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University of Guelph

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**UNIVERSITY OF GUELPH ATHLETIC AND RECREATION MASTER PLAN • MARCH 2007**

**ACKNOWLEDGEMENTS**
EXECUTIVE SUMMARY

Reynolds Walk View
planning process. In spite of this limited space, the University of Guelph has incredible participation by students and community in sports—varsity, intramural, club, and recreational—despite the square footage allocation with the comprehensive campus footprint, and team’s professional experience and advice. Typically, stakeholder interviews and assessments of demand result in requests for growth to existing facilities. Often those matrices include program spaces that overlap each other, and find duplicate spaces. This is not the case at Guelph, unless the hours of operation can find a way to expand. Guelph, unlike most institutions, has a true and documented unmet demand on all programs that are offered by students. An expansion of space would allow the University to engage alumni more actively on campus in a positive manner.

The Mitchell building was constructed in 1941 with a major expansion in 1957. The addition of the ice-pads and the second pool occurred in the early 1990’s. The building is past its normal lifespan for major mechanical components. All projects presented address issues of deferred maintenance.

4. Competitiveness

Guelph was a leader in student engagement. However, competitors now recognize the importance of student engagement for retention, student development purposes, and are giving more importance to residential programs, and the creation of communal places contribute toward strengthening the campus experience for students, faculty, staff, alumni, and the broader community. Planning for growth must consider the past for historic rationale and the future for projected expansion. This plan carefully reviewed all future campus development in the context of projected growth strategies and planning guidelines.

This plan envisages a strengthened campus by the creation of communal spaces, both within new interior environments and through new campus landscapes. An assessment of the existing conditions reflected not only significant infrastructure deficiencies but a general lack of welcoming environments. The Master Plan’s strength is in the integration of built structures and landscapes. For instance, an interior street would weave the major venues together through a transparent series of lobbies and lounges while the improvement to the Reynolds Walk experience is one of the highlighted landscape environments that complement Branion Plaza.

2. Demand

It is recommended that residentially intensive universities allot 10% of its space to athletics. At Guelph it is presently at 5.9%. This metric was used as a benchmark, not as a driving force in the planning process. In spite of this limited space, the University of Guelph has incredible participation by students and community in sports—varsity, intramural, club, and recreational—despite the wear and tear on the existing facilities. Forecasting the future at Guelph has been based on this current high level of usage and interest, interviews of all major stakeholders, a review of peer institutions, comparing the square footage allocation with the comprehensive campus footprint, and team’s professional experience and advice.

Typically, stakeholder interviews and assessments of demand result in requests for growth to existing facilities. Often those matrices include program spaces that overlap each other, and find duplicate spaces. This is not the case at Guelph, unless the hours of operation can find a way to expand. Guelph, unlike most institutions, has a true and documented unmet demand on all programs that are offered by the University. In addition to unmet demand by students, the University has engaged on a program that focuses on wellness for faculty and staff. The University's ability to engage faculty and staff in wellness related activities on-campus is limited by space. Finally, alumni continue to desire greater access to the athletics are frustrated with space priority being given to students. An expansion of space would allow the University to engage alumni more actively on campus in a positive manner.

3. Deferred Maintenance

The Mitchell building was constructed in 1941 with a major expansion in 1957. The addition of the ice-pads and the second pool occurred in the early 1990’s. The Mitchell building is now past its normal lifespan for major mechanical components. All projects presented address issues of deferred maintenance.
and the Health and Performance Centre with Athletics and Recreation sends a positive and unique message of the University's commitment to the health and wellbeing of its students.

Guiding Principles

The design of the facilities should be based on the following seven principles:

1. Concept of design - The vision of the Athletics facilities at the University of Guelph must be consistent with the Campus Master Plan approved by the Board of Governors October 30th, 2002 and the Arboretum Master Plan approved by the Board of Governors December 16th, 2004. The Master Plan for Athletic facilities will guide the University over the long-term in the development of facilities that will maintain and enhance the competitiveness of the University, meet the present and future needs of the University and the local community.

2. Efficient use of space - The concept design will seek to maximize use of current space and facilities, reduce deferred maintenance, improve the energy efficiency of the facilities and create functional spaces that meet the recreational and health needs of the community. The design of new facilities will adhere to energy efficient codes.

3. Aesthetics - The re-design of the athletic facilities will accommodate the design concepts embodied in the Campus and Arboretum Master Plans. Lying at the hinge between these two plans, there is an outstanding opportunity to develop the quadrant of the University campus currently occupied by the athletic facilities in a way that cements the aesthetic relationship between the two Master plans. Any new facilities will be designed to complement the exterior of buildings elsewhere on campus. Consideration will be given to providing discrete full-time and visitor parking.

4. Accessibility - All plans for renovation and new buildings will include careful consideration of appropriate accessibility to the facilities. Plans will also include consideration of access to facilities for on and off campus users.

5. Cost - The concept of design has to recognize the cost implications and capacity of the University to be able to support and fundraise for the facilities. Therefore, the Master Plan will be divided into a number of phases which are related to the demand for facilities, appropriate sequencing and possible communities of interest. All of the proposed developments will be taken to the Board for approval in the standard way and no building will be started unless all of the funding necessary has been identified. In addition, business plans will be developed to address operating costs of new or expanded facilities.

Process

The master planning process began in August 2006 with the Department of Athletics. Over a nine month period the Master Plan was developed, approved, and presented to the President in May 2007. The process was informed by participation from the stakeholders over seven workshops and thirty meetings. The series of workshops were held with members of the Department of Athletics and Recreation and the Office of Facilities Management to present conceptual designs as part of the Master Plan development. At each meeting, design concepts were reviewed and evaluated. Program accommodation, circulation, environmental, open space, infrastructure, phasing and cost issues were part of these discussions. Design concepts were selected for the team to advance, resulting in the recommended strategy for the University of Guelph Athletic and Recreation Master Plan. The planning process involved five main tasks:

Task 1: Needs Assessment - The first task was to determine the present needs for facilities based on programming. Interviews were conducted with senior and athletic administration, coaches and athletic department staff, recreation department staff, students (recreational users and athletes), and related university faculty and staff stakeholders. The existing program of spaces, both indoor and outdoor, was analyzed as a benchmark related to supply and demand. Then, the vision of the types of appropriate program spaces – size and quantity – were debated to ensure that the project met the needs of current programs, projected growth, and University-wide activities. The key outcome of this task was the development of an architectural program summary of existing and recommended spaces.

Task 2: Evaluation of Existing Facilities - This task evaluated the program needs against the conditions of the present facilities. A facilities assessment was conducted for the following buildings: W.F. Mitchell Athletic Centre, Gryphon Centre, Gryphon Dome, and Alumni Stadium; and for the followings fields: Alumni Stadium, Rugby Pitch, Soccer Pitch, Multipurpose Fields (East and Centre), Multipurpose Fields (West and North), Main Diamond, South Diamond, Quadpark Diamonds, Field Hockey Field and Beach Volleyball Courts. The facilities assessment evaluation included the expertise of structural, electrical, mechanical, plumbing, fire protection, and building code consultants as well as an inspection by the architectural team. The assessment was done through a site visit, informal discussions with University staff, and a review of existing documents. The key outcome of this task was succinct recommendations for the future of each of the existing buildings and fields.

Task 3: Conceptual Design - With a clear understanding of the status of existing conditions and a directive from the University regarding the recommended program of spaces to be included in the Master Plan, Task 3 involved the development of a number of design concepts for the future of athletics and recreation. Concepts were presented and changes made based on feedback.

Task 4: Cost Analysis / Implementation Timeline - Task 4 evaluated the recommended design concept documentation and its phasing strategy relative to construction costs in 2007 currency. The implementation timeline was reviewed and revised to separate the building construction sequence from the field’s construction sequence. As a result, the majority of the master plan is capable of implementation without dependency on sequential phases. However, priorities are established based on present demand.

Task 5: Cost and Final Report - The final report was prepared in draft form for presentation to the President in May 2007. Related to the final report and presentation was the commissioning of two watercolour renderings, one of an overall master plan aerial, and the other a plaza view along Reynolds Walk.

The Plan

The full build-out of the Athletics and Recreation Master Plan includes a total of 800,000 square feet, 11 fields, site improvements and parking. Each aspect of athletics and recreation at Guelph will be enhanced from the recreational user, to the athlete, to the coaches and staff, and to the spectator.

The building square footage includes major renovations and expansions to the existing Mitchell Centre, Gryphon Centre, Alumni Stadium, and the Powell Building. The development also includes two major new structures, a Multi-Purpose Hall and the Field House Centre. The facility that is recommended for removal is the Gryphon Dome once its life comes to an end.

The comprehensive master plan development will be linked by a north-south indoor-outdoor connector. The heart of this north-south indoor street will connect the Mitchell Centre north to the Field House Centre and south...
to the Gryphon Centre and the Multi-Purpose Hall via a pedestrian bridge over Reynolds Walk. Moreover, the connector will become a pedestrian path between the Gryphon Centre and the Multi-Purpose Hall, extending to the south residence halls. On the north side, the connector will tunnel below Alumni Walk for a direct link to Alumni Stadium.

The Mitchell Centre will have the most dramatic transformation, expanding and improving facilities for recreational use serving the campus community at large. A new expansion to the south will house a new fitness and weights area that will spread into the renovated West Gym. The central core of the building, the existing Main Gym, will become the location of general use lockers with an infill second level for multipurpose rooms.

The development of the fields improves the size, surface material, and adjacency of the existing inventory. Not all of the 8 existing fields for football, soccer, rugby, soccer, and lacrosse, are regulation size. The revised 10 fields include 4 soccer-sized fields in a quad setting that will likely more than double the supply for intramural and recreation use. Between the rugby field and the football field will be a practice field for both sports. The softball field inventory has been reduced to 2 fields with improvements and lighting to increase play capacity.

The goal of the initial implementation phases is to improve areas that will impact the largest percentage of the campus community: a new Multi-Purpose Hall, four new synthetic soccer size fields and parking, an improved Reynolds Walk experience, and an expanded and renovated Mitchell Centre/Powell Building that will become the athletic, recreation and wellness centre visible and accessible to the entire campus community.
III

MASTER PLAN

Summary Description
Planning and Design Recommendations
Phasing for Fields
Phasing for Buildings
Complete Architectural Floor Plans
Parking
SUMMARY DESCRIPTION

In the long-term future, the University of Guelph's campus will be distinguished by a greatly improved and well defined Athletics, Recreation and Wellness complex. It will be located east of Powerhouse Lane, extending from Stone Road north to College. The Complex will play a prominent role within the existing campus fabric, contribute to its overall campus image, and strengthen its relationship to the surrounding Guelph community.

The central organizing concept of the University of Guelph Athletic and Recreation Master Plan is the connective thread of the north-south pedestrian circulation link that connects all built structures. The new buildings and fields, set in strategic locations, provide significant architectural and campus open space opportunities. Access to these athletics and recreational venues is provided by a strong pedestrian walk network, carefully positioned vehicular access, drop-off, and strategic parking locations.

The initial short-term and long-term planning projects are identified below. The plan identifies short-term and long-term planning horizons. The short ranged (5-10 years) represents a vision of the foreseeable future. As specified in the Master Plan, the short-term projects are those that beneficially add value to the campus environment and are most in need. From the University's perspective, these are projects associated with critical capacity issues that best address the areas of high priority in the University Master Plan and are important for external purposes such as recruitment and enhanced partnerships with the city. The phasing of projects will also consider the life-cycle of buildings and be structured around renewal of aging and inadequate facilities. The long range plan (10-30 years) projects options for future development beyond foreseeable University growth and present needs. Note, the phasing may be revised due to changing needs, altering external factors, or strategic funding opportunities. A detailed implementation timeline is not provided as it will depend on fundraising opportunities and successes.

Short-Term Horizon (5-10 years):

Project 1A - Reynolds Walk Enhancement: A number of the plans will meet both the Master Plan recommendation to enhance the South-East quadrant as well as address critical space needs and deferred maintenance issues. They include:

a. Mitchell Centre. The Mitchell building is coming to the end of its life-cycle in terms of heating and mechanical systems. A significant renovation is required to deal with this deferred maintenance issue. It is recommended that the renovations include changes that will also address capacity constraints as well as profile needs. The renovated and expanded facility will include a fitness and weights centre, a climbing wall, several multipurpose rooms, squash courts, a 4-court gymnasium with a suspended a jogging/walking track, general use locker rooms, administrative offices, and new lobby areas. The lobby to the south access from Reynolds Walk, the lobby to the east will access the new drop-off area on the site of the Gryphon Dome, and the lobby to the north will connect to a Field House Centre, which will be built at a later time. The Mitchell Centre will be linked to all adjacent athletic and recreation facilities through a major north-south connector.

b. Powell Building. Changes to the Powell Building are dependant on other possible moves of the Human Biology and Nutritional Sciences Offices. The vision is to establish a Wellness/Community Centre located in the J.T. Powell Building that houses Health Services, the Wellness Centre, the Health and Performance Centre and Counseling Services. As one enters through the door of the Centre, with Athletics on the left and these programs on the right, students would be met with a hub of information and access to the various services and programs of the collaborating departments.

c. Multi-Purpose Hall. The new facility will include a hall that can accommodate 3,500 guests in bleacher and chair back seating and 600 guests on the event floor. The facility could be used for convocation, reducing significant operating costs that are incurred with the Dome. The facility would be available to other large University events as well as varsity basketball and volleyball games. To support the large event space, the facility includes multipurpose rooms, locker rooms, storage room, and two lounges. One lobby is on Reynolds Walk, and the second lobby is on the south side to welcome guests from the new drop-off. The facility will be linked to the Gryphon Centre by a bridge. It will provide opportunities for expanded space in the summer for conferences, and will be available to city communities for events that need larger seating.

d. Synthetic Turf Fields. The synthetic quad park will consist of four competition quality, intercollegiate size soccer fields. There will be limited portable bleacher seating and a convenience shelter providing washrooms, a team room, training room, and storage for sports and field maintenance equipment. The synthetic fields could be made available to address community needs in the summer.

e. Softball. Two softball fields will be reconstructed on the site of the existing quad softball park (reducing the number from the existing 4 fields to 2, reflects the lower demand for these diamonds).

Combined, these five plans will result in a new hub of activity at the south-east corner, with an expanded pedestrian space which will feed into the Arboretum.

Long-Term Horizon (10-30 years):

Project 1B - Field Renovations: A number of upgrades in fields are necessary to extend their playing use and reduce annual operating costs:

a. Track. The eight-lane, 400-metre track will accommodate an area for 200 seats in moveable bleachers. The natural turf field inside the track will accommodate field throwing events such as the javelin, discus, hammer, and shot put areas adjacent to the track. There are various reasons for moving the track to a new location: the new stadium turf, which will cover the existing field and track, will create a larger artificial surface that could be divided into three 100 yard by 60 yard fields for intramural, recreational and community use; a legally sized Canadian football field, as proposed in the stadium, does not fit inside a legal competition track; intramural, community, recreational users, programmers and varsity athletes and coaches have documented a number of conflicts between groups using the Dome field and users of the Dome track; and a separate track facility will provide an opportunity for a separate venue to produce revenue.

b. Practice Field. A new, common natural turf practice field will be shared by football and rugby on the current site of the Main Diamond and adjacent parking lot.

c. Rugby Field. The existing rugby field will be reconstructed in its current location, but with improved grading, drainage, irrigation and lighting. The site will be improved to include space for limited portable bleacher seating and a convenience shelter, which will provide washrooms, a team room, training room, and storage for fields and field maintenance equipment.

Project 2 - Enhanced Recreational Space

a. Tennis Courts. Four courts will serve recreational use. No seating is proposed for this area.

b. Beach Volleyball. Four courts will serve recreational use. No seating is proposed for this area.
Project 3 - Alumni Stadium: The stadium will provide a seating capacity for 4,100 spectators with expansion capacity of up to 7,000 seats. Football and soccer will be accommodated on the synthetic turf field. The stadium expansion will include a press box and coach boxes for home and visiting teams, hospitality boxes, and a banquet/meeting room. Concessions, ticketing, and toilet facilities will be integrated into a new entry plaza/gateway building on grade with the field at the northwest corner of the site.

Project 4 - Field House Centre: The new facility will include a field house with seating for 1,000 guests, a 3-court gymnasium with suspended jogging/walking track, a 10-lane, 200-metre track, varsity training centre, varsity locker rooms, coaches' offices, a new lobby from East Ring Road, and spectator's seating. The facility will be linked to the Mitchell Centre through the north-south connector and linked to Alumni Stadium through a tunnel below Alumni Walk.

Project 5 - Gryphon Centre Expansion: The renovated and expanded facility will include a new NHL regulation size ice rink to complement the Olympic Rink and the Red Rink, additional locker rooms, more space for Gryphix, and a new lobby. The Gryphon Centre will also have a new entry as part of the new rink to welcome guests from the new drop-off at the southeast parking lot. The facility will be linked to the Multi-Purpose Hall and the Mitchell Centre by two bridges.

Project 6 - Mitchell Centre Natatorium: A 50-metre pool to complement the existing Red Pool will be added. This will allow Guelph to offer provincial and national competitions.

In order to be successfully implemented, this plan needs to consider current and expected fiscal realities. Like the Master Plan, it is a vision but one that can be achieved over time through careful long term planning. Long range financial planning, including fund raising campaigns will be required to undertake any of the projects identified in the plan. Partnerships with the students, alumni, the city and sports funding agencies will be critical to the success of the plan.

Updating the plan

Each time a project is proposed, it should be tested against the plan.
**MASTER PLAN**

**PROJECTS LEGEND**

*Short-Term Horizon (5-10 years)*

Project 1A - Reynolds Walk Enhancement:
- 1A-a. Mitchell Centre
- 1A-b. Powell Building
- 1A-c. Multi-Purpose Hall
- 1A-d. Synthetic Turf Fields
- 1A-e. Softball

*Long-Term Horizon (10-30 years)*

Project 1B - Field Renovations:
- 1B-a. Track
- 1B-b. Practice Field
- 1B-c. Rugby Field

Project 2 - Enhanced Recreational Space:
- 2-a. Tennis Courts
- 2-b. Beach Volleyball

Project 3 - Alumni Stadium

Project 4 - Field House Centre

Project 5 - Gryphon Centre Expansion

Project 6 - Mitchell Centre Natatorium
PROJECTS LEGEND

Short-Term Horizon (5-10 years)
Project 1A - Reynolds Walk Enhancement:
   1A-a. Mitchell Centre
   1A-b. Powell Building
   1A-c. Multi-Purpose Hall
   1A-d. Synthetic Turf Fields
   1A-e. Softball

Long-Term Horizon (10-30 years)
Project 1B - Field Renovations:
   1B-a. Track
   1B-b. Practice Field
   1B-c. Rugby Field

Project 2 - Enhanced Recreational Space:
   2-a. Tennis Courts
   2-b. Beach Volleyball

Project 3 - Alumni Stadium

Project 4 - Field House Centre

Project 5 - Gryphon Centre Expansion

Project 6 - Mitchell Centre Natatorium
PLANNING AND DESIGN RECOMMENDATIONS

Vehicular Circulation

East Ring Road will remain a primary route between the athletic and recreation buildings and the fields. Intersections at College Avenue and Stone Road, with enhanced planting and signage, will serve two campus entries arriving from the City of Guelph. The Stone Road entry is reconfigured to allow parking relocation and field layout. Traffic calming measures are recommended along East Ring Road; crosswalks provide safe connections between buildings and fields. Vehicular drop-offs are proposed off East Ring Road in proximity to new building entrances in tandem with bus stops. These drop-offs allow visibility from the primary campus street with landscaped plazas that welcome visitors and everyday users.

Existing secondary campus streets, such as Dundas Lane and Arboretum Road, will remain. Arboretum Road is proposed as a two-way road extending east from East Ring Road terminating in a drop-off at the Arboretum’s entrance. The road provides access to campus buildings to the north as well as parking and vehicular drop-off adjacent to the Arboretum. An overlook plaza is proposed south of Arboretum Road at Alumni House. Located at a high point on campus, the plaza will allow spectacular views onto the fields as well as provide pedestrian access.

Service to the Athletic and Recreational buildings is primarily from Powerhouse Lane with two access points from East Ring Road. Powerhouse Lane will become a designated service lane north of Alumni Walk, reducing vehicular traffic to the south and allowing limited access across Reynolds Walk. Service access to the expanded Gryphon Centre is provided south of Reynolds Walk, connecting to East Ring Road.

Parking Strategies

There are currently 2,292 parking spaces within the University of Guelph Athletic and Recreational Master Plan study area. The program demand of added athletic and recreational facilities in combination of maintaining existing parking needs required redesign and relocation of campus parking as proposed in the master plan. The full master plan build-out provides for a net gain of approximately 226 parking spaces within the study area.

The distribution of parking illustrated in the Athletic and Recreation Master Plan provides for smaller surface parking lots in close proximity to the campus core. In addition, the small lots will serve accessible parking needs in close proximity to new athletic and recreational building entrances. Larger surface parking lots are positioned further away from the campus core with easy vehicular access to the surrounding city streets. A parking garage is accommodated below the proposed Field House Centre with vehicular access from the East Ring Road. A parking deck is proposed below two synthetic turf fields in the southeast portion of the study area. Existing topographic conditions allow for this parking deck to be constructed with open air ventilation on parts of the west, south and east sides. The parking deck can be accessed from East Ring Road and also allow for direct pedestrian connection to the upper play fields. For more information on parking and phasing issues please see the end of section III in this report.

Pedestrian Circulation

Pedestrian circulation is a defining element of the University of Guelph Athletic and Recreation Master Plan. Existing primary walkways oriented east-west have been extended and enhanced. New pedestrian walks oriented north-south allow for both exterior and interior pedestrian connections to important campus destinations. Collectively, the Athletic and Recreation Master Plan provides for a strong pedestrian network integrated into the existing campus fabric.

Primary walkways including Reynolds Walk and Alumni Walk exist within the master plan study area. The spatial structure of Reynolds Walk can be strengthened by the placement of the Multi-Purpose Hall and lobby addition at Gryphon Centre. It is recommended that Reynolds Walk extend further east with direct connection to the Arboretum’s west entrance. As identified in the 2004 Arboretum Master Plan, a long range plan calls for the central core of the Arboretum to become more pedestrian dominate. A pedestrian path and bikeway travel way is proposed to expand the Reynolds Walk “experience” and connect the core campus east to the Arboretum.

Reynolds Walk should be strengthened with unifying elements of paving, lighting and planting which frame the walk and unify the overall campus character.
Landscape Framework

The landscape within the study area should reinforce the spatial structure of new athletic and recreation buildings, fields and open spaces. The combination of proposed pedestrian walks, clear way finding, tree plantings and lighting will unify the entire portion of the east campus while providing strong links to the outside community, the campus core and the Arboretum. It is recommended that formal (regularly-spaced, uniform) deciduous tree plantings reinforce the vehicular and pedestrian circulation routes within the study area, including the East Ring Road, Alumni Walk and Reynolds Walk. Informal groupings of various trees are proposed along the east side of the study area. This landscape should establish a campus character that spatially defines play fields and pedestrian pathways while respecting and blending with the landscape character of the existing Arboretum.

Implementation of the Athletic and Recreation Master Plan should carefully consider topographic conditions within the study area. Establishment of both building and field grade elevations is critical in providing easy access to new facilities as well as determining floor to floor relationships of renovated and proposed buildings.

Buildings, Fields and Campus Open Spaces

Another important component of the University of Guelph Athletic and Recreation Master Plan is the placement and massing of new recreation and athletic buildings and location of fields to reinforce and connect overall campus open spaces. Physically, the campus experience is defined by the quality of its buildings and outdoor spaces. The master plan strives to organize the large programmatic footprints of the new athletic and recreational facilities that reinforce the existing campus open space, such as Reynolds Walk and Alumni Walk. In addition, the proposed buildings, including the Multi-Purpose Hall, Gryphon Centre Addition and the Field House Centre front on to East Ring Road with campus building entrances and plazas oriented outward, to the south and east portions of the campus.

The athletic and recreation fields are predominately oriented north-south for optimal solar orientation for field users and spectators. The position of four synthetic turf fields directly east of the Multi-Purpose Hall provides tournament play events and proximity to the campus core and student housing structures. Programmed events within the Multi-Purpose Hall is in close proximity to new campus open space gatherings.

Environmental Considerations

The University of Guelph Arboretum contains provincially significant wetlands on the westerly portion of the Arboretum property. Any proposed development within 120 meters of the designated wetland is regulated by The Grand River Conservation Authority (GRCA) and must comply with the Policy for Areas on Interference around Wetlands. The Athletic and Recreation Master Plan proposes development of a track and field, storage building, parking deck and pedestrian paths within the regulation area of interference as currently mapped by the Grand River Conservation Authority. Please refer to the Appendix of this report for more information pertaining to the existing wetlands and required permitting for Master Plan implementation.
PHASING FOR FIELDS

The University of Guelph Athletic and Recreation Master Plan is a long term strategy for the University’s athletic and recreation program with an understanding that implementation of the various components will likely occur over a period of 30 years. The timing and schedule for the design and construction of specific work is beyond the scope of this report, however, strategies for phasing the work have been studied based on the University and Department’s priorities and needs criteria.

The phasing effort took many issues into consideration, such as current campus conditions and future growth of all athletic and recreation programs. The phasing strategy was envisioned such that a minimal number of disruptions to athletic and recreational programs will occur during construction. It is divided into a phasing strategy for Buildings and another for Fields allowing for individual capital campaigns to be carried out independently providing greater flexibility in the implementation of projects. Phase 1A-d in the Fields Phasing is the number one priority the University has identified. Phases 1B-a to 3, may happen independent from each other with the exception that 1B-a needs to precede 3 so that Track and Field activities are not interrupted.

<table>
<thead>
<tr>
<th>PHASE</th>
<th>FIELDS</th>
<th>Fields NSF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A-d</td>
<td>Four Synthetic Soccer Fields</td>
<td>324,000</td>
</tr>
<tr>
<td>1A-b</td>
<td>Two Softball Fields</td>
<td>116,000</td>
</tr>
<tr>
<td></td>
<td>Reconfigured and Surface Parking</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Realigned Road</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Convenience Shelter</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Phase 2</strong></td>
<td><strong>440,000</strong></td>
</tr>
<tr>
<td>1B-a</td>
<td>Natural turf Track and Field</td>
<td>176,000</td>
</tr>
<tr>
<td></td>
<td>6-lane 400-metre track</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moveable seating for 500 spectators</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Phase 2</strong></td>
<td><strong>176,000</strong></td>
</tr>
<tr>
<td>1B-b</td>
<td>Football and Rugby Practice Field</td>
<td>111,500</td>
</tr>
<tr>
<td>1B-c</td>
<td>Rugby Event Field</td>
<td>111,500</td>
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<tr>
<td></td>
<td><strong>Total Phase 3</strong></td>
<td><strong>223,000</strong></td>
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<tr>
<td>2a</td>
<td>Four Tennis Courts</td>
<td>11,200</td>
</tr>
<tr>
<td>2b</td>
<td>Four Beach Volleyball Courts</td>
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<td></td>
<td><strong>Total Phase 4</strong></td>
<td><strong>18,400</strong></td>
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<tr>
<td>3</td>
<td>Stadium Field</td>
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<td></td>
<td><strong>Total Phase 5</strong></td>
<td><strong>88,000</strong></td>
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<tr>
<td><strong>TOTAL</strong></td>
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<td><strong>939,400</strong></td>
</tr>
</tbody>
</table>
PROJECTS LEGEND

Short-Term Horizon (5-10 years)
Project 1A - Reynolds Walk Enhancement:
  1A-a. Mitchell Centre
  1A-b. Powell Building
  1A-c. Multi-Purpose Hall
  1A-d. Synthetic Turf Fields
  1A-e. Softball

Long-Term Horizon (10-30 years)
Project 1B - Field Renovations:
  1B-a. Track
  1B-b. Practice Field
  1B-c. Rugby Field

Project 2 - Enhanced Recreational Space:
  2-a. Tennis Courts
  2-b. Beach Volleyball

Project 3 - Alumni Stadium

Project 4 - Field House Centre

Project 5 - Gryphon Centre Expansion

Project 6 - Mitchell Centre Natatorium

Proposed Master Plan
PHASE 1A-d and 1A-e

Four new soccer fields, two new softball fields, structured and surface parking, realigned road, and convenience shelter.

The four new synthetic soccer fields will sit on the current location of a parking lot and the north, centre, and field hockey fields. Increasing the number of fields, hours of use, night time lighting and extending the season's time frame will significantly improve the quantity and quality of play for all campus events – intramurals, recreation, club and varsity sports as well as practice. In addition to campus use, having the fields designed in a consolidated grouping will enable the University to effectively and efficiently host tournaments. There will be limited portable bleacher seating and a convenience shelter providing washrooms, a team room, training room, and storage for sports and field maintenance equipment.

The existing site topography, sloping from high at Arboretum Road to low on the south end, creates an opportunity to consider structured parking below the fields. The structured parking design allows the four fields to be at a consistent level. The estimated parking capacity is 865 spaces – any additional capacity will require major excavation. With the development of campus property over the life of the master plan, additional parking spaces will be necessary to avoid a substantial parking loss. This phase will also include two new softball fields to the east, replacing the softball quad park. This phase of field development, the largest in the implementation of the master plan, includes the need to reroute the East Ring Road access to Stone Road. Some landscape/streetscape areas directly north of the fields, along Arboretum Road and East Ring Road will be improved, extending the improved landscape from Reynolds Walk.

PHASE 18-a

Track and Field.

Replacing the existing cinder track at Alumni Stadium, this new track consists of a new 8-lane, 400-metre track with a natural turf infield. Seating at the track will accommodate 200 spectators in movable bleachers. The natural turf field inside the track will host track and field throwing events with practice javelin, discus, hammer, and shot put areas adjacent to the track. There are various reasons for moving the track to a new location: the new stadium turf, which will cover the existing field and track, will create a larger artificial surface that could be divided into three 100 yard by 60 yard fields for intramural, recreational and community use; a legally sized Canadian football field, as proposed in the stadium, does not fit inside a legal competition track; intramural, community, recreational users, programmers and varsity athletes and coaches have documented a number of conflicts between groups using the Dome field and users of the Dome track; and a separate track facility will provide an opportunity for a separate venue to produce revenue.

PHASE 18-b and 18-c

Football and Rugby fields to the North.

The main site development in this phase is focused on the northeast sector. The proposal is to replace the existing main diamond with a natural grass practice field share by football and rugby. Directly adjacent to this practice field, the existing rugby field will be reconstructed in its current location, but with improved grading, drainage, irrigation and lighting. The site will be improved to include space for limited portable bleacher seating and a convenience shelter, which will provide washrooms, a team room, training room, and storage for sports and field maintenance equipment. This phase also includes the reconfiguration of the existing parking lot into a more linear and efficient parking lot along East Rink Road.

PHASING FOR FIELDS
PHASE 2a and 2b

Four tennis courts and four beach volleyball courts.

In this phase beach volleyball and the tennis courts will be relocated south of the Multi-Purpose Hall’s parking lot. They will serve recreational use and no seating is proposed for this area.

PHASE 3

Alumni Stadium field.

Football and soccer will be accommodated on the synthetic turf field. The goal is to bring the football field closer to the spectator improving the spectator experience. With the existing track around stadium field relocated, the entire field will be rebuilt to the west, still centred on the stadium seating. Lighting conditions will also be improved.

PROPOSED IMPROVEMENT BEYOND PHASING LIMITS

The Master Plan design is defined within the study area indicated in the illustrative master plan. Only areas contained within the limits of the delineation shown in grey are included within the cost estimate. Areas beyond this delineation are shown enhanced to illustrate an overall master plan design direction sensitive to the 2002 Du Toit Allopp Hillier Master Plan and the 2004 Arboretum Master Plan. These enhanced areas could become part of other capital campaign initiatives. Areas adjacent to the limits of the phasing include:

Phase 1A-d and 1A-e: The overall landscape and streetscape enhancement of Arboretum Road could be improved to complete the connection between the campus and the Arboretum.

Phase 1B-b and 1B-c: In terms of the overall master plan design, the north fields precinct could benefit from a renovation and expansion of the northeast parking lot (currently used mainly by the residential Village), improved streetscapes between East Ring Road and Dundas, with increased parking along Dundas Road. Pedestrian paths that connect the east residence halls to the northeast parking lot could also be improved for accessibility and safety.
PHASING FOR BUILDINGS

The University of Guelph will renovate, add on to and expand athletics and recreation facilities on campus. The phasing strategy, identifying six projects or phases, represents short-term and long-term planning projects. The phasing may be revised due to changing needs, altering external factors, or strategic funding opportunities. The top priority of built structures, Phase 1A-a and 1A-b, completely renovates and expands the Mitchell Centre. In Phase 1A-c, the Multi-Purpose Hall, a shared venue for the entire campus community, and Gryphon Centre’s north expansion will complete projects along Reynolds Walk.

The chart on this page identifies major components of each phase along with a listing of associated square footage, separating new construction from renovation.

