

W.J. Henderson Recreation Centre Renewal

Loyalist Township

VALIDATION REPORT
November 2023





Artist's interpretation: Approaching new Aquatic Hall from the east along Amherst Drive

Land Acknowledgement

Loyalist Township is located on the ancestral lands of the Haudenosaunee, Mississauga, and Omámíwinini Peoples. These lands are recognized in the Two Row Wampum, Dish with One Spoon Treaty, Treaty 27, and the Crawford Purchase.

The shores of Loyalist, the place of white rocks, were a traditional place of gathering, commerce, and peaceful negotiations. We are grateful for the opportunity to meet here, and we thank all the generations of people who have cared for, and continue to take care of, the land since time immemorial.

We recognize the past and present systemic harms committed against Indigenous Peoples in Loyalist and throughout Canada. These atrocities have resulted in continual intergenerational trauma and are enabled by racist attitudes and imperialist and colonial ideologies. They include the dispossession of Indigenous Peoples from their ancestral lands, and acts of cultural genocide by the Crown, the government, and the churches.

The Township is committed to moving forward together in the spirit of the Two-Row Wampum and Dish with One Spoon Treaty. This spirit is one of partnership and of serving each other. We will do this by respectfully acknowledging the enduring and continued presence of Indigenous Peoples. As part of this partnership, we will listen to their knowledge, wisdom, and counsel and learning about their history, language, customs, and traditions.

Nya:wen, Miigwetch, Marcí, Thank You



Table of Contents



1.0 Executive Summary	8
2.0 Project Overview	14
2.1 Objectives + Overview	15
2.2 Project Team	18
2.3 Team Values	20
2.4 Validation Strategy	22
2.5 Functional Program + Project Area Summary.....	24
3.0 Public Consultation	26
4.0 Design Narratives	32
4.1. Site.....	34
4.2. Architectural	36
4.3. Legacy Space	38
4.4. Pools	39
4.5. Envelope.....	41
4.6. Structural.....	42
4.7. Mechanical.....	46
4.8. Electrical.....	51
4.9. Energy Efficiency and Sustainability	54
4.10. Minimizing Impacts of Construction	56
4.11. Furnitures, Fixtures, and Equipment	57
5.0 Schedule and Constructability	58
6.0 Construction Costs	74
CONSTRUCTION ESTIMATE	76
6.1 RISK REGISTER	79
6.2 OPPORTUNITY LOG (GRANTS, EFFICIENCIES)	87
6.3 ADDED VALUE INCENTIVES (WISH LIST)	91

7.0 Business Case	92
8.0 Summary	94
Appendix A – Drawings	96
ARCHITECTURAL	98
STRUCTURAL	120
MECHANICAL	124
ELECTRICAL.....	132
CIVIL.....	140
SURVEY	144
Appendix B – Decision Matrix	146
Appendix C – Pit Records	150
PIT RECORD- AQUATICS.....	152
PIT RECORD- ARCHITECTURAL, STRUCTURAL , ENVELOPE	154
PIT RECORD- ELECTRICAL	160
PIT RECORD- MECHANICAL + SUSTAINABILITY	162
PIT RECORD- OWNER.....	166
Appendix D – Design Briefs	168
Appendix E – Conditions of Satisfaction	304
Appendix F – Reports	
GEOTECHNICAL INVESTIGATION REPORT	
REFRIGERATION ASSET REPORT	
CODE REPORT	
TRAFFIC AND PARKING JUSTIFICATION REPORT	Included as separate attachment
ENERGY MODEL	
DANGEROUS SUBSTANCE SURVEY	
PUBLIC ENGAGEMENT REPORTS + SURVEYS	
POOL GAP STUDY.....	
CONSTRUCTION ESTIMATE	



1.0 Executive Summary

Executive Summary

Loyalist Township is a community situated along the limestone-lined shores of Lake Ontario which forms a blue-hued backdrop for the diverse groups of people who live, work, and play here. In 2016, Loyalist Township was home to 17,390 residents living in 6,430 households spread out over three main urban centres (Amherstview, Bath, and Odessa), Amherst Island, and rural areas and Hamlets spread out across the municipality. Growth projections developed as part of several studies commissioned in recent years estimate that the population will increase to almost 26,000 residents by the year 2046. This projected growth, combined with aging infrastructure, has prompted the need to renovate and expand existing recreation facilities to meet the levels of service that are expected by the community.

The concept of a Community Hub was first presented to Loyalist Township Council in 2017, after the completion of the 10-year Parks and Recreation Master Plan. This study included several recommendations for the W.J. Henderson Recreation Centre and referenced the opportunity to include additional recreation facilities and amenities and a potential new municipal office on the site, effectively creating a one-stop-shop location for the Loyalist Township community. However, the rapidly deteriorating state of the existing pool led to the decision to create separate phases for the project.

The first phase of the Community Hub project represents an improvement to the services which have historically been offered at the facility to meet the needs of a growing Loyalist community. As such this first phase of the Community Hub project has been given the name: W.J. Henderson Recreation Centre Renewal. The scope of work for this phase of the project will involve the following program and performance targets:

- The construction of a new aquatic facility comprising of an 8-lane, 25 metre pool as well as a separate warm-water leisure pool;
- Undertaking accessibility upgrades throughout the existing facility, including the addition of an elevator,

accessible change rooms, and barrier-free viewing areas;

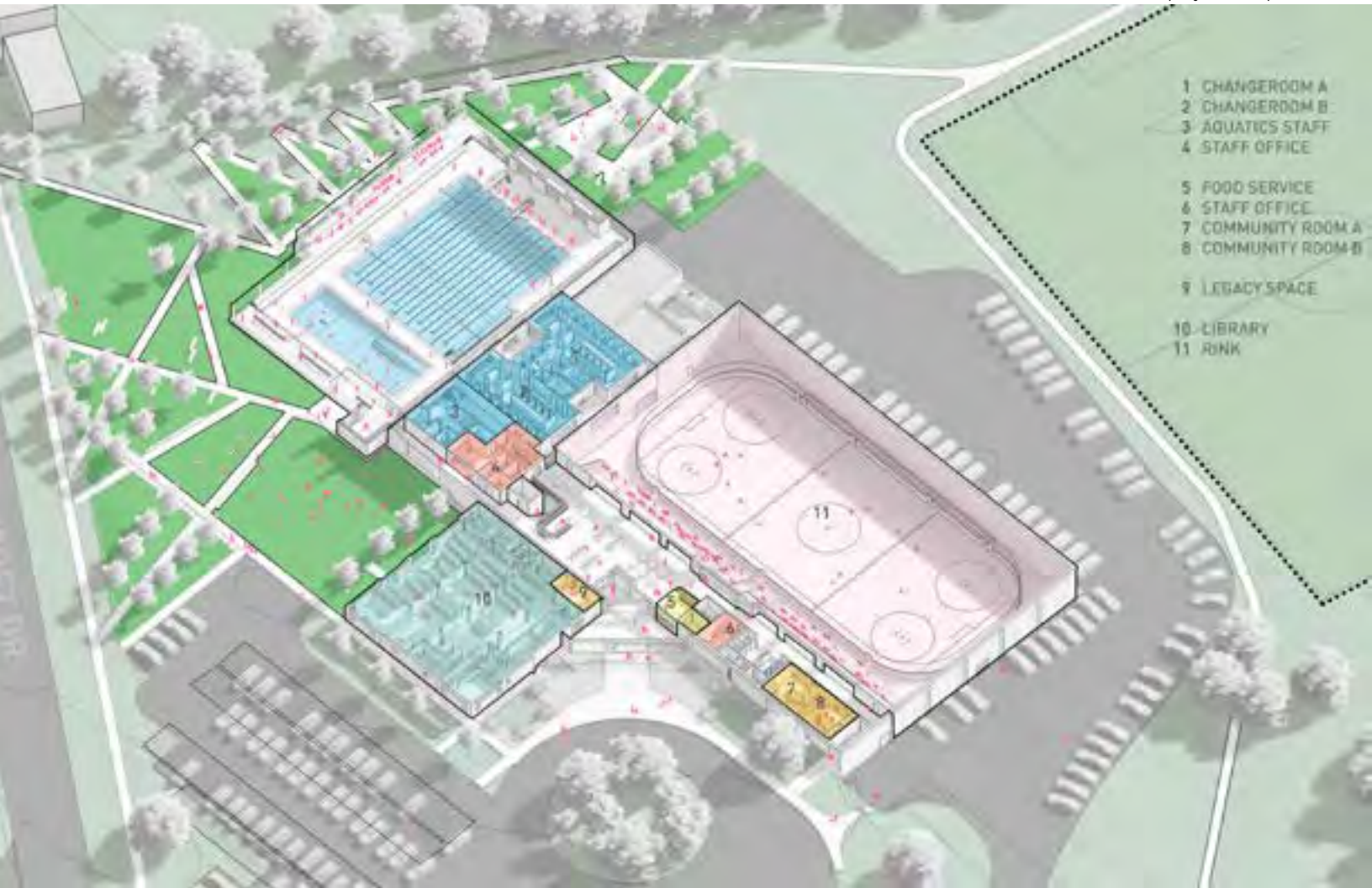
- Installing new aquatic change rooms, including the creation of family change rooms;
- Incorporating a new Indigenous Legacy Space in the facility, in collaboration with the Gord Downie and Chanie Wenjack Fund;
- Incorporating energy conservation measures throughout the facility to reduce energy usage and greenhouse gas emissions associated with its operations, achieving, at a minimum:
 - A 35% reduction in natural gas consumption
 - A reduction in greenhouse gas (GHG) emissions of at least 207 t CO₂e based on an average emissions rate of 389 t CO₂e for the existing facility

- Designing the building to be Net-Zero ready at a future date, meaning that the amount of energy needed to operate the building in a given year can be produced directly on site, typically through the use of solar panels;
- Keeping the building operational throughout as much of the construction period as possible and minimizing facility and programming downtime.

The objectives of this project, along with a more comprehensive background and overview of its history can be found in Section 2.1 of this validation report.

The implementation of the W.J. Henderson Recreation Centre Renewal project presents a unique set of challenges for the Township. The energy conservation and GHG reduction goals represent an important component of the municipality's climate action commitments and achieving them will require the use of innovative designs and technologies. Additionally, renovating parts of a building which was constructed in the 1970's represents a risk in itself due to the unknown conditions and lack of available information.

'Roof-off' aerial view of the project components



Maintaining access to certain areas of the building to minimize service disruptions while ensuring the safety of customers and staff is a top priority for the Township and will require a high level of coordination between the Township and construction crews. For these reasons, the Township has elected to make use of an Integrated Project Delivery (IPD) contract for this first phase of the work. Under this method the Owner, design consultant, contractor, and any other major partners, enter into a single-multi party contract, effectively forming an IPD team. The IPD Team is tasked to work collaboratively to deliver the project objectives, with contract documents being set up in a manner to encourage transparency and innovation.

The IPD team is made up of a multi-disciplinary group of consultants and trade partners who were selected based on their ability to successfully contribute to the project, with special emphasis being placed upon their willingness to collaborate and innovate. The team has been working together since July 2023 to validate the project's objectives, develop construction schedules and key milestones, and establish a base target cost for the project. Sections 2.2 through 2.4 of this validation report will introduce the project team and discuss the strategy used to advance the project during this phase of the work.

This validation report represents the project team's plan to achieve the goals for the project. It is, however, important to remember that these goals have been shaped by the community which will be served by the renewed W.J. Henderson Recreation Centre. Initial designs for the facility were based on recommendations made in the Township's 2017 Recreation Master Plan and represented a starting point for the project team. Early concepts were presented to stakeholders who had the opportunity to provide feedback which was used to inform the design and programming presented in this report. Section 3 of these documents will present the strategies which were used to consult with the community and local First Nations groups and how the information gathered in these sessions helped shape the project.

The design narratives found in Section 4 of these documents summarize the design decisions which were made to meet the programming and energy requirements of the proposed facility. This includes

descriptions of the site on which the facility is located, its form and function, the proposed Legacy Space, and the new aquatic facility. Technical information, such as details around the building envelope, structural considerations, as well as mechanical and electrical systems are also included in this section of the report, along with a review of the sustainability aspects of the project.

The construction schedule, found in Section 5, will review the proposed construction schedule as well as major milestones which will need to be met to achieve a target construction completion date of December 2025. Timelines for the development of detailed construction documents, as well as the phasing approach which is being proposed to minimize disruptions to programming will also be presented.

Section 6 will present the construction costs of the proposed project, which amount to \$46.4M+HST. This figure represents the direct costs, overhead, and profit of the project team. during the design and construction phases of the project, as well as a risk register of \$3.1M.

Soft costs, such as taxes, permitting, Township-supplied FF&E, project management expenses, and staff training also need to be incorporated into the capital cost of the project. These are estimated to amount to \$3,090,000, for a total capital cost of \$49,500,000. Additionally, operating the renewed and expanded facility will have a significant impact on annual operating budgets due to higher utility costs and increased staffing levels required to comply with current legislation, operational requirements, and programming demands. However, an increase in revenue is anticipated once the revitalized facility becomes operational, which will help offset the high operating costs. Based on the information gathered as part of this phase of the project, it is estimated that a 0.96% increase to the General Tax Rate will be required to implement this project. Section 7 of this report will present a detailed overview of the figures and assumptions which were used to make this determination.

The information contained in this validation summarizes the proposed design for the W.J. Henderson Recreation

Centre Renewal project along with the costs, strategies, and timelines for its implementation. The facility has been designed to meet the recreation needs of the Loyalist Township community both today and in the future. Council's acceptance and endorsement of this report will commit the Township to moving forward with the project, effectively representing the next chapter of recreational programming in Loyalist Township.

Artist's interpretation: Social Heart of the Community Centre





2.0 Project Overview



2.1 Objectives + Overview

The concept of a Community Hub was first presented to Loyalist Township Council in 2017, after the completion of the 10-year Parks and Recreation Master Plan. This study included several recommendations for the W.J. Henderson Recreation Centre and identified opportunities to include additional recreation facilities and amenities and a potential new municipal office on the site, effectively creating a one-stop-shop location for the Loyalist Township community.

In July 2018, the Township retained the services of MacLennan Jaunkalns Miller Architects (MJMA), a firm based out of Toronto, to complete a Study and Master Plan which would examine the feasibility of creating a Community Hub at the W.J. Henderson Recreation Centre. The study, which was completed in December of the same year and presented to Council at a Committee of the Whole on December 5th, 2018, concluded that the site was well suited for this purpose and presented a conceptual design for the proposed facility as well as high-level cost estimates.

The conceptual design presented as part of the initial feasibility study represented the long-term vision for the site and included upgraded recreation facilities as well as a new municipal office. However, the rapidly deteriorating state of the existing pool led to the decision to create separate phases for the project. The construction of a new aquatic facility would be incorporated into Phase 1, while the addition of a new administrative building and other recreation amenities could be completed over future, subsequent phases. Accessibility upgrades across the existing facility were also identified as needing to proceed in this initial phase in order to meet the expected levels of service. These included renovations to improve accessibility across the facility, as well as the replacement of equipment which was approaching the end of its useful life. The need to proceed with Phase 1 of the project was made more urgent with the subsequent closure of the pool in April 2022.

The first phase of the Community Hub project represents an improvement and expansion to the

services which have historically been offered at the facility to meet the needs of a growing Loyalist community. As such this first phase of the Community Hub project has been given the name: W.J. Henderson Recreation Centre Renewal.

In an effort to minimize the impact of this project on the tax base, the Township applied to several grant programs seeking funding for various components of this project. One major source of funding is through Infrastructure Canada's Green and Inclusive Community Building (GICB) program, which is meant to support green and accessible retrofits to existing community buildings. The Township was successful in its application to the retrofit stream of the GICB program, effectively securing up to \$16.5 million in funding towards the project. In its application to this program, the Township committed to the following:

- The construction of a new aquatic facility comprising of an 8-lane, 25 metre pool as well as a separate warm-water leisure pool;
- Undertaking accessibility upgrades throughout the existing facility, including the addition of an elevator, accessible change rooms, and barrier-free viewing areas;
- Installing new aquatic change rooms, including the creation of family change rooms;
- Incorporating a new Indigenous Legacy Space in the facility, in collaboration with the Gord Downie and Chanie Wenjack Fund;
- Incorporating energy conservation measures throughout the facility to reduce energy usage and greenhouse gas emissions associated with its operations, achieving, at a minimum:
 - A 35% reduction in natural gas consumption
 - A reduction in greenhouse gas (GHG) emissions of at least 207 t CO₂e based on an average emissions rate of 389 t CO₂e for the existing facility

These goals represent commitments which must be achieved as a condition of funding. The Township has also established additional goals for the project, including:

- Keeping the building operational throughout as much of the construction period as possible and minimizing facility and programming downtime:
- Designing the building to be Net-Zero ready at a future date, meaning that the amount of energy needed to operate the building in a given year can be produced directly on site, typically through the use of solar panels.

Integrated Project Delivery

The implementation of this project and its goals presents a unique set of challenges for the Township. The energy conservation and GHG reduction goals represent an important component of the municipality's climate action commitments and achieving them will require the use of innovative designs and technologies. Additionally, renovating parts of a building which was constructed in the 1970's represents a risk in itself due to the unknown conditions and lack of available information. Maintaining access to certain areas of the building to minimize service disruptions while ensuring the safety of customers and staff is a top priority for the Township and will require a high level of coordination between the Township and construction crews. For example, work on the arena portion of the building will need to be scheduled to occur during the time of year when the ice is taken out of service so that arena programming disruptions are kept to a minimum.

A high level of collaboration between the Township and the project's designers and contractors can help mitigate these risks while also allowing for the development of accurate budgets and construction plans. For these reasons, the Township has elected to make use of an Integrated Project Delivery (IPD) contract for this first phase of the work. Under this method the Owner, design consultant, contractor, and any other major partners, enter into a single-multi party contract, effectively forming an IPD team. The IPD Team is tasked to work collaboratively to deliver the project objectives, with contract documents being set up in a manner to encourage transparency and innovation.

Several different forms of agreement are available for IPD projects. Standard documents developed by the American Institute of Architects, Hanson Bridgett, and the Canadian Construction Documents Committee (CCDC) have all been used to deliver IPD projects in North America. A CCDC30 standard form of contract was selected for this project. These documents clearly outline the different phases of the project:

“ I’ve worked in this area a long time and our IPD project was the first project in my career where I can say that we got everything we wanted (Scope), in the time we wanted (Schedule) and to the standards we needed (Quality). In traditional project management we are told that you can only pick 2 of the 3, this is not the case for IPD. ”

-Matt Kachel, Eng. L, ASceT.
Capital Projects Supervisor
City of Kamloops

Validation: the IPD team validates the project objectives and establishes the Base Target cost, milestone schedule, and the profit pools. This information is summarized in a validation report which must be approved by the Owner before the project can proceed to the next phase. If the validation report is not approved by the Owner, all parties are released from the IPD Contract and the Design and Construction team receive reimbursement for any costs incurred to that point, without profit.

Design and Procurement: Following the approval of the validation report, the project team will complete designs, produce tender-ready drawings, finalize schedules, and order long-lead-time items. The Final Target cost will also be established at this time.

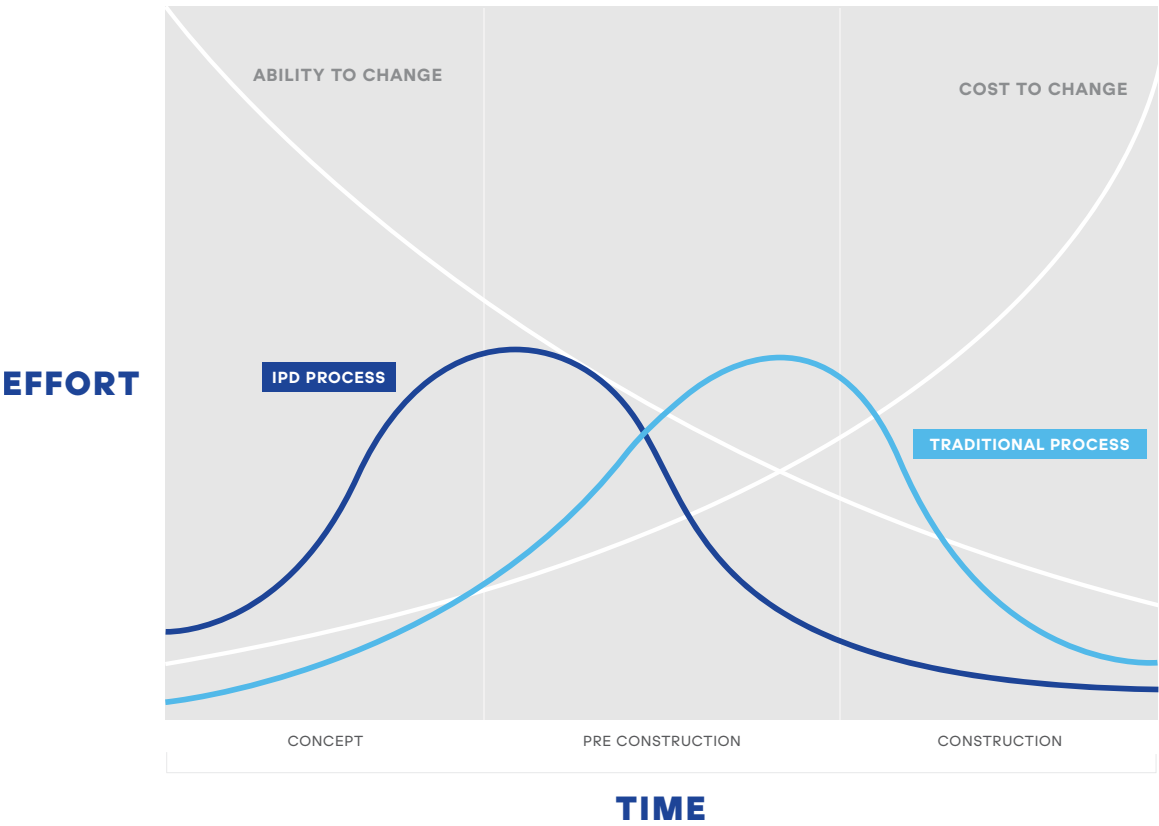
Construction: Construction activities may begin prior to the completion of the design phase, creating significant advantages for the project schedule. The project team continues to collaborate to solve problems and seek opportunities to further reduce project costs and improve on timelines.

Warranty: Upon completion of construction, the project team works together to address any work which may not have been completed in accordance with the contract documents.

This report represents the end of the validation phase of the work and summarizes the proposed plan to complete the W.J. Henderson Recreation Centre Renewal Project, along with the financial implications associated with the initiative, both from a capital and operating perspective.

DELIVERING IN IPD

An integrated project differs from start to finish from a traditional project. Design decisions are moved towards the beginning phases of the project, where these decisions can be more effective and less costly. This means early engagement of key stakeholders including clients, trade partners, and consultants. By moving the design phase forward and implementing early team engagement, the project has a higher level of completion prior to preconstruction.



2.2 Project Team



Partner	Scope	Team Member	Role
Loyalist Township	Owner	Rami Maassarani*	Senior Project Engineer
		Luke MacDonald**	Engineering and Environment Manager
		Kari Lambe	Manager of Recreation and Facilities
		Kelsea Brown	Recreation and Leisure Supervisor
		Andras Switzer	Aquatics Program Coordinator
		Chris Perry	Assistant Supervisor - Facilities
Chandos Construction	General Contractor	Glen Gardner	Senior Project Manager
		Lindsay Worton	Director, Coaching and Training
		Dominic Ries	Technical Solutions Director
		Wil Foster*	Project Director
		Peter Weiss**	Area Manager
		Evan Skutle	Senior Estimator
		Randy Dupree	Chief Estimator
		Vaishak Sharma	Field Engineer
MJMA Architecture & Design	Lead Consultant	Chris Burbidge*	Senior Principal
		Ted Watson**	Partner
		Caleb Tsui	Project Architect
		Nick Croft	Project Architect
Introba	Consultant – Mechanical, Electrical, Sustainability	Karine Kuepers	Mechanical Design Lead
		Daniel Lochand	Electrical Design Lead
		Mike Godawa**	Mechanical Principal in Charge
		Eric Campbell	Energy Modeler
		Zorica Gombac**	Electrical Principal in Charge
		Jamie Dabner	Sustainability Principal in Charge
		Keith Davidge	Project Manager, IPD Specialist, BIM Lead
Entuitive	Consultant – Structural and Envelope	Sean Lou-Hing	Structural Design Lead
		Paul Carter	Building Envelope Specialist
		David Fox**	Principal
Modern Niagara	Mechanical and Electrical Trade Partner	Brendan Hulme	Mechanical Project Manager
		Sean Robinson	Electrical Project Manager
		Jon Apperley**	Operations Manager
Acapulco	Pool Trade Partner	David Bergstrom	Project Manager
		Francine Gall**	President

*denotes PMT representative
** denotes SMT representative

The project team is made up of consultants and contractors who were onboarded at various stages of the project. MJMA was retained to conduct the initial feasibility study for the project in 2018 under a competitive procurement process which also awarded them subsequent stages of the work. Chandos Construction was onboarded as the General Contractor for the project in June 2023, following a lengthy procurement process which was overseen by The Procurement Office, a legal firm specializing in procurement law. Once the Lead Consultant and Contractor were identified, a separate procurement competition was undertaken to select the engineering firms and contractors who would join the project team. Partners were selected based on their ability to successfully contribute to the project, with special emphasis being placed upon their willingness to collaborate and innovate. Additional partners may also be onboarded at later stages of the project should a need to do so arise.



In IPD projects, the team's organizational structure includes several layers: the senior management team (SMT), the project management team (PMT), and several different project implementation teams (PIT). The SMT is made up of one senior member from each project partner, as well as a representative from the Township. This group is responsible for any major project decisions and for resolving any issues which need to be escalated by the PMT. Day to day project leadership, such as schedule or budget development, is handled by the PMT, which is made up of one member from the Owner, Lead Architect, and Lead Contractor, as well as one team member representing the consultants and another member representing the trades, for a total of five team members. Finally, the PITs are made up of various project team members based on their expertise in a particular field. The following PITs were established for this project:

- Aquatics
- Architectural, Structural, Envelope
- Electrical
- Estimating, Construction
- Mechanical, Energy
- Owner, Communications

These PITs will mostly continue through the design, procurement, and construction phases of the project, although their level of involvement will vary over time. Additional PITs may also be established later on during the project. For example, a “Commissioning, Maintenance and Training PIT” may be created to ensure that the Township staff are involved in the commissioning process and trained on how to operate the building once the project is nearing completion.

2.3 Team Values

Values for the project were collaboratively established by the project team at the onset of the Validation Phase. These values built on the objectives described in Section 2.1 and helped the project team define what success for the project would look like, not only in terms of results, but also in terms of process.

Project Values

Project values are intended to drive the design of the facility. They extend beyond budgets and timelines, rather considering the form and function of the facility as well as its impact on the community and surrounding environment. The team worked together to develop the following values which would define success for the project:

- End-user satisfaction
 - The building meets the needs of the community, both today and in the future.
- Functionality and Operational Excellence
 - The building will be easy to maintain and operate.
 - The building will be sustainable in terms of operational efficiency, durability, and impact on the environment.
 - The health and well-being of its users will clearly be considered as part of the building’s design.
- Community Pride
 - The building will instill pride in the community and will provide an inclusive and inviting space for all.
- Design Excellence
 - The building will be iconic, stand the test of time, have all spaces optimized, and be valued and enjoyed by all.

Behavioural Values

Behavioural values outline the expectations around the way the team will conduct itself over the course of the project. They will establish norms and provide guidelines on how team members will interact with each other and approach their work. The following behavioural values were developed and agreed-upon by the project team:

- Collaboration and Teamwork
 - We are committed to approaching our work with a collaborative mindset, fostering an environment that encourages proactive input, while reducing silos and increasing transparency.
- Trust
 - Everyone is committed to the successful delivery of the project. We will hold each other accountable and be responsible for our own contributions and commitments. We will create a safe space where we can own up to our mistakes through respectful and active communication as well as trusting relationships.
- Communication
 - This team will ensure every stakeholder has a voice. We will speak honestly, be transparent and think about the future. We will be proud of the story we are building together.
- Learning and Continuous Improvement
 - We are focused on continuous learning and improvement. We embrace lean, IPD methods, and belief in our success to build strong relationships with future opportunities to work together. We do good work and our pride is reflected in the project’s results.

Measuring and Working Towards Success

Success and adherence to the project's stated values will be measured through pre-established Key Performance Indicators (KPIs), which are a set of measurable and quantifiable metrics used to track progress towards a stated goal or intended result. The following KPIs were established by the team for this project.

- Safety
 - We have no lost time incidents and foster a safety culture that does not expose anyone to harm or injury. We consider safety for both construction and operations.
- Budget
 - We are on, or below, budget. We optimize design and construction to provide value based, well defined, trackable and transparent costs which consider both capital and operational expenses and benefits.
- Schedule
 - We are on, or ahead of, schedule. We hit or exceed project milestones while still maintaining high standards for ourselves and our work.
- Quality Assurance and Control
 - We aim for few deficiencies and limited-to-no rework. Construction work and building handover will be of a high quality so that the warranty list is minimal.



2.4 Validation Strategy

In an IPD setting, the purpose of the Validation Phase is to provide the project team with certainty. The validation process results in a comprehensive report which represents the following collective statement by the team: *“We can build this building, that does these things, for this much money, in this much time”*. If the specifics of those outcomes are acceptable to the Owner, the team can proceed with the confidence that the project is viable.

The conceptual design developed prior to the start of validation mostly answered the first two parts of the statement above: “We can build this building, that does these things”. The Township had a good understanding of the needs of the community when it came to recreational programming at the W.J. Henderson Recreation Centre. Taking the layout of the existing building as well as the topography of the site into consideration helped drive the design, creating an initial concept which the team could use as a starting point.

The Validation Phase of the project officially began in July 2023, after the project team had been established. The first three days of this phase were dedicated to introducing the team to IPD and lean processes, as well as to establishing the team’s values for the project. This process, which establishes the core values, goals, and objectives of the project, is crucial to creating a cohesive team which will work towards a common goal. This will help foster cooperation, trust, and a shared sense of purpose amongst all team members.

The project team met weekly between July and October 2023, alternating between in person and virtual “Big Rooms” to minimize expenses associated with team members travelling in from out of town. In person meetings were held at the W.J. Henderson Recreation Centre, allowing team members to become familiar with the facility and to “go and see” whenever questions came up. This proved to be an invaluable resource and led to the identification of several opportunities which may have otherwise been missed.

