heat recovery, including from the arena chillers if possible
- Stormwater management using on site infiltration

Capital Project Cost

Based on the conceptual design reports, Ross Templeton and Associates (quantity surveyor) produced a preliminary Class C estimate. This estimate identifies a total project cost (hard costs + soft costs) of $31,237,900. This cost is based on current market pricing and includes an escalation allowance for inflation based on an assumed construction start date of Q1 2024. The unit rates have been adjusted by a location factor to account for the specifics of the Golden area construction market. It should be noted that a potential variance of +/- 15-20% exists with this class of estimate.

Capital Loan

The CSRD anticipates that a capital loan will be required that represents the capital project costs less any grants, sponsorships, or donations projected or received. The capital loan is expected to be amortized over a 30-year period and funded through the Municipal Finance Authority at the interest rates prescribed at the time that the loan is taken.

Operational Cost

Based on the concept design, GDH Solutions prepared a preliminary operating budget for the facility, which was informed by actual operating costs for similar size facilities in the Kootenays. The estimate projects a net annual operating cost of $519,332 (not including capital depreciation). This figure includes a revenue projection of $219,000.

The current (2018) outdoor pool net operating costs were $302,559 and represent an operating season of approximately 3 months. The indoor aquatic facility will be open year round and its net operating costs represent an increase of $216,773 over of the existing outdoor pool.

With a common shared lobby and entrance space with the existing arena, further operational cost efficiencies should be explored between the CSRD and the Town of Golden in the next phases.

Asset Renewal Costs – Capital Depreciation

The CSRD conducted an internal assessment of asset renewals required over 5, 10, 20, 30 and 75 years. Based on this analysis, the CSRD currently anticipates funding asset renewals at 50% of the 30-year average. The 30-year average was selected as the capital loan period is anticipated to be amortized over a 30-year period. Funding this asset renewal at 50% was identified as appropriate from a benchmarking of recent similar projects in other jurisdictions and acknowledges that grants will be required for major asset renewals required during the 30-year period. The CSRD will reconsider its asset renewal strategy for this function once the capital loan is completely retired.

Grants, Donations and Sponsorships

It is understood that the CSRD would seek to apply for and receive grants, donations and sponsorships in funds or construction materials that would reduce the overall capital loan requirement. Federal and provincial infrastructure grants when available can provide substantial capital loan offsets. Grant opportunities may also exist with the Columbia Basin Trust and the Whitetooth Legacy Fund. With a significant legacy project such as an indoor aquatic facility, local manufacturers of products such as wood and concrete may be inclined to provide either funding support, or in-kind contributions of materials. The

CSRD will explore grant, sponsorship, and donation opportunities in conjunction with interested community groups during the next phases of the project.

Service Area Establishment

The current CSRD Bylaw # 5076, Area A and Golden Recreation Centre Local Service Bylaw, established the service area, which includes all properties within Electoral Area A and the Town of Golden, to fund operations of the existing CSRD owned arena, located in Golden. The CSRD determined that this service area is also suitable to be used to fund the operations of the Golden and Area arena and a new indoor aquatic facility, as the two buildings will be joined within a common lobby and entrance.

All anticipated operational and capital depreciation costs associated with the indoor aquatic facility can be accommodated within the existing bylaw maximums of the Area A and Golden Recreation Centre bylaw. The funding of the existing arena and future indoor aquatic facility are allocated in the existing bylaw between Electoral Area A and Golden at 47.5% for Electoral Area A and 52.5% Town of Golden.

With the operational budget accommodated through the existing recreation service area, there also exists the opportunity to conduct pre-taxation for the new indoor aquatic facility to further reduce the required capital loan and debt servicing amount. The CSRD may also want to explore taxation to accommodate the annual cost escalation contingency between the date of receipt of positive public assent and the construction start date.

Assent of Electors

To advance the detailed design and project tendering, a positive public assent will be required on the amount to be borrowed. The CSRD will need to determine if borrowing will include the full cost amount of the facility, or less any anticipated grants, sponsorships, and donations. Project costing is based on assent of the electors, anticipated to occur in 2022. If assent of the electors is sufficient and the entire construction costs are secured through a combination of loans, grants, donations and sponsorships, further engineering and detailed design, tendering, and contract award would occur in 2023 with a construction start date of 2024.

The project will only proceed to engineering design and tendering if assent is sufficient and includes all necessary funds through loans, grants, donations, and sponsorships. All funds necessary to advance the project need to be in place within five years of a successful public assent process.

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CSRD Aquatic Centre

1408 9 Street S
Golden, BC

Site Plan

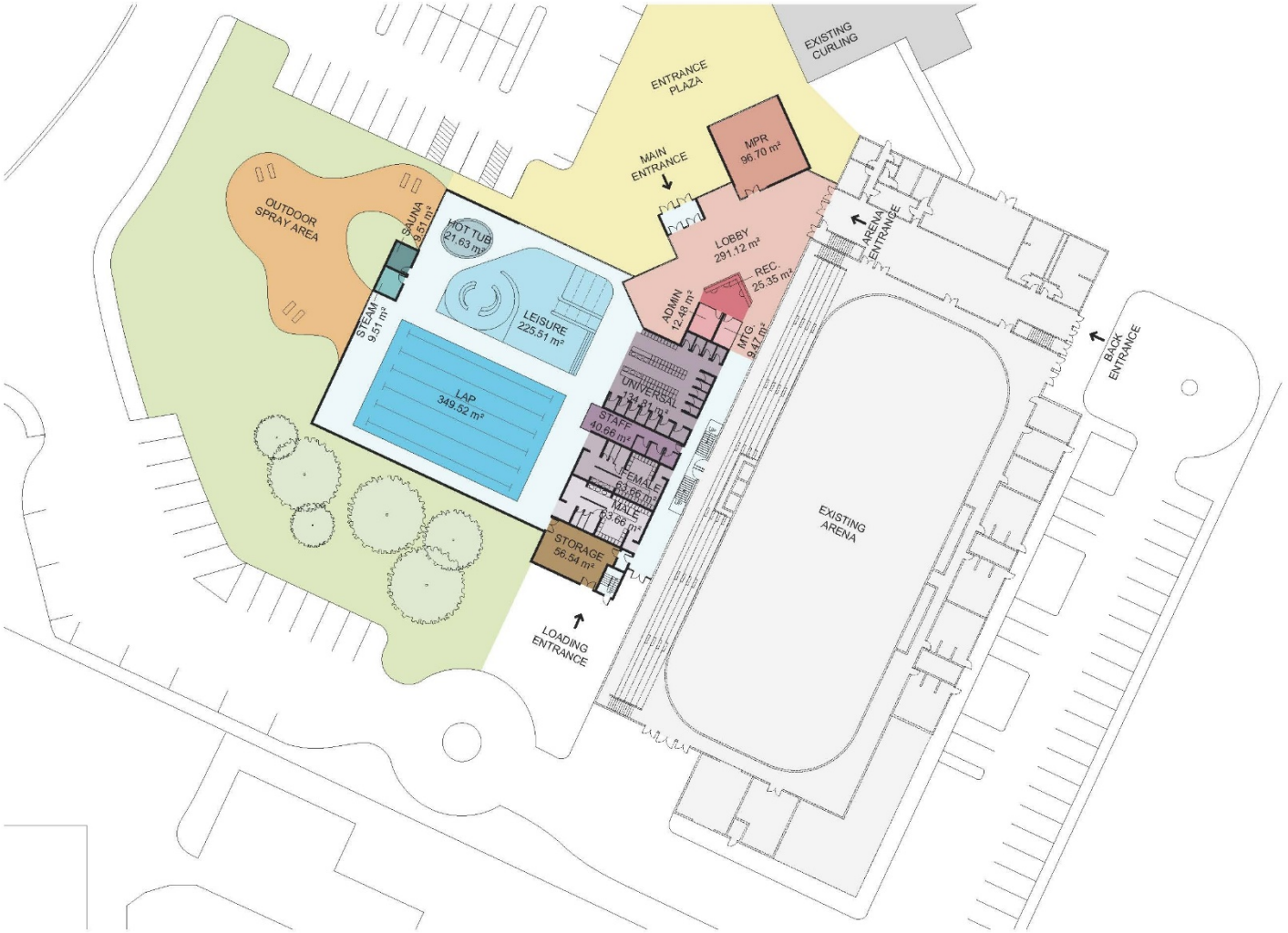
Project Number: 19056

DATE: 04/03/2021

A101

SCALE: 1:1000

HCMA



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CSRD Aquatic Centre

1408 9 Street S
Golden, BC

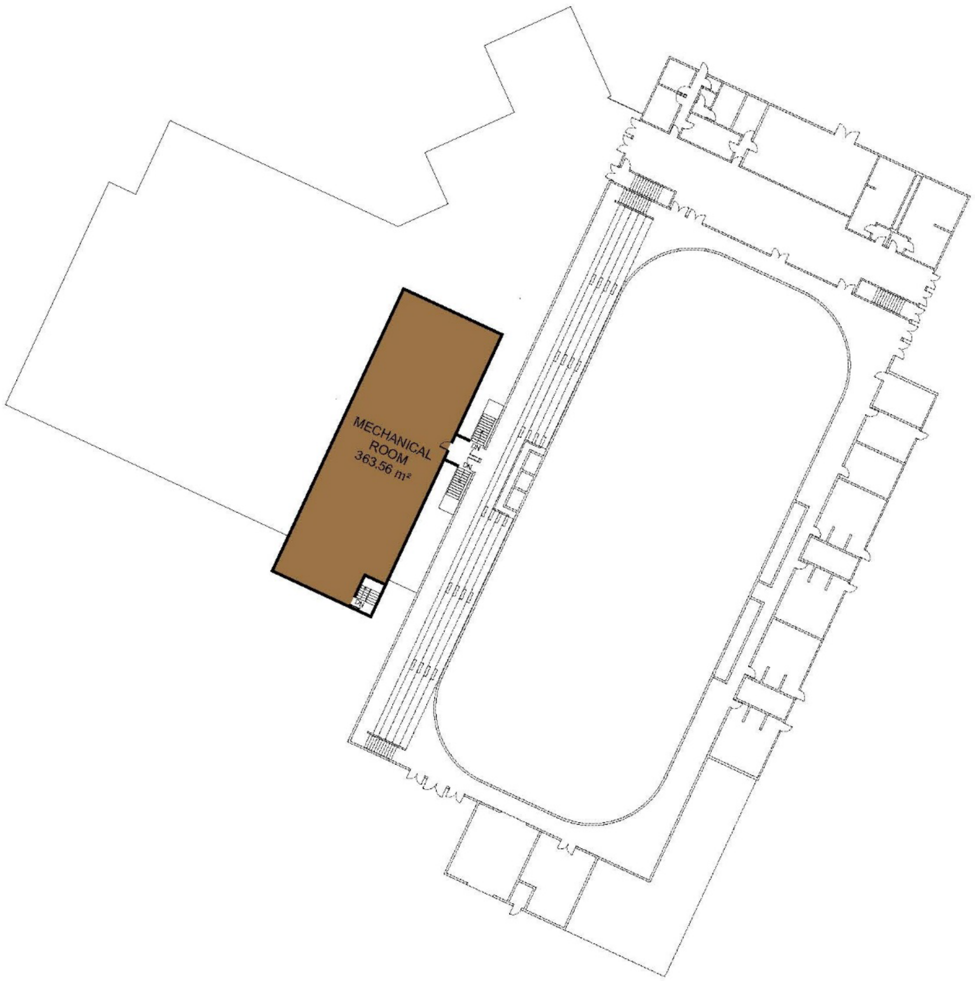
Level 1 Floor Plan

Project Number: 19056

DATE: 04/03/2021

A201

SCALE: 1:500



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CSRD Aquatic Centre

1408 9 Street S
Golden, BC

Level 2 Floor Plan

Project Number: 19056

DATE: 04/03/2021

A202

SCALE: 1:500

HCMA

Aquatic Facility Operating Costs – Golden and CSRD

Introduction

This report outlines the projected operating costs for the new Aquatics Facility.

The projections were developed using 2018 pool operating costs as a basis, primarily in the areas of staffing costs. The estimates for utilities, the next largest expense, was estimated based on other similar facilities where possible.

Budgets were obtained from several municipalities to help determine accurate projections. These municipalities included Revelstoke, Vernon, and Trail.

Facility Description

The Aquatics facility is assumed to include an six lane 25 M lap pool, a leisure pool, a hot tub, and changerooms (both universal and male and female).

Operating Cost Estimate

It is difficult to make precise estimates as no two facilities are the same and none have the same hours, or the same program and subsequently the same number of staff. Staff wages and salaries also vary.

Staffing is the highest cost item in the budget. The staff consists primary of aquatic staff to support the pool programs throughout the year. The aquatic staff are supported by administrative staff (front desk, registration etc.,) maintenance staff and management. The transition from a seasonal pool to a 12 month operation is a significant change in the number and types of programs that can be offered, and the staff required to support these programs.

The other significant cost is the utilities. This is difficult to accurately estimate until a decision is made on the facility design and plan for utilities (electricity, propane, or source other such as biomass)

The estimated operating cost based on the information available at this time is 738,332.00 without capital depreciation.

The revenue projection is $219,000. This results in a projected net operating cost of $519,332. The current net for the outdoor pool (based on 2018 numbers) was $302,559.

Capital depreciation has not yet been included in this budget estimate.

Therefore, the increase in the estimated total operating costs to CRSD/Golden for the new pool will be about $216,773 (not including capital depreciation).

Appendix A is a summary of the projected revenue and costs using current Town budget categories.

Appendix B is the detailed potential staffing levels and associated cost estimate.

It should be noted that the current estimates will need to be updated, once the facility design is complete.

Comparator Facility Operations

Three facilities have been used for the purpose of understanding the operating costs of the new aquatic facility. Although all three communities serve a larger population, their facilities are similar.

City of Revelstoke – Operates a 25 M six lane pool, leisure pool with lazy river, water slide, hot tub, sauna, steam room and climbing wall. They also have a small fitness facility.

Their 2019 actuals indicated that the two major expense areas are wages plus benefits at $595,756, and utilities at $250,636. Their revenue was $506,048.

Revelstoke is somewhat unique as they heat their pool through District Energy, which uses biomass.

They had an attendance of 80,000. This is each "visit" not unique individuals

Net operating cost for the facility in 2019 was $596,854. This does not include the Director's salary, and some other costs are included that are not just for the pool. They are relatively minor.

City of Vernon – Greater Vernon Recreation (which includes Coldstream and RDNO Electoral Areas B and C) operates a similar aquatic facility to what is being proposed for Golden. They have an 8 lane 25 M pool, a leisure pool, hot tub, steam room, sauna, and a very small fitness area.

Their 2020 projected expenses were $1,678,085 which included $1,178,058 in wages and benefits. Utilities were budgeted at $154,760 for electricity and $32,290 for natural gas. Their revenue was projected at $1,074,369.

Their attendance in 2019 was 220,000 users.

Their projected net operating cost for 2020 was $603,716 (prior to COVID-19 impact).

City of Trail – Trail has an aquatic centre similar (but somewhat larger) to what is being considered. They have an 8 lane, 25 M pool with diving boards, a large "play pool" with numerous water features, a large waterslide, steam room, and a fitness centre.

Based on their 2020 budget, their expenses were projected at $1,283,050 and revenues of $512,000. Their pool is older and has more lifeguarding/safety challenges due to the overall design and their waterslide.

Staff wages were budgeted at $672,300. Their utilities included $23,000 for natural gas to heat the pool and $148,000 for power.

Their projected net operating cost for 2020 was $771,050. (Prior to COVID-19)

Contracting Out Pool Operations

One option is to explore opportunities to contract out the operations to a private company. This option could be explored once the facility design is finalized. Preliminary discussions could take place to gain a clear understanding of the potential benefits and drawbacks.

Aquatic Facility Programming

The new facility, whether it is one pool or two will provide many aquatic opportunities for the community. The schedules for the pool(s) will be developed and revised based on community interest and need. The following is a potential list of program offerings.

Adults (including Seniors):

- Lane swimming -generally early mornings, lunch hour, and some evenings during lessons
- Adult swimming lessons – beginner to advanced.
- Age-friendly programs
- Therapeutic sessions, Physiotherapy, Gentle Fitness etc.
- Aquafit
- Masters Swim

Children and Youth:

- Pre-school lessons: mornings, afternoons, and weekends
- Children's "Swim Kids" lessons – after school and weekends
- Advanced lessons and lifeguard training – after school, evenings, and weekends
- Special Needs lessons
- Private lessons
- School Group Lessons (offered in coordination with the School District)
- Golden Dolphin Swim Club

All Ages:

- Recreational/Public Swim
- Wibit Swims
- Private Pool Rentals & Birthday Parties
- Water Safety – canoes etc.

Employment Focussed Training:

- Adventure Tourism – e.g. Rafting education
- High School Lifeguard Academy

Attachments:
APPENDIX A – Budget Projections for New Facility
APPENDIX B – Staffing Estimates

APPENDIX A	Outdoor Pool 2018 Actuals	Estimates for New Facility (2020 dollars)	Notes
REVENUE			
Membership and Punch Card	(40,195.83)	(120,450.00)	55% Drop-in programs
Program and Course	(28,653.01)	(54,750.00)	25% Lessons & other instructional
Merchandise	(5,117.39)	(10,950.00)	5% Items for sale
Facility Rental	(10,237.03)	(32,850.00)	15% Educational programs
TOTAL REVENUE	**(84,203.26)**	**(219,000.00)**	
EXPENSES			
Wages - Regular	96,748.55	156,428.00	From Staffing Estimate
Wages - Casual	135,995.28	238,122.00	From Staffing Estimate
Wages - Overtime	12,201.24	3,000.00	
	-		
Fringe Benefits	33,430.65	48,632.00	
Travel Expenses	3,991.84	3,000.00	
Freight	2,693.80	2,500.00	
Internet & Hosting Services	-	-	
Telephone	2,816.14	3,000.00	
Hydro/Utilities	9,835.78	151,000.00	Based on comparators (average)
Heating Fuel/Propane	14,282.81	33,000.00	mid-range of AME estimate
Water And Sewer	5,196.75	10,000.00	Larger facility
Advertising	1,787.84	1,500.00	
Business Meetings	43.10	50.00	
Insurance	2,546.80	7,500.00	Much larger facility
Memberships Professional Fees	264.15	300.00	
Memberships/Conferences	-	-	
Training/Professional Development	4,643.90	5,000.00	
Contract Employees	-	-	
Engineering	-	-	
Contracted Services	9,870.32	10,000.00	
Permits & Licences (Reclass)	595.00	600.00	
Equipment Rental - Internal	142.50	-	
Equipment Rental - External	-	-	
Computer - Software	-	-	
Materials & Supplies - General	25,801.04	26,000.00	
Materials & Supplies - Mechanical	-	-	
Materials & Supplies - Programs	2,121.81	3,000.00	
Materials & Supplies - Office	108.45	200.00	
Materials & Supplies - Janitorial	6,600.02	12,000.00	
Consumable Supplies	5,641.38	6,000.00	
Clothing Allowance	626.44	500.00	
Materials & Supplies - Chemicals	4,723.38	13,000.00	
Small Tools & Equipment	458.42	1,000.00	
Safety Supplies & Equipment	2,855.50	3,000.00	
Computer Maintenance	739.51		
	-	-	
TOTAL EXPENSES	**386,762.40**	**738,332.00**	
NET	**302,559.14**	**519,332.00**	

Notes: Increase primarily due to staffing, utilities, supplies and insurance

Utilities may change depending on design of facility.