<table>
<thead>
<tr>
<th>PHASE</th>
<th>BUILDINGS &amp; SITE IMPROVEMENTS</th>
<th>New Const. SF</th>
<th>Renovation SF</th>
<th>Total SF</th>
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<tbody>
<tr>
<td>1A-a</td>
<td>Mitchell Centre’s expansion and renovation</td>
<td>72,276</td>
<td>78,803</td>
<td>151,079</td>
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<tr>
<td></td>
<td>Parking Lot site improvements</td>
<td>80,028</td>
<td>9,738</td>
<td>89,765</td>
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<td></td>
<td>Mitchell Centre’s 4 court gym &amp; N-S corridor</td>
<td>102,304</td>
<td>68,541</td>
<td>170,845</td>
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<tr>
<td></td>
<td>Total Phase 2a</td>
<td>102,304</td>
<td>68,541</td>
<td>170,845</td>
</tr>
<tr>
<td>1A-b</td>
<td>Power Building 2nd level renovation</td>
<td>0</td>
<td>25,024</td>
<td>25,024</td>
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<tr>
<td></td>
<td>Total Phase 2b</td>
<td>0</td>
<td>25,024</td>
<td>25,024</td>
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<tr>
<td>1A-c</td>
<td>Multi-Purpose Hall</td>
<td>103,942</td>
<td>0</td>
<td>103,942</td>
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<tr>
<td></td>
<td>Gryphon Centre north expansion</td>
<td>19,737</td>
<td>6,484</td>
<td>26,221</td>
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<td>Multi-Purpose Hall south site improvements</td>
<td>120,680</td>
<td>944</td>
<td>121,624</td>
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<td>Drop off Area</td>
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<td>25,511</td>
<td>57,937</td>
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<td>Alumni Stadium renovation and expansion</td>
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<td>205,695</td>
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<td>Powerhouse Lane site improvements</td>
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<td>89,909</td>
<td>132,714</td>
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<td>Total Phase 4</td>
<td>43,805</td>
<td>89,909</td>
<td>132,714</td>
</tr>
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<td>5</td>
<td>Gryphon Centre renovation and south expansion</td>
<td>72,016</td>
<td>12,212</td>
<td>84,228</td>
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<td></td>
<td>Lockers and Third Ice Rink</td>
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<td>60,000</td>
<td>102,005</td>
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<tr>
<td></td>
<td>Total Phase 5</td>
<td>42,005</td>
<td>60,000</td>
<td>102,005</td>
</tr>
<tr>
<td>6</td>
<td>Mitchell Centre’s pool renovation and expansion</td>
<td>629,634</td>
<td>227,881</td>
<td>857,515</td>
</tr>
<tr>
<td></td>
<td>TOTAL ALL PHASES</td>
<td>629,634</td>
<td>227,881</td>
<td>857,515</td>
</tr>
</tbody>
</table>

Existing Conditions
MASTER PLAN: PHASING FOR BUILDINGS

PROJECTS (PHASES) LEGEND

Short-Term Horizon (5-10 years)
Project 1A - Reynolds Walk Enhancement:
  1A-a. Mitchell Centre
  1A-b. Powell Building
  1A-c. Multi-Purpose Hall
  1A-d. Synthetic Turf Fields
  1A-e. Softball

Long-Term Horizon (10-30 years)
Project 1B - Field Renovations:
  1B-a. Track
  1B-b. Practice Field
  1B-c. Rugby Field

Project 2 - Enhanced Recreational Space:
  2-a. Tennis Courts
  2-b. Beach Volleyball

Project 3 - Alumni Stadium

Project 4 - Field House Centre

Project 5 - Gryphon Centre Expansion

Project 6 - Mitchell Centre Natatorium
PHASE 1A-c
Multi-Purpose Hall, associated site improvements, and addition to the Gryphon Centre.

The Multi-Purpose Hall will be a new facility built for University-wide events and activities. The hall can accommodate 3,500 guests in bleachers and chair back seating as well as 600 guests on the event floor. The facility could be used for convocation and other large University events as well as varsity basketball and volleyball games.

To support the large event space, the facility includes multipurpose rooms, locker rooms, storage, and two lobbies. One lobby is on Reynolds Walk, the second lobby is on the south side to welcome guests from the new drop-off. Site improvements surrounding the Multi-Purpose Hall includes a vehicular drop-off plaza in the south entry, which will have easy access to adjacent parking areas. In the future, the drop-off area will also service the expanded Gryphon Centre.

Gryphon Centre will have two phases of improvements. The first phase rebuilds the entry lobby on Reynolds Walk to accommodate increased capacity and addresses disabled accessibility. An expansion of Gryph’s Pub on the upper level will bridge the Gryphon Centre and the Multi-Purpose Hall. A second phase of expansion will occur in Phase 5.

PHASE 3
Alumni Stadium renovation and expansion, and associated site improvements.

The stadium will provide a seating capacity for 4,100 spectators with expansion capacity of up to 7,000 seats. Team amenities in Alumni Stadium will be improved in this phase. The stadium expansion will include a press box and coach boxes for home and visiting teams, hospitality boxes, and a banquet/meeting room. Existing team lockers will be improved and new visitor’s lockers will be built to the south. A new entry sequence and plaza gateway building from the northwest site corner will be on grade with the field level and will include spectator amenities such as concessions, ticketing, and toilet facilities. Once completed, the entry plaza/gateway building will provide an inviting “front door” to the Stadium as well as address disabled access to it.

PHASING FOR BUILDINGS
PHASE 4

Field House Centre and associated site improvements.

The Field House Centre accommodates program for varsity athletics. Included in the proposed building are: a treatment and rehabilitation centre, team locker rooms, a 6-lane, 200-metre running track with an 8-lane straightaway, a 3-court gymnasium with suspended jogging/walking track, coaches' offices, a new lobby from East Ring Road and spectator's seating. The facility will be linked to the Mitchell Centre through the main north-south corridor and linked to Alumni Stadium through a tunnel below Alumni Walk.

Site improvements for the Field House Centre include the redevelopment of Alumni Walk, a tunnel from the team locker rooms to the Stadium field and a new entry from East Ring Road with direct access to the field house. A new on-grade entry from the drop-off / parking area will provide access to a structured parking below the main level of the field house.

PHASE 5

Gryphon Centre renovation and expansion.

The Gryphon Centre’s improvement and expansion revolves around the addition of a third sheet of ice for recreation, intramural, club and community uses. This will be a new NHL regulation size ice rink to complement the Olympic Rink and the Red Rink. Other improvements include additional locker space, a zamboni room and yard, storage rooms and improved amenities for concessions and community outreach. A new entry lobby will be located on the southeast corner to accommodate community use drop-off and pick-up from the new south entry plaza and parking area.

PHASE 6

Natatorium renovation and expansion.

The existing Gold pool will be rebuilt to accommodate a 50-metre pool with team rooms and amenities. This will allow Guelph to offer provincial and national competitions. The Red pool will be restored with recreational support space, and fully integrated into the repurposed recreational uses of the Mitchell Centre.
**BUILDING LAYOUT** - Phase 1A-a & 1A-b: Mitchell Centre renovation and expansion, Powell building renovation and Reynolds Walk and Plaza Site Improvements

**Phase 1A-a and 1A-b:** Mitchell Centre’s interior renovation and new façade / expansion towards Reynolds Walk with future bridge connecting to Gryphon Centre. Mitchell Centre’s 4-court gymnasium, completion of north-south indoor corridor and Plaza area. Improvements to Reynolds Walk, Powell Building interior renovation in the second level.

Improving the Reynolds Walk experience between Mitchell Centre, the Gryphon Centre, the Multi-Purpose Hall, and the Powell Building is important to increase the visibility, accessibility, and welcoming character for the east end of the campus pedestrian path. The architecture that frames the Walk will extend south from Mitchell Centre with an addition for a fitness and cardiovascular centre.

**Mitchell Centre renovation and south expansion:** The Mitchell Centre south expansion will focus on the addition of a fitness and cardio band of space that extends from the corner of Powerhouse Lane and Reynolds Walk to the Powell Building. The facility will also have a new free zone with an equipment issue desk, a juice bar, and a new climbing wall. The new additions to the Mitchell Centre and the Gryphon Centre will be linked with a bridge in a future phase. These architectural improvements will likely be mostly transparent, transforming the character of Reynolds Walk into an environment of visual connections. The site, then, will be repurposed for more pedestrian access and less vehicular use.

The Mitchell Centre interior renovation repurposes the majority of the Mitchell Centre space and assumes that some existing programs will be relocated in the future to the Multi-Purpose Hall. The goal is to create an infrastructure within the Mitchell Centre that acts as the central hub for the master plan. A major infill within the Main Gym – adding a floor level – will provide space for general use locker rooms at the Reynolds Walk level and an expanded suite of sky lit Multipurpose rooms on the Plaza level. The area of the current office suite will expand its capacity to include all administrative offices (varsity coaches offices excluded), which will face Reynolds Walk.

A north-south indoor street will begin development within the east façade of the Mitchell Centre. The street will eventually link the entire master plan facilities, from the Gryphon Centre to Alumni Stadium. The new squash courts will be relocated directly off this indoor street, a move that will clear the path to transform the West Gym into expanded space for fitness and weights. Together with the fitness and cardio expansion, the entire south and west facades of the Mitchell Centre will now be completely dedicated to fitness, providing the opportunity to have a fairly transparent corner at Reynolds Walk and Powerhouse Lane.

**Mitchell Centre’s 4 court-gymnasium, completion of north-south indoor corridor and Plaza area:** The addition of a 4-court gym east of Mitchell Centre requires the relocation or demolition of the Gryphon Dome and the construction of a north-south indoor corridor which will eventually connect the Mitchell Centre to the Field House Centre and provide retail and lounge areas overlooking the building activities. The north-south corridor will be filled with activities and opportunities to provide students with additional reason to stay in the building. This indoor corridor is a major implementation of the master plan, connecting all venues. The 4-court gym level will be accessible from Reynolds Walk while a suspended jogging/walking track will be accessible from Plaza Level. This upper level will have direct access from the Plaza area through a lobby and communicating open stairs between the two levels.

**Plaza area:** Vehicular access from East Ring Road will focus on a major drop-off and parking area. This entry, at Plaza level, will directly connect the visitor to the north-south indoor corridor. In the short-term, the site parking, drop-off and plaza could be developed taking into consideration a future access to parking under the Field House building to the north of the Plaza.

**Powell Building renovation:** The upper level of the Powell Building will be renovated, shifting the health science programs on the upper level to the east end, allowing a major lounge, hall of fame, alumni reception space and multi-purpose rooms adjacent and open to the Mitchell Centre. The new Plaza area will be the prime vehicular drop-off for guests and users.

At the end of this phase, the Mitchell Centre will have the core elements to function as a student-friendly fitness centre and one of the central campus hubs.
**BUILDING LAYOUT** - Phase 1A-c: Multi-Purpose Hall, Gryphon Centre north expansion and Site Improvements

**Phase 1A-c** - Multi-Purpose Hall and Site Improvements to the south including a parking / drop-off area. Gryphon Centre’s new façade towards Reynolds Walk.

The Multi-Purpose Hall is a two-level structure sized to host University-wide events and activities. The hall can accommodate 3,500 guests in bleachers and 600 on the event floor. The lower sections of seating are retractable, the upper sections are fixed. The facility could be used for convocation and other large University events as well as varsity basketball and volleyball games. The building will replace the current Main Gym in the Mitchell Centre. The building is complete with team locker rooms, event support space, VIP and press rooms, multipurpose rooms, and adequate lobby space. Located on the corner of East Ring Road and Reynolds Walk, the building has two main entries. The north entry accesses Reynolds Walk directly and is more of a campus entry with future connecting bridges to the Gryphon Centre and the Mitchell Centre. The south entry connects to a new drop-off plaza.

Site improvements surrounding the Multi-Purpose Hall include a vehicular drop-off plaza in the south entry, which will have easy access to adjacent parking areas. In the future, the drop-off area will also service the expanded Gryphon Centre. A loading and service zone is provided from East Ring Road, designed both for daily services and event staging. The Multi-Purpose Hall’s siting is designed to improve the campus image from the southeast entry. Its south entry will offer a welcoming façade to the public, not a back door image that is common for buildings that front Reynolds Walk. A north-south exterior path between the Gryphon Centre and the Multi-Purpose Hall will attract students in the south residence halls and visitors from the adjacent parking lots with a desirable approach to Reynolds Walk.

Gryphon Centre’s new façade towards Reynolds Walk requires the demolition of its existing façade and main lobby. This new addition will resolve accessibility issues and provide adequate lobby space for increased capacity on heavily used occasions. The addition will also provide multipurpose rooms and incorporate an open-end stair between both levels that meets accessible stair dimensions. Activities within these spaces will be visible from Reynolds Walk, thus providing visual engagement between pedestrians and building users. An expansion of Gryphon’s Pub on the upper level will bridge the Gryphon Centre with the Multi-Purpose Hall.
Focus Area

Upper / Plaza Level

---

LEGEND

1. Lobby
2. Lounge
3. Performance Courts
4. Recreational Courts
5. Field House
6. Olympic Ice Rink
7. Recreational Ice Rink
8. Olympic 50m Pool
9. Recreational Pool
10. Fitness and Weights
11. Climbing Wall
12. Combatives
13. Multipurpose Room
14. Squash Courts
15. Jogging Track
16. Classroom / Meeting Room
17. Varsity Training Centre
18. Satellite Therapy Room
19. Support Space
20. Fitness Administration
21. Central Administration
22. Coaching Administration
23. Food and Retail
24. Spectator Seating
25. Hall of Fame
26. VIP / Alumni Room
27. Press and Media Room
28. Health and Science Program
29. Varsity Team Room
30. Visiting / Club Locker Room
31. General Use Locker Room
32. Public Washrooms
33. Loading Dock
34. Zamboni Room and Service
35. Mechanical and Electrical Support
36. Storage
37. Unexcavated
38. Entrance Control
BUILDING LAYOUT - Phase 3: Alumni Stadium renovation and expansion, and Site Improvements

Phase 3. Alumni Stadium renovation, addition, new entry plaza and site related improvements.

This phase can be viewed as an independent phase, dependent only on the timing and construction of the new outdoor 400-metre track.

New entry Plaza: The spectator entrance will be relocated to the northwest corner of the site, near the intersection of College Road and Powerhouse Lane. A great plaza will extend the street corner to a new entry pavilion that will include stadium amenities – washrooms, concessions, first aid, and ticketing - all on grade with the football field. Site and landscape improvements will enhance Powerhouse Lane.

Alumni Stadium renovation and addition: The new entry pavilion will connect to the stadium building through a ramp. The existing stadium structure will be renovated and expanded to accommodate increased program needs. The lower level will include improved locker rooms, with the upper level renovated for multipurpose uses. The majority of expanded areas include an addition on the west façade for accessibility requirements – elevators and stairs – as well as a significant press box atop the stadium. The press box will provide teams with coaches’ rooms, the press with media space, and special guests with dedicated rooms to view the game or event on the field. An addition to the south of the stadium will provide visiting lockers at field level with mechanical support space above. The stadium will provide a seating capacity for 4,100 spectators with expansion capacity of up to 7,000 seats.
**BUILDING LAYOUT - Phase 4: Field House Centre and adjacent Site Improvements**

**Phase 4.** Field House Centre - including varsity lockers, training centre and coaches’ office suite - and adjacent site improvements - including Alumni Walk.

This phase, which could be viewed as an independent phase, develops the site of the current soccer field north of Mitchell Centre. The goal is to further increase the multipurpose needs of the campus community and improve the training facilities.

**Field House Centre:** The architectural development on the site of the soccer field will highlight a field house with a competition level 6-lane, 200-metre running track and an 8-lane straightaway. The infield will be capable of hosting throwing events, soccer practice, or intramural and recreation events. The field house has a capacity of 1,000 spectators for events, seated on a balcony along two sides of the space. The new field house is designed to replace the Gryphon Dome. On the same level of the field house is a new three-court basketball and volleyball gymnasium with a suspended jogging/walking track. The gymnasium will replace the need for events that currently use the West Gym in the Mitchell Centre. Having these two major spaces on the same level will create two large areas for programming, further expanding the available supply of multipurpose space for athletics, recreation, and the campus community.

Below the gymnasium are two levels of locker, training rooms and support spaces for varsity athletes. Currently operating in tight, shared spaces, the design of a varsity centre of excellence will improve the athlete experience and aid in recruiting and practice. The level between the gym and the lockers – Plaza level – contains the varsity training centre, complete with strength and conditioning, training and rehab amenities. A new wrestling venue is also on the Plaza level. The lockers level - Reynolds Walk level - will provide varsity and coaches lockers, and a large storage and equipment issue area. All varsity coaches’ offices will be located in a suite on the east side of the field house, on the edge of East Ring Road, with views to both the road and the venue.

**Site improvements and topographic relations:** Due to changes in topography, the Field House building bridges the grading levels of the master plan development from north to south. With the grade rising from Reynolds Walk toward the north, Reynolds Walk is on the same level as the locker rooms. The locker rooms have the capacity to tunnel below Alumni Walk to the north and provide direct access to the football field at
LEGEND
1  Lobby
2  Lounge
3  Performance Courts
4  Recreational Courts
5  Field House
6  Olympic Ice Rink
7  Recreational Ice Rink
8  Olympic 50m Pool
9  Recreational Pool
10 Fitness and Weights
11 Climbing Wall
12 Combatives
13 Multipurpose Room
14 Squash Courts
15 Jogging Track
16 Classroom / Meeting Room
17 Varsity Training Centre
18 Satellite Therapy Room
19 Support Space
20 Fitness Administration
21 Central Administration
22 Coaching Administration
23 Food and Retail
24 Spectator Seating
25 Hall of Fame
26 VIP / Alumni Room
27 Press and Media Room
28 Health and Science Program
29 Varsity Team Room
30 Visiting / Club Locker Room
31 General Use Locker Room
32 Public Washrooms
33 Loading Dock
34 Zamboni Room and Service
35 Mechanical and Electrical Support
36 Storage
37 Unexcavated
38 Entrance Control
Alumni Stadium. The next level up, the Plaza Level, will be on grade with a vehicular drop-off to the south from East Ring Road. The Plaza level will include the varsity training centre, and structured parking for 150 spaces below the Field House. In this phase the north-south indoor street will connect the Field House Centre and Mitchell Centre buildings at Reynolds Walk and Plaza levels. The level of the field house and gymnasium will be on level with the bus stop on East Ring Road. To provide an entry with street presence, a lobby has been designed on East Ring Road with direct access to the field house level. Guests can either walk through the spectator seating area of the Field House or connect vertically with the structured parking one level below. This phase will dramatically increase the visibility of sports along East Ring Road, providing a strong presence to complement the Multi-Purpose Hall to the south, as well as enhance the streetscape of East Ring Road between Alumni Walk and Reynolds Walk.

With the northeast corner of the Field House Centre being within close proximity to the tunnel and associated stair crossing Alumni Walk at East Ring Road, a portion of the existing pedestrian path will need to be reconstructed. An accessible ramp from East Ring Road down to Alumni Walk will be built on the north side of Alumni Walk, along with a retaining wall that will screen views into Alumni Stadium.

The site between the Field House Centre and the future Natatorium expansion will be developed to meet the goals of the 2002 Campus Master Plan, defining the east-west pedestrian path to the academic quad. This path will connect students to the east residence halls and other venues. Once implemented, this development will complete four exterior east-west paths: Reynolds Walk, Alumni Walk, College Avenue, and this seam in the centre of the master plan.
UNIVERSITY OF GUELPH ATHLETIC AND RECREATION MASTER PLAN • MARCH 2007

BUILDING PHASING

Focus Area

LEGEND

1. Lobby
2. Lounge
3. Performance Courts
4. Recreational Courts
5. Field House
6. Olympic Ice Rink
7. Recreational Ice Rink
8. Olympic 50m Pool
9. Recreational Pool
10. Fitness and Weights
11. Climbing Wall
12. Combatives
13. Multipurpose Room
14. Squash Courts
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29. Varsity Team Room
30. Visiting / Club Locker Room
31. General Use Locker Room
32. Public Washrooms
33. Loading Dock
34. Zamboni Room and Service
35. Mechanical and Electrical Support
36. Storage
37. Unexcavated
38. Entrance Control

Coaches’ Office Suite Level
**BUILDING LAYOUT** - Phase 5: Gryphon Centre renovation and south expansion, and Site Improvements

**Phase 5.** Gryphon Centre renovation and third ice sheet addition to the south.

This phase can be implemented independent from other phases. The goal is to improve the Gryphon Centre by adding a third ice sheet with a redesigned zamboni staging area, and by expanding the locker capacity within the building. This ice sheet will be a new NHL regulation size ice rink to complement the Olympic Rink and the Red Rink. Other improvements include storage rooms and amenities for concessions and community outreach. A new lobby will be provided at the southeast corner, which combined with the south lobby on the Multi-Purpose Hall will complete a new identity for the University at the southeast entrance. These two lobbies will share the vehicular drop-off and associated short-term parking.
Building Layout - Phase 6: Mitchell Centre Natatorium renovation and expansion


This could be an independent phase, not dependent on the development of previous phases for its implementation. The goal of the phase is to expand the body of water in the pool program for intramural, recreation, varsity, and community use. This will allow Guelph to offer provincial and national competitions.

The architectural development focuses on the reconstruction of the Gold pool to become a 50-metre pool. The project will expand the building footprint to the north and west with dedicated pool support spaces including varsity and visiting locker rooms, a wet classroom, fitness administrative offices and a pool mechanical room. Above the support spaces will be seating for 1,000 spectators. The visitor entry sequence will be from the east at Plaza level, directly in line with the spectator seating. The entry from the East Ring Road drop-off also links to the north-south indoor corridor. The support spaces on the west façade will include a loading dock from Powerhouse Lane. The Red Pool will remain in its location following a renovation to improve the quality of space and will continue to be used as a recreational body of water. Surrounding the Red Pool on the deck will be general use locker rooms and a whirlpool near the seam of both large bodies of water.
LEGEND
1 Lobby
2 Lounge
3 Performance Courts
4 Recreational Courts
5 Field House
6 Olympic Ice Rink
7 Recreational Ice Rink
8 Olympic 50m Pool
9 Recreational Pool
10 Fitness and Weights
11 Climbing Wall
12 Combatives
13 Multipurpose Room
14 Squash Courts
15 Jogging Track
16 Classroom / Meeting Room
17 Varsity Training Centre
18 Satellite Therapy Room
19 Support Space
20 Fitness Administration
21 Central Administration
22 Coaching Administration
23 Food and Retail
24 Spectator Seating
25 Hall of Fame
26 VIP / Alumni Room
27 Press and Media Room
28 Health and Science Program
29 Varsity Team Room
30 Visitng / Club Locker Room
31 General Use Locker Room
32 Public Washrooms
33 Loading Dock
34 Zamboni Room and Service
35 Mechanical and Electrical Support
36 Storage
37 Unexcavated
38 Entrance Control

Reynolds Level

MASTER PLAN: PHASING FOR BUILDINGS
**LEGEND**

1. Lobby  
2. Lounge  
3. Performance Courts  
4. Recreational Courts  
5. Field House  
6. Olympic Ice Rink  
7. Recreational Ice Rink  
8. Olympic 50m Pool  
9. Recreational Pool  
10. Fitness and Weights  
11. Climbing Wall  
12. Combatives  
13. Multipurpose Room  
14. Squash Courts  
15. Jogging Track  
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31. General Use Locker Room  
32. Public Washrooms  
33. Loading Dock  
34. Zamboni Room and Service  
35. Mechanical and Electrical Support  
36. Storage  
37. Unexcavated  
38. Entrance Control
COMPLETE ARCHITECTURAL FLOOR PLANS

The Athletic and Recreation Master Plan will include a total of six identifiable buildings with related program components. The buildings include the Multi-Purpose Hall, Field House Centre, the Mitchell Centre, the Powell Building, the Gryphon Centre, and Alumni Stadium. Two of the buildings are new construction, and the remaining structures are renovated and expanded. Gryphon Dome is the only existing building recommended for demolition or relocation. The Powell Building, not originally included in the project study area, will be integrated within the master plan as part of its renovation.

The square footage summary catalogued in this section is between 7% and 8% over the target square footage listed in the recommended program. Considering that the project is not yet in the design phase, it is not uncommon for the numbers to be within 10% at this stage. Once the project begins its next phase of development, the square footage should be reduced through a more rigorous and refined design schedule.

The full build-out plans shown in this section illustrate each floor plan in context with its site surroundings. If an area is not within the master plan scope, as in a large portion of the Powell Building, it has been rendered without colour. The legend of colour is a guide toward identifying the major program components, with the yellow bands of circulation becoming the unifying threads.

The two main levels, Reynolds Level and Plaza Level, refer to their relative ground planes. The Reynolds Level is on grade with Reynolds Walk, but as the grade rises to the north, the level eventually becomes below grade. As a result, the north terminus of the level is the tunnel below Alumni Walk. The Plaza Level relates to the new plaza from East Ring Road, just north of the Powell Building. The level is on grade with the upper level of the Mitchell Centre and with the new structured parking below the Field House Centre. The Plaza Level connects to the Gryphon Centre and the Multi-Purpose Hall via a combination of two bridge structures.

<table>
<thead>
<tr>
<th>PROPOSED BUILDINGS SQUARE FOOTAGE SUMMARY</th>
<th>New Const. GSF</th>
<th>Renovation GSF</th>
<th>Total GSF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-Purpose Hall</td>
<td>103,942</td>
<td>0</td>
<td>103,942</td>
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<tr>
<td>Field House</td>
<td>205,695</td>
<td>0</td>
<td>205,695</td>
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<tr>
<td>Mitchell Centre</td>
<td>224,939</td>
<td>100,753</td>
<td>325,692</td>
</tr>
<tr>
<td>Powell building</td>
<td>0</td>
<td>25,024</td>
<td>25,024</td>
</tr>
<tr>
<td>Gryphon Centre</td>
<td>62,632</td>
<td>78,393</td>
<td>139,025</td>
</tr>
<tr>
<td>Alumni Stadium</td>
<td>32,426</td>
<td>25,511</td>
<td>57,937</td>
</tr>
<tr>
<td>TOTAL</td>
<td>629,634</td>
<td>227,681</td>
<td>857,315</td>
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</table>
The parking count summary per lot gives an overview of how the Master Plan build-out represents an increase in parking from the existing 2,292 to a proposed 2,518, for an increase of 226 parking spaces. The greatest impact in this number increase is lot P-14, where the Master Plan proposes structured parking under the four fields. Parking Lots beyond the limits of the phasing strategy include an enlargement to Lot P-18, additional Dundas metres and parking dedicated to the Arboretum visitors.

### PARKING COUNT SUMMARY PER LOT

<table>
<thead>
<tr>
<th>PARKING COUNT SUMMARY PER LOT</th>
<th>Existing Capacity</th>
<th>Proposed capacity</th>
<th>Delta</th>
</tr>
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<tbody>
<tr>
<td>P-6</td>
<td>90</td>
<td>157</td>
<td>67</td>
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<tr>
<td>P-7</td>
<td>90</td>
<td>90</td>
<td>0</td>
</tr>
<tr>
<td>P-10</td>
<td>200</td>
<td>200</td>
<td>0</td>
</tr>
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<td>P-11</td>
<td>20</td>
<td>20</td>
<td>0</td>
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<tr>
<td>P-12</td>
<td>520</td>
<td>130</td>
<td>-390</td>
</tr>
<tr>
<td>P-13</td>
<td>478</td>
<td>330</td>
<td>-148</td>
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<tr>
<td>P-14</td>
<td>288</td>
<td>85</td>
<td>203</td>
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<tr>
<td>P-15</td>
<td>304</td>
<td>0</td>
<td>-304</td>
</tr>
<tr>
<td>P-17</td>
<td>98</td>
<td>85</td>
<td>-13</td>
</tr>
<tr>
<td>P-18</td>
<td>158</td>
<td>158</td>
<td>0</td>
</tr>
<tr>
<td>DUNDAS METERS</td>
<td>8</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>P-49</td>
<td>80</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td><strong>SUB TOTAL</strong></td>
<td><strong>2,292</strong></td>
<td><strong>2,116</strong></td>
<td></td>
</tr>
</tbody>
</table>

### OTHER LOTS WITHIN MASTER PLAN STUDY AREA

<table>
<thead>
<tr>
<th>OTHER LOTS WITHIN MASTER PLAN STUDY AREA</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOT P-18 enlargement</td>
<td>377</td>
</tr>
<tr>
<td>Dundas Meters</td>
<td>13</td>
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<tr>
<td>Arboretum Lot</td>
<td>12</td>
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<tr>
<td><strong>SUB TOTAL</strong></td>
<td><strong>402</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2,518</strong></td>
</tr>
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</table>

Existing Conditions
Parking Strategy in Master Plan
NEEDS ASSESSMENT

Overview
2002 Campus Master Plan
Campus Analysis
Facilities Analysis
Peer Analysis
Facilities Program
The process for developing the Needs Assessment for the future of athletics and recreation at the University has included several factors: user interviews, facilities assessments, peer comparisons, and professional experience.

The most informative data was contributed by key users including coaches, staff, and students, through a series of user interviews during Workshops 1 and 2. Of the gathered information, the heavy impact of intramural use on the facilities directly relates to an increase in program space to address an unmet demand.

The facilities assessments are discussed in a separate section of this report, but the obvious and discovered compounding deficiencies were contributing factors. The majority of the existing spaces are inadequate to support the demand of the campus community and varsity needs. Varsity programs need a new varsity training centre and new performance venues, including basketball, volleyball, and wrestling. Intramural programs need additional court and field space to meet demands and increase game times. Recreational users need an expanded fitness centre with support space for advanced training as well as outdoor field space. Class programs need additional multipurpose rooms with improved indoor quality. Along with unmet demand for more performance or recreation space is the added need for support space for the programs.

The peer comparisons exhibit the majority of peers have similar athletic programs as Guelph, but in Guelph the intramural use is proportionally higher than other programs. Within Canada, many programs have either recently renovated or expanded their facilities or have plans to expand in the near future. Given these factors, the current peer conditions are evolving.

Our professional experience recommends that the most rapidly expanding program is in the area of personal fitness. No fitness centre that has recently opened on a campus has been too large for the audience. Particularly considering the strong participation in intramural programs, the heavy traffic to the Mitchell Centre, and the female majority in enrollment, the fitness centre at the University of Guelph will be the most visited program space in the master plan.

The space program that has evolved through the needs assessment will be developed to adhere to an implementation plan. The plan will likely yield several phases of implementation based on priority needs.
From the beginning of the development of the Athletic and Recreation Master Plan, we carefully reviewed previous work developed for the future growth of the campus. The most recent document with relevant guidelines is the 2002 Campus Master Plan. The 2002 Campus Master Plan developed by Du Toit Allopp Hillier provides the prime reference point for campus improvement and expansion. The Athletic and Recreation Master Plan will be a complementary document and expand on specific planning and implementation needs not referenced in the 2002 Campus Master Plan. Our expectation is that the next update of the Campus Master Plan will incorporate the plans and strategies developed in this document.

The Campus Master Plan includes 5 major components with 46 guiding principles, many with direct impact and contribution to the Athletic and Recreation Master Plan. As part of the Athletic and Recreation Master Plan, we recommend that the select guiding principles described below be shared principles for unity between both documents.

The text and content below highlights key excerpts from the 2002 Campus Master Plan prepared by Du Toit Allopp Hillier that have the most relevance to this report. The excerpts are organized by the 5 major components: Environmental Quality Planning, Spatial Structure and Composition, Project Design, Movement and Associated Systems, and Land Use Locations.

- Environmental Quality Planning
  
  #3 Spirit of Place: to preserve the existing picturesque, rural and urban campus character; to reinforce the character defining elements including primary walkways, circulation axes, and fields.
  
  #7 Respecting Campus Neighbours: to maintain good relationships with the City of Guelph and adjacent neighbours including the Arboretum, and the Cuten Club Village by the Arboretum (adult lifestyle community).

- Spatial Structure and Composition
  
  #8 Consolidated Core: promote higher density development within core, locate primary support facilities within ten minute walking circle centered on the Library and facilitate the ten minute break for class change.
  
- Project Design
  
  #12 Preserve the Best, Remove the Worst, Repair the Rest: new project locations should consider the repair or enhancement of problem sites. Maintain Central Plant. Existing parking lots and temporary building sites should be considered. Locate academic buildings within 10 minute diameter walking circle.

- Movement and Associated Systems
  
  #21 Pedestrian Paths: expand pedestrian zones, enhance existing primary pedestrian systems, improve and expand secondary systems.
  
  #22 Street System: accommodate the pedestrian at primary, and secondary campus streets, such as Powder House Lane and East Ring Road.

- Land Use Locations
  
  #37 Outside Community Use: enhance Athletic amenities where necessary. Clearly identify facilities for campus visitors.

2002 CAMPUS MASTER PLAN

#10 Landscape Structure: landscape shall reinforce the framework of roads, walkways and open spaces (fields). Maintain fields and landscape buffers.

- Project Design

#12 Preserve the Best, Remove the Worst, Repair the Rest: new project locations should consider the repair or enhancement of problem sites. Maintain Central Plant. Existing parking lots and temporary building sites should be considered. Locate academic buildings within 10 minute diameter walking circle.

#13 Appropriate Relationships: Select project sites to ensure the best functional, technical, and environmental relationships among related users. Potential Precincts are: Health and Fitness, Residential, Physical Plant, Athletics and Recreation

#14 Utilization Renovation Infill Expansion: in meeting space needs, the University will emphasize consolidation over expansion. Infill/Local Expansion: Academic. Peripheral Expansion: Residential / Research-only Facilities.

- Movement and Associated Systems

#21 Pedestrian Paths: expand pedestrian zones, enhance existing primary pedestrian systems, improve and expand secondary systems.

#22 Street System: accommodate the pedestrian at primary, and secondary campus streets, such as Powder House Lane and East Ring Road.