Each PIT was responsible for developing design narratives specific to their scope. These narratives, which can be found in Section 4 of this report, include information such as: a description of the work required, equipment and material lists, drawings, details, specification sheets, sketches, etc. Construction schedules and Plans (Section 5) as well as Cost Estimates (Section 6) were developed in parallel with the Design Narratives using a Target Value Design approach. Target Value Design (TVD) is a philosophy of designing to a budget instead of budgeting a design. Cost estimating becomes a crucial part of the development of a design with constant checks against the target budget. Therefore, the goal is to design to a detailed budget, as opposed to waiting and budgeting a detailed design.

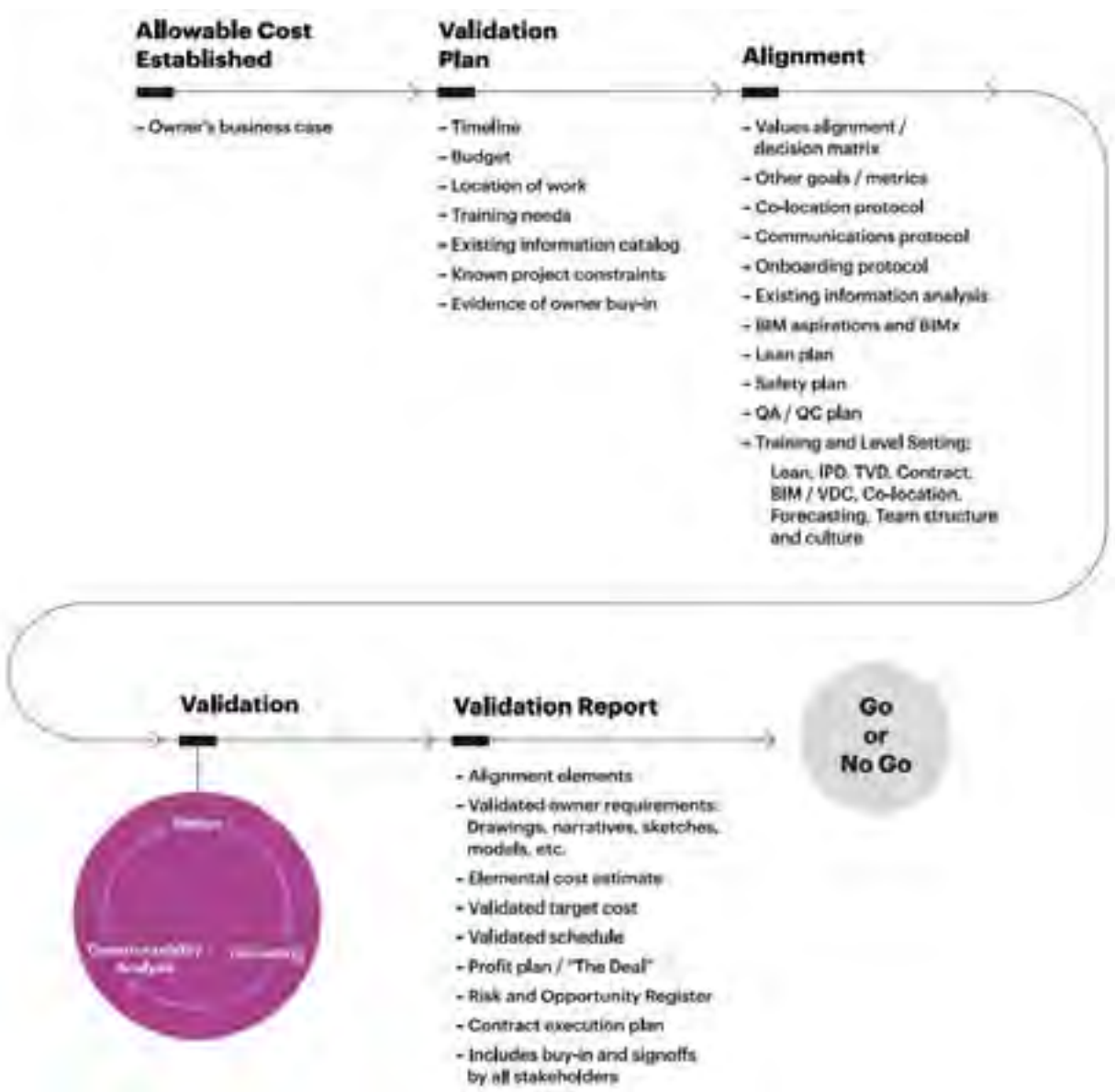
The objective of TVD on this project was to develop a cost-effective design that aligns with project objectives via the following processes:

- Collaborate with the PIT to establish project goals and value targets.
- Regularly review and refine project scope, specifications, and design to align with target values.
- Use Value Analysis and Value Engineering techniques to optimize costs while maintaining quality.

This Validation Report represents the culmination of these efforts. The designs, plans, and estimates contained in this document, all of which have been agreed upon by the project partners, represent the strategy which will be used to deliver the project within the agreed upon budget, timelines, and scope. The acceptance or rejection of the Validation Report by Loyalist Township Council will effectively form the final “Go or No-Go” for the project. Should Council elect to accept the report, along with its findings and recommendations, the project will move into its design and procurement phase before proceeding to construction. The rejection of the Validation Report by Council would prevent the project from moving forward, effectively marking its end as well as the dissolution of the project team.

The validation process results in a comprehensive report which represents the following collective statement by the team:

“We can build this building, that does these things, for this much money, in this much time”.



2.5 Functional Program + Project Area Summary

The functional program has evolved from needs assessments developed during the 2017 Loyalist Parks and Recreation Master Plan as well as feedback received during the community engagement process outlined in Section 3. In the Master Plan and a subsequent study by Loyalist and MJMA, the site was identified as ideal for future expansion potential and alignment with community demand for recreation services and trends in municipal service provision. The building is relatively structurally sound and appropriately located in relation to current and future population concentrations, has a large site for expansion potential and includes the basic major civic components already, including a library.

The program developed as part of the Master Plan included expanded recreational elements which have been excluded from this first phase of work. Those programs include a double gymnasium with running track, a catering kitchen, a fitness studio and weight room, as well as a new Municipal Office.

The current program in this report includes the 8 Lane, 25 metre, International Swimming Federation (FINA) regional competition facility lap pool with viewing areas, warm water leisure pool, associated changerooms and administration, 2 multi-purpose rooms, a new food service kiosk, Indigenous legacy space, expanded lobby and reception, repurposed meeting room, additional arena changerooms and a staff room. Accessibility upgrades include a new barrier-free lift between levels, new universal and unisex washrooms, and barrier-free rink viewing areas. Parking needs are summarized in a transportation study (included in Appendix F) and barrier-free parking spaces are being increased to meet the accessibility goals for the project.

FUNCTIONAL PROGRAM AREA SUMMARY (ADDITION/RENOVATION ONLY)						
Number	Name	Department	Area (sq.m)	Area (sq.m)	Area (sq.m)	Area (sq.m)
			NEW CONSTRUCTION		RENOVATION AREA	
LEVEL 1- RINK						
121/122	ICE RINK	ICE			1,562 sm	16,807 sf
Level 1- LOWER LOBBY						
110+	CHANGEROOMS/ COACHES	ICE			163 sm	1,754 sf
100+	STAFF ROOM	ICE			49 sm	527 sf
LEVEL 2 - RINK						
225	RINK BLEACHERS	ICE			398 sm	4,282 sf
TOTAL ICE					2,172 sm	23,371 sf

Level 2- ENTRY(FFE 99.97)			NEW CONSTRUCTION		RENOVATION AREA	
AQUATICS						
213	GUARDS AREA	AQUATICS			51 sm	549 sf
217	POOL VIEWING	AQUATICS	245 sm	2,636 sf		
218	POOL	AQUATICS	1,218 sm	13,106 sf		
218A	POOL STORAGE	AQUATICS	48 sm	516 sf		
219	POOL CLASSROOM	AQUATICS			34 sm	366 sf
220	UNIVERSAL CHANGEROOM	AQUATICS			177 sm	1,905 sf
223	MALE CHANGEROOM	AQUATICS			82 sm	882 sf
224	FEMALE CHANGEROOM	AQUATICS			77 sm	829 sf
SUBTOTALS AQUATICS			1,511 sm	16,258 sf	421 sm	4,530 sf
TOTAL AQUATICS					1,932 sm	20,788 sf

			NEW CONSTRUCTION		RENOVATION AREA	
COMMUNITY						
209	RINK VIEWING 1	COMMUNITY			11 sm	118 sf
227	MEETING ROOM	COMMUNITY			28 sm	301 sf
206B	MIRROR ROOM	COMMUNITY			37 sm	398 sf
216	LOBBY POOL VIEWING	COMMUNITY	38 sm	409 sf		
206A	MULTIPURPOSE RM	COMMUNITY			46 sm	495 sf
SUBTOTAL COMMUNITY SPACES			38 sm	409 sf	122 sm	1,313 sf
TOTAL COMMUNITY SPACES					160 sm	1,722 sf

			NEW CONSTRUCTION		RENOVATION AREA	
FOOD SERVICE						
202A	FOOD SERVICE BOH	FOOD SERVICE		9 sm	98 sf	
202	FOOD SERVICE	FOOD SERVICE		37 sm	401 sf	
TOTAL FOOD SERVICES				46 sm	499 sf	

			NEW CONSTRUCTION		RENOVATION AREA	
STAFF						
212D	WC	STAFF		5 sm	54 sf	
212B	OFFICE	STAFF		6 sm	65 sf	
212C	OFFICE	STAFF		7 sm	75 sf	
212A	OFFICE	STAFF		7 sm	75 sf	
204	ADMIN	STAFF		23 sm	247 sf	
210	RECEPTION	STAFF		28 sm	301 sf	
212	OPEN OFFICE	STAFF		41 sm	441 sf	
TOTAL STAFF SPACES				117 sm	1,259 sf	

			NEW CONSTRUCTION		RENOVATION AREA	
SUBTOTAL PROGRAM AREA			1,549 sm	16,667 sf	2,878 sm	30,967 sf
TOTAL USEABLE AREA (NEW+RENOVATED)					4,427 sm	47,635 sf

3.0 Public Consultation



Public Consultation

3.1 Community Engagement

Township Staff partnered with MJMA to deliver a series of workshops and open houses in early 2023. The purpose of these sessions was to allow community members and stakeholders the opportunity to ask questions about the conceptual design which was developed prior to the start of Validation and provide suggestions. These included:

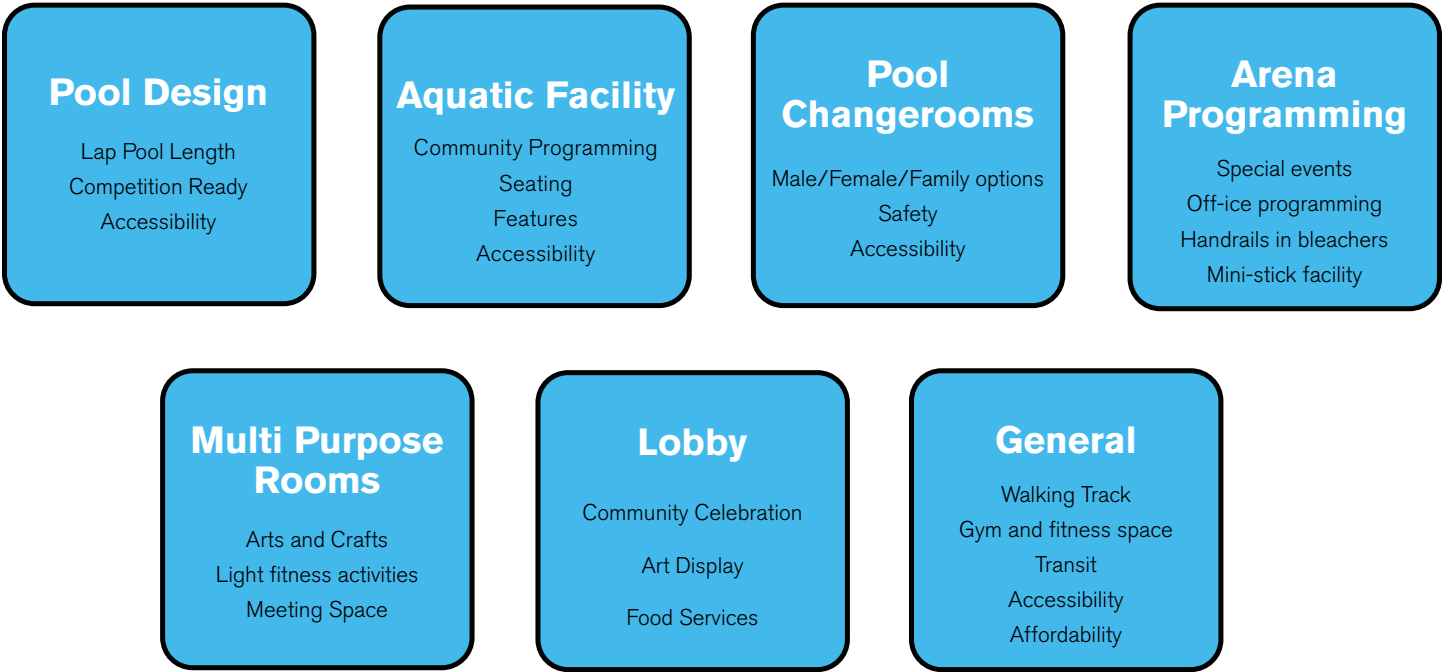
- A workshop with aquatics user groups, such as the Ernestown Barracudas, KFLA Public Health, Special Olympics, and the Limestone District School Board.
- A workshop with arena user groups, such as the Loyalist Township Minor Hockey Association, the Amherstview Jets, the Loyalist Skating Club, and several other organizations.
- A public open house which consisted of two drop-in public information sessions at the W.J. Henderson Recreation Centre on January 16th, 2023. A video containing the same information which was presented during this open house was developed by MJMA and posted on the Loyalist Township website, YouTube channel, and social media pages for members of the community who were unable to attend the in-person sessions.
- An online survey which was available on the Township website between January 5th and 27th, 2023.
- A separate online survey which was made available to students at Ernestown Secondary School between February 6th and 24th, 2023. This survey was used to solicit focused feedback from the youth segment of the population.

The full engagement report used to summarize the public engagement process along with the received feedback can be found in Appendix F of this Validation Report.

Throughout the public engagement process, residents were encouraged to join an email list which was established to provide periodic project updates and information about how to get involved in the project.

Overall, the uptake for the various public engagement sessions was relatively high. Over 600 responses to the online surveys were received, with the vast majority of respondents, almost 90%, residing in Loyalist Township. Residents from neighbouring municipalities, such as Kingston, Greater Napanee, or Stone Mills, also completed the survey but represented a much smaller proportion of respondents. Community members were also given the opportunity to provide feedback during the stakeholder workshops and public open house by interacting with the project story boards.

The feedback received from the public and various stakeholder groups was generally positive. A few themes, concerns, and requests which were brought up regularly by various groups and throughout the survey are summarized below



- Pool Design
 - Increasing the lap pool length from the proposed 25 metres to 50 metres
 - Designing the lap pool to accommodate local and regional swim meets
 - Incorporating accessibility features, such as a ramp, into both the lap and leisure pools
- Aquatic Facility Features and Programming
 - A high level of interest was expressed for community programming such as lane swims, public swims, aquafit classes, children swim classes, etc.
 - Providing additional seating in viewing areas and spectator stands
 - Incorporating radiant in-floor heating into the facility
 - Ensuring that the sound system and building acoustics facilitate the delivery of community programming such as aquafit classes
 - Adding water slides to both pools
 - Ensuring that the facility is accessible
 - Addition of hot tub and sauna
- Aquatic Facility Change Rooms
 - Strong objections over the proposed single universal change room concept
 - Family change rooms identified as a need for the community
 - Privacy
- Arena Programming
 - The online survey indicated a high level of interest for hosting concerts, tradeshow, or other special events in the arena
 - The offering of programming such as pickleball or basketball during the off-ice season seemed to be a popular request in the survey responses
 - Requests around the addition of handrails in the arena stands, along with removing barriers to accessibility were also received
 - The addition of a mini-stick facility was requested by a few respondents and stakeholders
- Multipurpose Rooms
 - Well received
 - Feedback received indicated a high level of

- interest for programming such as arts and crafts, light fitness activities like yoga, classes, or hosting meetings
- Atrium and peripherals
- The concept of using the atrium and common areas, referred to as the social heart of the facility, to celebrate the community was extremely well received
- Suggestions from the public for the use of this space included rotating art displays, historical exhibits, sports memorabilia, and indigenous history
- General Feedback
 - The inclusion of a walking track in the facility was brought up several times throughout the engagement process
 - The lack of public transit within Loyalist Township was frequently brought up as a barrier to visiting the facility, both under its current and proposed forms

This feedback was incorporated into the design where possible. Most notably, the design team studied the impacts of separating the proposed single universal change room for the aquatic facility into three distinct areas (male, female, universal) and developed an alternative concept to reflect the desires of the community. This concept was incorporated into the design presented in Section 4 of this report. Other requests which were incorporated into the facility's design include:

- designing the pool to meet FINA specifications
- increasing the seating capacity in the new aquatic facility
- incorporating handrails into the arena seating

Unfortunately, certain requests received during consultation could not be accommodated in the scope of work. Specifically, increasing the length of the pool basin from the proposed 25 metres to the requested 50 metres was deemed to be cost prohibitive both from a capital and operational standpoint. The construction costs associated with the construction of a 50-metre pool basin would be double that of a 25-metre basin, while additional chemical and energy consumption, along with increased staffing requirements, would substantially increase the costs of operating the facility.



Furthermore, any additional revenue which could be generated by operating a larger pool would not be sufficient to offset these increased costs. Finally, the retrofit stream of the Green and Inclusive Community Building program, which is providing \$16.5 million in funding towards this project, does not allow for building expansions beyond 30% of the existing footprint. The 25 metre, 8-lane pool, leisure pool, and spectator stands presented in the current conceptual design will account for the entirety of the allowable increased square footage permitted under the grant.

A request by the local competitive swim team to design the leisure pool in a way that would allow for swimmers to use it for warming up and cooling down during competitive meets was also received by the project team. However, the project team was of the opinion that this request would hinder community programming and was therefore not able to recommend this change. Finally, the requested addition of sauna or hot tub features, as well as the inclusion of a mini-stick facility could also not be incorporated into this phase of the project due to financial, operational, and design constraints.

The project team will continue to engage with the community through the design and construction phases of the project and will provide regular updates on progress and timelines.

3.2 First Nations Engagement

The W.J. Henderson Recreation Centre is located on the ancestral lands of the Haudenosaunee, Mississauga, and Omámiwinini peoples. These lands are recognized in the Two Row Wampum and Dish with One Spoon Treaty, as well as Treaty 27 and the Crawford Purchase. The project therefore represents an opportunity to teach the community about the histories, languages, customs, and traditions of local First Nations and advance Reconciliation in Loyalist Township.

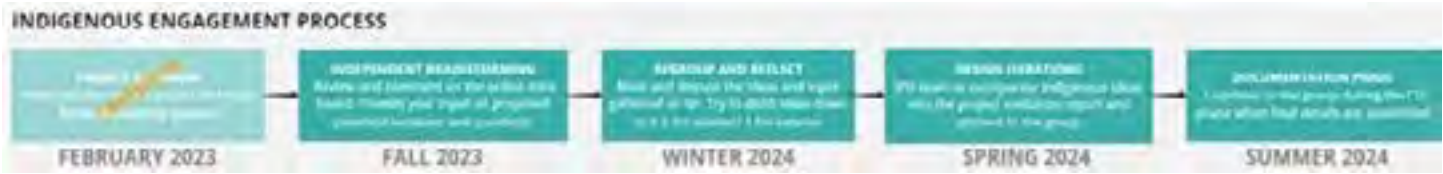
A preliminary workshop was held in February 2023 with local Indigenous groups and individuals with whom the Township has previously collaborated with as part of other initiatives. Participants were introduced to the project and its goals, and representatives from the Gord Downie and Chanie Wenjack Fund described the mandate of their organization and the purpose of the Legacy Space program. At the end of the session, participants were asked to reflect on ways to approach the design of the Legacy Spaces and will have the opportunity to present their ideas during the Design and Procurement phase of the project.

Representatives from Loyalist Township, Chandos Construction, and MJMA also met with the Tyendinaga Mohawk Council on September 27th, 2023, to

introduce them to the project and seek their input. The project team presented the conceptual designs which have been developed to date and suggested the idea of using the atrium as a space to celebrate local First Nations and share their stories. The Council agreed with the approach which was being proposed and suggested that members of the Mohawk Community be involved in developing the design of the Legacy Space and sharing stories of local First Nations. Members of the Council also indicated that the project is located in an area which was traditionally used as hunting grounds for many First Nations, including the Algonquin and Mississauga people.

The Legacy Space in the W.J. Henderson Recreation Centre will tell the story of the Dish with One Spoon and focus on how the Haudenosaunee, Mississauga, and Algonquin people shared the land while recognizing each other's independence and distinct identity.

The design and contents of the Legacy Space will be developed by bringing local First Nation members and groups together in a facilitated workshop which will be held during the Design and Procurement phase of the project. During this workshop, participants will be asked to provide input on the forms, materials, and finishes which could be incorporated into the space. Just as importantly, the group will work together to find ways to use the space to share the history, culture, and traditions of local First Nations, be it through graphics installations, artwork, or interactive displays. Representatives from the Gord Downie and Chanie Wenjack Fund will help provide guidance to the group based on their previous experience setting up Legacy Spaces in other community buildings. A dedicated line item has been included in the project budget to ensure that sufficient funds will be available to deliver the vision developed during the workshop.



OPPORTUNITIES	OPPORTUNITIES	OPPORTUNITIES	OPPORTUNITIES
MATERIALS / FORM / FURNISHINGS 	ENVIRONMENTAL GRAPHICS & SIGNAGE 	ART & INSTALLATIONS 	LANDSCAPE & PLANTING

4.0 Design Narratives

Design Narratives

This section will provide a high level summary of the design work completed to date which informs the project cost.

The following table of contents summarizes the design narratives which have been included in this section of the report.



4. Design Narratives

4.1 Site	36-37
4.2. Architectural	34-35
4.3. Legacy Space	36
4.4. Pools	37-38
4.5. Envelope	39
4.6. Structural	40-45
4.7. Mechanical	46-52
4.8. Electrical	53-57
4.9. Energy Efficiency and Sustainability	58-59
4.10. Constructability	60
4.11. FFE	61

4.1. Site

4.1.1 Site Selection

The W.J. Henderson Recreation Centre has served the local and surrounding community for over 40 years. The building houses a public library, a 25 m public swimming pool, and an arena, and also includes an outdoor soccer field. Currently, the pool serves all of Loyalist Township, a community of over 17,000 people situated on the north shore of Lake Ontario between the Town of Greater Napanee and the City of Kingston. In addition, the facility is on a City of Kingston transit route. Demands on the building are great and a visit to the facility shows a constant state of activity.

Both formal and informal pedestrian routes enter the site from various locations and the building backs onto one of three local elementary schools. The building's angled presence on the site, seemingly encourages access from all areas of the township was geologically

inspired. The shallow limestone that is synonymous with the area steps down sharply across the site and inspired the split-level nature of the building design.

Given the need to replace the failed pool basin and other factors, this site is the natural choice for the project. In the Parks and Recreation Master Plan and a subsequent study by Loyalist and MJMA, the W.J. Henderson Recreation Centre was identified as ideal for future expansion potential and alignment with community demand for recreation services and trends in municipal service provision. The building is structurally sound and appropriately located in relation to current and future population concentrations, has a large site for expansion potential and includes the basic major civic components already, including library.



4.1.2 Landscape + Civil

Site servicing will use the existing incoming domestic water and outgoing sanitary services at the eastern boundary and entering the building at the lower mechanical level along the south facade. A water service will be introduced from Amherst Drive to serve a new fire hydrant on site.

Stormwater will be conveyed around the new pool structure overland and into a buried storm chamber which will be released into a new bioswale to ensure stormwater volume is addressed on site, and an oil and grit separator will be used to control quality. Overland drainage will convey stormwater into the Township's collection system south of the site adjacent to the public school.

Landscaping scope for the project will be minimized as a cost control measure. Areas of the site will be re-graded as needed and bioswales will be planted for stormwater treatment. A small amount of trees will be also planted to increase biodiversity on site and to provide additional shade.

4.1.3 Parking

The site currently includes 284 parking spaces, 4 of which are accessible. Based on the gross floor area parking calculations outlined in Loyalist Township's zoning by-laws, the number of spaces currently available are not sufficient for the proposed facility, which would require 871 spaces.

A traffic consultant was retained to conduct a parking justification study for the proposed facility based on best practices and parking surveys conducted at nearby recreation facilities. A review of the Institute of Transportation Engineer (ITE) Parking Manual estimated a total site parking demand of 167 spaces, well below the 284 currently available. The consultant was also able to use parking supply and demand data for similar recreational facilities in the project area and concluded that the increase to the current parking supply was not required. The full consultant report can be found in Appendix F of these documents.

As such, the creation of additional parking spaces at the W.J. Henderson Recreation Centre will not be included in the scope of work for this project. However, existing spaces will likely be converted to accessible spaces to help meet the project's accessibility goals.

4.1.4 Future

Future phases of the Community Hub project could include a double gymnasium and fitness centre with upper level running track being added to the west of the existing rink. A potential new municipal office building located on the northern end of the site could also be included in future phases of work.



4.2. Architectural

Program

The proposed work at the W.J. Henderson Recreation Centre includes the addition of a new 26,000 square foot aquatic hall on the eastern side of the building. This aquatic facility will include an 8 lane, 25 metre lap pool, a leisure pool, and viewing area which will be used for competition and community programming alike. The existing pool basin will be filled in and the space will be converted into male, female, and family aquatic changerooms as well as staff offices and a wet classroom.

The project will also see the existing building renovated to meet current codes and expected levels of service. This will involve: renovating the existing ice rink, creating new dedicated changing rooms for the local Junior C hockey team, expanding the lobby to promote community gathering, installing a food service outlet, creating new multipurpose rooms, and upgrading existing washroom and changerooms. Accessibility upgrades will also be implemented across the building to remove any barriers to participation which may currently be experienced by members of the community.

Material and Form

The addition will be clad in a distinctive standing seam metal interlocking panel, taking a cue from the existing metal siding on the original 1976 building and fitting with the existing masonry colour. A large clearstory skylight will drop diffuse north light over the spectator

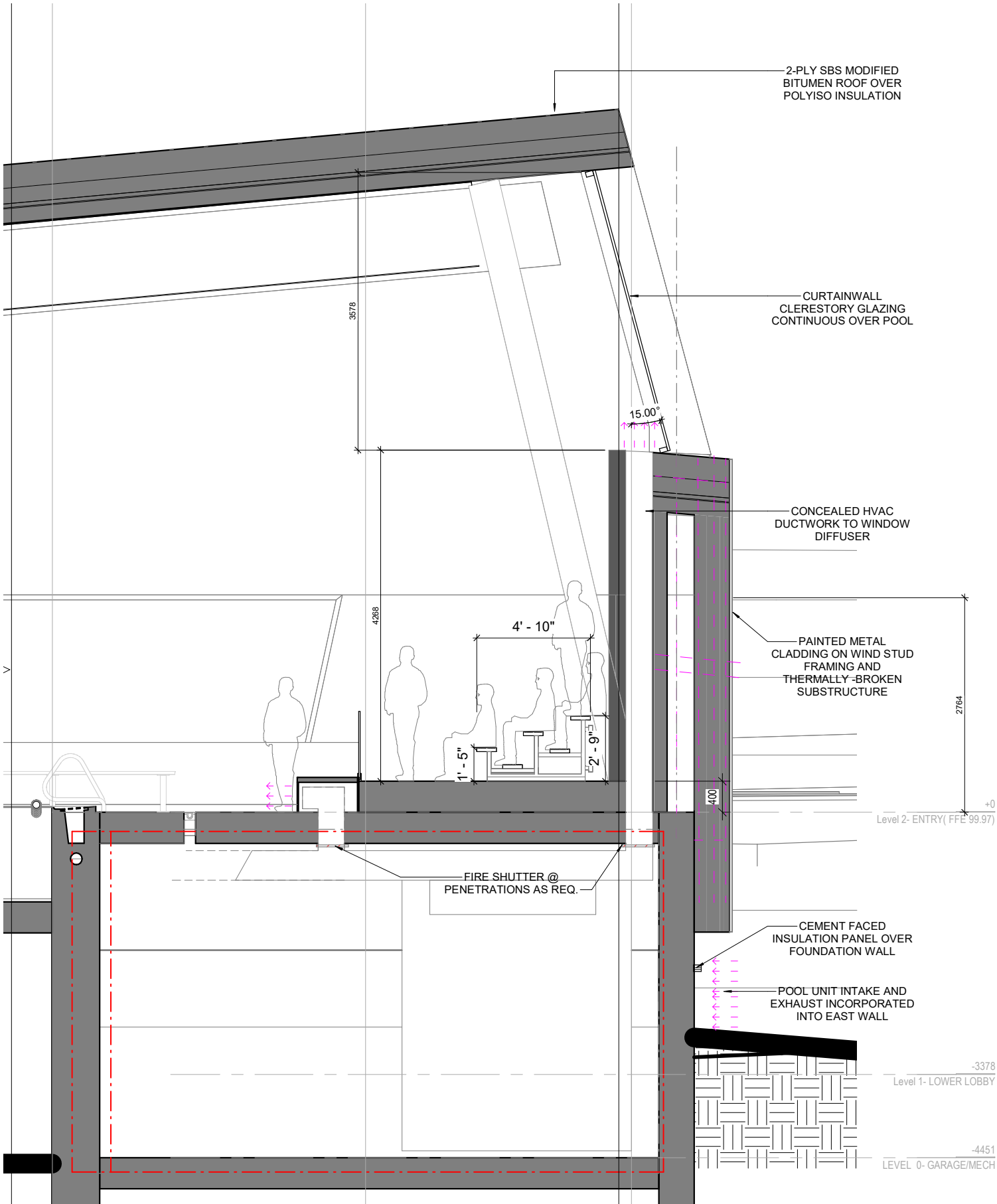
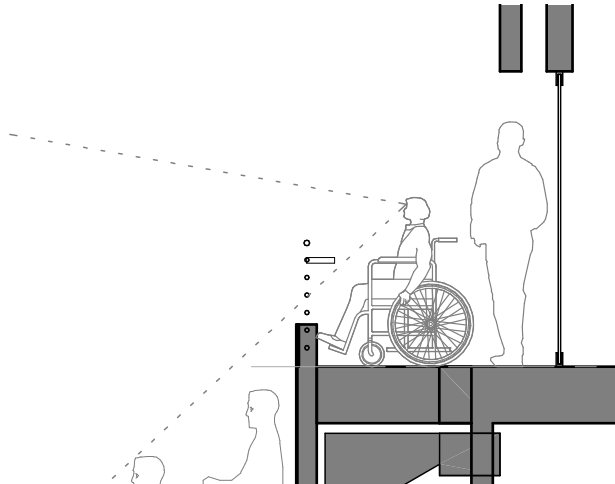


area in the pool, illuminating the water area within without creating glare. The angled skylight will create a peaked roofline, reminiscent of traditional shed roofs, tents or on a good day, like rock outcroppings common to the Amherstview shoreline. The large glazing openings will be lined in a longboard aluminum cladding in a wood or bright colour finish to highlight views into the building. This material emulates traditional clapboard siding.