Manager of Recreation Services Salary not included

Annual Capital Depreciation has not been included

APPENDIX B - STAFFING ESTIMATE

Position	Rate	Benefits	Hrs per Week	# of Weeks	Annual Cost w/o Benefits	Annual Cost with Benefits	Notes
Part Time / Casual Staff							
Aquatic Worker 3	$24.41	4.0%	40	40	$39,056	$40,618	See Note 1.
Aquatic Worker 3	$24.41	4.0%	40	40	$39,056	$40,618	See Note 1.
Aquatic Worker 3	$24.41	4.0%	40	40	$39,056	$40,618	See Note 1.
Aquatic Worker 2 (multiple people)	$23.41	4.0%	80	16	$29,965	$31,163	(May-Aug)
Aquatic Worker 2 (multiple people)	$23.41	4.0%	50	20	$23,410	$24,346	(Sept-April)
Recreation Clerk	$21.66	4.0%	30	52	$33,790	$35,141	See Note 2.
Recreation Clerk	$21.66	4.0%	30	52	$33,790	$35,141	See Note 2.
Part Time / Casual Staff Total					**$238,122**	**$247,647**	
Full Time Staff							
Recreation Coordinator- Aquatic Lead	$32.16	25.0%	40	52	$66,893	$83,616	
Recreation Coordinator - Programs Lead	$32.16	25.0%	20	52	$33,446	$41,808	See Note 3.
Recreation Operator	$31.16	25.0%	24	52	$38,888	$48,610	
Senior Recreation Operator	$33.08	25.0%	10	52	$17,202	$21,502	
Full Time Staff Total					**$156,428**	**$195,536**	See Note 4.
Total Costs					**$394,550**	**$443,182**	

Notes:

1. Aquatic Worker 3 staff work for three 10 week sessions plus one 8 week session with 2 training prep/wrap-up weeks.
2. 25% of time associated with other facilities.
3. 50% of time associated with other facilities.
4. Manager of Recreation Services position not included in caclulations

CSRD AND GOLDEN AQUATIC CENTRE

PROJECT NO.: 009A-098-20

GOLDEN, BC

CONCEPT REPORT

FEBRUARY 26, 2021

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TABLE OF CONTENTS

1. INTRODUCTION

The AME Consulting Group was commissioned HCMA on behalf of the Town of Golden to provide a mechanical concept report on the proposed new Recreation Centre. The purpose of this report is to outline the basis of design for the mechanical systems and to identify options for the user groups to consider. AME has proposed a traditional mechanical system along with sustainable options to achieve a lower carbon footprint to meet the Government of Canada's Zero Carbon Initiative for 2050. All information provided will meet current codes and standards and, where applicable, will identify future any codes and standards being considered.

The scope of work will consist of a recreation facility housing a natatorium with 25m lap pool, leisure pool, hot pool, steam and sauna rooms, change facility, and multi-purpose space, with an entrance lobby that connects to the existing arena. The mechanical spaces will be located in the basement, with main floor chemical storage rooms and upper floor fan rooms that will also house the heating plant.

The project has numerous sustainable strategies to move towards a low carbon footprint. Passive heat recovery, geo-thermal and solar hot water have all been considered to reduce the energy consumption as well as limiting green house gas (GHG) emissions. The design has been selected based upon energy efficiency, owner experience and maintenance, long term operating costs and occupant comfort.

2. DESIGN CRITERIA

2.1 Design Conditions

.1 Outdoor Design Conditions: Based upon British Columbia Building Code Supplement for Golden, BC.

Summer (°C)	Winter (°C)
July 2.5% Design	January 1% Design
Temperature	Temperature
30°C db / 17°C wb	- 30°C

.2 Indoor Design Conditions: The following design temperatures and air change rates were taken from the American College of Sports Medicine design guidelines.

	Summer (°C)	Winter (°C)	Relative Hum. Summer (%)	Relative Hum. Winter (%)	Air Change Rates (# / Hour)
Natatorium with Lap-pool, leisure pool, hot pool	27*	26	50-60	50-60	6
Change room (Arena & Aquatic)	27*	22	50-60*	20-30*	15 – 20
Multi-Purpose Rooms	18	18**	50-60*	20-30*	10
Administrative Uses	24	22	50-60*	20-30*	4 – 6

.1 Note: * Partial cooling / dehumidification will be provided

.3 Building Envelope Thermal Analysis

.1 This project falls under Climate Zone 6 as outlined in ASHRAE 90.1 – 2019. The pool hall shall have minimum R-30 on the walls and ceiling to prevent condensation from occurring. Remainder of the building structure shall have a minimum R-16 wall and R-20 ceiling per ASHRAE 90.1 – 2010.

2.2 Ventilation Rates

.1 Ventilation rates will be provided in accordance with ASHRAE standard 62.1-2010 (Ventilation for Acceptable Indoor Air Quality) as well as the National Building Code. Minimum Ventilation rates will be provided as follows:

Occupancy Category	Outdoor Air Rate L/s m2 /person	Outdoor Air Rate L/s m2	Occupancy if not programmed (#/1000 m2)
Natatorium with lap-pool, leisure pool, hot pool, water side *	NS	2.4	NS
Multi-purpose rooms	3.8	0.3	100
Weight Room	10	0.3	10
Administrative Uses	2.5	0.3	30
Supporting Uses	NS	0.6	NS

.1 Note: NS is defined as Not Specified.

3. MAIN SITE SERVICES

.1 The site will be fully serviced to 1 metre outside of the building footprint and coordinated with the project Civil Engineer. All on- and off-site services outside this footprint will be the responsibility of the Civil Engineer. The preliminary analysis of the project indicates that the following plumbing systems and site services are required:

- .1 150-mm sanitary sewer service at 1% slope to pick up:
  - .1 Building sanitary waste estimate of 100 fixture units.
  - .2 Approximately 15,000 litres of backwash water from the pool filters.
- .2 200-mm storm service at preliminary estimate of 22,000 litres in a 15-minute rainfall.
- .3 200-mm combined service to supply both domestic water and fire protection or
  - .1 75-mm domestic water service with an estimated load of 300 fixture units
  - .2 150-mm fire service for a new fire hydrant and sprinkler system.
- .4 5 psi gas main located outside the pool mechanical room.

4. INTERIOR PLUMBING SYSTEMS

4.1 Fixtures

.1 The interior plumbing fixtures are based on commercial grade fixtures for a public facility.

- .1 Public lavatories will be equipped with single temperature hands free metering type faucets.
- .2 Staff change room lavatories will have individual hot and cold faucets.
- .3 Public showers will be metering low flow single temperature.
- .4 Drinking fountains on the pool deck will be non-refrigerated push button with ADA compliance. All other drinking fountains with be refrigerated type with bottle filler.
- .5 A hot and cold water hose bib will be located in each pool change room and public washroom located below the lavatory counter with lockable cover.
- .6 Recessed cold water hose bibs will be scattered through the pool deck for cleaning.
- .7 Non-metallic floor drains will be used around the pool deck. Nickel-bronze metal floor drains will be used in the remainder of the facility.

4.2 Domestic Cold Water Systems

.1 The domestic cold water system will consist of:

- .1 Domestic water service entry station consisting of building isolation and double check backflow prevention device.
- .2 Distribution piping system to all fixtures.
- .3 Irrigation cap-off at the water entry room complete with backflow prevention device.
- .4 Pool fill line complete with water meter and reduced pressure backflow preventer.
- .5 Heating plant fill line complete with water meter, PRV and RP type backflow preventer.

4.3 Domestic Hot Water Systems

.1 The domestic hot water will be stored at 60°C in a minimum of two thermal storage tanks. We will have two hot water distribution systems that will supply hot water at 46°C to fixtures with internal mixing valves and 40°C to all single temperature metering faucets. Two thermostatic mixing valves within the domestic hot water room will mix the domestic hot water to the two different temperatures.

The domestic hot water system will be sized as follows:

.1 Double walled plate and frame heat exchanger connected off the central heating plant. Two pumps sized at 100% will transfer the heated water from the H/E to the storage tanks. Pumps will be controlled by tank water temperature to maintain set point.

.2 Central thermostatic mixing valves with recirculating pump will be located within the upper mechanical room.

4.4 Steam Room:

.1 An electric, packaged steam generator complete with piping, controls, and distribution manifold shall be provided. The steam room will have a main on-off control switch located within the water feature control panel. Once turned on then the steam generator will be set at a lower set point temperature to keep the room warm. A push button actuator outside of the room will activate the generator to produce steam for an adjustable period of time.

5. POOL SYSTEMS

5.1 Turnover Rates

.1 A pool's turnover rate is defined as the time it takes for its full water volume to be passed through the filtration plant. It is expressed in hours or minutes but can also be expressed as a volume flow rate when the pool's volume is taken into account. Lower turnover rates provide for better water quality, clarity, and a faster response to varying water chemistry.

.2 Maximum pool turnover rates are determined by the BC Guidelines for Pool Design. In AME's experience, however, turnover rates less than maximum values are recommended. Best practice turnover rates are determined by applying a recommended rate by depth approach for each pool type. Shallow pools, regardless of designation, tend to see concentrated bathers and less water volume per bather, requiring lower turnover than deeper pools.

.3 Hot pools require the lowest turnover rates of all pools. This is due to their high temperature, which encourages biological growth; as well as their propensity for high bather load.

.4 The pool water systems will be designed to provide turnover rates (entire pool water passes through the mechanical filtration system) as follows:

Pool Name	Turnover Rate (Hrs)	Estimated Volume (Litres)	Estimated Flow Rate (USGPM)
Lap Pool	3.0 hours	500,000	800
Leisure Pool	1.0 hours	175,000	800
Hot Pool	15 minutes	25,000	450

.5 The following table lists the recommended pool temperatures for this project. AME will design its heating plant such that it is capable of maintaining these temperatures with a pool hall air temperature of 27°C. Should it be desired to operate at higher pool temperatures and/or lower air temperatures, this must be confirmed prior to the completion of design development.

Parameter	Recommended Operating Temperature (°C)	Design Heat Up Time (h)
Lap Pool	27	72
Leisure Pool	32	48
Hot Pool	40	6

5.2 Pumps

.1 Filter pumps will be sized to meet the minimum turnover rate when the pool filters are dirty. Turnover rates will be increased when the filter is in a clean condition. The lap and leisure pools will have parallel pumps each sized for 50% of the flow and will provide redundancy for the filtration system should one pump fail.

.2 Chemical treatment pumps will be peristaltic type pumps. Peristaltic pumps keep the corrosive fluids within the tube thus protecting the pump's internal parts from corrosion.

.3 Bypass pumps to/from chemical rooms will be all stainless inline circulation pumps. The pumps are sized to bypass water into the chemical rooms such that the chemicals are injected within each room thus containing the chemicals.

5.3 Water Features

.1 Each water feature will have a dedicated pump. Smaller volume pumps will be constructed of corrosion resistant, reinforced thermoplastic with an integral strainer. Larger pumps will be either base-mounted, end-suction type, similar to the filter pumps, or 316SS in line circulators.

.2 A master control panel will be provided at the lifeguard station, allowing deck-level control of the water features by lifeguards. In addition, supplementary emergency stop buttons will be located strategically throughout the pool area to shut off all water features in case of a bather emergency, potential or real.

5.4 Pool Filters

.1 Conceptually, AME recommends vertical high rate sand filters for this facility. We also recommend NSF approved glass beads as the filter media with a flocculant and coagulant. This combination will produce superior water quality, reduce backwash runs thus consume less amount of water and are priced competitively, compared with traditional sand bed filter media.

5.5 Pool Water Heating Systems

.1 We recommend plate and frame heat exchangers over individual pool heaters. The plate and frame heat exchangers, one for each pool, are fed from the central hot water heating system.

Pool Name	Heat Up Time	Pool Temperatures
Main Pool	72 Hours	27°C
Leisure Pool	48 hours	32°C
Hot Pool	8 hours	40°C

5.6 Chemical Disinfection

.1 We recommend calcium hypo-chlorite as the primary pool disinfectant for this facility. The calcium hypochlorite operates on a briquette/tablet form and is clean, odour free, very reliable and safer to handle than either gas or liquid chlorine. The system is made entirely out of PVC therefore resistant to corrosion. The feed system utilizes the principles of erosion. The calcium hypochlorite system is pH neutral so there is no requirement for extra balancing of the pool water unlike gas and liquid chlorine.

.2 CL2-Vat-01 to CL2-Vat-03 consist of a large vat to store the calcium hypochlorite tablets, circulation pump, water solenoid valve and injector. On-demand for chlorine the solenoid valve opens and sprays water onto the dry tablets. The injector creates a vacuum to draw the chlorine into the pool filter system.

5.7 pH Disinfection

.1 Carbon dioxide is a safe-to-handle acid that would replace sodium bisulphate or hydrochloric acid. It is not suited for pools where the source water is high in alkalinity or hardness. Maximum levels are 150 mg/l alkalinity and 300 mg/l calcium hardness. The system consists of a large storage vessel owned and maintained by the CO2 supplier. The owner would lease the service from a local distributor. The tanks would be located inside a dedicated room with an external fill station. The system consists of a pressure regulating valve, flow meter, solenoid valve and a diffuser to inject the CO2 into the pool filtration return line.

6. FIRE PROTECTION SYSTEMS

The building will be fully sprinklered. There will be one wet sprinkler zone for each floor. The system will be complete with supervisory and tamper switches on all main isolation valves, backflow prevention, flow switches, and sprinkler flow control valve assemblies at each floor, fire department connections and all required appurtenances. We assume that a fire pump will not be required for the building.

6.1 Fire Protection Zones

.1 Wet sprinklers for all common areas and service spaces – designed to NFPA-13: Light and Ordinary Hazard. Final zone configuration will be determined on the bases of zone size, occupancy separations and floor levels.

6.2 General Fire Protection Requirements

.1 Fire extinguisher cabinets complete with a 4.5-kg fire extinguisher will be provided at locations approved by the authority having jurisdiction.

.2 Test flow connections for sprinkler system will be incorporated for each floor zone, and for testing each alarm device.

.3 Sprinkler heads will be chrome plated, pendant type in finished common areas, and bronze upright type in unfinished areas.

.4 Corrosion resistant heads for the natatorium and aquatic mechanical rooms. High temperature heads for the steam and sauna rooms.

.5 An exterior siamese connection for the fire department and a test connection will be provided adjacent to the main entrance.

.6 At this time we assumed no fire pump.

7. HEATING, VENTILATION AND COOLING SYSTEMS

7.1 General

.1 We have developed three scenarios for consideration: BC Code Minimum, an enhanced hybrid approach and a Zero Carbon Approach.

- Project Type #1 – Condensing Boilers; minimal heat recovery and energy sharing. The BC Code minimum system would consist of condensing boilers sized to heat the pools as well as all building heating and ventilation losses.
- Project Type #2 – Air Source Heat Pumps with Condensing Boiler back-up; moderate to high heat recovery and energy sharing. We would also provide passive heat recovery within the natatorium and change room spaces.
- Project Type #3 – Air Source Heat Pumps with Electric Boiler back-up; maximum or optimal heat recovery and energy sharing. Replaces condensing gas boilers with electric boilers to reduce carbon footprint.

AME completed a comparison study in September 2020 and summarized the results below. Also refer to **Appendix A** for the detailed report.

- Project Type #1 has the highest EUI and GHGI values of the project types.
- Project Types #1 and #2 have approximately equal energy costs per m^2 due to the utility cost ratio of hydro to natural gas being approximately inversely equal to the efficiency gains of the Project Type #2 equipment.
- Project Type #3 has the lowest EUI, GHGI and energy cost values, but the information doesn't include the costs for carbon offset measures (on-site renewables, carbon credits, etc.). It does however have a much higher construction cost.

7.2 Common Features of All Options:

.1 Aquatic Space System (AHU-1)

The unit will be sized to provide outside and re-circulated air at a rate of approximately 30,000 CFM (cubic feet/min) at 6 AC/hr (air changes per hour) maintaining +/- 28°C and maximum 50% RH under winter conditions. Supply-air (S/A) ductwork will run around the perimeter at high level of the aquatic space. Two return air louvers are recommended, one at high level and one at deck level. The low-level return-air louver will capture the heavy chloramines whereas the high-level louver will capture the excess heat. These systems will then re-circulate the air back to the air handling system. All internal parts of the unit will be epoxy coated, and the coils will also have a protective coating to prevent rusting.

7.3 Option 1 – BC Code minimum System:

.1 A 2,400 MBH central boiler plant will provide heating water to the aquatic space, domestic hot water, and pool water. The central plant will consist of three high efficiency condensing boilers with individual circulation pumps, secondary pumps, and plate and frame heat exchangers to transfer heat from the heating system to the pools, domestic water, and the heating water coils in the aquatic and change room air handling units.

.2 The lobby and multi-purpose rooms will have individual gas fired, electric cooled packaged rooftop units. Reheat coils within the ductwork serving the reception, administration and meeting room will provide individual space control from the overall lobby. Our preliminary selections indicate 2 at 5 ton roof top units for the lobby and a 4 ton unit for the Multi-purpose space.

.3 Aquatic Space System (AHU-1)

.1 This zone will require an air handling unit complete with supply and return fans, heating, passive heat recovery, filter, and mixing section.

.4 Aquatics Changing Rooms:

.1 The change room design will require an air-handling unit complete with supply fan, exhaust fan, gas fired heat exchanger, heat-pipe heat recovery coil, mixing box, and filter. Exhaust grilles will be located in potentially humid and odorous areas (i.e. washrooms) to maintain pressure differential and comfortable conditions. The heat pipe extends across the fresh air and exhaust air stream. The heat from the exhaust air stream is transferred into the fresh air system. This reclaim system requires no moving parts.

.2 During occupied times, the unit will supply 100% outside air. At night the unit will shut down and only turn on to maintain night set-back conditions. At this time the outside-air damper will be closed and the bypass damper open, therefore not introducing any additional ventilation.

7.4 Option 2 – Enhanced Hybrid System:

.1 A 2,400 MBH central boiler plant with a 120 ton air source heat pump that will provide heating water to the aquatic space, domestic hot water, and pool water. The central plant will consist of three at 40 ton module air source heat pumps, along with three high efficiency condensing boilers with individual circulation pumps, secondary pumps, and plate and frame heat exchangers to transfer heat from the heating system to the pools, domestic water, and the heating water coils in the aquatic and change room air handling units.

.1 In the summer, the air-source heat pump would provide chilled water as well as heating water. The chilled water system would provide cooling to fan coil units serving the lobby, administration and multi-purpose spaces.

.2 The lobby, administration and multi-purpose rooms will have individual fan coil units to provide space heating and cooling. Ventilation would be provided through a central HRV.

.3 Aquatic Space System (AHU-1)

.1 This zone will require a packed dehumidification air handling unit complete with supply and return fans, refrigerant dehumidifier, heating coil, filter, and mixing section.

.4 Aquatics Changing Rooms:

.1 We recommend a single air handling unit with air heat recovery for the Changing Room areas. The unit will consist of supply and return fans with variable speed drives, 100% fresh air mixing box with two position occupied / unoccupied dampers, bag filters and heating coil. 100% of the exhaust air heat will be recovered before discharging outdoors.

.2 Each change room including staff room will have its own reheat coil to provide individual temperature control. The fresh air will be supplied to the change lockers and opening separating the change rooms from the pool. Exhaust air grilles will be located in the shower and toilet areas. Each zone will be pressure neutral to the pool and negative pressure to the lobby.

7.5 Option 3 – Zero Carbon Approach:

.1 This option would use a hybrid system that consists of air source heat pumps, water source heat pumps, and sewage waste heat recovery with electric boiler back-up that will provide heating water to the aquatic space, domestic hot water, and pool water as well as cooling to the spaces. The central plant will consist of three at 40-ton module air source heat pumps, 2 at 40-ton water to water heat pumps, 20 ton sewage heat recovery heat pump and 1,500 MBH electric boiler back-up. Heat recovery system within the pool ventilation will also be considered as a part of the main source of heating. The capacity of the system will handle 100% of the building heating loads.

.2 Natatorium HVAC Unit (AHU-1)

.1 An air handling unit complete with supply and return fans, heating coil, dehumidification coil, heat recovery coil, filters, and mixing section. Chilled and heating water would come from the central plant.

.3 All of the remaining spaces will follow the design within option 2.

8. EXHAUST SYSTEMS

.1 **The majority of the exhaust will be collected through the HRVs. Rooms that are remotely located or have corrosive fumes will be exhausted separately. The following is a list of individual exhaust systems not picked up by the HRV.**

.1 EF-001: Tri-Chloramine Exhaust. Exhaust air will be extracted from the pool deck drains to capture tri-chloramines which are located along the floor water level. The number of fans will be dependant on the final layout of the pool deck drains.

.2 EF-002: Chemical storage exhaust fans to remove foul odours shall run continuously with air transferred from adjacent spaces.

.3 EF-003: A purge fan will be installed in the Steam – Sauna room. The fan will run in the evening to purge the room of odors from the day's usage. Ventilation for these spaces will be accomplished via displacement and natural buoyancy.

.4 EF-004: Mechanical and electrical room exhaust fans shall cycle based on space temperature.

