# ATTACHMENT – 2

# DESIGN DEVELOPMENT REPORT

# CRYSTAL POOL AND WELLNESS CENTRE

DESIGN DEVELOPMENT REPORT - FEBRUARY 2019

DRAFT

HCMA

## DESIGN TEAM

| | |
|---|---|
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| ELECTRICAL | AES |
| CIVIL | HEROLD ENGINEERING |
| BUILDING ENVELOPE & ENERGY MODELING | MORRISON HERSHFIELD |
| LANDSCAPE | PWL partnership |
| BUILDING CODE | LMDG |
| ACOUSTICS | RWDI |
| ACCESSIBILITY | Rick Hansen Foundation |
| INCLUSIVITY | TransFocus CONSULTING |
| SUSTAINABILITY | synergy |
| TRAFFIC | WATT Consulting Group |
| VERTICAL TRANSPORTATION | VERTECH Elevator Services |

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# EXECUTIVE SUMMARY

Since the completion of schematic design in June 2018, the Design Team has undertaken a comprehensive design development process that has endeavoured to gather feedback from key stakeholders, carefully review user needs, refocus on key principles and refine the facility design. This process requires the Design Team to understand the intricacies of all activities that will be taking place within the facility and develop spaces that enable and enhance these, while simultaneously resolving the technical challenges posed by a complex multi-use facility.

This collaborative process has resulted in significant improvements to several aspects of the facility design. These have been driven by a range of factors including programming development, feedback from stakeholders, enhancing user experience, seeking efficiency, enhancing performance, technical requirements and cost considerations. Some of the key areas of development are:

- Revisions to the aquatic configuration driven by stakeholder feedback and a City staff review of programming and focused on enhancing user experience and saving cost.
- Reorganization of the dry land configuration driven by feedback received from staff and stakeholders and focused on improving connectivity to the street and park, enhancing user experience, improving functionality, reducing circulation areas and simplifying wayfinding.
- Developments to the building form, envelope and systems with a focus on improving performance, reducing capital and operational costs, reducing environmental impact and creating an appealing visual character.
- Review of options that maintain park space and reduce parking.
- Enhanced focus on the 5 guiding principles for the project and the key design principle of creating a unified facility that complements the unique site setting and surrounding trees.

Ensuring that the project stays on budget has been a key consideration through design development. At the commencement of this project stage, the

Design Team was directed to seek cost efficiency through design decisions made, while maintaining the core program areas. This process resulted in cost savings through the reduction in area, simplification of the building form, attention to constructability and the careful selection of materials and finishes. A formal value engineering process was also constituted towards the end of the design development process, resulting in a list of possible measures to further reduce project costs.

At the end of design development, Victoria City Council directed the Project Team to “finish project A” and to "wrap up design development work on the current proposed project (Project A), and not submit an application for the initial intake of the Investing in Canada Funding Program." This was intended to facilitate a review of other sites and options for the development of a new community and recreation centre for the citizens of Victoria.

The next phase of the project would generally involve the creation of detailed construction documents by the Design Team and continued review with the Construction Manager leading up to the commencement of construction. To ensure the project is on budget, a comprehensive value engineering process could be undertaken as suggested in the costing review prepared by Turnbull Construction Project Managers (TCPM).

However, in light of the fact that a review of other options has been prioritized by Council, the following report outlines the design development process that was undertaken, illustrates key decisions made and summarizes the facility design that resulted at the end of the process.

# 1

# PROJECT OVERVIEW

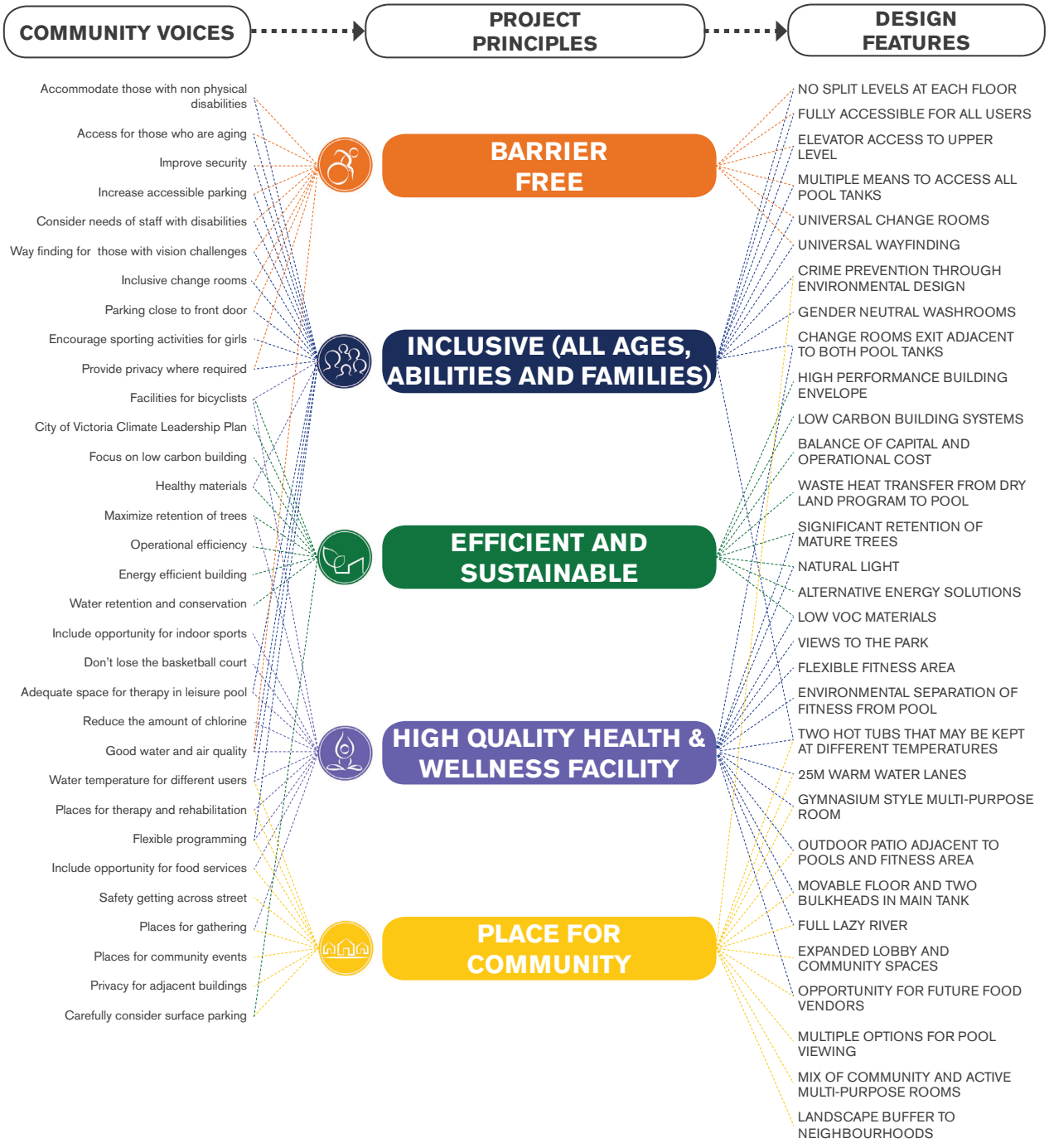



**FIGURE 1: Project Principles and Design Strategies**

# 1.1 PROJECT PRINCIPLES

Five guiding principles established for the project have continued to guide design decisions regarding the site and building. The design team has applied these principles to decisions at all scales, from the position and relationships of major programs to the characteristics of each space within the new facility.

**Barrier Free**
Seamless access to all parts of the facility continues to be a critical focus of the design. Key considerations include fully accessible site circulation, a gentle slope to access the front door, multiple options to access to each body of water, level transitions throughout the facility and clear wayfinding for users of all abilities. The project is also pursuing "Accessibility Certified Gold" rating under the Rick Hansen Foundation's Accessibility Certification Program and many detailed considerations from this program continue to be integrated into the design.

**Inclusive (All ages, Abilities and Families)**
Creating a facility that caters to the needs of a range of different uses has been a critical focus. Key considerations include the inclusion of spaces that can cater to programming for different age groups, including a large universal (family) change space, creating a gender neutral facility (exuding gendered change rooms), accommodating for cultural differences and designing for those with non-physical disabilities.

**Efficient and Sustainable**
Reducing energy usage and minimizing the carbon footprint of the new facility has been a critical focus. Strategies employed to achieve this include creating a high performing building envelope, using low carbon building systems for heating and cooling, designing an efficient mechanical system that reuses waste heat, reducing water consumption, considering alternate means of energy generation and using healthy materials. A sustainability framework specific to this project has also been developed to further guide the design and construction of the new facility, which is included as part of section 4 of this report.

**High Quality Health and Wellness Facility**
Creating a facility that accommodates a wide range of health and wellness activities both in and out of the water has been a critical focus. This has been achieved by including spaces that can accommodate varied health and fitness activities, connecting interior spaces to the surrounding park space and designing a flexible aquatic configuration that can accommodate a range of programming.

**Place for Community**
Creating a facility that is welcoming to the community and enables the enrichment of community bonds has been a critical focus. Key considerations include creating a public lobby before the control point, including community focused multi-purpose rooms and creating spaces that encourage informal gathering.

# 1.2 ENGAGEMENT AND STAFF REVIEW

Through design development, the project team continued to review the refined design with members of the public, stakeholders, user groups and City staff. In addition to providing an update on the facility design, these discussions also solicited feedback from each group to help further direct and refine the design.

**Public Engagement**
During schematic design, two engagement sessions were held to gather feedback from user groups, stakeholders and the wider public. Prior to the commencement of design development, an additional public open house was organized by the City that included discussions with both user groups and the wider public. The schematic design configuration was presented by HCMA and feedback regarding various aspects of the design was collected.