#24 & 25 Transit and Parking: coordinate transit stops with walks, expand bicycle network (Powerhouse Lane, Arboretum Road), reduce parking in the campus core, site new parking facilities outside of the core and maximize efficiency on existing lots and streets, reserve an accessible site close to the centre for a potential parking structure.

- Land Use Locations

#37 Outside Community Use: enhance Athletic amenities where necessary. Clearly identify facilities for campus visitors.

#39 Housing: 1995 Strategic Plan identified residential expansion with a focus on first year guaranteed housing. Meet the needs of returning students requesting housing.

#40 Athletic Facilities: Athletics is essential to core campus activities and link to the larger community. Provide athletic facilities and playing fields easily accessible from campus core. Land and resources should continue to be allocated to associated athletic facilities.

Conclusions and Project Goals:

1. The Athletic and Recreation Master Plan will redefine the precinct associated with these program needs.

2. Campus character defining elements need to be reinforced through planning and design.

3. Adjacent neighbours and community must be respected.

4. Building, field, and landscape planning and design needs to integrate a strong spatial structure.

5. The overall parking count of 2,292 spaces needs to be maintained within the Athletic and Recreation precinct.

6. The proposed expansion in the 2002 Campus Master Plan needs to be reconciled with the needs for Academic, Student Housing, Research, and Athletic and Recreation programs.
The following existing campus analysis was conducted during the master plan process and served to inform the conceptual development of the Athletics and Recreation Master Plan design concepts. The existing site analysis was prepared after review of the 2002 Campus Master Plan and 2004 Arboretum Master Plan. The two master plans were also discussed directly with the Steering Committee to gain a better understanding of the their current status and directions the University were taking in adopting and implementing the previous master plans. The existing site analysis provides a background to the overall campus context, assessment of the principle campus systems in concert with the goals and objectives of the University of Guelph Athletics and Recreation.

Study Area

The Athletic and Recreation Master Plan study area consists of a large University land area located directly east of the core campus extending to the Arboretum property. There are approximately 53 hectares (132 acres) within the site area. The study area is bordered by College Avenue and the Cutten Club on the north. The study area’s broader context includes the City of Guelph historic centre to the north and commercial and residential development to the south. The city plans to widen Stone Road to four lanes in the future as vehicular traffic is due to increase over time. The Arboretum is located directly east of the study area. This property falls within the linked-open-space concept City of Guelph Official Plan, with proximity to the Eravosa River corridor and the Hanlon Creek corridor.

Land Use

The study area is located on the east side of the core campus. The Mitchell Centre, Gryphon Dome, and Gryphon Centre house the majority of athletic and recreation use with a distribution of outdoor play fields and campus parking to the north and east. Academic and student services is housed in the Powell Building east of the Mitchell Centre. Existing land use patterns directly west of the study area include academic and physical resource facilities. Academic and research use primarily exists within the Arboretum property. A majority of the University of Guelph student residences are clustered to the north, east and south of the athletic and recreation study area. The study area is well positioned in relationship to the student residences and within a 10 minute walking ring centred on the existing Mitchell Centre building.
Vehicular circulation consists of campus ring roads, connector roads and smaller undefined lanes. City arterials including College Avenue and Stone Road provide easy access to the athletic and recreation study area. The south and east ring roads are wide, each with four traffic lanes. The 2002 Campus master plan recommends traffic calming measures including parallel parking, bike lanes at ring roads to slow vehicular traffic volumes. Dundas Lane and the Stone Road entry drive bisect athletic and recreation fields without sidewalks for pedestrians entering the campus from the surrounding streets. Currently, Powerhouse Lane and the vehicular lane along Reynolds Walk allow vehicles to access a high volume pedestrian circulation area next to the Mitchell Centre and Gryphon Centre. Pedestrian movement is defined by two primary walkways that include Reynolds Walk and Alumni Walk, providing a spatial framework and defining landscape characteristic within this portion of the campus. As Reynolds Walk approaches East Ring Road, a parallel vehicular lane detracts from the pedestrian setting; walk-defining elements including consistent tree planting and lighting are lacking. Secondary walkway systems are incomplete and inconsistent. Pedestrian connections from fields and parking are undefined, and existing sidewalks have wide widths and materials. Opportunities exist to strengthen the entire east portion of the core campus with a clear and legible system of walks that connect to important campus destinations.

A substantial number of parking spaces (approx. 2,292) exist within the Athletic and Recreation study area. These parking areas consist of large surface parking lots positioned between existing Athletic and Recreation buildings and fields. Although some of the parking lots are in closer proximity to the core campus, they conflict with pedestrian movement between student residences and athletic and recreation destinations. In addition, the large surface lots occupy a large land area (approx 20 acres within the study area). Athletic and Recreation program expansion needs and required campus parking is a significant master plan challenge which needs to be carefully considered as future implementation takes place.

The University of Guelph currently maintains a centralized utilities system located within and adjacent to the study area. A Central Utilities Plant, Generator Building and Cooling Towers occupy the area immediately adjacent to the intersection of Powerhouse Lane and Alumni Walk. The campus utility system includes a chilled water plant, boiler plant, compressed air, domestic water, raw and deionized water, sanitary and storm sewers, electrical distribution and telecommunications cables. Utility systems extend east across the study at two locations. A utility tunnel exists under Reynolds Walk directly south of the Mitchell Centre. Utility conduits are also located south and parallel to Alumni Walk.

Plantings, topography, solar orientation and wind are important aspects in evaluating the existing conditions within the study area. Collectively the landscape is a vital component of how one experiences the University of Guelph campus. It can provide a sense of clarity and cohesiveness for the first time campus visitor as well as the every day campus user. Currently there is a lack of landscape structure within the study area. The landscape contains undifferentiated components of open play fields and parking lots. A strong woodland edge exists along the east edge of the study area which abruptly stops at the edge of play fields. The lack of vegetation and strong winds and solar glare impacts current athletic and recreational activities and detracts from the spectator experience. The most successful spectator field experience within the study area is Alumni Field.

The existing topographic features of this area provide for a low point at field level and with natural slope and stepped seating on the east and west sides. The field is protected from the wind and the spectator seating provided by sloping topography. An existing high point located along Arboretum Road provides long views in the south, east and west directions. The sloping topography south of this high point offers design opportunities for new facilities, fields and terraced overlooks to be well integrated into the campus setting.
Existing and Proposed Built Space Comparison

Historically, the programs within athletics and recreation at the University of Guelph have been in great demand from users, but with a limited supply of space. To review the aggregate amount of built space on campus, we obtained the metrics for built space by use group from the Physical Services department at the University. Comparing the existing space with the history of growth and development referenced in the 2002 Campus Master Plan, we prepared the comparisons between the charts on this page.

The amount of built space dedicated to athletics and recreation at the University of Guelph is lower than expected when compared to comparable institutions, based on our experience. Campuses traditionally have close to 10% of all built space dedicated to athletics and recreation, compared to the 5.97% of space allocated at Guelph.
Overview
Seven peer institutions were evaluated of comparable facilities based on four major criteria. The seven institutions are Waterloo University, Wilfrid Laurier University, University of Western Ontario, McMaster University, Queen’s University, University of Toronto, and York University. The four major criteria include Indoor Venues, Outdoor Venues, Recreational teams (Instrumental and Club sports), Intercollegiate teams, and Instructional programs.

Indoor Venues
Eleven major indoor venues were evaluated for comparison of quantity and age of facilities with the University of Guelph. Four of the institutions have facilities that have been built or significantly renovated within the past 9 years. They are the University of Western Ontario (basketball, volleyball, 50-metre pool, squash, multipurpose rooms, and fitness and weights), McMaster University (indoor track, indoor tennis, multipurpose rooms, and fitness and weights), Queen’s University (all venues are currently under new construction, scheduled for opening between 2009 and 2012), and York University (ice hockey, indoor tennis, multipurpose rooms, and fitness and weights).

Other relevant observations are that four of the institutions have new 50-metre pools, two have 2 pools, five have 7 basketball courts, two have 10 volleyball courts, five have 200-metre indoor tracks, York has 6 ice sheets, and six have new fitness and weights facilities.
## PEER ANALYSIS - INDOOR VENUES

<table>
<thead>
<tr>
<th></th>
<th>Basketball</th>
<th>Volleyball</th>
<th>Ice Hockey</th>
<th>Pool</th>
<th>Pool - 50m</th>
<th>Indoor Track</th>
<th>Indoor Tennis</th>
<th>Racquetball/Squash</th>
<th>Combatives</th>
<th>Multi-Purpose</th>
<th>Fitness &amp; Weights</th>
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<td>Enrolment 18,000</td>
<td>1200 cap, 3 courts</td>
<td>5 courts</td>
<td>twin pad</td>
<td>25m &amp; 25 yd</td>
<td>197m</td>
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<td>4500 cap, 10 courts</td>
<td>1 rink, 800 cap</td>
<td>25yd, 300 cap</td>
<td>off-site, 6 courts</td>
<td>1 int, 6 NA</td>
<td>5</td>
<td>10,000 sf</td>
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<td>2,200 cap, 3 courts</td>
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<td>Enrolment 24,000</td>
<td>1200 cap, 7 courts</td>
<td>1200 cap, 8 courts</td>
<td>1 rink, 4000 cap</td>
<td>25yd - 6 lane</td>
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<td>Enrolment 68,600</td>
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<td>8-lane 600 cap</td>
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<td>7 courts</td>
<td>5 int, 7 NA</td>
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<tr>
<td>Enrolment 47,000</td>
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<td>1000 cap, 7 courts</td>
<td>6 sheets, 1,500 cap</td>
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<td>4</td>
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<td>2</td>
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### Legend:
- ![Symbol] Facility 0 - 9 years old
- ![Symbol] Facility 10 - 29 years old
- ![Symbol] Facility 30 + years old
- ![Symbol] Facility of unknown age or age not applicable

### Notes:
- University of Western Ontario - chart includes 150,000sf Recreation Centre opening 2008. Fitness & weights - 19,000sf recreation, 6,000sf varsity
- McMaster University - Fitness/weights centre includes one dedicated fitness studio not included in multi-purpose room number count.
- Queen’s University - chart includes new Queen’s Centre construction.
- University of Toronto - Fitness & Weights - 2,200sf weight room, cardio machines in field house (no available sf).
- York University - Performance basketball/tennis/ball court floor and seating replaced in last 2 years. Ice rink facility leased by the university and is on the campus. Track & Field Centre is partnership with City of Toronto - facility significantly updated (original building age shown in chart). Tennis facilities leased from Tennis Canada on-campus. Fitness & Weights - 11,000sf recreation, vastly not available.
### PEER ANALYSIS - OUTDOOR VENUES

<table>
<thead>
<tr>
<th></th>
<th>Football</th>
<th>Soccer</th>
<th>Track &amp; Field</th>
<th>Lacrosse</th>
<th>Field Hockey</th>
<th>Rugby</th>
<th>Baseball</th>
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<th>Tennis</th>
<th>Basketball</th>
<th>Multi-Purpose</th>
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<td>Enrolment: 11,700</td>
<td>Stadium 6,000 cap + 6x in bern</td>
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<td>Stadium 5,000 cap</td>
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<td>Enrolment: 47,000</td>
<td>2000 cap + bern</td>
<td>in Stadium</td>
<td>Track &amp; Field Centre</td>
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**Notes:**
- Laurier University - Stadium built in 1967 but significantly renovated 2007
- McMaster University - 400m outdoor track needs resurfacing therefore not used
- York University - Track & Field Centre is partnership with City of Toronto. Facility significantly updated (original building age shown in chart)

**Legend:**
- Facility 0 - 9 years old
- Facility 10 - 29 years old
- Facility 30 + years old
- Facility of unknown age or age not applicable

### Outdoor Venues

Twelve outdoor venues were evaluated for comparison of quantity and age of facilities with the University of Guelph. Four of the institutions have facilities that have been built or significantly renovated within the past 9 years. They are Wilfrid Laurier University (football, soccer, lacrosse, and rugby), University of Western Ontario Western (football, soccer, track and field, lacrosse, field hockey, and rugby), McMaster University, (football, soccer, lacrosse, and rugby) and the University of Toronto (football, soccer, track and field).

Three of the venues evaluated do not exist at Guelph, including Field Hockey, Tennis, and Basketball, although Tennis is off-site at the Cutten Club. Less than 50% of peers have these outdoor venues. Field Hockey and Tennis venues are at three of the peer institutions, with one or two additional institutions having off-site venues. Only one peer has an outdoor basketball venue.
### Intramural and Club Sports

Forty six teams were surveyed among the peer institutions for comparison to Guelph. The listing is a combination of intramural teams and club teams. Eighteen of the programs do not exist at Guelph, including Swimming, Golf, Rugby, Lacrosse, Field Hockey, Broomball, Softball, Gymnastics, Rowing, Track / Cross Country, Archery, Fencing, Wrestling, Bowling, Equestrian, Cycling, Mountain Bike, and Skiing.

Of these programs, none of them exist at more than 50% of the peer institutions.

Counter to the programs not on campus, Guelph has several programs that only exist at three or fewer peer institutions. They are Curling, Synchronized Swimming, Tennis, Beach Volleyball, Baseball, Lobball, Slo-Pitch, Fast Pitch, Cheerleading, Dance, and Figure Skating.

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<thead>
<tr>
<th>Team</th>
<th>Intramural</th>
<th>Club</th>
<th>Intramural &amp; Club</th>
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</table>

Notes on waiting lists:
- Waterloo University - Indoor soccer and hockey intramural team have waiting list this term. Ski and snowboard club has waiting list.
- University of Western Ontario - Waiting lists for all intramurals (about 25% turned away). New facility should resolve waiting lists.
- McMaster University - No waiting lists with new facilities complete.
- University of Toronto - Significant intramural waiting lists particularly indoor soccer, basketball, co-ed volleyball.
- Queen’s University - No waiting lists expected with new facilities complete.

Legend:
- Intramural
- Club
- Intramural & Club
Intercollegiate Programs
Forty six programs were surveyed among the seven peer institutions. Of the programs, there are several programs that do not exist at Guelph. They include Softball, Tennis (M & W), Badminton (M & W), Squash (M & W), Water Polo (M & W), Curling (M & W), Fencing (M & W), Gymnastics, and Cheerleading (M & W).

Of these programs, all exist at more than 50% of the peer institutions with the exception of softball, gymnastics, and cheerleading.
### Instructional Programs

Forty-six programs were evaluated for comparison with programs at Guelph. Programs at peer institutions that do not exist at Guelph include Aquafit, Badminton, Coaching Certification, Fit Ball work-out, Gymnastics, Irish Dance, Modern Dance, Self Defence, Tap Dancing, and Tennis.

Of these programs, several of the programs exist at over 50% of peer campuses. Those programs include Aquafit, Coaching Certification, Fit Ball work-out, Modern Dance, and Self Defence. Three of the missing programs at Guelph only exist on one campus – Badminton, Gymnastics, and Irish Dance.

Counter to the programs not on campus, Guelph has several programs that only exist at one or two peer institutions. These programs include Aikido, Break Dancing, Diving, Kendo, Rock Climbing, Rowing / Kayak Certification, Scuba Diving, and Taekwondo.

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**Table: Instructional Programs**

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<thead>
<tr>
<th>Program</th>
<th>University of Guelph</th>
<th>Waterloo University</th>
<th>Wilfrid Laurier University</th>
<th>University of Western Ontario</th>
<th>McMaster University</th>
<th>Queen's University</th>
<th>University of Toronto</th>
<th>York University</th>
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</thead>
</table>

Comparison of fall/winter programs 2006/2007 school year.
Development of the Athletic and Recreation Program

Each program for athletic and recreation activities will be expanded in the master plan. The amount of growth is based on a series of interviews with all impacted stakeholders, an assessment of existing facilities, a review of peer institutions, and our professional experience.

The existing program of space allocation for the activities within the structures being evaluated is fairly evenly distributed in our experience, with one major exception – the allocation of space dedicated to fitness and weights. Being the most rapidly expanding trend among collegiate programs, the percentage of space will significantly increase with the implementation of the master plan. Currently shared between athletic and recreation programs, the new program will group varsity-based strength and conditioning in the varsity program space. The space allocated in the Recreational Fitness Centre program will be dedicated exclusively to the every day user.
Participation metrics for the 2006 year are:

- Recreation Participation: 83,862 GSF
- Intramural Participation: 14,745 GSF
- Class Participation: 3,685 GSF
- Fitness Participation: 9,575 GSF

These participation rates represent an increase up to 16% per year.

The program areas with the highest percentage of growth are in the Free Zone, Recreational Courts, and Varsity Training.
FACILITIES PROGRAM

The Program of Activities for Athletics and Recreation at the University of Guelph has been thoroughly debated and scrutinized throughout the master plan process. Determining the appropriate program was an exhaustive process that considered all potential needs, but then considered a realistic target. The final target program recommends a considerable expansion of the current space allocation implemented over the course of a long range master plan.

The program is defined by eight major categories, grouped by activity and sport.

Administration and Free Zone. All central administrative office space in the project, coaches offices included, is within this category. Offices related to specific stand-alone venues, such as hockey, football, aquatics, and fitness, are in grouped with their respective program categories. The Free Zone refers to the entry lobby areas of the building that are open to the general public outside of the secure zone that monitors access to locker rooms and general athletic and recreation venues. The threshold is typically defined by a control desk and potentially an alarmed entry. Depending on University protocol when the project enters the design phases, the threshold can be softened or hardened.

Recreational Fitness Centre. Likely the most utilized program area within the master plan, the Recreational Fitness Centre includes a full fitness centre, 2 recreational gymnasiums with a total of seven basketball-sized courts, a jogging track, multipurpose rooms, squash courts, a climbing wall, and general use locker rooms with equipment issue. The fitness centre is sized to accommodate not only recreational fitness, but also the needs of specialized training areas. The multipurpose rooms are programmed for classes, clubs, and intramurals.

Varsity Court Sports. The varsity category brings a fully equipped varsity training centre to the core of the master plan. The training centre includes therapy and rehab space, a strength and conditioning suite, and team locker space with central equipment storage. Varsity sports are supported by court space for basketball and volleyball, doubling for convocation, and a dedicated venue for wrestling. The Multi-Purpose Hall is sized for 3,500 spectators in bleacher seating with an additional 600 seats on the court floor.

Aquatic Centre. Creating a 50-metre pool transforms the existing aquatics centre to a facility that will meet the demand of usage and increase spectator seating. The Gold Pool will be replaced with the larger body of water, located adjacent to the existing Red Pool. A new whirlpool will be on the common pool deck. Support space, including team rooms, office and meeting space, surround the pools. A new entry from the East Ring Road access will be sized to accommodate event day spectators.

Ice Rink. The full build-out of three ice sheets complements the ice time demand for the University. The third ice sheet, an 85’x200’ rink, is the largest single addition. Increased locker space is a major upgrade for the facility, as is increased training and therapy space. The lobby on Reynolds Walk is programmed for an increase as well as a second lobby on the southeast facade. Gryph’s and user amenity space is expanded.

Stadium. The fixed seating capacity remains intact with improved spectator amenities. A new stadium entry pavilion is planned with concessions, ticketing, and washrooms. The stadium infrastructure is expanded for a new press box with a dedicated hospitality suite, and improved with a more functional team locker room and support spaces.

Field House. A 6-lane, 200-metre field house with an infield is the prime component of this category. Space for 1,000 spectators with amenities is included.

Outdoor Facilities. Fields cannot successfully exist without convenience shelters. Each shelter includes washrooms, triage space that doubles as an office, and storage for sport and maintenance equipment.
### Administration and Free Zone Program

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| [left] Bosse Sports and Health Club, Sudbury, MA
| [right] Lounge, Merrimack College, North Andover, MA
## Administration and Free Zone Program

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**Totals: 19,080**
## Recreational Fitness Centre Program

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### Recreational Activities

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### Recreational Needs

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### Comments

- **Gymnasium with hardwood surface**: 28,300 m²  
  - 2 courts, 1 with 6x4m line  
  - 1 court with 12x8m line

- **Gymnasium with synthetic surface**: 28,300 m²  
  - 2 courts, 1 with 6x4m line  
  - 1 court with 12x8m line

- **Basketball courts**: 21,000 m²  
  - 2 courts, 1 with 12x6m line  
  - 1 court with 12x8m line

- **Soccer / Field Hockey**: 17,500 m²  
  - 2 courts, 1 with 9x6m line  
  - 1 court with 12x8m line

- **Racquetball / Squash / Badminton**: 17,500 m²  
  - 2 courts, 1 with 9x6m line  
  - 1 court with 12x8m line

- **Tennis**: 17,500 m²  
  - 2 courts, 1 with 12x8m line  
  - 1 court with 12x8m line

- **Volleyball**: 17,500 m²  
  - 2 courts, 1 with 9x6m line  
  - 1 court with 12x8m line

- **Other**: 17,500 m²  
  - 2 courts, 1 with 9x6m line  
  - 1 court with 12x8m line

---

(left) Climbing Wall, Johns Hopkins University, Baltimore, MD  
(right) Multipurpose Room, Harvard University, Cambridge, MA

Fitness Area, Cleveland State University, Cleveland, OH  
Running Track, York College of Pennsylvania, York, PA
### Varsity Court Sports Program

#### Program Elements

<table>
<thead>
<tr>
<th>Details</th>
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<th>Workshop 4</th>
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#### Arena Summary

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#### Varsity Court Sports Program

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#### Needs Assessment: Program

**Varsity Court Sports Program**

1. **General Use Lockers and Equipment**
2. **Equipment Storage**
3. **Waist Area**
4. **Weight Room**
5. **Recreation Fitness Center Total**

**Notes**:

**Weights Room, Grinnell College, Grinnell, IA**
## Varsity Court Sports Program

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### Basketball and Volleyball

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### Wrestling

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### Concessions and Lobby, Paul Tsongas Arena, Lowell, MA

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### Basketball Courts, York College of Pennsylvania, York, PA

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### Track and Field

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### Area Summary

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### Notes

- Workshop 3 is the current plan for the next 10 years.
- Workshop 4 is the plan with potential for renovation.
- Recommended is the plan with potential for new construction.
- All costs are in SF.

### Additional Notes

- New building or renovation of current building.
- All costs are in SF.
- SF = square footage.
# Aquatics Centre Program

## Existing and Workshop 3

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## Aquatics Centre Program Total NASF

- **General**: 19,495
- **Pool (swimming and diving)**: 27,810
- **Support Area**: 30,975
- **Equipment and Storage**: 20,915

**Total**: 98,215

## Aquatics Centre Program Total GSF

- **General**: 27,810
- **Pool (swimming and diving)**: 52,900
- **Support Area**: 51,761
- **Equipment and Storage**: 36,073

**Total**: 168,543
## Ice Rink Programs

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<td>Ice Rink, University of New Hampshire, Durham NH</td>
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### Press Box and Locker Room, University of New Hampshire, Durham NH

- **Press Box**
- **Locker Room**

### Ice Rink, University of New Hampshire, Durham NH

- **Ice Rink**
- **Concession**
- **Press Box**
- **Locker Room**
### Stadium and Field House Program

**Field House Program**

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### Program Elements

#### Stadium Program

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Outdoor Fields

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<th>Program Elements</th>
<th>Site</th>
<th>Existing Qty</th>
<th>Existing NAU</th>
<th>Proposed Qty</th>
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<td>Administration and Free Zone</td>
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<td>Ice Rink</td>
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<td>Program Area Summary Total GSF</td>
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<th>Existing Qty</th>
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<td>Football and Rugby Field - Practice</td>
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<td>Rugby Field - Sport</td>
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<td>Lacrosse (Men and Women)</td>
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<td>Tennis Courts</td>
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<td>Outdoor Field - Men</td>
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<td>Outdoor Field - Women</td>
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<td>Current; Natural, Proposed; Synthetic</td>
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<td>Outdoor Facilities Built Space Total NASF</td>
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Outdoor Fields, Rensselaer Polytechnic Institute, Troy, NY

Outdoor Fields, Marquette University, Milwaukee, WI
OUTDOOR FIELDS PROGRAM

Upon evaluating the existing conditions and understanding the demand for outdoor sports and recreation fields an array of outdoor venues was envisioned which could substantially improve the availability as well as the condition of the outdoor fields-of-play. The issue addressed is one that is common to many academic institutions, excessive demand for natural turf surfaces, primarily for rectilinear sports fields. In addition to the poor surface conditions created by overuse, a significant limiting factor to providing fields to meet the demand, is the lack of sports lighting. While this absence of lighting is a limiting factor, the inclusion of lighting and the resulting increase in use would only make the conditions of excessive wear even more unacceptable.

The proposed approach to meeting the present and future demand for outdoor venues is to provide for maximum usage while maintaining acceptable conditions. By including several synthetic turf surfaces and by lighting the fields of play to a level suitable for their intended use, the availability of fields can accommodate the expected use requirements. The most significant restructuring of the sports fields layout and configuration is proposed in the area of the existing multi purpose fields and the field hockey field. For this area a lighted four field quad complex of synthetic turf is proposed with appropriate support and spectator accommodation. The provision for these synthetic surfaces in addition to synthetic surface on the Alumni Stadium field, will nearly double the effective rectangular sports and recreation fields capacity. These fields will allow extended play hours on surfaces that will maintain high quality throughout the sports and recreation season.

The following is a more detailed description of the proposed program for outdoor fields.

Alumni Field:
The running track is removed from the venue, and the horizontal location for the field is shifted to bring the field in closer proximity to the stadium seating. This will improve the spectator / fan experience by bringing the game experience closer and making their participation more intimate. The sports lighting will be reconfigured and upgraded to improve light levels, uniformity qualities, and more environmentally friendly fixtures and energy as well as a “dark skies” perspective. The surface for the stadium is envisioned as a vertically draining infill type synthetic turf whose fiber length would be suitable for football, soccer, lacrosse, as well as the full array of recreational events.

Professional Football Practice & Rugby Pitch, Practice:
The area currently occupied by a parking area and the Softball Main Diamond is regarded and is the location for full size football and rugby field. The surface would be natural turf with improved underdrainage to promote rapid recovery following rain occurrences. The field would be lighted to facilitate nighttime use and include a fixed irrigation system to help maintain a healthy stand of grasses on the playing surface.

Rugby Pitch, Event Field:
The existing rugby field is remodeled and upgraded to provide for improved natural turf surface which would include under drainage as well as a fixed irrigation system. The lighting system would be upgraded to improve light levels, uniformity qualities, and include more environmentally friendly fixtures. Spectator accommodation would be provided for in bleacher seating for 100.

Synthetic Turf Quad Park:
The area presently generally occupied by the field hockey field, and several multipurpose fields, which are also the venues for men's and women's lacrosse will be reconfigured to accommodate four full size multipurpose fields constructed in part above a parking structure. The fields will accommodate soccer, lacrosse, and field hockey as intercollegiate sports but more significantly represents a significant venue for all recreational rectangular field activities including soccer, flag football, ultimate (frisbee) and others that may be added. In the area of the synthetic turf quad park will be a support building of 1,245 sq ft that will accommodate toilet facilities, small administrative on field staff office for operations, medical triage area, team room and equipment storage. All fields will be lighted for nighttime use. The sports surfaces are expected to be vertically draining infill systems whose fiber length and infill level may vary from field to field given the primary sport need accommodated. Provision for portable spectator bleacher seating will be provided. The north-northwesterly of the fields is expected to be the competition venue for soccer (in addition to Alumni Stadium) and accordingly will have the most extensive bleacher seating for 400 spectators, and could accommodate a press box facility.

Relocated Track & Field Facility:
The track displaced from Alumni Stadium would be relocated to an area west of the synthetic turf quad park. The venue would include and eight lane all weather synthetic surface in accordance with IAAF standards accommodating the full range of running events, as well as the vertical and horizontal jumping events. Throwing events will be accommodated within the oval and include Hammer, Discuss, Javelin, and Shot Put. The infield for the track venue is an irrigated and under drained natural grass turf. The infield of the track can be used as an all purpose field having adequate dimensions for a full size soccer pitch. The location for this facility allows for the inclusion of a press box aligned with the track finish line and spectator seating/viewing from sloping grade change to the synthetic turf quad park.

Softball Fields:
In the area of the existing softball quad park two of the field will be removed to accommodate the synthetic turf quad park and surface parking to its south. The remaining two field would be substantially improved to accommodate improved athlete and spectator facility by dimensional improvements, bleacher seating, upgraded player bench areas, fencing and backstops. The field surface conditions will be upgraded by turf root zone improvements, irrigation and subdrainage. Equipment storage will be provided at the venue. Lighting is recommended to accommodate nighttime use, with provision for scoreboards and public address systems.

Tennis:
Located to the east of the south residence halls will be four tennis courts to accommodate recreational tennis activities. The surfaces are the all-weather synthetic surface of a “plesi-pave” or a “plesi-cushion” type. Fencing, wind screening and lighting is included to improve the game experience and extend the available hours of operation.

Beach Volleyball:
Located to the east of the south residence halls and south of the recreational tennis courts will be four sand or beach volleyball courts to accommodate recreational volleyball activities. Given the character of the programmatic activities, adequate lawn space should be provided for social gatherings that frequently occur at these venues.
FACILITIES ASSESSMENT

Overview
Fields Assessment
Buildings Assessment
The athletic and recreation facilities at the University of Guelph, both fields and buildings, were carefully reviewed to determine their current value as assets for future development. Working within a sustainable framework, the design team preserved as many assets as possible. However, depending on technical limitations for competitions, building system deficiencies, and program location, some of the existing facilities will incur significant transformations.

One strong factor toward understanding the current condition of the facilities is to assess the heavy usage patterns that are imposed on a daily basis. Serving all sport-related interest groups with limited space, the facilities are overused and in general states of disrepair.

Assessing the current value of assets is a critical factor toward determining long-term investment. In addition to the fields and building assessment within this section, the appendix of this report includes technical assessments from specialty consultants, including structural, mechanical, plumbing, and electrical engineering, and building code. The technical assessments should be viewed in tandem with this section to understand a holistic view of the context. Placing the engineering systems of the project study area in context with current technology is an important link to redefine the precinct infrastructure plan for the future.

The documented assessment does not focus on campus landscape features within the project study area, but the excerpts from the 2002 Campus Master Plan are reinforced within the recommended master plan approach. The general identity to the precinct is currently lacking strong organizational components. Through the recommended improvements to vehicular and pedestrian approach routes, identity will be strengthened centred around memorable places, both indoor and outdoor.
ALUMNI STADIUM

- Turf condition is generally good. However, given the facility’s limited use, better field conditions would have been expected. There is no fixed irrigation; the field is watered via water cannon. While it was not raining at the time of the tour, it was noted that the field drains well and that puddles from intense precipitation dissipate, typically in 30-45 minutes. The field is under drained but surface evidence was not observed.

- The presence of the track results in spectator seating being 30’ +/- further from the field. Sight lines to the field appear to be good both from the grandstand seating and the informal berm seating.

- The track is not acceptable for today’s track and field program performance and expectations. The track should be an all weather surface of either polyurethane and/or rubber, graded to current tolerances. There are no provisions for throwing events within or contiguous to the venue. The run-ups for horizontal jumping events, while hard surfaced, were not of acceptable quality due to surface irregularities. The jumping pits did not appear to be maintained; their present use is questionable.

- Lighting is via 80 foot high poles with a 6 pole configuration with 8 fixtures per pole. While the system was not seen in night time operation, based upon the number and location of the fixtures, it is expected that the field is considerably underlit considering its use as the performance venue for Football and Soccer. Electrical feeds and telecom feeds to and within the field areas are in questionable condition based upon observation.

- The only apparent entrance to the stadium is in the southwest corner from Powerhouse lane, not the best location due to the presence of adjacent mechanical equipment. Observation was noted that the noise was quite distracting, and the cooling tower seemed to be spewing a fine water spray along the lane and into the stadium. On-field concessions and storage are in small sheds that should be updated, upgraded, and potentially integrated into an expansion to the stadium.

SOCcer - WEST FIELD

- The west field for soccer is a highly used field at 65 hours per week and the condition of the turf is an indication of that use. The high use does not allow the field sufficient time for recovery and regeneration.

- The condition of the turf grass was generally fair with evidence of high traffic wear in the goal areas.

- There is no fixed irrigation and the field is watered via the use of a water cannon.

- The field’s primary use is for soccer practice, while in addition four to five Lacrosse events may be played under the lights each season.

- While not confirmed by either observation or utility plan review, there is said to be a steam line that runs southwest to northeast generally in the middle of the field. This is likely a contributor to the variation of turf grass condition within the middle of the field.

- While not observed directly, the university indicated that the sub drainage that is shown on the record drawings is the small diameter or narrow type tubing variety. While not observed during a rain event, reports are that the sub drainage is marginally effective. The field likely relies on surface runoff for drainage.

- The field is lighted with an 8 pole configuration of 12 fixtures per pole. However the illumination should be reviewed and potentially be improved for night time lacrosse use.

- Some surface irregularities were noted primarily due to inconsistent cross pitch or crown. The west and southwest corner of the field appeared to fall off with an excessive pitch toward the pedestrian path.

- There are no fixed spectator seats and at the time of the tour, no portable seating.

SOFTBALL - MAIN DIAMOND

- General condition of the playing surface was good. Better delineation between the infield mix areas and the outfield could be maintained.

- Grading appeared to be consistent and playable.

- In football season, the outfield is used for practice and skill drills.

- The players’ bench areas could use significant improvements as there are no dugouts or other enclosures for the team benches.

- The backstop appears to be far less than adequate especially given the field’s proximity to two campus streets.

- The field is lighted and would appear to be adequate for softball; the locations of the light poles and the attached transformers are close to the foul lines and appear to be an unacceptable obstruction within an area that should be clear. The pole mounted transformers are due to the precinct power distribution not currently including the northeast corner of the site.