9. CONTROL SYSTEMS

.1 All major mechanical systems will be equipped with Direct Digital Control (DDC) systems. This will include all equipment located in mechanical rooms as well as the roof mounted systems.

.2 The entire building will be controlled by BACnet compatible components.

.3 The majority of the wall mounted space sensors will be installed for zone temperature control including internal occupancy sensors and/or CO2 sensor. Protective covers will be installed on the sensors within the gym or other none supervised rooms.

.4 Electrical room and mechanical room exhaust fans will be controlled by reverse acting thermostats.

.5 Change rooms will be equipped with motion detectors linked back to the Heat Recovery Ventilator units and the by-pass damper. When the rooms are unoccupied, dampers will be open and air will be re-circulated. The recirculation of the air will be used for pre-heating the rooms.

.6 The pool chemical controllers will have their own standalone systems. Either an RS-232 cable or modem will allow the chemical controller to download information onto the building management PC via a windows software program.

.7 The pool water features will be controlled from the central lifeguard station. On/off switches will allow individual control to each feature. A speed switch will allow the staff to control the speed of the lazy river. An emergency stop switch within the panel will shut off all water features and filtration pumps. Everything would then have to be restarted manually. Deck mounted emergency switches will also be installed to shut down all air induced water features to allow staff clear view of the pool floor.

.8 The pool filtration system will have the following DDC interface:

.1 Pool temperature complete with adjustment.

.2 Pool flow rate complete with low flow alarm for backwashing.

.3 Pump alarms.

.4 Secondary treatment shut down in evenings.

.5 Reduce pump speed on low occupied conditions. This would be a manual program, thus not reacting on load change.

END OF REPORT

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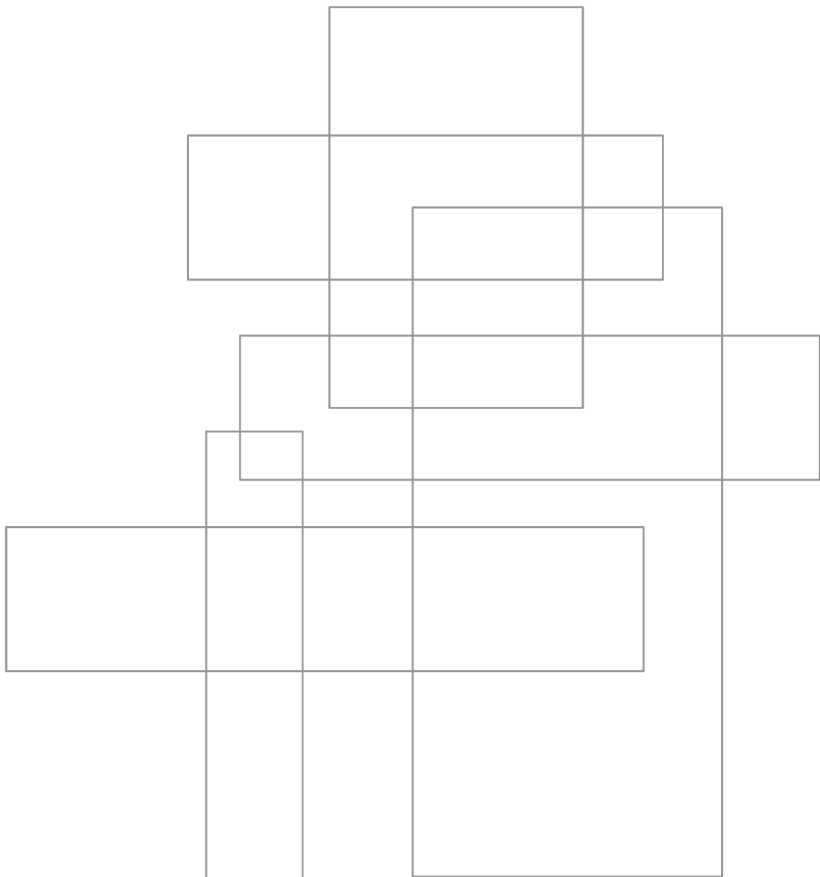
APPENDIX A

GOLDEN ENERGY STUDY REPORT



TOWN OF GOLDEN - GOLDEN AQUATIC CENTRE

PROJECT NO.: 009A-098-20

PROJECT ADDRESS

ENERGY STUDY

SEPTEMBER 23, 2020

PREPARED FOR:
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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

AME has conducted a survey review of previous projects in order to generate Energy Use Intensity (EUI), energy cost, and Greenhouse Gas Intensity (GHGI) values associated with three different building types, as follows:

- Project Type #1 – BC Building Code minimum
- Project Type #2 – BC Building Code enhanced
- Project Type #3 – Zero Carbon

Examples of the three building types are:

- Project Type #1 – Condensing Boilers; minimal heat recovery and energy sharing
- Project Type #2 – Air Source Heat Pumps with Condensing Boiler back-up; moderate to high heat recovery and energy sharing
- Project Type #3 – Air Source Heat Pumps with Electric Boiler back-up; maximum or optimal heat recovery and energy sharing

From the values obtained by the survey review, it was confirmed that:

- Project Type #1 has the highest EUI and GHGI values of the project types
- Project Types #1 and #2 have approximately equal energy costs per m^2 due to the utility cost ratio of hydro to natural gas being approximately inversely equal to the efficiency gains of the Project Type #2 equipment.
- Project Type #3 has the lowest EUI, GHGI and energy cost values, but the information doesn't include the costs for carbon offset measures (on-site renewables, carbon credits, etc.)

2. INTRODUCTION

AME has been engaged by HCMA Architecture + Design to conduct a survey review of energy consumption in previous recreation facility designs in order to generate some order of magnitude energy consumption and energy cost values for the following general building design targets:

- BC Building Code minimum
- BC Building Code enhanced
- Zero Carbon

This information will then be used to help guide the development of the design for a recreation facility project located in the Town of Golden, BC.

2.1 Team and Project Background

AME's team has completed the mechanical design in over 100 recreation centres of varying sizes, shapes and programs. Through the completion of these facilities, we have cultivated a deep understanding of how different factors will influence the energy consumption required to operate the building. AME maintains a database of energy models from current and completed projects that help quantify and support this understanding.

For the current project, we have pulled from that database several projects of similar scope and program to that which was presented in the "CSRD + Town of Golden Indoor Aquatic Centre Feasibility Study", dated June 23.

The projects, and the information provided from those projects, should be interpreted with the understanding that they are demonstrating relative energy consumption and energy cost values between the general building design targets and do not necessarily reflect the actual values that will be seen when the new facility is operating.

3. PROJECT TYPES

We have generated three project types to match the aforementioned building design targets, grouping them generally based on the central heating plant, as follows:

3.1 Project Type #1 – BC Building Code Minimum – Condensing Boilers

When compared with projects from earlier generations, this type of project is still considered to be higher performing as the base BC Building Code has gradually been moving towards higher efficiency over time. It is, however, not typically viewed as being particularly "leading edge" in terms of system type, complexity and integration.

They are often defined by minimal heat recovery, or energy sharing within the building (moving heat from one area that doesn't need it to another area that does), beyond the Code mandated minimum level, which translates to higher consumption of "new" energy input to the facility.

3.2 Project Type #2 – BC Building Code Enhanced – Air Source Heat Pumps (ASHP)

This type of project typically will have either condensing or electric boilers in a back-up role, supporting a higher performing central system that may consist of ASHP, water source heat pumps (WSHP), a geothermal field, or other equipment designed to support a higher level of energy sharing within the building and a method of new energy input to a facility that is either more efficient, better performing, or more at the leading edge design-wise.

They are often defined by significant heat recovery or energy sharing within the building, often, though not always, increasing first costs for building construction if the payback period arising from the associated energy cost savings is short enough to be acceptable.

3.3 Project Type #3 –Zero Carbon

The third project type we reviewed is zero carbon, which, mechanically speaking, generally refers to moving away from fossil fuels and towards electrification of the facility, employing different methods such as the purchase of Carbon Credits or installation of solar photovoltaic panels to offset any generated carbon. Biomass may also be investigated as an option in support of zero carbon projects.

The level of system integration for this type of building is high, with the intent being to maximize all heat recovery and energy sharing within the building at all times. This goal is often driven by the higher utility cost associated with electricity, depending on geographic location and the local energy structure.

4. DATA AND DISCUSSION

4.1 Data

The following table was generated using information from AME's energy modeling for recreation centres database, based on the three project types outlined above.

Energy Consumption and Energy Cost Comparison				
Project Type	Central Plant (Example)	EUI, Energy Usage Intensity (kWh/m^2)	Energy Cost ($/m^2)	GHGI, Greenhouse Gas Intensity (kgCO2/m^2)
Project #1	Condensing Boilers	950	$75	46
Project #2	ASHP c/w Condensing Boiler Back-up	800	$75	25
Project #3	ASHP, WSHP c/w Electric Boiler Back-up	650	$60	7

Table 1 – Energy Consumption and Energy Cost Comparison

4.2 Discussion

From Table 1, it can be seen that Project Type #1 has the highest overall energy consumption (EUI) and Greenhouse Gas (GHGI) intensities of the three examples, which is to be expected. At the same time, Project Type #3 has the lowest overall EUI and GHGI values of the three examples, which is also to be expected.

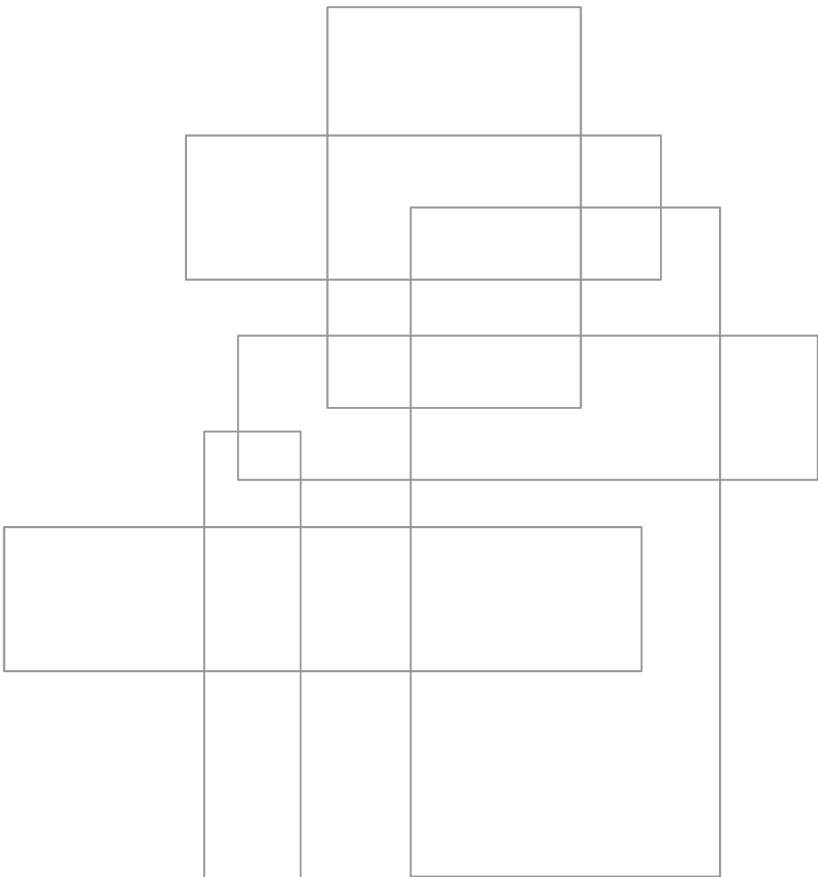
One interesting item to note is that while Project Type #1 has a higher EUI than Project Type #2, the energy cost is approximately the same (there is a slight difference, but it is small enough to be essentially the same, when considering other differences between the projects in terms of building form and program). This is explained by utility rates of hydro being approximately 3 times that of natural gas, which is approximately the inverse of the efficiency gains from the higher performing equipment in Project Type #2. Due to this relationship, the two factors essentially cancel each other out from a cost perspective, despite the lower energy intensity and greenhouse gas generation of Project Type #2.

An additional item to note is that the value presented for Project Type #3 do not include the additional costs associated with purchasing of Carbon Credits or with installation of equipment associated with the on-site renewable energy generation required to offset the lower carbon intensity of that project to achieve zero carbon.

END OF REPORT

APPENDIX B

EQUIPMENT LISTS



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PROJECT TITLE: CSRD and Golden Aquatic Centre

PROJECT NUMBER: 009a-098-20

DATE: Feb 25, 2021

EQUIPMENT LIST - OPTION 1

UNIT #:	DESCRIPTION:	MANUFACTURER / MODEL #	LOCATION:	ELEC. CAPACITY H.P.	EQUIP. CAPACITY CFM / USGPM	EQUIP. WEIGHT LBS	REMARKS:
	Pool Filtration & Disinfection						
PP-001	Lap Pool Filtration	Grundfos	Filter Room	20	400 gpm / 85 ft hd		c/w VFD
PP-002	Lap Pool Filtration	Grundfos	Filter Room	20	400 gpm / 85 ft hd		c/w VFD
PP-003	Leisure Pool Filtration	Grundfos	Filter Room	20	400 gpm / 85 ft hd		c/w VFD
PP-004	Leisure Pool Filtration	Grundfos	Filter Room	20	400 gpm / 85 ft hd		c/w VFD
PP-005	Swirl Pool Filtration	Grundfos	Filter Room	20	450 gpm / 65 ft hd		c/w VFD
PP-006	Swirl Pool Jets	Grundfos	Filter Room	25	750 gpm / 50 ft hd		
PP-010	Water Feature Pump	Grundfos	Filter Room	10	200 gpm / 30 ft hd		
PP-011	Water Feature Pump	Grundfos	Filter Room	10	360 gpm / 50 ft hd		
PP-012	Water Feature Pump	Grundfos	Filter Room	10	300 gpm / 55 ft hd		
PP-013	Water Feature Pump	Grundfos	Filter Room	30	1800 gpm / 50 ft hd		c/w VFD
PP-014	Water Feature Pump	Grundfos	Filter Room	20	450 gpm / 50 ft hd		
PP-015	Water Feature Pump	Grundfos	Filter Room	20	600 gpm / 50 ft hd		c/w VFD
PP-020	Lap Pool Chem By-Pass	Grundfos	Filter Room	frac	20 gpm / 20 ft hd		
PP-021	Leisure Pool Chem By-Pass	Grundfos	Filter Room	frac	20 gpm / 20 ft hd		
PP-022	Swirl Pool Chem By-Pass	Grundfos	Filter Room	frac	20 gpm / 20 ft hd		
PP-023	Lap Pool CL2 Injection	Pacfab	Chemical Storage Rm	1			Chlorine Injection Pump
PP-024	Leisure Pool CL2 Injection	Pacfab	Chemical Storage Rm	1			Chlorine Injection Pump
PP-025	Swirl Pool CL2 Injection	Pacfab	Chemical Storage Rm	1			Chlorine Injection Pump
CL2-Vat-01	Main Pool Calcium Hypo-chlorite Feeder	Pulsar	Chemical Storage Rm	N/A			Chlorine feeder
CL2-Vat-02	Leisure Pool Calcium Hypo-chlorite	Pulsar	Chemical Storage Rm	N/A			Chlorine feeder
CL2-Vat-03	Swirl Pool Calcium Hypo-chlorite Feeder	Pulsar	Chemical Storage Rm	N/A			Chlorine feeder
PF-001	Main Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-002	Main Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-003	Main Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-004	Main Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-005	Leisure Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-006	Leisure Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-007	Leisure Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-008	Leisure Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-009	Swirl Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-010	Swirl Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
UV-001	Main Pool UV Reactor	ETS - SP-50-8	Filter Room	5 KW	5 KW		c/w Contro Panel
UV-002	Leisure Pool UV Reactor	ETS - SP-50-8	Filter Room	5 KW	5 KW		c/w Contro Panel
UV-003	Swirl Pool UV Reactor	ETS - SP-25-6	Filter Room	2.5 KW	2.5 KW		c/w Contro Panel
CC-001	Main Pool Chemical Controller	BECS : BECSys7	Filter Room	20 Amp - 120V			c/w Filter Backwash Control
CC-002	Leisure Pool Chemical Controller	BECS : BECSys7	Filter Room	20 Amp - 120V			c/w Filter Backwash Control
CC-003	Swirl Pool Chemical Controller	BECS : BECSys7	Filter Room	20 Amp - 120V			c/w Filter Backwash Control
FM-001-A	Main Pool Flow Meter	GF+ Signet Paddle Flow Sensor	Filter Room	20 Amp - 120V			C/W Wall Mounted Monitor
FM-001-B	Leisure Pool Flow Meter	GF+ Signet Paddle Flow Sensor	Filter Room	20 Amp - 120V			C/W Wall Mounted Monitor
FM-001-C	Swirl Pool Flow Meter	GF+ Signet Paddle Flow Sensor	Filter Room	20 Amp - 120V			C/W Wall Mounted Monitor
AF-001	Auto-Fill (One / Pool)						
TK-001	Bulk Feed Mixing Tank						
SG-001	Steam Generator	Relaxamist	Filter Room	27kW			
	HVAC						
AHU-001	Natatorium Air handling Unit	Haakon	Upper Fan room	110 MCA	30,000 CFM,		c/w air side passive heat recovery
AHU-002	Change Room HRV	Venmar CES ERV 5000	Roof	2 @ 5 HP Each	4,500 CFM E/A & S/A		Rooftop units
EF-001	Tri-Chloramine Exhaust	Plastec	Upper Fan room	0.50			all Plastic Fan
EF-002	Chemcial Storage Exhaust	Plastec	Chemical room	Frac			all Plastic Fan
EF-003	Steam Room Purge E/A	Plastec	Storage room	Frac			all Plastic Fan
EF-004	Mechanical and Electrical Room	Greenheck	Electrical room	0.50			

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PROJECT TITLE: CSRD and Golden Aquatic Centre

PROJECT NUMBER: 009a-098-20

DATE: Feb 25, 2021

EQUIPMENT LIST - OPTION 1

UNIT #:	DESCRIPTION:	MANUFACTURER / MODEL #	LOCATION:	ELEC. CAPACITY H.P.	EQUIP. CAPACITY CFM / USGPM	EQUIP. WEIGHT LBS	REMARKS:
HP-001	Lobby Heat Pump	Trane Foundation	Lobby Roof Top		2,000 CFM, 5 Tons		As noted above
HP-002	Lobby Heat Pump	Trane Foundation	Lobby Ceiling		2,000 CFM, 5 Tons		As noted above
HP-003	Multi-Purpose Room Heat Pump	Trane Foundation	Multi-purpose Area		1,600 CFM, 4 Tons		As noted above
RHC-001	Admin Hydronic Reheat Coil	Trane	Admin		10 MBH		As noted above
RHC-002	Reception Hydronic Reheat Coil	Trane	Reception		10 MBH		As noted above
RHC-003	Meeting Hydronic Reheat Coil	Trane	Meeting Room		10 MBH		As noted above
B-001	Building Heating Boiler	Lochinvar Crest	Boiler Room		800 MBH		
B-002	Building Heating Boiler	Lochinvar Crest	Boiler Room		800 MBH		
B-003	Building Heating Boiler	Lochinvar Crest	Boiler Room		800 MBH		
P-101	Boiler # 1 Circ Pump	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-102	Boiler # 2 Circ Pump	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-103	Boiler # 3 Circ Pump	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-104	Building Heat Pump Loop	Grundfos	Boiler room		375 GPM / 35 Ft		
P-105	Building Heat Pump Loop	Grundfos	Boiler room		375 GPM / 35 Ft		
P-106	Pool Heat Exchangers - Heating loop	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-107	Domestic Hot Water Heating Loop	Grundfos	Upper Fan room		50 GPM / 30 Ft		
	Domestic Hot Water						
DHWT-001	Domestic Hot Water Storage Tank	A O Smith	Upper Fan Room		250 Gallon		
DHWT-002	Domestic Hot Water Storage Tank	A O Smith	Upper Fan Room		250 Gallon		
DHWT-003	Domestic Hot Water Storage Tank	A O Smith	Upper Fan Room		250 Gallon		
DHWT-004	Domestic Hot Water Storage Tank	A O Smith	Upper Fan Room		250 Gallon		
TMV-001	Building Thermostatic Mixing Valve	Bradley	Upper Fan Room		50 GPM		
P-201	Domestic Water Circulation Pump	Grundfos	Upper Fan Room				
P-202	Domestic Water Circulation Pump	Grundfos	Upper Fan Room				
P-203	Domestic Water Bld. Reciirc Pump	Grundfos	Upper Fan Room				
	Heat Exchangers						
HX-001	Lap Pool Heat Exchanger	Grundfos	Basement Mech	N/A	1,100MBH / 80/90 EWT-LWT: 120-100 EHWT=LHWT		316l Plate & Frame H/E
HX-002	Leisure Pool Heat Exchanger	Grundfos	Basement Mech	N/A	600MBH / 90/100 EWT-LWT: 120-100 EHWT-LHWT		316l Plate & Frame H/E
HX-003	Swirl Pool Heat Exchanger	Grundfos	Basement Mech	N/A	600MBH / 104/115 EWT-LWT: 125-115 EHWT-LHWT		316l Plate & Frame H/E
HX-004	Domestic Hot Water Heat Exchanger	Grundfos	Basement Mech	N/A	600MBH / 120/140 EWT-LWT: 160/140 EHWT-LHWT		Double Wall Plate & Frame H/E