An online survey set up by City staff requested feedback on whether the design met each of the 5 project principles. Survey results showed that over 80% of respondents agreed that the design met each of the five principles and almost 80% felt that the design met their needs and expectations for the new facility.

**Council Presentations**
Regular presentations were made to Victoria City Council that included project updates and confirmed their desired direction to proceed. Presentations were made by City staff with input as required from the Design Team. A comprehensive review of the project design, schedule and funding was also undertaken by the new Council that took office in December 2018 to determine the desired path for the project.

**Stakeholder Consultation**
Over 40 stakeholder groups including accessibility groups, community groups and recreation groups have been consulted through the public engagement process. At key points during design development, the Accessibility Working Group, Active Transportation Advisory Committee and aquatic user groups were engaged to provide feedback. These discussions included an update on the refined design, key aspects of concern and a review of questions specific to each group.

**Technical Meetings**
Technical meetings served as the core of the design refinement process as they brought together specific members of the Design Team, representatives from Turnbull Construction Project Managers (TCPM) and City staff for detailed discussions regarding specific topics. Meetings were held on the following topics:

- Aquatic programming and pool configuration
- Dry land programming and requirements
- Sustainability and building performance

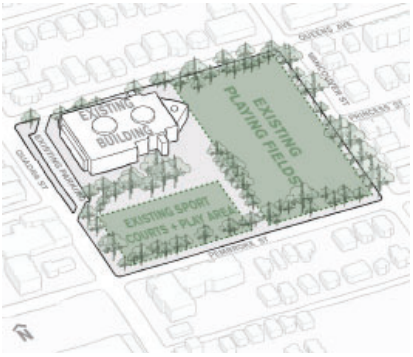
- Facility operations
- Accessibility and inclusivity
- Site, civil and landscape design
- Transportation and parking strategies

**Project Team Meetings**

The Project Team also convened for weekly meetings to review progress on all aspects of the project including the design, schedule, budget, communications and engagement. Periodic reviews were also conducted with the Steering Committee for the project that included heads of several departments at the City.


**FIGURE 2: Images from the Public Engagement Session**

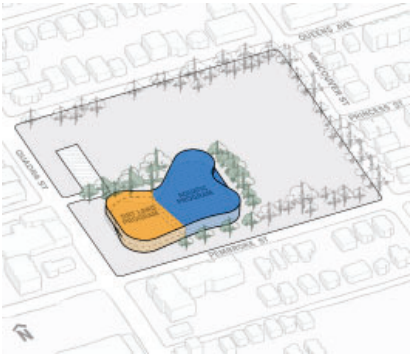
Image credit: City of Victoria



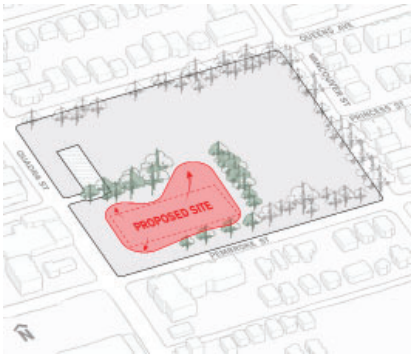

1. Existing Configuration


5. Organization of Interior Elements

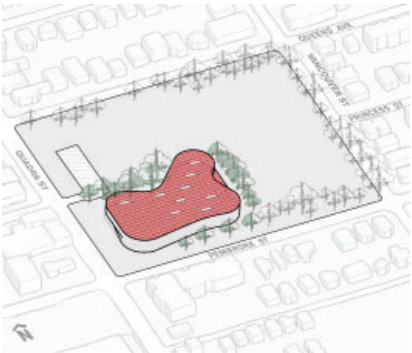

2. Project Site



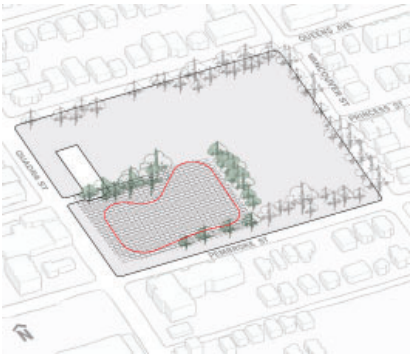

6. Building Program



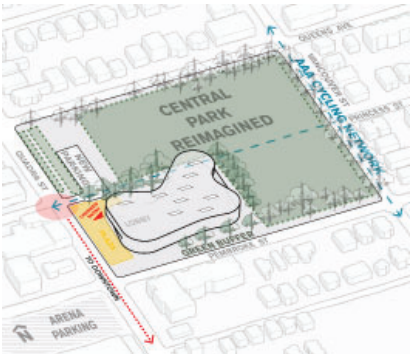

3. Occupying the Existing Clearing




7. Unifying Roof & Ceiling Plane




4. Project Grid




8. Urban COnnections

**FIGURE 3: Design Strategies**

# 1.3 DESIGN PRINCIPLES

The unique opportunity of having a site bounded by large mature trees has been an important factor that has guided the design direction for the project. Ensuring that most of these trees are preserved, connecting interior spaces to them and enhancing the experience of being within the park while using the facility are important design criteria resulting from our analysis of existing site conditions.

**Strategically Occupying the Existing Clearing**
In keeping with the desire to maximize retention of existing trees, the curved exterior profile of the building is defined by the clearing between them and seeks to occupy existing gaps rather than removing trees. Within this, program elements have been organized with a focus on programmatic relationships and creating a simple and legible path between them. The layout is thus a product of both the critical programmatic relationships and the ability to accommodate these within the clearing, thus minimizing the impact on existing trees.

**A Pavilion in the Park**
A simple pavilion within the park has been the guiding principle for the building form and articulation of major building elements. The pavilion is characterized by simple and transparent vertical walls supporting a visually bold horizontal surface at the roof. Transparency ensures that uninterrupted visual connections to the existing trees are maximized from within the new facility, thus enhancing the experience of being within the trees. Simplicity keeps existing trees as a key visual element and minimizes visual distractions from them. The roof plane serves as a visual connector between the dry land and natatorium programs and as a unifying element for the entire design.

**Grids**
An organizational system has been overlaid over the site to connect interior and exterior elements, organize interior spaces and define patterns within the site and building. A grid that follows the east-west direction, connecting dry land and aquatic programs is combined with one that follows the angle of the main lap pool. The spacing between lines that make up each of the grids is carefully sized to ensure that the resulting patterns can be easily fabricated using standard material sizes.

**Curved Elements**
The curved lines creating the exterior wall and major landscape elements have been considered as a unique system that exists in contrast to elements conforming to the grid. In keeping with the desire for a simple exterior facade, the curved wall is defined by a constant geometry that differs from that of the grids. This geometry is evident in the glazing system, its supporting structure and the termination of major building elements at the exterior facade.

# 2

# SUMMARY OF DESIGN PROGRESS

**FIGURE 4: Interior Rendering within Natatorium**

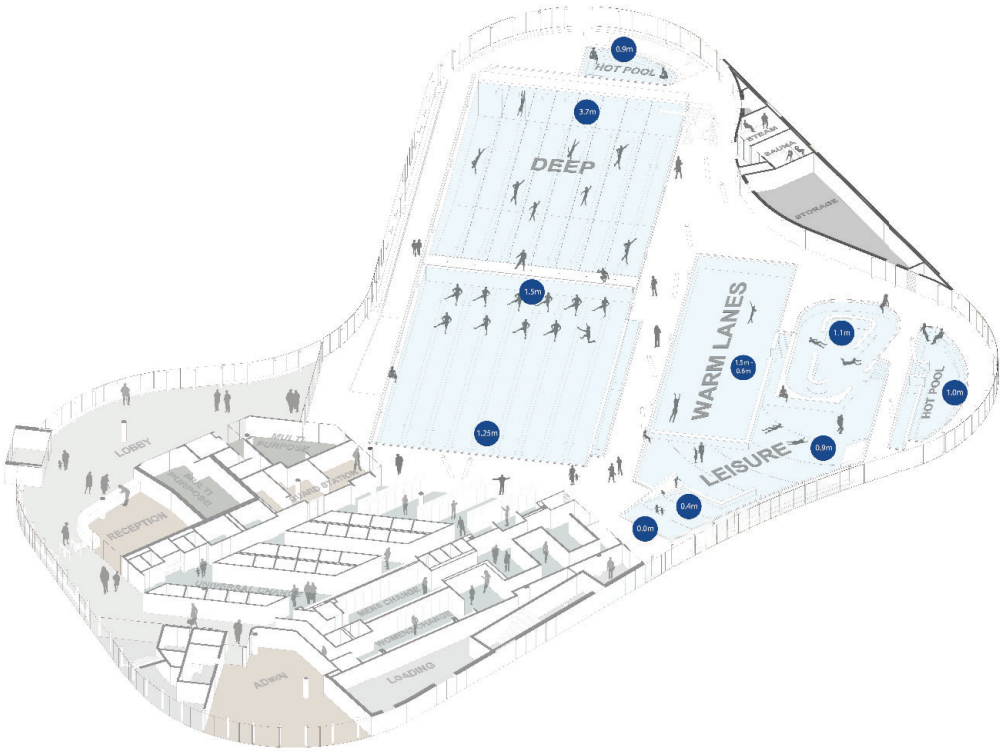



**FIGURE 5: Aquatic Configuration**

# 2.1 AQUATIC PROGRAMS

The aquatic configuration at the end of schematic design included the following major components.