Accessibility

The City of London's Facility Accessibility Design Standard (FADS) have been used to inform the barrier-free design throughout the building and plans have been reviewed with the County of Lennox and Addington's Joint Accessibility Advisory Committee for acceptance. New pool changerooms will include all-gender changing areas and showers with entry and exit to the pool deck. New universal barrier-free washrooms will be available on the main level and in the pool changeroom.

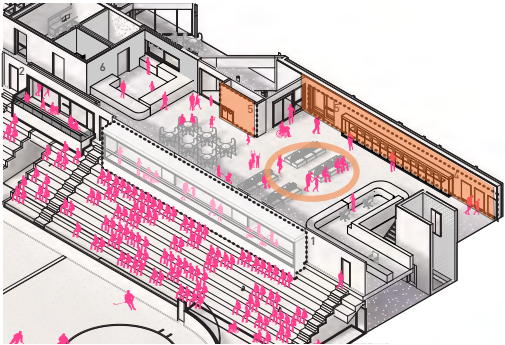
A new Limited Use, Limited Application (LULA) style elevator will be installed near the front reception to join the main level to the arena changeroom corridor. These systems are a cost-effective alternative to full-size elevators and are specifically designed to facilitate travel for facility users with limited mobility. New stairs will also be installed in this area, replacing the existing staircase located on the western side of the building and effectively increasing passive security for the facility.



4.3. Legacy Space

Indigenous programming will centre around the creation of a Legacy Space in collaboration with the Gord Downie and Chanie Wenjack Foundation. The space will facilitate conversations around the history of local First Nations through its design and layout. The new lobby will embody this Legacy Space through material, quality of light and function. References to natural materials like wood and stone will be used to the fullest extent possible. Light diffusing ceiling elements will filter natural light from new dome skylights, bringing a sense of the exterior to this space while still shielding from heat gain and glare. The seating will allow for flexible table arrangements at the canteen and in the centre of the room, a circular seating area will allow for teaching circle configurations; providing a central gravity to the room. This symbolic centre of the building will be circumscribed with a ceiling form of light and material to denote this as a place where people meet and gather.

From a teaching perspective, the layout of the atrium will create a large amount of wall space which can be used for display of art, artefacts and other means to tell stories of local First Nations groups. For example, Loyalist Township is located on what used to be the shared traditional hunting grounds of the Haudenosaunee, Mississauga, and Omámiwinini peoples. Agreements between different First Nations to share the land were described as “dish with one spoon” treaties. Under this concept, the dish symbolizes a common hunting ground while the spoon represents the people living on the land and using its resources in a



spirit of cooperation. In addition to teaching the history of local First Nations, stories such as these can also be used to raise awareness of matters pertaining to ecological and environmental sustainability by teaching individuals and groups to only take what they need from the land.

The space can also be used to promote current First Nations cultures by showcasing local artists through rotating art displays, displaying environmental graphics on monitors in the lobby, and becoming a place for meeting and gathering of First Nations groups and events. The lobby can be used for teaching circle evenings, and the multi-purpose rooms can host smudging ceremonies, indigenous youth groups, language classes, and program and services based on Indigenous cultural traditions and teachings.



4.4. Pools

The new aquatic facility will include an 8 lane, 25 metre lap pool as well as a leisure pool. Both pools will be designed and constructed in accordance with Section 3.11 (Public Pools) of the Ontario Building Code as well as Ontario Public Health R.R.O, Reg 565, Public Pools.

Lap Pool

The lap pool will support community activities while also meeting the requirements to host regional swim meets, which would ensure that any record times achieved by swimmers in the pool would be considered valid. The shallow end of the pool will be 1.115 metres deep to allow for swim training, play, and leisure activities, while the deep end will be 3.265 metres to allow for diving off a 1 metre board. Access to the pool will be provided by way of a ramp as well as one ladder at the shallow end of the pool and two at the deep end. Based on feedback received during public consultation, as well as best practices, accessibility lifts are not included as part of the project.

Competitive swimming will be supported by designing the pool to meet Swim Canada requirements for regional meets. An elevated stainless-steel headwall required to support legitimate competition swim records will be installed and swim lanes will be identified on the bottom of the pool by contrasting colour tiled markers. The gutter flow design will create favourable conditions for swimmers by minimizing rebound from the pool structure. This will be further reinforced

through the installation of a total of nine lane ropes, with one immediately adjacent to the side walls of the pool. These lanes will be stored in below-deck baskets which will be accessible through deck hatches located on the pool deck. A total of eight stanchion posts will be provided to support other facility programming, and a resting toe-ledge will extend across the deep end wall of the pool. Finally, a timing system with the required touch pads, computer, deck level touchpad communication jacks and an 8-line LED display will be included in the lap pool. However, this piece of equipment will be provided separately by the owner and is not included in the scope of work for the project.

The lap pool circulation system features complete perimeter flow, also called ‘negative edge’ or ‘continuous gutter’ design. This design has the water at deck level, constantly overflowing the entire perimeter of the pool for maximum skimming of the pool’s surface. Excess water from bather load is delivered to a surge tank below the pool deck, which is accessible from the pool deck through tiled, aluminum hatches designed for the purpose. The tanks are lit with a single LED light to facilitate maintenance efforts. The operating temperature of the Lap Pool is expected to be between 80-83 degrees Fahrenheit for competition and training purposes respectively.

Leisure Pool

The leisure pool will feature full perimeter overflow for maximum surface skimming and have a dimension of



approximately 20.5 metres by 7 metres, with depths ranging from 750mm to 1200mm. The shallow end of the leisure pool will be accessible both by way of a ramp or a set of stairs and a ladder will be included at the deeper area of the pool. A hydrotherapy bench with lumbar and calf jets is being proposed adjacent to the stairs.

The steps and bench area will support swim training for young users, socializing, and child monitoring for parents. Three features add fun and activity to the pool. In the steps, 3 geysers will produce vertically active water for all bathers to enjoy. In the deep end, a 25-port air bubbler adds excitement. Finally, a sheet flow, deck mounted, water feature runs concurrently to the geysers in the step. The feature is installed with an Omni-Pod fixture allowing it to be easily changed to a new feature in the future. The deep area will support aquafit activities. The temperature of this pool is anticipated to be 90 degrees Fahrenheit for casual bather comfort.

All plumbing is solvent welded PVC. Gutter flow circulation for both pools exceeds Ontario Building Code (OBC) and Public Health requirements. Both pools receive a ceramic tile finish with epoxy grout for longevity. The deck equipment is all 316 stainless steel. Each circulation pump is powered though a variable frequency drive for energy saving and longer equipment life. Similarly, the filters provide low operating costs and water conservation. Chemical

treatment is automated using liquid chlorine and CO₂ to manage water sanitation and pH respectively.

Pool Mechanical Systems

Each pool has a completely separate and dedicated mechanical system with similar components and operation, specifically sized for each pools’ associated flow rate to achieve the desired turnover of the pool volumes. Because the systems are independent, a fouling or other incident with one pool will not affect the operation of the other pool.

The pools’ mechanical equipment is in a mechanical space below the pool deck at the deep end of the Lap Pool. Mechanical equipment has been selected based on ease of operation, energy efficiency, and overall life cycle cost considerations. Most notably, Pressure/Regenerative D-E filters have been selected for their many benefits. This will provide consistently superior water quality even at the end of an operational day, such that a “night turndown” of the circulation rate can be executed at night. The filters also have a much smaller footprint than sand filters, reducing the required mechanical room space and associated cost. These filters provide substantial water and energy savings as their backwash intervals are very long (2-3 weeks) and use very little water.

As a matter of cost saving and reduced redundancy, the chemical supplies for the pools are shared rather than duplicated. One large chlorine tank and CO₂ tank will service both pools. This configuration will still allow both pools to be operated independantly of each other. For example, in the event of a shut down at the leisure pool, the lap pool would still remain operational.

The pool water is continuously monitored by a chemical controller associated with each pool.

Medium pressure UV water treatment is planned as a ‘secondary ‘oxidizer for the pool water in each pool. It will provide both chloramine control and direct destruction of bacterial and viral DNA, with minimal operator intervention or the addition of additional chemicals to the pool water.



4.5. Envelope

The proposed building envelope design prioritizes energy efficiency, durability, weathertightness, air tightness, occupant comfort, and condensation resistance. It aims to create an aesthetically pleasing enclosure that will help maintain a functional and enjoyable interior space for years to come.

New Building Addition

The envelope of the new building addition includes continuous water, thermal, air, and vapor control layers to support the building’s interior environmental design, intended use, and occupant comfort. These features are designed to meet project energy performance targets, with a focus on preventing condensation on interior surfaces.

The roof over the aquatic facility consists of a 2-ply modified bitumen roof and includes thermal insulation with effective R-40 thermal performance.

Exterior walls are clad with metal panel cladding in an insulated rainscreen assembly. These walls feature a thermally broken substructure and 6” of mineral wool insulation for effective R-21 thermal performance and will include a self-adhered air/vapor barrier to support building airtightness.

High-performance thermally broken aluminum-framed curtain walls with double pane glazing are used in aquatic facility areas. These windows provide R-3 thermal performance and resist condensation in high humidity pool environments, in conjunction with mechanical heating measures.

Foundation walls adjacent to backfilled spaces are damp proofed with bituminous material and insulated with extruded polystyrene (XPS) insulation providing effective R-10 thermal performance. Foundation walls where exterior grade is higher than interior floor level are waterproofed, complete with drainage board and XPS insulation providing effective R-15 thermal performance.

Existing Building

The existing building envelope is generally in fair to good condition but requires localized repairs.

The existing roofing consists of a conventional built-up assembly with polyisocyanurate insulation. Some areas show signs of deterioration and moisture ingress, necessitating localized repairs.

The expansion joint between the new and existing buildings will be treated with a flexible continuous EPDM-based synthetic rubber waterproofing membrane, which will also serve as an air barrier and will include thermal insulation.

Existing exterior walls are constructed with architectural block or brick. Some areas require repairs, including the removal of damaged block and the installation of a continuous air/vapor barrier membrane and new aluminum panel cladding. Metal fascia panels will be repainted to match the new addition cladding. Dome skylights will be installed over the main atrium to provide natural light and a connection to the outdoors. Roofing adjacent to the skylights will be replaced.

The existing windows throughout the building date back to 1979 and may need maintenance or replacement.



4.6. Structural

The approach to designing structural systems for the W.J. Henderson Recreation Centre will prioritize the effective utilization of materials, ease of construction, practical trade sequencing, and superior design quality.

General Design Criteria

All design and construction must adhere to the 2012 Edition of the OBC. Existing structures that are deemed to be structurally inadequate will be upgraded to current design standards including the Building Code and material design codes and standards. Unaltered areas of the building will not be structurally modified unless there is reason to believe that they are structurally deficient. Where structural assessment of unaltered areas is required, national standards for building review and assessment will be used in lieu of standards for new construction provided this is allowed within the restrictions of these standards and provided there is no risk to public safety.

A geotechnical report prepared by Malroz Engineering Inc. dated May 31, 2023 will be referenced for the design of the foundation structure.

The entire structure is designed as a building of normal importance category as defined by the Building Code.

The structure will be designed so that all floor assemblies are fire separations with a fire-resistance rating equal to 1 hour. All loadbearing walls and columns supporting a floor or roof assembly with a fire-resistance rating will be designed to have the same fire-resistance rating. Where specific Underwriters

Laboratories of Canada (ULC) assemblies are used to achieve a fire-resistance rating, these are to be confirmed and specified by the Architect. ULC Standards develops and publishes standards and specifications for products having a bearing on fire, life safety and security, crime prevention, energy efficiency, environmental safety, security of assets and facilities, live working and workplace safety and other areas. ULC Standards is accredited by the Standards Council of Canada as a consensus based Standards Development Organization under the National Standards System of Canada.

Pool Addition

The pool extension on the east side of the site spans two floors, featuring an eight-lane lap pool, a leisure pool, and a mechanical space situated underneath. The existing topography around the addition's proposed location slopes downwards towards the southeast, revealing a 4-5 m difference in elevation. The top of the slope stands roughly at 100 m above mean sea level (mASL), while the base measures between 95-96 mASL. This regional terrain generally descends southward, leading to Lake Ontario. The existing building's foundations are made up of conventional spread and strip footings resting on bedrock. The new pool's proposed foundation will also utilize conventional spread and strip footings supported on weathered bedrock, with a preliminary bearing capacity of 1 MPa (Ultimate Limit States). In the Kingston area, buildings require a minimum frost protection depth of 1.5 m.

The slab-on-grade will be traditionally designed, resting on granular material. Surrounding Level 1, the perimeter will be built using cast-in-place concrete foundation walls. In the northern part, where the grade is higher, the walls will be full-height. However, as the grade slopes downward towards Level 1 on the east and south, the walls will be of partial height. A perimeter drainage system for this construction has been advised by the geotechnical consultant.

The pool basin will be constructed using cast-in-place concrete construction. The pool slab will be 250mm thick reinforced concrete, and the pool basin walls will be 640mm thick reinforced concrete. The level 2 pool deck will primarily consist of a 250 mm structural slab supported on the pool basin walls and concrete columns or walls around the perimeter.

The pool room will be constructed using a 5-ply (175mm) grade V2 Cross Laminated Timber (CLT) panel, spanning 5.4m and supported on W1100 steel beams spaced at 5.4m c/c. The roof has been designed to accommodate a solar photo voltaic array, effectively future proofing the needs of the facility.

Interior Renovations

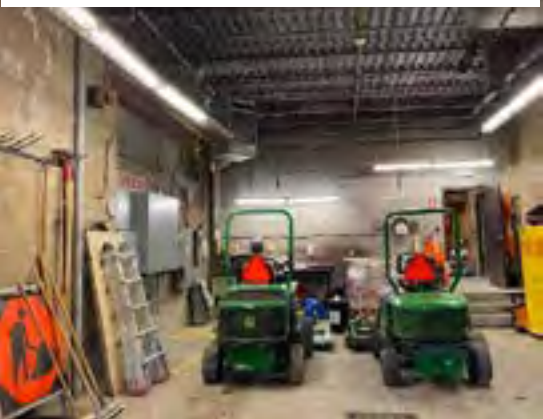
Various parts of the current building are planned to undergo structural alterations and renovations as part of this project. One major change involves integrating a new LULA (Limited Use / Limited Application) lift into the existing building, which requires the construction of a new load-bearing masonry shaft and pit foundation, partial removal of the existing floor structure, and the installation of new steel framing for added support. Other modifications include the infilling of current stair openings, enhancing the arena's viewing bleachers with new skybox sections, replacing the rink's existing slab-on-grade, and infilling the existing pool basin to accommodate a new suspended floor structure supported on a new steel frame. To support the new loads from infilling the existing pool basin, the existing perimeter walls will need to be underpinned. A geotechnical engineer will evaluate the final load-bearing elevations and capacities. Furthermore, new skylight openings will be created through roof double tee members, and some existing load-bearing masonry walls will be modified. The roof of the existing maintenance garage will also be reinforced to support anticipated snow loads due to the new extension, and new roof top mechanical units.



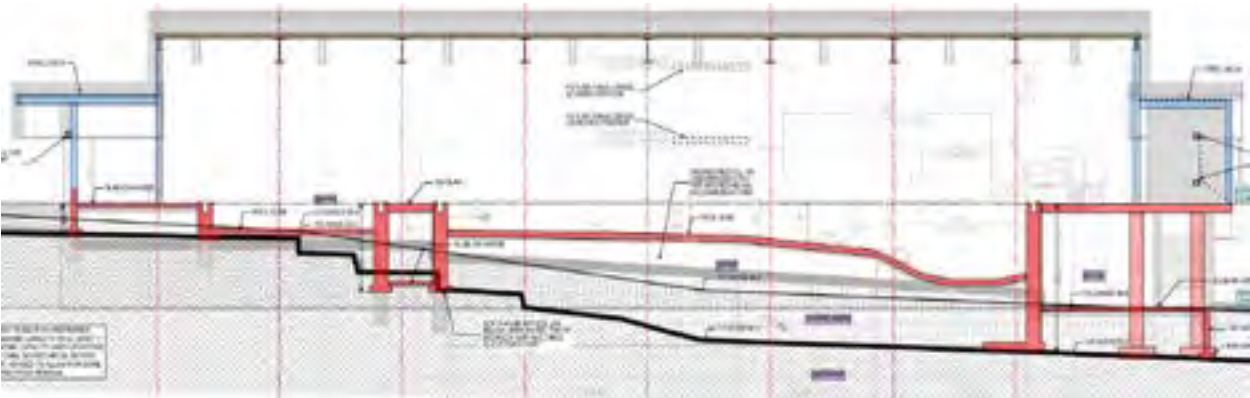
Cor Van Raay YMCA – YMCA of Lethbridge



Crawl Space Beside Existing Pool Basin



Existing Maintenance Garage



Building Section through Natatorium Addition

Typical renovation tasks, such as infilling of openings, creating new openings, coring, cutting, patching, and similar requirements, are also anticipated in the process. The extent and specifics of these

modifications or renovations will be refined during the design development stage, ensuring a detailed design is prepared for the tender documents.

Summary of Calculated Loads

The structural systems will be capable of sustaining the following gravity load requirements:

Roof of Pool Addition

Superimposed Dead Loads	
PV Array	0.50 kPa
Roofing Allowance	0.50 kPa
Suspended M&E	0.25 kPa
Snow Load	2.12 kPa + ASL

The design of the roof structure has also considered the future installation of a ninja cross system which can be suspended from the roof structure. An example of this system is included below.

Pool Deck

Superimposed Dead Loads	
Floor Finishes	1.00 kPa
Sloped Concrete Topping	2.35 kPa
Suspended M&E	0.75 kPa
Live Load	4.80 kPa

Change Rooms

Superimposed Dead Loads	
Partition Allowance	1.00 kPa minimum (see plans for masonry partitions)
Floor Finishes	0.50 kPa
Sloped Concrete Topping	2.35 kPa
Suspended M&E	0.25 kPa
Live Load	4.80 kPa

Equipment Areas

Superimposed Dead Loads	
Partition Allowance	1.00 kPa
Suspended M&E	0.50 kPa
Live Load	3.60 kPa

Seismic loads

Seismic load parameters are outlined in the Building Code. The parameters used to represent seismic hazard are the 5% damped horizontal spectral acceleration values for 0.2, 0.5, 1.0 and 2.0 second periods and the horizontal Peak Ground Acceleration value that has a 2% probability of being exceeded in 50 years.

For this project the Seismic data as per the Building Code are as follows:

Sa (0.2)	= 0.290
Sa (0.5)	= 0.180
Sa (1.0)	= 0.099
Sa (2.0)	= 0.031
PGA	= 0.120

The ground profile corresponding to Site Class C.

In the design formula for minimum lateral earth quake force $V = S(Ta) \times Mv \times IE \times W / (Rd \times Ro)$, the following values will be adopted in the design of the lateral load resisting system:

$S(Ta) = Fv \times Sa(2.0)/2$ for $Ta \geq 4.0$ secs (Design spectral acceleration Values)

Fv	= 1.0 (Velocity based site coefficient)
Mv	= 1.0 (Higher Mode factor for a shear wall structure)
IE	= 1.0 (Importance factor)
Rd	= 1.5 (Ductility related force modification factor)
Ro	= 1.3 (Over-strength related force modification factor)

Wind Loads

Wind loads have been determined by the detailed requirements of the OBC. The building will be designed based on a fifty year return period (mean hourly) consistent with hourly wind pressure of $1/10 = 0.36$, $1/50 = 0.47$.

Building Movements
Vertical Deflection criteria
Typical Interior Elements

All typical floor framing elements, except those specifically noted below, will be designed for a maximum instantaneous live load deflection and long-term creep deflection of L/360. All interior partitions, building services and the like will need to be detailed to accommodate these deflections.

Elements Supporting Masonry Partitions

Horizontal structural elements supporting masonry partitions will be designed for a maximum live load deflection of L/480.

Elements Supporting Cladding

Horizontal structural elements supporting cladding will be designed for a maximum live load deflection of L/480 or 19 mm maximum (vertical) and L/175 maximum (horizontal).

4.7. Mechanical

The main mechanical objective of this project is to provide an energy-efficient system which will ensure ease of operation and maintenance without compromising costs while providing a comfortable and controllable environment within the building throughout its useful life.

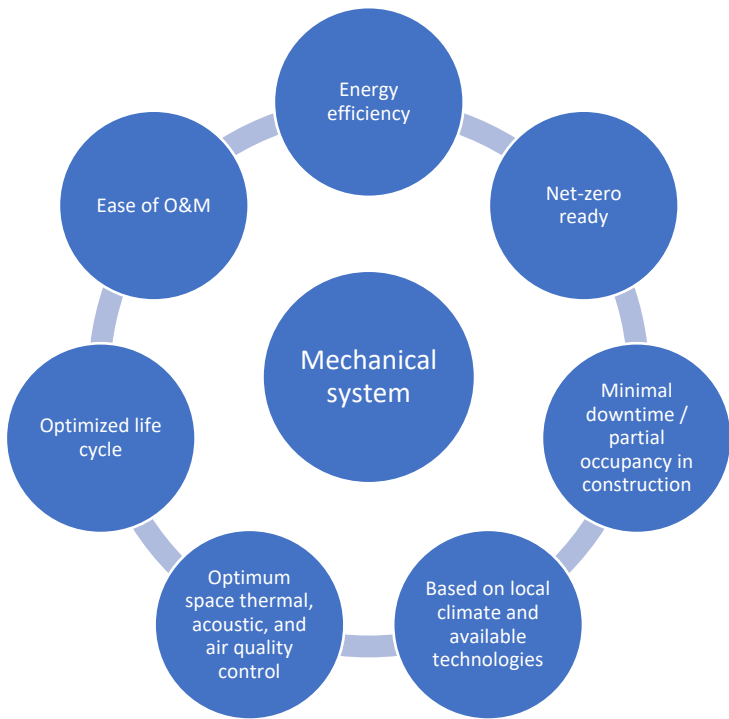
Process Description

The design for the proposed mechanical system revolves around the installation of a water source heat pump (WSHP) which will provide heating and cooling while making use of the simultaneous loads that the facility will have. Energy Recovery Ventilators (ERVs) will provide fresh air while recovering the energy from spaces requiring exhaust like the changerooms and washrooms. Two hydronic dehumidification systems, one for the new pool and one for the arena, will also be connected to the WSHP, effectively regulating moisture levels, improving air quality, and creating a comfortable

environment for facility users. The WSHP will also provide heating loads for domestic hot water fixtures, as well as the new lap pool and leisure pool.

The rejected heat from the existing ice plant will be captured and used as the source for the WSHP, and new electric boilers will provide supplemental heat to the system as needed. Low grade reject heat will be used to feed a new heating coil inside the zamboni snow melt pit, eliminating the current practice of operators manually melting ice by using hot water from a hose after each ice resurfacing event.

Finally, a thermal storage system will be used to store excess heat until it is needed in the system, effectively creating a large heat battery which can be drawn on when needed.



Mechanical Design Objectives

General Design Criteria and Standards

The mechanical systems will be designed and installed by following principles of good engineering practice and meeting or exceeding requirements of applicable codes including the Ontario Building Code (OBC); American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) standards; The National Fire Protection Association (NFPA) standards; and The Canadian Standards Association (CSA) standards.

To predict the peak heating and cooling loads of the building to size the mechanical systems, heat loss/gain calculations were estimated based on the architectural drawings including the building envelope construction.

The interior design conditions and ventilation identified are:

Heating, Ventilation and Air Conditioning

The proposed mechanical heating, cooling, and ventilation systems have been selected based on the building type, discussions with the IPD team, the energy and greenhouse gas emissions reductions goals.

The preliminary peak load estimate (excluding the rink ice) for the building are 910 kW (3,100 MBH) heating and 525 kW (150 tons) cooling. It is anticipated that even in summer, the building will have a constant heating load of 440 kW (1,150 MBH) due to the heating requirements of the aquatic facility dehumidification unit and pool water heating.

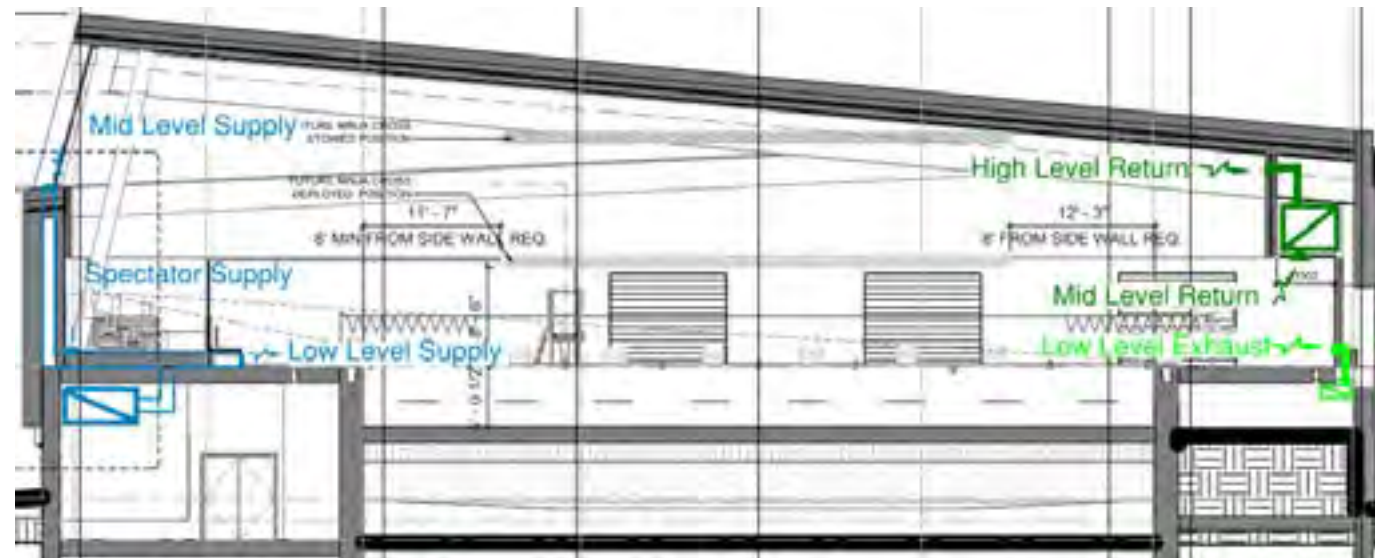
Spaces	Cooling Design	Heating Design	Ventilation	Minimum Exhaust
Meeting/Multi-Purpose/Lobby/ Office Space	24.0°C (75°F)	21.0°C (70°F)	5.0 cfm/person 0.06 cfm/sq.ft	
Natorium (pool and deck)	29.5°C (85°F)	29.5°C (85°F)	0.48 cfm/sq.ft	
Ice Rink	15°C – 44%RH (59°F)	10°C - 50%RH (50°F)	0.50 cfm/sq.ft	
Spectator Areas	-	-	7.5 cfm/person 0.06 cfm/sq.ft	
Change Rooms Dry Area Wet Area	Pool: 26°C (79°F) Rink: 26°C (79°F)	Pool: 24°C (75°F) Rink: 20°C (64°F)	-	0.25 cfm/sq.ft 0.50 cfm/sq.ft
Kitchens	24.0°C (75°F)	21.0°C (70°F)	-	0.70 cfm/sq.ft
Refrigerating machinery rooms	28.0°C (82°F)	16.0°C (61°F)	-	0.50 cfm/sq.ft
Storage Rooms, Chemical	28.0°C (82°F)	16.0°C (61°F)	-	1.50 cfm/sq.ft
Washrooms	-	20.0°C (68°C)	-	70cfm/WC



Location of Air Handling Units

Central Heating and Cooling

The rink refrigeration system will provide the heat injection source to a 6-pipe water source heat recovery heat pump (WSHP) system for the building hot and chilled water loads. The system will efficiently distribute the simultaneous heating and cooling loads that the building will see, both on the building side and between the building and rink source side.



Pool Ventilation Schematics

Building Ventilation

To meet the energy use targets of a high efficiency building, it is essential that all supply and exhaust air streams are passed through Energy Recovery Ventilators (ERV) to ensure that waste heat and latent energy of the exhaust air can be passed to the unconditioned outdoor air. Three ERVs will be provided: ERV-1 for the rink locker rooms, ERV-2 for the main area, ERV-3 for the pool changerooms. The three units will be provided with a glycol preheat coil and high efficiency heat wheel. ERV-1 will have an additional heating and cooling coil to provide some temperature control. ERV-2 and ERV-3 will provide outdoor air to 4-pipe fan coil units (FCU) that will provide zone temperature control.

The library existing rooftop unit (RTU) will remain untouched.

A dehumidifier air handling unit (DHU-1) will ensure the ventilation requirements and the indoor design temperatures and humidity conditions of the rink. An enthalpy wheel will lower the work required by the glycol chilled water coils of the equipment to lower operating costs.

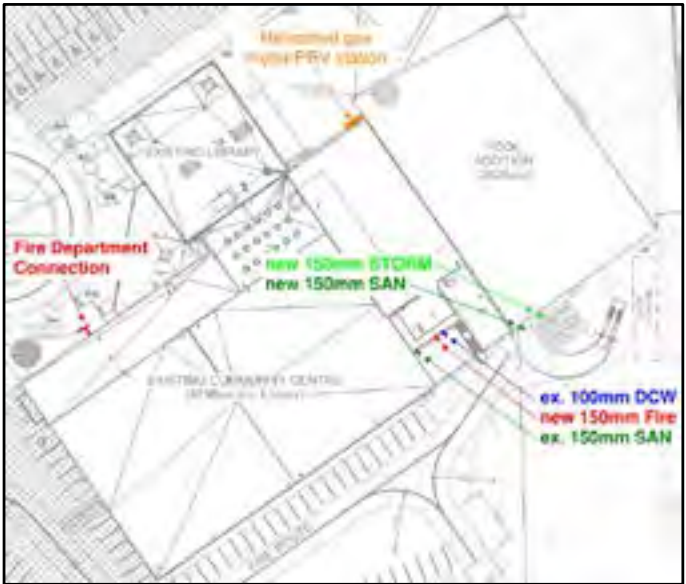
A packaged dehumidification air handling unit (DHU-2) will ensure the indoor design temperature and humidity conditions of the aquatic facility. The unit will

increase the use of outdoor air when the conditions are favorable to increase the air quality and reduce the energy consumption. The air pattern is critical in aquatic facilities to ensure proper airflow and removal of chloramines and other airborne pollutants coming from the pool while assuring occupant comfort. As such, a combination of low and medium supply air will be provided to ensure good mixing of the air and prevent condensation on windows. A mixture of low level exhaust, mid and high level return will be provided to remove pollutants and to optimize hot/humid air recovery and prevent stratification.