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PROJECT TITLE: CSRD and Golden Aquatic Centre

PROJECT NUMBER: 009a-098-20

DATE: Feb 25, 2021

EQUIPMENT LIST - OPTION 2

UNIT #:	DESCRIPTION:	MANUFACTURER / MODEL #	LOCATION:	ELEC. CAPACITY H.P.	EQUIP. CAPACITY CFM / USGPM	EQUIP. WEIGHT LBS	REMARKS:
	Pool Filtration & Disinfection						
PP-001	Lap Pool Filtration	Grundfos	Filter Room	20	400 gpm / 85 ft hd		c/w VFD
PP-002	Lap Pool Filtration	Grundfos	Filter Room	20	400 gpm / 85 ft hd		c/w VFD
PP-003	Leisure Pool Filtration	Grundfos	Filter Room	20	400 gpm / 85 ft hd		c/w VFD
PP-004	Leisure Pool Filtration	Grundfos	Filter Room	20	400 gpm / 85 ft hd		c/w VFD
PP-005	Swirl Pool Filtration	Grundfos	Filter Room	20	450 gpm / 65 ft hd		c/w VFD
PP-006	Swirl Pool Jets	Grundfos	Filter Room	25	750 gpm / 50 ft hd		
PP-010	Water Feature Pump	Grundfos	Filter Room	10	200 gpm / 30 ft hd		
PP-011	Water Feature Pump	Grundfos	Filter Room	10	360 gpm / 50 ft hd		
PP-012	Water Feature Pump	Grundfos	Filter Room	10	300 gpm / 55 ft hd		
PP-013	Water Feature Pump	Grundfos	Filter Room	30	1800 gpm / 50 ft hd		c/w VFD
PP-014	Water Feature Pump	Grundfos	Filter Room	20	450 gpm / 50 ft hd		
PP-015	Water Feature Pump	Grundfos	Filter Room	20	600 gpm / 50 ft hd		c/w VFD
PP-020	Lap Pool Chem By-Pass	Grundfos	Filter Room	frac	20 gpm / 20 ft hd		
PP-021	Leisure Pool Chem By-Pass	Grundfos	Filter Room	frac	20 gpm / 20 ft hd		
PP-022	Swirl Pool Chem By-Pass	Grundfos	Filter Room	frac	20 gpm / 20 ft hd		
PP-023	Lap Pool CL2 Injection	Pacfab	Chemical Storage Rm	1			Chlorine Injection Pump
PP-024	Leisure Pool CL2 Injection	Pacfab	Chemical Storage Rm	1			Chlorine Injection Pump
PP-025	Swirl Pool CL2 Injection	Pacfab	Chemical Storage Rm	1			Chlorine Injection Pump
CL2-Vat-01	Main Pool Calcium Hypo-chlorite Feeder	Pulsar	Chemical Storage Rm	N/A			Chlorine feeder
CL2-Vat-02	Leisure Pool Calcium Hypo-chlorite	Pulsar	Chemical Storage Rm	N/A			Chlorine feeder
CL2-Vat-03	Swirl Pool Calcium Hypo-chlorite Feeder	Pulsar	Chemical Storage Rm	N/A			Chlorine feeder
PF-001	Main Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-002	Main Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-003	Main Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-004	Main Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-005	Leisure Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-006	Leisure Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-007	Leisure Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-008	Leisure Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-009	Swirl Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-010	Swirl Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
UV-001	Main Pool UV Reactor	ETS - SP-50-8	Filter Room	5 KW	5 KW		c/w Contro Panel
UV-002	Leisure Pool UV Reactor	ETS - SP-50-8	Filter Room	5 KW	5 KW		c/w Contro Panel
UV-003	Swirl Pool UV Reactor	ETS - SP-25-6	Filter Room	2.5 KW	2.5 KW		c/w Contro Panel
CC-001	Main Pool Chemical Controller	BECS : BECSys7	Filter Room	20 Amp - 120V			c/w Filter Backwash Control
CC-002	Leisure Pool Chemical Controller	BECS : BECSys7	Filter Room	20 Amp - 120V			c/w Filter Backwash Control
CC-003	Swirl Pool Chemical Controller	BECS : BECSys7	Filter Room	20 Amp - 120V			c/w Filter Backwash Control
FM-001-A	Main Pool Flow Meter	GF+ Signet Paddle Flow Sensor	Filter Room	20 Amp - 120V			C/W Wall Mounted Monitor
FM-001-B	Leisure Pool Flow Meter	GF+ Signet Paddle Flow Sensor	Filter Room	20 Amp - 120V			C/W Wall Mounted Monitor
FM-001-C	Swirl Pool Flow Meter	GF+ Signet Paddle Flow Sensor	Filter Room	20 Amp - 120V			C/W Wall Mounted Monitor
AF-001	Auto-Fill (One / Pool)						
TK-001	Bulk Feed Mixing Tank						
SG-001	Steam Generator	Relaxamist	Filter Room	27kW			
	HVAC						
AHU-001	Natatorium Air handling Unit	Seresco-NE-045-064	Upper Fan Room	110 MCA	30,000 CFM,		c/w Refridgerant Deumidification syste
AHU-002	Change Room HRV	Venmar CES ERV 5000	Roof	2 @ 5 HP Each	4,500 CFM E/A & S/A		c/w heat pipe heat recovery
EF-001	Tri-Chloramine Exhaust	Plastec	Upper Fan room	0.50			all Plastic Fan
EF-002	Chemcial Storage Exhaust	Plastec	Chemical room	Frac			all Plastic Fan
EF-003	Steam Room Purge E/A	Plastec	Storage room	Frac			all Plastic Fan
EF-004	Mechanical and Electrical Room	Greenheck	Electrical room	0.50			

AME Group
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PROJECT TITLE: CSRD and Golden Aquatic Centre

PROJECT NUMBER: 009a-098-20

DATE: Feb 25, 2021

EQUIPMENT LIST - OPTION 2

UNIT #:	DESCRIPTION:	MANUFACTURER / MODEL #	LOCATION:	ELEC. CAPACITY H.P.	EQUIP. CAPACITY CFM / USGPM	EQUIP. WEIGHT LBS	REMARKS:
HRV-001	Lobby Central HRV	Venmar CES ERV 5000	Roof	2 @ 5 HP Each	4,500 CFM E/A & S/A		Rooftop units
FC-001	Admin Hydronic Fan Coil	Trane	Admin		2 Ton		4 pipe fan coils
FC-002	Reception Hydronic Fan Coil	Trane	Reception		2 Ton		4 pipe fan coils
FC-003	Meeting Hydronic Fan Coil	Trane	Meeting Room		2 Ton		4 pipe fan coils
RHC-001	Mens Changeroom	Trane	Admin		10 MBH		
RHC-002	Womens Changeroom	Trane	Reception		10 MBH		
RHC-003	Staff Changeroom	Trane	Meeting Room		10 MBH		
B-001	Building Heating Boiler	Lochinvar Crest	Boiler Room		800 MBH		
B-002	Building Heating Boiler	Lochinvar Crest	Boiler Room		800 MBH		
B-003	Building Heating Boiler	Lochinvar Crest	Boiler Room		800 MBH		
ASHP-001	Building Air Source Heat Pump	MultiStack	Outdoors		120 Ton		4 Pipe with 3@40 Ton Modules
P-101	Boiler # 1 Circ Pump	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-102	Boiler # 2 Circ Pump	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-103	Boiler # 3 Circ Pump	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-104	Building Heat Pump Loop	Grundfos	Boiler room		375 GPM / 35 Ft		
P-105	Building Heat Pump Loop	Grundfos	Boiler room		375 GPM / 35 Ft		
P-106	Pool Heat Exchangers - Heating loop	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-107	Domestic Hot Water Heating Loop	Grundfos	Upper Fan room		50 GPM / 30 Ft		
P-108	AHSP # 1 Circ Pump	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-109	AHSP # 2 Circ Pump	Grundfos	Boiler room		100 gpm / 20 ft hd		
	Domestic Hot Water						
DHWT-001	Domestic Hot Water Storage Tank	A O Smith	Upper Fan Room		250 Gallon		
DHWT-002	Domestic Hot Water Storage Tank	A O Smith	Upper Fan Room		250 Gallon		
DHWT-003	Domestic Hot Water Storage Tank	A O Smith	Upper Fan Room		250 Gallon		
DHWT-004	Domestic Hot Water Storage Tank	A O Smith	Upper Fan Room		250 Gallon		
TMV-001	Building Thermostatic Mixing Valve	Bradley	Upper Fan Room		50 GPM		
P-201	Domestic Water Circulation Pump	Grundfos	Upper Fan Room				
P-202	Domestic Water Circulation Pump	Grundfos	Upper Fan Room				
P-203	Domestic Water Bld. Reciirc Pump	Grundfos	Upper Fan Room				
	Heat Exchangers						
HX-001	Lap Pool Heat Exchanger	Grundfos	Basement Mech	N/A	1,100MBH / 80/90 EWT-LWT: 120-100 EHWT=LHWT		316l Plate & Frame H/E
HX-002	Leisure Pool Heat Exchanger	Grundfos	Basement Mech	N/A	600MBH / 90/100 EWT-LWT: 120-100 EHWT-LHWT		316l Plate & Frame H/E
HX-003	Swirl Pool Heat Exchanger	Grundfos	Basement Mech	N/A	600MBH / 104/115 EWT-LWT: 125-115 EHWT-LHWT		316l Plate & Frame H/E
HX-004	Domestic Hot Water Heat Exchanger	Grundfos	Basement Mech	N/A	600MBH / 120/140 EWT-LWT: 160/140 EHWT-LHWT		Double Wall Plate & Frame H/E

AME Group
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PROJECT TITLE: CSRD and Golden Aquatic Centre

PROJECT NUMBER: 009a-098-20

DATE: Feb 25, 2021

EQUIPMENT LIST - OPTION 3

UNIT #:	DESCRIPTION:	MANUFACTURER / MODEL #	LOCATION:	ELEC. CAPACITY H.P.	EQUIP. CAPACITY CFM / USGPM	EQUIP. WEIGHT LBS	REMARKS:
	Pool Filtration & Disinfection						
PP-001	Lap Pool Filtration	Grundfos	Filter Room	20	400 gpm / 85 ft hd		c/w VFD
PP-002	Lap Pool Filtration	Grundfos	Filter Room	20	400 gpm / 85 ft hd		c/w VFD
PP-003	Leisure Pool Filtration	Grundfos	Filter Room	20	400 gpm / 85 ft hd		c/w VFD
PP-004	Leisure Pool Filtration	Grundfos	Filter Room	20	400 gpm / 85 ft hd		c/w VFD
PP-005	Swirl Pool Filtration	Grundfos	Filter Room	20	450 gpm / 65 ft hd		c/w VFD
PP-006	Swirl Pool Jets	Grundfos	Filter Room	25	750 gpm / 50 ft hd		
PP-010	Water Feature Pump	Grundfos	Filter Room	10	200 gpm / 30 ft hd		
PP-011	Water Feature Pump	Grundfos	Filter Room	10	360 gpm / 50 ft hd		
PP-012	Water Feature Pump	Grundfos	Filter Room	10	300 gpm / 55 ft hd		
PP-013	Water Feature Pump	Grundfos	Filter Room	30	1800 gpm / 50 ft hd		c/w VFD
PP-014	Water Feature Pump	Grundfos	Filter Room	20	450 gpm / 50 ft hd		
PP-015	Water Feature Pump	Grundfos	Filter Room	20	600 gpm / 50 ft hd		c/w VFD
PP-020	Lap Pool Chem By-Pass	Grundfos	Filter Room	frac	20 gpm / 20 ft hd		
PP-021	Leisure Pool Chem By-Pass	Grundfos	Filter Room	frac	20 gpm / 20 ft hd		
PP-022	Swirl Pool Chem By-Pass	Grundfos	Filter Room	frac	20 gpm / 20 ft hd		
PP-023	Lap Pool CL2 Injection	Pacfab	Chemical Storage Rm	1			Chlorine Injection Pump
PP-024	Leisure Pool CL2 Injection	Pacfab	Chemical Storage Rm	1			Chlorine Injection Pump
PP-025	Swirl Pool CL2 Injection	Pacfab	Chemical Storage Rm	1			Chlorine Injection Pump
CL2-Vat-01	Main Pool Calcium Hypo-chlorite Feeder	Pulsar	Chemical Storage Rm	N/A			Chlorine feeder
CL2-Vat-02	Leisure Pool Calcium Hypo-chlorite	Pulsar	Chemical Storage Rm	N/A			Chlorine feeder
CL2-Vat-03	Swirl Pool Calcium Hypo-chlorite Feeder	Pulsar	Chemical Storage Rm	N/A			Chlorine feeder
PF-001	Main Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-002	Main Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-003	Main Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-004	Main Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
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PF-009	Swirl Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
PF-010	Swirl Pool Filter	Neptune Benson 60-SRF	Filter Room	N/A	60"dia, 20 ft2, 200 GPM	11,800	C/W Dryden Aqua activated Filter Medi
UV-001	Main Pool UV Reactor	ETS - SP-50-8	Filter Room	5 KW	5 KW		c/w Contro Panel
UV-002	Leisure Pool UV Reactor	ETS - SP-50-8	Filter Room	5 KW	5 KW		c/w Contro Panel
UV-003	Swirl Pool UV Reactor	ETS - SP-25-6	Filter Room	2.5 KW	2.5 KW		c/w Contro Panel
CC-001	Main Pool Chemical Controller	BECS : BECSys7	Filter Room	20 Amp - 120V			c/w Filter Backwash Control
CC-002	Leisure Pool Chemical Controller	BECS : BECSys7	Filter Room	20 Amp - 120V			c/w Filter Backwash Control
CC-003	Swirl Pool Chemical Controller	BECS : BECSys7	Filter Room	20 Amp - 120V			c/w Filter Backwash Control
FM-001-A	Main Pool Flow Meter	GF+ Signet Paddle Flow Sensor	Filter Room	20 Amp - 120V			C/W Wall Mounted Monitor
FM-001-B	Leisure Pool Flow Meter	GF+ Signet Paddle Flow Sensor	Filter Room	20 Amp - 120V			C/W Wall Mounted Monitor
FM-001-C	Swirl Pool Flow Meter	GF+ Signet Paddle Flow Sensor	Filter Room	20 Amp - 120V			C/W Wall Mounted Monitor
AF-001	Auto-Fill (One / Pool)						
TK-001	Bulk Feed Mixing Tank						
SG-001	Steam Generator	Relaxamist	Filter Room	27kW			
	HVAC						
AHU-001	Natatorium Air handling Unit	Seresco-NE-045-064	Upper Fan Room	110 MCA	30,000 CFM,		c/w Chilled Water Deumidification Coi
AHU-002	Change Room HRV	Venmar CES ERV 5000	Roof	2 @ 5 HP Each	4,500 CFM E/A & S/A		c/w heat pipe heat recovery
EF-001	Tri-Chloramine Exhaust	Plastec	Upper Fan room	0.50			all Plastic Fan
EF-002	Chemcial Storage Exhaust	Plastec	Chemical room	Frac			all Plastic Fan
EF-003	Steam Room Purge E/A	Plastec	Storage room	Frac			all Plastic Fan
EF-004	Mechanical and Electrical Room	Greenheck	Electrical room	0.50			

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EQUIPMENT LIST - OPTION 3

UNIT #:	DESCRIPTION:	MANUFACTURER / MODEL #	LOCATION:	ELEC. CAPACITY H.P.	EQUIP. CAPACITY CFM / USGPM	EQUIP. WEIGHT LBS	REMARKS:
HRV-001	Lobby Central HRV	Venmar CES ERV 5000	Roof	2 @ 5 HP Each	4,500 CFM E/A & S/A		Rooftop units
FC-001	Admin Hydronic Fan Coil	Trane	Admin		2 Ton		4 pipe fan coils
FC-002	Reception Hydronic Fan Coil	Trane	Reception		2 Ton		4 pipe fan coils
FC-003	Meeting Hydronic Fan Coil	Trane	Meeting Room		2 Ton		4 pipe fan coils
RHC-001	Mens Changeroom	Trane	Admin		10 MBH		
RHC-002	Womens Changeroom	Trane	Reception		10 MBH		
RHC-003	Staff Changeroom	Trane	Meeting Room		10 MBH		
B-001	Backup Electric Building Heating Boiler	Lochinvar	Boiler Room		1500 MBH		
ASHP-001	Building Air Source Heat Pump	MultiStack	Outdoors		120 Ton		4 Pipe with 3@40 Ton Modules
WSHP-001	Building Water Source Heat Pump	MultiStack	Boiler Room		80 Ton		4 Pipe with 2@40 Ton Modules
SHR-001	Sewage Heat Recovery Unit	Piranha	Boiler Room		20 Ton		
P-101	Boiler # 1 Circ Pump	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-102	Building Heat Pump Loop	Grundfos	Boiler room		375 GPM / 35 Ft		
P-103	Building Heat Pump Loop	Grundfos	Boiler room		375 GPM / 35 Ft		
P-104	Pool Heat Exchangers - Heating loop	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-105	Domestic Hot Water Heating Loop	Grundfos	Upper Fan room		50 GPM / 30 Ft		
P-106	AHSP # 1 Circ Pump	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-107	AHSP # 1 Circ Pump	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-108	WHSP # 1 Circ Pump	Grundfos	Boiler room		100 gpm / 20 ft hd		
P-109	WHSP # 1 Circ Pump	Grundfos	Boiler room		100 gpm / 20 ft hd		
	Domestic Hot Water						
DHWT-001	Domestic Hot Water Storage Tank	A O Smith	Upper Fan Room		250 Gallon		
DHWT-002	Domestic Hot Water Storage Tank	A O Smith	Upper Fan Room		250 Gallon		
DHWT-003	Domestic Hot Water Storage Tank	A O Smith	Upper Fan Room		250 Gallon		
DHWT-004	Domestic Hot Water Storage Tank	A O Smith	Upper Fan Room		250 Gallon		
TMV-001	Building Thermostatic Mixing Valve	Bradley	Upper Fan Room		50 GPM		
P-201	Domestic Water Circulation Pump	Grundfos	Upper Fan Room				
P-202	Domestic Water Circulation Pump	Grundfos	Upper Fan Room				
P-203	Domestic Water Bld. Reciirc Pump	Grundfos	Upper Fan Room				
	Heat Exchangers						
HX-001	Lap Pool Heat Exchanger	Grundfos	Basement Mech	N/A	1,100MBH / 80/90 EWT-LWT: 120-100 EHWT=LHWT		316l Plate & Frame H/E
HX-002	Leisure Pool Heat Exchanger	Grundfos	Basement Mech	N/A	600MBH / 90/100 EWT-LWT: 120-100 EHWT-LHWT		316l Plate & Frame H/E
HX-003	Swirl Pool Heat Exchanger	Grundfos	Basement Mech	N/A	600MBH / 104/115 EWT-LWT: 125-115 EHWT-LHWT		316l Plate & Frame H/E
HX-004	Domestic Hot Water Heat Exchanger	Grundfos	Basement Mech	N/A	600MBH / 120/140 EWT-LWT: 160/140 EHWT-LHWT		Double Wall Plate & Frame H/E

Smith + Andersen
300 – 6400 Roberts Street Burnaby British Columbia V5G 4C9
604 294 8414 f 604 294 6405 smithandandersen.com

ELECTRICAL CONCEPT REPORT

FOR
CSRD + TOWN OF GOLDEN
INDOOR AQUATIC CENTRE SCHEMATIC REPORT
GOLDEN, BC

OUR PROJECT NUMBER:
21084.001.E

DATE:
2021-03-31

ISSUED / REVISION:
CONCEPT REPORT

LIMITS OF LIABILITY ASSOCIATED WITH THIS DOCUMENT

1. HAZARDOUS MATERIALS

1.1. It is understood that hazardous materials may be present (e.g. asbestos, mould, PCB's, etc.) within the existing building. The identification of and abatement recommendations with respect to hazardous materials is outside the scope of services provided by Smith + Andersen.