- A 20 metre wide and 50 metre long main pool tank with two bulkheads and a movable floor
- A leisure pool with tots area, lazy river and three 25 metre warm water lanes.
- Two hot pools with water kept at different temperatures.
- Steam and sauna rooms
- An outdoor patio

An internal review undertaken by aquatics staff tested the programming flexibility of this configuration and made several recommendations for improvement. The analysis projected that an enlarged leisure pool with additional warm water lanes and a warm water movable floor could accommodate a wider range of programming and increase the availability of the main pool tank for lane swimming and aqua fit classes. The main pool tank would have depths in the shallow end specifically adjusted for aqua fit classes and require only a single bulkhead to allow it to be configured for short and long course lane swimming. This configuration is focused on maximizing the times available for both lane and leisure swimming.

This analysis guided several revisions to the aquatic configuration. In conjunction with this, the relationships between various aquatic elements, their connection to the park and ease of access to each body of water from the revised locations of the change rooms were also carefully reviewed.

**Main Pool Tank**

An 18.5 metre wide main pool tank with a single bulkhead is located at the north end of the natatorium. The width of the pool tank was reduced to allow for the enlargement of the leisure pool while maintaining the same area of water. While a standard floating bulkhead has been specified for the base design, an alternate option with one or two vertical bulkheads that would allow a ramp into the pool tank and simultaneous operation in short and long course lane configuration was also considered. This option has been included as a separate price in the project costing and can be reviewed further if funding permits.

Since the single floating bulkhead limits the ability to include a fixed ramp, other accessible features including lifts and a transfer bench have been included. Bleacher seating has also been integrated along the glazing to the north of the pool tank for swim meets and events. Depths at the north east end of the pool tank have been set to allow diving options up to a 5 metre platform and deep water play features such as a climbing wall and rope swing to be accommodated.

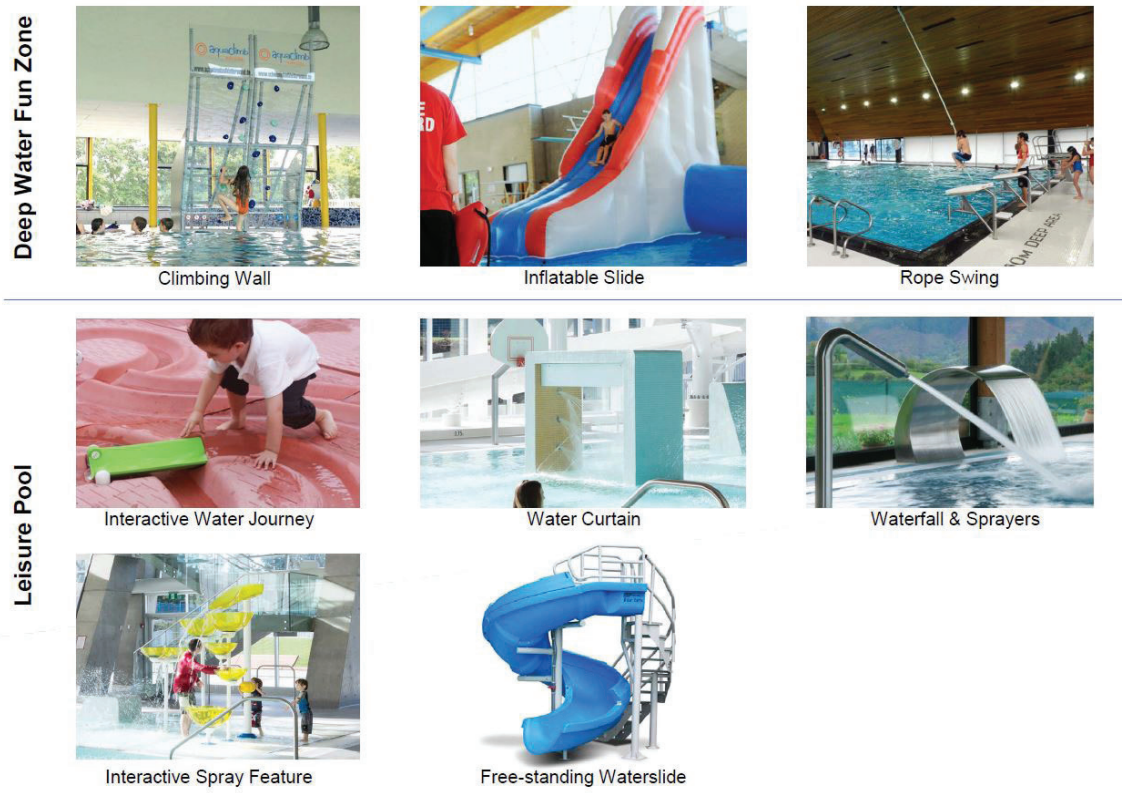



**FIGURE 6: Options for Play Features**


**FIGURE 7: Options for Accessibility Features**

**Leisure Pool**
Reduction in the area of the main pool tank has allowed the leisure pool to be enlarged and configured to accommodate a wide range of programming. Its position in the south west corner of the natatorium has been maintained and its connection to existing trees has been enhanced.

Within it, an additional warm water lane has been added and the movable floor relocated here. This allows swim lessons for different age groups and a range of therapy functions to be accommodated in this area. The leisure and play area continues to include a tot area with zero depth entry and an enlarged zone for leisure activities that contains  range of water play features. A full lazy river is also included to accommodate play and therapeutic functions.

With the zero depth entry, integrated ramps and lifts, the leisure pool accommodates seamless access for a range of abilities. A hinged ramp and collapsible stair allows access to the variable depth area within the warm lanes.

**Hot Pools**
The larger and cooler of the two hot pools is intended for a mix of play and therapeutic activities. It has been positioned within the curved south west corner of the natatorium and configured to enhance its connection to surrounding trees. Ramp and lift access has been provided for this hot pool.

A smaller and warmer hot pool is being considered for therapeutic and wellness activities and its inclusion will need to be reviewed against available budget. This could be located in the north east corner of the natatorium to provide separation from the active leisure zone and to connect it with the park and adjacent trees. A transfer bench and lift access could be provided for this hot pool.

**Steam, Sauna and Patio**
Steam and sauna rooms have been integrated into the volume at the east edge of the natatorium with views to existing trees. Their proximity to the small hot pool could create a wellness and therapeutic zone within the natatorium.

A fenced outdoor patio is being considered at the south end of the natatorium and connected to the trees along Pembroke Street. Its inclusion will need to be carefully reviewed against available project budget.

**Support Programs**
Aquatic storage occupies a majority of the space within the volume at the east end of the natatorium. This has been consolidated into a single  volume to enhance visual transparency from within the natatorium.

A viewing area has also been included at the upper level, overlooking the leisure pool.

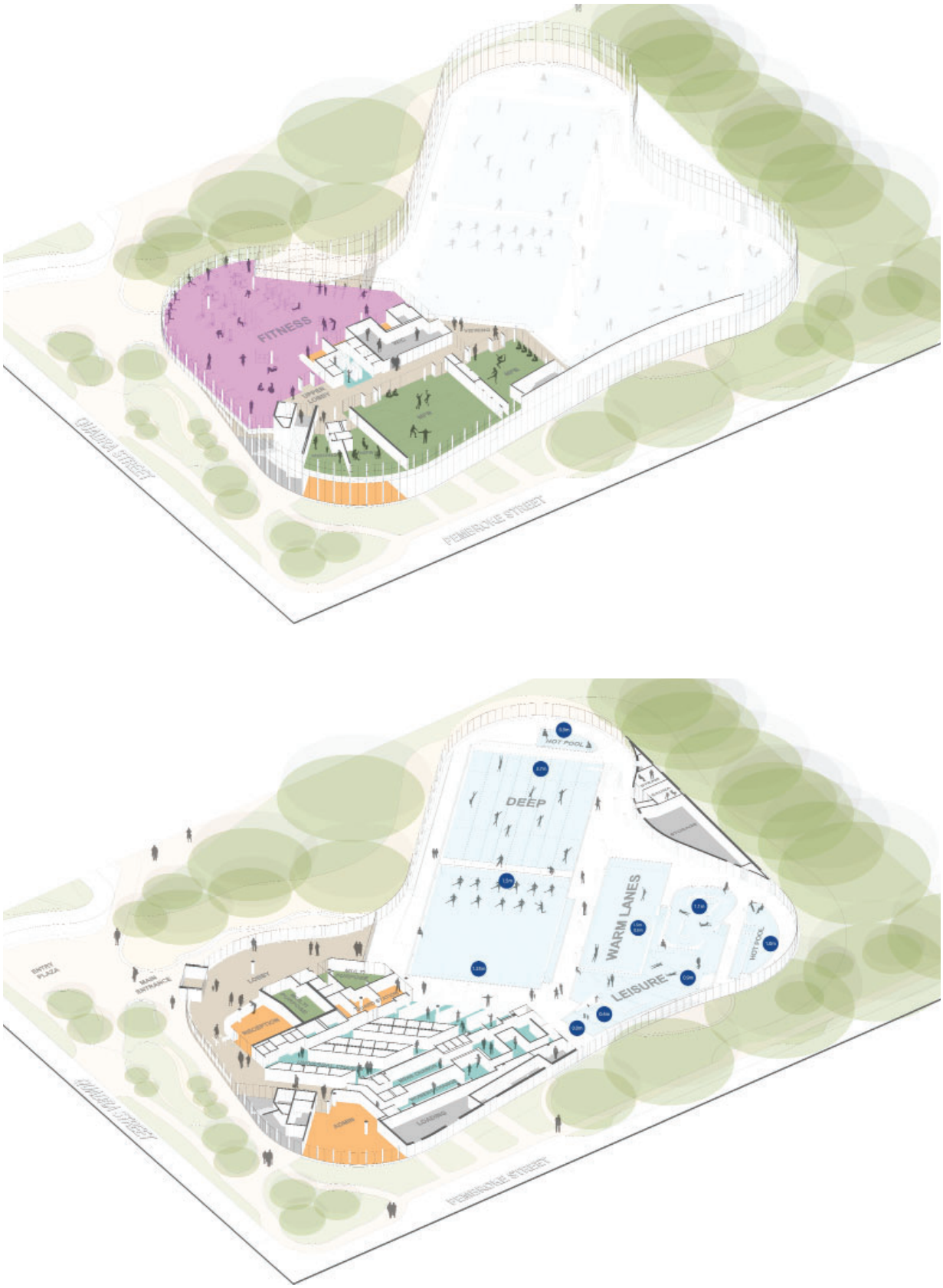



**FIGURE 8: Program Configuration**

# 2.2 DRY LAND PROGRAMS

A careful review of the dry land layout was undertaken to optimize how they fit within the existing clearing. Important considerations included improving connectivity to the street and park, enhancing user experience, improving functionality, reducing circulation and simplifying wayfinding.