Exhaust Systems

Exhaust fans will be provided for the following:

- Chemical storage room exhaust (runs continuously)
- Chemical injection plant room exhaust (controlled by a sensor located in the room which signal an alarm upon detection of chlorine)
- Low level pool exhaust (runs continuously)
- Surge tank venting exhaust (runs continuously)
- Refrigerant equipment exhaust (runs seasonally)
- Snow melt exhaust (runs seasonally)
- Kitchen exhaust to NFPA 96 (runs based on schedule)



Auxiliary Systems

Perimeter bathrooms, storage rooms and equipment rooms will be provided with heating via hydronic force flow heaters complete with direct digital control thermostatic control. Stairwells will be provided with a force flow unit at the base and all entry/exit points to the exterior.

A hydronic coil will be installed at the base of the snow melt pit. This should considerably reduce the use of domestic hot water relative to current conditions, which involve operators spraying down the snow melt pit with hot water after each ice resurfacing event.

Small electric infrared heaters will be ceiling mounted for the rink spectator heating. The units proposed are anticipated to generate approximately 17 W/sq.ft of heating and would have a coverage of 250 sq.ft each. These units are effective at directing the heat where it is needed while limiting the bleed over from the heated stands to the ice.

Plumbing and Drainage Systems

Within the building, the 150mm (6") sanitary pipe currently serving the existing building pipe will remain and a new 150mm (6") sanitary pipe will be required for the new pool. Both pipes will drain by gravity into the existing sanitary system.

The new addition will have rainwater collected from the roof as well as a foundation subdrainage system. As such, a new 150mm (6") storm service will be required. It is not expected that a sump pit and pump will be required.

The existing 100mm (4") domestic cold-water connection complete with backflow preventer and water meter will be retained.

A new dedicated 150mm (6") cold water supply will be required for the building fire protection system complete with backflow preventer and water meter in the rink refrigeration mechanical room.

Domestic Hot Water

The domestic hot water (DHW) system will be connected to the main hydronic heating loop. The heating plant will use a WSHP to raise the temperature of the water up to 140°C. This system will substantially reduce the overall energy use and CO₂ emissions.

Cold Water Ice Resurfacing

A REALice water treatment system will be used to eliminate the need for hot water for the ice resurfacers. This is made possible by removing the micro air bubbles in the water and will result in large reductions in the building domestic hot water load. This system will also reduce the ice resurfacers loads on both the ice refrigeration equipment and the rink dehumidification unit without impacting ice quality.

Natural Gas Systems

The existing incoming natural gas meter and pressure reducing valve (PRV) station will be relocated to accommodate the new addition.

During the phased construction, natural gas piping will need to be re-routed to serve the existing gas-fired boilers, rink dehumidification unit and the library rooftop unit (RTU). The natural gas piping routing will also need to be modified to accommodate the new roof work and skylights being installed. Once the construction is complete, natural gas piping will be provided only for the library RTU. Replacing the library RTU with an electric system would effectively disconnect the entire building from the natural gas distribution system. This work is not included in the scope of the project but should be considered once the existing unit is scheduled for replacement as part of regular lifecycle activities.

Fire Protection Systems

The new addition will be sprinklered in accordance with NFPA 13 – Installation of Sprinkler System. A new 150mm (6”) fire protection system complete with backflow preventer and water meter will be installed and connect to the existing municipal services. Two sprinkler control zone stations will also be located in the rink refrigeration mechanical room and linked to the central fire alarm panel. The installation will be in accordance with the local Ontario fire codes and seismic code requirements.

The sprinkler system, complete with inspectors’ test stations, will consist of a wet system for each floor of the addition. A fire department connection will be located near the front main entrance.

All sprinkler heads shall be quick response type. Multi-purpose portable handheld fire extinguishers will be provided and installed in recessed wall cabinets.

Rink Refrigeration Equipment

The existing ammonia ice rink refrigeration equipment will be replaced with new and include a new heat recovery component complete with updated controls. The heat recovery will contribute to the heating of the pools, snow melt pit, domestic hot water, and the building heating HVAC loop.

New glycol piping, including headers, will be provided for underneath the rink slab. The plate and frame evaporator that was installed in 2018 is the only major equipment that will be retained, and it will be modified to operate from brine to glycol.

A cold ice battery system will also be added to the refrigeration system and be used to provide low temperature glycol chilled water to the rink dehumidification unit as well as additional cooling to the building chilled water loop. This additional ice storage will provide opportunity to offset peak cooling demand for the building.

Control Systems

Good controls are essential to maintain the desired levels of service, comfort, and safety in an energy efficient manner.

The proposed controls solution will be a Building Automation System (BAS) that will perform the overall control and monitoring of the building’s plant and systems. The design intent is to be able to monitor and record the energy used by the building and break this down to accurately detail the energy use within the building.

4.8. Electrical

The following section of the report outlines the intended strategies for both new and existing electrical systems at the W.J. Henderson Recreation Centre.

The electrical systems in the existing facility (which includes power distribution, lighting, lighting controls, communications, A/V, fire alarm, and security systems) have all been modified and upgraded throughout the years. However, a full-service upgrade will be required to expand the facility while fully achieving the project’s sustainability goals.

The mechanical systems described in Section 4.7 will effectively electrify the building by removing equipment powered by natural gas. This will necessitate an upgrade to the electrical system. The design of these systems will focus on sizing new services to accommodate future loads, incorporating energy efficient fixtures, and minimizing service disruptions over the course of construction.

A detailed description of the service size and planned shutdowns as well as retaining temporary power has been developed in depth along with a phasing plan to provide power to areas unaffected by the construction.

Applicable Codes

All work carried out shall be in conformance with the Ontario Building Code and all other applicable codes, by-laws and authorities having jurisdiction.

The electrical systems will be designed and installed by following principles of good engineering practice and meeting or exceeding requirements of applicable codes, including but not limited to the following:

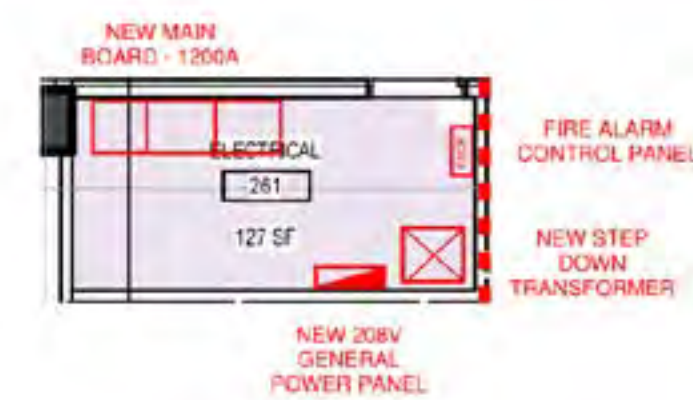
- O. Reg. 332/12, Ontario Building Code
- O. Reg. 213/07, Ontario Fire Code
- CSA C22.1, Ontario Electrical Code
- Illumination Engineering Society of North America (IESNA)
- CSA 282, Emergency electrical power supply for buildings
- CSA Z462-18, Workplace Electrical Safety
- CAN/ULC-S524, Standard for the Installation of Fire Alarm

- Systems
- CAN/ULC-S536, Standard for Inspection and Testing of Fire Alarm Systems
- CAN/ULC-S537, Standard for the verification of Fire Alarm Systems
- CAN/ULC-S561, Installation and Services for Fire Signal Receiving Centres and Systems
- Institute of Electrical and Electronic Engineers (IEEE) Standards
- Electrical Safety Authority (ESA)
- TIA/EIA Telecommunications Design Standards
- BICSI, Telecommunication Distribution Methods
- Accessible Design for the Built Environment (CSA B651-04)

Power Distribution

Power to the existing facility is provided by a hydro pole which is owned and operated by the local authority, Hydro One Networks Inc. The pole, which includes three (3) 100kVA step down transformers for a total incoming service rated for 600 Amps at 600 volts, is located in the footprint of the proposed aquatic facility and will need to be relocated as part of the project. Temporary power will need to be provided by way of a new hydro pole which will be located north of the site and powered from existing hydro lines running east-west along Amherst Drive.

The existing electric meter is wall mounted within the garage area and provides power to the main distribution board on the opposite side of the wall in



the compressor room. Apart from the main board, the electrical power distribution systems in the facility will be replaced and upgraded since most of the existing equipment are nearing the end of their estimated service life.

The new facility shall be equipped with a new main electrical room located on Level 2 (on grade) and fed directly from the recommended new transformer via an underground duct bank. The new fire alarm control panel is best suited to be installed where the existing panel is located (compressor room) however, reserving space in the main electrical room is also a recommendation.

Power Demand

Based on the projected power demand of the proposed facility, the installation of a new hydro-owned transformer is recommended. The new transformer will be sized for the new pool and arena upgrades while also providing future capacity for any additional loads which may be required as part of future phases. Power demand calculations have accounted for the installation of up to ten Level 2 electric vehicle chargers, however only four of these systems are included in the scope of work for the project.



a wish list item.

Power Generation

The installation of photovoltaic (PV) systems is not part of the scope of work for the project but could be included in future phases of work. PV panels could be installed on the roof of the new aquatic facility or

Metering

A new detailed power meter with demand metering will be provided on the main incoming service. Additional metering will also be provided in the building to allow for proper monitoring of mechanical equipment, outdoor lighting, indoor lighting, and any specialty power requirements. All the power meters will be networked together on an independent wiring loop with ethernet gateways provided to read the data remotely. As requested by the Owner, the strategy to separate the power loads dedicated for the arena, pool and library will be implemented.

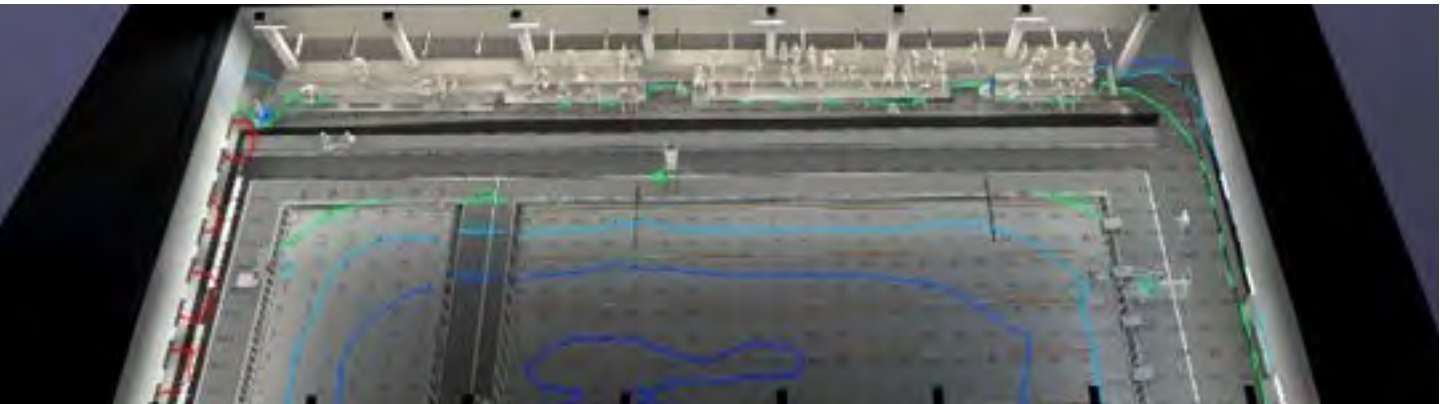
Emergency Power

Emergency power is not provided in the existing building, with the exception of a battery backed-up lighting system which is installed throughout the facility to indicate the location of emergency exits. New exit lighting will be installed to replace existing systems and to match proposed new life safety pathways.

In an effort to manage the project's budget, the provision of back-up power is not a part of the base scope of work for the project but has been included as

through the parking lot, however the existing facility's roof space would not be able to withstand the additional load. The figure below illustrates the areas which could accommodate the installation of PV panels (green) as well as the areas that cannot (red).

The addition of solar panels on the roof of the aquatic



facility is included as a wish list item for the project.

Lighting

All luminaires throughout the renovation and new building shall be high efficiency LED type. The lighting system will be designed to provide adequate lighting to all areas of the building referencing best practices and Illuminating Engineering Society of North America (IESNA) standards for specialty areas. Lighting will accentuate the architectural features of the building and site, support the project's sustainability goals with high-efficiency and flexible lighting systems and provide excellent quality illumination suitable for a high-performance environment where visual tasks are crucial.

Light fixtures inside the arena were recently replaced with LED fixtures which can be reused. This will save on project costs while providing adequate lighting.

The new aquatic facility is a focus for the lighting design within the new building addition. Following applicable codes for illumination, minimums required at the pool surface, as well as keeping in mind the maintenance aspect required for the lighting and pool area, the main strategy to illuminate the pool was to keep the lighting around the perimeter of the deck. Asymmetric linear along with focused flood lights have been proposed around the perimeter of the pool deck to provide the sufficient lighting required for the pool surface. A centralized lighting control system will be provided for the building, including local control dimming switches, occupancy sensors, photo sensors, and timeclocks.

Exterior lighting shall be provided at each entrance/exit of the building and around the perimeter for security. Additional lighting will be provided in the outdoor amenity spaces. Exterior lighting will be designed to ensure that IESNA to attain light pollution reduction. Additionally, the lighting design will be dark sky compliant, as directed by

Loyalist Township planning staff during the project's pre-consultation meeting.

Communications and Security Infrastructure

The communications design will include all telecommunications infrastructure pathways, backbone and horizontal telecommunications cabling, communications rooms, firestopping and wireless infrastructure. There will be a new rack provided to provide data termination and patching for the new pool area.

The existing public announcement system is currently being used for general audio for music throughout the building as well making non-emergency announcements. The speakers within the rink and the Level 1 changerooms will be replaced, however this work will be completed separately by the Township and is not included in the project's scope of work.

An intelligent, integrated IP-based Video Surveillance (IPVS) system will be provided. The system will be comprised of fixed and panoramic digital IPVS cameras, network video recorders and controls.

Fire Protection

The building shall be served from a new main fire alarm panel in the Compressor Room, complete with a fire alarm annunciator at the main entrance. The system shall be an addressable single or two stage system (code report will be reviewed to confirm the stage) complete in every aspect to meet or exceed the requirements of the latest releases of the Ontario Building Code and requirements of the Fire Protection and Prevention Act.

4.9. Energy Efficiency and Sustainability

The W.J. Henderson Recreation Centre is one of the most energy intensive facilities in the Township's portfolio. Prior to the closure of the existing pool in March of 2022, the facility had an average energy use of 3,065 megawatt hours (MWh) per year, the majority of which stemmed from the consumption of approximately 1,938,712 m3 of natural gas each year. This resulted in the production of almost 400 tonnes of carbon dioxide equivalent (tCO2e) of greenhouse gas (GHG) emissions.

The proposed project will significantly reduce the GHG emissions generated by the facility, primarily through the replacement and electrification of the mechanical systems used to heat and cool the building.

The existing building relies on gas-fired air handling units to heat the building and older natural gas boilers

to heat the pool and provide domestic hot water to the facility. The use of natural gas to operate these systems accounts for over 90% of the GHG emissions of the facility, which has been tracked by analyzing the existing energy bills at 352 tCO2 each year. Additionally, the heat generated as part of the ice making process in the arena is not recovered in any fashion in the existing building, representing a significant missed opportunity for its reuse somewhere else in the building.

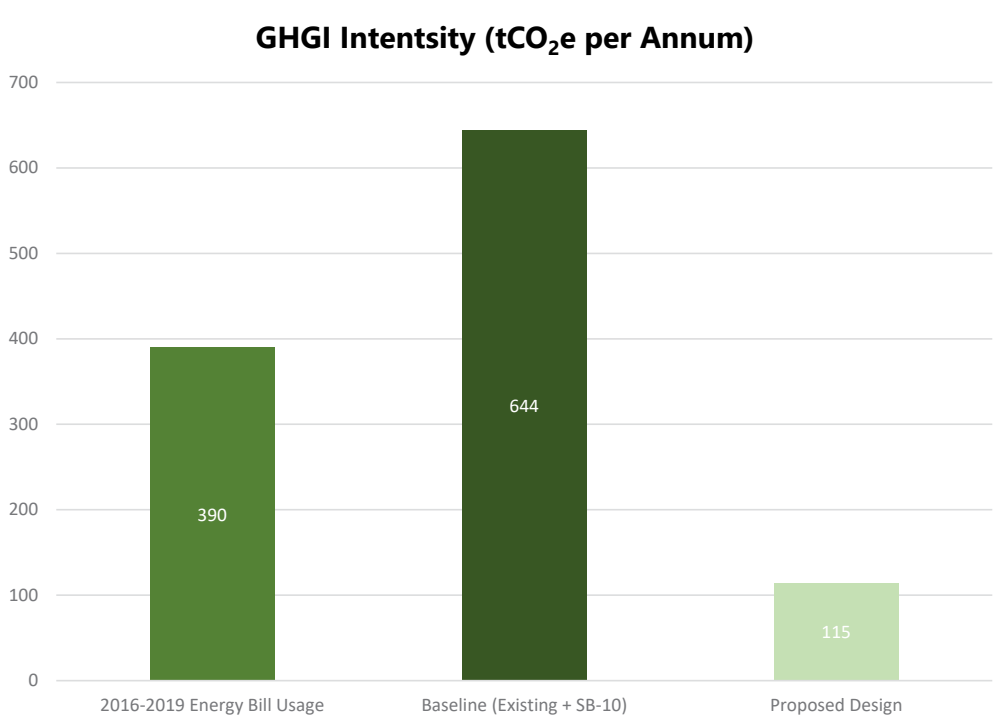
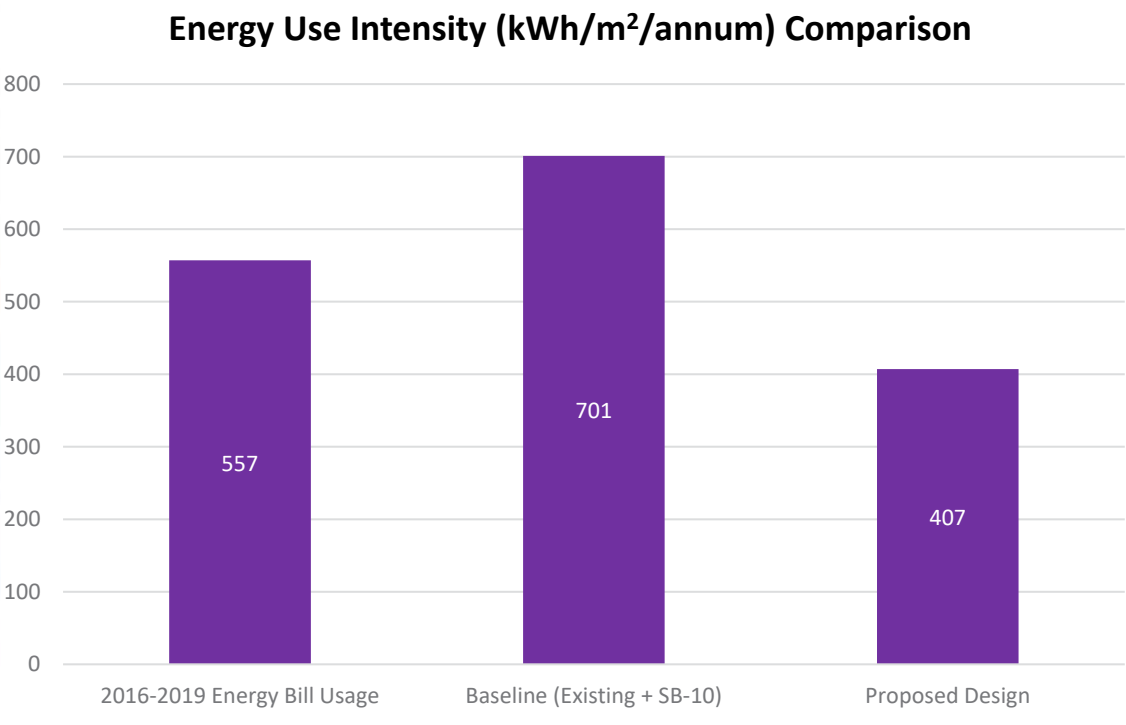
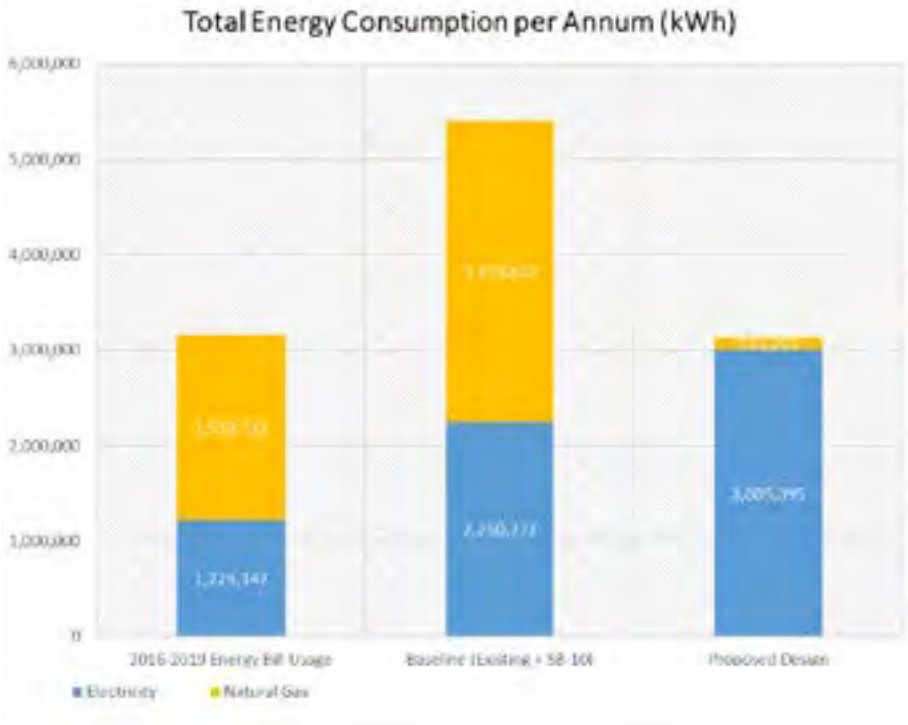
A lot of the equipment currently in use in the building is either approaching, or has exceeded, its useful life and is due to be replaced. This project therefore represents an excellent opportunity to install a new mechanical system which will significantly reduce the GHG emissions associated with operation of the facility by electrifying equipment and capturing waste heat.

As a whole, the new mechanical system in the proposed design is expected to use 3,138,596 kWh of energy each year, which, when compared to the existing facility's energy consumption on an area basis, represents a reduction in energy of 27%. More importantly, the substantial reduction in natural gas usage is projected to lead to a 71%, or 275 tCO2e, reduction in GHG emissions. This figure is especially impressive when considering that the proposed system will be used to operate a 30% bigger facility with a larger pool and a new leisure pool.

Additionally, the energy model has also compared the projected energy profiles of the facility as currently designed and the facility if it was built to the minimum requirements of the Ontario Building Code (OBC SB-10). Under this comparison, the reduction in energy usage and GHG emissions is even more pronounced,

with a 42% reduction in energy usage and a 96% reduction in GHG emissions.

The environmental benefits of this project go beyond lowering GHG emissions. The new pool filtration systems will make use of diatomaceous earth filters, which reduce the amount of water which would be sent to the sanitary sewer system. Additionally, the implementation of this project will also lead to the addition of stormwater management measures on the project site, leading to improved stormwater quality downstream of the facility.



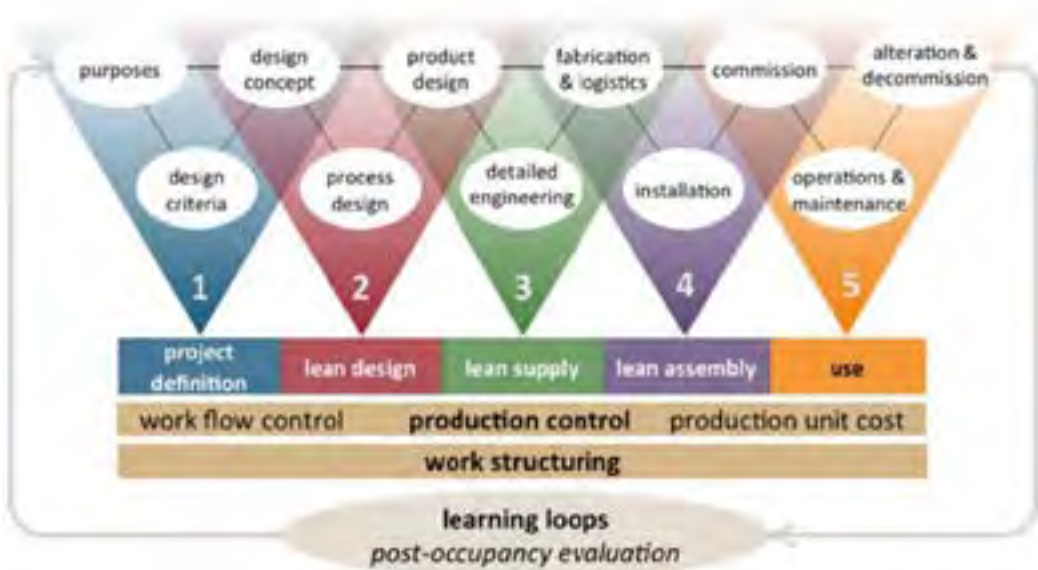
4.10. Minimizing Impacts of Construction

Several of the project goals and team values described in Section 2 of this Validation Report will ultimately be impacted by the constructability of the facility. Specifically, ease of construction will lead to lower project costs, streamlined schedules, higher quality work, and, most importantly, a safer job site.

The project team leveraged lean design principles and embraced the collaborative nature of Integrated Project Delivery to develop a design which will maximize the constructability of the project. The location of the Big Room on the project site also allowed team members to “go and see” while getting a feel for the building. These conditions led to several design changes which had a positive impact on the project’s budget and timelines, effectively demonstrating the benefits of IPD. For example, the initial schematic design called for the removal of a wall on the lower level of the facility to allow for the installation of a new arena change room. While doing a walkthrough of the area, a team member identified that the wall was load bearing and its removal would have negative implications on the project. Within hours of this finding, the project team had revised the design of the hallway to eliminate the need to remove the wall without compromising the ability to program the space. In another instance of collaborative problem

solving, the project team determined that moving the washroom located on level 2 of the facility by just a few meters would allow for the reuse of existing plumbing infrastructure, thereby eliminating the need to create new openings in the floors and walls of the building.

The phasing of work will also have a large impact on the constructability of the project. The amount of renovations which will be conducted within the existing building, combined with the need to minimize disruptions to arena programming, will require careful planning and consideration. This is especially true when considering the installation of new mechanical systems over the course of the project. These systems have been designed to work together to provide heating and cooling loads to the building while minimizing wasted energy. However, long lead times associated with the delivery of large pieces of equipment and specific windows during which ice-making equipment can be taken out of service will mean that the installation and commissioning of the building’s mechanical system must happen in a specific, well thought out manner. Once again, team members were able to work together to develop a realistic plan to bring the mechanical systems online gradually over the course of construction.



4.11. Furnitures, Fixtures, and Equipment

Furniture, fixtures, and equipment (FFE) from the existing facility will be reused where possible, this includes office equipment, staff lockers, aquatic supplies, and canteen equipment.

The supply and installation of a portion of the new FFE for the facility will be included in the project scope, with the Township being responsible for the rest, as summarized in the Table below.

Item	Project Expense	Owner Provided	
Aquatics			
Lane ropes	X		
Backstroke flags	X		
Diving Board	X		
Timing system		X	
Starting platforms	X		
Lifeguard chairs		X	
Safety equipment		X	
Programming equipment		X	
Bathing suit spinners	X		
Lockers	X		
Arena			
Benches	X		
Hooks	X		
Boot racks	X		
Atrium, MPR, Canteen			
Cabinets	X		
Specialized furniture	X		
Tables and Chairs		X	
Canteen Equipment	X		
Millwork	X		
Staff areas			
Desks, tables, chairs		X	
Computers and peripherals		X	
Office Equipment		X	
Filing Cabinets		X	
Whiteboards and Tack boards	X	X	Owner to supplement as needed
Audio/visual			
Conduit and junction boxes	X		
Security Systems		X	
Server Racks		X	
Wireless Access Points		X	
Speakers		X	
Screens and Displays		X	

resulting in reduced error and re-work.

Our project team will conduct final quality walkthroughs with all sub-trades prior to demobilization from site to ensure all contractual commitments and desired level of quality is achieved. During this walkthrough, we can provide a level of confidence to Loyalist Township to ensure that ‘done means done’. Prior to this walk-through, our trade partners are to provide our site teams with internal trade specific punch lists with comments to provide us with the comfort that a thorough review and final fit-out has been conducted. The project management team collects these lists and ensures that all noted items are completed to our level of satisfaction before conducting a final review with clients and stakeholders.

PROCUREMENT PLAN

Major trades on the project are part of the poly-party agreement and are therefore procured (Modern Niagara for mechanical and electrical, and Acapulco for pool and tiling). The benefit of having the trades onboard during validation is that the IPD team were able to prepare the below early procurement plan for equipment to prevent the risk of potential delay to long lead items and reduce the risk of price escalation.

MODERN NIAGARA EQUIPMENT	
Supplier	Item
HTS	ERV1 (locker rooms)
	ERV2 (Main area)
	ERV3 (Changerooms)
HTS	DHU2 (Pool)
HTS	WSHP1 (CO2)
HTS	WSHP2
HTS	B1/B2 (electric)
	HX 2 (Glycol)
	PHX 1 (Lap Pool)
	PHX 2 (Leisure Pool)
	P1A/B (Heat Recovery)
	P2A/B (CW)
	P3A/B (HW)
	P4A/B (glycol)

CIMCO EQUIPMENT

Supplier	Item
CIMCO	Compressors
CIMCO	Plate/Frame HX
CIMCO	Smart Heat Package
CIMCO	Fluid Cooler
CIMCO	Ecodyr 8500 CFM ***
CIMCO	glycol pump for snow melt, buffer & Cold floor pumps

Further to the poly party trades already appointed, other trades required, including steel stud and drywall, glazing, painting, masonry, scaffolding etc., will be procured publicly following industry standards. Please note that Chandos is lead on procurement of sub-trades as they will be directly contracted to Chandos and not Loyalist Township.