2. THIRD PARTY USE

2.1. Any use that a third party makes of this document, or reliance on or decisions to be based on it, are the responsibility of such third party. Smith + Andersen accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based upon this document.

3. GENERAL LIMITS

3.1. Very limited existing drawings and photos were made available for the review of existing systems.

3.2. This document has been prepared solely for the use of HMCA Architecture + Design and its design team associated with the Town of Golden Indoor Aquatic Center Feasibility Study. The material contained in this document reflects Smith + Andersen's best judgement in light of the information available at the time of preparation. There is no warranty expressed or implied. Professional judgement was exercised in gathering and assessing information. The recommendations presented are the product of professional care and competence and cannot be construed as an absolute guarantee.

3.3. Where equipment sizing is provided it should be considered order-of-magnitude only as the project details that may affect systems have not been established or finalized.

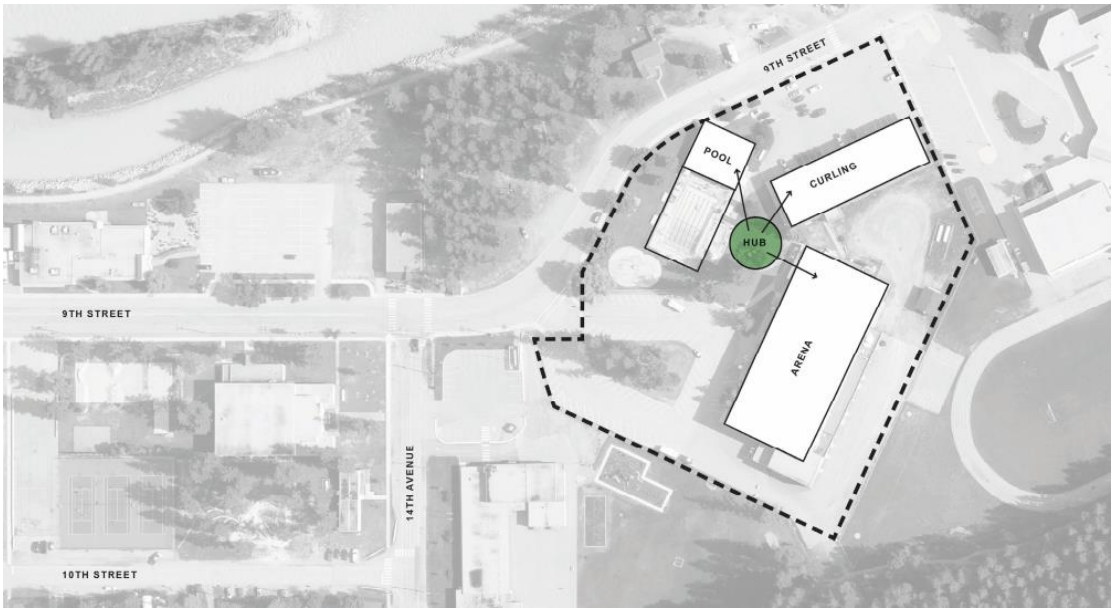
1. INTRODUCTION

1.1. The outdoor pool is owned by the Town of Golden. The arena and curling rink is owned by the CSRD (Columbia Shuswap Regional District). The outdoor pool and curling rink was constructed in the 1970's and the arena was constructed in 1986.

Golden and District Arena - 1410 9 St S, Golden, BC

1.2. Several of the Town of Golden's recreational facilities are part of a proposed redevelopment.

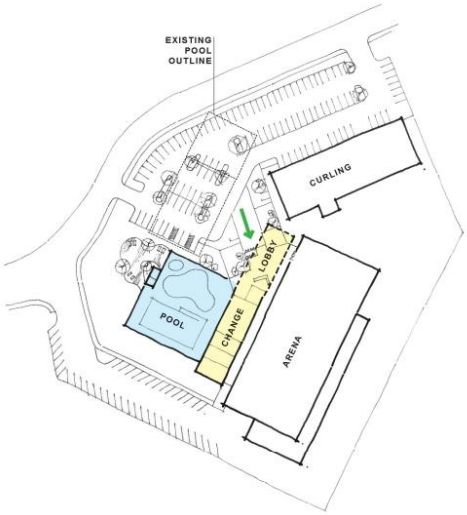
1.3. Currently, the facilities include a 25 meter heated outdoor municipal swimming pool, an arena with one ice rink, and a four sheet curling building.



Existing Buildings

1.4. The existing buildings are cumulatively approximately 4,600 square meters, with a proposed addition of 3,620 square meters, 2 stories tall, with no stories below grade.

1.5. The proposed additions include but are not limited to an indoor leisure and lap pool, hot tub, steam/sauna room, fitness center, change rooms, lobby area and multi-purpose spaces.



Proposed Additions

1.6. Following completion of the proposed expansion/redevelopment, the existing outdoor pool and associated change house will be demolished.

1.7. There is also a proposed future gymnasium with a basketball court on the North-West side of the arena.

2. DESIGN STANDARDS

2.1. The Electrical systems will be designed in accordance with the current edition of the following Codes and Standards:

- British Columbia Building Code
- Canadian Electrical Code
- National Fire Protection Authority (NFPA)
- British Columbia Fire Code
- Local Ordinances and Authorities
- Institute of Electrical and Electronic Engineers (IEEE) standards
- Illumination Engineering Society (IES) Standards
- ASHRAE 90.1 “Energy Standard for Buildings Except Low-Rise Residential Buildings”
- CAN/CSA-B72; Installation Code for Lightning Protection Systems

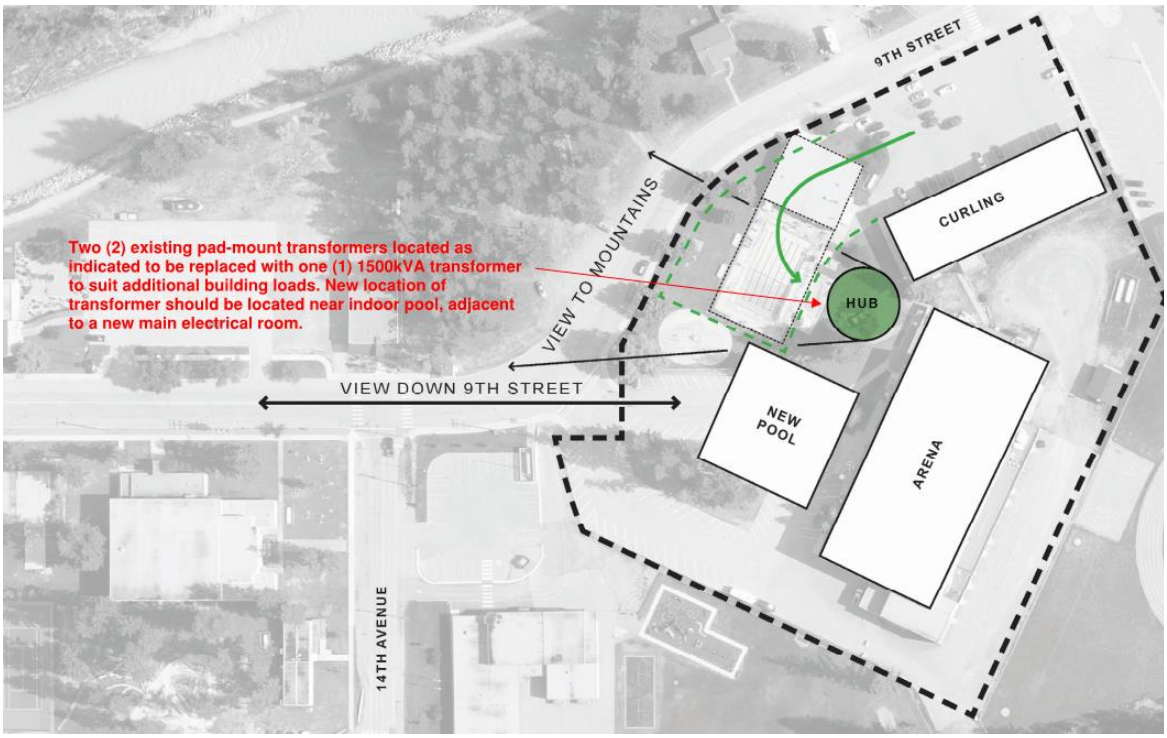
3. NORMAL POWER DISTRIBUTION

3.1. The local distribution authority is BC Hydro.

3.2. There are three (3) BC Hydro meters, one for each building. The meters are located in their respective electrical rooms.

3.3. It was noted that the chiller for the curling rink is located in and fed from the arena.

3.4. The existing site services are from BC Hydro, Telus and Eastlink. The arena utility feeders for BC Hydro come into the North end of the building below ground from a 500kVA, 25kV:347/600V pad mount transformer located in between the arena and outdoor pool. Based on the as-built drawings, the telecommunication services run parallel to the incoming utility feeders. Similarly, the change house/pool and curling rink feeders come below ground from a 150kVA, 25kV:120/208V pad mount transformer located in between the arena and outdoor pool.



Location of Existing Utility Pad Mount Transformers

3.5. Based on discussion with BC Hydro, there are two (2) existing incoming services. One pad mount transformer feeds the arena at 347/600V, 500kVA, 3 phase, 4 wire. The second pad mount transformer feeds the change house/outdoor pool and curling rink at 120/208V, 150kVA, 3 phase, 4 wire.

25kV:120/208V, 150kVA, 3PH/4W Transformer

25kV:347/600V, 500kVA, 3PH/4W Transformer

3.6. The distribution for the pool house is anticipated to be removed following the completion of the new areas of scope. The distribution for the arena is ITE Industries Limited (now Siemens) equipment that is near end of life and difficult to obtain spare/replacement components for. We recommend that it is replaced with new.

3.7. Based on the proposed additional areas and anticipated mechanical loads primarily servicing the new indoor pool the additional connected load is approximately 520kW. This will require the service size to be increased.

3.8. The current location of the two existing pad mount transformers appears to conflict with the proposed improvements. A new transformer location and revised primary and secondary conductor runs will be required to suit the new facility layout.

3.9. A new BC Hydro PMT will be required to replace the two existing, to suit the additional connected load. The new transformer is currently projected to be a 1500kVA, 25kV:600V, 3Ph, 4W to serve the cumulative building loads (including but not limited to the arena, curling rink, aquatics center, future gymnasium, etc.). The past two years of Hydro billing information (including peak and demand loads) and confirmation of the new loads will be required to finalize the service size. It was also noted that Golden's substation is close to the facilities, and BC Hydro typically is able to increase the service size up to a maximum of 1600A (with an 80% rated main breaker). Further formal design coordination will be required to determine the specific requirements of the service upgrade for both BC Hydro and the customer.

3.10. Based on discussion with BC Hydro, the costs associated with the relocation of the incoming service, upsizing of the PMT, and any related provisions shall be covered by the facility owner. Credit may be provided for the return of the existing pad-mount transformers to BC Hydro.

3.11. As part of a service upgrade to accommodate the additional building loads, we recommend that a new service entry electrical room is incorporated into the expanded area c/w new equipment sized to suit the new service size. The other electrical rooms would be sub fed from this main electrical room.

3.12. All electrical equipment should be sprinkler proof.

3.13. Spare capacity should also be included when selecting the service size if EV charging is desired as part of this redevelopment or expected to be implemented in the future.

4. EMERGENCY POWER DISTRIBUTION

4.1. There is no emergency power at this site. Battery packs and remote heads are currently utilized for emergency lighting.

4.2. If a generator may be required in the future, it is recommended that provisions for a generator are coordinated as part of this redevelopment.

5. FIRE ALARM

5.1. Currently, each building has it's own fire alarm panel and is monitored separately from the other buildings

5.2. The current Edwards fire alarm panel in the arena is at end of life. We recommend replacing the fire alarm system with a new addressable system including battery charger, standby batteries and annunciator. This will also ensure that the panel has adequate capacity for the additional initiating, notification, and supervisory devices within the new areas.

5.3. All fire alarm detection and addressable loop wiring should be Class A. All output device wiring should be Class B.

5.4. Smoke detectors, heat detectors, bells, strobes, pull stations, flow switches, tamper switches, modules, and wiring should be provided throughout the new expansion, and replaced where required throughout the building.

5.5. The complete fire alarm system should be tested and verified as per the requirements of the British Columbia Building Code.

6. LIGHTING FOR NEW EXPANSION

6.1. High efficiency luminaires should be provided for the new expansion as per the recommendations of IES.

6.2. Lighting should be designed to BCBC requirements.

6.3. All interior lighting should be provided utilizing LED luminaires.

6.4. Emergency lighting should be provided in the new expansion and as needed in existing area to meet current code and requirements of authority having jurisdiction.

6.5. Exterior on-building lighting for the new expansion should be complete with shielding to ensure glare control and light trespass to passers by and neighbouring properties. Full cut-off LED luminaires to ensure illumination with no spillage of light above the horizontal plane or onto adjacent properties.

6.6. Pool lighting should be designed to Class IV recreational to provide 300 lux at the pool surface and 200 lux at the pool deck. Either direct/indirect luminaires around the perimeter of the pool or pipe lighting over the pool should be provided to allow for access to fixtures. Luminaires suitable for pool environments shall be provided.

6.7. All lighting luminaires should suit layout and intended use. Luminaires in high humidity areas (Pool, Change Rooms, Steam, Sauna, and Lifeguard Station) shall be damp resistant.

7. LIGHTING CONTROL FOR THE NEW EXPANSION

7.1. A low voltage lighting control system should be provided for the new expansion and remodelled area, including LV switches, occupancy sensors, photo sensors and time-clocks.

7.2. Washrooms, storage rooms, office areas and any other areas with transient occupancy should be provided with ceiling or wall mounted occupancy sensors.

7.3. Exterior lighting should be automatically controlled capable of turning off exterior lighting when sufficient daylight is available or when the lighting is not required during night time hours.

7.4. In areas with natural lighting, daylight sensors should control luminaires for daylighting harvesting.

8. CORROSION RESISTANCE

8.1. Corrosion resistant equipment (including but not limited to electrical panels, conduit, disconnects, cables, etc.) shall be provided in corrosive environments as defined below.

.1 In areas where pool sanitation chemicals are stored, as well as areas with circulation pumps, automatic chlorinators, filters, open areas under decks adjacent to or abutting the pool structure, and similar locations shall be considered to be a corrosive environment. The air/liquid/condensation in those areas shall be considered to be laden with acids, chlorine and bromine vapours or a combination of.

8.2. Wiring in corrosive environments shall be listed and identified. Rigid metal conduit, intermediate metal conduit, rigid PVC, and reinforced thermosetting resin conduit shall be used in the specified corrosive environment/area.

9. GROUNDING SYSTEM

9.1. As part of the new service upgrade, the existing grounding system should be removed and replaced with new to suit the upgraded service and service entrance distribution equipment.

9.2. An AC grounding system with new main ground electrode that should consist of a minimum of four 3m ground rods spaced 3m apart and connected to the main electrical ground bus located in the main electrical room with two separate #3/0AWG ground connections. The grounding system for the building should be provided connecting each new typical electrical room to the main grounding system in the current main electrical room in a radial connection. A ground bar should be provided in each new electrical room. All transformer neutrals should be connected to the grounding bar and a common cable connected back to the system ground.

9.3. Grounding should be provided following IEEE 1100 and Electrical Code Section 10 standards.

9.4. The metal parts of the pool and of other non-electrical equipment associated with the pool such as piping, pool reinforcing steel, ladders, diving board supports, and fences within 1.5m of the pool shall be bonded together and to non-current carrying metal parts of the electrical equipment with a minimum no.6 AWG copper conductor.

10. LIGHTNING PROTECTION SYSTEM

10.1. Based on CSA B72-20 Installation code for lighting protection systems, a lightning protection system is recommended for the arena/indoor pool structure based on a preliminary dimensions of the proposed additions. A preliminary calculation resulted in the annual threat occurrence being larger than the tolerable lightning frequency.

10.2. The preliminary calculation indicates that the threat of a lightning strike to the structure is approximately 2.4 strikes per 1000 years.

END OF ELECTRICAL CONCEPT REPORT

HCMA ARCHITECTURE + DESIGN

GOLDEN AQUATIC CENTRE EXPANSION
CIVIL CONCEPTUAL DESIGN REPORT

GOLDEN AQUATIC CENTRE EXPANSION

CIVIL CONCEPTUAL DESIGN REPORT

HCMA ARCHITECTURE + DESIGN

DRAFT

PROJECT NO.: 201-09983-00
DATE: FEBRUARY 23, 2021

WSP

WSP.COM

SIGNATURES

PREPARED BY

Shawn Morrow, EIT
Project Engineer

Date

APPROVED[1] BY

Doug Randell, P.L.Eng., PMP, AScT
Branch Manager

Date

WSP Canada Inc prepared this report solely for the use of the intended recipient, HCMA ARCHITECTURE + DESIGN, in accordance with the professional services agreement. The intended recipient is solely responsible for the disclosure of any information contained in this report. The content and opinions contained in the present report are based on the observations and/or information available to WSP at the time of preparation. If a third party makes use of, relies on, or makes decisions in accordance with this report, said third party is solely responsible for such use, reliance or decisions. WSP does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken by said third party based on this report. This limitations statement is considered an integral part of this report.

[1] Approval of this document is an administrative function indicating readiness for release and does not impart legal liability on to the Approver for any technical content contained herein. Technical accuracy and fit-for-purpose of this content is obtained through the review process. The Approver shall ensure the applicable review process has occurred prior to signing the document.

TABLE OF CONTENTS

1 PROJECT BACKGROUND

1.1 INTRODUCTION

HCMA Architecture + Design (the Client) retained WSP Canada Inc. (WSP) on behalf of the Columbia-Shuswap Regional District to provide conceptual civil design services for the proposed expansion of the Golden Aquatic Centre. The project consists of a building expansion to support new amenities such as, but not limited to, new fitness facilities, a new indoor lap pool, leisure pool, and steam/sauna rooms.