In July 2018, Victoria City Council passed a motion to "Examine alternatives for providing parking for pool users to ensure no net loss of park space; explore alternatives to the proposed surface parking lot." This required some adjustment to the program layout and led to the relocation of two multi-purpose rooms to the upper level, in an effort to reduce building footprint.

In keeping with the direction to pursue cost efficiency through design decisions made during his phase, the gross building area was reduced by approximately 225sm (2,425sf) while maintaining all critical program areas.

**Design Approach**
To maximize the impact of the curved building profile, the interior elements were envisioned as a system that was separated from and contrasted with the curved exterior wall. To achieve this, the grid extending across the site was used to define the geometry of several interior elements, thus emphasizing the contrast to the exterior wall.

The relocation of more solid zones of program away from the glazing and the careful articulation of interior partitions that needed to extend to the glazing were other strategies used to allow both systems to be read independently.

**Reception, Lobby and Control Point**
The schematic design layout placed the reception and control point behind the line of sight for users entering the facility, which was not ideal. Modifying this was an important factor that drove the reorganization of the layout. In the current design, users entering the lobby have a clear line of sight to both the reception and the natatorium, allowing all desired visual connections to exist.

The desire to pull programs away from the curved exterior wall and enhance visual connection to the street and park resulted in the creation of an interior grouping of programs adjacent to the main entry that include multi-purpose rooms, washrooms and administration areas. The zone between this interior volume and the curved exterior wall is occupied by the lobby, control point and major circulation spaces. Beyond enhancing visual connectivity, this interior volume also serves as a significant wayfinding device between the lobby, natatorium, vertical circulation and other spaces at street level.

The lobby continues to be located before the control point, thus creating a freely accessible community space and is designed to encourage informal gathering and ensure that community members may use the facility for activities beyond health and fitness.

**Change Rooms**
The universal change room has been relocated to the south of the entry volume, creating a continuous open path of movement around the volume and enhancing its role as a critical wayfinding device. Gendered change rooms are integrated into the solid zone of the layout to the south of the universal change room. In consultation with City staff and stakeholders, the layout of the change rooms has been refined to better accommodate the needs of a wide range of users.

The universal change room continues to be a gender neutral space This approach implies that all washrooms, shower stalls and dry change stalls are independent private units. Additional privacy measures have also been introduced within the gendered change rooms to enhance inclusivity.

**Fitness Area**
The fitness area continues to occupy a majority of the Quadra Street facade at the upper level to maintain its role as an active beacon to the community and provide passive surveillance. Its extents have been revised to improve functionality and long term flexibility.

As a result of its current location, the fitness area mitigates some of the concerns regarding the transmission of sound and vibrations to street level programs. While the reception area and two multi purpose rooms still exist below, it is largely located over lobby, circulation and change room areas that are less impacted. Additionally, an acoustically isolated floor system has been included to further reduce the passage of sound and vibrations to street level programs.

**Multi-purpose Rooms**
Recreation staff undertook a review of anticipated programming and recommended a series of different multi-purpose rooms to accommodate current and projected needs of the community. Based on their recommendations, the following spaces have been included in the current design.

- Half Gym - This has been configured as a space for active recreation and large social gatherings. Due to budget constraints, the space does not have the additional height required to accommodate indoor sports such as basketball or badminton but a sprung wood floor has been included to allow other types of active uses.
- Dance/Yoga studio - This is a smaller room that has been designed with a sprung floor to accommodate dance and other active programs.
- Seniors room - This room has been designed to accommodate seniors programming including games, presentations and community lunches. It is located close to the entry to allow ease of access and adjacent to the Silver Threads space, as they are anticipated to provide some of the programming within it.
- Wet room - This room is located adjacent to the natatorium and has been designed for wet activities including aquatic training and birthday parties.
- Child minding room - This room is located at the upper level and has been

designed to accommodate both child minding and programming as a small multi-purpose.
- Arts room - This room is located at the upper level and is designed to primarily accommodate arts programming.

An additional fitness studio was also suggested as part of the staff study. Through discussion with City staff, this has been considered to be a part of the fitness area to be partitioned is required at a later date.

All multi-purpose rooms have been provided with adequate storage to accommodate furniture and equipment required for the range of programs to be held within them. Additionally, kitchenettes have been provided at the seniors room and the wet room to support anticipated programming.

**Administration**
The primary administration spaces have been relocated to the south west corner of the building, from their earlier location along the west facade. This allows the primary public circulation spaces to occupy the west face of the building rather than the more private administration areas, thus increasing the visibility of activities and enhancing passive surveillance.

**Circulation Areas**
Circulation areas were carefully reviewed through the design development process with the aim of reducing area, simplifying paths of movement and ensuring clear wayfinding. Primary vertical circulation elements including the main stair and elevator have been relocated to the south west corner of the building as part of the layout revisions. An important driver of this has been the reorientation of circulation at the upper level and the need to explore ways to connect with this.

In their current location, the vertical circulation elements are clearly visible to users moving through the control point at street level. As users exit at the upper level, they are located at the head of the main circulation path that connects all upper level programs. There is thus a simple and clear path through the building that connects all major program elements.

Tactile wayfinding and contrasting colours are being considered at all interior and exterior paths of movement to aid those with limited vision.

**Service Areas**
The basement contains most of the required service areas including mechanical rooms, electrical rooms, workshop and storage areas. Additional loading, garbage and chemical storage areas are located at street level along the south end of the building. Loading of chemicals and equipment is intended to occur along Pembroke Street and with a mechanical lift or hoist enabling the movement of these to the basement when required.

An acoustically screened enclosure is also located on the roof that contains major mechanical equipment serving the natatorium and upper level dry land programs.

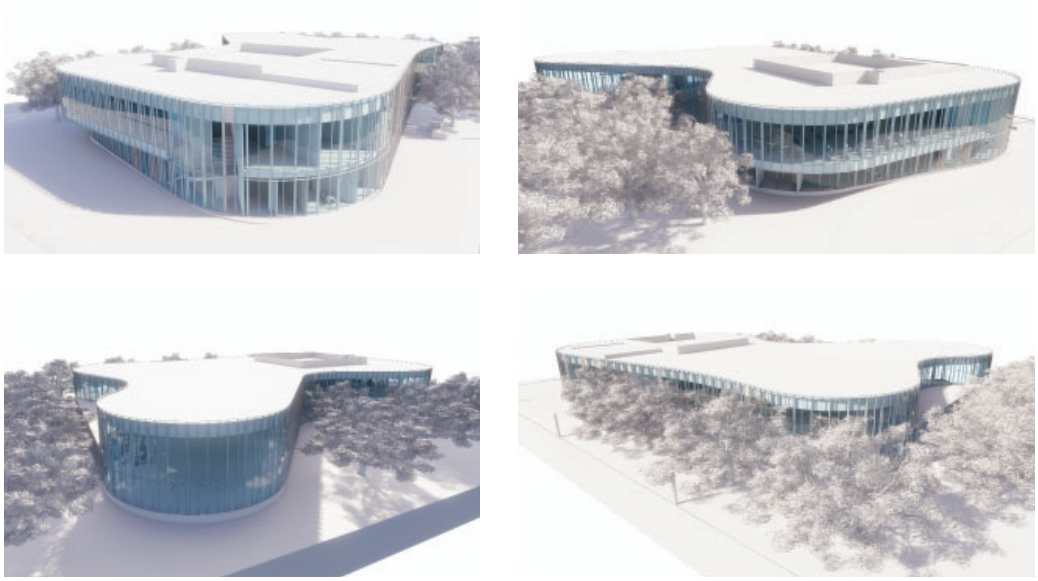


**FIGURE 9: Views of the Building Facade**

**FIGURE 10: Exterior Rendering with Facade Design**

# 2.3 BUILDING ENVELOPE

In keeping with the direction to pursue cost efficiency through design decisions made during design development, considerable effort was put in to simplify the building form and rationalize articulation of the facades.

**Design Approach**
The building facades play a critical role in achieving the concept of a pavilion in the park that is envisioned for the new facility. This concept suggests a simple shroud around the interior programs that maximizes visual connectivity to the park and existing trees. Locations of existing trees play a crucial role in determining the facade profile to maximize tree retention and to carefully occupy the existing clearing.

**Articulation**
At the end of schematic design, the facade was articulated as a series of curved vertical planes bounded by horizontal projections at the upper level and roof. The horizontal bands created patios at the upper level, defined the entry experience and provided shading where required.

The removal of the programmatic need for upper level outdoor spaces along with the desire to simplify and find cost efficiency required a change in this approach and led to the volumetric approach of the current design. In this approach, the curved vertical planes are mostly coplanar but peel apart in a few critical instances to define the entry and accommodate natatorium support spaces. Horizontal projections were not beneficial to this approach and their removal greatly simplified the constructability and detailing of the exterior envelope. Shading and glare control are now integrated with the glazing system through fins and frit on the glass.

Solid sections of envelope were introduced at several locations to reduce envelope costs. This included both the use of a simpler wall assembly at service spaces and the introduction of a solid assembly within the curtain wall system. The transition between solid and clear sections of the facades was thus critical to maintain unified visual character and was achieved by creating a gradual transition between solid and transparent sections with different densities of frit pattern on the glass.