- There are no fixed spectator seats and at the time of the tour, no portable seating.

- There is no fixed irrigation and the field is watered via the use of a water cannon.
**RUGBY AND PRACTICE FOOTBALL FIELD**

- The field is lighted with an 8 pole configuration with 10 fixtures per pole. It appears that the level of lighting should be adequate for the present use.
- The field has sub drainage that is reported to be clay tiles at 42”.
- The high use of the field is evidenced by the poor condition of the turf due to over use. The reported daily use of the field is 6 hours for practice plus recreation use.
- There is no fixed irrigation and the field is watered via the use of a water cannon.
- Storage of equipment is in small sheds that appear to be inadequate for the need. Additionally there appeared to be some field maintenance equipment stored at the field’s perimeter.
- Were it not for the overuse of the field resulting in the poor surface condition, the field would be adequate for the purpose.

**NORTH MULTI-PURPOSE FIELD**

- The field is dimensionally adequate for recreation use and for practice (i.e. skill and agility drills) as the “field” measures approximately 75 yards by 80 yards.
- The grade slopes down from west to east and from south to north.
- The condition of the surface is generally good with some localized variations as to grade. Turf grass is adequate for the purpose.
- The field is not lighted for night time use.

**MULTI-PURPOSE FIELDS – EAST, MIDDLE, AND WEST**

- Uses for these fields are for Men’s Lacrosse (East Field), Women’s Lacrosse (Middle Field), and Recreation (West Field).
- East and Middle fields are generally graded as one consistent slope west to east. The fields are not crowned but are pitched side to side.
- They are not lighted for night time use and as such the wear and tear on the turf grass is not as significant as is evidenced on other fields.
- There is no accommodation for spectators.
- There is no fixed irrigation and the field is watered via the use of a water cannon.
**SOFTBALL QUAD PARK**

- Generally the facility is adequate to host the level of recreation or intramural play that is presently anticipated, with the following exceptions.
  - The outfield fencing is configured such that retrieving balls hit out of the park is difficult and time consuming especially to the east which is a wet area.
  - There is not adequate spectator accommodation.
  - Backstops, players bench areas and fencing could use an upgrade as they appear to be minimal and in less than excellent condition.
  - Not lighted for night time use.
  - Not irrigated.

**FIELD HOCKEY FIELD**

- Presently the “Field Hockey Field” is a misnomer as field hockey is neither practiced nor played competitively on the field.
  - Present primary use for the field is intramural soccer.
  - The field is lighted for night time use.
  - The field is generally in reasonably good condition with some wear areas noted in the areas of goal mouths. The turf is not substantially overstressed as is seen on other lighted fields (likely due to the soccer activity vs. football or rugby).
  - Grades for the surface appear to be quite regular with a gentle crown to the field.
  - A small concrete block building on the westerly side of the field serves the dual purpose of modest storage for sports equipment and the field lighting control center. Each function is accessed via a separate door on opposite ends of the building.

**SOUTH DIAMOND**

- This field is presently laid-out for softball but is lacking in facility to be effectively used for that purpose in an organised way.
  - The backstop is inadequate.
  - There is no fencing for ball containment.
  - There is no player accommodation (benches, dugouts, enclosures).
  - The field surface is somewhat irregular.
  - The presence of the glass façade on the building in the area of right field is a constraint to renovation and use for organized softball.
  - The field is not lighted for night time use.
  - The field is not irrigated.
**COMPREHENSIVE KEY DEFICIENCIES**

- Ineffective and unequal field lighting limits the use of fields after hours.
- Poor field drainage limits the programming of activities during wet seasons.
- Cinder track surface is not acceptable for today’s track and field performance and expectations.
- The field at Alumni Stadium is 30’ +/- from the bleacher seating due to the presence of the track around the field.
- Spectator amenities are either limited or do not exist at all of the venues.
- Team amenities are either limited or do not exist at all of the venues.
- Inadequate on/adjacent secure, weather tight storage for sports equipment.
FIELDS UTILIZATION ASSESSMENT

Intercollegiate Fields

Intercollegiate sports takes place at five (5) field venues on campus. Some of these are lighted for nighttime activities.

- The Alumni Stadium field is primarily used for football events, but is also used for soccer. The track in Alumni Stadium is used for practice only as the surface is unacceptable and there are inadequate provisions for throwing and jumping events for intercollegiate competition. There is lighting for nighttime play.

- The Soccer Field West is used for soccer practice and competition. There is lighting for nighttime play.

- The Rugby and Practice Football field is lighted for nighttime use and is the location for football practice, and is the location for Rugby practice as well as competition.

- The Multi-purpose East and Middle are not lighted and are used for men’s and women’s lacrosse, both practice and competition.

Intramural Fields

The current intramural program is accommodated on 12 fields at six (6) locations.

- The Soccer Field West
- Softball Main Diamond
- North Multi-Purpose Fields, Area accommodates two “small dimensioned” fields
- Multi-Purpose Fields – East, Middle, and West
- Softball Quad Park, Four (4) fields
- Field Hockey Field

The venues that are lighted for nighttime play are the Soccer Field West, Softball Main Diamond, and the Field Hockey Field.
Recreational Fields

Recreational sports activities are accommodated at six (6) general locations that have 11 play fields or courts. Recreational sports activities take place at:

- Softball Quad Park – Four (4) playing fields, unlighted
- South Diamond – Softball, unlighted
- Field Hockey Field – Multi-purpose rectangular field venue, lighted
- Multi-Purpose Field West – Multi-purpose rectangular field venue, unlighted
- North Multi-Purpose Field – Small field rectangular field venue, unlighted
- Beach Volleyball Courts (south of South Diamond), unlighted

Intercollegiate and Intramural Fields Overlap

Usage of the available outdoor sports venues is shared by several uses at various locations on campus. The intercollegiate programs are assigned the fields on a priority basis to accommodate practice and competition events. The quality of the playing fields for varsity sports is of the highest level as is the level of athlete play associated with the intensity of competition. Accordingly, those venues for competition may not be the same as the practice venue as the quality of playing surface is intentionally preserved and reserved for competition. The current field usage between intercollegiate teams and the intramural teams is shared by the venues of West Soccer Field, Multi-Purpose Field East and Middle, and Field Hockey Field.

Intramural and Recreational Fields Overlap

In addition to sharing field space by Intercollegiate Athletics and Intramural Sports, several fields are also shared between Intramural Sports and Recreational Sports. The recreational sports are generally allocated the surplus of time slots that may become available from intramural and intercollegiate use. The following fields are used for recreation when available and not in conflict with intramural activities:

- Softball Quad Park – Four (4) playing fields, unlighted
- Field Hockey Field – Multi-purpose rectangular field venue, lighted
- Multi-Purpose Field West – Multi-purpose rectangular field venue, unlighted
- North Multi-Purpose Field – Small field rectangular field venue, unlighted
The oldest remaining structure on site, the 1941 ice sheet, had a major expansion in 1957. The expansion was not built at the same floor level of the 1941 structure, creating accessibility issues that remain today. The expansion added gymnasium space and a pool with significant support space for the enrollment of 1800 or less at that time. Since 1957, the only addition has been the new pool built in the 1990s. Other noticeable building modifications since the 1990s have included (a) the conversion of the ice sheet to hardwood court space coinciding with the opening of the twin-pad Gryphon Centre, (b) renovation of the second floor office space, and (c) renovation and infill of squash courts and multipurpose rooms on the ends of the converted ice sheet.

Key Deficiencies

Basketball. The Main Gym does not have adequate perimeter court dimension, creating compromised game-time conditions with the placement of the scorer’s bench. The conditions in turn compromise life safety egress routes.

Swimming. The Gold Pool does not have adequate pool deck space, creating unsafe conditions for users during tournaments and insufficient conditions for teams.

Volleyball. The West Gym, converted from an ice sheet, hosts competitive volleyball matches yet does not have adequate vertical clearance. As a result, only a portion of the courts can be used for games.

Spatial Deficiencies. The University has a history of significant participation in intramural and club sports. The University has also expanded tenfold since the last major addition of space to the building (with the exception of the pool). As a result, many areas are undersized and overprogrammed. All spaces in the building, with the exception of a select few, serve both the varsity athlete and the recreational user.

Fitness and Weights. The space allocated for fitness and weights is insufficient to meet needs demands, making many recreational users join local health clubs.

Swimming. Both pools are heavily programmed for athletic, intramural, and community uses, reducing the practice time available for teams. Tournament events and camps create an overuse of the lobby space, particularly with the need for crush space and vendor sales. Tournaments also incur an increased spectator capacity that is currently not achievable.

Court Sports. All courts are overutilized, basketball and volleyball, impacting the length of practice times and intramural game times. Intramural use currently has a waiting list for prospective teams. Camp programs add significant short-term volume to the courts.

Multipurpose Rooms. Some of the new multipurpose rooms are very popular, compared in quality to the older rooms. Even with the increased number of rooms, the building cannot meet the demand for the classes and programs that are offered. Class use currently has a waiting list for prospective students.

Varsity Therapy. The therapy space allocated for varsity athletes is severely deficient in size and amenities.

Spectator Seating and Amenities. The seating capacities in swimming and basketball need to expand due to demand, projected growth, and special events. Currently, spectator amenities are very limited. Upgrading to projected needs will create a significant growth to the program.
Life Safety: Fire, Smoke and Corridors. The building does not meet life safety requirements. It is unclear if there are any smoke compartments within the building. It is also unclear if any of the construction is rated for fire. The building has a limited sprinkler system. The building has multiple dead end corridors. It is unclear if the egress widths of all corridors meet egress width requirements based on occupancy demands.

Life Safety: Stairs, Rails, and Egress. The upper and lower floor levels do not have more than one means of vertical egress in many areas. Not all egress stairs meet life safety requirements, either due to the riser dimension or the railing type. Not all door swing directions are oriented in the outward direction of egress.

Building Quality

Exterior Cladding. The building has multiple additions or renovations, with exterior condition having various deficiencies. Brick veneer is in fair condition, needs repointing. Flashing from original structure should be replaced with flashed window frames. Boarded windows or openings (currently coloured panels) in original structure should be replaced with flashed windows.

Interior Partitions. The areas with the best conditions include the second floor office area, the squash courts and weight areas. There are limited cracks in block walls. General concern at condition of the sawcut concrete walls in the basement at the climbing wall installation. No debur is apparent in the wall at the sawcut, with no additional structural support. The quality of the support of the climbing wall to the existing wall is a concern.

Interior Finishes. A hazardous materials report needs to be conducted before renovation or demolition is scheduled. Flooring appears to be in fair condition overall. The court flooring surface of the main gym is near the end of its lifespan and needs replacement. Sealed concrete throughout the building is in fair condition. Original tile flooring likely is asbestos and must be removed. Ceiling in red pool is in poor condition, likely caused by mold. Other ceilings are in good to fair condition overall. Painted and tiled walls are in serviceable condition, unless hazardous materials report finds positive results. Interior finishes in mechanical and electrical spaces and other back-of-house spaces are in poor condition.

Interior Quality of Space. The majority of spaces need a significant upgrade in the quality of space, both for aesthetic and performance requirements. Examples include poor lighting, compromised performance surfaces, and poor ventilation. limited-to-no daylighting in most spaces is counterintuitive to the desired quality of space for an athletic and recreation facility devoted to health and human performance. Circulation and wayfinding is poorly organized. Lack of quality ventilation limits the effective use of space throughout the year. New mechanical systems in the fitness centre should improve user comfort. Lack of quantity of space has translated to using less than desirable spaces for programs, including the use of the range room for yoga and pilates.

Recommendations

1. Correct barrier free and life safety deficiencies
2. Create capacity to expand mechanical and electrical systems
3. Determine master plan location for new electrical substation (if required for total replacement)
4. Reconsider building program, potentially focused on recreational sports
5. Improve wayfinding
6. Avoid public use of basement
7. Integrate daylighting
8. New entry / identity from Reynolds Walk
9. Solve seam between Mitchell Centre and Powell Building

Barrier Free Accessibility: Circulation. The building is not a barrier free environment.

Elevator Access. The building has no elevator to provide access between all levels. The service elevator near the red pool connects between the lobby and the basement. If accessible access to the second level is needed, users depend on adjacent Powell Building and the connecting bridge.

Floor Level Differences. The majority of corridors and paths meet accessibility width requirements. The building has multiple subtle floor level changes on all levels. On the basement level, the access around the base of the red pool has two levels separated with stairs. The basement level mechanical room is separated from the rest of the level with stairs. On the main entry level, a series of ramps and stairs between the main lobby and the west gym provides the only accessible connection between the level’s floor changes. In some areas, the door along the ramp or stair access does not have adequate dimension along the pull/push side of the door. The pool area and areas to the north of the building are not connected with an accessible route. The main second level has fewer subtle level changes, with the west side having them all. No level changes on the second floor have ramped connections, only stairs. The top level includes disconnected spaces, a combination of mechanical room over the main gym and new multipurpose rooms above the west gym.

Building Systems. The main mechanical and electrical rooms on the main level are only accessible from the exterior.

Barrier Free Accessibility: Fixtures. The majority of plumbing fixtures do not meet accessible requirements and must be replaced, including toilets, sinks, showers, and electric water coolers. Not all mirrors and grab bars not meet accessible requirements.

Barrier Free Accessibility: Signage. The building does not have signage with braille.

Barrier Free Accessibility: Hardware. The majority of hardware does not meet accessibility requirements and not all hardware is rated for fire where required.

Barrier Free Accessibility: Signage. The building does not have signage with braille.

Barrier Free Accessibility: Hardware. The majority of hardware does not meet accessibility requirements and not all hardware is rated for fire where required.
The twin-pad arena, built in 1990, replaced the 1941 ice sheet in the Mitchell Centre. Built to the south of the Mitchell Centre, the two buildings form a hub of athletic and recreation activity at the east end of Reynolds Walk.

Key Deficiencies

Athletic Performance. Ice Sheet. The Olympic rink is 6" +/- short of being a true Olympic ice sheet. The dimensional difference does not affect the game, but could impact the ability of the University to attract tournaments. Any proposed expansion to include a third ice sheet should consider the viability of the new ice sheet at Olympic size requirements.

Spatial Deficiencies. The University has a history of significant participation in intramural and club sports. As a result, many areas are undersized and overprogrammed. All spaces in the building, with the exception of the varsity locker rooms, serve both the varsity athlete and the recreational user.

Spectator Seating and Amenities. The seating capacity in the Olympic rink is projected to expand due to demand, projected growth, and special events. Currently, spectator amenities are very limited. Upgrading to projected needs will create a significant growth to the program.

Varsity Therapy. The taping and therapy space allocated for varsity athletes is deficient in size and amenities.

Locker Rooms. The space allocated for locker rooms is insufficient for team capacities, both relative to the number of teams and the amount of space needed for varsity programs.

Figure Skating. The figure skating program needs an identity within the building, both in regard to locker space and training space. Currently, the building does not support the program.

Barrier Free Accessibility: Circulation. Elevator Access: The building has one elevator to provide access between both levels. All corridors and paths meet accessibility width requirements.

Barrier Free Accessibility: Fixtures. Not all plumbing fixtures meet accessible requirements and must be replaced, including toilets, sinks, showers, and electric water coolers. Not all mirrors and grab bars meet accessible requirements.

Barrier Free Accessibility: Signage. The building does not have signage with braille.

Barrier Free Accessibility: Hardware. Not all hardware meets accessibility requirements and not all hardware is rated for fire where required.

Life Safety: Stairs, Rails, and Egress. Egress from the upper floor level is compromised. The main stair on Reynolds Walk has risers that are slightly greater than the maximum dimension allowed by code. The remaining stairs that may act as a second means of egress are either through the spectator seating of the Olympic ice sheet or through Gryphs.

Building Quality

Exterior Cladding. Building is relatively new, and exterior veneer is in good condition. Original storefront and windows need replacement to increase energy efficiency.

Interior Partitions. Interior partitions are in good condition, pending their age and abuse. There are limited cracks in block walls.

Interior Finishes. A hazardous materials report needs to be conducted before renovation or demolition is scheduled. Flooring appears to be in fair condition overall. Sealed concrete throughout the building is in fair condition. Ceilings are in good to fair condition overall. Painted and tiled walls are in serviceable condition, unless hazardous materials report finds positive results. Interior finishes in mechanical and electrical spaces and other back-of-house spaces are in fair condition.

Interior Quality of Space. Spaces such as the ice sheets and support areas could benefit from an upgrade in the quality of space with regard to lighting and ventilation.

Recommendations

1. Correct barrier free and life safety deficiencies
2. Create capacity to expand mechanical and electrical systems
3. Consider new entry from Reynolds Walk to solve stair riser issue in main open stair
4. Determine if third ice sheet should replace the function of the Olympic rink, or just be a third rink
5. Create improved team rooms and support space
The twin-pad arena, built in 1990, replaced the 1941 ice sheet in the Mitchell Centre. Built to the south of the Mitchell Centre, the two buildings form a hub of athletic and recreation activity at the east end of Reynolds Walk.

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**Figure Skating.** The figure skating program needs an identity within the building, both in regard to locker space and training space. Currently, the building does not support the program.

**Barrier Free Accessibility: Circulation.** Elevator Access: The building has one elevator to provide access between both levels. All corridors and paths meet accessibility width requirements.

**Barrier Free Accessibility: Fixtures.** Not all plumbing fixtures meet accessible requirements and must be replaced, including toilets, sinks, showers, and electric water coolers. Not all mirrors and grab bars meet accessible requirements.

**Barrier Free Accessibility: Signage.** The building does not have signage with braille.

**Barrier Free Accessibility: Hardware.** Not all hardware meets accessibility requirements and not all hardware is rated for fire where required.

**Life Safety: Stairs, Rails, and Egress.** Egress from the upper floor level is compromised. The main stair on Reynolds Walk has risers that are slightly greater than the maximum dimension allowed by code. The remaining stairs that may act as a second means of egress are either through the spectator seating of the Olympic ice sheet or through Gryphs.

**Building Quality**

**Exterior Cladding.** Building is relatively new, and exterior veneer is in good condition. Original storefront and windows need replacement to increase energy efficiency.

**Interior Partitions.** Interior partitions are in good condition, pending their age and abuse. There are limited cracks in block walls.

**Interior Finishes.** A hazardous materials report needs to be conducted before renovation or demolition is scheduled. Flooring appears to be in fair condition overall. Sealed concrete throughout the building is in fair condition. Ceilings are in good to fair condition overall. Painted and tiled walls are in serviceable condition, unless hazardous materials report finds positive results. Interior finishes in mechanical and electrical spaces and other back-of-house spaces are in fair condition.

**Interior Quality of Space.** Spaces such as the ice sheets and support areas could benefit from an upgrade in the quality of space with regard to lighting and ventilation.

**Recommendations**

1. Correct barrier free and life safety deficiencies
2. Create capacity to expand mechanical and electrical systems
3. Consider new entry from Reynolds Walk to solve stair riser issue in main open stair
4. Determine if third ice sheet should replace the function of the Olympic rink, or just be a third rink
5. Create improved team rooms and support space
Spectator Seating and Amenities. The discussion of an inclusion of seating capacities will require expansion to the current program. In addition, spectator amenities will need to be incorporated.

Barrier Free Accessibility. The building has no known barrier free issues.

Life Safety. The building has no known life safety issues.

Building Quality

Exterior Cladding. Building is relatively new, and in good condition.

Interior Partitions. The only interior partitions are a small amount of masonry partitions, all in good condition.

Interior Finishes. The track and infield flooring surface is not an ideal surface for the events and activities performed in the dome and should be upgraded to a more appropriate surface.

Interior Quality of Space. The daylight in the space transforms the building into a truly unique structure at the University. However, the lack of conditioned space compromises major events, and events in extreme weather conditions. The poor climate conditions impacts the ability for teams to train and for clubs to practice. The venue is not ideal for convocation, but is a host site due to its size. An alternate venue should be considered for convocation.

Recommendations

1. Create capacity to expand mechanical and electrical systems
2. Reconsider value of structure
3. Consider value of a true fieldhouse, a 200m 6 lane indoor training facility
4. Plan for all potential events to be programmed
5. Reconsider convocation venue

The most unique structure among the facilities, built in the late 1990s, the Gryphon Dome serves the need of an indoor field for the campus.

Key Deficiencies

Athletic Performance. Track: The indoor track was projected to be a 200-metre track. The result is a 197-metre track that further limits its competitive use by not having the turning radius that are technically required, only having 4-lanes, and not having straightaway lanes. Other field events, such as long jump and pole vault, are not possible in the building either due to its compromised dimensions.

Spatial Deficiencies. The University has a history of significant participation in intramural and club sports. The dome, being the only indoor venue for field events, is extremely undersized and overprogrammed by the varsity athlete and the recreational user.

Support Space. The dome is a fairly lean structure, with only a few water closets and an information desk. To become a venue that can service an increase in events, the program needs to expand to include locker space, equipment space, and a lobby.
ALUMNI STADIUM

The 1970 stadium holds a respected history in Ontario collegiate sports. The adjacent natural bowl forms a perfect setting for stadium events. The stadium has had minor renovations since its opening, but nothing substantial.

Key Deficiencies

Spatial Deficiencies. The needs of support space for football programs and spectators have expanded since the opening of Alumni Stadium. As a result, the majority of space in the building is insufficient.

Locker Room. The space allocated for both varsity and visiting teams is insufficient. The varsity room needs to accommodate an increase in roster spots as well as space for film review.

Training and Therapy. The training and therapy suite, currently a strength training centre, needs to accommodate space for therapy demands. The current space is compromised by its adjacency to the overused Gryphon Room.

Spectator Seating and Amenities. Seating capacity may need to expand due to demand, but the support facilities need significant improvement. The spectator amenities need an increase in quality for concessions, washrooms, and general comforts. The press box program needs a comprehensive upgrade, both in content and in quality.

Barrier Free Accessibility: Circulation. The building is not a barrier free environment. The building has no elevator to provide access to any level. The southwest entry to the stadium provides the only barrier free access to the site.

Barrier Free Accessibility: Fixtures. The majority of plumbing fixtures do not meet accessible requirements and must be replaced, including toilets, sinks, showers, and electric water coolers. Not all mirrors and grab bars meet accessible requirements.

Barrier Free Accessibility: Signage. The building does not have signage with braille.

Barrier Free Accessibility: Hardware. The majority of hardware does not meet accessibility requirements and not all hardware is rated for fire where required.

Life Safety: Fire, Smoke and Corridors. The building does not appear to meet life safety requirements. It is unclear if any of the construction is rated for fire. The building has a limited sprinkler system. The building has at least one dead end corridors at the south end of the lower level. It is unclear if the egress widths of all corridors meet egress width requirements based on occupancy demands.

Life Safety: Stairs, Rails, and Egress. It is unclear if the riser dimension of egress stairs exceeds the maximum allowed dimension. The majority of the railing types do not meet life safety requirements.

Building Quality

Exterior Cladding. Building is in serviceable condition, being mostly a masonry block building. Block is in good condition. Original doors and frames need replacement.

Interior Partitions. Interior partitions are in fair to good condition, pending their abuse. There are limited cracks in block walls.

Interior Finishes. A hazardous materials report needs to be conducted before renovation or demolition is scheduled. Flooring appears to be in fair condition overall. Sealed concrete throughout the building is in fair condition. Original tile flooring likely is asbestos and must be removed. Ceilings are in fair condition. Painted and tiled walls are in serviceable condition, unless hazardous materials report finds positive results. Interior finishes in mechanical and electrical spaces and other back-of-house spaces are in poor condition.

Interior Quality of Space. The majority of spaces need a significant upgrade in the quality of space, both for aesthetic and performance requirements. Examples include poor lighting, compromised performance surfaces, and poor ventilation. Limited-to-no daylighting in most spaces creates poor indoor environment. Flooring surface in training centre is not ideal. Lack of quality ventilation limits the effective use of space.

Recommendations

1. Correct barrier free and life safety deficiencies
2. Create capacity to expand mechanical and electrical systems
3. Improve entry sequence to stadium
4. Improve team support spaces
5. Improve spectator experience
6. Plan for increased capacity
7. Consider stadium to be the hub for varsity venues
VI

MASTER PLAN

DEVELOPMENT CONCEPTS

Overview
Development Concepts
The design concepts evoke a visionary approach for the master plan. As such, the documents should be viewed as guiding principles rather than schematic design plans. Critical to the development of each concept was the idea of strong adjacencies, recognizable placemaking, and viable implementation. Adjacencies between sports venues and support spaces, as well as between the venues campus-wide establishes relationships regarding security, spectator experience, and central services. Placemaking on campus creates identity and memory, both large scale and intimate scale. Placemaking happens both with outdoor experiences, such as Banion Plaza, and with internal spaces. Implementation that is viable to the University must create projects that meet fiscal expectations and projects that are fairly independent.

Each of the concepts carefully took into consideration the location of major building components and fields while working within the project study area. Early concepts studied a broad range of development concepts and areas, a range that considered everything from the construction of new venues spread across the entire north-south length of the study area to compact options with limited travel distance. As the concepts developed, the process of investigation began exploring internal building adjacencies along with the capacity of parking spaces. Internal building plan layouts are documented primarily to ensure that the program of activities can be accommodated. Likewise, the parking study was tracked to ensure that the net implementation of the master plan did not decrease the capacity.
Design Concept 1

Stretch the built environment for athletics and recreation from the Gryphon Centre to College Avenue. By locating the Multi-Purpose at the corner of College Avenue and East Ring Road, the University captures a strong presence at a property edge and transforms the usage and planning of Alumni Stadium. The Mitchell Centre expands to the north, linking to the Field House Centre built on the site of the existing soccer field. The Gryphon Centre adds a third ice sheet to the east with a common entry along Reynolds Walk. The existing southeast access route from Stone Road remains intact, along with three of the four existing softball fields. Three of the soccer fields is accessed from Arboretum Road with the remaining field and track to the south.

Design Concept 2

Maximize the centre of gravity for athletics and recreation. The Mitchell Centre becomes the hub for built development, adding the Field House Centre, the Multi-Purpose Hall, and additional gymnasium court space. The only built venues outside of the Mitchell Centre expansion is the Gryphon Centre and Alumni Stadium. The southeast access route to Stone Road is removed, replaced by a major surface parking lot. Surface parking is also retained at the corner of East Ring Road and Arboretum Road, with the four soccer fields surrounding the track.

Design Concept 3

Create a major north-south indoor connection from Reynolds Walk to Alumni Walk. Rotating the Field House to be along East Ring Road, and maintaining the Multi-Purpose Hall on the corner of East Ring Road and Alumni Walk, allows users an unobstructed walk through the building. The intersection at an equally clear east-west indoor connection forms a major hub. The development builds to the edge of East Ring Road while the Reynolds Walk façade has minimal expansion. The southeast route to Stone Road remains intact adjacent to five soccer fields and three softball fields. The track remains at Alumni Stadium, limiting the proximity between spectator and player.
Design Concept 4
Maintain a clear north-south indoor connection, strengthened by the Multi-Purpose Hall on Reynolds Walk. The move to locate the Multi-Purpose Hall on Reynolds Walk signals the importance of the building to everyday campus life, not solely an athletic building. The seam between it and the Gryphon Centre, with the third ice sheet expanded to the south, creates an outdoor extension of the north-south connection. The Field House Centre and the Mitchell Centre expansion are separated by a east-west seam. The four soccer fields are located in a quadpark, enhancing its usage for tournament play. As a result, the southeast route to Stone Road is realigned. The track is between the soccer fields and the arboretum with two softball fields to the south. Surface parking is maintained along Arboretum Road for convenient access to Reynolds Walk.

Design Concept 5
Shift the north-south indoor connection to the west, closer to the corner of Reynolds Walk and Powerhouse Lane. Rather than taking users from the west past the entire length of façade of the Mitchell Centre from the west, a closer entry will ease the pedestrian relationship between the redeveloped east part of Reynolds Walk with nearby Bantion Plaza. Shifting the connection to the west pushes the pool expansion closer to the drop-off entry from East Ring Road. The seam between the Mitchell Centre expansion and the Field House Centre creates a path for east residence hall students to have access to main campus.

Design Concept 6
Clear pedestrian circulation, convenient vehicular access, great programmatic adjacencies. Design Concept 6 locates the full program in an elegantly sculpted architectural grouping of structure. Scale issues from previous concepts have been resolved to relate to the scale of the campus and the human scale. The Mitchell Centre expansion has been refined to primarily focus on fitness and recreation needs, serving the broader campus community. The four soccer fields, grouped for tournament events and ease of management, sit atop structured parking, taking advantage of grade changes from Arboretum Road south to Stone Road.
Overview
Wetland Assessment
Code Report
Structural Report
Mechanical Report
Electrical Report
The master plan process included the support and advice of expert technical consultants. This section is dedicated to their contributions as well as a research on wetland issues adjacent to this project study area. Each of the consultants prepared facilities assessments of the four key building structures: (1) the Mitchell Centre, (2) the Gryphon Centre, (3) the Gryphon Dome, and (4) Alumni Stadium. The engineering consultants documented narratives for new building infrastructure systems to complement the recommended design concept that is highlighted within this report. To assist with the narratives, University staff from Physical Resources met with the consultants and shared information on infrastructure deficiencies and needs. These narratives should become the basis for planning future system growth for the precinct that supports the master plan project study area.

The structural engineering consultant is Halcrow Yolles; the mechanical engineering consultant is TMP (The Mitchell Partnership); the electrical engineering consultant is Mulvey Banani; and the building code consultant is Leber-Rubes.
The following is a summary of research conducted by Sasaki pertaining to the existing wetlands located at the University of Guelph Arboretum and adjacent to the University of Guelph Athletics and Recreation Master Plan Study area. This research was conducted during the week of March 19, 2007. Information was obtained from discussions with the City of Guelph Planning Department, a resource planner at the Grand River Conservation Authority (GRCA), and review of material posted on the GRCA website www.granderiver.ca.

1. The University of Guelph Arboretum contains Provincially Significant Wetlands on the westerly portion of the Arboretum property.

2. Any proposed development within 120 meters of the designated wetland is regulated by the Grand River Conservation Authority (GRCA) and must comply with the Policy for Areas of Interference Around Wetlands* and will require a permit from the Grand River Conservation Authority. (*Grand River Conservation Authority Policy for Areas of Interference Around Wetlands, approved May 2006)

3. Development is defined and includes:
   - The construction or placing of a building or structure of any kind
   - Site grading
   - Temporary or permanent placing, dumping or removal of any material, originating on the site or elsewhere.

4. The proposed University of Guelph Athletics and Recreation Master Plan Study area indicates development including the expansion of softball fields, implementation of an eight lane running track, natural turf field, storage structure, parking deck and walkways within regulation limit/area of interference as currently mapped by the Grand River Conservation Authority.

5. Development proposed within 120 meters of Provincially significant wetlands generally triggers the requirement for an Environmental Impact Study (EIS). Per discussions with the GRCA they speculated that the EIS would be considered a "Scoped EIS." A scoped EIS is an area or site-specific study that addresses issues of particular concern not previously addressed in sufficient detail in a comprehensive study.*

6. Environmental Impact Study involves a permitting process that addresses the potential impact of site-specific development on wetlands and other parts of the natural heritage system that supports wetlands. The EIS should present sufficient information on proposed development, identify the impacts on wetlands and specify measures that would avoid or mitigate those impacts.

7. Mitigation would include both short-term and long-term strategies. For example, erosion control measures would address short-term measures and "sheet grading" of the site rather than point source runoff would be considered a long-term strategy.

8. The following guidelines for the completion of a Environmental Impact Study * include the following steps:
   - Pre-consultation with GRCA to confirm the requirement for an EIS.
   - Review application and complete an EIS checklist to identify parameters of the study for an adequate and complete EIS submission.
   - EIS submission should include:
     - Biophysical Description of the Site. (Wetland Boundary shall be surveyed in the field by a qualified wetland biologist, field verified by GRCA staff and mapped on all site plans).
     - Inventory of Existing Conditions
     - Proposed Development Conditions
     - Assessment of Potential Impacts
     - Recommendations for Wetland Protection and or Enhancement
     - Monitoring (before, during and after construction)
     - Recommendations and Conclusions.

9. The entire GRCA EIS process typically takes a year and would involve an environmental consultant who would assist with the pre-consultation and preparation of an EIS submission. GRCA typical needs 2-3 month review period of a completed EIS submission document.

PRELIMINARY BUILDING CODE REPORT

UNIVERSITY OF GUELPH
ATHLETIC FACILITIES RENEWAL
FEASIBILITY STUDY

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1.0 EXECUTIVE SUMMARY

This report describes the overall application of Ontario Building Code (OBC) requirements to the redevelopment of the athletic facilities at the University of Guelph.

This redevelopment includes the potential for a mix of upgrades and expansion of existing buildings and construction of new facilities as part of the project. Existing buildings were observed to contain existing ‘non-conforming’ conditions as observed during the site meeting and as noted in documentation provided by Sasaki Associates Inc. It is recommended that each of these conditions be addressed in the context of the renewal program.

The principal recommendation for purposes of improving overall life safety and property protection in existing facilities and to permit greater design flexibility in the project overall, is that the existing buildings and any new buildings forming part of the redevelopment be equipped with sprinkler protection throughout.

Existing unsprinklered buildings that are renovated as part of the redesign must be evaluated under OBC Part 11 “Renovation”. As part of the evaluation, sprinkler protection may not be literally required, however, as stated above, the addition of sprinkler protection throughout existing portions of the facility will provide greater life safety and property protection, as well as benefits with regard to fire separation ratings and fire department access.