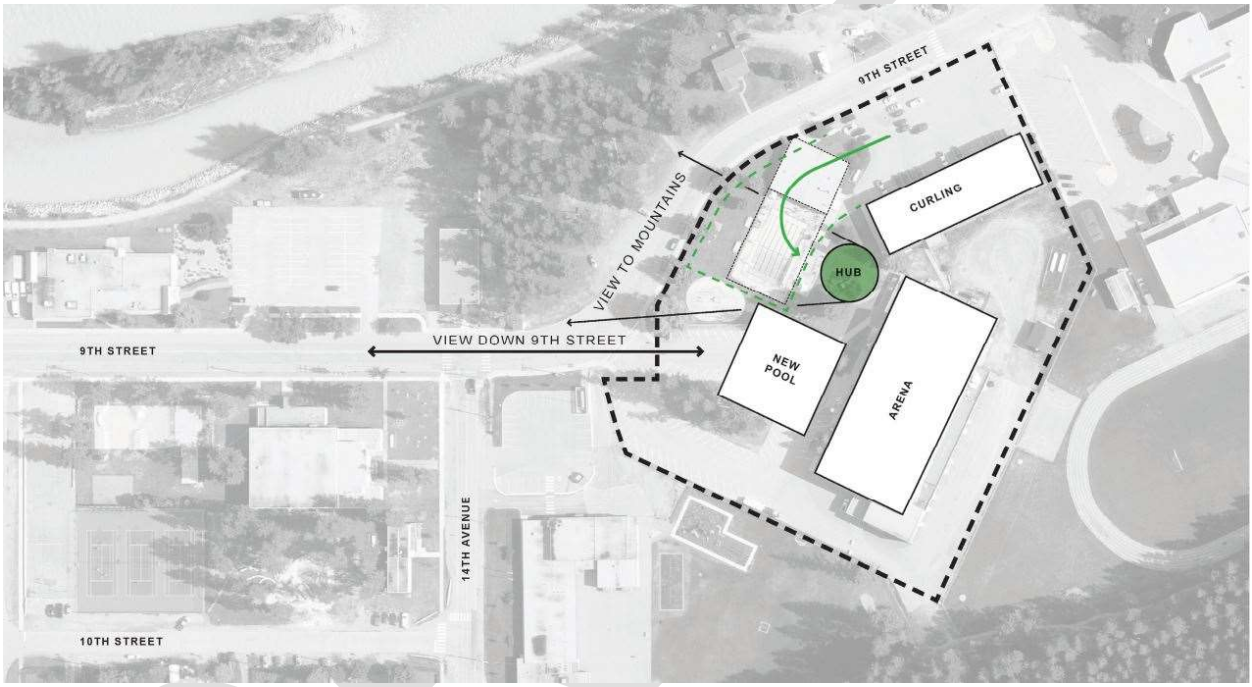


Figure 1: Conceptual Site Plan from HCMA Architects + Design

2 ASSESSMENT / OBSERVATIONS

2.1 WATER

2.1.1 CURRENT

The arena is currently serviced by a 200 mm water connection that is extended from 9th Avenue South West towards the East side of the Arena. The service is carried into the building where it provides fire and domestic flows to the existing building. It appears the Curling rink receives its water supply from a separate 50mm water service further north along 9th Street South. There also appears to be a second service connection from the 200mm water main extending North towards the South West side of the curling rink. The service connections to both the Arena and Curling rink should be located in the field and verify operational needs.

2.1.2 PROPOSED

The proposed location of the new aquatic centre will impact service connections to both the Curling Rink and Arena. The existing water service to the Arena will need to be rerouted most likely to the south side of the proposed building. A new branch from the rerouted watermain would run around the north side of the proposed building to maintain water service to the curling building. The future proposed Gymnasium will need to be considered as well. The new service connection location for the aquatic centre will need to be coordinated with Mechanical.

2.2 SANITARY SEWER

2.2.1 CURRENT

The sanitary sewer connection for the Arena was also found on the same "CJP Architects" drawings M-1. It is noted as 150mm diameter at 1 % heading East South East towards 9th Street. The existing pool's change house and the curling rink have sanitary connections heading North towards 9th Street South. Sanitary connections should be located in the field and condition assessment completed.

2.2.2 PROPOSED

The existing sanitary service will need to be rerouted to the west side of the new building. Depending on the mechanical room location it may make sense to provide a new connection to the curling rink considering the age of the infrastructure. The size of the existing service will need to be coordinated with Mechanical. We do not anticipate any offsite improvements, however, that will need to be verified with the Town of Golden.

2.3 STORM SEWER

2.3.1 CURRENT

The current storm sewer system that services this site consists of a series of small cathment areas piped to infiltrative manholes located in the parking lots. No issues have been observed and surface runoff appears to drain away from the buildings.

2.3.2 PROPOSED

The new aquatic center building will displace two storm leads and associated infiltrative manholes. This in addition to the increase in parking both from the demolition of the existing pool and the new parking lot proposed across 9th street south will require additional storm management services to convey storm water. Proposed storm water locations can be found on the attached conceptual site plan. We anticipate a similar approach of collection and infiltration back into the ground.

2.4 ACCESS AND PARKING

2.4.1 CURRENT

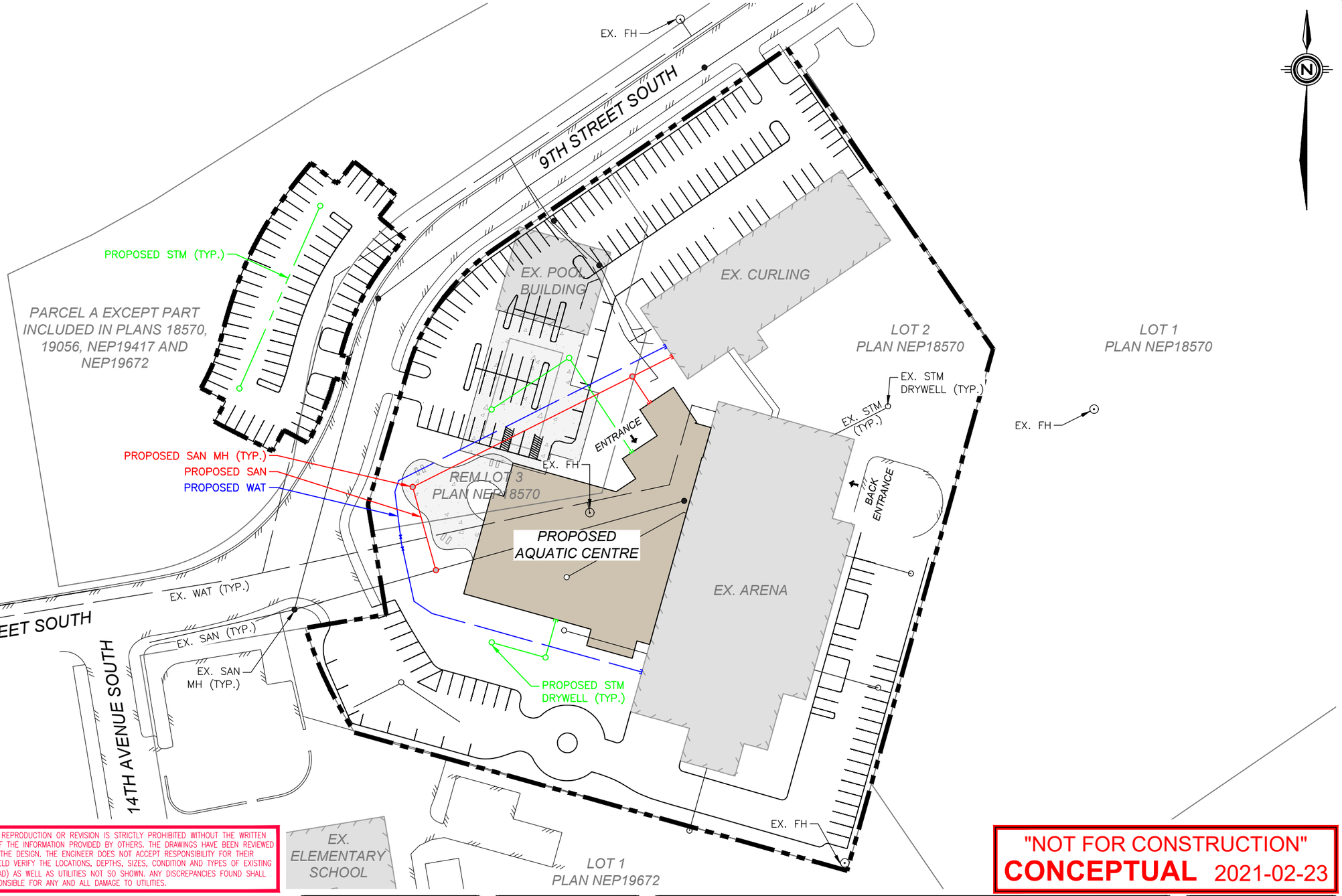
The existing parking lots are paved and vary in conditions with some areas still in good condition and others showing significant alligator cracking and patching. Drainage is collected via catch basins and conveyed to infiltrative manholes found throughout the site.

2.4.2 PROPOSED

Parking will be increased by the demolition of the existing pool and the creation of a new parking lot, located east across 9th St. S. Access from across the street should be assessed for vehicular and pedestrian movements and safety. We anticipate a new crosswalk in this area. The proposed parking areas are anticipated to be paved. New paint markings and signage will be required.

APPENDIX

A SITE PLAN



"NOT FOR CONSTRUCTION"
CONCEPTUAL 2021-02-23

DATE	REV	DESCRIPTION	BY	APPR.
2021-02-23	A	CONCEPTUAL	AIP	DSR

SCALE	1:1000
DATE	2021-02-23
APPROVED	DSR
DESIGN BY	SM
DRAWN BY	AIP
CHECKED BY	DSR

SEAL

wsp
#420-301 VICTORIA STREET, KAMLOOPS, BC, V2C 2A3
PHONE (250) 374-5252 FAX (250) 372-8336

HCMA ARCHITECTURE
GOLDEN AQUATIC CENTRE
SITE PLAN

REV. No. A
PROJECT No. 201-09983-00
DRAWING No. FIG. 1

N:\201-09983-00 Golden Aquatic Centre\03 Cad_Sheets\FIG.1 SITE PLAN.dwg Plotted 23 February 2021

Read Jones Christoffersen
Consulting Engineers

Suite 300
1285 West Broadway
Vancouver, BC V6H 3X8
Canada

604 738-0048
Fax 604 738-1107
www.rjc.ca

February 24, 2021

Paul Fast
HCMA Architecture+Design
400 – 675 West Hastings Street
Vancouver, BC V6B 1N2

Dear Paul:

RE: CRSD Aquatic Centre - Structural Concept Design RJC No.: VAN.128437.0001

As requested, we have reviewed the conceptual designs for proposed renewal at the CRSD Recreation Centre Complex located in Golden BC. This letter and the appended sketches are intended to summarize the primary structural design criteria and proposed structural systems for the project. The design concepts presented are based on architectural drawings dated January 20, 2021.

PROJECT DESCRIPTION

The existing CRSD recreation complex includes an arena, curling rink, and outdoor pool. A feasibility study was done by HCMA to explore options for renewal of the site, including an indoor aquatic centre. The proposed pool and lobby area would be placed as an addition to the existing arena and include a new lobby, change rooms, multipurpose room, and mechanical spaces. It is understood that structural work to the existing arena and curling rink are not proposed at this time. We also assume that the building will be designated Normal Importance under the design building code.

GENERAL DESCRIPTION OF STRUCTURAL SYSTEMS

The proposed aquatic centre building is a single story structure over the pool areas, with a two level space adjacent to house change facilities and a second level mechanical space. The proposed addition is to remain structurally separated from the existing arena building. We anticipate that the roof of the new addition will be at a lower elevation than the existing arena roof, therefore there will be no negative impacts to the existing roof due to changes in snow build-up. No structural upgrades or renovations to the arena building are proposed at this time.

Foundations will be conventional pad and strip footings. Foundations have been placed at some distance to the existing arena, with the intention of minimizing impact of new foundations on existing. New footings may need to be lowered to match existing foundations. Allowable soil bearing pressures have been based on a Geotechnical report by OnSite Engineering, dated April 6, 2015, for a nearby site.

Based on this report, anticipated allowable bearing pressures will be in the range of 100kPa-150kPa. Although not specifically mentioned in the report, we have assumed the site classification to be Site Class D. These assumptions should be confirmed with a site-specific geotechnical report should the project move forward.

Pool walls and ground floor areas will be conventional reinforced concrete. Pool walls will have increased cover to reinforcing and may include water-resistant admixtures.

The proposed natatorium roof is comprised of timber panels spanning to glulam beams, in turn supported on steel tube columns. It is expected that wood structural elements could be sourced locally, as there are producers of both timber panels and beams in the region near Golden. Steel columns may be placed on concrete pedestals to improve durability.

The remainder of the roof areas over the lobby and mechanical spaces will be structural steel, comprised of steel decking on open-web steel joints and steel beams. Columns are set back from the joint with the arena and the roof structure cantilevered over the connecting corridor to minimize impact on existing foundations.

The second floor is framed in structural steel, utilizing a long-span composite concrete topping on deep steel deck floor system, supported on steel beams and columns. We also expect that new stairs to the upper floor of the arena will be framed with structural steel.

The proposed lateral load resisting system is conventional steel braced frames. Golden is located in region of the province with moderate seismicity as compared to coastal regions, allowing for a low or moderately ductile lateral system to be adequate for the building.

RISK ASSESSMENT

Please note that the design process for the project is not complete and, as a consequence, these structural drawings are also not complete. Structural design continues to evolve in parallel with the design by other consultants and through evolution of programme requirements. We recommend that a Design Contingency be carried to reflect the preliminary nature of the design information.

Based on our experience, we recommend that a Construction Contingency be carried to cover the effect of unforeseen site conditions and unexpected construction process items such as varying founding conditions, construction sequencing, the need for temporary bracing or shoring,etc.

We also recommend that an Escalation Contingency be carried to cover the effect of the escalation in construction costs from the time the cost estimate is prepared and the start of construction.

If you would like us to comment on the costs developed from these drawings, please do not hesitate to contact us. We may be able to assist in helping to determine what additional costs and allowances should be carried in developing the approximate structural costs.

Yours truly,

Read Jones Christoffersen Ltd.

Meredith Anderson, P.Eng., Struct. Eng.
Associate

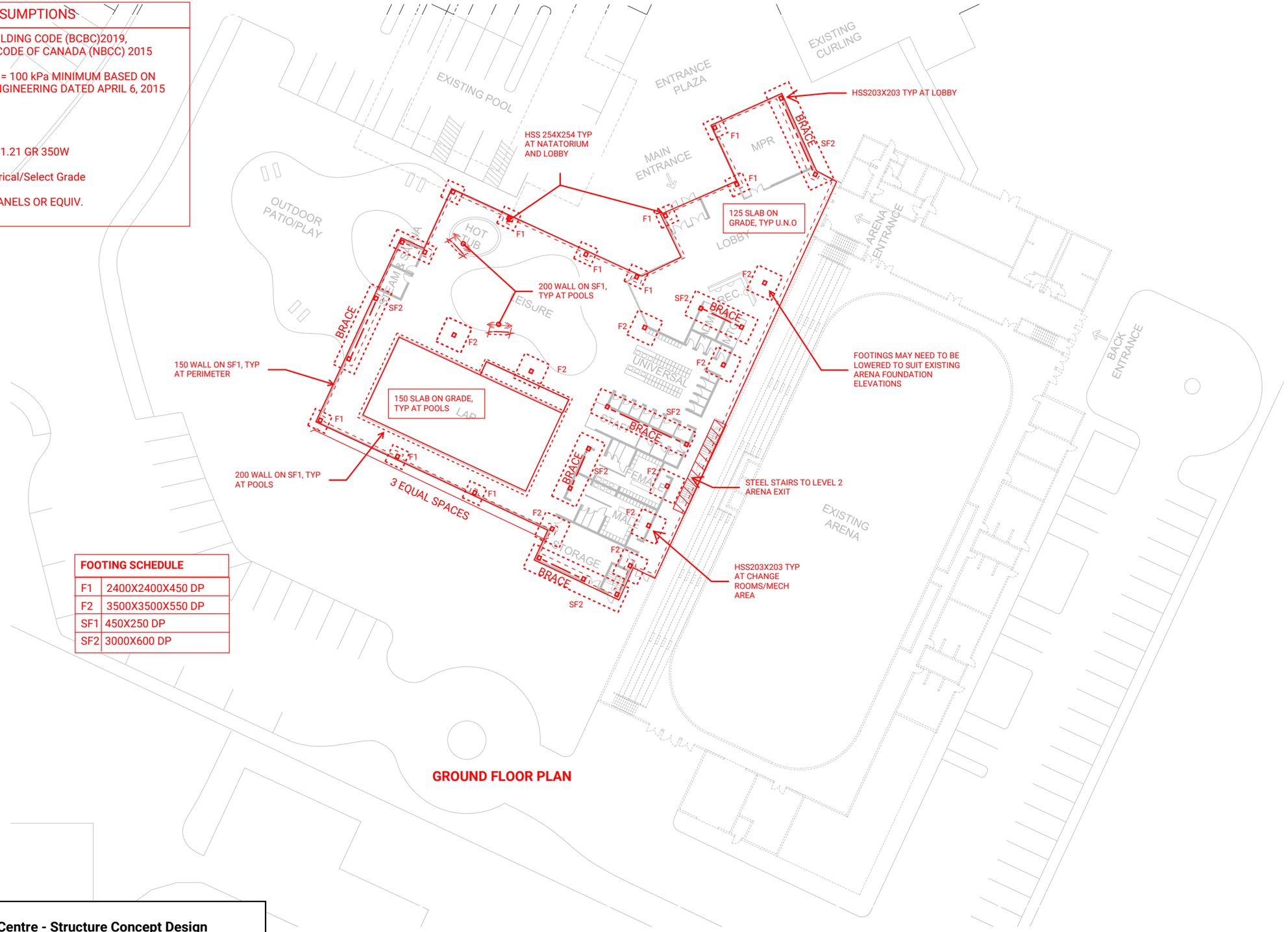
CC Yao, PhD, P.Eng., Struct. Eng.
Principal

MRA/CCY/taf

Encl. - GAC Structural Concept Drawings

GENERAL INFORMATION AND ASSUMPTIONS

1. DESIGN CODE: BRITISH COLUMBIA BUILDING CODE (BCBC)2019, BASED ON THE NATIONAL BUILDING CODE OF CANADA (NBCC) 2015
2. ALLOWABLE SOIL BEARING PRESSURE = 100 kPa MINIMUM BASED ON GEOTECHNICAL REPORT BY ONSITE ENGINEERING DATED APRIL 6, 2015 FOR A NEARBY SITE
3. CONCRETE f'c = 35 MPa
4. STEEL SECTIONS AS PER CAN/CSA-G41.21 GR 350W
5. GLULAM GRADE D.Fir-L 24 f-Ex Commerical/Select Grade
6. LVL PANELS TO BE BRISCO VENEER PANELS OR EQUIV.