A request for proposal (RFP) will be issued rather than a traditional tender when the requirements for goods and services and construction services needed cannot be definitively specified or where innovative solutions to a problem are sought. The selection of the successful proponent will be based on the effectiveness of the proposed solution rather than on price alone. Each request for proposal document shall include a list of evaluation criteria and shall be evaluated by the Project Management Team (PMT). Evaluation criteria may include, but is not limited to, price, experience and qualifications, methodology, references, schedules and project approach. RFPs will be based upon 50% quantitative (pricing) and 50% qualitative (qualifications) criteria.

For construction costing more than \$10,000.01 but not more than \$200,000.00, a minimum of three written proposals will be obtained. Having reviewed the proposals, the PMT team may make the purchase from such supplier or contractor and upon such terms and conditions that in their opinion are most appropriate for the project. When the lowest quotation cannot be recommended, a report shall be made by the PMT for approval by the Senior Management Team (SMT), and Loyalist Township prior to making the purchase. In appropriate circumstances, a normal sealed request for quotation, tender or request for proposal may be utilized in this dollar range.

For construction costing \$200,000.01 or more, a request for proposal posted through an electronic tendering system such as Building Connected will be issued and awarded with the approval of the PMT and

potentially the SMT.

In line with the requirements set out in the GICB Grant Application, procurement will focus on targeting small, medium and indigenous enterprises and encouraging said enterprises to bid on RFP’s issued.

The following procurement process will be used for the W.J Henderson Recreation Centre Renewal project:

- The PMT will assemble the tender documents and distribute an RFP to the market.
- The RFP package will include the most up to date schedule/s agreed to by the PMT which the successful sub-trades are expected to adhere to.
- Receive the sub-trade proposals in a manner that complies with the Loyalist Township requirements.
- The PMT will analyze the tenders and perform due diligence on the sub-trade responses to determine scope gaps, scope overlaps, exclusions, and inclusions.
- Assemble a tender proposal summary of the results.
- Meet with Loyalist Township and the SMT to review the tender summary on a fully open book basis with the goal to agree on which sub trades scopes could be awarded to.
- Conduct further due diligence with sub-trades where necessary. This could include meetings with the sub-trades and consultants to cover any loose ends in the proposals.
- Explore cost savings suggestions with the sub-trades and report such to the PMT for consideration.
- Provide a final recommendation to Loyalist Township and SMT.
- Receive authorization from the SMT and Loyalist Township.
- Award contracts to successful sub-trades upon receipt of the authorization to proceed.

OPEN BOOK TENDERING

The results of the sub-trade tender are open book. Recommendations for selected sub trades are made by Chandos and reviewed and confirmed with the PMT. In a scenario where a project needs to be fast tracked due to schedule requirements, sequential tendering can be implemented to get foundations under construction

prior to the final design of the interior being completed.

PURCHASING

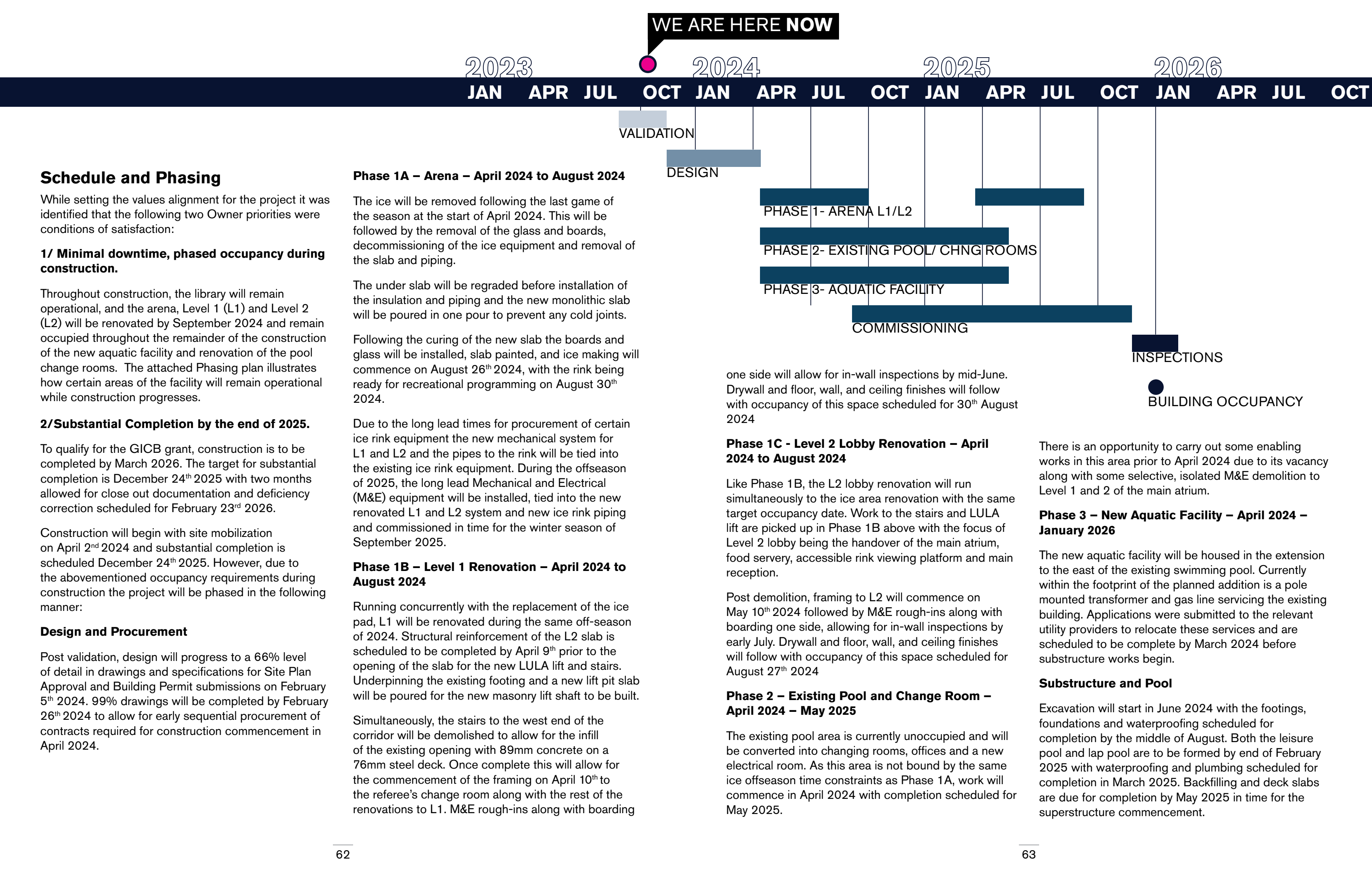
When possible, we encourage purchasing from and support of local suppliers, manufacturers and businesses. A large percentage of our current sub-trade list is comprised of local businesses. Further, there are also materials procured, manufactured and extracted locally.

COMMISSIONING

Commissioning and closeout of the project will be key performance targets throughout the project design, construction, turnover and facility operation. The attention to detail will result in a space that performs as designed at time of delivery. The project team is committed to ensure proper planning, installation, testing, and operations for all elements of the project, from design and installation to post-occupancy. A very rigorous and detailed QA/QC process will be followed and will include:

- Pre and Post-construction review
- Operations and maintenance seminars
- Close out materials (as built drawings; operations and maintenance manuals)
- Warranty administration
- Understand and coordinate and third-party inspections and commissioning agents

Loyalist Township operators will be consulted in the development of the commissioning plan for the project including the conditions of satisfaction for facility turnover prior to occupancy. As part of our standard operating procedure, the commissioning plan is developed during the preconstruction phase. We have rigorous procedures in place to ensure the metrics and gauges of success for design, specification and performance are met during construction and at handover. Our QA/QC program will match with our commissioning vision and master plan to identify critical tolerances and commissioning protocols.



Structure and Envelope

Superstructure will commence with the erection of steel on foundations in May 2025. Parapets, roofing and wall framing will follow before the curtain wall installation in September and siding in December with an envelope milestone scheduled for December 2025.

Finishing Pool Area

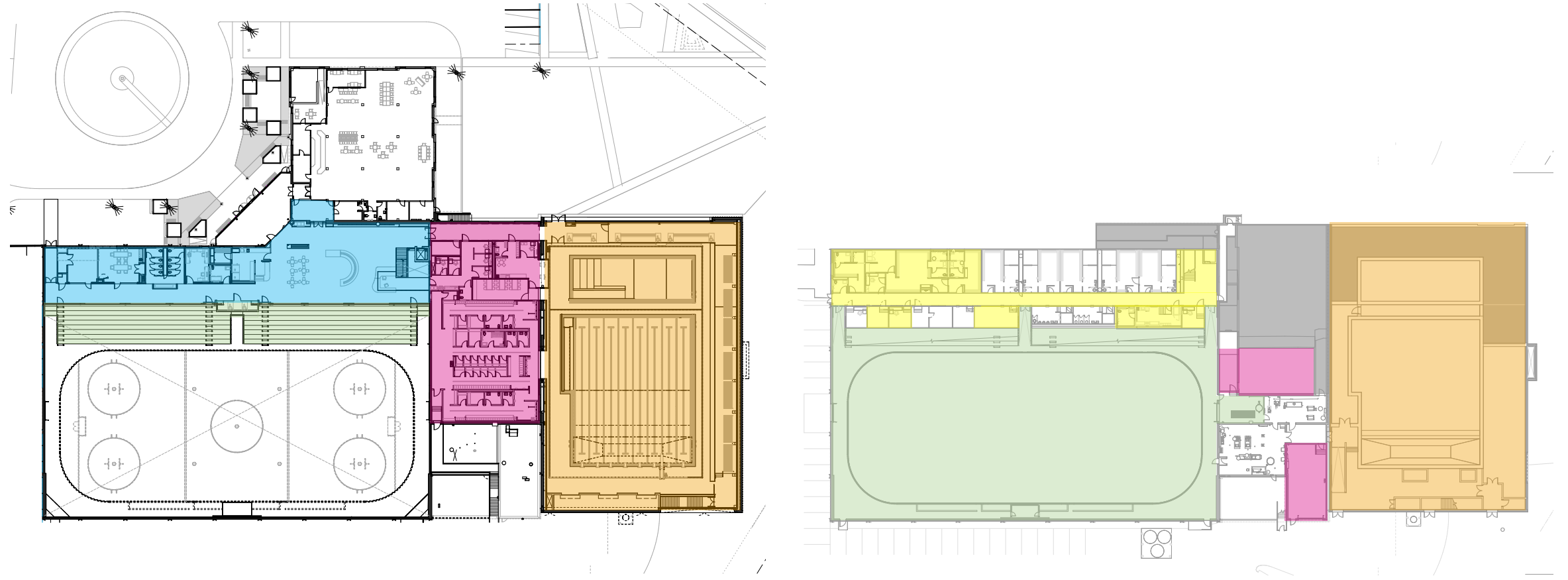
Ceiling, tiling and other finishes are scheduled to commence once the envelope is weathertight with “pool ready for filling” scheduled November 2025 and ready for occupancy inspections in December.

Mechanical Room (Refrigeration) Equipment and tie into New Renovated Area - April 2025 – August 2025

Due to the long lead times for procurement of certain ice rink equipment the new mechanical equipment for Level 1, Level 2 and the rink will be tied into the systems installed in Phases 1A, 1B and 1C during the offseason of 2025 and commissioned in time for the winter season starting in September of that year.

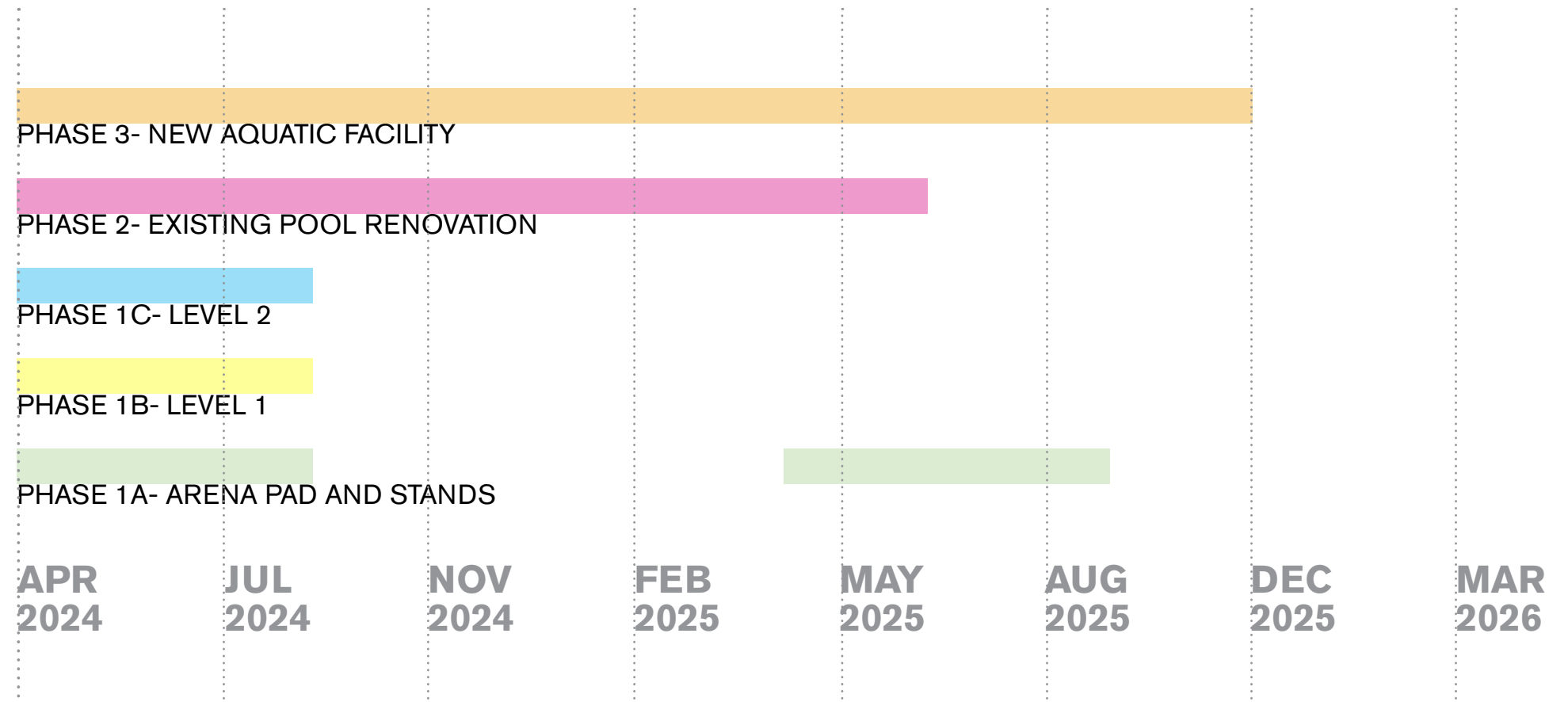
Site Works

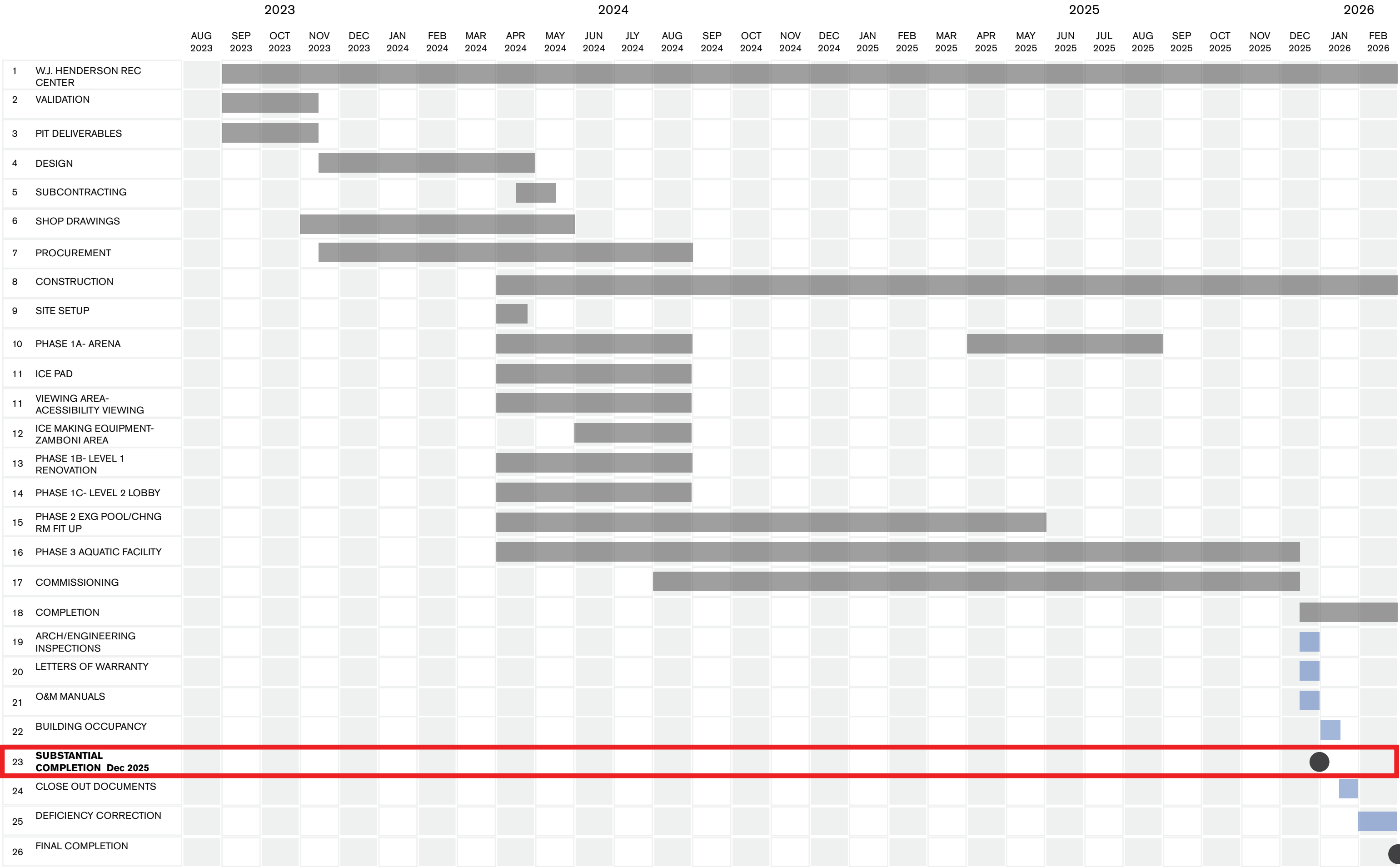
Due to the current long lead timelines associated with the relocations of current hydro, gas and communication services, applications were made at the start of validation with Hydro One, Enbridge and Utilities Kingston respectively to have all services relocated by March 2024 to allow for excavation to commence in June 2024. Furthermore, the design of site services and stormwater management will be completed and constructed prior to site set up on April 2nd 2024.



Level 2

Level 1





THE APPROACH TO PROVIDING A SAFE ENVIRONMENT

Our commitment is to provide a safe environment for staff, IPD employees, contractors and visitors at the site. We take all reasonable steps to prevent work-related incidents and disease through the recognition, evaluation, control, and, wherever practical, the removal of hazards, including but not limited to fire safety, contamination, and dust control. Our culture promotes the awareness of occupational health and safety issues and safe work practices and procedures. We ensure all work areas maintain an effective safety management system and we maintain compliance with provincial and federal occupational health and safety legislation. In addition, we also support employee involvement in all aspects of occupational health and safety. For example, we would liaise with facility management to coordinate construction specific health and safety protocols and procedures to all staff and visitors. The intent would be to identify on site health and safety issues associated with construction. Not only does this enhance on site safety, but we have also found it to be an opportunity to educate on health and safety more broadly in construction.

The challenges of working in an occupied building can be best illustrated in dealing with fire safety systems. Emergency exit lighting and the fire escape routes can be challenging to maintain, including unobstructed escape routes to be kept in good order during major construction work, but this is a challenge that Chandos has risen to successfully and on many occasions. We will actively contribute to finding acceptable alternate access routes for workers and stakeholders during the construction process, including barriers and hoardings to keep these groups apart.

The objectives of our Safety Management System are as follows:

- We take all reasonable steps to prevent work related incidents and disease through the recognition, evaluation, control, and, wherever practical, the removal of hazards.
- Promote the awareness of occupational health and safety issues and safe work practices and procedures.
- Ensure all work areas maintain an effective Safety Management System.
- Maintain compliance with provincial and federal occupational health and safety legislation.
- Support employee involvement in all aspects of occupational health and safety.
- Achieve a workplace with zero incidents and injuries.
- Take all reasonable steps to prevent environmental incidents.

We provide the tools and information people need to make informed decisions through detailed root cause analysis and pre-task planning. Our approach to safety centers on training, instilling, and reinforcing safe behaviors throughout the company and entire project team, including owners, architects and subcontractors. The output is a robust, value-based safety program that looks upstream at leading indicators to produce exceptional downstream results. In many instances our safety initiatives overlap with those of Loyalist Township. When we are undertaking work on occupied facilities, we work closely with building operators to develop a customized safety plan suitable to all parties.

SAFETY MANAGEMENT SYSTEM

It is Chandos policy to educate our employees, subtrades, and occupational health and safety committees to ensure that both the Provincial Acts and Regulations and Chandos Safety Program are met with the highest standards. We will create the safest possible work environment. Safety and production are not mutually exclusive. Safe production is the cornerstone of Chandos safety culture. The foundation of our SMS is split into 10 sections. Each section contains the relevant policies, forms, and support materials.

1. General Policies and Legislation
2. Hazard Assessment and Control
3. Emergency Response Preparedness
4. Employee Onboarding and Training
5. Inspections and Monitoring
6. Close Calls and Incidents
7. Health and Safety Communication
8. General Contractor Site Responsibilities
9. Actions, Records and Statistics
10. Annual Review Process

We understand that the portion of the facility, such as the arena, will be operational for as long as possible during the construction phase. The IPD team worked with Loyalist Township to determine what portions of the facility can remain operational during construction as illustrated in the phasing plan.

Chandos will continue to develop the detailed phasing of each area of the project with the Loyalist Township and Consultant team during design development and planning phases to minimize the disruption to the public. Chandos team has extensive experience to manage operational facilities construction/ renovation.

Please refer to the Lighthouse HSE Overview (electronic safety information acquisition, approval, and reporting system) in the appendices.

Lighthouse HSE Window - Overview

Lighthouse HSE is an electronic safety information acquisition, approval and reporting system. Lighthouse accomplishes this through a series of Forms, Processes, Security Protocols & Permission, Data Views and Dashboards. The dashboard view that each individual sees may differ from others (due to - permission security levels, etc.), however the functionality of the window is the same for each user.

<p><u>Lighthouse Window Functions</u></p> <p>① Hamburger - (Process Menu)</p> <ul style="list-style-type: none">An alternate way of accessing the data in Lighthouse <p>② Search Field</p> <ul style="list-style-type: none">Entering a value in this field (words, numbers, etc.) and hitting enter or clicking on the magnifying glass will search all of Lighthouse for the entered values. <p>③ Home Button</p> <ul style="list-style-type: none">When the Red House is visible on any screen it will return you to the DEFAULT DASHBOARD, usually the General Dashboard. <p>④ User Preferences Menu (your name with a dropdown arrow "▼" beside it)</p> <ul style="list-style-type: none">Allows the user to customize their display settings in Lighthouse <p>⑤ Help Menu</p> <ul style="list-style-type: none">Provides user with access to the help functions in Lighthouse (User Manual, Keyboard Shortcuts, etc.) <p>⑥ Sign Out Button</p> <ul style="list-style-type: none">Closes Lighthouse and returns user to the Sign In screen. <p>⑦ Chandos Logo</p> <ul style="list-style-type: none">Display only <p>⑧ Window Navigation Controls</p> <ul style="list-style-type: none">Function the same way as other windows navigation tools when visible on screen: scroll up & down, Scroll Left & Right, etc. <p>⑨ Dashboard Selections</p> <ul style="list-style-type: none">Displays the Dashboards a user has access to, depending on the user's security permissions. They may be menus, inquiry, or statistical. <p>⑩ Process Selection Area</p> <ul style="list-style-type: none">Where users can select the processes or forms they wish to start, view, update, approve or search. <p><u>Lighthouse Process Selections</u></p> <p><i>Not all process buttons will be available on all dashboards, therefore specific users may not see all the buttons.</i></p> <p>❶ Specifically, Programmed Process Button</p> <ul style="list-style-type: none">This will be in a color that is NOT BLUE. These buttons display data in an alternate format than the system default.This process button allows display of the "Sign In" & "Sign Out" transactions for the current day formatted to print emergency evacuation sheets for the current day after user filter them to a specific job. <p>❷ Start Process Button</p> <ul style="list-style-type: none">This will be BLUE in color. other than BLUE. Entering a value in this field (words, numbers, etc.) and hitting enter or clicking on the magnifying glass will search all of Lighthouse for the entered values	<ul style="list-style-type: none">This specific button starts an Incident/Near Miss Report.Other processes include – Weekly Site Inspections, Toolbox Meetings Minutes, Project Management inspections, etc. <p>❸ Specifically, Programmed Process Button</p> <ul style="list-style-type: none">This will be in a color that is NOT BLUE. These buttons display data in an alternate format than the system default.This process button allows display all the "Sign In" & "Sign Out" transactions for the current day. These can be further filtered down to specific jobs. <p>❹ Start a Support Request submission Process Button</p> <ul style="list-style-type: none">This allows user to report trouble issues, user account requests, duplicate form removal requests, design enhancements suggestions and management in section updates. <p>❺ View Process Buttons</p> <ul style="list-style-type: none">Displays the selected process' active data that a user has security access to in a tabular format like Excel. This data can then be filtered as the user decides.These buttons are small than the Start process buttons and will be white in Color <p>❻ Approvals Processing</p> <ul style="list-style-type: none">These are specific "Approval Request" to be actioned by the user. These specific forms will remain at this stage until the user reviews the specific form and approves it. This is a COR Audit requirement for middle and senior management to demonstrate involvement in the process.Forms that are not approved will not proceed to the next stage in the approval chain until the PC, PM, PD, CM, DM or HSE representative clicks on the Approval Button. <p>❼ Chandos Tools Search Widgets</p> <ul style="list-style-type: none">Provides the user with access to several Chandos safety tools.These context searches are based on keywords.Tools include: Chandos Safety Manual; Toolbox Talks; Code of Practices, Safe Work Practices, Safe job Procedures, etc. <p>❽ Action Items Due requiring the User to do something</p> <ul style="list-style-type: none">These are "Action Items" & "Corrective Actions", that requires you to do something and confirm it has been completed. <p>❾ Historical list of the 10 Oldest Action Items</p> <ul style="list-style-type: none">Shows your action items that have not been addressed by you yet. <p>❿ System Message Process Area</p> <ul style="list-style-type: none">From time to time system wide messages will be posted in this area, outages, upgrade to Lighthouse, etc.
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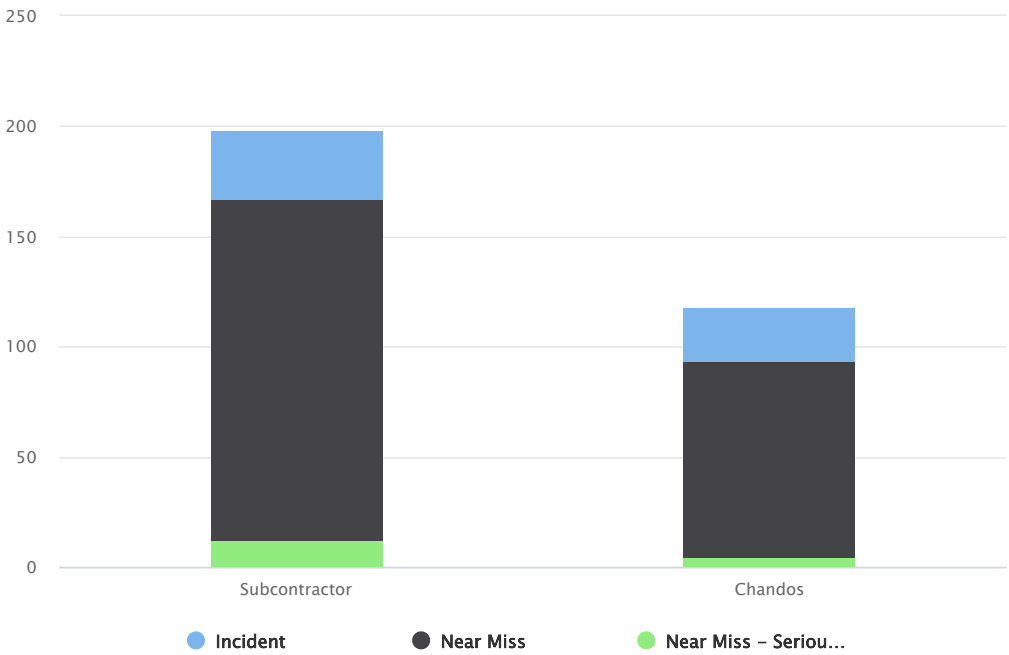
🔍 Job-Events By Classification

243	Near Miss
56	Incident
17	Near Miss – Serious Potential

🔍 Job Events by Classification for Chandos

88	Near Miss
25	Incident
5	Near Miss – Serious Potential

🔍 Job Events Classification by Company



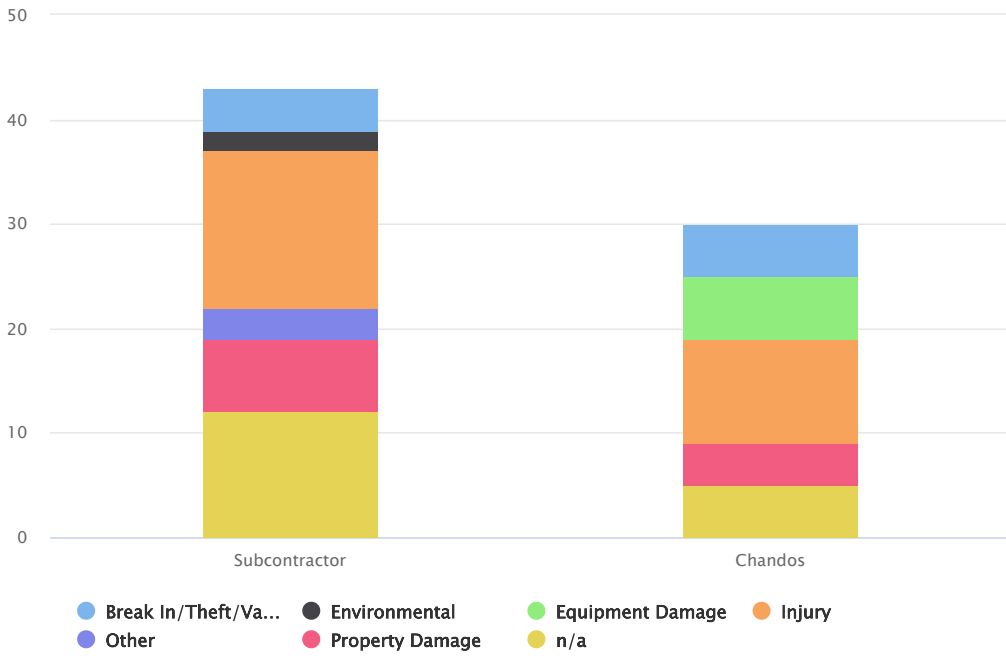
📅 Weekly Site Inspections

74	Attention: Superintendent Review/Approval Required
68	Attention: Project Managment Review/Approval Required
48	Closed
18	Attention: Safety Specialist Review/Approval Required
7	In Progress
215	Total

🔍 Job Incidents by Primary Event Type

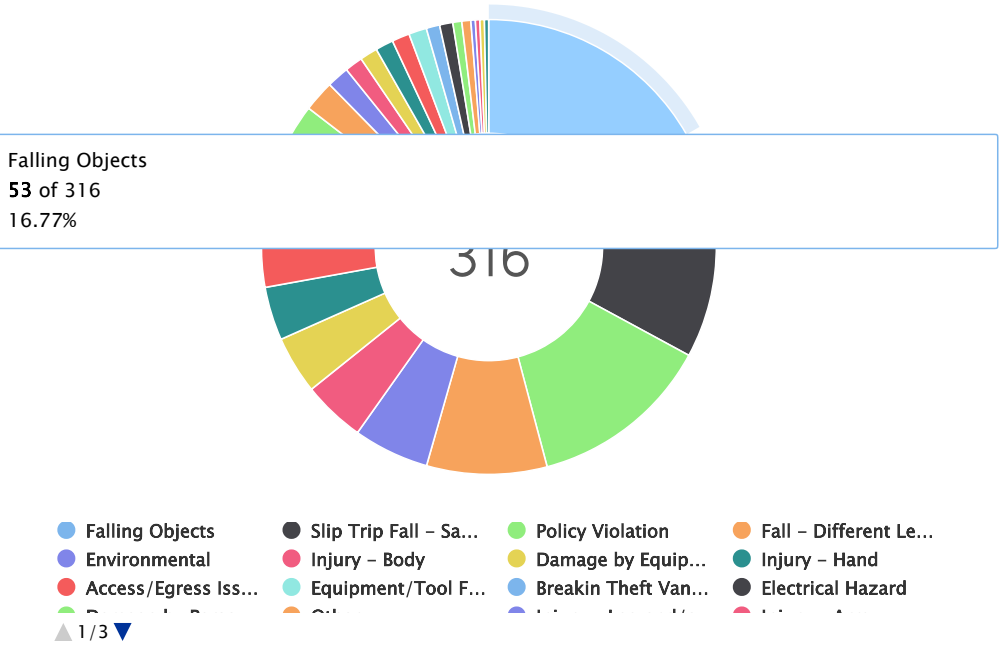
25	Injury
11	Property Damage
9	Break In/Theft/Vandalism
6	Equipment Damage
3	Other
2	Environmental

🔍 Job Incidents by Primary Event Type by Company



🔍 Job Incidents by Primary Event Type by Company

🔍 Incident/Near Miss Trending



📅 Job Safety Mini Audits

9	Closed
8	Awaiting PM/Super COR Compliance Approval
2	In Progress

📅 Job Safety Contact Reports

6	Closed
4	Awaiting PM/Super COR Compliance Approval

📅 Job Safety Observations

None

📅 Job Safety Comprehensive Inspection

1	Closed
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🔍 Job Follow Up Actions

6.0 Construction Costs

Risk Management

There is no traditional “contingency” on an IPD project, instead IPD teams use a risk register – a detailed list of all potential issues on a project, as related to budget, schedule, or other measurable outcomes.