Sprinkler protection will also permit the interconnection of floor spaces.

Significant design challenges with means of egress from existing facilities may be present depending upon the proposed configuration of additions or new buildings surrounding existing facilities.

2.0 INTRODUCTION

2.1 PURPOSE AND BACKGROUND

1. The purpose of this report is to provide preliminary information to Sasaki Associates Inc. and B + H Architects Inc. for the design option presentation phase of this project. This report is intended to assist in presenting feasibility study plans that comply with the overall life and fire safety requirements of the 2006 Ontario Building Code (OBC).

2. The 2006 OBC comes into effect January 1, 2007. The 2006 regulation will be used, as it is the version that will be applicable should the project advance beyond the feasibility study phase.

3. It is intended that this report form an integral component of the report submission by Sasaki Associates Inc. to the University of Guelph.

4. This report does not restate all applicable OBC requirements. The purpose is to provide general life safety and fire protection requirements that will affect the overall approach to design of any new buildings and renovation of existing structures within the context of the proposed athletic centre redevelopment.

5. Barrier-free access requirements are not addressed herein.

6. The information contained in this report is based on the following:
   a) information and drawings provided at the meeting of September 21, 2006,
   b) building summary reports prepared by VFA dated August 24, 2006, and
   c) the requirements of the 2006 OBC.

7. The site meeting included a walking tour of each building. Information obtained from the tour was based on visual observation of readily observable conditions. Active system testing or destructive testing to confirm construction methods was not conducted.
2.2 SCOPE

1. This report addresses general life safety and fire protection requirements applicable to the proposed University of Guelph athletic facilities redevelopment in the context of the feasibility study phase.

2. It is not intended that this report restate all applicable OBC requirements, or those of other Code and Standards that may be referenced. Official volumes of the OBC, or other standards noted herein, should be referenced as applicable.

2.3 REPORT ORGANIZATION

1. References (i.e. Part, Article, Sentence) note OBC requirements unless otherwise stated.

3.0 DESCRIPTION OF EXISTING FACILITIES

3.1 GENERAL

1. The project may involve the redevelopment, renovation or expansion of existing athletic facilities at the University of Guelph. These include the following:

   a) W.F. Mitchell Athletic Centre
   b) Alumni Stadium
   c) Griffin Centre Twin Pad Arena
   d) Gryphon Dome

3.2 EXISTING FACILITIES

1. The following provides a brief description of each building. The descriptions noted below are based on information from the VFA reports and notes taken during the site visit.

2. W.F. Mitchell Athletic Centre:

   a) Year of construction - 1941 (multiple renovations, additions since original construction)
   b) Noncombustible and combustible construction
   c) Building height - two storeys
   d) Building area - 13,484 m²
   e) Partially sprinklered
   f) Partial standpipe system
   g) Simplex fire alarm system installed in 1970. This system model is a; the end of its serviceable lifespan. Replacement parts are difficult to obtain. Additionally, these types of existing systems cannot support the type of renovation and/or expansion contemplated for the University of Guelph due to its limited capacity to support additional fire alarm zones and the integration of newer-generation fire alarm systems.
h) Multiple renovations, changes of use and other alterations appear to have impacted exiting from the basement. Specifically, this includes the multi-purpose room, climbing walls, storage rooms and offices. Multi-purpose room 300 does not appear to have adequate exit provision.

i) Combustible construction was observed in the basement climbing wall rooms and Mechanical Room 310. Based on the current OBC, the building area and unsprinklered condition requires non-combustible construction be used. This can be considered an 'existing non-conforming' condition. However, this type of conditions should be addressed in the overall renewal program.

j) The glazing in the Circuit Training room is non-wired glass. This appears to indicate that the second storey is not fire separated from the ground floor. This type of interconnection is not permitted as the two storeys comprising the interconnected floor space are not sprinklered.

3. Alumni Stadium:
   a) Year of construction – 1970
   b) Noncombustible construction
   c) Building height – two storeys
   d) Building area – 1,476 m²
   e) Sprinkler protection or standpipe protection not provided
   f) Fire alarm system installed. The fire alarm system is an Edwards 1221 single stage system. This fire alarm system was installed at the time of construction and is at the end of its serviceable lifespan. Replacement parts are difficult to obtain.
   g) Guards within the grandstand area do not comply with current code requirements. This can be considered an 'existing non-conforming' condition. However, it is strongly recommended that this condition be addressed as part of the renewal program.

4. Griffin Centre Twin Pad Arena:
   a) Year of construction – 1990
   b) Noncombustible construction
   c) Building height – two storeys
   d) Building area – 8,261 m²
   e) Fully sprinklered
   f) Fire alarm system installed
   g) Guards within the Gold Rink do not comply with current code requirements. This can be considered an 'existing non-conforming' condition. However, it is strongly recommended that this condition be addressed as part of the renewal program.
   h) The number of egress locations from the surface of each of the Red Rink and Gold Rink appears to be insufficient based on the configuration of the boards lining each rink. This may be considered an 'existing non-conforming' condition. However, this type of conditions should be addressed in the overall renewal program.

5. Gryphon Dome:
   a) Year of construction - ~ late 1990's
   b) Combustible construction
   c) Building height – one storey
   d) Building area – 3,567 m²
   e) Unsprinklered
   f) Fire alarm system installed
q) The posted maximum occupant load is 100 persons. It is understood that events are conducted within the Gryphon Dome that may exceed the posted 100 person limit (i.e. convocation ceremonies). This type of use should be reviewed to ensure that it does not exceed the posted occupant load.

h) Either a review of existing exposing building faces or a review of the permit and construction documentation should be conducted to determine compliance with spatial separation requirements between the Gryphon Dome and the W.F. Mitchell Athletic Centre (i.e. concerning building-to-building fire exposure).

4.0 PRINCIPAL REQUIREMENTS

4.1 GENERAL

1. The buildings comprising the athletic centre redevelopment, whether renovation of existing buildings or new buildings, will be owned and operated by the University of Guelph.

2. Part 3 "Fire Protection, Occupant Safety and Accessibility" will apply to all new construction.

3. Part 10 "Change of Use" (Part 10) applies to changes in major occupancy (use group) to the existing building where construction activities are not conducted.

4. Part 11 "Renovation" (Part 11) applies to extension, material alteration or repair of existing building.

5. A fundamental principle of Part 11 and Part 10 is that the fire and life safety performance level of the building subsequent to renovations and/or change of use cannot be reduced from the original level. Upgrading of early warning and evacuation systems and means of egress is required as a minimum, for extensive renovations.

6. A primary recommendation for fire and life safety purposes and for the integration of potential uses is complete sprinkler protection.

7. Sprinkler protection will offer increased design flexibility, which includes:
   a) Interconnected floor spaces (i.e. atria).
   b) Greater travel distances to exits relative to number and location of exterior exits and exit stairs.
   c) Reduced access to exit requirements (i.e. greater common paths of travel).
   d) Reduced ratings for fire separations of corridors used by the public.
4.0 CONSTRUCTION REQUIREMENTS

4.1 GENERAL

1. This section of the report provides general information on major occupancy determination, construction classification and principal fire separation rating requirements of the OBC related to the potential types of major occupancy classifications within the athletic facilities redevelopment.

2. A major occupancy is defined by the OBC as the principal occupancy for which a building, or part of a building, is used or intended to be use. A major occupancy also includes the subsidiary occupancies which are an integral part of the principal occupancy (i.e. subsidiary administration areas within an athletic building).

3. A major occupancy that occupies less than 10% of the floor area of the storey is not required to be considered as a major occupancy for the purposes of construction classification.

4. For the purpose of this summary, the major occupancy classifications considered as part of this review include:
   a) Group A, Division 2 (Assembly): Gymnasium
   b) Group A, Division 3 (Assembly): Arenas, indoor swimming pools, rinks
   c) Group A, Division 4 (Assembly – Open Air): Bleachers, grandstands, stadia

5. The following provides information on potential construction classification requirements based on the general types of occupancies within the existing facilities.
   a) Article 3.2.2.23 - Group A, Division 2, any height, any area, sprinklered:
      i. noncombustible construction
      ii. 2 hr floor assemblies
      iii. 1 hr mezzanines
      iv. 2 hr supporting construction for storeys and 1 hr supporting mezzanines
      v. non-rated roof assemblies
      vi. non-rated columns supporting roof only at uppermost storey.
b) Article 3.2.2.24 - Group A, Division 2, up to six storeys, any area, sprinklered:
   i. noncombustible construction
   ii. 1 hr floor assemblies (above grade)
   iii. 1 hr mezzanines
   iv. 1 hr supporting construction
   v. non-rated roof assemblies
   vi. non-rated columns supporting roof only at uppermost storey.

c) Article 3.2.2.29. – Group A, Division 3, any height, any area:
   i. noncombustible construction
   ii. sprinklered throughout if regulated by Subsection 3.2.6 (high buildings)
   iii. 2 hr floor assemblies
   iv. 1 hr mezzanines
   v. 2 hr supporting construction for storeys and 1 hr supporting mezzanines
   vi. non-rated roof assemblies only if the building is sprinklered
   vii. non-rated columns supporting roof only if the building is sprinklered.

d) Article 3.2.2.35 – Group A, Division 4:
   i. noncombustible construction
   ii. sprinkler protection required in all areas below seating tiers if those spaces are used for occupancy

6. Article 3.2.2.15 – Storeys Below Ground:
   a) 2 hr floor assemblies
   b) 2 hr supporting construction
   c) sprinkler protection required throughout.

7. Depending on the composition and arrangement of ancillary occupancies (i.e. athletic centre offices, physiotherapy, treatment, personal service uses) construction classification requirements may require review under additional major occupancies such as Group D (Office and Personal Services).

8. The Authority Having Jurisdiction (AHJ) may interpret the OBC to require 1 hr major occupancy fire separations between any new pool structure (Group A, Division 3) and an adjacent Group A, Division 2 occupancy, or any new arena structure (Group A, Division 3) and an adjacent Group A, Division 2 occupancy. Such major occupancy fire separations are not required to be provided at sprinklered interconnected floor spaces as described in Section 5.1 of this report.

4.2 MEANS OF EGRESS

1. Location of exits - Maximum travel distances to: an exterior exit, an exit stair, or an exit corridor having a fire separation equivalent to the rating of the applicable floor assembly above (i.e. 1 hr in Group A, Division 2 and 2 hr in Group A, Division 3), or through a 2 hr "fire wall", or a 1 1/2 hr fire separated walkway, or a 1 1/2 fire separated tunnel connecting to another separate building (i.e. a horizontal exit):
   a) 45 m if sprinklered (except as noted below)
   b) 45 m if sprinklered on ground floor of interconnected floor space (i.e. communicating space or atrium)
   c) 45 m if sprinklered in second storey or basement storey of a two storey interconnected floor space that includes the ground storey
   d) 30 m if floor area is not sprinklered
   e) 30 m if floor area is sprinklered but floor area is above second storey in an atrium and the floor area is not fire separated from an atrium
   f) 30 m if floor area is sprinklered but floor is the first basement storey or second storey and is open to a multi-storey atrium (i.e. if an atrium is open and interconnects more than only the ground and second storey or the ground and first basement storey)
g) 45 m if floor area is sprinklered and although floor is above second storey in the atrium, the floor area is fire separated from the atrium by at least 1 hr fire separations (Group A, Division 2) or 2 hr fire separations (Group A, Division 3).

h) 105 m in a sprinklered floor area served by a corridor with a width of at least 9 m and a ceiling height of at least 4 m (e.g., similar to shopping mall requirements – subject to acceptance of equivalency approach by AHJ). This approach should also be approved via equivalency approach by AHJ in a multi-storey interconnected floor space (atrium).

2. Width of exits - The aggregate width of exits must provide sufficient capacity for occupant load at the respective storey. Exit widths are not required to be sized for cumulative/converging loading of occupants located on superimposed storeys, except where:
   a) occupants converge from above and below at grade (e.g. in a common exit stair shaft)
   b) occupants are in a single volume space where one fire condition can cause the need for simultaneous evacuation of occupants from more than one level, or
   c) the building incorporates an atrium with floor areas greater than 18 m above grade.

3. Access to exits and exits are required to be sized based on the following factors:
   a) 6.1 mm per person for level means of egress
   b) 6.1 mm per person for doorways and corridors
   c) 6.1 mm per person for ramps with a slope less than 1:8
   d) 9.2 mm per person for ramps with a slope greater (steeper) than 1:8
   e) 9.2 mm per person for exit stairs with risers greater than 180 mm or a run less than 280 mm

f) 8 mm per person for exit stairs with risers 180 mm or less and a run 280 mm or more.

4. All exits stairs are required to discharge directly to the exterior at grade, with access to a public thoroughfare.

5. One exit stair serving a floor area (storey) is permitted to discharge through a lobby to an exterior exit door. The path of travel through the lobby from the exit stair to the exterior exit door cannot exceed 15 m. The lobby is required to be fire separated from adjacent floor areas by a non-rated fire separation (e.g. plain glazing in aluminum-framed interior screens) provided the lobby and adjacent areas are sprinklered. Otherwise at least a 1 hr fire separation is required for the lobby from the remainder of the building. The lobby is permitted to be contained within a two storey atrium consisting of the ground and second storey or the ground and first basement storeys only.

6. Exterior exit routes are required to be protected against exposure from an internal fire for horizontal distances of at least 3 m.

7. A second means of egress is required from a room when:
   a) The occupant load is greater than 60 persons,
   b) The travel distance from the most remote point in the room is 25 m in a floor area that is sprinklered (15 m maximum in non-sprinklered floor area), or
   c) The area of the room exceeds:
      i. 200 m² (Assembly occupancy – sprinklered floor area)
      ii. 150 m² (Assembly occupancy – non-sprinklered floor area)
      iii. 300 m² (Office occupancy – sprinklered floor area), or
      iv. 200 m² (Office occupancy – non-sprinklered floor area).

6. Fire separation of means of egress - The following summarizes fire separation requirements (i.e. of means of egress from the remainder of the building) for access to exit corridors and exits. Exits include exit stair shafts and exit corridors necessary to transfer exit stairs to the exterior (other than as permitted for an exit through a lobby previously described):
   a) Corridors used by the public (i.e. students, staff and others) (except as noted below) – 1 hr fire separation.
b) Corridors used by the public in sprinklered floor areas – non-rated fire separations.

c) Corridors used by the public in assembly occupancy floor areas that are sprinklered, and provided that all points within the floor area are within 45 m of an exit, measured from the most remote point – no fire separation is required for the corridor.

d) Corridors used by the public at least 5 m in unobstructed width – no fire separation is required (subject to equivalency approval by AHJ).

e) Corridors at least 9 m wide and 4 m high (e.g. similar to mall) – no fire separation is required (subject to equivalency approval by AHJ).

f) Exit stair shafts penetrating 1 hr floor assemblies require a 1 hr fire separation.

g) Exit stair shafts penetrating 2 hr floor assemblies require a 2 hr fire separation.

h) Exit corridors must have an equivalent fire separation rating as required for the exit stairs.

7. Occupant Load Factors (m²/person)

   a) Gymnasium and field house floors used for examinations – 1.85

   b) Offices – 9.3

   c) Bleacher seating – 450 mm/person per bench length

   d) Standing room – 0.4

   e) Rows of chairs – 0.75

   f) Locker rooms – no applicable OBC factor

   g) Swimming pools – based upon the area and depth of the pool.

8. Program occupant loads can be used in lieu of occupant loads calculated in conformance with OBC factors, provided maximum occupant load signs are conspicuously posted and the program loads are reasonable and enforceable.
5.0 INTERCONNECTED FLOOR SPACES

5.1 ATRIUMS OR COMMUNICATING SPACES

General

1. The renovation of the existing building or the configuration of new buildings may contain interconnected floor spaces (ICFS). If the building is fully sprinklered, greater program flexibility is available for the extent of the ICFS. An ICFS can, for example, consist of atria, multi-storey high concourses, or spine corridors or simple open stair or escalator floor openings that serve to interconnect two or more storeys that would otherwise be fire separated by a floor slab.

2. Two storey ICFS’s are permitted consisting of the first and second storeys or first and basement (i.e. first basement) storeys without provision of a smoke management system for the ICFS provided the ICFS is sprinklered. In such cases, the applicable travel distance to an exit is 45 m measured from a door onto a fire separated corridor, to an exit door.

3. An ICFS is limited in extent by the provision of fire separation walls at its perimeter having a fire-resistance rating at least equal to the required fire rating of the floor assembly penetrated by the floor opening. One hour fire separations can incorporate wired glass in fixed steel frames meeting specific Code requirements. Two hour fire separations cannot incorporate wired glass and openings at the perimeter of such ICFS’s are often addressed by window assemblies protected by special sprinkler heads complying with specific OBC Subsection 3.1.8., Division B requirements.

4. Escalator and stair openings through floors are permitted provided the building is sprinklered and the floor openings are limited to 10 m² in area each (although up to 20 m² has been approved through numerous Building Code Commission rulings.)

5. ICFS’s that communicate through more than two storeys, through more than the limited openings described in item 4., or through any storey above the second storey (or below first basement storey), are required to be protected by a smoke management system and the building is then required to be sprinklered throughout.

6. Refer to Section 4.2.1 for the travel distance implications of an ICFS interconnecting multiple levels and not limited to small escalator and stair openings.

7. An ICFS described in item 6., in addition to reduced travel distance to exits (i.e. 30 m) at all floors except the ground floor (45 m) and floors served by mall-type corridors (105 m) (i.e. mall-type corridor is 9 m wide and 4 m high minimum), requires the following:
   a) sprinkler protection throughout
   b) smoke management (consisting of an engineered smoke exhaust system with make-up air provision) to provide a minimum extraction rate of 6 air changes per hour for all volumes up to 17,000 m³, either via zoned floor area system or centrally only at the top of the ICFS
   c) smoke management at a rate of 4 air changes per hour for volumes greater than 17,000 m³
   d) emergency pressurization of exit stair shafts if the building is more than 18 m high between grade and the floor level of the top storey (excludes mechanical penthouses)
   e) emergency pressurization of elevator shaft vestibules where an elevator opens into storeys above an ICFS and more than 18 m above grade; such vestibules can either be provided at the ICFS storeys or the storeys above the ICFS
   f) Smoke detection in the ICFS (atrium) for the purpose of activating the smoke management system.

8. A multi-level ICFS is permitted to serve an arena (i.e. the arena bowl is permitted to interconnect multiple viewing levels) without provision of a smoke management system. However, smoke management may be necessary to provide smoke protected seating and egress routes (via an engineered smoke management system) depending on the seating layout and the aggregate capacity of means of egress such as the vomitories, aisles and exit stairs.
# UNIVERSITY OF GUELPH ATHLETIC AND RECREATION MASTER PLAN - MARCH 2007

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## STRUCTURAL REPORT

### Master Plan Structural Narrative

**University of Guelph Athletics and Recreation**

**Project No. 1051926**

**May 9, 2007**

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1 INTRODUCTION

1.1 This brief contains an outline specification (Master Planning Narrative) which includes general design criteria and a description of the structural components for pre-schematic design costing purposes only. The brief is to be read in conjunction with the preliminary architectural master plan drawings.

1.2 The structural work shown is based on architectural drawings received on February 20, 2007 for a project of approximately 770,000 square feet.

1.3 All information presented is under development and will be revised to suit final design and programme requirements.

2 PROJECT DESCRIPTION

2.1 The program consists of:
   a) A new structured parking for 865 cars under outdoor fields.
   b) A new Convocation Hall
   c) A new Fieldhouse and Varsity Training Centre
   d) Renovations to the Powell Building.
   e) Renovation and expansion of the Gryphon Centre.
   f) Renovation and expansion of Alumni Stadium.
   g) Phased renovations to the Mitchell Centre including the addition of a four court gym to the east, the addition of a new fitness/cardio addition to the south, a pool expansion to the north and two infill mezzanine areas.

2.2 The project will be designed and constructed in approximately 10 phases over a timeline to be determined by the University. Refer also to the architectural narrative and sketches for additional information with respect to phasing.

3 GENERAL CRITERIA AND ASSUMPTIONS

3.1 General:

3.2 Soils Information:

   3.2.1 Limited geotechnical information is available for the site.

   3.2.2 A comprehensive geotechnical investigation including boreholes for soil properties will be required at the locations of new buildings and additions.

   3.2.3 Test pits may also be required to evaluate the foundation conditions (footing sizes and elevations) for the Mitchell Centre.
3.2.4 Through discussion with the University, poor soils and water issues have posed some difficulty with existing construction on the campus. Subject to the comprehensive geotechnical investigation noted above, considerations are as follows:

i. While limited below grade construction is planned, dewatering may be required for the two parking areas beneath buildings and for the new pool construction which are partially or completely below grade. Geotechnical advice on dewatering in the vicinity of existing buildings would be required if dewatering is a required.

ii. The area north of the Mitchel Centre is noted by the University as having particular water issues. Depending on the assessment of the water table in the area, the new pool construction may be subject to uplift. In this case, the pool would be designed to resist uplift pressure by having a thick reinforced slab as a base.

iii. Adequate waterproofing in these below grade areas would be required and foundation walls would be designed to resist hydrostatic pressure.

iv. A November 2004 report on Floor Settlement in the Mitchell building attributes the issues to poorly compacted fill. The geotechnical investigation must assess whether native materials are adequate for use as fill materials and, if they are acceptable, proper compaction will be specified. Alternatively, additional compacted granular fill will be required.

3.3 Design Criteria: Refer to Appendix A.

4  STRUCTURED PARKING UNDER OUTDOOR FIELDS

4.1 GENERAL DESCRIPTION

A single level parking structure for 665 cars is proposed under the two southernmost outdoor synthetic fields at the re-aligned East Ring Road. Based on the existing grades of the site, the parking structures is essentially below grade at the north and open at the south.

4.2 SUBSTRUCTURE & FOUNDATIONS

4.2.1 Based on the existing structures at the university, the foundation structure is expected to be spread footings under columns and strip footings under walls subject to the findings of a geotechnical investigation.

4.2.2 A foundation wall estimated to be 250 thick will be required at the north side and for some return on the east and west sides to suit grading. These walls will be founded on continuous strip footings at minimum 1200 below the parking level grade.

4.2.3 As the grade lowers toward the south, the foundation wall will be revised to a retaining wall of varying height to suit grading.

4.2.4 A 125 thick slab on grade is anticipated.

4.3 SUPERSTRUCTURE

4.3.1 The roof over the parking structure will be designed to support synthetic turf fields. It will be generally a flat slab construction with sizing dependent on the synthetic field construction. For the purposes of costing, this can be assumed to be 300mm thick with 275 thick drop panels and 350 column capitals.

4.3.2 The column spacing is expected to be on a roughly 9mx5.5m grid. For the purposes of costing, columns can be assumed to be 1200x500 in size.

4.3.3 A large upstand perimeter beam will be required to contain the field construction.

5  CONVOCATION HALL

5.1 GENERAL DESCRIPTION

The proposed Convocation Hall is a two story building with no basement. The ground level primarily consists of a centre court or three cross courts and various support facilities such as locker rooms, coaches rooms, storage areas and the like. The second level is primarily a viewing gallery and with auxiliary multipurpose spaces.

5.2 SUBSTRUCTURE & FOUNDATIONS

5.2.1 Based on the existing structures at the university, the foundation structure is expected to be spread footings under columns and strip footings under walls subject to the findings of a geotechnical investigation.

5.2.2 A perimeter foundation wall of thickness to suit the cladding assembly (estimated at 350 thick) will be required around the building to a
minimum depth of 1200 below the exterior grade. These frost walls will be founded on a strip footing.

5.2.3 A 125 thick slab on grade is anticipated.

5.3 SUPERSTRUCTURE

5.3.1 The second floor is expected for be poured concrete to address potential vibration in the multipurpose rooms and to accommodate the stepped seating at the viewing gallery over occupied spaces below.

5.3.2 The second floor at the multipurpose rooms and the lobby areas is anticipated to be flat slab construction with continuous drops or concrete beams. For the purposes of spanning an average slab thickness of 250mm can be used.

5.3.3 The second floor in the central court area and viewing gallery is anticipated to be slabs and beams. Two lines of concrete columns will be located around the perimeter of the court area at roughly 7m spacing — one line on interior walls adjacent to the corridors and locker rooms and one line on the exterior east and west walls as well as on the wall of adjacent lobby/multipurpose areas on the north and south sides. Concrete beams will run between these columns and cantilever into the seating area of the viewing gallery. The folded slab of the viewing gallery will span between cantilever beams.

5.3.4 The roof over the lobbies and multipurpose areas is anticipated to be conventional steel framing including steel columns. Roof deck is expected to be 31mm metal deck.

5.3.5 The roof of the long span space over the central court area will be framed with 76 deck on steel wide flange purlines and custom steel trusses. The trusses will be composed of wide flange chords and vertical members and double angle diagonal members.

5.3.6 These roofs will all require horizontal bracing to connect them to a vertical steel bracing system.

5.3.7 Columns from the second floor to the steel framed roof will be steel columns.

5.3.8 There is a proposed mechanical penthouse on the west side of the roof. The floor construction is proposed to be 114 concrete on 76 metal deck with conventional steel framing. The mechanical penthouse should not be on the long span structure so additional columns will be required below.

5.3.9 The roof of the proposed mechanical penthouse will be 31mm metal deck on conventional steel framing with steel columns.

6 VARSITY TRAINING CENTRE AND FIELDHOUSE

6.1 GENERAL DESCRIPTION

The Field House portion of this proposed new building is a two story structure stacking an indoor running track and open athletic area over a parking structure. Due to the change in grade in the area, the parking structure is at grade on the south side and below grade at the north side. A long span roof covers the Field House.

The Varsity Training Centre portion of this proposed new building is a three storey structure. The lowest level consists of locker rooms and coach areas. While level with the main level of the remaining buildings this portion of the building is below grade due to existing grade changes. The second level consists primarily of three practice courts and various support spaces including storage areas and washrooms. A long span roof covers the gymnasium space.

6.2 SUBSTRUCTURE & FOUNDATIONS

6.2.1 Based on structural drawings for existing buildings at the university, the foundation structure is expected to be spread footings under columns and strip footings under walls subject to the findings of a geotechnical investigation.

6.2.2 The entire locker room area is understood to be below grade. A foundation wall will be required on all four sides. For the purposes of pricing, the wall will be roughly 250mm thick.

6.2.3 The parking level under the Field House is understood to be partially below a sloping grade. A foundation wall estimated to be 250 thick will be required at the north side and for some return on the east side of the Field House to suit grading. As the grade lowers to the west and to the south, concrete retaining walls will be required for the below grade areas. This likely includes the east side of the Field House and the north wall of the Varsity Training Centre. The parking level is understood to roughly match grade on the south side. Here a frost wall to minimum 1200mm below exterior grade will be required to support cladding. The thickness of this frost wall will match the cladding assembly but for the purposes of costing may be assumed to be 350 thick.

6.2.4 Strip footings will be provided under foundation walls and frost walls.

6.2.5 A 125 thick slab on grade is anticipated in the locker room areas under the Varsity Training Centre and in the parking area under the Field House.
6.3 SUPERSTRUCTURE

6.3.1 The roof over the Varsity gymnasium is proposed to consist of open web steel joists spanning east-west with 76mm roof deck. Perimeter columns on the three exterior walls and the interior corridor wall are expected to be spaced at 8-9m.

6.3.2 The roof of the long span space over the Field House will be framed with 76 deck on steel wide flange purlins and custom steel trusses. The trusses will be composed of wide flange chords and vertical members and double angle diagonal members. Perimeter columns on the three exterior walls and the interior corridor wall are expected to be spaced at 8-9m.

6.3.3 These roofs will both require horizontal bracing to connect them to a vertical steel bracing system.

6.3.4 The floor of the Field House and Varsity Gymnasium is expected to be flat slab construction with drop panels and column capitals. For the purposes of costing, this can be assumed to be 250mm thick with 200 thick drop panels and 300 column capitals assuming a roughly 8m x 8m grid spacing of 500x500 concrete columns below. The final column layout and therefore slab thickness will be dependent on the parking layout below the Field House and the acceptable column locations in the Varsity Training Centre below the gymnasium.

6.3.5 The floor of the Varsity Training Centre is also expected to be flat slab construction with drop panels and column capitals. For the purposes of costing, this can be assumed to be 250mm thick with 200 thick drop panels and 300 column capitals assuming a roughly 8m x 8m grid spacing of 500x500 concrete columns below.

7 J.T. POWELL BUILDING

7.1 GENERAL DESCRIPTION

The J.T. Powell Building is an existing two storey building. The proposed renovations to 25,000 square feet appear to be mostly non-structural in nature and relate primarily to layout and finishes. Structural input is anticipated to be quite minor in nature.

8 THE GRYPHON CENTRE

8.1 GENERAL DESCRIPTION OF EXISTING STRUCTURE

8.1.1 The existing Gryphon Centre is a twin pad arena with a concession and circulation area at the north end. The facility was constructed between 1988 and 1990.

8.1.2 Foundations are generally spread footings under columns and concrete strip footings under load-bearing masonry walls.

8.1.3 The ground floor level is a slab on grade structure with no basement.

8.1.4 The second floor structure is principally a viewing gallery to the west rink and consists of 8" precast slabs supported on load-bearing masonry. At the stepped seating, the precast planks are supported on cranked steel beams. The mechanical mezzanine is open grating on steel beams.

8.1.5 The second floor at the north part is 8" precast planks on structural steel beams and load-bearing masonry.

8.1.6 The roof over the twin pad arena is a preformed standing seam metal roof on Z-purlins with long span plate girder frames. The structural system is consistent with typical pre-engineered building construction.

8.1.7 The roof over the north part is conventional steel framing with steel columns.

8.2 GENERAL DESCRIPTION OF RENOVATIONS AND ADDITIONS

8.2.1 The north end of building is planned to have two-storey infill areas in the northeast and northwest corners to expand the lobbies and add auxiliary space on both levels.

8.2.2 A two storey expansion is also planned on the west side of the building to accommodate varsity locker rooms on the ground floor and additional viewing gallery space at the second level.

8.2.3 A large single storey expansion is planned on the south end of the building consisting of service areas, numerous locker rooms and a third ice rink.

8.2.4 No below grade areas are planned in the additions.

8.3 SUBSTRUCTURE & FOUNDATIONS

8.3.1 Consistent with the existing building, foundations are planned to be generally spread footings under columns and concrete strip footings under walls.
8.3.2 The ground floor level is expected to be a 125 thick un-reinforced slab on grade with the exception of the new rink slab which will be 200 thick and reinforced with 10M @ 300 T&B EW.

8.3.3 A perimeter foundation wall of thickness to suit the cladding assembly (estimated at 350 thick) will be required at new exterior walls of the additions. These walls will be to a minimum depth of 1200 below the exterior grade and will be founded on a strip footing.

8.4 SUPERSTRUCTURE

8.4.1 The second floor construction at the northeast and northwest infill areas is proposed to be concrete on metal deck on conventional steel framing including steel columns.

8.4.2 The roof at the northeast and northwest infill areas is proposed to be 38mm metal deck on conventional steel framing with steel columns.

8.4.3 The second floor structure at the west expansion is proposed to be concrete on 3" metal deck supported on load-bearing masonry. At the stepped seating, concrete on 3" metal deck will be supported on cranked steel beams.

8.4.4 The roof over the west expansion is proposed to be 3" metal deck on conventional steel framing. The framing will be supported by the pre-engineered columns on the interior side.

8.4.5 The single story addition to the south consists of a low roof area over lockers and a high roof area over the rink. The low roof area will be constructed on 3" metal deck on wide flange beams with load-bearing masonry walls between locker rooms. The structure over the third rink will likely be a pre-engineered frame building similar to the existing two pad roof construction. For economy, a pre-engineered cladding system such as a standing seam metal roof and metal siding on cold formed girts would be recommended. Alternate systems could also be considered.

9 ALUMNI STADIUM

9.1 GENERAL DESCRIPTION OF EXISTING STRUCTURE

9.1.1 The existing Alumni Stadium is an open air stadium seating structure with enclosed press box. Below the seating area is an enclosed building for change rooms and other ancillary spaces for athletics associated with the field. The structures were constructed in 1969-1970.

9.1.2 Foundations are generally spread footings under columns and strip footings under load-bearing masonry walls.

9.1.3 The lowest floor level is principally slab on grade construction. Although it is roughly 6' below the field level, the grades are such that this lowest level, for all intents and purposes, is not a basement.

9.1.4 The second floor of the amenity building is 8' hollow core slabs with 2' topping spanning 16' to 20' on load-bearing masonry walls. There are some precast concrete beams over openings in walls and to support walls above the hollow core slab.

9.1.5 The roof of the amenity building consists of 12" hollow core slabs sloped at approximately 25° and spanning approximately 35'. Walls supporting the hollow core roof are reinforced block masonry with a precast concrete beam at the top of the wall.

9.1.6 The stadium construction consists of pre-engineered seating units (likely aluminum) on precast concrete piers and precast concrete columns.

9.1.7 The press box main structure is 8' hollow cored for both the roof and floor spanning between precast columns and beams. Steel framing is also present to support the cantilevered stairs, platforms and the like extending from the main press box.

9.2 GENERAL DESCRIPTION OF RENOVATIONS & ADDITIONS

9.2.1 There is a proposed west side addition which includes:
   i. A new entrance and lobby with ramp access at the lowest level.
   ii. A new lobby and VIP suites at the second level.
   iii. A new infill 3rd floor consisting of meeting rooms and a lobby.
   iv. A completely re-worked media gondola expanded to the entire length of the existing stadium.