**Geometry**
An essential part of the envelope simplification process involved ensuring that a standard curtain wall system could be used for its construction and restricting the number of unique conditions that had to be fabricated and constructed.

Standard curtain wall systems allow the glazing to be rotated to a limited extent to create curved facades with a radius of around 14 metres. If tighter radii are required, a more complex curtain wall system or curved glass needs to be employed. The building profile was adjusted to work with the above

number to ensure that a simple curtain wall system could be used. The number of different radii was also limited in an effort to simplify fabrication of the glazing system.

**Thermal Performance and Solar Control**
Results of the energy modeling conducted on the project indicted that the performance of the envelope had a fairly low impact on the overall energy consumption, which is typical for this building typology due to high mechanical and heating loads. Switching to a triple glazed system thus did not provide a significant operational saving.

The focus was thus to create a high performing double glazed system and to minimize thermal bridging through careful detailing. These considerations also have some impact on the possibility of condensation within the natatorium and allow the reduction in the number of air changes required within it.

Glare analysis was also conducted to determine areas of concern within the facility. This process indicated that careful considerations was needed for glazing on the west, south and north east faces of the building to mitigate unwanted solar gains and uncomfortable glare. While the adjacent trees provide some protection during the spring and summer months, additional measures are required to ensure that a safe and comfortable indoor environment is created.

Vertical fins are integrated into the curtain wall system along the north, west and south faces of the dry land programs that mitigate some of the glare. A frit (patterned screening applied to the glass) has also been applied to the glazing to mitigate this. However, most areas that experience direct solar penetration will require internal shades in addition to the above measures to fully prevent glare throughout the year.

**Support System**
The approach adopted to support the curved exterior facade is to employ a line of structure adjacent to the interior face of the glazing system that follows its curved profile. Its geometry is based on the glazing module and always aligns with it, thus ensuring that it visually reads as a part of the facade. The system comprises of a series of closely spaced round steel columns and angled brace frames that support the roof, upper level slab and glazing.

**Integration of All Components**
The desire for a simple and clean facade requires careful detailing to integrate all components including structural elements, mechanical elements and solar control shades, along with the termination of finishes and interior elements. At the roof, this is achieved by creating a continuous ceiling pocket at the junction of the ceiling plane and glazing that continues all around the building. The ceiling pocket allows mechanical ducts and shades to be concealed and ensures a clean termination for structural columns and ceiling finishes.

At the lower end of the glazing, a continuous raised pedestal allows for the integration of air supply diffusers and bench seating while carefully terminating floor finishes.

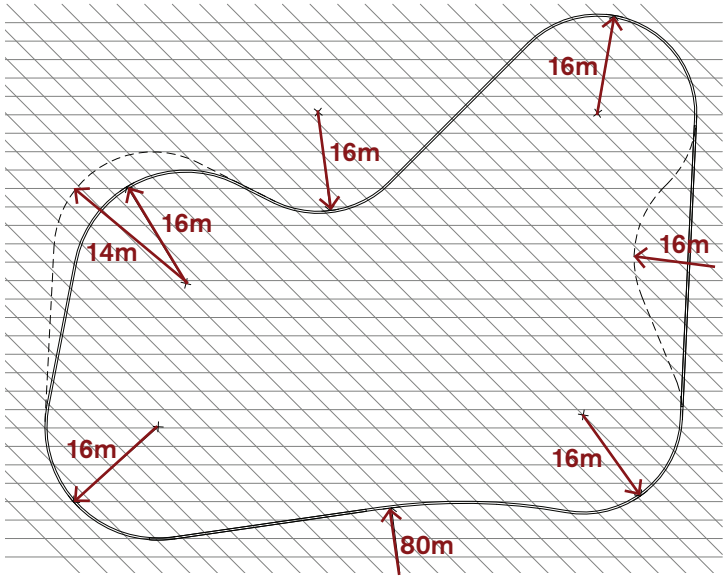
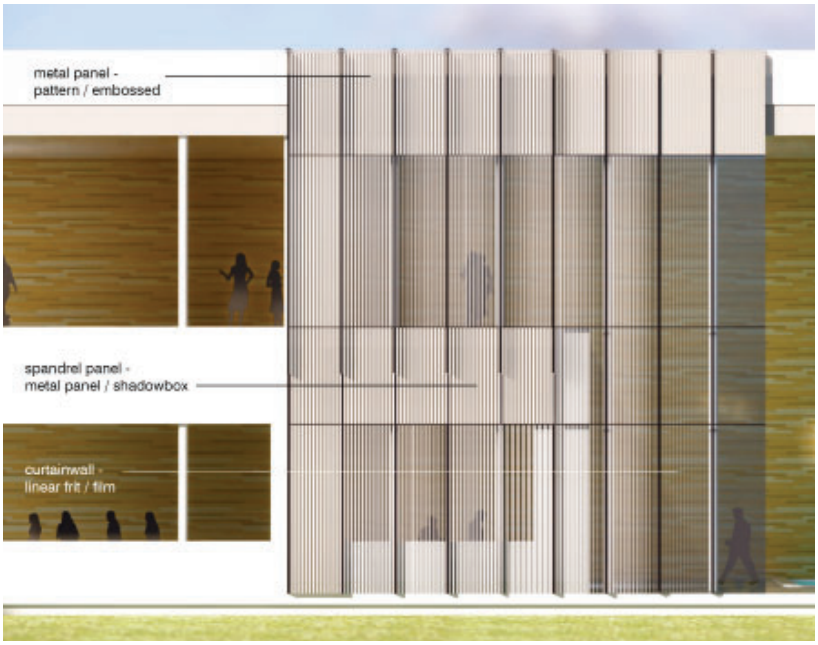



**FIGURE 11: Simplification of Facade Geometry**



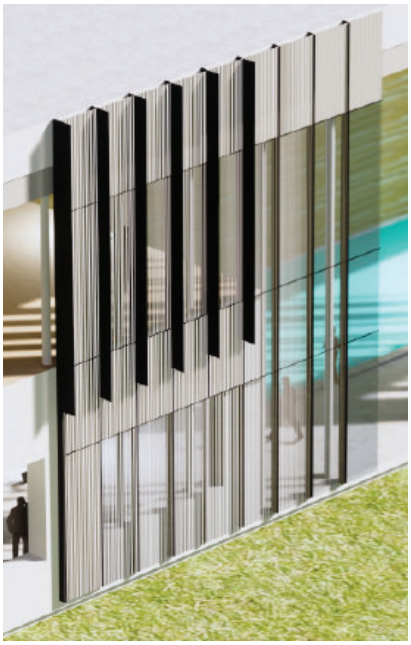



**FIGURE 12: Studies of Facade Treatment**

## 2.4 BUILDING PERFORMANCE AND SUSTAINABILITY

The City of Victoria's Climate Leadership Plan sets broad targets for green house gas (GHG) reductions community wide and for City facilities. This focus on climate change inducing GHG's is a focus that is not directly addressed in the LEED (Leader in Energy and Environmental Design) program. A sustainability framework has been developed to ensure that the new facility is high performing and makes progress towards these targets while being mindful of cost impacts.

**Sustainability Framework**
A project specific framework for building performance and sustainability has been created to compile sustainability strategies and building performance targets for the project. Approaches and strategies in the following categories have been included:

- Energy and carbon
- Water and storm water management
- Materials
- Solid waste management
- Transportation
- Site development
- Indoor environmental quality
- Social wellbeing

**Energy Modeling**
Energy modeling was undertaken to test the impact of several levels of envelope performance, different mechanical systems and the option of on site energy generation through a photovoltaic array. Three scenarios containing a range of strategies were simulated to determine anticipated operational energy and cost savings.

Several individual strategies were also reviewed to determine if there was a life cycle cost benefit to pursuing them in the facility design. This analysis suggested that improving the performance of the building envelope had relatively low impact on operational energy use while including a photovoltaic array, reducing the area of skylights and providing shading on the west facade has the highest impact. These strategies are to be reviewed further against their capital cost impacts.

**Low Carbon Systems**
In keeping with the City's Climate Leadership Plan, reducing GHG emissions from the operation of the new facility has been the primary goal for the project. An all electric system for heating and cooling interior spaces and for heating pool water is being considered to meet this goal. This can be coupled with several strategies to reduce energy usage and on site generation of energy to further reduce operational costs and GHG emissions.

Since there is a considerable capital cost impact to pursue these strategies, the project team will be carefully reviewing these to achieve the optimal

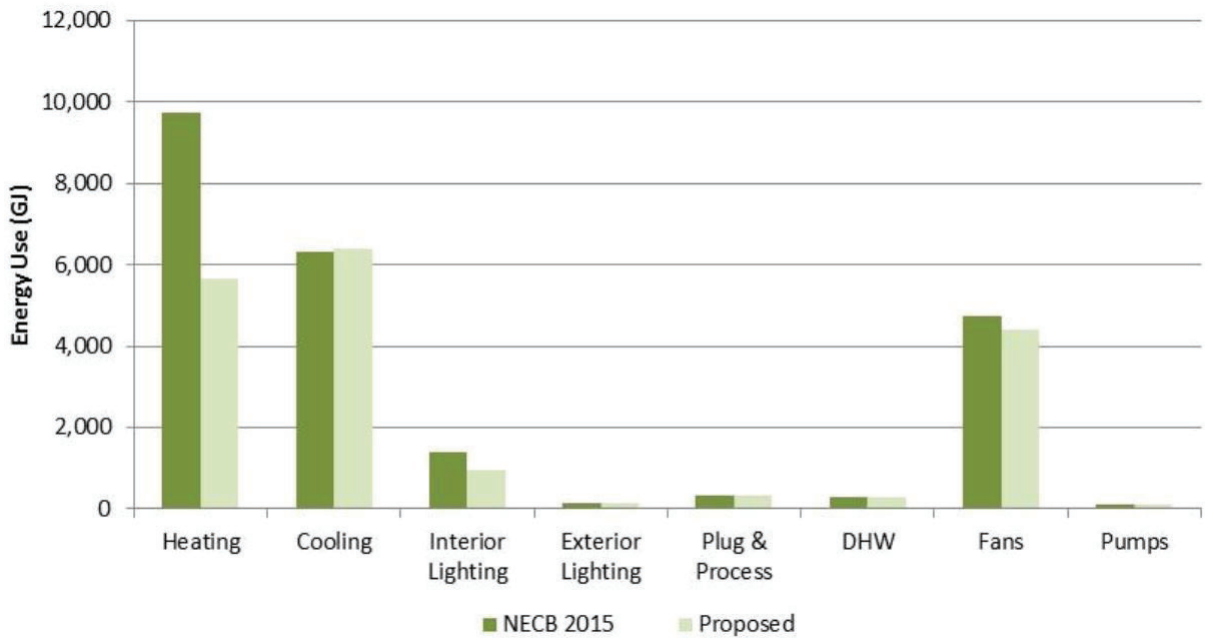



**FIGURE 13: Results from the Energy Modeling Process**

balance.