Budget Development

The primary purpose of budget development in validation is to create accountability prior to significant money expenditures.

During the validation period, the project team members worked through several iterations of the project budget to ensure that there were no scope gaps or doubling up of scope, and that quantities of materials were aligned with the design. Additionally, Modern Niagara and Acapulco Pools, in their capacity as trade partners, received supplier pricing for all materials and equipment which would be included in their respective scopes of work, providing additional certainty to the budget. Furthermore, Modern Niagara and Acapulco received pricing for all equipment from suppliers to provide certainty in the budgets carried for their scope.

In addition to trade partner pricing, Covertite were onboarded through a design-assist contract for the envelope to ensure that this scope of work could be achieved for the budget carried for roofing, exterior cladding, exterior glazing, and exterior doors. Trade pricing was also attained for concrete, rebar, formwork, CLT, flooring, tile, painting, lockers, food service equipment, bleachers, rink boards and glass, LULA elevator, earthworks, and site services.

In terms of trade coverage for the construction cost carried in the budget, trade partners accounted for **46%** of the value, with a further **40%** of construction costs backed up by trade pricing received by non-partners. The remaining **14%** of the construction estimate was developed using actual rates from previous projects of a similar size and scope which were completed by Chandos Construction in the same region as the W.J. Henderson Recreation Centre Renewal Project.

The budget is based on procurement in Q1 and Q2 of 2024 and includes for escalation of costs expected during procurement, however, a further 3.42% escalation was carried in the risk register.

DETAILED COST ESTIMATE IN APPENDIX F

Monthly Progress Forecast and Billing

Contractor/
onsultant:
Project:
Project #:

Group 2

Period Ending:
Dec-19
Project Claim #
Subcontract #

Profit %
18.00%
Overhead %
Included

Cells in yellow require your entry.
Cells in green are auto-calculated, do not edit these cells.

Company	Item Description	Phase Code	Budget	Labour/ Material Rate	Budgeted Labour/ Material Cost	Units To Date	Total Costs To Date	% Spent	Units to Complete	Cost to Complete	Forecast Units At Completion	Total Forecast Costs at Completion	Forecast Versus Budget	Units This Claim	Previous Units Claimed	Amount Previously Claimed	Amount Claimed This Progress
Bill Group 1 Due Diligence Phase 005310-1			Budget			To Date			Forecast				This Claim				
Company	Item Description	Phase Code	Budget	Labour/ Material Rate	Budgeted Labour/ Material Cost	Units To Date	Total Costs To Date	% Spent	Units to Complete	Cost to Complete	Forecast Units At Completion	Total Forecast Costs at Completion	Forecast Versus Budget	Units This Claim	Previous Units Claimed	Amount Previously Claimed	Amount Claimed This Progress
Office Staff																	
		005310-1	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
		005310-1	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
		005310-1	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
		005310-1	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
		005310-1	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
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		005310-1	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
		005310-1	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
Office Staff Sub Total			0	\$ -	0.00 \$ -	0.00 \$ -	0.0%	0.00 \$ -	0.00 \$ -	0.00 \$ -	\$ -	\$ -	\$ -	0.00	0.00	\$ -	\$ -
Material																	
		005310-1	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
		005310-1	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
		005310-1	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
Material Sub Total			0	\$ -	0.00 \$ -	0.00 \$ -	0.0%	0.00 \$ -	0.00 \$ -	0.00 \$ -	\$ -	\$ -	\$ -	0	0	\$ -	\$ -
1	Due Diligence Phase 005310-1		0.0	\$ -	0.00 \$ -	0.00 \$ -	0.0%	0.00 \$ -	0.00 \$ -	0.00 \$ -	\$ -	\$ -	\$ -	0.00	0.00	\$ -	\$ -
Bill Group 2 PRE Validation Phase - Team Assets 005310-2			Budget			To Date			Forecast				This Claim				
Company	Item Description	Phase Code	Budget	Labour/ Material Rate	Budgeted Labour/ Material Cost	Units To Date	Total Costs To Date	% Spent	Units to Complete	Cost to Complete	Forecast Units At Completion	Total Forecast Costs at Completion	Forecast Versus Budget	Units This Claim	Previous Units Claimed	Amount Previously Claimed	Amount Claimed This Progress
Office Staff																	
		005310-2	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
		005310-2	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
		005310-2	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
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		005310-2	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
		005310-2	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
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		005310-2	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
		005310-2	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
Office Staff Sub Total			0	\$ -	0.00 \$ -	0.00 \$ -	0.0%	0.00 \$ -	0.00 \$ -	0.00 \$ -	\$ -	\$ -	\$ -	0.00	0.00	\$ -	\$ -
Material																	
		005310-2	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
		005310-2	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
		005310-2	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	
Material Sub Total			0	\$ -	0.00 \$ -	0.00 \$ -	0.0%	0.00 \$ -	0.00 \$ -	0.00 \$ -	\$ -	\$ -	\$ -	0	0	\$ -	\$ -
2	PRE Validation Phase - Team Assembly 005310-2		0.0	\$ -	0.00 \$ -	0.00 \$ -	0.0%	0.00 \$ -	0.00 \$ -	0.00 \$ -	\$ -	\$ -	\$ -	0.00	0.00	\$ -	\$ -
Bill Group 3 PRE Validation Phase - Pre Validat 005310-3			Budget			To Date			Forecast				This Claim				
Company	Item Description	Phase Code	Budget	Labour/ Material Rate	Budgeted Labour/ Material Cost	Units To Date	Total Costs To Date	% Spent	Units to Complete	Cost to Complete	Forecast Units At Completion	Total Forecast Costs at Completion	Forecast Versus Budget	Units This Claim	Previous Units Claimed	Amount Previously Claimed	Amount Claimed This Progress
Office Staff																	
		005310-3	\$	-	0.00 \$ -	0.00 \$ -	0.0%		\$ -	0.00 \$ -	\$ -	\$ -	\$ -		\$ -	\$ -	

Forecast budget tracking tool

CONSTRUCTION ESTIMATE

Project: WJHRC Budget 2023.10.25
Prime Consultant: MJMA
Budget Class: C



Code	Description	Quantity	UoM	Total	% of Total	Cost/Size Unit
00 53 00	Design Agreement Forms			1,929,725	4.16 %	43.76
00 61 00	Bond Forms			150,000	0.32 %	3.40
00 73 00	Supplementary Conditions			604,935	1.30 %	13.72
01 18 00	Project Utility Sources			172,775	0.37 %	3.92
01 31 00	Project Management and Coordination			2,185,848	4.71 %	49.57
01 32 00	Construction Progress Documentation			25,090	0.05 %	0.57
01 35 00	Special Procedures			37,800	0.08 %	0.86
01 38 00	Travel/Subsistence, Salaried Staff			120,041	0.26 %	2.72
01 45 00	Quality Control			127,105	0.27 %	2.88
01 51 00	Temporary Utilities			282,045	0.61 %	6.40
01 52 00	Construction Facilities			158,506	0.34 %	3.59
01 53 00	Temporary Construction			3,500	0.01 %	0.08
01 54 00	Construction Aids			436,548	0.94 %	9.90
01 55 00	Vehicular Access and Parking			30,589	0.07 %	0.69
01 56 00	Temporary Barriers and Enclosures			60,390	0.13 %	1.37
01 57 00	Temporary Controls			35,090	0.08 %	0.80
01 58 00	Project Identification			20,970	0.05 %	0.48
01 71 00	Examination and Preparation			115,563	0.25 %	2.62
01 74 00	Cleaning and Waste Management			145,490	0.31 %	3.30
01 78 00	Closeout Submittals			30,652	0.07 %	0.70
02 21 00	Surveys			25,000	0.05 %	0.57
02 26 00	Hazardous Material Assessment			15,000	0.03 %	0.34
02 32 00	Geotechnical Investigations			53,328	0.11 %	1.21
02 41 00	Demolition			363,920	0.78 %	8.25
03 11 00	Concrete Forming			1,174,486	2.53 %	26.63
03 21 00	Reinforcement Bars			657,491	1.42 %	14.91
03 31 00	Structural Concrete			639,279	1.38 %	14.50
03 35 00	Concrete Finishing			236,157	0.51 %	5.36
03 41 00	Precast Structural Concrete			100,000	0.22 %	2.27
04 20 00	Unit Masonry			968,280	2.09 %	21.96
05 12 00	Structural Steel Framing			2,090,330	4.51 %	47.40
05 50 00	Metal Fabrications			5,280	0.01 %	0.12
05 73 00	Decorative Metal Railings			40,471	0.09 %	0.92
06 10 00	Rough Carpentry			126,435	0.27 %	2.87
06 17 00	Shop-Fabricated Structural Wood			850,000	1.83 %	19.27
06 41 00	Architectural Wood Casework			362,300	0.78 %	8.22
07 11 00	Dampproofing			164,373	0.35 %	3.73
07 21 00	Thermal Insulation			179,873	0.39 %	4.08
07 26 00	Vapor Retarders			37,222	0.08 %	0.84
07 42 00	Wall Panels			1,704,389	3.67 %	38.65
07 52 00	Modified Bituminous Membrane Roofing			831,080	1.79 %	18.85
07 84 00	Firestopping			66,150	0.14 %	1.50
08 11 00	Metal Doors and Frames			352,600	0.76 %	8.00
08 33 00	Coiling Doors and Grilles			45,000	0.10 %	1.02
08 41 00	Entrances and Storefronts			489,750	1.06 %	11.11
08 44 00	Curtain Wall and Glazed Assemblies			273,020	0.59 %	6.19
08 60 00	Roof Windows and Skylights			18,000	0.04 %	0.41
09 20 00	Plaster and Gypsum Board			529,873	1.14 %	12.02
09 30 00	Tiling			388,072	0.84 %	8.80
09 61 00	Flooring Treatment			156,917	0.34 %	3.56
09 80 00	Acoustic Treatment			113,010	0.24 %	2.56
09 90 00	Painting and Coating			369,500	0.80 %	8.38
10 14 00	Signage			250,000	0.54 %	5.67
10 28 00	Toilet, Bath, and Laundry Accessories			277,475	0.60 %	6.29
11 40 00	Foodservice Equipment			105,000	0.23 %	2.38
12 21 00	Window Blinds			245,555	0.53 %	5.57
12 61 00	Fixed Audience Seating			60,000	0.13 %	1.36
13 11 00	Swimming Pools			3,192,161	6.88 %	72.38
13 18 00	Ice Rinks			252,410	0.54 %	5.72
14 28 00	Elevator Equipment and Controls			122,988	0.27 %	2.79
22 00 00	Plumbing			6,403,383	13.80 %	145.20
26 00 00	Electrical			2,541,168	5.48 %	57.62
31 05 16	Aggregates for Earthwork			13,680	0.03 %	0.31
31 23 00	Excavation and Fill			515,646	1.11 %	11.69

Project: WJHRC Budget 2023.10.25
Prime Consultant: MJMA
Budget Class: C



Code	Description	Quantity	UoM	Total	% of Total	Cost/Size Unit
31 66 00	Special Foundations			25,000	0.05 %	0.57
32 12 00	Flexible Paving			54,365	0.12 %	1.23
32 16 00	Curbs, Gutters, Sidewalks, and Driveways			72,505	0.16 %	1.64
32 31 00	Fences and Gates			5,405	0.01 %	0.12
32 33 00	Site Furnishings			19,700	0.04 %	0.45
32 90 00	Planting			184,280	0.40 %	4.18
33 00 00	Utilities			496,491	1.07 %	11.26
	Estimate Subtotal			34,936,459	75.30 %	792.21/SF
	Percent Estimate Total					
	IPD PARTNER O/H - Pool Partner	21.00	%	682,156	1.47 %	15.47/SF
	IPD PARTNER O/H - Mechanical Partner	12.00	%	600,132	1.29 %	13.61/SF
	IPD PARTNER O/H - Electrical Partner	12.00	%	311,266	0.67 %	7.06/SF
	DESIGN GROUP O/H - Architectural	174.00	%	894,150	1.93 %	20.28/SF
	DESIGN GROUP O/H - Structural	99.00	%	128,322	0.28 %	2.91/SF
	DESIGN GROUP O/H - Envelope	99.00	%	64,350	0.14 %	1.46/SF
	DESIGN GROUP O/H - Electrical	95.56	%	183,379	0.40 %	4.16/SF
	DESIGN GROUP O/H - Mechanical	95.56	%	250,157	0.54 %	5.67/SF
	DESIGN GROUP O/H - Sustainability	95.56	%	49,605	0.11 %	1.12/SF
	Team O/H on Construction Total			3,163,516	6.82 %	71.74
	IPD PARTNER Risk Pool - Pool Partner	6.00	%	235,831	0.51 %	5.35/SF
	IPD PARTNER Risk Pool - Mechanical Partner	9.00	%	504,111	1.09 %	11.43/SF
	IPD PARTNER Risk Pool - Electrical Partner	9.00	%	261,463	0.56 %	5.93/SF
	DESIGN GROUP Risk Pool - Architectural	15.00	%	211,204	0.46 %	4.79/SF
	DESIGN GROUP Risk Pool - Structural	12.50	%	32,242	0.07 %	0.73/SF
	DESIGN GROUP Risk Pool - Envelope	12.50	%	16,169	0.03 %	0.37/SF
	DESIGN GROUP Risk Pool - Electrical	15.00	%	56,292	0.12 %	1.28/SF
	DESIGN GROUP Risk Pool - Mechanical	15.00	%	76,791	0.17 %	1.74/SF
	DESIGN GROUP Risk Pool - Sustainability	15.00	%	15,227	0.03 %	0.35/SF
	Subtotal			39,509,306	85.15 %	895.90/SF
	GC O/H - Chandos	5.65	%	2,225,680	4.80 %	50.47/SF
	Subtotal			41,734,986	89.95 %	946.37/SF
	GC Risk Pool - Chandos	3.75	%	1,560,684	3.36 %	35.39/SF
	Subtotal			5,195,694	11.20 %	117.82
	Risk Register	3,103,764.00	lsum	3,103,764	6.69 %	70.38/SF
	Subtotal			3,103,764	6.69 %	70.38
	Total Estimate	44,100.00	SF	46,399,434	100.00 %	1,052.14/SF

6.1 Risk Register

The primary purpose of the Risk Register is to identify and monitor project risks throughout project duration and inform relevant stakeholders.

Visualizing a project's outcome before it starts is a valuable way to identify risks and opportunities to record, track, and mitigate. At the kick-off of the W.J Henderson Recreational Centre validation the team members, in groups, compiled a pre-mortem. A pre-mortem meeting is a pre-project exercise that involves visualizing a project failure and evaluating how to solve the issues. This brings forward risks, issues, and opportunities at the early stages of a project which leaves as much time as possible to mitigate. It is used as the first step in populating the risk register.

Risks Identified

- **Market Volatility** – Material and labour cost escalations (inflation). Escalation has been a major risk realised on projects over the past years globally. In order to mitigate this risk, the team has identified all equipment and materials that can be procured early in order to fix prices prior to the escalation. The intention is to order the mechanical equipment such as a ERV's, dehumidifiers, heat exchangers, heat pumps as well as CIMCO refrigeration equipment valued at \$2.25m after approval of validation to mitigate any price escalations associated with this equipment. Furthermore, other materials such as tile may be procured early during design development and stored to prevent escalating costs.
- **Bedrock** – The limestone bedrock elevation, identified in the geotechnical report, varies between elevation ranging from 93.3m to 98.9 and may vary further between borehole locations along with a variance in degree of weathering and will require final inspection and approval from the geotechnical engineer. This may have impact on the pool extension as well as the site service scope of works such as swales and underground services.
- **Structural Undermining of Existing Pool** – The capping of the existing pool with a concrete slab applies additional loading to the current pool walls. To mitigate this risk Malroz (Geotechnical Engineer) hand dug at locations around the existing pool walls to determine if the foundations were bearing on the bedrock. During this investigation Malroz were unable to advance to rock and further investigations with limited access drilling equipment will be required to investigate further during design development.
- **Scope Gaps and Interferences** - Gaps in scope and interference between trades could cause extras in both cost and time to investigate and mitigate problems that arise. Chandos has a team of dedicated BIM professionals that will aid in assessing clash detection with consultants. After trade scopes are awarded, we will also conduct Project Implementation Team meetings (PIT) that include representatives from each trade and assessing where scopes touch and overlap. These meetings have successfully been conducted on several projects and have proven to provide greater cooperation, resolution to timing of work, and solutions to conflict areas.

RISK REGISTER

Project: WJ Henderson Recreation Centre
Client: Loyalist Township
Date: 03-Nov-23

Date: 03-Nov-23											TOTAL	TOTAL																						
											\$ 8,824,495	\$ 3,103,764																						
RISK ITEM #	STATUS:	DATE POSTED	RESPONSIBILITY	POTENTIAL RISK	DETAILED DESCRIPTION	RISK TRIGGER	AFFECTS (Environmental, Health, Safety, Costs / Schedule, Relationships, Tendering, Logistics)	PROBABILITY Low = <33% Medium <66% High >66%	IMPACT	Risk Matrix	POTENTIAL COST RANGE	RISK AMOUNT CARRIED	RISK STRATEGY:	RISK STRATEGY DESCRIPTION																				
	Active Dormant Retired		Team/PIT										Avoidance, Transfer, Mitigation, Acceptance																					
1	Active	14-Jun-23	ALL	Disruption to Existing Occupants/Programming	Because this project includes significant renovations to existing facilities there is the possibility of disruption to existing programming which would have large impacts to Loyalist as this is one of the prime facilities available to the local population	Disruption due to construction activities	Relationships, Schedule, Cost	High	Medium	<table><tr><td></td><td></td><td>X</td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table>			X										\$ 199,500	\$ 177,333	Mitigation	Chandos will develop detailed phasing of each area of the project with the Loyalist and Consultant team during validation and planning phase to minimize the disruption to the public. Chandos team has extensive experience managing operational facilities construction/renovations.								
		X																																
2	Active	14-Jun-23	ESTIMATE	Market Volatility	Current Estimate is based on procurement in Q1 and Q2 of 2024. 3.42% forecasted escalation calculated on historical data from Stats Canada. (3.42% of \$46.5m less RR @\$2.8M = 1,494,540)	Material and labor cost escalations / Inflation	Schedule, Cost	Medium	High	<table><tr><td>PROB.</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td>X</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> <table><tr><td>IMPACT</td><td></td><td></td><td></td><td></td></tr></table>	PROB.									X						IMPACT					\$ 1,494,540	\$ 996,360	Mitigation	With the IPD contract, major trades will be included in the overall team agreement, and the team will therefore be able to get early updates on any supplier pricing impacts or potential labor shortfalls. For any parties not included in the overall team agreement, Chandos’ estimating team would reach out well in advance of tendering the project to “prime” the market and ensure trades are interested in the project and competitive tenders will be received. Because Chandos will be working closely with the design consultants, any lead time issues or alternate products can be investigated during the pre-construction phase, so that once mobilized these issues can be avoided. Early procurement of equipment and supplies to buy out and avoid escalation. Storage costs may apply.
PROB.																																		
				X																														
IMPACT																																		
3	Active	14-Jun-23	OWNER	Permits & Occupancy Phases	Permit timelines for complex renovations can be extended compared to typical new-build construction. Phased projects also require separate occupancy permits, which requires agreement from the township and potential adjustment of scopes and finishes. Assuming 2 month delay, cost of GC's for this period (GC's per month for site super (\$15k/m), coordinator (\$13k/m) and partial PM (\$5k/m) = \$33k/m	Non availability of permits	Schedule, Cost	Medium	Medium	<table><tr><td>PROB.</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td>X</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> <table><tr><td>IMPACT</td><td></td><td></td><td></td><td></td></tr></table>	PROB.							X								IMPACT					\$ 66,000	\$ 36,667	Mitigation	Early meetings with the permitting authorities during validation will help ensure the team's proposed schedule and sequencing is realistic based on permit issuance timeframes and occupancy phase requirements. These dates will be tracked in all schedules to ensure the team is prepared with all required documents and consultant schedules for each phased occupancy milestone.
PROB.																																		
		X																																
IMPACT																																		
4	Retired	14-Jun-23	ALL	Construction Communication	Critical to keep Consultants, Client, and Users apprised of all updates or potential upcoming impacts related to construction. Library has a set schedule which is crucial for the operation.	Stakeholders unaware of any change in situations	Schedule, Cost	High	Low	<table><tr><td>PROB.</td><td>X</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> <table><tr><td>IMPACT</td><td></td><td></td><td></td><td></td></tr></table>	PROB.	X														IMPACT					\$ -	\$ -	Avoidance	Chandos understands the importance of undisturbed operation of the facility so we will keep everyone one updated and always have a plan B in case of any planned delays due to unknown conditions or happenings. Develop communication plan to avoid any miscommunication.
PROB.	X																																	
IMPACT																																		
5	Active	14-Jun-23	CIVIL	Landscape design development and Stormwater Collection	The new roof and hardscapes may affect the stormwater collection in the immediate areas of the new project.	Overloading of stormwater collection system	Environmental, Safety, Cost	Medium	Medium	<table><tr><td>PROB.</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td>X</td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> <table><tr><td>IMPACT</td><td></td><td></td><td></td><td></td></tr></table>	PROB.							X								IMPACT					\$ 128,000	\$ 71,111	Mitigation	The new structure may create new hydrology considerations with roof drainage to the rainwater management system. Review of options for rooftop drainage during construction to reduce the possibility of overloading systems.
PROB.																																		
		X																																
IMPACT																																		
6	Retired	14-Jun-23	MECH	Removal and exposal of chemicals and contamination related to existing ammonia plant.	Introduction of a trenchless underground piping manifold. Pipe integrity	Corrosion of pipe network	Environmental, Safety, Cost	Low	Low	<table><tr><td>PROB.</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>X</td><td></td><td></td><td></td></tr></table> <table><tr><td>IMPACT</td><td></td><td></td><td></td><td></td></tr></table>	PROB.											X				IMPACT						\$ -	Avoidance	Ammonia not excepted to be media in under slab piping. Trenchless application being pursued for piping durability. Corrosion remediation measures and identification of deterioration in areas with clamps, connectors and leads for the new connection and adjusted rate of flow from pipe configuration changes.
PROB.																																		
	X																																	
IMPACT																																		
7	Active	14-Jun-23	ENVLP	Pressurization Differential, Vestibules, and interior wall connection	The demising wall between the enclosed pool and the arena will need to be reviewed for the vapor barrier inside the building. The pool natatorium will operate at 30%-60% relative humidity based on ASHRAE 62.1-2010. The pressurization of the arena will create a small weather system in the area. The separation of the two entities will need to be reviewed to ensure that there is no breach or short cycling of the AHU's	Moisture/Vapor affecting air quality and structural integrity	Environmental, Health, Safety,	High	Low	<table><tr><td>PROB.</td><td>X</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> <table><tr><td>IMPACT</td><td></td><td></td><td></td><td></td></tr></table>	PROB.	X														IMPACT					\$ 28,200	\$ 21,933	Mitigation	Environmental barrier identified for respective mechanical systems in locations
PROB.	X																																	
IMPACT																																		
8	Retired	14-Jun-23	MECH	Mechanical connection to new refrigeration plant	Subtle scope review and pipe integrity will be determined for connections to new piping branch. Connectivity to pump configuration, rate of flow, insulation of new line of site distance	Insufficient space for HVAC system, Energy loss	Schedule, Cost, Environmental	High	Low	<table><tr><td>PROB.</td><td>X</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> <table><tr><td>IMPACT</td><td></td><td></td><td></td><td></td></tr></table>	PROB.	X														IMPACT						\$ -	Avoidance	Review GPM and PSI / Delta T line loss based on liner foot of travel to ensure refrigeration plant maintains energy efficiency with distance change to slab floor. We will engage subcontractors at an early phase to get special layout requirements from shop drawings. Obtain schedule implications and advise accordingly. Perhaps a better use of the heat is for the snow dump pit for ice melt. No expectation of large change of footprint for new equipment. Design is to use HR loop for snow melt pit
PROB.	X																																	
IMPACT																																		
9	Retired	14-Jun-23	ALL	Material Delivery	Construction site to have appropriate marshaling and staging areas. However, the risk of lifting material into a building always exists. Site access could cause schedule and cost to suffer. Contingency for heavy delivery items.	Site inaccessible for equipment and lifting activity	Schedule, Cost, Logistics	High	Low	<table><tr><td>PROB.</td><td>X</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> <table><tr><td>IMPACT</td><td></td><td></td><td></td><td></td></tr></table>	PROB.	X														IMPACT						\$ -	Mitigation	Ensure site access requirements are fully fleshed out and understood by all subcontractors. Analyze, in detail, delivery schedules and the requirement for delivering material by unconventional means. Occupied space
PROB.	X																																	
IMPACT																																		
10	Active	14-Jun-23	CIVIL	Environmental Impact	Erosion and sedimentation impacts that may affect immediate areas and community impact conservation.	Soil erosion, noise pollution	Environmental, Relationships, Cost	High	Low	<table><tr><td>PROB.</td><td>X</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> <table><tr><td>IMPACT</td><td></td><td></td><td></td><td></td></tr></table>	PROB.	X														IMPACT					\$ 16,750	\$ 13,028	Mitigation	Possible changes to accommodate the delivery, relocation or changes to the site landscape will require operational review and oversight to ensure alignment with current bylaw mandates and noise reduction requirements.
PROB.	X																																	
IMPACT																																		
11	Retired	14-Jun-23	MECH	Refrigeration Installer	Specialized team to install and certify refrigeration plant. The install team will be non-local and will require specific installation criteria to be met prior to site arrival.	Mismanagement of sub-contractors	Schedule, Cost, Safety	High	Low	<table><tr><td>PROB.</td><td>X</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> <table><tr><td>IMPACT</td><td></td><td></td><td></td><td></td></tr></table>	PROB.	X														IMPACT					\$ 150,000	\$ -	Mitigation	Defined scope of work and parameters of installation is necessary to prevent overruns. Discussion to be had regarding CIMCO falling under mech as a sub or if engaged directly (engaged directly would reduce OH/P percentages as opposed to engaging a sub)
PROB.	X																																	
IMPACT																																		
12	Active	14-Jun-23	STRUCT	Equipment Placement	Positioning large/heavy M&E equipment on existing structure poses potential risk to reinforce existing framing members	Structural failure due to excess load (live)	Schedule, Cost, Safety	High	Low	<table><tr><td>PROB.</td><td>X</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> <table><tr><td>IMPACT</td><td></td><td></td><td></td><td></td></tr></table>	PROB.	X														IMPACT					\$ 15,000	\$ 11,667	Mitigation	Work with structural base build designer/consultant to ensure additional loading due to lifts and heavy equipment is fully understood prior to construction (ERV relocation in particular)
PROB.	X																																	
IMPACT																																		
13	Active	14-Jun-23	ESTIMATE	Cost Control	Project conditions may expose unforeseen installation or structural issues. Subcontractor input depending on finalized scope poses a project cost risk	Scope creep	Schedule, Cost	Low	Low	<table><tr><td>PROB.</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>X</td><td></td><td></td><td></td></tr></table> <table><tr><td>IMPACT</td><td></td><td></td><td></td><td></td></tr></table>	PROB.											X				IMPACT					\$ 152,000	\$ 16,889	Mitigation	Prompt review of design requirements with project team (including client and architect) in an open and collaborative environment at the beginning stages of construction will mitigate this risk. Our final risk register will also flesh out and provide a more robust model to assess project contingency.
PROB.																																		
	X																																	
IMPACT																																		