9.2.2 A proposed new single story structure to the north of the existing stadium consists of spectator amenities (ticketing, concessions and washrooms).

9.2.3 There are no basements proposed.

9.3 SUBSTRUCTURE & FOUNDATIONS

9.3.1 Consistent with the existing building, foundations for the west addition are planned to be generally spread footings under columns and concrete strip footings under walls.

9.3.2 The foundation system for the proposed new single story building is expected to be perimeter strip footings and frost walls to a minimum depth of 1200mm below grade. Based on existing drawings the depth will likely be lower to suit competent load bearing soil but the final depth is subject to the results of a geotechnical investigation. These strip footings and frost walls will support the perimeter load bearing masonry walls.
9.3.3 Both the new building and the expansion are expected to have a 125mm unreinforced slab on grade at the ground level.

9.4 SUPERSTRUCTURE

9.4.1 The proposed west expansion is proposed to be entirely framed in conventional steel framing. The new media gondola roof is expected to be 38mm metal deck on steel beams and steel columns. Both the second and third levels of the addition are proposed to be constructed with concrete on metal deck on conventional steel framing with steel columns. The lines of steel columns will be at the exterior wall and adjacent to the existing west wall. The new columns will be offset north-south from the existing stadium columns to allow new footings between the existing.

9.4.2 The existing media gondola will require complete demolition to accommodate the proposed new expanded media gondola.

9.4.3 The proposed new single story building is expected be of simple construction consisting of 38mm metal roof deck on open web steel joists (OWSJ) clear spanning the building in the short direction (east-west). Joists will be supported on perimeter floor bearing block walls.

10 W.F. MITCHELL ATHLETICS CENTRE

10.1 GENERAL DESCRIPTION OF EXISTING STRUCTURE

10.1.1 The Mitchell Centre is the oldest of the existing buildings. The majority of the building was constructed in 1957 with the second pool and the multi-purpose room over the squash courts added later. A variety of documented renovations have also occurred over the years. It is uncertain if other renovations have occurred which may not be documented as is common in buildings of this age.

10.1.2 Limited structural drawings were provided for this existing facility particularly for the original construction.

10.1.3 Foundations are strip footings under walls and spread footings under columns.

10.1.4 The building includes two separate partial basements: one at the north consisting of a tunnel around the original pool, a change room and two mechanical spaces and one at the south for various uses. The foundation walls are concrete. There is no tunnel around the pool in the pool addition.

10.1.5 The ground floor structure appears to be slab on grade with the exception of suspended concrete slabs over the basement areas.
i. Pool construction is anticipated to be reinforced concrete walls estimated at 275 thick and a 200 thick slab on grade reinforced with 25kg/m²

ii. Strip footings under load bearing masonry walls supporting the viewing galleries.

iii. Spread footings under perimeter columns on all four sides of the new expanded Gold Pool.

iv. A perimeter frost wall of thickness to suit the cladding assembly (estimated at 350 thick) will be required at new exterior walls. These walls will be to a minimum depth of 1200 below the exterior grade and will be founded on a strip footing.

10.3.2 The anticipated foundation for the planned south and east additions is as follows:

i. Spread footings under columns and strip footings under walls.

ii. A perimeter frost wall of thickness to suit the cladding assembly (estimated at 350 thick) will be required at new exterior walls. These walls will be to a minimum depth of 1200 below the exterior grade and will be founded on a strip footing.

10.3.3 The anticipated foundations for the two infill mezzanine areas are spread footings under columns.

10.3.4 New foundations adjacent to or within the existing structure are to be founded at elevations to match existing footings.

10.3.5 No new basement areas are planned and as such the new additions to the north, south and east will have 125mm un-reinforced slabs on grade at the ground level with the exception of the new pool slab.

10.4 SUPERSTRUCTURE

10.4.1 The anticipated structural requirements for the planned north addition at the existing Gold Pool is as follows:

i. Demolish existing roof since the primary structure spans in the north south direction and the north line of supports is to be relocated.

ii. Demolish north, west and east walls.

iii. Provide new roof structure anticipated as consisting of long span custom trusses spanning north-south at 3 to 3.5m spacing with 37 metal deck. Trusses will be supported on new steel columns at the north exterior wall and adjacent to the existing Red Pool.

iv. The roofs will all require horizontal bracing to connect to a vertical steel bracing system.

v. An expansion joint between the new Gold Pool structure and the existing building should be provided to eliminate consideration of the additional building mass on the original 1957 Mithcell Centre Building with respect to lateral loading from earthquake or wind. See more under “Lateral Systems” below.

vi. The second floor viewing gallery areas are expected to be concrete on metal deck on east-west beams and cranked north-south beams on load bearing masonry walls at the exterior wall and east-west interior wall.

10.4.2 The anticipated structural system for the planned south addition is as follows:

i. Roof construction of 38mm metal deck conventional framing of open web steel joists and beams. OWSJ will be clear span north-south to a new line of columns adjacent to the existing Mitchell centre and a new line of columns on the new south exterior wall.

ii. The roof will require horizontal bracing to connect to a vertical steel bracing system.

iii. Second floor construction will be conventional steel framed composite construction with concrete on metal deck. For the purposes of cooling 114 concrete on 76 deck should be assumed and a 50% premium on steel framing weights should be considered to account for the cost of design required for potential vibration issues in the multipurpose areas.

iv. An expansion joint between the new south structure and the existing building should be provided to eliminate consideration of the additional building mass on the original 1957 Mithcell Centre Building with respect to lateral loading from earthquake or wind. See more under “Lateral Systems” below.

10.4.3 The anticipated structural system for the east addition is as follows:

i. Roof construction of 76mm metal deck on open web steel joists spanning east-west from the east exterior wall to the west side of the gym.

ii. The roof will require horizontal bracing to connect to a vertical steel bracing system.

iii. The roof area over the shops will be conventional steel framing.

iv. Second floor construction in the retail areas and the running track will be conventional steel framed composite construction with concrete on
metal deck. The retail area will be supported on steel columns on the east and west sides. The running track will be hung from the roof.

v. An expansion joint between the new east structure and the existing building should be provided to eliminate consideration of the additional building mass on the original 1957 Mitchell Centre Building with respect to lateral loading from earthquake or wind. See more under “Lateral Systems” below.

10.4.4 The proposed new mezzanine over the west weights and fitness room should be an independent free standing mezzanine consisting of concrete on metal deck on conventional steel framing with independent columns and footings and an independent lateral system of cross-bracing. It will not be supported on the existing curved roof trusses.

10.4.5 The proposed new mezzanine at the second floor within the footprint of the existing gymnasium is proposed to be an independent free standing mezzanine consisting of concrete on metal deck on conventional steel framing with independent columns and footings and an independent lateral system of cross-bracing. A typical 8 x 9m grid of columns below is anticipated. An expansion joint to the adjacent existing Mitchell Centre Building is proposed all around.

10.5 LATERAL SYSTEMS

10.5.1 Due to the vintage of the building, the lateral system is unlikely to meet current requirements for seismic design. This is often considered acceptable in existing buildings provided planned modifications do not generate a change of use for the facility, do not modify the design loading (building size/mass/extent) and do not alter the inherent lateral load resisting system.

10.5.2 Due to the lack of existing structural information for the original construction it is difficult to evaluate the adequacy of the lateral system. Based on the few existing structural drawings provided, the lateral system is not well defined and appears to be a number of masonry walls provided throughout the building.

10.5.3 The planned goal is to keep the three building “additions” and two infill mezzanines as independent structural systems with expansion joints separating them from the original building. By doing this, the intent is to not impact the extent of the existing building or the lateral system which is present. We would recommend initiating a discussion with the Authorities Having Jurisdiction over this project to determine if they would accept the perspective that the structure’s lateral system and the mass/extent of the building will not be modified and as such, the existing structure is adequate. This implies that the other, structurally more minor, renovations to the building do not significantly alter existing masonry walls. Regardless, some review of the lateral system will be required to ensure that minimum requirements were met.

10.5.4 Barring this opinion, the lateral system would require a complete investigation and it is likely that the existing building would require upgrading with masonry walls and steel bracing. We would recommend that the budget pricing include a separate allowance for this work.

10.5.5 It would be important at the design stage that all modifications to the Mitchell building be considered through an overall plan with a firm understanding of the phasing of the construction.

11 SUSTAINABLE DESIGN CONSIDERATIONS

Structural materials such as structural steel and concrete reinforcement include a significant percentage of recycled material content. Concrete with a high percentage of cement replacement materials such as fly ash or slag may also be considered.

12 PRELIMINARY QUANTITIES

The following outlines our preliminary estimate of reinforcing and structural steel quantities for the different types of spaces and elements:

Reinforcing Steel:

- Footings: 50 kg/m³
- Slabs on grade: Unreinforced
- Foundation walls: 110 kg/m³
- Suspended Slabs:
  - 225 mm: 28 kg/m²
  - 250 slabs: 40 kg/m²
  - 350 slabs: 50 kg/m²
- Columns: 250 kg/m³
- Beams: 250 kg/m³

Structural Steel:

- Floor Framing:
  - Conventional areas: 90 kg/m²
- Roofs:
  - Conventional areas: 35 kg/m²
  - Long span areas: 110 kg/m²
- Exterior Walls: 20 kg/m² (cladding support)
APPENDIX A
STRUCTURAL DESIGN CRITERIA

A. DESIGN CRITERIA

1. Applicable Codes:
   All structural elements shall be designed in accordance with the requirements of
   the Ontario Building Code, utilizing the version appropriate for the year of design.
   Currently OBC-2006 is in force.

2. Structural Steel:
   In general, details and design of structural steel shall be in accordance with the
   Canadian Standards Association CAN3-S16.1 "Limit States Design of Steel
   Structures" utilizing the version appropriate for the year of design.

3. Concrete:
   Limit States Design shall be used in accordance with Canadian Standards
   Association A23.3 "Design of Concrete Structures" utilizing the version
   appropriate for the year of design. Also in accordance with CSA A23.1/A23.2
   "Concrete Materials and Methods of Concrete Construction/Methods of Testing
   for Concrete" utilizing the version appropriate for the year of design.

B. DESIGN LOADS

B.1 Uniformly Distributed Live Loads:

- Parking: 2.4 kPa
- Athletic Spaces: 4.8 kPa
- Fixed Arena Seating Area: 4.8 kPa
- Aisles, Corridors and Lobbies: 4.8 kPa
- Retail: 4.8 kPa
- Stairways: 4.8 kPa
- Classrooms: 2.4 kPa
- Offices: 4.8 kPa
- Concession/Vending Area: 9.6 kPa (locally)
- Interior public areas: 4.8 kPa
- Concourses: 4.8 kPa
- Light Storage Areas: 7.2 kPa
- Heavy Storage Areas: 12.0 kPa
- Loading Dock: 12.0 kPa or OHBC
- Telephone Exchange Rooms: 7.2 kPa
- Mechanical Rooms on Arena Floors: 7.2 kPa
- Exterior Plazas: 12.0 kPa or OHBC
- Roofs: 1.45 kPa snow (+ snow drift as reqd.)
- Railings & Parapets:
  - lateral - for means of egress: 3.0 kN/lm
  - elsewhere: 0.75 kN/lm
  - vertical: 1.50 kN/lm
  - or: 1.0 kN point load in any direction
- Ice Rink Area: 15.0 kPa
1.0 GENERAL

1.1 This preliminary design brief addresses the main components required in Division 15 to suit the finished multiphase project. Costs associated with complications related to phasing such as services rerouting and temporary services to maintain existing buildings and other interim conditions are not completely understood at this stage and will not be defined to a great degree at this stage for itemized budgeting, however, the intent is to update this brief on an ongoing basis and provide further input to the brief in this regard will be applied when known.

1.2 Plumbing, fire protection, heating, ventilation and air conditioning shall be provided in accordance with the requirements of all applicable codes, standards and local requirements for buildings constructed in the City of Guelph, including Model National Energy Code of Canada for Buildings and/or ASHRAE 90.1 and the Ontario Building Code.

1.3 Mechanical systems will be designed to meet the University of Guelph Building Standards unless deviations are considered beneficial and agreed by Physical Resources.

1.4 The mechanical systems will contribute to energy efficient operation and life cycle value.

2.0 DESIGN CRITERIA

2.1 Heating and cooling systems will be designed to meet as a minimum the outdoor conditions for summer and winter defined in the Ontario Building Code and/or exceeding these criteria as necessary for good engineering practice for this location.

2.2 Internal loads for final equipment selection will be based on actual owner’s criteria. We anticipate that lighting loads will be based on energy efficient design to reflect exceeding ASHRAE 90.1 and the Model Energy Code.

2.3 Outdoor air provisions will meet the applicable ASHRAE 62 criteria.

2.4 ASHRAE recommended seasonal comfort conditions will be addressed by the design as well as other recommended guidelines for temperature and humidity for the applicable space type.

2.5 Acoustic performance of mechanical equipment will be designed to reflect ASHRAE criteria and good engineering practice.

3.0 HEATING VENTILATION AND AIR CONDITIONING

3.1 General

3.1.1 The University of Guelph owns and operates a central chilled water and steam plant with piping infrastructure to the campus generally emanating from the plant and running outward to and through Tower House Lane as well as south behind the vehicle storage building.

The main steam and chilled water tunnels run as follows from the plant:

1. East-west tunnel running between the south end of the football field and north of the future varsity field house site. This tunnel does not contain chilled water or steam at this time, but has available space to do so.

2. A southbound tunnel running west of the vehicle services building and landscape architecture building and then running east and west between the Mitchell Centre and the Gryphon Centre.

3.1.2 The majority of the Athletics Master Plan involves buildings adjacent these tunnels and as such, future heating, humidification and cooling will be based on services from the mains of the existing distribution for heating and chilled water.

3.1.3 The points of connection to existing infrastructure, routing of new mains, and the number and location of branches will be the subject of more advanced design exercises. For chilled water, two main options (as per the attached Diagram M5K-1) are considered at this time:

1. Option 1

Route new steam, condensate and chilled water in the existing empty tunnel south of the football field and create a new extension south to be developed into services for Varsity and the Mitchell Centre. In addition, run a branch extension through the Mitchell Centre and extend to the services in the street north of the Gryphon Centre and Convocation Hall.

2. Option 2

Route a new tunnel from the proposed central plant expansion to a node (below grade) north of the Mitchell Centre will allow a feed north to the Varsity/Field House and Alumni and a feed south for all other buildings including, again, extending services to interconnect with the existing in the street north of the Gryphon Centre.

Thermal services for the Alumni Stadium in either case would run in the empty tunnel south of the football field with new lines going north to the Stadium.

3.2 Heating

3.2.1 A great deal of the Guelph campus is currently served by a high-pressure steam system operating between 125 and 150 psi. We anticipate that utilizing the existing campus steam system will be a preference of the University of Guelph. On this basis, and common to most new and redeveloped buildings, we would propose the following:

1. High pressure steam converted to low pressure steam (15 psi) in steam entry mechanical service room.
Low pressure steam will be utilized as follows:

1. Steam to hot water heat exchangers (100% duty/standby) will provide a hot water heating circuits to address:
   - envelope heat using fin tube, radiant panels and cabinet unit heaters (unit heaters) will provide heat at the envelope for each building, which will be temperature controlled via an indoor/ outdoor schedule with duty/standby variable speed drive pumping and three-way mixing valve control.
   - Air stream heat via heating coils when air streams are above 4°C.

2. Where ventilation air streams in air handling units have high percentage outdoor air requirements with temperatures below 4°C, the steam may be utilized directly in face and bypass type coils or, preferably again converted, via heat exchangers and pumping as previously described for a heated propylene glycol system to serve preheat coils.

3. Humidification will be ideally provided by direct campus steam injected into the air stream via steam grid humidifiers. This is subject to Guelph approval and confirmation that the steam system water treatment is suitable for this purpose. Should this not be the case, a high pressure steam branch line would be used to serve steam to steam heat exchanger with steam for humidification made from softened water.

4. Domestic hot water heating will be done via steam in storage tank heat exchanger systems. The opportunity to utilize condensate for domestic hot water preheat can be explored with Guelph.

5. Pumped condensate return systems will be provided to return condensate to the central plant.

3.3 Ventilation

3.3.1 Ventilation will be provided as a function of outdoor air being part of the supply air stream on building air handling equipment. Most mixed air systems will have full air side economizer capabilities.

3.3.2 ASHRAE 62n standards will be applied.

3.3.3 Where spaces require a high rate of exhaust and makeup air heat recovery systems will typically be applied.

3.4 Air Conditioning – Chilled Water

3.4.1 The principle source of air conditioning will be chilled water supplied to air handling unit cooling coils. The chilled water will be provided by the Guelph University Central Plant which currently operates at 18°C temperature.

3.4.2 Exception to this chilled water application will include but many not be limited to:

   3. The Gryphon Centre revisions and additions associated with the new ice surface.

3.4.3 Buildings receiving chilled water from the central plant will each have secondary variable speed pumping systems with the format being 2 v.s.d. pumps with 100% duty/standby capability or 3 v.s.d. pumps at 50% of required capacity providing superior low load control. Subject to further evaluation of Guelph chilled water operations, a three-way mixing valve may also be used to allow elevated chilled water operating temperature within the buildings during low load conditions and help achieve the highest possible return chilled water temperature to the Central Plant.

4.0 PLUMBING AND DRAINAGE

4.1 Services for the new or substantially renovated buildings will be typically provided as follows:

4.1.1 A new 200 mm domestic cold water/fire service will be provided for both new and renovated individual buildings, which will also connect to a 150 mm domestic water header located in the incoming service room. (Alternatively, these services may be brought into each building individually subject to Guelph or municipality requirements.)

4.1.2 Separate Sanitary and Storm sewer services for each building will be provided for connection to the combined municipal campus sewer main.

4.1.3 A new 15 kPa Gas service for food preparation will be provided where applicable.

4.1.4 Backflow prevention devices as prescribed by Municipal bylaws.

4.2 A Triplex domestic water booster pump package will be provided should Campus pressures be inadequate and to ensure operating pressure for fixtures and equipment above the level where mains pressure is inadequate.

4.3 Roof Drainage will be control flow type where possible on flat roof areas.

4.4 Submersible Sanitary Sump Pumps will be provided for all drainage, which cannot meet the street sewer service invert elevation.
4.5 Submersible Storm Sump Pumps will be provided for its weeping tile drainage in the lowest levels of new buildings where directed by geotechnical specialists.

4.6 Electronic proximity sensor flush valve urinals and lavatories with single faucets and electronic sensor will be provided in all new washrooms based on review and acceptance by Guelph. All fixtures will be low flow type to suit plumbing code requirements, however, a detailed review process will be undertaken to ensure that products are acceptable to Guelph and will function properly in this heavy usage application.

4.7 Domestic hot water for the new athletic facility will be generated by steam tube bundles in storage tanks.

4.8 Kitchen and Food Preparation areas with grease laden drainage will be directed to a large grease interceptor located in service accessible areas like truck docks or loading areas.

4.9 The plumbing systems for the pools will include a 800 kW steam to hot water heat exchange system supported by the campus central steam plant with circulating pump and filtration.

4.10 Emergency eye wash stations will be provided in all janitors' rooms and in the main mechanical room. These stations will be served by cold water. Janitor's rooms will be equipped with floor mounted mop sinks.

5.0 FIRE PROTECTION

5.1 Typically new or substantially renovated buildings will be equipped with a 200 mm water services from the Campus main provided for fire service. The new service will be connected to the Campus main, separated by an isolation valve to allow isolation of the municipal main without affecting the fire main service to the building. The water service will terminate at 200 mm header in the incoming service room. The main domestic cold water service and the fire main will be taken off the header.

5.2 A combined standpipe and sprinkler fire service will be connected to a zone header in each building located in a sprinkler room with separate branches serving sprinkler zones and fire standpipe in the first phase of construction. Each zone service will be equipped with an alarm valve.

5.3 Construction phases may be planned with separate sprinkler rooms to house zone headers similar to the one described above. Valved and capped connections will be left in each phase of work to support the next big extension of services to the subsequent construction phases. More complex interconnected ring main systems may be considered if directed by Guelph or their insurance group.

5.4 Should the local street water pressure be inadequate to meet the requirements of this project, the fire main will be equipped with a single electric driven fire pump to serve the most hydraulically remote areas of each building. The fire pump will be located in the incoming service room of a given first Phase for any building, and will have an emergency power transfer switch.

5.5 The Centre will be fully sprinklered and the piping sized for hydraulic design. Semi recessed heads with escutcheon cups will be utilized in all areas with ceilings. Areas without finished ceilings will have standard upright pendant heads. In areas, heads will be arranged in accordance with NFPA 13 guidelines for the type of occupancy served.

5.6 Indoor Parkades will utilize dry sprinklers.

5.7 Dry sprinklers will be utilized at the truck dock and near entrances to the Parking garage.

5.9 Protection sprinklers will be utilized in transformer vaults and in main computer rooms.

5.10 The project will include Fire Standpipe system with fire hose cabinets complete with 35mm and 32 mm fire department valves, 50m hoses and ABC fire extinguishers.

5.11 Additional fire extinguisher cabinets complete with ABC extinguishers shall be installed and arranged in accordance with OBIC and Ontario Fire Code requirements.

5.12 Subject to proximity of exterior building walls and area of glazing window sprinklers may be required on buildings with parallel and/or adjacent vertical surfaces.

6.0 DIESEL GENERATOR FUEL OIL, EXHAUST VENTILATION AND COOLING SYSTEM (IF CENTRAL EMERGENCY POWER IS NOT AVAILABLE)

6.1 Emergency power will be supplied by the Central Utilities Plant. As such, these mechanical services will not be required.

7.0 AUTOMATIC CONTROLS

7.1 A fully distributed DDC electronic control system shall be provided throughout the facility meeting the requirements of the Guelph University Building Standards currently based on Kruger Marketing Canada (KMC) controls as well as Delta and Optimus. The BMS shall start, stop, monitor and control all the new mechanical systems and devices. Programmable temperature sensors shall control local devices such as radiation and control valves to maintain space temperature. Valves and damper operators in mechanical rooms shall be pneumatically operated to meet Guelph's requirements.

7.2 A standard current generation PC computer front end shall be provided in the local Physical Resources office to interface with the distributed system and shall be equipped with trending and run totalization programming which is fully compatible with standard software such as Microsoft Excel and Word.

7.3 An Internet connection provision will be included so that any or all components of the automatic control system can be monitored and controlled from a Central Plant Office.
7.4 The system components will be based on suppliers approved by Guelph University as noted above.

7.5 All new building information will connect to and flow along an existing fibre optics network.

8.0 PHASE BY PHASE – PRELIMINARY MAIN MECHANICAL SCOPE ITEMS

8.1 A preliminary outline of main mechanical and HVAC systems and additional relevant items as noted on a by Phase and building basis herein.

8.2 Phase 1: This is principally sports fields not requiring notable mechanical building services. However, some plumbing for washroom facilities may be anticipated and the synthetic fields themselves will have significant storm drainage requirements. In addition, with the prospect of parking under these fields, mechanical exhaust may be necessary due to the large field area coverage.

8.3 Phase 2: Convocation Hall – New (100,000 sq. ft.)

8.3.1 The main HVAC systems are envisioned as follows:

.1 Three (3) constant volume units complete with return fans, variable speed drives, face and bypass steam preheat coils or glycol preheat coils and chilled water cooling coils, each at approximately 20,000 CFM at 50% outdoor air.

.2 One (1) north Multipurpose/Lobby VAV Unit at approximately 15,000 CFM and 50% outdoor air similarly equipped to the above unit.

.3 One (1) south Multipurpose/Lobby Unit at 10,000 CFM similar to the north unit.

.4 One (1) Locker Room Unit with approximately 10,000 CFM at 100% outdoor air and heat recovery. Terminal unit control via reheat.

.5 Toilet/Locker Room exhaust to match the above unit and connected to the heat recovery wheel.

.6 Washroom exhaust systems for main public washrooms two (2) required at approximately 3,000 CFM each.

.7 Subject to further code review, this facility may require a smoke evacuation system from the main bowl of the hall. This could be several hundred thousand CFM.

.8 Preliminary cooling and heating loads associated with this building are:

 Cooling: 400 tons (6" dia. supply and return pipe)
 Heating and humidification: 6,000 lbs/hr (3" dia. HPS pipe)

8.4 Phase 3: Mitchell Centre – Renovations and Expansion (140,000 sq. ft.)

8.4.1 The main HVAC systems are envisioned as follows:

.1 One (1) Level 3 Multipurpose VAV unit with steam heating coil and chilled water coil at approximately 24,000 CFM and 30% outdoor air minimum.

.2 One Level 3/2 General and Public service unit at approximately 30,000 CFM and 20% outdoor air. This also would be a VAV unit.

.3 Two (2) units for the Level 2 Cardio/Weight and Fitness as well as serving the Level 3 Mezzanine. These units would be 35,000 CFM at 100% outdoor air with heat recovery. Variable volume and zone reheat would be used for space temperature control.

.4 Preliminary cooling and heating loads associated with this phase and building are:

 Cooling: 700 tons (6" dia. supply and return pipe) Heating and humidification: 7,000 lbs/hr (3" dia. HPS pipe)

8.5 Phase 4: Field House/Varsity Centre – New (210,000 sq. ft.)

8.5.1 This facility includes the field house with parking below as well as the varsity training centre. The preliminary vision of systems is as follows:

.1 Level 3 Strength and Conditioning Unit will be 50,000 CFM with 100% outside air and heat recovery. Zone temperature control will be by variable air volume and, in some cases, terminal reheat.

.2 Level 2 Lockers similar to above with 100% outdoor air and heat recovery. Locker room temperature control will be by terminal reheat and, in selective cases, bypass boxes may be used.

.3 Varsity General Public Unit will be approximately 25,000 CFM at 30% outdoor air systems with VAV control.

.4 The Parking Garage will require significant makeup air and exhaust for proper ventilation to code. As this space is below the field house, we propose that the garage makeup air would be tempered to 60°F to perhaps be a lower cost solution compared to insulating the undersides of the field house. To serve this location, we envision two (2) 24,000 CFM makeup air heating only units using face and bypass steam coils.

Six (6) exhaust fans at 9,000 CFM (propeller type) would remove pollutants from the garage based on a CO/NOx detection and control system.
5. We anticipate at this stage the field house would be air conditioned. As such, the preliminary systems proposed are two (2) 40,000 CFM constant volume (but with variable frequency drivers) with 40% outdoor air minimum capability.

6. Preliminary cooling and heating loads associated with this phase and building are:
   - Cooling: 700 tons (8" dia. supply and return pipe)
   - Heating and humidification: 12,000 lbs/hr (3" dia. HPS pipe)

Phase 5: Mitchell Centre West Gym – Renovation (50,000 sq. ft.)

This phase is primarily fields and shelters and no significant mechanical building services are anticipated.

Phase 6: Mitchell Centre East – New 4 Court Addition (50,000 sq. ft.)

This phase is primarily four (4) indoor basketball courts that appear to be individually partitioned. The main systems considered at this time are:

1. Four (4) 17,000 CFM constant volume 30% outdoor air handling units with steam heating and chilled water cooling.

2. The cooling and heating loads estimated for this phase are:
   - Cooling: 150 tons (4" dia. supply and return pipe)
   - Heating and humidification: 2,000 lbs/hr (2" dia. HPS pipe)

Phase 7: Power Building – Renovation (25,000 sq. ft.)

Preliminary HVAC systems include:

1. Two (2) VAV units at 16,000 CFM and with 30% outdoor air minimum capacity.

2. Preliminary cooling and heating loads are estimated at:
   - Cooling: 100 tons (4" dia. supply and return pipe)
   - Heating and humidification: 1,300 lbs/hr (2" dia. HPS pipe)

Phase 8: Gryphon Centre Renovation and Expansion (100,000 sq. ft.)

Preliminary main mechanical and HVAC systems include:

1. A new refrigeration plant for the new rink to be added. A sample specification is attached for reference only in terms of scope and quality envisioned.

Other elements associated with the new ice rink are:

1. Emergency exhaust fan with intake louvres and motorized dampers with manual control and automatic control from refrigerant leak detection system.

2. Zamboni exhaust system at 1,500 CFM complete with CO and natural gas detection system.

3. HVAC systems envisioned with this phase include:

   1. Two (2) new lobby units will be required, one (1) constant volume unit at approximately 10,000 CFM at 30% outdoor air and one (1) VAV unit at 30,000 CFM and 30% outdoor air to serve the new front lobby areas.

   2. The lockers and dressing rooms will be served by a 10,000 CFM unit with 100% outdoor air capability and heat recovery (cooling is included at this time). The locker room and toilet exhaust systems will interconnect for heat recovery with this unit. Locker room temperature control will be by terminal reheat.

   3. Preliminary estimate of cooling and heating loads for this phase are:
      - Cooling: 150 tons (4" dia. supply and return pipe)
      - Heating and humidification: 2,200 lbs/hr (2" dia. HPS pipe)

Phase 6: Alumni Stadium Renovation and New (50,000 sq. ft.)

Preliminary concepts for the HVAC systems in this building include:

1. The occupancy and use of this facility is to be tied to the seasonal activity of football as well as classrooms and regularly used multipurpose space.

2. In order to provide makeup air to address the exhaust requirements for significant washroom and locker room/shower areas, we propose a 8,000 CFM makeup air ventilation unit with heat recovery that will meet requirements for all building exhaust and outdoor air. This unit and related exhaust systems will have variable speed control and can also be shut down when the facility is not used.

   Heating and cooling within the spaces not used on a regular basis would be served by heating and cooling fan coil units, typically one fan coil unit per 800 sq. ft. or one per space with thermostat. Ventilation air would be fed to the back of these units as required.

   Capped ventilation duct heating and chilled water lines only can be provided to VIP suites if they are to be completed under a tenant fit out cost.
3. Cost savings are available if the system is switched to a two pipe heat/cool fan coil unit type or heating only fan coils with the makeup air unit only providing fully dehumidified and conditioned air.

4. One (1) VAV unit at approximately 25,000 CFM 30% outdoor air would apply to classrooms and regularly occupied spaces.

5. Humidification is not proposed for this facility only in the regularly occupied spaces.

8.10.2 Preliminary estimates of cooling and heating loads associated with this phase are:

- Cooling: 150 tons (4" dia. supply and return pipe)
- Heating: 1,600 lbs/hr (2" dia. HPS pipe)

8.11 Phase 10: Mitchell Centre Pool – Renovation and Expansion (70,000 sq. ft.)

8.11.1 Anticipated new main mechanical systems include:

1. All new pool pumping filtering water treatment system for both pools.

2. Steam heat exchangers for pool heating.

3. New pool HVAC units. If chilled water from the central plant is not available year round, Drydrom units would be anticipated.
   - Gold Pool: 35,000 CFM
   - Red Pool: 12,000 CFM

These units would be integrated for heat rejection to pool water makeup preheat.

4. Preliminary loads are largely subject to decision on pool unit type. Estimates would be:
   - Cooling: 150 tons (4" dia. supply and return pipe)
   - Heating including pool heater via steam to hot water heat exchanger: 3,000 lbs/hr (2" dia. HPS pipe)
1.0 GENERAL

1.1 WORK INCLUDED

1.2 REFERENCE STANDARDS

1.3 ACCEPTABLE REFRIGERATION CONTRACTORS

1.4 DESIGN DRAWINGS

1.5 PERFORMANCE REQUIREMENTS

1.6 DESIGN CRITERIA

2.0 PRODUCTS

2.1 COMPRESSORS

2.2 DISCHARGE LINE OIL SEPARATORS

2.3 EVAPORATIVE CONDENSER

2.4 INDOOR SUMP TANK

2.5 GLYCOL CHILLER

2.6 GLYCOL PUMPS

2.7 CONDENSER WATER PUMP

2.8 SUBSOIL HEATING PUMP

2.9 JACKET WATER COOLING PUMP

2.10 MOTOR CONTROL PANEL

2.11 ICE TEMPERATURE CONTROLS

2.12 WASTE HEAT SYSTEM

2.13 GLYCOL MIXING TANK AND FEED SYSTEM

2.14 RINK HEADERS

2.15 RINK FLOOR PIPING

2.16 SUBFLOOR SOIL HEATING PIPE

2.17 PIPE CHAIRS

2.18 PIPING

2.19 VALVES

2.20 RELIEF AND FIRE LINES

2.21 REFRIGERANT CHARGE

2.22 STRUCTURAL STEEL SUPPORTS

2.23 FIRESTOPPING

2.24 GLYCOL

2.25 GLYCOL BALANCE TANKS

2.26 INSULATION

2.27 ICE RINK DEHUMIDIFIER

2.28 TIE WIRES

2.29 CONDENSER WATER TREATMENT SYSTEM

2.30 MISCELLANEOUS ITEMS

3.0 EXECUTION

3.1 ELECTRICAL

3.2 RINK PIPE INSTALLATION

3.3 PAINTING

3.4 STARTUP AND TESTING

3.5 CHARGING AND OPERATING

3.6 GUARDED PLANT

3.7 WARRANTY

4.0 PERFORMANCE REQUIREMENTS

4.1 Provide an ammonia/glycol ice refrigeration system for one 200 ft x 85 ft ice rink to be operated year round, including but not limited to the following major items:

- Refrigeration compressors, glycol chillers, closed circuit evaporative cooler, expansion tanks, pumps and interconnecting piping.
1. Rink glycol piping with embedded headers, isolation and control valves, glycol filters, pumps and associated trim.