**Optimizing Building Performance**

Energy usage for this typology of facility is predominantly for heating, cooling and dehumidification of interior spaces and the heating of water within the pool tanks. Mechanical loads dominate these categories too and the building envelope has minimal impact on the overall energy usage of the facility.

Optimizing mechanical systems to reduce energy usage has thus been a focus throughout the design process. A heat recovery system that recaptures waste heat and uses it where required forms the core of the system. Air cooled heat pumps are being considered to provide heating and cooling for both interior spaces and pool water, as they provide good energy performance and constitute a low carbon system. A system to capture waste heat from backwash, showers and deck drains is also being considered as a separate price for the project.

Careful detailing has been employed for the building envelope to minimize thermal bridging and associated concerns regarding condensation within the natatorium. A combination of vertical fins and frit have been applied along the west facade to reduce heat gains. Skylight areas have also been reduced to align with results of the energy modelling process.

## 2.5 INTERIOR ARTICULATION AND FINISHES

Spaces and elements on the dry land side and within the natatorium have very different needs and characteristics. In some instances, this conflicted with the design intent to create a unified series of elements within the curved exterior wall. Achieving this unity, while respecting the unique needs of individual elements thus became the driver of several key decisions.

The project grid served as the primary organizing system for interior elements connecting both sides of the program. This was used to define the position and shape of certain elements and to define patterns within interior finishes. The ceiling and floor surfaces that continue over both dry land and natatorium programs are critical to this unified reading of interior spaces and careful attention will need to be paid to the articulation of these to enhance this.

**Upper Ceiling Grid and Panelization**
Panelization of the ceiling plane has been a critical factor in determining the spacing of the project grids. This ensures that fabrication of the ceiling and any other elements that conform to the grid can be achieved using standard sizes of board products. As indicated in figure 15, each ceiling panel can be fabricated from three 4ft by 8ft boards, minimizing cut offs and waste during the fabrication process and thus reducing cost.

**Ceiling Fixtures**
Elements that integrate with the ceiling plane such as air diffusers and lighting fixtures align with specific directions of the grid. Linear air diffusers have been located above the ceiling panels that allows the use of inexpensive products. Linear lighting fixtures have been positioned in a pattern that follows the grid direction and complements the ceiling pattern.

**Interface With Exterior Wall**
Interior elements have been pulled away from the curved exterior wall to increase transparency and visual connections to the surrounding streets and park. This approach has led to the creation of the entry volume that organizes the street level layout. A more solid zone occupies the area to the south of the universal change room and defines the southern edge of the main movement zone at street level. Where elements like these need to extend to the exterior facade, careful detailing will need to be implemented that allows these systems to read independently.

A similar approach is adopted at the upper level with the fitness area being a large open zone to the north of the central service volume and main circulation spine and a zone containing  varied multi-purpose rooms to its south.

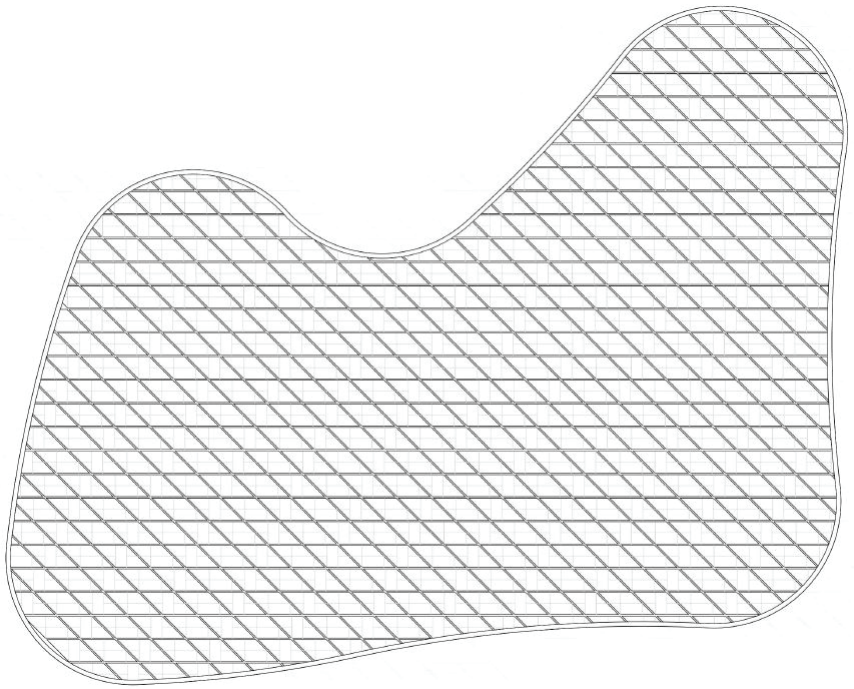


**FIGURE 14: Ceiling Grid**

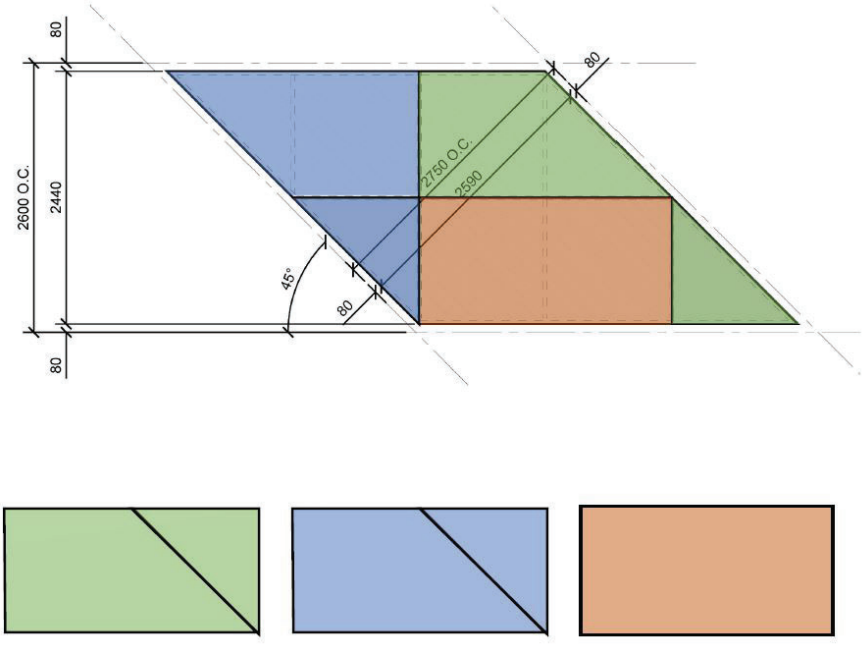



**FIGURE 15: Ceiling Panelization Strategy**

# 2.6 SITE AND LANDSCAPE DESIGN

The site configuration continues to be developed around the building entry located adjacent to the Quadra and Princess Street intersection. It is accessed through a plaza that connects it with paths into the park, the surface parking lot and the Quadra and Pembroke Street intersection.

The landscape design works with a combination of geometries from both the project grid and the curved facade system to define a series of outdoor spaces that accommodate a range of activities While patterns and some of the planting follow the grid, the larger area defining elements are composed of curves that complement the overall building form.

**Entry Experience**
Seamless access to the front door from all major access points on the site has been instrumental in determining the first floor elevation and required grading. Slopes have been kept below 5% to remove the requirement for ramps and stairs and improve barrier free access to the front door. The split in the building form at its north west corner creates a covered outdoor space and defines the location of the building entry. Landscape elements are configured to lead users towards the front door and enhance the entry experience.

**New and Existing Vegetation**
Existing trees that surround the new facility have been complemented with low level planting that reflect natural Garry Oak meadows. New planting has been provided at the entry plaza and parking to enhance the experience of arrival and entry to the new facility.

**Outdoor Patios**
A patio space has been included to the north of the lobby that serves as an outdoor community space. Large doors have been included to connect the lobby and outdoor patio when the weather permits. A screened outdoor patio connected to the natatorium is also being considered at the south face of the building. Additionally, a paved area has been included at the north east end of the natatorium to allow outdoor staging for swim meets and other events.

**Bike and Vehicular Parking**
Victoria City Council's directive to not reduce park space required a reduction in size of the surface parking lot and the exploration of other options for parking described in section 3 of this report. There was also a desire to reduce vehicluar parking to align with the City's climate action plan and prioritize alternate modes of transportation. The current extents of the parking lot can accommodate around 30 stalls, with priority given to accessible parking and low emission vehicles. Vehicular access to the parking continues to be off Quadra Street with a drop off area integrated adjacent to the vehicular entry. Parking for approximately 100 bikes is also included within the entry plaza.