14	Active	14-Jun-23	ALL	Scope Gaps and Interferences	Gaps in scope and interference between trades could cause extras in both cost and time to investigate and mitigate problems that arise. There is potential for overlap of scopes, creating grey areas of misunderstanding and responsibility.	Scope conflicts	Schedule, Cost, Relationships	Medium	Low	<div><div>PROB. <div><div></div><div>X</div><div></div><div></div><div></div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 309,000	\$ 137,333	Mitigation	Chandos has a team of dedicated BIM professionals that will aid in assessing clash detection with consultants. After trade scopes are awarded, we will also conduct Project Implementation Team meetings (PIT) that include representatives from each trade and assessing where scopes touch and overlap. These meetings have successfully been conducted on several projects and have proven to provide greater cooperation, resolution to timing of work, and solutions to conflict areas.
15	Active	14-Jun-23	CIVIL	Current Code compliance	A base build project turnover delay will impact schedule for the building fit out.	Delays in execution and testing/inspection	Schedule, Cost	Medium	Low	<div><div>PROB. <div><div></div><div>X</div><div></div><div></div><div></div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 314,000	\$ 139,556	Avoidance	Mitigation strategy to be decided during design & development stage
16	Active	14-Jun-23	STRUCT	Excavation and final foundation bearing elevations with bedrock	Malroz geotechnical report dated May 31, 2023 includes 8 borehole locations and 3 test pits to identify subgrade conditions. Bedrock surface elevation highly varies between elevation ranging from 93.3m (BH106) to 98.9 (BH102). Final bedrock elevations may vary and degree of weathering may also vary and will require final inspection and approval from project geotechnical engineer.	Excavation into bedrock for pool construction will come with a cost premium.	Schedule, Cost	Medium	Low	<div><div>PROB. <div><div></div><div>X</div><div></div><div></div><div></div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 232,500	\$ 103,333	Mitigation	Estimation has considered backfill to underside of the overburden. Only 300mm excavation into bedrock carried as a risk
17	Active	14-Jun-23	STRUCT	Corrosion in structural pool walls	Presence of chlorides and moisture in the environment corrodes the pool structures	Moisture/Vapor affecting structural integrity	Environmental, Health, Safety, Cost	High	Low	<div><div>PROB. <div><div></div><div>X</div><div></div><div></div><div></div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 59,400	\$ 46,200	Mitigation	Exploratory demo carried out on 19th Sep. Decision made and recorded in PIT record to remove Rain screen and insulation to east wall as this wall is covered by new materials as part of natatorium construction
18	Active	01-Aug-23	ESTIMATE	Force Majeur	Labour Strike / Fire/weather	Schedule delay and budgeting issues	Schedule, cost	Low	Low	<div><div>PROB. <div><div></div><div></div><div></div><div>X</div><div></div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 157,000	\$ 17,444	Acceptance	Force Majeure is an unforeseen risk and therefore strategy is to develop and mitigation upon event occurrence.
19	Active	01-Aug-23	ALL	Encounter additional bedrock at new swale and u/g service locations	Encounter additional bedrock at new swale and u/g service locations as these locations were not included in the original bore hole and geotechnical analysis	Excavation into bedrock for swale and u/g service locations	schedule, phasing	High	Low	<div><div>PROB. <div><div></div><div>X</div><div></div><div></div><div></div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 158,000	\$ 122,889	Mitigation	Test pits to be carried out by awarded site services contractor in swale and u/g pipe locations. Therefore, only remobilization costs require to investigate this risk.
20	Active	01-Aug-23	CIVIL	Relocating existing utilities	Disruption of service - timing and costing item that can add to schedule	Schedule delay and budgeting issues	Schedule, Cost, Phasing	Medium	High	<div><div>PROB. <div><div></div><div></div><div></div><div></div><div>X</div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 50,000	\$ 33,333	Mitigation	Work with utilities company to reduce impact of temp service relocation to construction activities.
21	Retired	01-Aug-23	ELEC	Maintain existing electrical infrastructure	Additional costs incurred to maintain current electrical circuits through the construction process and tie in to new system	Construction Schedule/Unknown conditions	Cost/Schedule	Medium	Low	<div><div>PROB. <div><div></div><div>X</div><div></div><div></div><div></div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 25,000	\$ -	Mitigate/Accept	Modern Electrical to perform site audit prior to demolition of existing power systems Library Electrical to identify during enabling works
22	Retired	01-Aug-23	AQUA	Aquatics - Existing sanitary may be undersized for new aquatic centre	Sanitary invert of alternate sewer is too high; Sanitary lift station required	Calculation of flows compared to the existing capacity	Cost, schedule	Medium	High	<div><div>PROB. <div><div></div><div></div><div></div><div></div><div>X</div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>		\$ -	Acceptance	This was considered too high of a risk to carry in the risk register. It will be resolved as part of mechanical estimate.
23	Active	10-Aug-23	STRUCT	Unforeseen conditions during renovation and demolition	Renovating and remodeling the existing structure, along with tying in, could lead to significant structural reinforcing of the existing building. Allowed for One week consultant Review, one week superintendent time and constructability, equipment and material allowance of \$5,000 to allow for any removals/patching as required		Cost, schedule	Low	Medium	<div><div>PROB. <div><div></div><div></div><div></div><div>X</div><div></div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 100,000	\$ 22,222	Mitigation	Enabling works by M&E trades in Jan 2024 to identify outliers Risk carried for Stru/Arch
24	Active	10-Aug-23	STRUCT	Undermining of existing pool. Structural concerns.	Infill of existing pool basin with new concrete slab, additional loading is imposed to the existing pool structure. Potential for reinforcement of local underpinning to ensure bearing capacity is acceptable under the new loads		Cost, schedule	Low	High	<div><div>PROB. <div><div></div><div></div><div></div><div></div><div>X</div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 1,500,000	\$ 500,000	Mitigation	Geotech engineer engaged to carry out further investigation of bearing capacity of existing pool. Estimated to include for required underpinning. Further risk allocated here for potential upsizing of design underpinning.
25	Retired	23-Aug-23	MECH	AHJ comes back and determines that fire protection needs to be added to the entire building, not just new as proposed by the code consultant (used for base of design)	Rami is trying to informally get advice from the AHJ and find out what their requirement would be	AHJ requirement	Safety / Schedule / Cost	Low	Low	<div><div>PROB. <div><div></div><div></div><div></div><div>X</div><div></div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 135,000	\$ -	Avoidance	Fire protection will not be required. Confirmed by code consultant.
26	Retired	23-Aug-23	STRUCT	Repair to slab after Mech and Elec demo	Openings for existing piping and ductwork will require closing/ patchwork based on the existing mechanical and electrical equipment and piping on site - quantifiable from building scan.	Observable openings in existing slabs	Cost, schedule	High	Low	<div><div>PROB. <div><div></div><div>X</div><div></div><div></div><div></div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 75,000	\$ -	Avoidance	Plan in place to add fire separation and infill to any openings
27	Active	23-Aug-23	STRUCT	Abatement and Remediation	Abatement and remediation if updated DSS report does not come back before validation.		Cost, schedule	High	Medium	<div><div>PROB. <div><div></div><div></div><div>X</div><div></div><div></div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 200,000	\$ 177,778	Mitigation	DSS reports due prior to validation (Investigation week commencing 25th Sep 2023)
28	Retired	23-Aug-23	OWNER	Requirement for increased parking (gravel parking to asphalt based on authority feedback).	Anticipated worst case area of new parking: 11,100sm (120,000sf)	AHJ requirement (zoning), parking use study. Consider asphalt or gravel options, MJMA provides \$350/sm rough estimate for asphalt, \$32.28/sm for gravel	schedule, cost, phasing	Low	High	<div><div>PROB. <div><div></div><div></div><div></div><div></div><div>X</div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 1,942,500		Avoidance	Working with local authorities to justify reductions in the current zoning requirements, ensuring parking use study reflects real-conditions and not a once-a-year event. Decision with Township made to close this risk, will be dealt with outside of this project
29	Active	06-Sep-23	ALL	Shortage of Labour, availability of trades during construction.	Shortage of Labour, availability of trades during construction with Local Battery Plant construction absorbing trades from union halls.		schedule, cost, phasing	Low	Low	<div><div>PROB. <div><div></div><div></div><div></div><div>X</div><div></div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>	\$ 256,000	\$ 28,444	Mitigation	Keep track of labor market and adjust schedule to mitigate impacts to rate increases
30	Retired	06-Sep-23	ALL	Bankruptcy of Vendors	Risk of sub-trades and vendors entering into administration during construction.			Low	High	<div><div>PROB. <div><div></div><div></div><div></div><div></div><div>X</div></div><div>IMPACT <div><div></div><div></div><div></div><div></div><div></div></div></div></div></div>		\$ -	Avoidance	Proper progress control (not overpaying) and subcontractor bonding (more than normal). Prequalify major subcontractors. Sub bond all contracts over \$50K

31	Retired	06-Sep-23	ALL	Performance Risks	Commissioning and start up (developing bugs, Maintaining effluent quality, timing, seasonal affects) 2 months schedule impact carried		schedule, cost, phasing	Low	Medium	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ -	\$ -	Avoidance	Draft plan to be included within the validation report. Not a large risk, it is something we have to manage Full commissioning plan included in validation draft schedule
32	Active	06-Sep-23	ALL	Specialty Lifts	We may need to build a platform in the main pool for lifts to access the ceiling above for finishes/additional cleaning prior to occupancy turnover		Cost	Medium	Medium	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 19,950	\$ 11,083	Mitigation	Sequence work in a manner that a specialty lift is not required. Or only required for a minimal amount of time. Assumes rental of special equipment.
33	Active	06-Sep-23	AQUA	PVC Costs	PVC cost have been quite volatile in recent years. It doubled during COVID. We should account for possible increases. Supplier has been contacted for info.	Increases at time of procurement	Cost	Medium	Low	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 20,000	\$ 8,889	Acceptance	Prepurchase PVC materials. Addressed in PIT record.
34	Active	06-Sep-23	AQUA	Long Lead Items	Some items may have long lead times including pumps and VFD's. Equipment, specialty equipment, materials from outside of Canada	Notification by vendor	Schedule	Medium	Low	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 157,000	\$ 69,778	Mitigation	Confirmation received on VFD delivery - 6 weeks
35	Retired	06-Sep-23	AQUA	Shipping amounts	Shipping amounts will not be known until procurement.	order	cost	Low	Low	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ -	\$ -	Acceptance	Trade partner management - will change if there is a delay in validation
36	Active	07-Sep-23	AQUA	Concrete pricing design may not match final structural design	Change in Structural design from validation to design to construction could change with new information	change in structural design	Cost, schedule	Medium	Low	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 77,350	\$ 34,378	Mitigation	Allowances carried in project estimates
37	Retired	07-Sep-23	AQUA	change in pool equipment location	The equipment is assumed to be located at the deep end of the pool. Changes may affect PVC amounts	Change in equipment location	Cost, schedule	Low	Low	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>		\$ -		Eqpt layout complete
38	Active	07-Sep-23	ESTIMATE	Excavation unearths "something"	While excavating we come across something (indigenous artifacts) that put a halt to the work while it is investigated.	Excavation	Cost, schedule	Medium	Low	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 187,000	\$ 83,111	Acceptance	
39	Active	08-Sep-23	ENVLP	Improperly coordinated envelope interfaces leading to field fixes that compromise performance or require rework/remedial work.	Envelope construction problems typically happen at interfaces between systems, and improperly coordinated shop drawings or shop drawings missing key details can lead to field improvisation. This results in having to accommodate site conditions that may not be ideal, compromising performance or quality, and requiring removing and replacing work, or doing remedial work.	Missing or uncoordinated details resulting in field improvisation, requiring remedial work to address new site condition.	Cost, schedule, performance	Low	Low	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 50,000	\$ 5,556	Mitigation	Building envelope trades to show interfacing work on their shop drawings, to verify they understand how tie-ins work. Construct mock-ups of key transitions before proceeding with balance of installation
40	Active	08-Sep-23	ENVLP	Air or water leakage through envelope assemblies	Air and water leaks through envelope assemblies can damage interior finishes, create condensation risk, lead to hazardous mold growth, and deteriorate envelope assemblies	Water leak into building, condensation on interior surface of envelope	Cost, schedule, performance	Low	Low	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 100,000	\$ 11,111	Mitigation	Specify quality control procedures and verify they are followed during construction. Conduct in situ air and water leakage tests for glazing systems, including interface transitions. Perform Electric Field Vector Mapping test on roofing membranes.
41	Active	12-Sep-23	ESTIMATE	Damage to existing car park.	Cost of replacing existing car park vs temp road construction.	Damage to existing parking lot during equipment deliveries, construction activities	Cost, price	Medium	Low	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 67,500	\$ 30,000	Mitigation	Site traffic to access project diverted from existing car park with access in and out at North East corner of site on existing grass area. Estimate currently carrying temp. road costs. However, some deliveries will still need to access project through existing car park.
42	Active	12-Sep-23	ELEC	Utilities Temp, delay.	Application for temp utilities submitted during validation and work scheduled to be complete prior to April 2024. However, although Utility companies have confirmed lead time as risk remains that these lead times will increase.	Utility companies not meeting lead time.	Schedule	Medium	Low	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 78,500	\$ 34,889	Mitigation	All Temp utilities requests submitted early during validation.
43	Active	12-Sep-23	ELEC	40 Week Lead time for Main distribution board in level 02 Electrical Room	May be eligible for early Procurement	Delay in power connection and terminations, power back up to other portions of the building (library lower level changerooms)	Cost, Schedule	Low	High	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 78,500	\$ 26,167	Avoidance	Avoidance via early shop drawing submittal/approval process for early procurement.
45	Active	12-Sep-23	ESTIMATE	Additional Winter Heating required	Should we see schedule get pushed, extended winter, unforeseen phasing implications	Schedule slippage	Cost, Schedule	High	Low	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 52,502	\$ 40,835	Avoidance	Maintain schedule to avoid excess winter heating costs and if require resequencing work.
46	Active	12-Sep-23	ESTIMATE	Additional Drywall patch and repair to renovation areas	Should renovation work create additional patching and repair work that is unforeseen	Post demolition discovery	Cost, Schedule	High	Low	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 60,000	\$ 46,667	Mitigation	Demolition works to be carried out as selectively and carefully as possible.
47	Active	12-Sep-23	AQUA	Potential Delay due to Myrtha Headwall Install	Acapulco currently experiencing delay from Myrtha with install of headwall	Delay in Myrtha	Cost, Schedule	Low	Low	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 78,500	\$ 8,722	Mitigation	Myrtha to be managed by both Acapulco and Chandos to ensure no delay to headwall install
48	Active	12-Sep-23	AQUA	Potential for Non-Travel Staff to be replaced with Travel Staff	Acapulco currently carrying 2 local carpenters. These 2 staff quit and need to be replaced with travelling staff	Local Staff quit	Cost	Medium	Medium	<div><div>PROB.</div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>X</div></div>	\$ 34,303	\$ 19,057	Acceptance	This is a risk raised by Acapulco during travel and hotelling discussion. The understanding is that these staff members are a low risk to quit but a risk should be carried.

6.2 Opportunity Log

The primary purpose of the Opportunity Log is to identify potential Added Value Incentives for incorporation into the Final Target Cost.

The Opportunity Log identifies potential further saving to the project that may be realised during design development. In the W.J. Henderson Recreational Centre there are opportunities to reduce the number of BAS control points, replace the Myrtha headwall in the swimming pool to a concrete headwall amongst other items as identified in the below log.

OPPORTUNITY LOG (GRANTS, EFFICIENCIES)



Project: WJ Henderson Recreation Centre

October 20, 2023

Total Potential Cost
Range
\$ 836,951

Total Amount
Proposed
\$ 261,877

Date Updated: 23-Oct-20

OPP.	STATUS:	DATE POSTED	Champion	OPPORTUNITY	DETAILED DESCRIPTION	AFFECTS (Environmental, Health,	PROBABILITY	IMPACT	Opp Matrix	POTENTIAL COST RANGE	AMOUNT	OPPORTUNITY STRATEGY DESCRIPTION	OPPORTUNITY PLAN	
1	Retired	07-Sep-23	Sean (ENT)	Reduce loading allowance on new pool roof. Delete green roof and also remove allowance for future PV if it is not needed.	Estimate 15% reduction in steel tonnage				PROB. <div><div></div><div></div><div></div><div></div><div></div><div></div></div>	\$ -	\$ -	This opportunity has been incorporated into the Validation Estimate		
2	Retired	07-Sep-23	Sean (ENT)	Simplify new pool addition east perimeter overhang					PROB. <div><div></div><div></div><div></div><div></div><div></div><div></div></div>	\$ -	\$ -	This opportunity has been incorporated into the Validation Estimate		
3	Retired	07-Sep-23	Sean (ENT)	Consider removing cantilever overhang and soffit on south side of new pool and aligning L1 and L2					PROB. <div><div></div><div></div><div></div><div></div><div></div><div></div></div>	\$ -	\$ -	This opportunity has been incorporated into the Validation Estimate		
4	Active	07-Sep-23	Sean (ENT)	Remove or reduce new skylights in existing lobby	Currently carrying 18 dome skylights in Validation Estimate that may be removed.	Costs / Schedule	Low	Low	PROB. <div><div></div><div></div><div></div><div></div><div></div><div></div></div>	\$ 18,000	\$ 2,000	Due to the low costs of these type of skylights and the benefit of natural light they provide this opportunity will likely not be realised.		
5	Active	07-Sep-23	Brendan (MN)	Reduce the no. of BAS control points	Potential savings on eqpt and install costs of BAS	Costs / Schedule	High	Medium	PROB. <div><div></div><div></div><div></div><div></div><div></div><div></div></div>	\$ 43,750	\$ 38,889	Cost benifit analysis to be carried out during design development.		
6	Active	11-Sep-23	Mech	Different ERV selection than current basis of design	<ul style="list-style-type: none">• Tempeff Selections: \$272k, 52 week lead time• Oxygen8 Selections: \$230k + P.Glycol Extra HW Piping, 20 week lead time• TBC	Costs / Schedule	High	Medium	PROB. <div><div></div><div></div><div></div><div></div><div></div><div></div></div>	\$ 25,000	\$ 22,222	This opportunity has been incorporated into the Validation Estimate		
7	Active	11-Sep-23	Mech	Different Rink DHU-1 selection than current basis of design	<ul style="list-style-type: none">• CDI Selection: \$492k, 50 weeks lead time• TBC ECM Evaluation in energy model: gas not an option for targets	Costs / Schedule	High	High	PROB. <div><div></div><div></div><div></div><div></div><div></div><div></div></div>	\$ -	\$ -	Still looking for oppourtuny but no cost saving opions realised to date. This opportunity will be exporded further during design development.		
8	Active	11-Sep-23	Mech	Different Pool DHU-2 selection than current basis of design	<ul style="list-style-type: none">• Innovent Selection: \$425k, 40 weeks lead time• Haakon Selection: \$387k, 50 weeks lead time• TBC ECM Evaluation in energy model: gas not an option for targets. Unit geometry limitations to fit in tunnel space.	Costs / Schedule	Medium	Medium	PROB. <div><div></div><div></div><div></div><div></div><div></div><div></div></div>	\$ -	\$ -	No cost saving opportunity discovered to date. Inovate unit selected at this stage. This opportunity will be exporded further during design development.		
9	Active	11-Sep-23	Mech	Use electric heating for domestic water instead of WSHP-2 for temperature boost	<ul style="list-style-type: none">• Aermec WSHP-2 Selection: \$72k, 44 weeks lead time• Electric: TBD ECM Evaluatin in energy model, Pending confirmation of DHW demand based on snow melt pit + ramp heat	Costs / Schedule	Medium	Low	PROB. <div><div></div><div></div><div></div><div></div><div></div><div></div></div>	\$ -	\$ -	Selections recieved for both. Opportunity may be realised during design development.		
10	Active	13-Oct-23	Pool	Myrtha Headwall	Current estimate carrying Myrtha headwall at \$177,555. Opportunity to go with concrete headwall or Natare to realise saving	Costs / Schedule	Medium	Medium	PROB. <div><div></div><div></div><div></div><div></div><div></div><div></div></div>	\$ 99,423	\$ 55,235	Opportunity to be explored during design development.		
11	Active	14-Oct-23	Arch	Metal Deck in lieu of CLT	Current estimate carrying CLT. Saving potetial to proceed with Metal Deck Ceiling	Costs / Schedule	Low	Low	PROB. <div><div></div><div></div><div></div><div></div><div></div><div></div></div>	\$ 334,278	\$ 37,142	Metal deck not desirable for aesthetics		

OPPORTUNITY LOG (GRANTS, EFFICIENCIES)

13	Active	15-Oct-23	Arch	Partitions to changing rooms in lieu of blockwork	Current design illustrates blockwork partitions to changings rooms. Potential opportunity to save costs with Washroom/ Changing room partitions to universal changerooms and L2 atrium washrooms	Costs / Schedule	Medium	Medium	<div> <div>PROB.</div> <div> <div></div> <div>X</div> <div></div> </div> </div>	\$ 55,000	\$ 30,556	Opportunity to be explored during design development.		
17	Active	16-Oct-23	Arch	Install NLT ceiling in lieu of CLT to natatorium roof	Current estimate carrying CLT. Saving potetial to proceed with NLT	Costs / Schedule	Medium	Medium	<div> <div>PROB.</div> <div> <div></div> <div>X</div> <div></div> </div> </div>	\$ -	\$ -	Opportunity to be explored during design development.		
18	Active	17-Oct-23	Arch	Install metal lockers (\$900 each) in lieu of phenolic (\$2,200 each) lockers (105 lockers)	Current estimate carrying Phenolic Lockers Saving potetial to proceed with Metal Lockers	Costs / Schedule	Medium	Medium	<div> <div>PROB.</div> <div> <div></div> <div>X</div> <div></div> </div> </div>	\$ 136,500	\$ 75,833	Opportunity to be explored during design development.		
19	Active	18-Oct-23	Rami (Loyalist)	Reuse ice rink boards and glass.	Current estimate carrying full replacement of rink boards and glass.	Costs / Schedule	High		<div> <div>PROB.</div> <div> <div></div> <div></div> <div></div> </div> </div>	\$ 125,000	\$ -	Potetial cost range \$100k to \$150K. Opportunity to be explored during design development.		
20	Active	19-Oct-23	Glen (Chandos)	Fasttracking Schedule (savings on GCs)	Current schedule based on required completion date based on funding and grants and buy in from trade partners onboarded and Contractor/ Consultant experience. Opportunities to be explored during procurement of trades.	Costs / Schedule	Low	Medium	<div> <div>PROB.</div> <div> <div></div> <div></div> <div>X</div> </div> </div>	\$ -	\$ -	Schedule to be evaluated during design development and procurement and opportunities to expedite schedule explored with trades procured.		
21	Active	20-Oct-23	David (Acalpulco)	Pool plumbing schedule	Throughout validation, schedule 80 pipe has been assumed for all plumbing. Using schedule 40 pipe where pipe is invulnerable will reduce material costs.	Costs / Schedule	Medium	Medium	<div> <div>PROB.</div> <div> <div></div> <div>X</div> <div></div> </div> </div>	\$ -	\$ -	Opportunity to be explored during design development.		

6.3 Wish List

The primary purpose of the Wish List is to establish “nice-to-have” items which may not be vital to the operation of the building/facility but improve the functionality, appeal, and value of the project that might be added if the project is coming in under budget.

Each wish list item is allocated a cost and a priority so that as the budget evolves during design development and procurement, if savings can be found in the base build costs, Loyalist Township will have the opportunity to introduce Wish List items back into the project.

Wish List Item #	Description	Cost	Owner Priority
1	Ninja Cross System	\$ 650,000	Low
2	Emergency Power - as relief center (AC, showers, related power above minimum)	\$ 150,000	High
3	Reading garden/ expanded landscape scope	\$ 232,450	Low
4	Servicing for additional EV in parking lot	\$ 50,000	Low
5	Connections for broadcasting at center ice	\$ 15,000	Medium
6	Wider Zamboni melt pit	\$ 10,000	Medium
7	Add skylights to atrium (cost is per skylight added)	\$ 25,000	Low
8	Complete roof repair (in lieu of patch repairs)	\$ 2,429,600	Medium
9	Update (Paint) cladding on existing building exterior to match addition	\$ 91,000	High
10	Patch ceiling above arena	\$ 62,725	High
11	Replace ceiling above arena	\$ 376,350	Medium
12	Updated fixtures in arena changerooms	\$500/fixture	Medium
13	PV over new building	\$ 200,000 - 300,000	High



7.0 Business Case

Business Case

The construction costs outlined in Section 6 of this report represent the majority of the overall costs which will be incurred by the Township should Council elect to proceed with the project. However, soft costs, such as taxes, permitting, Township-supplied FF&E, project management expenses, and staff training also need to be incorporated into the capital cost of the project. Additionally, operating the renewed and expanded facility will have a significant impact on annual operating budgets due to higher utility costs and increased staffing levels required to comply with current legislation, operational requirements, and programming demands.

However, the revitalization of the W.J. Henderson Recreation Centre is expected to lead to additional sources of revenue. For example, one-time revenue, such as grants, partnerships, fundraising efforts, reserve funds, and development charges, will help offset capital expenditures. Similarly, higher annual revenues, such as projected increases in facility use and user fees or sponsorship deals, will assist with offsetting a portion of operating costs.

This section of the Validation Report will present a detailed overview of the capital and operating costs associated with the proposed facility as well as the projected revenues which can be expected as part of the project's implementation.



7.1 Capital Costs

The financial figures, hereafter referred to as “Project Costs” presented in Section 6 of this report represent the costs payable to the project team for the design and construction of the facility. However, soft costs must also be taken into account when considering the overall costs to the Township, the combined total of these costs will hereafter be referred to as “Capital Costs”.

Costs incurred prior to the start of the Validation Phase of the project must be included in the Capital Costs. These amounted to **\$343,000** and included design fees, studies, project management costs, and all applicable taxes.

The Project Cost of \$46.4 million described in Section 6 is exclusive of taxes. As a municipality, the Township is charged a Harmonized Sales Tax (HST) rate of 1.76%, which amounts to approximately **\$817,000**.

Building permit costs must also be considered in the overall Capital Costs. Based on Loyalist Township’s Building By-law (2022-054), the permitting fees for the project would approximate \$200,000. The Ontario Building Code provides that building permits may be set on a cost-recovery basis relative to the reasonable costs to provide the service, effectively ensuring that inspection services are revenue neutral. Given that this project will be funded in part through the general rate, an exemption from the Building By-law is being proposed so that only direct costs incurred by the Township’s Building Division be charged to the project. To that end, a conservative estimate of **\$100,000** is being proposed to cover the direct costs only in lieu of full permitting fees for the project.

Section 4.11. of the Validation Report outlines the furniture, fixtures, and equipment which are included in the Project Costs and those which are to be provided by the Township. For example, pool deck equipment, furniture, audio/visual equipment, and security systems can all be purchased and installed by Township staff, resulting in lower project costs. A budget of **\$1 million** has been established to outfit the facility once construction is completed and prior to the facility opening to the public.

Project management costs during the validation, construction, and warranty phases of the work will also be captured in the Capital Costs and will include **\$350,000** in staff time from the Township’s Engineering Division. An amount of **\$150,000** is being budgeted to hire an external project management firm to supplement staff time.

A robust fundraising effort has the potential to increase the funds which can be raised in the community. As such, the inclusion of a dedicated fundraising coordinator for the project has been included in the soft costs in the amount of **\$70,000**. This will ensure that sufficient resources are allocated to this important component of the project.

The new mechanical systems in the proposed facility will require that staff be trained in their operations. This will help contribute to the longevity of the equipment while ensuring that the facility is operated as efficiently as possible and minimizing downtime associated with maintenance. Operations staff will be included in the start-up and commissioning of the building towards the end of construction and training sessions will be organized by the project team to ensure a smooth transition. The one-time costs associated with this training are considered to be a capital expense and are estimated at **\$20,000**, which will include the cost of having operators achieve necessary designations such as Certified Pool Operator (CPO).

Finally, a **\$250,000** contingency, approximating 10% of the soft costs described above, is being included to cover any issues which may arise over the course of the project.

The costs outlined above amount to **\$3,090,000** and represent funds spent prior to the start of validation as well as the soft costs which are projected to be incurred during the validation, construction, and warranty phases of the project. When combined with the Project Costs of \$46.4 million, the total Capital Costs projected for the project amount to **\$49,500,000**, as summarized in the Table below.

Pre-Validation Costs (incl. net HST)	\$343,000
Project Costs – Contract (excl. net HST)	\$46,400,000
Municipal Share HST on Contract	\$817,000
Building Department Direct Costs	\$100,000
Furniture, Fixtures and Equipment	\$1,000,000
Project Management – Internal	\$350,000
Temporary Project Management – External	\$150,000
Fundraising Coordinator	\$70,000
One-time staff training	\$20,000
Contingency on soft costs	\$250,000
Total Capital Costs	\$49,500,000

Summary of the capital costs associated with the W.J. Henderson Recreation Centre Renewal project.

7.2 One-Time Revenues

A number of one-time contributions to the project will help offset the capital costs described in Section 7.1. These include various grants, partnerships, transfers from reserve funds, development charges, fundraising, and foregone capital expenditures included in existing planned contributions to capital from operating.