2. Rink sub-floor heating system with sub-floor piping, embedded headers, glycol filters, pump, and heat exchangers.

3. Insulation of piping, pressure vessels and associated equipment.


5. Glycol mixing tank, pumps and associated piping.

6. Ammonia desuperheater - water heater ammonia and heat reclaim piping to sub-floor heating system and other heat recovery systems.

7. Show melting pit plate coil radiators.

8. Dehumidifier - supply only.

9. DDC automatic control system with infrared ice temperature sensor control and all associated wiring and accessories.

10. Initial ammonia and glycol charge.

11. Insulation

12. Condenser tank and water treatment

13. All miscellaneous support steel and hangers.


15. Water supply and drain lines to compressors as required and to rink piping during concrete pour.

16. Ammonia refrigerant detector for refrigeration room and manual shutdown of refrigeration room equipment.

17. PLC controller with infrared controls.

18. Concrete housekeeping pads, equipment vibration solution and inserts will be provided by the ice refrigeration contractor.

19. The following related work will be performed by other trades and co-ordinated by the ice refrigeration contractor. Separate prices may be submitted for completion of this work.

   1. Temporary lighting and heating
   2. 1-1/2" makeup water supply c/w backflow preventer.
   3. Floor drains and all sanitary drainage systems.
   4. Condenser steel support framing.

   Two annual schedules shall be included that cover holidays and tournaments. The holiday schedule shall override any pre-existing weekly schedule and revert to the night setting setpoint, and the tournament schedule shall override any pre-existing weekly schedule and revert to the game setpoint.

   Rink ice surface shall have a trend log associated with it for each rink. The DDC controller shall store 200 samples per rink, in its own memory of ice temperature setpoint, actual ice temperature, brine supply temperature and brine return temperature.

   All compressors, pumps and fans shall have their own individual trend logs. The trends will show 200 samples each of equipment status, i.e., on/off or fail, and the associate control variable relevant to that equipment, i.e., temperature, pressure etc.

   The controller shall log run hours and # of starts for each pump, compressor and fan.

   The controller shall monitor all temperatures, pressures and equipment status for alarm conditions. The alarm setpoints shall be adjustable by the operator with the appropriate password.

   Upon an alarm condition, a message shall appear on the operator interface indicating what the alarm condition is and time it occurred. The same message shall be generated on hard copy on the alarm printer.

   Acknowledgement of the alarm will clear the alarm and an acknowledge message c/w date stamp shall be printed to the printer.

   The DDC controller shall have the ability to dial out to a numeric pager and notify the pager with a numeric code of an alarm condition. This capability shall exist for a minimum of 3 alarm pagers.

   The DDC controller shall be capable of being monitored remotely from any location via the phone line. Remote diagnostics, software maintenance and setpoint adjustment shall be possible with remote communications.

   The DDC controller shall be password protected.

   Provide one operators work station PC computer for rink operational software.

   Provide graphical operator interface software to meet the following criteria:

   1. Graphics screens created specifically for this project.
   2. Ability to generate graphical views that present system information as objects or icons along with numerical information in an easy to understand format.
   3. Allow navigation through the screens by navigating with a mouse. Other than entering numerical values, key entries shall be kept to a minimum.
2. The refrigeration plant shall be a built up, field fabricated ammonia/glycol plant. Conform to local union requirements. Equipment shall be arranged to fit within the confines of the identified refrigeration room. Condense installation in the least amount of space and identify space that may be reclaimed by the Owner for other purposes. Identify potential space savings associated with alternative equipment design i.e. plate and frame heat exchangers. Allow for tube and equipment removal and service access space. Identify requirements on shop drawings.

3. All ammonia refrigerant containing components shall be confined to the refrigeration room except for safety relief and purge lines that are piped to an acceptable exterior location, and ammonia refrigeration piping that should run directly to the exterior condenser from the refrigeration room, without passing through other spaces.

4. Temperature of each rink surface shall be automatically and readily adjustable by the refrigeration operator. Refrigeration system to be capable of controlling and maintaining different ice surface temperatures on each rink.

2.0 PRODUCTS

2.1 COMPRESSORS

1. Provide three (3) 50 hp Mycom reciprocating compressors, equal to Mycom, Model N6A each with a capacity of 33.0 T.R. at 10°F saturated suction temperature and 95°F saturated discharge temperature, and one (1) 30 hp Mycom N4A compressor with a capacity of 22 T.R.

2. Compressors shall be complete with the following:

1. Steel base to mount motor and compressor. Provide sliding base for tightening belts. Compressors to be mounted at standing height to facilitate servicing.

2. V belt drive complete with guard.

3. Suction and discharge shutoff valves.

4. 600V/3ph/60 cycle EEMAC 1, high efficiency motors with class B insulation, open drip proof with 1.15 SF, 1800 rpm, suitable for auto transformer type starting.

5. Force feed lubrication system with replaceable cylinder liners.

6. Internal relief valve.


8. Oil pressure gauge.

9. Mechanical shaft seal

10. Crankcase heaters

11. Unloaded starting

12. Discharge oil trap

2.2 DISCHARGE LINE OIL SEPARATORS

1. Provide each compressor with a high efficiency discharge line oil separator sized to manufacturer's recommendations. Each separator to be complete with automatic oil return float valve and connection to oil receiver. Each separator shall have a full size discharge line check valve and solenoid valve wired to open and close when compressor starts and stops.

2.3 EVAPORATIVE CONDENSER

1. Provide a Evapco factor assembled, induced draft, counterflow, closed circuited cooler with vertical air discharge. Alternative manufacturer is Baltimore Aircoil.

2. Duty and capacity of evaporative condenser shall be selected to match the refrigeration chiller, compressor jacket water cooling requirements and the following:

1. Condensing Temperature 95°F

2. E.A. Wet Bulb Temperature 76°F

3. Refrigerant: Ammonia

3. Unit construction shall be all G-235 hot dipped galvanized sheet steel finished with a corrosion protection system. Insulation system can all internal parts is prior to assembly.

4. Provide 2 speed single wind fan motor, suitable for outdoor service.

5. Provide copper coil connections.

6. Belt drives shall be designed for not less than 150% of the motor nameplate power rating. Completely enclose drive and all moving parts by removable hot dip galvanized steel screens.

7. All exterior pipe supports shall be hot dip galvanized.

8. Provide caulking and / or gasketing as required to prevent leaks. Recaulk on site if necessary to eliminate leaks.

2.4 INDOOR SUMP TANK

1. A steel indoor sump tank 8’ x 4’ x 5’ high shall be provided by the Refrigeration Contractor.

2. The sump tank shall be of 1/4” steel plate properly reinforced at top and sides to minimize deflection.

3. Makeup water connections, overflow connections and required pump connections shall be provided as shown on drawings. Equip makeup water line with float valve. Provide angle inlet screen on tank suction connection.

4. After fabrication, the tank shall be painted inside and outside with black bitumastic paint to minimize corrosion.
2.5 GLYCOL CHILLER

.1 Provide a flooded ammonia all steel shell and tube glycol chiller. Tubes shall be 3/4" O.D., 16 gauge seamless enhanced steel tubes.

.2 Maximum allowable brine pressure drop of 15 psi with 1000 GSPM, 40% ethylene glycol solution. Chiller shall have a nominal rating of 120 T.R. with glycol in at 18°F, and out at 15°F. Chiller refrigerant operating conditions are 10°F evaporating temperature and 95°F condensing temperature.

.3 Chiller shall be provided with a surge drum with gas risers to limit gas velocity to 150 ft./min.

.4 Chiller and surge drum shall be constructed to ASME code and registered with the TSSA for 250 psi working pressure.

.5 Chiller shall be complete with Armstrong high pressure float valve.

.6 Provide two frost free bullseye liquid level indicators.

.7 Provide dual pressure relief valves.

.8 Chiller shall be complete with support saddles mounted to chiller frame, and all safety controls, valves, gauges, refrigerant float switch and accessories shown and or required for proper operation and monitoring. Safety controls shall shut down the compressors and sound an alarm when a high or low Ammonia level is sensed in the chiller.

.9 Chiller to be provided with a complete oil return system.

.10 High pressure liquid feeding the chiller shall be controlled with automatic valves. Provide isolation and by-pass valves around automatic valve.

.11 Acceptable chiller manufacturers are CIMCO, Chilcon and Docal.

.12 Equip chiller with a glycol cooling exchanger for compressor jacket cooling.

2.6 GLYCOL PUMPS

.1 Provide two (2) Armstrong base mounted, end suction centra-line discharge centrifugal pumps suitable for 40% ethylene glycol service. Pumps shall be radially split case centrifugal base mounted cast iron type pumps with bronze dynamically balanced impeller, stainless steel shaft sleeve, water tight, long life, self lubricating mechanical seal and designed with split spacer coupling and back pull out feature permitting removal of the complete rotating assembly without disturbing pipe connections, motor or electrical wiring.

.2 Provide horizontally solid shaft normal thrust P base squire cage induction type high efficiency motor with open type drip proof construction.

.3 Equip each pump with tapped connections and seal flush lines including Cuno filters and site flow indicators.

.4 Provide isolation valves, Armstrong "SG" suction guides with strainers and Armstrong, triple duty Floretex "FTV-SF" discharge fittings.

5.5 Performance of brine pumps shall be as follows:

<table>
<thead>
<tr>
<th>Tag</th>
<th>Series</th>
<th>Size</th>
<th>Flow (gpm)</th>
<th>Head (ft H2O)</th>
<th>RPM</th>
<th>HP</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-1</td>
<td>4030</td>
<td>6x5x11.5</td>
<td>1000</td>
<td>100</td>
<td>1800</td>
<td>40</td>
<td>100% flow</td>
</tr>
<tr>
<td>P-2</td>
<td>4030</td>
<td>5x4x8</td>
<td>500</td>
<td>25</td>
<td>1800</td>
<td>5</td>
<td>50% flow</td>
</tr>
</tbody>
</table>

5.6 Acceptable alternative pump manufacturer is Bell and Gossett.

2.7 CONDENSER WATER PUMP

.1 Provide an Armstrong base mounted pump as per glycol pump, specifications suitable for condenser water service, with bronze impeller, and with isolation valves, suction guide and triple duty valve.

.2 Performance of condenser water pump shall be as follows:

<table>
<thead>
<tr>
<th>Tag</th>
<th>Series</th>
<th>Size</th>
<th>Flow (gpm)</th>
<th>Head (ft H2O)</th>
<th>m³/M</th>
<th>HP</th>
<th>SG</th>
<th>FTV</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-3</td>
<td>4030</td>
<td>5x4x8</td>
<td>340</td>
<td>40</td>
<td>1600</td>
<td>7.5</td>
<td>55</td>
<td>3 SF</td>
</tr>
</tbody>
</table>

5.3 Acceptable alternate pump manufacturer is Bell and Gossett.

2.8 SUBSOIL HEATING PUMP

.1 Provide an Armstrong base mounted pump as per brine pump specifications suitable for calcium chloride brine service, with isolation valves, suction guide and triple duty valve.

.2 Performance of subsoil heating pump is as follows:

<table>
<thead>
<tr>
<th>Tag</th>
<th>Series</th>
<th>Size</th>
<th>Flow (gpm)</th>
<th>Head (ft H2O)</th>
<th>RPM</th>
<th>HP</th>
<th>SG</th>
<th>FTV</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-4</td>
<td>4030</td>
<td>3x1.5x8</td>
<td>100</td>
<td>65</td>
<td>1800</td>
<td>7.5</td>
<td>33</td>
<td>3 SF</td>
</tr>
</tbody>
</table>

5.3 Acceptable alternate pump manufacturer is Bell and Gossett.

2.9 JACKET WATER COOLING PUMP

.1 Provide an Armstrong H65 high duty in-line circulator, complete with 1½" connections, 1 hp, 1800 rpm, 3 phase drip proof mounted 60 cycle motor for compressor jacket cooling.

2.10
MOTOR CONTROL PANEL

.1 Provide one prewired control panel in CEMA 12 enclosure, including:
   .1 main unfused disconnect switch in door.
   .2 three 50 hp compressor motor starters and one 30 hp compressor motor starter.
   .3 one 30 hp and one 5 hp glycol pump motor starters.
   .4 one 7.5 hp condenser water pump motor starter.
   .5 one 15 hp - 2 speed condenser fan motor starter.
   .6 one 7.5 hp subsoil heating pump motor starter.
   .7 one 1 hp compressor jacket cooling, pump motor starter.
   .8 Provide space for starters for the emergency ventilation exhaust fans.

.2 All starters shall be fused across-the-line magnetic type with 120V holding coils, and 3 position HQA selector switches and sized for 600V/3ph/60 cycle power. Reduced voltage starters shall be required for any motor over 25 hp. Provide a visual lockout for all motors and lockable disconnect switches. Provide control contacts and control transformers for each starter.

.3 Control panel shall be complete with pilot lights to indicate run status of each motor, overload relays, and resets and gauges to indicate system suction and discharge pressures. Control panel shall include high and low pressure control switches and all necessary control transformers. All compressor safety controls will be mounted, piped and wired to the panel. All internal control wiring shall be factory installed to ULC, Provinciaal and municipal codes.

.4 Provide switchable control between regular ice rink / chiller operation and quick melt heat exchanger operation with the use of control valves as shown on floor schematic. Refrigeration controls package is to control building hot water control valve to maintain design leaving brine temperature.

.5 5” dia. gauges and pressure switches shall be mounted on a metal gauge plate across the top front of the cabinet, with engraved nameplates.

.6 All gauges, cutouts and selector switches will be properly identified with engraved laminoid nameplates.

.7 Provide terminal strips for connecting external control points to the control centre, including rink thermostat, solenoid valves and compressor safety controls.

.8 Provide hour meters for each compressor.

.9 Control panel shall include the microprocessor based ice rink temperature controller and a display module mounted in the panel door.

ICE TEMPERATURE CONTROLS

.1 Provide a complete microprocessor based automatic control system to achieve the performance specified herein.

.2 The control system shall be supplied by the refrigeration contractor as an integral part of the refrigeration system.

.3 Provide all the necessary hardware, software and interface devices for DDC-based control of the following refrigeration equipment:
   .1 Cold glycol pumps
   .2 Compressors
   .3 Condenser pump
   .4 Condenser fan (2-speed)
   .5 Warm glycol pump

.4 The control system shall control the refrigeration equipment based on information received from the following field sensors as a minimum. Sensors shall be of the 4-20mA transmitter type. Temperature sensors shall be RTD type. Thermistor types are not allowed.
   .1 Infrared cameras mounted above each ice surface
   .2 Cold glycol supply temperature sensors (one/rink)
   .3 Cold glycol return temperature sensors (one/rink)
   .4 Rink slab temperature sensors (two/rink)
   .5 Warm glycol supply temperature sensor (one/rink)
   .6 Warm glycol return temperature sensor (one/rink)
   .7 Status inputs from all pumps, compressors & fans.

.5 The DDC controller shall be mounted as an integral part of the refrigeration motor control panel. Provide a modem in the refrigeration motor control panel. Provide automatically rechargeable battery backup to hold all programming for a minimum of 8 hours.

.6 The DDC controller shall be capable of the following functions:
   .1 Control all the refrigeration equipment and associated components directly. The DDC controller shall not depend on any other CPU or computer to perform this function. Loss or failure of the operator work station shall in no way affect the operation of the refrigeration equipment.
   .2 Provide individual rink scheduling for the ice temperature setpoint. Schedules shall include, day mode, night mode and game mode settings. The controller shall be
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capable of scheduling at least 4 different on/off periods per day for each 7 day schedule.

.3 Two annual schedules shall be included that cover holidays and tournaments. The holiday schedule shall override any presiding weekly schedule and revert to the night setting setpoint, and the tournament schedule shall override any presiding weekly schedule and revert to the game setpoint.

.4 Rink ice surface shall have a trend log associated with it for each rink. The DDC controller shall store 200 samples per rink, in its own memory of ice temperature setpoint, actual ice temperature, brine supply temperature and brine return temperature.

.5 All compressors, pumps and fans shall have their own individual trend logs. The trends will show 200 samples each of equipment status, i.e. on/off or fail, and the associate control variable relevant to that equipment, i.e. temperature, pressure etc.

.6 The controller shall log run hours and # of starts for each pump, compressor and fan.

.7 The controller shall monitor all temperatures, pressures and equipment status for alarm conditions. The alarm setpoints shall be adjustable by the operator with the appropriate password.

.8 Upon an alarm condition, a message shall appear on the operator interface indicating what the alarm condition is and time it occurred. The same message shall be generated on hard copy on the alarm printer.

.9 Acknowledgement of the alarm will clear the alarm and an acknowledge message with date stamp shall be printed to the printer.

.10 The DDC controller shall have the ability to dial out to a numeric pager and notify the pager with a numeric code of an alarm condition. This capability shall exist for a minimum of 3 alarm pagers.

.11 The DDC controller shall be capable of being monitored remotely from any location via the phone line. Remote diagnostics, software maintenance and setpoint adjustment shall be possible with remote communications.

.12 The DDC controller shall be password protected.

.7 Provide one operators work station PC computer for rink operational software.

.8 Provide graphical operator interface software to meet the following criteria:

.1 Graphics screen created specifically for this project.

.2 Ability to generate graphical views that present system information as objects or icons with numerical information in an easy to understand format.

.3 Allow navigation through the screens by navigating with a mouse. Other than entering numerical values, key entries shall be kept to a minimum.

.4 Allow for restricted access to setpoints and selected information depending on the password level of the operator.

.5 Allow for editing of setpoints, alarms, schedules.

.6 Allow the display of trends, equipment screens, run hours, flow screen, sensor values, etc.

.9 A screen specific help icon shall be available on each screen providing the user with relevant information. Minimum screen requirements are:

.1 Logon screen

.2 Main project screen

.3 Flow screen

.4 One schedule screen per surface

.5 One screen for each piece of refrigeration equipment

.6 One screen for each trend log

.7 Setpoint screen

.10 Provide owner with software for remote communication as part of the contract price.

.11 The control system shall include a "manual" mode under which the brine pumps and the compressors shall have the capability to be started and stopped manually. Software interlocking shall prevent operation of the compressors unless one brine pump is operating.

.12 Two ice slab temperature sensors per rink, in two different locations of each rink slab shall be provided for backup control of the infrared ice sensors. Ice slab temperature control shall be from Honeywell T755 remote reading thermostats with temperature sensed in an oil filled well located between two floor pipes in the concrete.

.13 Provide all sensors associated with ice rink refrigeration.

.14 Provide dry contacts for ice temperature and plant operation monitoring and setpoint control of the refrigeration plant from the base building energy management system.

.15 Automatic Ice Temperature control system shall be CIMCO 3000E or equivalent.

2.12 WASTE HEAT SYSTEM

.1 Provide a shell and tube compressor discharge desuperheater/heat recovery system for sub-floor heating. Provide Cimco, Chil-con, or Docal desuperheater to meet the following Cimco specifications.

.2 Desuperheater must be package mounted and piped to the chiller.

.3 Desuperheater to be complete with carbon steel shell and stainless steel tubes. Provide all temperature controls, solenoid valves and liquid drain.
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.4 Desuperheater to meet the following design criteria:
  .1 Heat load 100,000 Btu/hr
  .2 Fluid flow 100 USGPM
  .3 Inlet temperature 42.72°F
  .4 Outlet temperature 45°F
  .5 Tubside fouling factor 0.0005 hr ft² F/Btu
  .6 Shellside fouling factor 0.0005 hr ft² F/Btu
  .7 Fluid 40% ethylene glycol
  .8 Maximum fluid pressure drop 0.70 psi
  .9 Refrigerant Ammonia
  .10 Condensing temperature 95°F

2.13 GLYCOOL MIXING TANK AND FEED SYSTEM

.1 Glycol mixing tank shall be polyethylene cylindrical tank as manufactured by FABCO suitable for two rink surfaces. Glycol tank shall be complete with 1/2" tapping as indicated on drawings, and mesh screen insert. Provide hose end connection to match hose end connections on glycol piping circuit. Provide flexible hoses to connect to system. Provide stand, agitator bracket and pump shelf.

.2 Provide and install on each cold and warm glycol system, an automatic glycol feed system.

.1 Provide sufficient glycol to fill the glycol feed tank after the systems are charged.

2.14 RINK HEADERS

.1 Glycol headers shall be Schedule 40 black steel pipe ASTM A53 Grade A ERW, 6" I.D. with 3/4" Schedule 80 nipples, welded to header.

.2 Support glycol headers on steel channel frames on minimum 8 ft centres. Headers shall be buried and built in sections to facilitate removal. Provide main isolation valves for each rink.

2.15 RINK FLOOR PIPING

.1 Provide continuous lengths of nominal 1" I.D. polyethylene plastic pipe for the rink on 4" centres.

.2 Piping shall be virgin polyethylene plastic pipe by Polytubes Inc. Minimum bursting pressure 240 psi at 70°F, minimum working pressure 60 psi at 70°F, wall thickness 0.1" minimum, weight of pipe 15.1 lbs/100′.

.3 Plastic pipe shall be guaranteed by the contractor as appropriate for rink construction. Workmanship and material shall be guaranteed for one year from date of start up.

2.16 SUBFLOOR SOIL HEATING PIPE

.1 Provide subsoil heating mains as per rink headers sized 3" schedule 40 steel piping.

.2 Provide nominal 1" I.D. polyethylene rink piping spaced on 2' centres as shown on drawings. Piping shall be as specified for glycol rink floor piping.

.3 Piping shall be installed in continuous lengths from supply header to return header.

.4 Provide two stainless steel clamps at each nipple.

.5 Support subsoil heating mains as per glycol rink headers.

2.17 PIPE CHAIRS

.1 Pipe chairs shall be 3/16" diameter galvanized wire chairs, formed for 4" spacing of pipe, with 3" wide, 22 gauge steel shoe plate, suitable for mounting on Styrofoam insulation.

.2 Pipe chairs shall be spaced on 2 ft centres.

.3 Coordinate placing of pipe chairs and refrigeration piping with installation of refrigerated rink slab reinforcing.

.4 Installation of bottom layer of reinforcing must be complete before commencing installation of piping for refrigerated rink slab.

.5 Welded wire fabric will be installed over rink floor piping and will be wired to bottom layer of steel reinforcing and to pipe chairs to draw reinforcing, chairs, piping and mesh into a level plane.

2.18 PIPING

.1 Glycol pipe and condenser water pipe shall be Schedule 40 black steel pipe ASTM A53, Grade A ERW, with welding fittings over 2" size.

.2 Water pipe to compressor jackets may be either galvanized steel or Type L hard drawn copper.

.3 Refrigerant pipe shall conform to the ASME B31.5 Refrigeration Pressure Piping code for Ammonia and the ASHRAE/ANSI 15 Safety Code for Mechanical Refrigeration, and be thoroughly cleaned before installation.
2.19 VALVES

.1 Provide glycol and water valves as follows:

.1 Valves at chiller shall be butterfly type 150 psi W.P. with cast iron lug body, 316 stainless steel disk, epdm seat, 316 stainless steel shaft, with manual gear operators, equivalent to ITT Grinnell Butterfly Valves.

.2 Gate valves on condenser water system shall be iron body, bronze mounted, flat faced flanged ends, OS and Y, rising stem, solid wedge disc, Crane fig. 466% or equivalent.

.3 Check valves in vertical lines or on pump discharge for water system and brine system shall be wafer type Non-Slam check valve with cast iron body, 316 stainless steel disc and epdm seals. Mission valve ‘Duo-Check’ or equivalent.

.2 Provide refrigerated valves as follows:

.1 Refrigerant valves shall be suitable for Ammonia application, as manufactured by Henry, RS and Philips.

.2 Valves to have ductile iron body with screw connections rated for 1125 psi working pressure. Valves to be groove type or angle type with screwed bonnet or bolted bonnet equivalent to Henry type 200 and 300 series.

.3 A charging valve with capped end shall be installed on the high pressure receiver of brine chiller.


.3 Relief valves shall be supplied as dual relief valve assemblies complete with relief valves set at correct pressure. Relief valves shall be provided on all pressure vessels in accordance with standard and code requirements.

2.20 RELIEF AND FIRE LINES

.1 Relief and fire line shall be Schedule 80 steel pipe.

.2 Provide a fire box of galvanized steel painted red on exterior wall as required by Code. This box shall have a glass front and contain two valves in series, and an emergency stop switch wired to stop the refrigeration equipment.

2.21 REFRIGERANT CHARGE

.1 Provide a full charge of Ammonia in refrigeration system.

.2 Prior to charging, check the refrigerant plant thoroughly for leaks, and thoroughly flush using nitrogen.

.3 Provide additional Ammonia to ensure a full charge throughout 12 month period from plant startup.
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.4 Insulate all cooling water lines and fittings with 1” thick fibreglass insulation with vapour barrier and canvas cover. Insulate all hot water lines as per cooling water lines without vapour barrier.

.5 Pipe and equipment insulation shall be applied over clean dry surfaces with the pipe at approximately room temperature.

.6 Pipe and equipment insulation shall be applied in accordance with manufacturer published installation instructions.

.7 Insulate chiller and surge drum with 2” of foamed in place urethane insulation covered with a fibreglass jacket to protect against damage. Insulated head covers shall be removable without damage.

2.27 ICE RINK DEHUMIDIFIER

.1 Provide one Munters or Desicon desiccant dehumidification air handler ducted to and from the rink ceiling space to meet the following Munters specifications:

.2 Dehumidifier to meet the following minimum performance.

.1 Manufacturer Munters

.2 Model IceAire A20

.3 Supply air volume: 5000 cfm

.4 Make up air volume: 1000 cfm

.5 Moisture removal capacity: 150 lbs/hr

.6 Supply fan allowable E.S.P. 1.5 inches H₂O

.7 Reactivation fan air volume 1800 cfm

.8 Reactivation gas heater input 400,000 Btu/hr

.9 Desiccant Wheel Diameter 42 inches

.10 Filters 2” - 30% eff. Pleated

.11 Electrical 575/3/60

11.07 FLA

12.87 MCA

20 MCOP

.12 Disconnect 16 Amp

.3 Dehumidifier to be provided with gas fired reactivation energy burner with 25 to 1 turndown ratio. 14 gauge G90 galvanized steel channel base, 18 gauge G90 galvanized steel floor panels, 1” thick duct board insulation, 22 gauge removable galvalume exterior panels. Doors shall be c/w compression type latches and resilient gaskets. Desiccant wheel to be 100% inert silicates impregnated with an inorganic, non-granular, crystalline desiccant. Equip
dehumidifier with air flow indicating gauges, inlet filters for reactivation and process air, reactivation energy control system and overheat and rotation fault circuitry.

.4 Fans shall be single width, single inlet backward air foil, direct driven fans. Motors shall be open drip proof NEMA design B with class B insulation and 1.15 service factor.

.5 Provide factory mounted disconnect for desiccant dehumidifier.

2.28 TIE WIRES

.1 Refrigeration Contractor shall submit details on method of installation and removal of tie wires used as tension control during concrete pour of rink slab.

2.29 CONDENSER WATER TREATMENT SYSTEM

.1 Provide a chemical feed and control system consisting of a turbine flow sensor, auto reset timer, dual biocide control, chemical pumps, conductivity bleedoff sensor and solenoid valve. Sequence of operation shall be as follows:

.1 The chemical feed pump shall be controlled by an auto reset timer which in turn shall be controlled by the turbine flow sensor. After a preset volume of makeup water has passed through the flow sensor into the open cooling water system, the timer shall activate the chemical pump for sufficient time to add enough chemical for the amount of water added to the system.

.2 The bleedoff or solids level of the cooling water shall be controlled by the use of a specific conductance controller. When the conductivity sensor indicates that the required limit has been reached, the controller shall open a solenoid valve to bleedoff sufficient water to attain the required solids level in the cooling water.

.3 Biocides shall be added to the system by chemical pumps to control algae and bacterial growth. The biocide pumps shall be controlled by a programmable 14 day timer.

.4 A bypass feeder shall be used to add biocide to the system in case of failure of the chemical pump or timer.

.2 Provide chemicals of the organic type containing no heavy metals.

.3 Corrosion inhibitors currently in use are effective only when there is normal water flow in the open cooling water system. It is essential therefore when normal flow does not exist for more than four days, additional chemicals shall be added to the condensing water system or parts of the system to ensure that specified corrosion rates are not exceeded.

.4 Provide not less than the following equipment for the open cooling water system.

.1 One Autoval 475 TTC electronic programmable controller complete with one auto reset timer, dual biocide feed timer, and conductivity control capabilities. Install the conductivity sensor in a valved bypass line located across the cooling water pump headers.
2. One turbine flow sensor, suitably sized for makeup requirements, installed on the domestic water makeup line with a 3 valve line-size bypass.

3. One solenoid valve, suitably sized for bleedoff requirements, located on the cooling water pump discharge header and piped to a visible floor drain. Protect the solenoid valve with a strainer installed with a 3 valve bypass.

4. Three electronic diaphragm pumps for inhibitor and biocide feed, complete with suitable capacity and pressure rating, poly tubing, relief valves, PVC ball check valves and PVC isolating ball valves. Feed the chemical directly into the cooling water line at a point where, if possible, the system pressure is less than 400 kPa (60 psi). Install the chemical lines inside PVC pipe and support continuously.

5. One bypass feeder with [7.6 L] [2 gallons] capacity complete with all necessary isolating and drain ball valves. Locate the feeder no more than [1 m] [3 ft] above the floor and adjacent to a floor drain. Install across the cooling water pump headers.

6. One PVC shelf to support chemical pumps.

5. Feed chemicals directly from shipping containers. Alternative methods shall include all necessary equipment.

6. Provide sufficient chemicals to treat condenser water system for 12 months after turnover of the system.

7. Acceptable manufacturers are listed in Section 15007.

2.3.0 MISCELLANEOUS ITEMS

1. Provide the following miscellaneous items:


   2. One oil pump to charge oil into compressors.

   3. Refrigerant fire and relief lines, including relief valves, diffuser above roof and properly mounted dump valve box.

   4. Ammonia refrigerant detection system for refrigeration room designed to alarm at 250 ppm. Refrigerant detection system to be complete with two digital output contacts for building controls system to operate exhaust fans. Ammonia detector to have battery backup power supply in lieu of power failure.

3.0 EXECUTION

3.1 ELECTRICAL

1. The Refrigeration contractor shall do all power and control wiring for the refrigeration system.

2. Division 16 will provide power wiring to line side of MCC/refrigeration control panel.

3. Emergency remote controls for refrigeration equipment and ventilation equipment shall be in accordance with latest revision of ASHRAE 15.
6 It is understood that before the contractor's journeymen starts this instruction period, that 3 copies of instruction books and diagrams shall have been supplied to the job by the Refrigeration Contractor within 24 hours of equipment startup. Provides a glazed and framed system diagram of the complete refrigeration system and mount on the Equipment Room wall.

3.5 CHARGING AND OPERATING

1. On completion of the installation, charge the system with refrigerant and conduct a test run of sufficient duration to make all adjustments and prove its operation to the satisfaction of the consultant. In addition to this test run, the refrigerant subcontractor shall, with the Owner’s operating agencies, spend one 24-hour period of continuous supervision of plant startup to be followed by two 8-hour day shifts to run continuously. During that period the Owner’s regular crew will be in attendance for instruction in operation and maintenance under this contractor’s supervision, except as to time and hour of working. The refrigeration subcontractor shall also note that it is his responsibility to maintain a working log book record during the instruction period. This log shall contain an hourly record of all the installation pressure, temperature and flow conditions, etc. and in addition, notes of all corrective measures or failure of equipment. This record shall be handed to the Owner on completion of the instruction period.

3.6 GUARDED PLANT

1. Provide float switches, relief devices, safety switches, controls and all additional components required to operate the refrigeration system as a Guarded Plant, in accordance with the latest applicable regulations.

3.7 WARRANTY

1. The refrigeration subcontractor shall undertake to service the equipment and systems without any additional cost and shall replace, free of charge any defective parts within a period of one year from date of acceptance.
UNIVERSITY OF GUELPH

SPORT CENTRE MASTER PLAN - ELECTRICAL

GUELPH, ONTARIO

Prepared for:
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PROJECT NO. 06080

11 May, 2007
REP/UG Sport Master Plan R1-IPC

UNIVERSITY OF GUELPH ATHLETIC AND RECREATION MASTER PLAN ⋅ MARCH 2007

APPENDIX ELECTRICAL REPORT

University of Guelph, Sport Centre Master Plan
11 May, 2007
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MASTER PLAN ELECTRICAL (R1)

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APPENDIX 'A' - PROPOSED LUMINAIRE CUT SHEETS

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APPENDIX 'B' - PROPOSED ELECTRICAL DRAWINGS

ESK-01 Proposed 15kV Campus Distribution Routing (Part 1 of 2)
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ESK-07 Proposed Satellite Communication Centre (SCC)
1 GENERAL

1.1 The electrical system shall be designed to offer ease of operation, maintenance and flexibility.

1.2 All components shall be of a modular construction for fast and efficient servicing and to provide flexibility for ongoing reconfigurations.

1.3 All electrical work shall comply with or exceed the minimum requirements of the applicable codes, rules and regulations of the latest:
- Ontario Building Code
- Ontario Hydro Electrical Safety code
- National Fire Code of Canada
- Local Hydro requirements
- CSA Standards
- IEEE Standards
- IES Standards
- ASHRAE Standards
- any other governing authority having jurisdiction

1.4 All materials shall be new and free of defects. Canadian products shall be used where possible.

1.5 The building shall utilize state of the art components intended to satisfy the needs of a contemporary highly automated sport facilities and office environment. The major features of the building can be described as follows:
- Loads shall be segregated to separate the major building components as well as to separate sensitive loads from interference causing loads.
- Energy efficient lighting systems.
- Complete telecommunications empty raceway system for voice, data and CATV throughout the building complex as provided under University of Guelph’s Security.
- Microprocessor based network structured fire alarm and detection system.
- Empty raceway for the security system for card operated controlled access system, CCTV monitoring and perimeter door monitoring as provided under University of Guelph ITS.
- LV Lighting Control System to serve all indoor and outdoor lighting loads and interface with Building automation system, BAS for optimum system operation.