FOOTING SCHEDULE

F1	2400X2400X450 DP
F2	3500X3500X550 DP
SF1	450X250 DP
SF2	3000X600 DP

GROUND FLOOR PLAN

HCMA

rjc Engineers

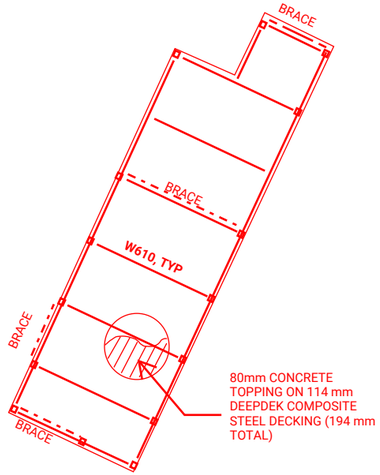
CSRD Aquatic Centre - Structure Concept Design
Level 02 and Roof Plans
24 February 2021
RJC# VAN.128437.0001

HCMA Architecture + Design
Suite 400 - 675 W Hastings Street
Vancouver BC V6B 1N2 Canada
T 604.732.6620
W hcma.ca

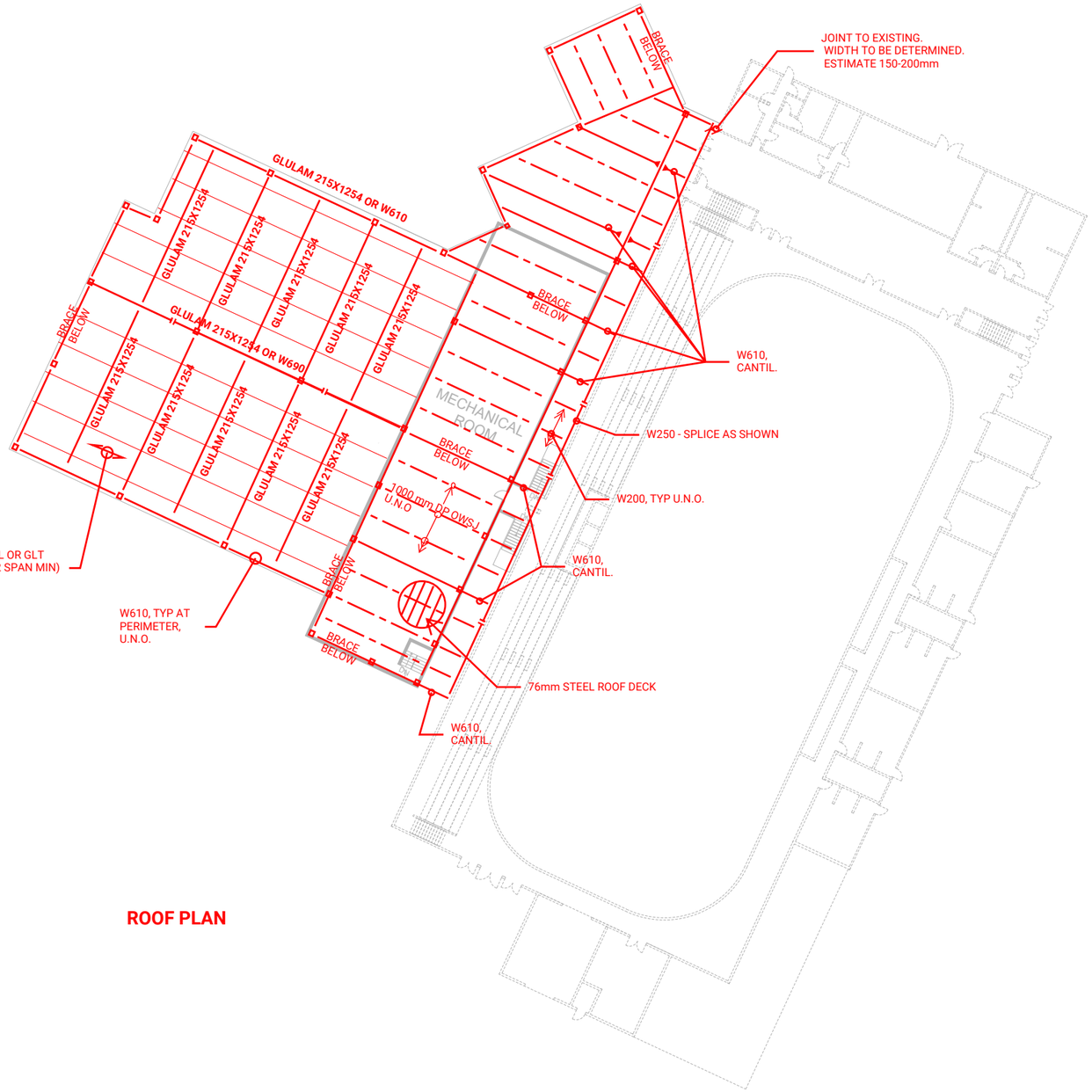
CSRD Aquatic Centre
1408 9 Street S
Golden, BC

Level 1 Floor Plan
Project Number: 19056

DATE: 20/01/2021
A201
SCALE: 1:500



L02 - MECH ROOM PLAN



ROOF PLAN

CSRD Aquatic Centre - Structure Concept Design
Level 02 and Roof Plans
24 February 2021
RJC# VAN.128437.0001

rjc Engineers

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CSRD Aquatic Centre
1408 9 Street S
Golden, BC

Level 2 Floor Plan
Project Number: 19056

DATE: 20/01/2021
A202
SCALE: 1:500

205 – 1777 56th Street
Tsawwassen (Delta)
BC V4L 0A6
Canada

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E: info@rtaqs.com
W: www.rtaqs.com

March 23, 2021

HCMA Architecture + Design
400–675 West Hastings Street
Vancouver, BC V6B 1N2

Attention: **PAUL FAST**
Principal Architect AIBC, AAA, OAA, MRAIC

CSRD AQUATIC CENTRE
TOWN OF GOLDEN, BC
CLASS C SCHEMATIC DESIGN PROJECT ESTIMATE

We have reviewed the design documents, prepared a Class 'C' Schematic Design estimate (based on preliminary schematic design information), and enclose our report.

Pricing has been included at Q1 2021 local unit rates noting the current uncertainty and volatility of the market. It should be noted that supply chain issues currently being experienced may have unknown (short and long term) impacts on pricing levels and anticipated projected construction escalation.

Please note the conditions on which the costs are based, and the items excluded.

For RTAQS

Ross Templeton MRICS, PQS
Partner

ross@rtaqs.com

Daniel Holland MRICS
Partner

daniel@rtaqs.com

1350

PROJECT DESCRIPTION

The project involves the proposed new leisure facility "CSRD Aquatic Centre in the Town of Golden, BC as described fully in the HCMA Architecture + Design (and respective sub-consultants) comprehensive preliminary schematic design package.

ESTIMATED CAPITAL CONSTRUCTION COST SUMMARY

Please refer to the appended Class C estimate for the estimate detail of each component space costing:

Element		Class C Estimate $
A.	Land Costs	Excluded
B.	Estimated Construction Cost (Net Costs Q1 2021 $)	18,405,600
C.	Contingencies (Design Pricing, Escalation Q2 2025 & Construction)	2,717,600
D.	**Estimated Construction Cost including Contingencies**	**$ 27,210,900**
E.	Professional Fees (Allowance)	2,993,000
F.	Connection Fees & Permits (Permits & Utility Company charges only)	230,000
G.	Owners Management & Overhead (Commissioning only)	136,000
H.	Soft Cost Contingency (5% allowance of Items E to G)	168,000
I.	Loose FF&E (5% allowance of Item B)	500,000
J.	GST	Excluded
K.	**Escalated Construction Cost (Excl. GST, Exclusions)**	**$ 31,237,900**

Preliminary Schematic Design stage Class C construction cost estimates are typically +/- 15-20% in accuracy with many variables influencing the final construction price including most importantly the final design scope parameters, final specifications (output specification and performance specifications), proprietary specifications, final drawings, contractors' contractual obligations, extent of supplementary conditions, number of compliant bidders, volatility of the market, supply chain issues and market activity at time of tender.

Pricing has been included at March Q1 2021 local unit rates noting the current uncertainty and volatility of the market. Supply chain issues currently being experienced may have unknown (short and long term) impacts on pricing levels and anticipated projected construction escalation.

Please refer to the exclusions section and appended Class C estimate detail and project summary.

PROJECT CALENDAR

A construction start date of Q1 2024 has been indicated. We have included an allowance to cover projected anticipated construction escalation calculated to the assumed construction midpoint of Q2 2025.

ESTIMATED CONSTRUCTION COST SUMMARY

Please refer to the appended elemental summary and construction estimate detail.

Element	Estimated Cost $
Substructure	578,600
Structure	3,393,400
Exterior Enclosure	2,837,700
Partitions & Doors	540,500
Finishes	1,727,500
Fittings & Equipment (excluding Loose FF&E)	1,116,700
Mechanical (including Pool Equipment)	2,155,300
Electrical	1,118,700
General Requirements (Div.1) & GC Fee (Building)	2,219,600
Net Building Cost (Q1 2021 $ excluding contingencies)	**$ 15,688,000**
Sitework (on site only, off-site excluded)	1,897,600
Ancillary Work (Demolition)	325,500
HazMat Abatement (allowance, specialist survey and costing required)	110,000
General Requirements (Div.1) & GC Fee (Site)	384,500
Design Pricing Contingency	1,840,600
Construction Contingency (Change Orders) – Owner Owned	1,295,800
Escalation Contingency (Q2 2025 mid-point allowance)	5,668,900
Total Escalated Construction Costs (excluding GST & Soft Costs)	**$ 27,210,900**
Escalated Construction Cost $/m²	**$ 10,946 /m²**

SEPARATE PRICE – INCLUDED IN BASELINE ESTIMATE

The MPR room is currently included in the baseline estimate. Should the MPR room be deleted from the design and program it would create an approximate construction cost saving of $290k (net Q1 2021 building costs excluding contingencies and soft costs).

AREA ANALYSIS

Gross Floor Areas measured in conformance to CIQS (Canadian Institute of Quantity Surveyors) rules of measurement is 2,486 m² (26,760 sqft).

CONTRACT CONDITIONS

The costs are based on the work being executed through a fixed lump sum competitive tender contract or construction management on standard form documents with no onerous supplementary conditions. Tenders will be received from at least five qualified bidders with tenders received from three sub-contractors for each major sub-trade and supply contracts (civils, structure, drywall, exterior envelope, pool equipment, specialty equipment, mechanical and electrical). Consideration of future unknown market volatility and supply chain issues at the time of tender have been specifically excluded from this estimate.

EXCLUSIONS

- Legal, land, financing charges, accounting, property taxes and soft costs not detailed are excluded
- Soft costs exceeding budget allowances included
- Unforeseen existing ground or building conditions
- Special foundations (piling, rock blasting, shotcrete, excessive dewatering conditions
- Out of hours working premium / restricted working hours / restricted noise conditions
- Off-site works (outside the property line)
- Off-site utility upgrades
- Site works beyond allowances included
- Utility company charges beyond allowance included
- Construction works outside the defined scope
- Hazmat Abatement beyond allowance included
- Demolition beyond allowance included
- Parking lot on north west side of 9th St S
- Phasing of the works
- Accelerated Schedule
- Development cost charges (separate budget)
- Owners Project Management Fee (separate budget)
- Owners Planning and Administrative Cost (separate budget)
- Project Insurance (separate budget)
- Permits beyond allowances included by City
- Exhibits, Artwork, Public Art
- PassiveHouse or Net Zero design or certification
- Temporary facilities
- Moving or decanting costs
- Operating, Maintenance and Facility Management Costs
- Loose Fixtures, Furnishings & Equipment (FF&E) beyond allowances included
- Pricing based on BCBC 2018 Step Code and does not include future unknown code change cost implications
- Goods & Services Tax (GST)
- Extraordinary market conditions, market volatility and supply chain issues
- Cost escalation past allowance included
- Items listed as ‘excluded’ in the estimate detail

DESIGN PRICING CONTINGENCY

The project is at preliminary schematic design and a design pricing contingency of ten percent (10%) has been included to cover quantity and pricing variances that may occur with changes to scope, design assumptions, detailing clarifications and specification changes through the remainder of the design process. This contingency will ultimately reduce to zero at tender stage.

CONSTRUCTION CONTINGENCY

Construction projects are rarely completed without some level of change and often additional scopes of work are required. We recommend the owner carry an additional sum in their budget to help offset any unforeseen costs that may arise during construction. We recommend an amount of five percent (5%) of the construction cost is carried in a separate owner-owned budget which has been included in this estimate.

ESCALATION CONTINGENCY

Pricing has been included at Q1 2021 local unit rates noting the current uncertainty and volatility of the market. Supply chain issues currently being experienced may have unknown (short and long term) impacts on pricing levels and anticipated projected construction escalation.

An escalation contingency of twenty-eight percent (28%) has been included in the estimate to cover projected anticipated construction escalation to the assumed construction midpoint of Q2 2025 using a projected escalation rate of six percent (6%) per annum (for all years) compound calculated (noting the above statement) from this March 2021 $ pricing baseline.

DOCUMENTS AND DATA

This cost plan estimate has been prepared using the following concept documents (file names noted for reference):

- 009a-098-20 RPT-002 - Golden Concept Report Revison
- 21084.001.E Golden Aquatic Centre Concept Report
- CSRD - Plans - 2021-03-04
- Golden Aquatic Centre Expansion - Civil Concept - R0 2021-02-24 DRAFT
- VAN.128437.0001-RPT-20210224-MRA-CRSD Aquatic Concept Design

RTA QS

CSRD Aquatic Centre
Golden, BC
Class C Schematic Design
March 23, 2021

PROJECT COST SUMMARY

ESTIMATED CAPITAL COST SUMMARY		ESTIMATED CAPITAL COST TOTAL ($)
A. LAND COST		**Excluded**
1 Land		Excluded
2 Property Taxes		Excluded
3 Legal Fees		Excluded
B. ESTIMATED CONSTRUCTION COST (Net Building Cost Q1 2021 $)		**$18,405,600**
1 Net Construction Cost (Q1 2021)	Estimate	15,688,000
2 Site Works, Demolition & HazMat allowances	Estimate	2,717,600
3 Off Site Works	Excl.	Excluded
C. CONSTRUCTION CONTINGENCIES (Allowances)		**$8,805,300**
1 Design Pricing Contingency (Design & Program Changes)	10.0%	1,840,600
2 Escalation Contingency (Q2 2025)	28.0%	5,668,900
3 Post Tender Change Order Contingency	5.0%	1,295,800
D. ESTIMATED CONSTRUCTION COST INCLUDING CONTINGENCIES		**$27,210,900**
E. PROFESSIONAL FEES (Allowance)	**11.0%**	**$2,993,000**
F. CONNECTION FEES & PERMITS (Allowances)		**$230,000**
1 Allowance for Development Cost Charges (Fees waived)	Excluded	Excluded
2 Allowance for Building Permits (City allowance)	Allowance	30,000
3 Utility Company Charges (on-site) (Allowance)	Allowance	200,000
G. OWNERS MANAGEMENT & OVERHEAD (Allowances)		**$136,000**
1 Owners Project Management Fee (separate budget)	Excluded	Excluded
2 Owners Planning and Administrative Cost (separate budget)	Excluded	Excluded
3 Project Insurance (separate budget)	Excluded	Excluded
4 Project Commissioning (Allowance)	0.50%	136,000
H. SOFT COSTS PROJECT CONTINGENCY (5% of Items E to G)	**5%**	**$168,000**
SUB-TOTAL (Excluding FF&E)		**$30,737,900**
I. LOOSE FURNISHINGS, FITTINGS & EQUIPMENT (Allowance)	**Allow**	**$500,000**
SUB-TOTAL (Including FF&E)		**$31,237,900**
J. GST (Excluded)	**0%**	**Excluded**
K. TOTAL PROJECT COST (Excluding Finance Charges & GST)		**$31,237,900**
L. FINANCING CHARGES		**Excluded**
1 Financing Interest Charges (Excluded)	0.00%	Excluded
L. ESCALATED PROJECT COST (Excluding Finance Charges & GST)		**$31,237,900**
STATISTICS		
1 Gross Floor Area - (m²)		2,486 m²
2 Total Net Q1 2021 $ Construction Cost (Excluding Contingencies) $/m^2 (Item B)		$7,404/m²

ELEMENTAL COST ANALYSIS

ELEMENT	Total Quantity	Unit	Average Unit Rate	ESTIMATED COST ($) GFA = 2,486 m²		
				$	$/m²	%
SUBSTRUCTURE				**578,600**	**233**	**4%**
Standard Foundations	2,097	m²	233.81	490,300	197	
Basement Excavation	1,766	m³	50.00	88,300	36	
STRUCTURE				**3,393,400**	**1,365**	**22%**
Lowest Floor Construction	2,097	m²	266.24	558,300	225	
Upper Floor Construction	389	m²	1,111.83	432,500	174	
Stair Construction	0	sum	0.00	99,000	40	
Roof Construction	2,097	m²	1,098.52	2,303,600	927	
EXTERIOR ENCLOSURE				**2,837,700**	**1,141**	**18%**
Walls Below Grade	365	sum	1,967.97	718,800	289	
Walls Above Grade	915	m²	673.19	616,100	248	
Structural Walls Above Grade	0	m²	0.00	0	0	
Windows & Entrances	493	m²	1,311.28	646,200	260	
Exterior Doors (including roller doors)	7	no.	16,314.29	114,200	46	
Roof Covering	2,108	m²	318.12	670,600	270	
Skylights	0	N/a	0.00	0	0	
Projections	1	sum	71,800.00	71,800	29	
PARTITIONS & DOORS				**540,500**	**217**	**3%**
Fixed Partitions	908	m²	439.32	398,900	160	
Structural Partitions	0	m²	0.00	0	0	
Movable Partitions	0	N/a	0.00	0	0	
Interior Doors	34	no.	4,164.71	141,600	57	
FINISHES				**1,727,500**	**695**	**11%**
Floor Finishes	2,040	m²	335.20	683,900	275	
Ceiling Finishes	1,337	m²	383.77	513,100	206	
Wall Finishes	2,486	m²	213.40	530,500	213	
FITTINGS & EQUIPMENT				**1,116,700**	**449**	**7%**
Metals	2,486	m²	50.00	124,300	50	
Millwork	2,486	m²	79.00	196,400	79	
Specialties	2,486	m²	121.88	303,000	122	
Equipment	2,486	N/a	198.31	493,000	198	
Elevators	0	N/a	0.00	0	0	
MECHANICAL				**2,155,300**	**867**	**14%**
Plumbing & Drainage (incl. pool equipment)	2,486	m²	364.00	904,900	364	
Fire Protection	2,486	m²	48.99	121,800	49	
HVAC	2,486	m²	404.99	1,006,800	405	
Controls	2,486	m²	48.99	121,800	49	
ELECTRICAL				**1,118,700**	**450**	**7%**
Service & Distribution	2,486	m²	189.02	469,900	189	
Lighting, Devices & Heating	2,486	m²	178.00	442,500	178	
Systems & Ancillaries	2,486	m²	82.98	206,300	83	
GENERAL REQUIREMENTS & FEE (BUILDING)				**2,219,600**	**893**	**14%**
General Requirements (Div.1)			12.0%	1,616,200	650	
GC/CM Fee			4.0%	603,400	243	
NET BUILDING COST (EXCL. CONTINGENCIES)				**15,688,000**	**6,311**	**100%**

ELEMENTAL COST ANALYSIS

ELEMENT	Total Quantity	Unit	Average Unit Rate	ESTIMATED COST ($) GFA = 2,486 m²		
				$	$/m²	%
SITEWORK				**1,897,600**	**763**	
Site Preparation	2,486	m²	52.17	129,700	52	
Hard Surfaces	2,486	m²	289.34	719,300	289	
Improvements	2,486	m²	224.58	558,300	225	
Landscaping	2,486	m²	34.92	86,800	35	
Mechanical Site Services	2,486	m²	95.94	238,500	96	
Electrical Site Services	2,486	m²	66.37	165,000	66	
ANCILLARY WORK				**435,500**	**175**	
Demolition	0	Excl.	0.00	325,500	131	
Hazardous Materials Abatement (Allowance)	0	Excl.	0.00	110,000	44	
GENERAL REQUIREMENTS & FEE (SITE)				**384,500**	**155**	
General Requirements (Div.1)			12.0%	280,000	113	
GC/CM Fee			4.0%	104,500	42	
CONTINGENCIES				**8,805,300**	**3,542**	
Design Pricing Contingency			10.0%	1,840,600	740	
Escalation Contingency (Q2 2025)			28.0%	5,668,900	2,280	
Construction Contingency			5.0%	1,295,800	521	
TOTAL ESTIMATED CONSTRUCTION COST (Excluding GST & Soft Costs)				**27,210,900**	**10,946**	

ELEMENTAL COST ANALYSIS **Gross Floor Area: 2,486 m²**

				$	$/m²	
SUBSTRUCTURE				**578,600**	**233**	**4%**
Standard Foundations				**490,300**	**197**	
Pad footing F1 - 2400x2400x450 dp	10	no.	3,857.00	38,600		
Excavation and disposal			-	-		
Backfill			-	-		
Concrete supply, 35 MPa			-	-		
Formwork			-	-		
Rebar			-	-		
Placing of concrete			-	-		
Blinding course concrete supply			-	-		
Placing of blinding course: pump			-	-		
			-	-		
Pad footing F2 - 3500x3500x550 dp	9	no.	8,500.00	76,500		
Excavation and disposal			-	-		
Backfill			-	-		
Concrete supply, 35 MPa			-	-		
Formwork			-	-		
Rebar			-	-		
Placing of concrete			-	-		
Blinding course concrete supply			-	-		
Placing of blinding course: pump			-	-		
Strip footing SF1 - 450x250 dp	193	m	320.00	61,600		
Excavation and disposal			-	-		
Backfill			-	-		
Concrete supply, 35 MPa			-	-		
Formwork			-	-		
Strip footing keyway 50 x 100			-	-		
Rebar			-	-		
Placing of concrete			-	-		
Blinding course concrete supply			-	-		
Placing of blinding course: pump			-	-		
Strip footing SF1 - 450x250 dp (lap pool)	88	m	344.00	30,100		
Excavation and disposal			-	-		
Backfill			-	-		
Concrete supply, 35 MPa			-	-		
Formwork			-	-		
Strip footing keyway 50 x 100			-	-		
Rebar			-	-		
Placing of concrete			-	-		
Blinding course concrete supply			-	-		
Placing of blinding course: pump			-	-		
Strip footing SF1 - 450x250 dp (curved pool walls)	74	m	745.00	55,100		
Excavation and disposal			-	-		