**Loading Area**
An outdoor enclosure has been included to the south of the building to contain the transformer, generator access to the loading area and mechanical exhaust well.

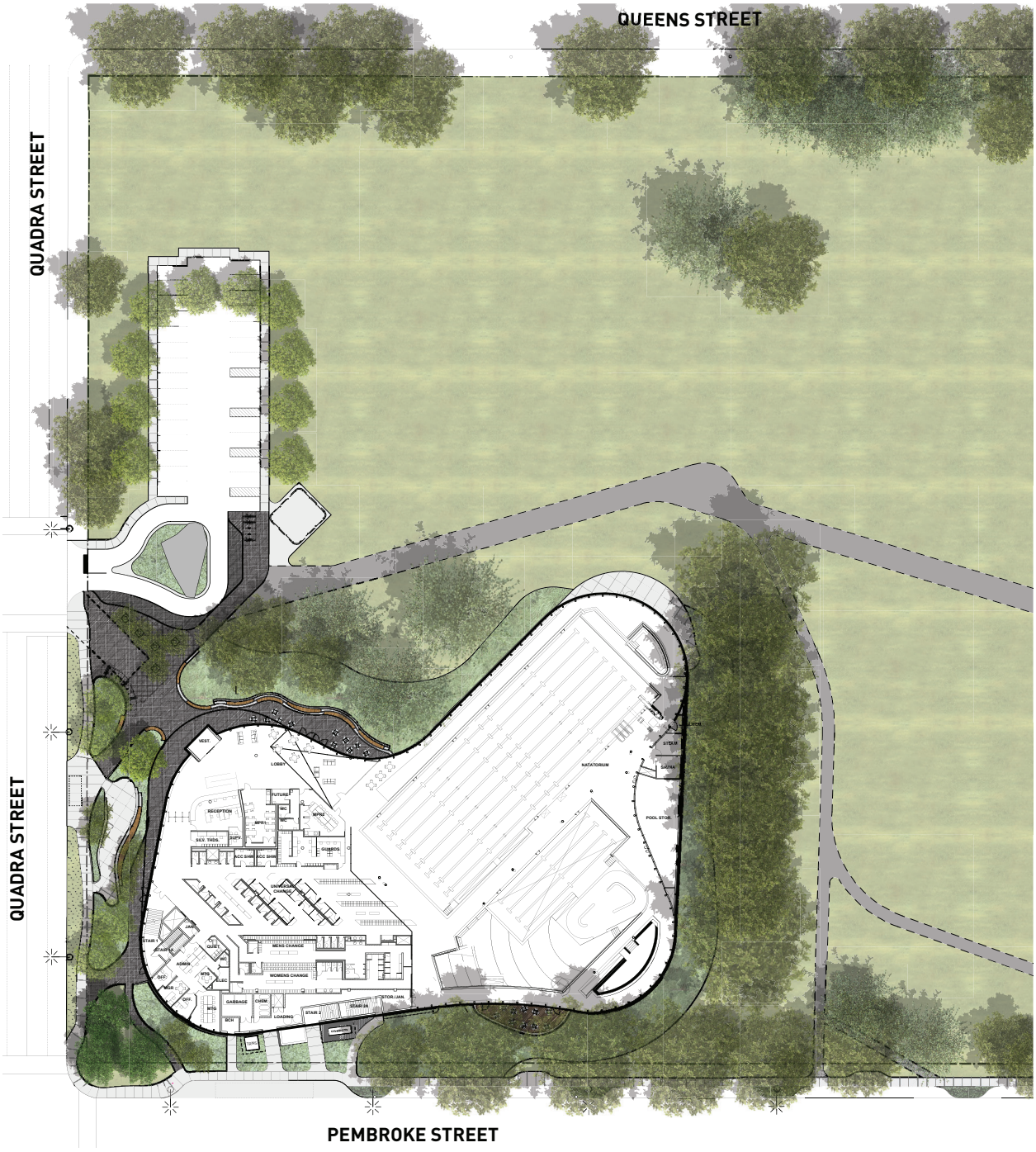



**FIGURE 16: Site and Landscape Design**

# 3

# PARKING OPTIONS

# 3.1 COUNCIL MOTION REGARDING PARK SPACE

In July 2017, a traffic impact analysis was undertaken identifying an anticipated demand of between 90 and 140 parking stalls for the program within the facility, based on projected growth in patrons, a staff and patron survey and a study of other facilities around the Capital Regional District. In keeping with this projection, a surface parking lot with approximately 100 parking stalls as accommodated on the site, which was anticipated to not add a parking burden to the adjacent neighbourhoods.

In July 2018, Victoria City Council passed a motion requiring the Project Team to ensure “no net loss of park space” due to the configuration of the new facility. This implied that the footprint (building, parking & hardscape) of the new facility had to be accommodated within an area equivalent to the park space disturbed by the existing facility. To maintain the program within the new facility, this required a significant reduction in surface parking and the development of new strategies to accommodate anticipated demand.

Based on this motion, a detailed study was undertaken to review other options to accommodate the amount of parking anticipated for the new facility. This process included input from HCMA and City staff along with structural, civil and traffic consultants.

Watt Consulting Group, Traffic Consultants for the project, consolidated all inputs into a multi-criteria analysis that reviewed each option with respect to the following key parameters that were developed in consultation with City staff.

- IMPACT TO NEIGHBOURHOOD - Defined as [a] the anticipated traffic impact of vehicles circulating the neighbourhood searching for parking, [b] the potential for new vehicles to impact the ability for others to access parking in the neighbourhood, and [c] impact to the boulevard in terms loss of trees and green space.
- USER EXPERIENCE - Defined as [a] the overall ability to access the recreation centre from the parking option location, [b] the ability for the patron to find an available parking space [c] impacts to social / economic equity and [d] the proximity to the front door of the recreation centre.
- FINANCIAL IMPACTS - Defined as the estimated capital and operational costs associated with each parking option.

The complete report compiled by Watt Consulting Group has been included n section 4 of this report.

# 3.2 PARKING OPTIONS

Three new options were reviewed as part of the multi-criteria analysis and these were compared to the existing strategy of the surface parking lot on the project site.

**Distributed On -Street Parking in the Neighbourhood**
This strategy involves accommodating parking overflow from the reduced on site parking lot on adjoining streets within a 5 minute walk from the new facility. A review of parking opportunities on adjoining streets conducted by Watt Consulting and City staff determined that approximately 64 additional spaces could be accommodated. This option has a high impact on surrounding neighbourhoods, the lowest user experience and low cost to build and operate.

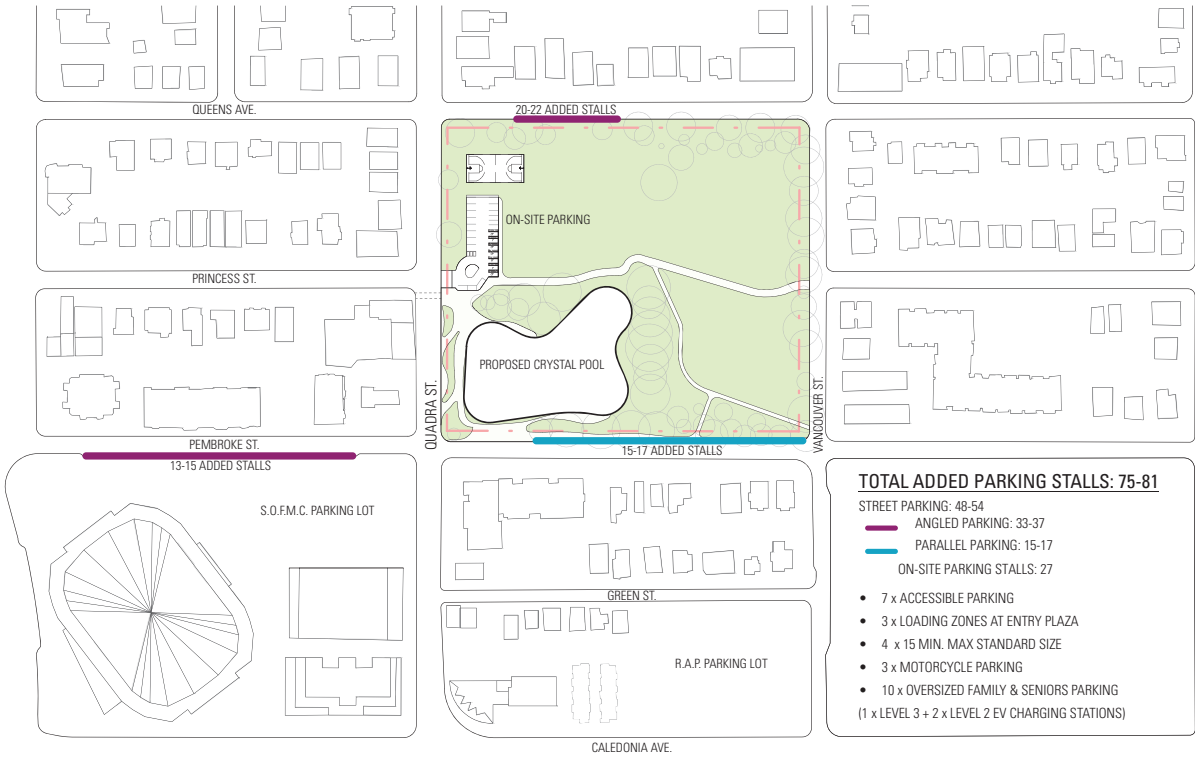



**FIGURE 17: Distributed On-Street Parking in the Neighbourhood**

**On-Site Underground Parking**

This option accommodates approximately 120 parking stalls within an underground parkade located on the site. The parkade includes a green roof that allows park space to be constituted over it, thus allowing the required number of stalls to be accommodated on site while meeting the Council directive. This option has a moderate impact on the surrounding neighbourhoods, moderate user experience and high cost to build and operate.