In an effort to reduce the strain on the General Tax Rate, the Township has been submitting applications to grant programs which could be applied towards the project. Most notably, the Retrofit stream of the Green and Inclusive Community Building program will be providing **\$16,554,946** towards the project, as announced in December 2022. Funding from other programs, such as Employment and Social Development Canada’s Enabling Accessibility Fund, and the Township’s Renewable Energy Benefit fund have also been secured, in the amount of **\$86,000** and **\$669,900**, respectively. The Township will be pursuing other grant opportunities over the course of the project. For example, an application has been submitted to the Community Building Retrofit fund, which is administered by the Green Municipal Fund. If successful, this grant would contribute an additional **\$1.25 million** to the project.

The City of Kingston has expressed an interest in contributing funding towards the capital costs of the project. This partnership represents a short-term solution to address the gaps in aquatic services currently experienced by the City as it investigates options to offer additional programming in the medium and long terms. A resolution passed at the September 5, 2023, Kingston City Council Meeting approved a contribution of up to **\$6,550,000** to support the aquatic component of the project. This contribution is conditional on giving City of Kingston residents equal access to recreation programming at the new facility for a period of 20 years. The terms of this agreement have yet to be determined. Should Council approve this partnership, Township Staff would negotiate with the City of Kingston to develop an agreement which would be agreeable to both parties.

Fundraising typically represents an important component for projects which will have a large impact on the community. The W.J. Henderson Recreation Centre Renewal project would act as a source of civic pride for the Loyalist Township community and act as a gathering space for residents. Several requests to contribute to the new facility have already been received, suggesting that fundraising efforts could contribute to offsetting costs. As such, a community fundraising target of **\$900,000** has been set for the project. It is recommended that a Community Fundraising Committee be established to lead these efforts. This committee will be made up of members of the community

who will spearhead these efforts with the assistance of a dedicated staff or external consultant as a resource.

Existing funds previously allocated for the project can also be included in the one-time revenue category for the project given that they have been sitting in the existing budget, either as carry forward or reserve funds. Specifically:

- A balance of **\$1,721,200** within the General Capital Reserve Fund allocated to the Community Hub project;
- A balance of **\$200,000** within the General Capital Reserve Fund allocated to Recreation emergency. An emergency repair fund was created in 2019 specifically for the pool. An annual transfer of \$50,000 was applied to this fund and currently includes a total of **\$200,000**;

The W.J. Henderson Recreation Centre Renewal project will lead to an increased level of service and is a result of growth in Loyalist Township. As such, a portion of the project is eligible to be funded through Development Charges. As determined by Hemson in the completion of the Development Charges (DC) study in 2020, the eligible current period growth share funded from DC is **\$2,377,381**. A recent analysis found that 49.4% of the total project cost represents the portion to be funded by the municipality. 24.7% of the total project cost is not eligible for DC funding, leaving 24.7% recoverable from DC. The portion recoverable from DC is split between 19% over the period 2021-2030 and 81%, or **\$9,842,346**, to be recovered after 2030.

The Renewable Energy Benefit Fund (REBF) originates from the Community Vibrancy Reserve Fund (solar) and Community Benefit Agreement Fund (wind turbines). This fund presents an opportunity to reduce the cost impact of this project on the General Tax Rate. As of the writing of this report, over \$1,135,908 million in accumulated unused funds from previous years are currently available in the REBF. The fund allocates funding to local community groups through an annual call for applications. The requests from community groups to the REBF over the last few years have been lower than the amount of available funding, leading to accumulation of funds. It is therefore proposed that this surplus be allocated to service debt associated with the W.J. Henderson Recreation Centre Renewal project, in the amount of **\$1,135,908**.

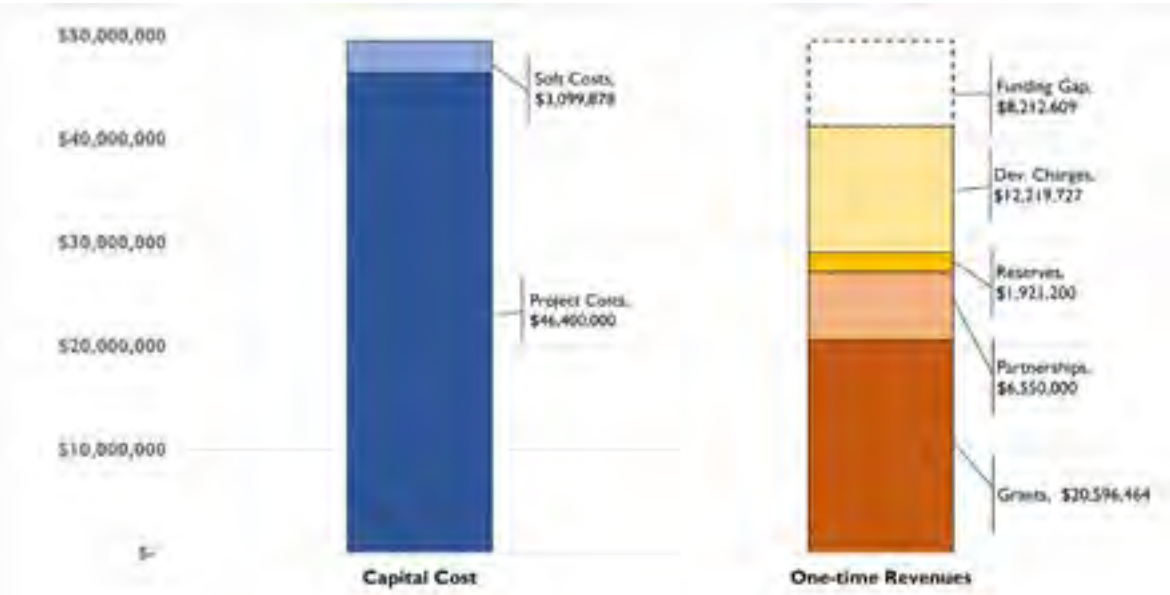
The total one-time revenue which can be applied against the project’s Capital Costs amount to **\$41,287,391**, as summarized in the Table below.

Grant Name	Grant Agency	Amount	Secured?
Green and Inclusive Community Buildings – Retrofit Stream	Infrastructure Canada	\$16,554,956	Y
Enabling Accessibility Fund	Employment and Social Development Canada	\$86,000	Y
Renewable Energy Benefit Fund	Loyalist Township	\$669,900	Y
Community Building Retrofit Fund	Green Municipal Fund (FCM)	\$1,250,000	N

Summary of the grant programs to which Loyalist Township has submitted applications to fund the W.J. Henderson Recreation Centre Renewal project

Green and Inclusive Community Buildings (Federal)	\$16,554,956
Enabling Accessibility Fund (Federal)	\$86,000
Renewable Energy Benefit Fund (Loyalist)	\$669,600
Community Building Retrofit Fund (FCM)	\$1,250,000
City of Kingston Contribution	\$6,550,000
Community Fundraising Target	\$900,000
General Capital Reserve Fund – allocation for Community Hub	\$1,721,200
General Capital Reserve Fund – allocation for Recreation Emergency	\$200,000
Development Charges (2022-2030)	\$2,377,381
Development Charges - Post Period (after 2030)	\$9,842,346
Available unused Renewable Energy Benefit Fund	\$1,135,908
Total One-Time Revenue	\$41,287,391

Summary of the one-time revenues associated with the W.J. Henderson Recreation Centre Renewal project



Graphical representation of the one-time costs revenues for the W.J. Henderson Recreation Centre Renewal Project

7.3 Operating Expenses

The W.J. Henderson Recreation Centre Renewal project will have a larger footprint than the existing facility and will allow the Township to offer a wider variety and amount of programming to users. This increase in level of service will result in an increase in operating costs in terms of staffing, utilities, and general maintenance. The first five years of operating costs considered as part of this business case will help quantify the financial impact of the expanded facility.

7.3.1 Staffing

The proposed new facility will allow for a significant increase in programming which can be offered at the W.J. Henderson Recreation Centre. However, this, combined with ensuring compliance with current legislation and best practices, will require an increase in administrative, aquatic, and operations staffing levels. As such, several new positions will need to be created to operate the facility in a safe and effective manner.

Three new full-time recreation attendants will be needed in the Facilities Division to maintain and operate the new pool, arena, and the building as a whole. The increase in summer programming at the W.J. Henderson Recreation Centre will also mean that attendants who would historically move to parks and sports fields during the ice-off season would no longer be able to do so. As such, an additional three new seasonal labourers will be required to ensure that expected levels of services at the Township’s parks and sports fields continue to be met.

Within aquatics, a new full time aquatic programmer position will be created, as well as two new full-time guard/instructor positions. Additionally, a number of part time positions, such as lifeguards and instructors will continue to be required, with staffing hours being reflective of the amount of programming being operated. It is anticipated that, with the increased pool size and the addition of the

leisure pool, the scope of programming will grow, leading to a proportional increase in the number of part-time aquatic staff required to offer this programming. The facilities and aquatics positions are necessary to comply with Public Pool regulations. For example, R.R.O 1990, Reg. 565: (Public Pools) dictates the requirements for both the physical operations of an aquatic facility and its staffing levels. The same regulation also states that all pool operators shall be trained in public pool operation and maintenance, filtration systems, water chemistry, and all relevant safety and emergency procedures. The regulation also addresses such things as bather loads, supervision, and, specifically, minimum guard to bather ratios.

The Table below summarizes the costs of staffing the proposed facility in 2026, which represents the first full year during which the facility would be operational, relative to the 2019 budget. The 2019 budget values were used for this exercise since this was the last full year during which aquatic programming was offered at the W.J. Henderson Recreation Centre, representing the most accurate comparison available.

Overall, additional expenses of \$780,221 will need to be added to the 2026 operating budget to staff the facility in a manner which will conform to existing legislation while delivering the level of services which would be expected for a modernized facility. It should be noted that the projected 2026 operating costs are inclusive of inflation and therefore do not represent an accurate direct comparison to the 2019 figures. Should the 2019 values have been increased to reflect the tax increases between 2019 and 2023, the resulting total would be \$1.67 million.

	2019	2026	Difference
Administrative	\$867,200	\$577,404	\$(289,796)
Arena	\$272,400	\$457,787	\$185,387
Aquatic	\$323,900	\$1,208,530	\$884,630
Total	\$1,463,500	\$2,243,721	\$780,221

Staffing costs associated with maintaining and operating the Renewed W.J. Henderson Recreation Centre compared to 2019.

7.3.2 Energy Costs

The proposed project will see an expansion of the existing facility, both in terms of physical footprint and programming. This, combined with the electrification of the mechanical systems which is being proposed to meet the sustainability goals of the project, will result in utility costs which will be higher than historical averages.

A comparison of the projected energy usage to a base case scenario can help quantify the increase in costs associated with operating the proposed facility. The base case scenario usage is based on data collected at the W.J. Henderson Recreation Centre between 2016 and 2019, which represents the most recent period during which the pool was in service and the building was operating as initially intended. The comparison will evaluate the costs of operating the proposed and base case facilities in 2026, which represents the first full year during which the renewed W.J. Henderson Recreation Centre will be operational. An additional scenario, representing the energy costs of the expanded facility if it were built to the minimum standards prescribed by the Ontario Building Code, will also be presented as part of this study. This scenario will be referred to as SB-10.

The following Tables summarize the projected cost of electricity and natural gas for all three scenarios after one, five, and thirty years of operating the facility.

The figures above assumed an inflation rate of 2% and 6% for electricity and natural gas, respectively, and also account for projected increases in the carbon tax which will be applied to the fossil fuels. Based on these figures,

an additional \$80,000 in annual energy costs is projected to be incurred for the proposed facility relative to the base case scenario. However, the faster rate of increase in natural gas costs and the increase in carbon tax will gradually narrow the gap. After the five-year period considered in this business case, the cumulative difference between the proposed and base case scenarios are projected to be approximately \$360,770. However, it is important to note that, the projected cumulative costs after thirty years are projected to be lower for the proposed facility than the base case scenario.

This difference is even more pronounced when comparing the proposed facility to the SB10 scenario. The energy costs for the proposed facility are projected to be almost \$8,000 lower than those of the SB-10 scenario after year 1. This gap will gradually widen over time, leading to a projected cumulative difference of \$137,000 after five years, and almost \$6 million over thirty years. As such, the premium associated with electrifying the expanded facility should prove to be a worthwhile investment for the Township, both in terms of meeting its sustainability goals as well as its financial bottom line.

For the purpose of this report, the average energy costs for the first five years of operating the new facility, approximately \$385,000, will be compared to the 2019 budget number of \$285,000. As such, an additional **\$100,000** in additional annual energy costs will be carried as part of the analysis.

Year 1 Energy Costs			
	Base Case (2019)	Proposed (2026)	SB10 (2026)
Electricity	\$208,000	\$353,866	\$257,994
Gas	\$77,000	\$12,740	\$116,389
Total	\$285,000	\$366,606	\$374,382
Cumulative Energy Costs (2026 to 2031)			
	Base Case	Proposed	SB10
Electricity	\$1,083,871	\$1,841,535	\$1,342,610
Gas	\$479,894	\$83,000	\$718,966
Total	\$1,563,765	\$1,924,535	\$2,061,575
Cumulative Energy Costs (2026 to 2056)			
	Base Case	Proposed	SB10
Electricity	\$8,449,316	\$14,355,680	\$10,466,309
Gas	\$7,435,708	\$1,350,821	\$11,133,135
Total	\$15,885,025	\$15,706,501	\$21,599,444

Projected cumulative energy consumption costs for the W.J. Henderson Recreation Centre after one, five, and thirty years of operating the facility. The table compares the energy costs of operating the existing facility, the expanded facility as designed (proposed), and the expanded facility if it were designed according to the minimum requirements of the Ontario Building Code.

7.3.3 General Costs

In addition to higher staffing and energy costs, other expenses also need to be accounted for when calculating the projected operating costs associated with the renewed W.J. Henderson Recreation Centre. These include recurring expenses such as insurance, property taxes, supplies and equipment, contracted services, advertising, and capital costs, as well as water and sewer charges.

The following Table summarizes general costs which were included in the 2019 operating budget to the costs which are projected to be incurred at the renewed W.J. Henderson Recreation Centre in 2026.

As can be seen in the Table above, the overall projected costs for supplies and equipment, insurance and other fees, contracted services, and water and sewer charges

are expected to decrease compared to 2019 values. This is primarily due to the inclusion of \$246,600 in capital costs in the 2019 budget. The completion of this project will address all of the assets that are approaching the end of their useful lives and aim to eliminate the need for any capital works at the facility for five to ten years after opening. However, advertising values from 2019 to 2026 have changed dramatically as all budgeted funds for advertising within the Recreation and Facilities division have been realigned to department 710 - Recreation Services Administration which is considered in the Table above. The 2026 advertising budget increase does recognize the expanded facility and thus anticipated increased advertising needs.

	2019	2026	Difference
Supplies and Equipment	\$105,800	\$120,988	\$15,188
Insurance and Other Fees	\$148,600	\$164,123	\$15,523
Contracted Services	\$71,000	\$114,600	\$43,600
Advertising	\$14,500	\$60,000	\$45,500
Capital Costs	\$246,600	\$0	\$(246,600)
Water and Sewer	\$80,000	\$110,000	\$30,000
Total	\$666,500	\$569,711	\$(96,789)

Summary of the general costs associated with operating the Renewed W.J. Henderson Recreation Centre

7.4 Facility Revenues

The ability to provide additional programming at the renewed W.J. Henderson Recreation Centre will lead to an increase in proceeds which will help offset the cost of operating the facility. Rentals, programming, lessons, and sales are all expected to generate more revenue, and a new Capital Improvement Fee (CIF) is being proposed to create a fund which will help finance the eventual replacement of assets at the facility.

7.4.1 Arena Revenues

The proposed project will not substantially alter the delivery of ice-based programming at the arena. Ice allocation will be similar to 2023/2024 and will include rentals, Township programming such as shinny, public skating and parent and tot skates, as well as special programs such as school board use. A review of ice rental rates for nearby arenas suggests that prices at the W.J. Henderson Recreation Centre are already some of the highest in the region. As such, the proposed model is only considering an annual 2% year over year increase for all ice-related programming.

However, the updated facilities will allow the recreation division to offer floor programming on the arena pad between the months of May and August, inclusive. This represents a new source of revenue which will grow over time. For the purpose of this exercise, it is assumed that 25% of the total available allocation of floor rentals will be sold to various user groups in the first year of the renewed facility being operational. The following table summarizes the various sources of revenue which are anticipated for the arena in 2026 and compares them to their corresponding values from the 2019 budget.

Overall, relative to 2019, the arena is expected to generate an additional \$47,747 in its first year of operation.

7.4.2 Aquatic Revenues

The new aquatic facility will be able to offer significantly more programming than the old 5-lane, 25 metre pool. The new, 8-lane, lap pool will be large enough to accommodate split programming, providing the ability to offer multiple types of programs over the same period. The addition of a leisure pool will also allow the Township to offer in-demand programming, such as swimming lessons or aquafit, while the lap pool is programmed separately or without having to use the lap pool altogether.

The new aquatic facility will represent a significant improvement from the existing pool and thus provide an improved experience for users. As such, an increase in rates is being proposed to reflect this increased level of service and to better offset the higher costs associated with its delivery. The following table summarizes the projected revenues for the aquatic facility based on the new proposed rates.

Based on these projections, the new aquatic facility is anticipated to bring in an additional \$345,750 in revenue compared to the 2019 budget.

7.4.3 Other Facility Revenues

The new multipurpose rooms and renovated canteen, along with the sales of merchandise at the front desk, are expected to generate new or increased sources of revenue, as summarized in the Table below.

	2019	2026	Difference
Misc revenue	\$(13,500)	\$(14,076)	\$(576)
Sales*	\$(2,000)	\$0	\$2,000
Rentals and programming	\$(346,500)	\$(380,683)	\$(34,183)
CIF	\$(7,000)	\$(21,988)	\$(14,988)
Subtotal	\$(369,000)	\$(416,747)	\$(47,747)

*2019 Sales revenue were from the existing canteen and have been included in another section of this analysis.

Summary of the arena revenues which are projected for the Renewed W.J. Henderson Recreation Centre compared to 2019.

	2019	2026	Difference
Recovery	\$0	\$(45,000)	\$(45,000)
Memberships	\$(21,000)	\$(22,000)	\$(1,000)
Private Lessons	\$(35,000)	\$(35,000)	\$0
Public Swims	\$(20,000)	\$(82,000)	\$(62,000)
Pool Rentals	\$(50,000)	\$(137,500)	\$(87,500)
Children’s Swimming Lessons	\$(135,000)	\$(209,000)	\$(74,000)
Other instructions	\$(35,000)	\$(35,000)	\$0
Sales	\$(4,500)	\$0	\$4,500
Facility Free Use	\$(5,000)	\$2,000	\$7,000
Teen/Adult lessons	\$0	\$(3,000)	\$(3,000)
Masters	\$0	\$(4,500)	\$(4,500)
Aquafit	\$(22,000)	\$(94,000)	\$(72,000)
CIF	\$0	\$(8,250)	\$(8,250)
Total	\$(327,500)	\$(673,250)	\$(345,750)

*2019 figure incorporated into program registration values for 2026.

Summary of the aquatic revenues which are projected for the Renewed W.J. Henderson Recreation Centre compared to 2019.

	2019	2026	Difference
Misc revenue	\$(15,600)	\$(15,300)	\$300
Sales	\$0	\$(4,000)	\$(4,000)
Rentals and programming	\$0	\$(22,200)	\$(22,200)
Capital improvement fee	\$0	\$(660)	\$(660)
Subtotal	\$(15,600)	\$(42,160)	\$(26,560)

Summary of other facility revenues which are projected for the Renewed W.J. Henderson Recreation Centre compared to 2019.

7.5 Other Revenues

7.5.1 Reserve Fund Transfers

Since 2016, the Township’s capital budget has included an annual transfer to reserve funds in various amounts (\$250,000 in 2023) with an accumulated balance of **\$1,721,200** allocated within the General Capital Reserve Fund. The accumulated funds have been assigned to this project and accounted for in Section 7.2. This annual transfer can be maintained without negatively impacting the user rate, resulting in **\$250,000** in annual revenues which can be applied towards the project. The same principle can be applied to the emergency pool repair allocation within the General Capital Reserve Fund totaling \$200,000 (most recent contribution was \$50,000 in 2022). Although no contribution was made in 2023, it is recommended that monies continue to be set aside in an emergency repair fund to address any issues which may arise at the facility in the future. This will be considered as part of the 2024 budget.

7.5.3 Sponsorships and Naming Rights

Naming rights and sponsorships are another source of revenue which could be used to offset the costs associated with the project. Although the name for the facility as a whole will remain the W.J. Henderson Recreation Centre, the naming rights to individual areas of the revitalized building could present an opportunity for local businesses to promote themselves to the community through various sponsorships. This could include purchasing the naming rights to the new aquatic facility, the arena pad, the new multipurpose rooms, renovated changerooms, and more. Based on a review of similar initiatives in the area, a target of **\$25,000** in annual sponsorship revenue has been included in this analysis.

7.5.4 Foregone Capital Costs

Foregone capital costs refers to work that would otherwise need to be completed at the W.J. Henderson Recreation Centre should the project not move forward and have been reflected as a savings in the funding model. For example, several mechanical components of the existing

arena are approaching the end of their useful lives and scheduled for replacement in the next few years, with some needing to be replaced as early as 2024. These components will be replaced as part of the mechanical scope of work for the project, thereby eliminating the requirement to incur almost \$1 million in costs otherwise required if this project does not move forward.

Any regular lifecycle activities which would otherwise be required at the existing W.J. Henderson Recreation Centre over the next ten years should the project not move forward are included as foregone capital expenditures. Based on the state of the existing facility and the Township’s asset management plan, it is estimated that \$4.5 million of life cycle maintenance will not be required over the next ten years if the project moves forward. As such, the financial analysis assumes that **\$450,000** in annual expenditures over a 10-year time frame funded through contributions from operating will not be required.

It should be noted that this figure only represents work which will be needed to maintain the facility and does not include any improved levels of service. For example, the installation of a lift to improve accessibility would require an additional \$300,000 to \$400,000. Similarly, the installation of electric vehicle chargers would cost \$50,000. Any other major upgrades, such as reconfiguring changerooms or improving the accessibility of washrooms would require major design work and capital investments. All of these improved levels of service are captured in the proposed scope of work and would therefore no longer be needed should the project move forward.

7.5.6 Opportunities for Additional Savings

Additional cost saving opportunities can be leveraged to reduce the impact on the general rate. For example, the Township’s current agreements with its energy provider includes a flat rate for electricity as opposed to time-of-use pricing scheme. This arrangement was advantageous for the old facility given that the majority of energy usage happened during peak pricing periods, which would have led to substantially higher costs under time-of-use pricing. However, the proposed mechanical system will have the ability to store energy in the facility’s ice batteries, allow-

ing the facility to shift a significant portion of its energy draw to different times of the day. As such, moving to a time-of-use pricing scheme and programming the facility to produce and store energy overnight could result in significantly lower energy prices than those presented in Section 7.3.2.

Similarly, the sources of revenue included in this analysis do not incorporate non-resident fees. Outside of the grant received through the Green and Inclusive Community Buildings program, the main sources of funding for the project proposed facility will be through the Township’s general rate and the City of Kingston’s capital contribution. Within municipal recreation operations, given that services are traditionally subsidized through the tax rate, it is a common practice that municipalities charge non-resident fees for registered programs. These fees range from 10-33%, with the common rate being 25% however additional research is required. As such, it is recommended that the Township continue to investigate options during the design phase of the project. A renewed Schedule F to the Miscellaneous Fees By-law that includes a non-resident fee structure will be presented to Council in Spring 2024.

These opportunities have not been considered as part of this business case but will be explored in further detail during the design phase of the project.

7.6 Summary

The information presented in Sections 7.1 through 7.5 summarize the capital costs, one-time sources of funding, and annual expenses and revenues associated with constructing and operating the Renewed W.J. Henderson Recreation Centre. These figures can be used to determine the portion of the project which would need to be financed through a loan, the annual costs of servicing debt, and the subsequent impact on the General Rate.

Subtracting the total one-time revenues from the total capital costs yields the value of the loan needed to cover the costs of the project, as summarized in the Table below.

A 30-year loan with an interest rate of 5.33% could be issued to the Township by Infrastructure Ontario, which would result in an annual repayment value of \$549,097. These payments would then be added to the incremental annual costs and revenues to determine the net funding required for the project, as outlined in the Table below.



Projected impact to the tax rate increase required to fund the W.J. Henderson Recreation Centre Renewal Project should Loyalist Township Council reject the proposed contribution from the City of Kingston.

Once the annual debt repayment, incremental added costs, and increased revenues have accounted for, approximately \$188,472 would remain to be funded each year. Based on the 2023 General Rate Tax Levy of \$19,608,733, this would require an increase of 0.96% to the tax levy. However, these projections do not reflect known or anticipated impacts that could reduce the required increase to the General Rate Tax Levy. For example, Latham Pools, Umi-core, and residential developments are expected to have a positive impact through increased assessments in the near future.

Total Capital Costs	\$49,500,000
Total One-Time Revenue	\$41,287,391
Amount to be Financed	\$8,212,609

Value of the loan needed to fund the W.J. Henderson Recreation Centre Renewal project based on projected capital expenses and one-time revenues.

Annual Debt Service Cost	\$549,097
Increased Staffing Costs	\$780,221
Increased Energy Costs	\$100,000
Decrease General Costs	\$(96,789)
Increased Arena Revenues	\$(47,747)
Increased Aquatic Revenues	\$(345,750)
Increased Other Facility Revenues	\$(25,560)
Reallocation of Existing Transfer to General Capital Reserve	\$(250,000)
Sponsorship and naming rights	\$(25,000)
Foregone Capital Expenditures (10 year)	\$(450,000)
Total Annual Funding/Savings	\$(360,625)
Remaining Amount to be funded (annually)	\$188,472

Annual funding needed to cover the capital and operating costs of the W.J. Henderson Recreation Centre Renewal project once debt repayment, incremental added costs, and increased revenues have been accounted for.

7.7 Additional considerations

The figures projected above incorporate several assumptions that may be impacted, either through unsuccessful funding applications, decisions made by Council, or fundraising goals not being met. For example, an unsuccessful application to the Community Building Retrofit fund would reduce the projected Total One-Time Revenue by \$1.25 million, from \$41,287,391 to \$40,037,391 and increase the annual finance payment to \$632,665. This would in turn lead to a Tax Increase Requirement of 1.39% as summarized in the Table below.

Similarly, should Council reject the proposed contribution from the City of Kingston, a 3.19% Tax Increase would be required to fund the project, as summarized in the Table below.

	Current Projections	Unsuccessful CBR Grant
Total Project Costs	\$49,500,000	\$49,500,000
One Time Revenue	\$41,287,391	\$40,037,391
Amount to be Financed	\$8,212,609	\$9,462,609
Annual Debt Service Cost	\$549,097	\$632,673
Total Annual Funding/Savings	\$(360,625)	\$(360,625)
Remaining Amount to Fund (annually)	\$188,472	\$272,048
General Rate Tax Levy	\$19,608,733	\$19,608,733
Tax Increase Requirement	0.96%	1.39%

Projected impact to the tax rate increase required to fund the W.J. Henderson Recreation Centre Renewal project should the Township's application to the Community Building Retrofit program be unsuccessful.

	Current Projections	No contribution from City of Kingston
Total Project Costs	\$49,500,000	\$49,500,000
One Time Revenue	\$41,287,391	\$34,737,391
Amount to be Financed	\$8,212,487	\$14,762,609
Annual Debt Service Cost	\$549,089	\$987,032
Total Annual Funding/Savings	\$(359,625)	\$(360,625)
Remaining Amount to Fund (annually)	\$189,464	\$626,407
General Rate Tax Levy	\$19,608,733	\$19,608,733
Tax Increase Requirement	0.97%	3.19%

Projected impact to the tax rate increase required to fund the W.J. Henderson Recreation Centre Renewal Project should Loyalist Township Council reject the proposed contribution from the City of Kingston.

8.0 Summary

Summary

The W.J. Henderson Recreation Centre Renewal project is a modernization and expansion of the existing facility which will create an improved experience for users and improve access to recreational programming for the entire Loyalist Township community. The project, which represents the first phase of the broader Community Hub initiative, will involve the construction of a new aquatic facility, accessibility upgrades across the existing building, the creation of a new Indigenous Legacy Space, and upgrading mechanical systems to improve energy efficiency and reduce GHG emissions associated with the building. The information contained in this validation report summarizes the design for the proposed project, along with the costs, strategies, and timelines associated with its implementation.

An IPD model was selected for this project to ensure that the stated goals will be met within the required budget and timelines. The project partners tasked with delivering the W.J. Henderson Renewal project have worked as a team to develop this validation report which represents the following collective statement: “We can build this building, that does these things, for this much money, in this much time”. The project team will continue to work collaboratively during the design phase of the project to identify further opportunities reduce costs, accelerate timelines, or improve end user satisfaction.

The design for the proposed facility reflects feedback collected as part of a rigorous public consultation process which involved a series of workshops and open houses held in early 2023. Stakeholders will continue to be consulted throughout the design phase of the project to ensure that their needs and expectations are met once the work is completed.

The narratives presented in this report summarize the design decisions which were made to meet the programming and energy requirements of the proposed facility. They include descriptions of the site, the form and function of the building, and technical specifications pertaining to the building's envelope, structural elements, mechanical systems, and electrical considerations.

The Target Project Cost, which has been set at \$46,399,434 by the project team, represents the cost of building the proposed facility as designed. This figure includes design costs, the overhead and profit of each project partner, as well as a risk register which details all of the potential issues or opportunities which may arise throughout the project. For example, and most notably, the impact of inflation has been identified as a major risk to the project budget and was therefore included in the project's risk register, reducing potential impacts to the Target Project Cost. Project soft costs, such as taxes, permitting, Township-supplied FF&E, project management expenses, and staff training have also been considered and amount to \$3,090,000, for a total capital cost of \$49,500,000.

The incremental costs associated with operating the renewed and expanded facility, along with one-time and annual revenues were considered to determine the overall financial impact of the W.J. Henderson Renewal project on the Township. Based on available information, it is estimated that a 0.96% increase to the General Tax Rate will be required to fund this project. It should however be noted that these figures are based on a construction start date in April 2024 and a project completion date of December 24, 2025. Any delays in approving the project would affect construction timelines, thereby increasing the impact of inflation on materials and labour, effectively invalidating the Target Project Cost.

The W.J. Henderson Recreation Centre Renewal project will ensure that the recreation needs of the Loyalist Township community are met, both today and in the future. Council's acceptance and endorsement of this report will commit the Township to moving forward with the project, effectively representing the next chapter of recreational programming in Loyalist Township.