ELEMENTAL COST ANALYSIS **Gross Floor Area: 2,486 m²**

			$	$/m²			
Backfill			-	-			
Concrete supply, 35 MPa			-	-			
Formwork; curved to pool walls			-	-			
Strip footing keyway 50 x 100			-	-			
Rebar			-	-			
Placing of concrete			-	-			
Blinding course concrete supply			-	-			
Placing of blinding course: pump			-	-			
Strip footing SF2 - 3000x600 dp	54	m	2,151.00	115,500			
Excavation and disposal			-	-			
Backfill			-	-			
Concrete supply, 35 MPa			-	-			
Formwork			-	-			
Strip footing keyway 50 x 100			-	-			
Rebar			-	-			
Placing of concrete			-	-			
Blinding course concrete supply			-	-			
Placing of blinding course: pump			-	-			
			-	-			
Allowance for additional foundation works associated with tie-in to existing building	1	sum	91,025.00	91,000			
			-	-			
Perimeter drainage; allowance	233	m	94.00	21,900			
			-	-			
Special Foundations			-	-			
Special foundation excluded (piles, rock blasting, raft slab, pre-load, non-standard dewatering or tanking etc)		Excl.	-	-			
Underpinning - Excluded		Excl.	-	-			
Basement Excavation					**88,300**	**36**	
Bulk excavation; disposal on site to reinstate ground where existing pool has been demolished; allowance cubic area	1,766	m³	50.00	88,300			
Non standard dewatering site conditions - Excluded		Excl.	-	-			
Shotcrete - Excluded		Excl.	-	-			
Shoring and soil anchors - Excluded		Excl.	-	-			
STRUCTURE					**3,393,400**	**1,365**	**22%**
Lowest Floor Construction					**558,300**	**225**	
Concrete slab on grade 125mm thick including concrete supply, placing, rebar, formwork, 100mm rigid insulation and granular base (standard)	1,493	m²	182.00	271,700			
150mm granular base			-	-			
Concrete supply - 35 Mpa			-	-			

ELEMENTAL COST ANALYSIS **Gross Floor Area: 2,486 m²**

			$	$/m²	$	$/m²
Edge formwork			-	-		
Rebar; assumed 60kg/m^3			-	-		
Placing			-	-		
6 mil poly			-	-		
Expansion joint/Control joint			-	-		
Screed and Trowel finish			-	-		
Cure & protect			-	-		
100mm rigid insulation			-	-		
Concrete slab on grade 150mm thick including concrete supply, placing, rebar, formwork, 100mm rigid insulation and granular base (Pools)	604	m²	354.00	213,800		
150mm granular base			-	-		
Concrete supply - 35 Mpa			-	-		
Edge formwork			-	-		
Rebar; assumed 100kg/m^3			-	-		
Placing			-	-		
6 mil poly			-	-		
Expansion joint/Control joint			-	-		
Screed and Trowel finish			-	-		
Cure & protect			-	-		
100mm rigid insulation			-	-		
Allowance for additional slab on grade works associated with tie-in to existing building	1	sum	72,820.00	72,800		
Upper Floor Construction					**432,500**	**174**
Allowance for columns; HSS 203x203x?	4,653	kg	8.80	40,900		
Allowance for W610 beams x ?	17,750	kg	8.80	156,200		
Extra over allowance for bracing	1	sum	35,397.60	35,400		
Allowance for miscellaneous steel	2,240	kg	11.60	26,000		
80mm concrete topping on 114mm composite steel decking	434	m²	363.00	157,500		
Allow for gusset plates with embeds, etc.	1	sum	16,500.00	16,500		
Stair Construction					**99,000**	**40**
Allowance for new steel stair to level 2 arena exit	1	no.	55,000.00	55,000		
Allowance for stairs to leisure pool	1	sum	27,500.00	27,500		
Allowance for concrete fire exit stair	1	no.	16,500.00	16,500		
Roof Construction					**2,303,600**	**927**
Allowance for columns; HSS 203x203x?	4,653	kg	8.80	40,900		
Allowance for columns; HSS 254x254x?	15,640	kg	8.80	137,600		
Allowance for W250 beams x ?	2,003	kg	8.80	17,600		
Allowance for W610 beams x ?	35,508	kg	8.80	312,500		
Allowance for 1000dp x ? OWSJ	8,944	kg	8.30	74,200		
76mm steel deck roof including decking angles	959	m²	116.60	111,800		

ELEMENTAL COST ANALYSIS — **Gross Floor Area: 2,486 m²**

				$	$/m²	
Extra over allowance for bracing and cantilevered	1	sum	105,464.50	105,500		
Allowance for miscellaneous steel	6,675	kg	11.60	77,400		
Allow for gusset plates with embeds, etc.	1	sum	16,500.00	16,500		
Extra over for galvanizing steel in wet area	1	sum	220,000.00	220,000		
80mm concrete topping on 114mm composite steel decking	434	m²	363.00	157,500		
GL 215x1254 dp including sealer, temporary weather protection, erection, cranage, engineering, PST	251	m	1,276.00	320,300		
90mm LVL or GLT panels; budget allowance including sealer, temporary weather protection, erection, cranage, engineering, PST	1,149	m²	462.00	530,800		
Misc. glulam connections and plates	1	sum	93,621.00	93,600		
Allowance for additional roof structure works associated with tie-in to existing building; including joint (150-200mm)	1	sum	87,384.00	87,400		
EXTERIOR ENCLOSURE				**2,837,700**	**1,141**	**18%**
Walls Below Grade				**718,800**	**289**	
Allowance quantities; scope TBD						
Allowance for 150mm CIP Concrete walls below grade including concrete supply, placing, formwork and rebar	123	m²	556.00	68,500		
Allowance for 200mm CIP Concrete walls below grade including concrete supply, placing, formwork and rebar	131	m²	1,249.00	163,900		
Allowance for 200mm CIP Concrete walls below grade including concrete supply, placing, formwork and rebar; curved	111	m²	1,907.00	211,400		
Allowance for leisure pool, steps, ramp, handrails walls; lazy river walls etc	1	sum	275,000.00	275,000		
Walls Above Grade				**616,100**	**248**	
Allowance for exterior wall assembly, cementious panels, z-girts, semi-rigid insulation (65% of assumed total exterior wall area)	915	m²	583.00	533,600		
Allowance for architectural louvres	1	sum	82,500.00	82,500		
Structural Walls Above Grade				**0**	**-**	
Included in Upper Floor Construction		Note	-	-		
Windows & Entrances				**646,200**	**260**	
Double glazed curtain wall; Kawneer 1600 (non UT)	493	m²	1,265.00	623,400		
Extra over curtain wall glazing for fritted pattern (Allow 20%)	99	m²	231.00	22,800		
Exterior Doors				**114,200**	**46**	

ELEMENTAL COST ANALYSIS **Gross Floor Area: 2,486 m²**

					$	$/m²	
Single Hollow Metal Doors; insulated doors including hardware	1	no.	2,035.00	2,000			
Double Hollow Metal Doors; insulated doors including hardware	2	no.	3,850.00	7,700			
Double glazed aluminium double entry door; including hardware	4	no.	5,500.00	22,000			
Allowance for overhead door	1	allow	22,000.00	22,000			
Allowance for automatic door openers	4	no.	3,850.00	15,400			
Allowance for nanawall to MPR	1	sum	45,100.00	45,100			
Roof Covering					**670,600**	**270**	
Allowance for 2-ply roofing including sloped rigid insulation, protection board; allowance	2,108	m²	286.00	602,900			
Parapet details/junction details, gutters downpipes	410	m	165.00	67,700			
Skylights					**0**	**-**	
None		Excl.	-	-			
Projections					**71,800**	**29**	
Allowance for suspended soffit cladding, strapping and metal framing	1	sum	33,275.00	33,300			
Allowance for overhangs detailing; scope TBD	1	sum	38,500.00	38,500			
PARTITIONS & DOORS					**540,500**	**217**	**3%**
Fixed Partitions					**398,900**	**160**	
Allowance for interior partitions; allowance (steel stud and CMU block wall)	908	m²	297.00	269,700			
Glazed partitions allowance (including sauna and steam)	1	sum	86,918.00	86,900			
Allowance for rough carpentry, backing, blocking	2,486	m²	17.00	42,300			
Structural Partitions					**0**	**-**	
Included in Fixed Partitions		Note	-	-			
Movable Partitions					**0**	**-**	
None		Excl.	-	-			
Interior Doors					**141,600**	**57**	
Single door, Glazed; set, including all hardware and accessories (steam/sauna)	2	no.	2,750.00	5,500			
Single solid core wood door; set, including all hardware and accessories (washrooms)	25	no.	1,650.00	41,300			
Single solid core wood door; set, including all hardware and accessories (general areas)	3	no.	1,760.00	5,300			
Single hollow metal door; set, including all hardware and accessories	2	no.	1,980.00	4,000			

ELEMENTAL COST ANALYSIS					Gross Floor Area:	2,486	m²
					$	$/m²	
Double hollow metal door; set, including all hardware and accessories	1	no.	3,520.00	3,500			
Double door, Glazed; set, including all hardware and accessories	1	no.	4,950.00	5,000			
Specialty hardware, panic, electronic card access, auto opener access etc - allowance	1	sum	77,000.00	77,000			
FINISHES					**1,727,500**	**695**	**11%**
Floor Finishes					**683,900**	**275**	
Sealed concrete floors	81	m²	17.00	1,400			
Allowance for ceramic tile; Washrooms and showers	294	m²	286.00	84,100			
Allowance for ceramic tile; pool floors	604	m²	462.00	279,000			
Allowance for ceramic tile; pool deck, steam room	487	m²	407.00	198,200			
Allowance resilient sheet vinyl flooring	564	m²	94.00	53,000			
Allowance for polished concrete (minor area)	1	sum	16,500.00	16,500			
Sauna wood floor	10	m²	220.00	2,200			
2nd floor mechanical room - no floor finish		Excl.	-	-			
Allowance for patching and repairs; tie-into existing	1	sum	49,500.00	49,500			
Ceiling Finishes					**513,100**	**206**	
Suspended GWB drop ceiling including paint finish	1,337	m²	132.00	176,500			
Allowance for suspended GWB bulkheads	1	sum	55,000.00	55,000			
Allowance for acoustic ceiling panels	1	sum	110,000.00	110,000			
Allowance for sauna ceiling finish	1	sum	12,100.00	12,100			
Misc. painting and finishes - allowance	1	sum	110,000.00	110,000			
Allowance for patching and repairs; tie-into existing	1	sum	49,500.00	49,500			
Wall Finishes					**530,500**	**213**	
Allowance for ceramic wall tiles including pool tanks	1	sum	241,694.00	241,700			
Allowance for acoustic wall panels	1	sum	82,500.00	82,500			
Allowance wall finishes and specialty surfaces yet to be defined including paint to walls, trim including intumescent paint where required to steel structure	2,486	m²	83.00	206,300			
FITTINGS & EQUIPMENT					**1,116,700**	**449**	**7%**
Metals					**124,300**	**50**	
Allow for miscellaneous metals (By GFA)	2,486	m²	50.00	124,300			
Millwork					**196,400**	**79**	
Allow for millwork (By GFA)	2,486	m²	66.00	164,100			
Loose Workshop; loose Benches, loose millwork, etc.		Excl. FF&E		-			
Office and meeting room loose furniture		Excl. FF&E		-			
Allow for finish carpentry, extra over miscellaneous	2,486	m²	13.00	32,300			
Specialties					**303,000**	**122**	

ELEMENTAL COST ANALYSIS **Gross Floor Area: 2,486 m²**

				$	$/m²	
Allowance for miscellaneous specialties including but limited to:	2,486	m²	66.00	164,100		
Directional wayfinding & information signage		Incl.				
Room signage		Incl.				
Fire extinguisher cabinets		Incl.				
Wall & corner guards		Incl.				
Stair nosings		Incl.				
Washroom & changeroom accessories		Incl.				
Pedigrid metal grid entrance mat		Incl.				
Mirrors		Incl.				
Window treatments (allowance)	1	sum	49,500.00	49,500		
Roller blinds, shading, window film - allowance		Incl.				
Allowance for acoustic treatments; specialties (not covered elsewhere)	2,486	m²	17.00	42,300		
			-	-		
Lockers; Allow double stack	107	no.	440.00	47,100		
Equipment					**493,000**	**198**
Kitchen equipment (Excluded - Owners FF&E budget)		Excl. FF&E				
Washer/dryer equipment (Excluded - Owners FF&E budget)		Excl. FF&E				
Tables and chairs (Excluded)		Excl. FF&E				
Loose furniture, furnishings and equipment (Excluded)		Excl. FF&E				
Entry control gates	1	sum	38,500.00	38,500		
Saunas and steam rooms equipment	2	set	22,000.00	44,000		
Water play features for Leisure pool (allowance scope TBD)	1	sum	192,500.00	192,500		
Springboards	1	sum	38,500.00	38,500		
Allow for roof safety anchors	1	sum	82,500.00	82,500		
Waterslide (Excluded)		Excl. (FF&E)				
Portable lifts (Excluded)		Excl. (FF&E)				
Pool cleaning equipment (Excluded)		Excl. (FF&E)				
Allowance for fixed equipment (By GFA)	2,486	m²	39.00	97,000		
Elevators					**0**	**-**
None		Excl.	-	-		
MECHANICAL					**2,155,300**	**867**	**14%**
Plumbing & Drainage					**904,900**	**364**
Allow for plumbing & drainage (including pool equipment)	2,486	m²	364.00	904,900		
Fire Protection					**121,800**	**49**

ELEMENTAL COST ANALYSIS					Gross Floor Area:	2,486	m²
					$	$/m²	
Allow for Fire Protection	2,486	m²	49.00	121,800			
Fire stopping		Incl.	-	-			
HVAC					**1,006,800**	**405**	
Allow for HVAC systems (including garage exhaust system)	2,486	m²	405.00	1,006,800			
Controls					**121,800**	**49**	
Allow for controls	2,486	m²	49.00	121,800			
ELECTRICAL					**1,118,700**	**450**	**7%**
Service & Distribution					**469,900**	**189**	
Allow for service & distribution	2,486	m²	189.00	469,900			
Lighting, Devices & Heating					**442,500**	**178**	
Allow for Lighting, Devices & Heating	2,486	m²	178.00	442,500			
Systems & Ancillaries					**206,300**	**83**	
Allow for systems & ancillaries	2,486	m²	83.00	206,300			
GENERAL REQUIREMENTS & FEE (BUILDING)					**2,219,600**	**893**	**14%**
General Requirements (Div.1)	12.0%			1,616,200			
GC/CM Fee	4.0%			603,400			
NET BUILDING COST (EXCL. CONTINGENCIES)					**15,688,000**	**6,311**	**100%**
SITEWORK					**1,897,600**	**763**	
Site Preparation & Civils					**129,700**	**52**	
Allowances - preliminary design stage not all scope is defined at this stage			-	-			
Site Preparation	1	Sum	38,526.00	38,500			
Rough grading (minor)	1	Sum	9,632.00	9,600			
Allowance for reinstatement of ground post demolition of existing pool/building, using new aquatic building excavated native material obtained on site	3,021	m³	27.00	81,600			
Environmental sedimentary control (Excluded)		Excl.	-	-			
Wheel wash station requirement (Excluded)		Excl.	-	-			
On site storm detention tank (Excluded)		Excl.	-	-			
Work outside the property line is excluded		Excl.	-	-			
Hard Surfaces					**719,300**	**289**	
Allowance quantities - preliminary design stage not all scope is defined at this stage			-	-			
Allowance for cast-in place sidewalks including curbs and letdowns; allowance area	570	m²	160.00	91,200			

ELEMENTAL COST ANALYSIS					Gross Floor Area:	2,486	m²
					$	$/m²	
Allowance for new asphalt paving including curbs where required, paint markings and parking rubber bump stops	5,320	m²	91.00	484,100			
Allowance for cast-in place plaza including curbs and letdowns; allowance area	900	m²	160.00	144,000			
Work outside the property line is excluded		Excl.	-	-			
Improvements					**558,300**	**225**	
Site furnishings general allowance (basic) - trash receptacles (including parking), bench, picnic table, bollards, bike racks, metal handrails, stop signs (on site only) etc.	1	Sum	27,500.00	27,500			
Sports & Play Equipment		Excl.	-	-			
Allowance for site signage including on-site parking signage	1	Sum	27,500.00	27,500			
New Splash Park Allowance			-	-			
Allowance for new splash park (basic); 366m², scope and design intent TBD	1	Sum	503,250.00	503,300			
Work outside the property line is excluded		Excl.	-	-			
Landscaping					**86,800**	**35**	
Soft landscaping (basic) general allowance; no irrigation, no new trees; draught resistant ground cover, sodding, shrub/flower beds with growing medium	1	Sum	86,821.00	86,800			
Irrigation		Excl.	-	-			
New trees		Excl.	-	-			
Tree protection (permanent - excluded)		Excl.	-	-			
Rain garden		Excl.	-	-			
Green Roof (building)		Excl.	-	-			
Work outside the property line is excluded		Excl.	-	-			
Mechanical Site Services					**238,500**	**96**	
Allowance for mechanical site demolition	1	Sum	11,000.00	11,000			
			-	-			
Allowance quantities - preliminary design stage not all scope is defined at this stage			-	-			
			-	-			
Storm Sewer			-	-			
Storm Sewer	107	m	273.00	29,200			
Storm service connections	1	no	1,650.00	1,700			
Drywell	7	no	6,404.00	44,800			
Video Inspection	1	L/S	3,300.00	3,300			
Tie in to existing	1	no	3,850.00	3,900			
			-	-			
Sanitary Sewer			-	-			
Sanitary Sewer	103	m	322.00	33,200			

ELEMENTAL COST ANALYSIS — **Gross Floor Area: 2,486 m²**

					$	$/m²
Sanitary service connection	1	no	1,650.00	1,700		
Manholes	3	no	14,327.00	43,000		
Manhole clean outs	3	no	171.00	500		
Cap sanitary sewer	1	no	558.00	600		
Video Inspection	1	L/S	1,650.00	1,700		
			-	-		
Water Main			-	-		
Water Main	166	m	366.00	60,600		
Water main service connection	3	no	1,115.00	3,300		
			-	-		
Allowance for gas connections (excluded)		Excl.	-	-		
On-site storm water detention tanks		Excl.	-	-		
Geothermal (excluded)		Excl.	-	-		
Allowance for Fire Hydrants (excluded)		Excl.	-	-		
Offsite utilities, work outside the property line is excluded		Excl.	-	-		
Electrical Site Services					**165,000**	**66**
Allowance for electrical site demolition	1	Sum	5,500.00	5,500		
Allowance for electrical site services (no design/scope available) including allowance for new transformer pad, lighting bollards, parking lighting, ducts, feeders, associated civils earthworks	1	Sum	159,500.00	159,500		
New transformer - excluded in construction estimate, by BC Hydro (soft cost - included in project cost summary)		Soft Cost	-	-		
Emergency power generator		Excl.	-	-		
Offsite utilities, work outside the property line is excluded		Excl.	-	-		
ANCILLARY WORK					**435,500**	**175**
Demolition & Off-Site					**325,500**	**131**
Off-site, work outside the property line, off-site utilities or infrastructure upgrades, pedestrian crosswalk, intersection works, traffic lights are all excluded		Excl.	-	-		
Allowance to demolish existing 1-storey pool support building	545	m²	165.00	89,900		
Allowance to demolish existing 6-lane 25 m pool + deck	924	m²	157.00	145,100		
Demolish existing parking lot; asphalt/concrete pavings, existing splash park, allowance area	3,500	m³	18.00	63,000		
Allowance for on site mechanical and electrical demolition	Ref M&E Site Se		-	-		
Allowance for demolition of existing miscellaneous site works	1	sum	27,500.00	27,500		

ELEMENTAL COST ANALYSIS — **Gross Floor Area: 2,486 m²**

					$	$/m²
Hazardous Materials Abatement					**110,000**	**44**
Allowance for Hazardous Materials (specialist HazMat costing and survey required) (no HazMat $0 is included in the Demolition estimate)	1	Allow	110,000.00	110,000		
GENERAL REQUIREMENTS AND FEE (SITE)					**384,500**	**155**
General Requirements (Div.1)	12.0%			280,000	280,000	
GC/CM Fee	4.0%			104,500	104,500	
CONTINGENCIES					**8,805,300**	**3,542**
Design Pricing Contingency	10.0%			1,840,600		
Escalation Contingency (Q2 2025)	28.0%			5,668,900		
Construction Contingency	5.0%			1,295,800		
TOTAL ESTIMATED ESCALATED CONSTRUCTION COST (Excluding GST & Soft Costs)					**$27,210,900**	**10,946**