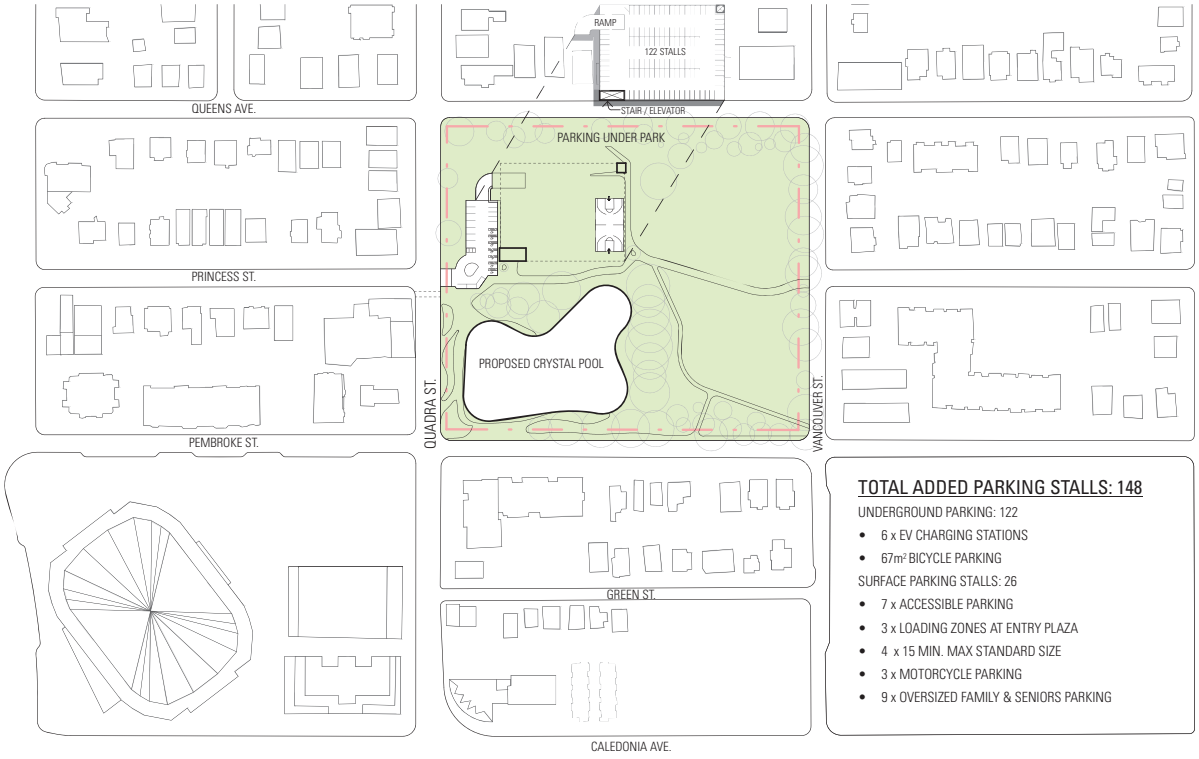



**FIGURE 18: On-Site Underground Parking**

**Modular Parking at Save on Foods Memorial Centre**

This option includes the construction of a temporary modular parking tier over existing surface parking within the surface lot at the Save on Foods Memorial Centre that would accommodate approximately 130 parking stalls. This option was considered to have a moderate impact on adjacent neighbourhoods, moderate user experience and high capital and operational costs.

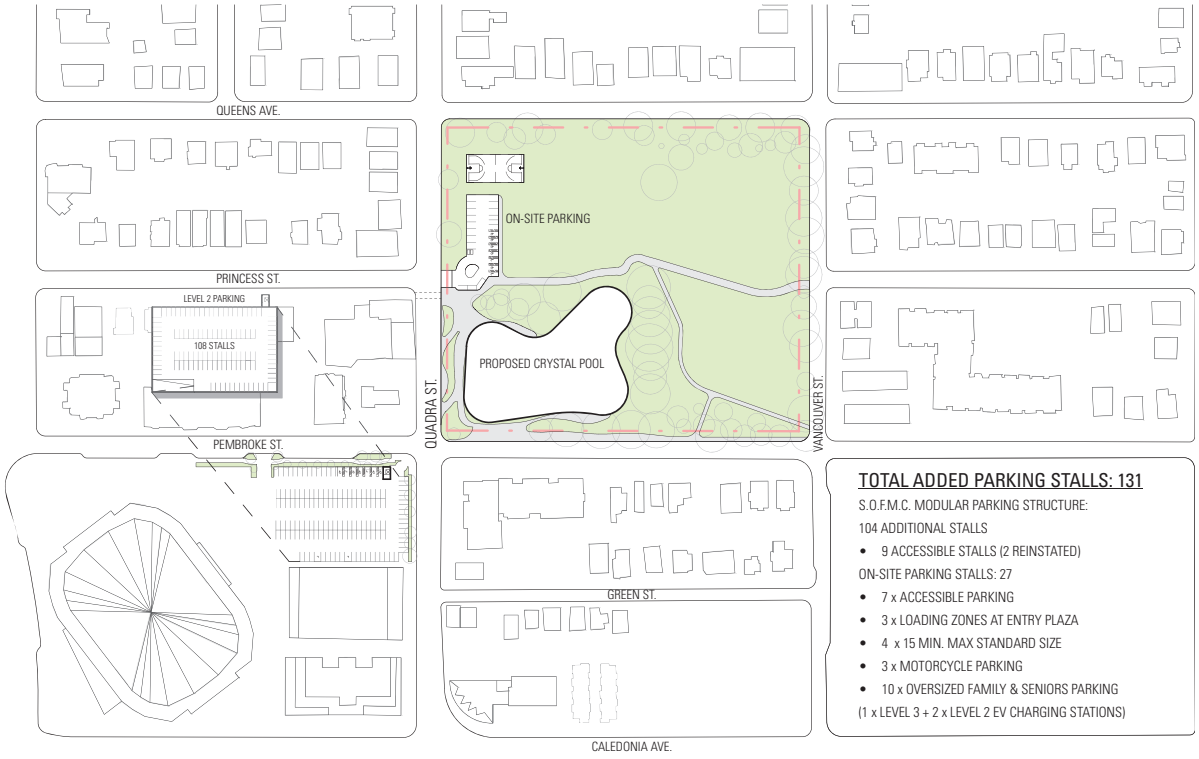



**FIGURE 19: Modular Parking at Save on Foods Memorial Centre**

**On-Site Surface Parking**

As a point of comparison, the existing option of accommodating between 95 and 105 parking stalls in a surface parking lot on site was reviewed. This option has the lowest impact to the surrounding neighbourhoods, best user experience and lowest capital and operational costs.

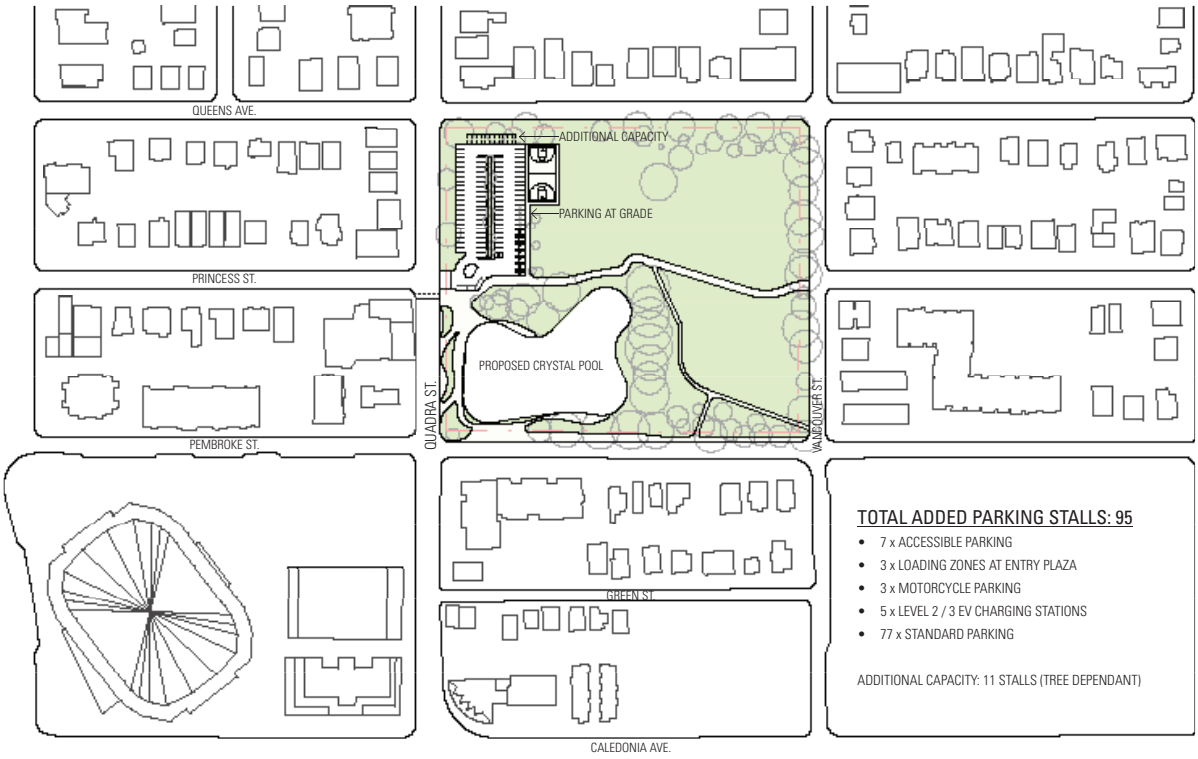



**FIGURE 20: On-Site Surface Parking**

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