2 13.8KV CAMPUS ELECTRICAL DISTRIBUTION SYSTEM

2.1 The proposed project is to be carried out in six Building phases and five sport field phases. Based on the final build out of the project, an estimated electrical demand load of approximately 6,000 kW is anticipated. In order to satisfy the final anticipated demand load, a new 15KV campus distribution loop feeder will be required.

2.2 For proposed Building Phase B-1, Convocation hall, and Gryphon Centre North Expansion, it is proposed to construct a new concrete encased ductbank and interface with an existing electrical manhole at the southeast corner of Landscape Architectural Building and run along easeoward to east ring road. At east ring road, new electrical manhole is proposed to extend the ductbank and HV feeders into the new Building Phase B-1 Main electrical room. A new Electrical substation B-1 shall be built to serve Phase B-1 with 15KV provisions to serve Building Phase B-1, Gryphon Centre Renovation and south expansion.

.1 The proposed new electrical substation, B-1, shall consist of the following major equipment:
- 1 15kV rated loop switchgear with fused load break switches to meet latest ESA requirements.
- 2 Fused load break switch to feed a 750kVA 15/195-600/347Y 3ph 4w dry type transformer and associated electrical distribution switchboard to serve Building Phase B-1.
- 3 Provisions for one fused load break switch to feed a 1250kVA 15/195-600/347Y 3ph 4w dry type transformer, associated electrical switchboard and distribution equipment, for Building Phase B-4. (To be implemented under Building Phase B-4).
- The secondary 600V switchboards for both Building Phase B-1 and B-4 shall be fitted with two normal open circuit breakers such that in the event of major transformer break down of either building, temporary power can be re-routed to serve the failed transformer building for added reliability. (To be implemented under Building Phase B-4).
- Prior to Building Phase B-4 work, Gryphon Centre shall remain connected to existing Mitchell Centre Electrical Substation system.

2.3 With the new concrete encased ductbank running along East Ring Road, a new electrical manhole is proposed to be installed south of the Building Phase B-1 to anticipate the construction of sport field Phase F-1.

1 For sport field phase F-1, a new electrical substation # F-1 is proposed to be constructed under the four synthetic soccer sport fields covered parking area. The new substation F-1 shall be sized with sufficient capacity to serve the following sport field phases: Phase F-1 sport fields, Phase F-2 Natural Turf Track and Field, sport field Phase F-4, four tennis courts and Four Beach Volleyball Courts.

2 For Phase F-1, the substation F-1 shall consist of the following major components:
- 1 15kV rated loop switchgear. Provide Fault Filter electronic fuses as per ESA requirements.
- 2 Two fused load break switches feeding two 1250kVA 15/195-600/347Y 3ph 4w dry type transformers with force fan cooling.
- A double end configured 600V switchboards with electric operated Main-Tie-Main draw air circuit breakers serving Phase F-1 sport fields lighting load, convenience shelter load, indoor/outdoor parking lighting, and miscellaneous loads.
- One Draw out air circuit breaker to feed an outdoor Integrated Power Centre #1 to serve the two softball sport field electrical needs.
- One Draw out air circuit breaker to feed an outdoor Integrated Power Centre #2 to serve sport field phase F-2 IAW track and field’s electrical needs. (To be implemented under Phase F-2).
- One Draw out air circuit breaker to feed an outdoor Integrated Power Centre #3 to serve sport field phase F-3 Beach Volley Ball courts and Tennis Courts (To be implemented under Phase F-3).
- Typical outdoor Integrated Power Centre (#1 to #3) shall consist of the following equipment:
- 1 Section 1: 600V draw out type insulated power air circuit breaker.
2.4 For Building Phase B-2A and 2B, the concrete encased duct bank along East Ring Road shall run northward and terminate at a new electrical manhole located north of Powell Building. Ductbank and HV feeders shall be extended into Mitchell and Powell Building’s new main electrical substation. The new electrical substation shall replace the existing double ended electrical substation which we understood one of the transformer contain PCD. With the new electrical substation, the capacity shall be adequately sized to handle both existing building loads presently connected to the existing substation and also handle the new and renovated areas under Building Phase B-2A, B-2B and B-6.

2.5 Electrical concrete encased ductbank shall extended northward along East Ring Road and turn west towards Central Generators Building and interface with an existing electrical manhole outside of the Generators building. This interface will allow 600/347V emergency power from the Central Generators Building be distributed to different buildings via 1000V Teck Cables, sharing the 13.8KV electrical ductbank.

2.6 For Building Phase B-3, Varsity and Field House, new electrical concrete encased ductbank and HV feeders shall be extended from new electrical manhole located at northeast corner of the site on East Ring Road to a new Main electrical substation dedicated for the Varsity Centre and Field House Building. A new Electrical substation, B-3 shall be constructed to serve the Building phase, B-3.

2.7 For sport field phase, F-3, football and Rugby fields, electrical ductbank and HV feeders shall be extended from existing electrical manhole at corner of Varsity and Field House and run eastward, south of the football and Rugby fields. The electrical ductbank and HV feeders shall terminate at a new Integrated Power Centre # 4.

2.8 For Building Phase B-5 and sport field phase F-5, Alumni Stadium and Field, we assume both phases will implement at the same time. The sport field lighting shall be fed from the stadium electrical distribution system. New electrical ductbank and HV feeders shall extend from an electrical manhole located south of the stadium into the stadium new Main Electrical Substation, B-4.

2.9 During the build out of the project, it is proposed that the renovated and expansion areas of the building components be connected to the new 15KV campus loop system; while the existing 15KV loop 4 systems will be re-configured to service other existing university buildings. It is also noted that building such as Mitchell Centre will be renovated and new areas to be constructed in two phases. Therefore, for cost effectiveness, the new electrical equipment provided for “Day 1” will include sufficient capacity to handle the added electrical loads in future phases.

2.10 Detail construction sequence of the electrical ductbank and HV feeders shall be confirmed at detail design stage in accordance with approved construction schedule.
3 CAMPUS COMMUNICATION DUCTS DISTRIBUTION SYSTEM

3.1 A new Communication ductbank dedicated for communication use is proposed for the project. The ductbank shall interface with existing service tunnel system approximately at Crop Science Building. Due to new Redundant Fibre Link requirements for each university building, new communication cabling will have to be added via existing service tunnel to Johnston Hall at north side of the campus and to University Centre at the south side of the campus. Exact quantity and types of fibre will have to be determined in the detail design phase of the project with University IT group.

3.2 To serve multiple phases of the project which include a built out of a number of outdoor sport fields, it is proposed that a new communication ductbank consist of a number of 100mm (4") duct encased in concrete shall run from Crop Science Building service tunnel to a new communication manhole located at the northeast corner of Building Phase B-1, Convocation Hall. Communication ductbank shall be extended into Convocation Hall Communication Equipment Room (CER) #1. The CER #1 shall sized with adequate capacity to handle the adjacent Gryphon Centre. Communication ductbank shall be extended from CER/W-1 to Gryphon Centre new CER # B-4 under Building Phase B-4 project.

1. The new Gryphon CER# B-4 shall reconnect existing communication system and devices.
2. The CER room shall be sized to accommodate the expansion and renovation communication needs.

3.3 South of Building Phase B-1, Convocation Hall along East Ring Road, the communication ductbank is proposed to shall terminate in a new communication manhole opposite to sport field Phase F-1 - four synthetic soccer fields.

3.4 When sport field phase F-1 is ready to be implemented, communication ductbank shall be extended from the manhole into sport field phase F-1, new CER located in the covered parking area.
1. Each Main CER incoming service shall be equipped with two – 6 strands single mode fibre optic cables.
2. Between softball sport fields, a Satellite Communication Centre #1 (SCC) shall be provided to serve the communication needs of the sport fields area.
3. The SCC #1 shall consist of:
   1. Two 100mm (4") duct for communication cables shall enter and exit the cabinet at the bottom.
   2. Two – 15A 125V rated GFI receptacles located at bottom of the cabinet, shall be provided for communication equipment use. Power shall be fed from nearest IFC.
   3. Two Power Bar with plug-in cords shall be fitted on both side of the rack.
   4. Bottom of rack shall have provisions for a rack mounted removable UPS unit, provisions for special events use.
   5. Each rack shall be fitted with minimum one fibre to copper panel and a standard copper patch panel.
      Server, router and other communication equipment shall be provided under FF & E contract or under separate contract.
4. Three SCC are proposed for the four synthetic soccer fields, one SCC shall be provided under sport field phase, F-2 for IAWN track and field, and one SCC shall be provided under sport field phase F-4 for the beach volley ball courts and tennis courts areas. Refer to proposed communication campus distribution routing drawings.

3.5 The communication concrete encased ductbank shall run northward along East Ring Road with communication manholes located at Building Phase B-2A & B-2B site, at Building Phase B-3 Varsity and Field House site, at sport field phase F-5 stadium field site and at southwest corner of College Avenue East.
4

600V POWER DISTRIBUTION SYSTEM

4.1 Refer to proposed 15KV Campus Power Distribution Single Line Block Diagram for Building Phases and sport field phases single line distribution scheme

4.2 Exact load estimate and proposed distribution scheme will be confirmed during detail design stage.

4.3 600V Main Switchboards design criteria

- The Secondary Switchgear shall be manufactured to CSA C22.2 No. 31, EEMAC G83 and relevant ANSI specifications.
- The metal enclosed switchboard main bus shall be sized to suit power transformer secondary, 600/347V, 3 phase, 4 wire, 60 Hz, braced for a maximum short circuit current as confirmed by the coordination study with insulated copper bus bars.
- Each switchboard cubicles section shall be free standing metal enclosed.
- The first section shall contain:
  - Power insulated breaker with modular solid state multi-trip functions (LSG) and metering unit, and necessary Guelph Hydro approval revenue metering CTs and Pts to feed fire pump assembly as per NFPA requirements.
- The Secondary section shall contain:
  - 100% ANSI rated power insulated main breaker with solid state multi-trip functions (LSG) and metering unit.
- The third section shall contain:
  - Guelph Hydro CTs and Pts Metering compartment.
- Branch Feeders Distribution sections:
  - Each section shall contain minimum three ANSI rated power insulated breakers with solid state multi-trip functions (LSG) and metering units.
  - Normally Open Tie breaker with key interlock as required.
- Three branch feeders distribution section shall be allowed for each switchboard.

4.4 Surge Protection

- Transient voltage surge protection system will be connected to all main switchboards and all receptacle panels serving communication systems areas only, via MCCB breakers.
- All TVSS panels shall be physically mounted outside of the electrical switchboards and panels.

4.5 Automatic Power Correction System

- A microprocessor based automatic power factor correction system utilizing multi-steps reactor type capacitors will be provided for each section of the switchboard to correct and maintain electrical operating system's power factor to 0.9.

4.6 Power Monitoring and Control System (PMCS)

- A microprocessor based, distribution network PMCS system with solid state IP address based metering unit similar to Power Measurements PML 7350, shall be provided for all main, tie and branch power insulated breakers, and at each major distribution panel for energy consumption metering and energy quality monitoring use.
- The proposed system shall web-browser enable and shall include a database structure server similar to Microsoft SQL Server for data gathering for up to two years.

4.7 Electrical Grounding

- Grounding and bonding materials shall be manufactured to CSA C22.2 No. 41 and installed to CSA C22.3 No. 2.
- The grounding system shall comprise of:

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1. Continuous copper ground bus all around perimeter of Main Electrical Room with two runs of #4/0 bare stranded copper conductor back to the building ground system and also one #3/0 bare stranded copper conductor to building watermain.

2. Bare, stranded, copper wire conductors, size 3/0 AWG for ground bus electrodes interconnections, metal structures, transformers, motors, ground connections.

3. Copper grounding bus will be provided in each electrical room.

4. Grounding connections to all typical equipment shall be installed. Separate grounding wire shall be provided for service equipment, transformers, Bus duct systems, frames and motors, motor control centres, starters, control panels, dimming racks, building steel and metal cladding work, distribution panels, outdoor lighting.

5. A separate communication grounding system consisting of main communication ground bus, satellite communication room ground bus and copper ground conductor will be provided in all communication room. Main communication ground bus shall be ground to the main building electrical ground bus for each building complex.

4.8 Emergency Power Generation System

1. To achieve better generator operation efficiency, maximize cost benefit, and minimize environment pollution impact, it is recommended that a 1500KW/1875kVA 600/347V 3P 4W standby diesel generator be provided at the existing Central Diesel Building to distribute 600/347V emergency power to each building components (Alumni Stadium, Varsity & Field House, Mitchell Centre & Powell Building, Gryphon Centre, Convocation Hall and covered parking).

2. At each building components, the 600/347V emergency power will be interface with utility power distribution via dedicated automatic transfer switch c/w two way isolation bypass switches. 600/347V emergency power distribution panels, 347/208V emergency lighting panel, display distribution transformers, and 120/208V emergency power receptacles panels, will be provided for each Sport Building components excluding outdoor sport field and parking facilities.
5 LIGHTING

5.1 Sport facilities: High quality, low glare, energy efficient illumination system will be provided to different sport facilities. Illumination Engineering Society of North America, RP-6, "Recommended Practice for Sport and Recreational Area Lighting" standard will be used as design reference.

5.2 General: Special emphasis shall be placed on the design of the illumination systems and the choice of light sources. High efficiency and high colour rendering lamps and energy saving electronic fluorescent ballasts shall be used throughout. Fluorescent lamps to be equal to be 3500k, with a minimum CRI of 85.

5.3 Swimming Pool

   1 Ceiling suspended steel structure frame around the pool will be fitted with indirect 400 watt pulse start lamps and ballasts will be provided to illuminate the swimming pool water surface and the immediate pool deck areas.
      Average maintained illumination level (pool surface): 300-400 Lux

   2 Underwater Illumination - Special wattage underwater luminaires recessed into the pool walls will be provided along the long side of the swimming pool wall between 3.0 meter to 5 meter apart and 1 meter below the water surface. Another row of underwater luminaires with 1meter apart will be mounted at the 3.0 meter level at the deep end of the pool to enhance underwater vision.
      Average luminance level (underwater): 30-25 Candelas per square foot

   3 Rows of ceiling suspended/mounted direct HID downlight utilizing 250W metal halide lamps will be provided for the pool deck and spectator seating areas.
      Average maintained illumination level (Pool Deck Area): 500 Lux
      Average maintained illumination level (Spectator Seating areas): 250 Lux

5.4 Wet Lockers Areas

   1 Surface ceiling mounted two lamps T8 fluorescent luminaries with IP67 protection will be provided for wet lockers/change areas.
      Average maintained illumination level: 300 Lux

5.5 Lockers Areas

   1 Recessed or surface ceiling mounted two lamps T8 fluorescent luminaries with weatherproof gasket will be provided for lockers/change areas.
      Average maintained illumination level: 300 Lux

5.6 Varsity Gymnasium (Convocation Hall)

   1 Multiple rows of ceiling suspended direct HID luminaries cluster (three – 400W pulse start metal halide in one cluster) and fitted with custom design perforated metal housing and integrated with multi-levels switching schemes will be provided for the Gymnasium/Convocation Hall.
      Average maintained illumination level: 1000 Lux

5.7 Practice/Recreation Gymnasium

   1 Multiple rows of ceiling suspended direct HID luminaries cluster (three – 400W pulse start metal halide in one cluster) and integrated with multi-levels switching schemes will be provided for the Gymnasium.
      Average maintained illumination level: 800 – 1000 Lux

   2 Running Track – ceiling suspended HID luminaries utilizing 250W metal halide pulse start lamps and pulse start ballasts will be provided.
      Average maintained illumination level: 300-500 Lux

5.8 Fitness & Weight Areas

   1 Multiple rows of ceiling suspended indirect fluorescent luminaries fitted with three T8 lamps and electronic HPF ballasts will be provided.
      Average maintained illumination level: 450-400 Lux

5.9 Teaching Rooms/Multi-purpose Rooms

   1 Ceiling suspended indirect fluorescent luminaries fitted with T8 lamps and electronic ballast will be provided.
      Average maintained illumination level: 450 Lux

5.10 Common Areas/Retail

   1 The interior spaces will be fully fit up with combination of custom design incandescent (MR16) luminaries, compact fluorescent luminaries and T8 fluorescent to suit and coordinated with interior space functions and theme requirements.

5.11 Office areas

   1 Ceiling suspended indirect fluorescent luminaries fitted with T8 lamps and electronic ballast will be provided.
      Average maintained illumination level: 450 Lux

5.12 Hockey Arena

   1 Multiple rows of ceiling suspended HID direct luminaries clusters (each cluster shall consist of three 400W pulse start metal halide lamps and pulse start ballasts) with glare guards will be provided over the Arena areas.
      Average maintained illumination level: 1500-1000 Lux

   2 Multiple rows of ceiling suspended HID direct luminaries clusters (each cluster shall consist of two – 250W pulse start metal halide lamps and pulse start ballasts) will be provided for the spectator seating areas.
      Average maintained illumination level: 500 Lux

5.13 Field House

   1 Multiple rows of ceiling suspended HID direct luminaries clusters (each cluster shall consist of three 400W pulse start metal halide lamps and pulse start ballasts) with glare guards will be provided over the Track & Field areas.
      Average maintained illumination level: 1000 – 1250 Lux
5.14 Public Spaces
.1 For Ahtrum Spaces, multiple rows of ceiling suspended 400W metal halide direct down luminaries will be provided for general illumination.
  Average maintained illumination level: 250-200 Lux

5.15 Food Court Areas/Lounge
.1 Illumination system will be coordinated with interior space functions and theme requirements. Combination of MR16 incandescent, compact fluorescent and T8 fluorescent luminaries will be provided.
  Average maintained illumination level: 350-250 Lux

5.16 Field 1: Alumni Stadium for Football and Soccer
.1 Strategic located concrete high lighting masts fitted with clusters of HID power spot luminaries. Each HID luminaries will be fitted with 1500W pulse start metal halide lamps and pulse start ballasts. Estimate total of 80 luminaries.
  Average maintained illumination level: 500 to 650 Lux

5.17 Field 2: Practice Field for Football and Rugby
.1 Strategic located concrete high lighting masts fitted with clusters of HID power spot luminaries for both football and Rugby. Each HID luminaries will be fitted with 1500W pulse start metal halide lamps and pulse start ballasts. Estimate total of 90 luminaries.
  Average maintained illumination level: 500 to 300 Lux

5.18 Field 3: Competition Rugby
.1 Strategic located concrete high lighting masts fitted with clusters of HID power spot luminaries for competition Rugby. Each HID luminaries will be fitted with 1500W pulse start metal halide lamps and pulse start ballasts. Estimate total of 90 luminaries.
  Average maintained illumination level: 500 to 650 Lux

5.19 Field 4: Event Soccer Field
.1 Strategic located concrete high lighting masts fitted with clusters of HID power spot luminaries for event soccer. Each HID luminaries will be fitted with 1500W pulse start metal halide lamps and pulse start ballasts. Estimate total of 80 luminaries.
  Average maintained illumination level: 500 to 650 Lux

5.20 Field 5: Soccer Field for Women’s Lacrosse
.1 Strategic located concrete high lighting masts fitted with clusters of HID power spot luminaries. Each HID luminaries will be fitted with 1500W pulse start metal halide lamps and pulse start ballasts. Estimate total of 80 luminaries.
  Average maintained illumination level: 500 to 650 Lux

5.21 Field 6: Soccer Field for Men’s Lacrosse
.1 Strategic located concrete high lighting masts fitted with clusters of HID power spot luminaries. Each HID luminaries will be fitted with 1500W pulse start metal halide lamps and pulse start ballasts. Estimate total of 80 luminaries.
  Average maintained illumination level: 500 to 650 Lux

5.22 Field 7: Soccer Field for Field Hockey
.1 Strategic located concrete high lighting masts fitted with clusters of HID power spot luminaries. Each HID luminaries will be fitted with 1500W pulse start metal halide lamps and pulse start ballasts. Estimate total of 80 luminaries.
  Average maintained illumination level: 500 to 650 Lux

5.23 Field 8: Eight Lane IMW Track for Soccer Inside Track
.1 Strategic located concrete high lighting masts fitted with clusters of HID power spot luminaries. Each HID luminaries will be fitted with 1500W pulse start metal halide lamps and pulse start ballasts. Estimate total of 100 luminaries.
  Average maintained illumination level: 500 to 650 Lux

5.24 Field 9 & 9A: Softball Fields
.1 Strategic located concrete high lighting masts fitted with clusters of HID power spot luminaries. Each HID luminaries will be fitted with 1500W pulse start metal halide lamps and pulse start ballasts. Estimate total of 75 luminaries per softball field.
  Average maintained illumination level (infield): 1000 to 700 Lux
  Average maintained illumination level (outfield): 700 to 500 Lux

5.25 Field 10: Four Tennis Courts
.1 Strategic located concrete high lighting masts fitted with clusters of HID power spot luminaries. Each HID luminaries will be fitted with 1000W pulse start metal halide lamps and pulse start ballasts. Estimate total of 36 luminaries.
  Average maintained illumination level: 700 to 500 Lux

5.26 Field 11: Four Beach Volley Ball Courts
.1 Strategic located concrete high lighting masts fitted with clusters of HID power spot luminaries. Each HID luminaries will be fitted with 1500W pulse start metal halide lamps and pulse start ballasts. Estimate total of 20 luminaries.
  Average maintained illumination level: 500 to 300 Lux

5.27 Covered Parking
.1 Surface ceiling mounted HID luminaries fitted with 150W pulse start metal halide lamps and ballasts. All conduit shall be surface mounted rigid galvanized steel as per CSA Parking standard requirements.
  Average maintained illumination level: 35 to 15 Lux
5.28 Storage Room

.1 Surface ceiling mounted two lamp T8 fluorescent luminaries with electronic HPF ballast will be provided.  
   Average maintained illumination level: 450 Lux

5.29 Service Room/Mechanical Penthouse

.1 Surface ceiling mounted two lamp T8 fluorescent luminaries with slotted reflectors, electronic HPF ballast  
   will be provided.  
   Average maintained illumination level: 450 Lux

5.30 Washrooms Areas

.1 Combination of two lamps T8 fluorescent cove luminaries and compact fluorescent down lights with  
   electronic HPF ballast will be provided.  
   Average maintained illumination level: 350 Lux

5.31 Exterior Lighting

.1 Numbers of low level 250W metal halide exterior wall wash luminaries spaced at maximum 20 feet on  
   centre and special narrow beam distribution metal halide outdoor luminaries will be provided. Placement  
   of luminaries will be coordinated with architects to highlight the architectural building features of the  
   complex.  
   Average maintained illumination level on walls: 35 Lux

5.32 H.I.D. metal halide bollards and recessed H.I.D. luminaries in soffits shall be used for illumination of  
   exterior walkways and building entrances.

5.33 Street Lighting

.1 Rectangular “Shoe Box” shape HID post mounted luminaries lamped with 250W pulse start metal halide  
   lamps and ballasts will be provided along all roadway and surface parking. Minimum 125mm square, 6M  
   (20’-0”) high extruded aluminum post will be provided with 16” wide concrete base. For surface parking,  
   minimum 1m high concrete base shall be used.  
.2 All street lighting to be fed from nearest buildings lighting panel.

6 LOW VOLTAGE LIGHTING CONTROL SYSTEM

6.1 A microprocessor based network structured low voltage control system will networked LV relay panels will  
   be provided for each building throughout the complex, to control and monitor all luminaries, sport facilities  
   Hi/Lo switching system, and local architectural dimming system.

6.2 Each building's lighting control system will be independently operated and interconnected for remote  
   programming, monitoring and control.

6.3 Occupancy sensors operating together with Low Voltage Lighting Control system will only be provided in  
   service and private areas subject to University of Guelph agreement.
7 LIFE SAFETY SYSTEM

7.1 An addressable, zoned non-coded, modified two stage, Fire Alarm system with network communication is proposed for the Sport Facilities complex. The proposed modified two stage Fire Alarm system is conditioned upon obtaining approval from both the local authorities having jurisdiction and from University of Guelph Security and operation departments. The system shall be as manufactured by Notifier to conform with University of Guelph standard.

7.2 Each Building complex: Mitchell Centre, Varsity & Field House, Alumni Stadium, Gryphon Centre, and Convocation Hall, will be equipped with a standalone Fire Alarm Control Panel, FACP interconnected to a number of LCD display Remote Fire Alarm Annunciators located at each designated Exit vestibule, and a number of Delta Gathering panels will be provided throughout the complex for life safety alarm and monitoring use.

7.3 Pending on the construction phasing of the building components, each building’s FACP’s shall have provisions to network to other buildings’ FACP. The proposed FA system shall also also with other communication network interface modules such as LON work and Modbus interface for future system integration use.

7.4 The design intent is to allow each building complex’s FA system to be able to perform on a standalone mode of operation as well as on a network basis for added system reliability and system survivability.

7.5 Pending on review and approval from local authorities having jurisdiction, Smoke Control/Smoke Management system shall be designed and operated as manual operation.

7.6 Exit Lighting
   .1 Illuminated LED exit signs shall be provided at all means of egress and paths leading to such means. Power supply to these shall be from local Emergency Powered Lighting panelboards.

7.7 Emergency Lighting
   .1 Selective luminaires throughout the complex and along all egress paths and exit means providing an average maintained illumination of 10 Lux at floor level, will be connected to emergency lighting panels via Emergency Diesel Power Generation System.

   .2 In addition, Emergency Lighting Battery Units with integral 50W quartz light heads will be provided in Convenience Shelters, Mechanical Equipment Room, Major Service Room, Electrical/Transformer Room, and Mechanical Penthouse etc. for ease of emergency repair work.

8 PUBLIC ADDRESS SYSTEM

8.1 An independent standalone electronic zoned, coded microprocessor based Public Address System complete with speakers and speaker horns will be provided for the following building areas:
   Swimming Pool areas
   Varsity Gymnasium/Convocation Hall
   Practice/Recreation Gymnasium
   Hockey Arena
   Field House
   Alumni Stadium

8.2 Each PA system shall include as a minimum the following playback and recording equipment:
   .1 DVD/CD Player
   .2 Cassette Player
   .3 DVD/CD Recorder with 8/4 hard drive and PC interface

8.3 Specific spatial characteristic such as shape and size of room, reverberation time of sound travel etc. will be studied and reviewed to provide proper types and placement of PA speakers during design stage.

8.4 For Convocation Hall, Swimming Pool, Hockey Arena, Field House and Alumni Stadium, provide separate Assistive Listening system complete with transmitters and wireless headsets (minimum six sets per system).

8.5 For outdoor sport fields other than Alumni Stadium, separate standalone PA system with outdoor speakers shall be provided.
9 INFORMATION TECHNOLOGIES SYSTEMS

9.1 A complete communications system consists of both fibre optic cables and copper cabling installed in metal raceway systems shall be provided for the entire Sport Centre complex.

9.2 Based on available information, the voice system presently used at the site is utilizing VoIP technology. Same Voice Services shall be extended to all building components and sport fields.

9.3 A main communication Room (CER) of minimum 3.5m by 3.5m will be provided at each building component. Each main communication room shall have minimum six 8 - 100mm (4") ducts extended from room to Campus communication distribution network connections. The 8" ducts shall be of a horizontal distance longer than 70m, a satellite CER shall be constructed. Vertical aligned floor sleeves and conduit will be provided to interconnect all satellite communication rooms to Main CER. Fire retardant treated plywood backboards will be provided on all walls of the Main CER. Minimum three 120V dedicated emergency powered receptacles will be provided for each CER room.

9.4 New incoming fibre optic cables and Cat. 6 horizontal copper cabling shall be provided to serve all renovated and expansion areas under each phase of the project.

9.5 Vertical aligned satellite CER with minimum 2.5m x 2.5m will be located on each level. Fire retardant treated plywood cavity backboards will be provided on all walls of the satellite communication room. Minimum three (3) 120V dedicated emergency powered receptacles will be provided for each room. Horizontal raceway/ventilated cable ladder system to house Cat. 6 voice and data cables shall be provided for each floor and terminated at each satellite CER.

9.6 Quantity of all horizontal and vertical copper and fiber optic cables and associated telecom equipment shall be based on EIA/TIA standard and BCSI recommended requirements.

9.7 For horizontal voice and data drops, base the cabling to be Cat. 6 and quantity shall be based on:

1. All buildings shall be equipped with wireless communication network system.

2. For every 9m (30ft) radius, two Cat. 6 data drops shall be provided.

3. For every 10 sq. m of office area, provide minimum two data drops for voice and data use.

4. For Pool and Varsity Gymnasium/Convocation Hall areas, wireless coverage shall be provided for the spectators seating areas.

5. For Cardio and Fitness area, provide minimum one data drop per each piece of equipment.

6. Two data drops shall be allowed for each score board.

7. Two data drops shall be allowed for each Point of sale location.

8. Horizontal cabling for both Voice and Data shall be based on Cat. 6 cables.

9.8 All communication cabling (Voice and Data) associated cable tray system and communication room interior fit-up work will be provided by telecom contractor as per University of Guelph Standard practice.
11. MISCELLANEOUS SYSTEMS

11.1 Provide multi-stations Intercom system for Loading and Receiving areas.

11.2 Provide cleaning receptacles spaced maximum at 15M on centre along all corridors, lobby and at each exit stair entrance for cleaning equipment use.

11.3 In Convocation Hall/Gymnasiums, provide 120V power connections to all power winch equipment as required.

11.4 In Convocation Hall/Gymnasium, provide flush floor mounted custom design floor boxes at perimeter of court to interconnect scoreboard and time keeper control unit.

11.5 In Convocation Hall/Gymnasium, provide minimum two 400A 208/120V 3Ph 4W unfused disconnect switch at each side of the stage area, for non-athletic events such as stage lighting system use.

11.6 In Convocation Hall/Gymnasium, provide minimum two 15A 120V dedicated circuits duplex receptacles, one-voice outlet, one data outlets and one RGB outlets located in a custom designed flush wood floor mounted floor box, around the perimeter of the court for non-athletic events use. Allow minimum ten floor boxes.

11.7 In Convocation Hall/Gymnasium stage, provide similar minimum five custom floor boxes on stage platform for non-athletic events use.

11.8 In Convocation Hall/Gymnasium ceiling space, provide three dedicated circuits 15A duplex receptacles, together with data and video drops for future AV and non-athletic event use.

11.9 In Convocation Hall/Gymnasium, provide custom power and communication floor box to interconnect timing and scoreboard equipment.

11.10 In Track and Field House, provide empty raceway and power connections for scoring and timing system.

11.11 In arena, provide empty raceway and power connections for timing and scoreboard system.

11.12 In swimming pool area, provide empty raceway system and power connections for all time and scoring system.

11.13 For Swimming Pool, Gymnasiums and Arena etc., where media boxes are allocated, provide minimum four 2" IC to nearest Telecom Room and minimum two - 100ED to satellite truck broadcast locations. Allow one per building components. (Mitchell Centre, Varsity & Field House, Alumni Stadium, Gryphon Centre and Convocation Hall).

11.14 At each convenience shelter:
   .1 Provides minimum one 100A 600V 3P -S disconnect for concession’s interior fit up and equipment use.
   .2 Weatherproof type Lighting fixtures and GFI duplex receptacles with weatherproof covers for washrooms facilities.
   .3 Allow minimum two - 20A 208V 1Ph power connections for hand dryers.

11.15 At each outdoor sport field allow:
   .1 Light Control cabinet for connection to local event lighting controller weatherproof stainless steel junction box.
12 SUSTAINABLE DESIGN

12.1 The base electrical design is based on “Best Practice” principles. Systems selected are deemed appropriate for a complex of this type being constructed under current conditions. Many elements in the electrical design including energy efficient light sources & ballasts, occupancy sensors, low impedance low loss transformers, electronic power metering and low impedance feeders sizing contribute to sustainability. However, these base elements are considered to be integral to a “Best Practice” design and should not be considered as premium elements added to the complex to obtain LEED certification.

12.2 More aggressive “Green” technologies such as wind power generation, photovoltaic or fuel cells are not addressed at this stage and will only be considered if deemed appropriate for demonstration purposes.

-End of Master Plan Electrical-

APPENDIX ‘A’

PROPOSED LUMINAIRE CUT SHEETS
Ultra Sport™ Floodlight

Applications
- Large and mid-sized outdoor stadia and indoor arenas where premium quality and excellent glare control are required. Color rendition ideal for television broadcasting.

Specification Features
- Optional Instant Hot Start in case of momentary power interruption or large line dips
- Suitable for wet locations with IP55 construction
- Primary reflector is coated with high reflectance glass
- 20-inch secondary reflector is coated with AGCAS finish
- Compact die-cast aluminum integral ballast housing with thermally isolated optical
- Rear re-lamping door with corrosion-resistant fasteners and lamp power disconnect
- Hydroguard advanced filtering system
- Utilizes advanced 1000, 1500 or 2000 watt double-ended metal halide lamps
- Optional arc cutoff for glare/spill light control

Powr-Spot III Floodlight

Applications
- Recreational and competition sports fields at all levels. General floodlighting where the performance of reflectors of revolution are needed.

Specification Features
- UL 1570 Listed for wet locations
- CSA Certified
- Standard construction is IP55
- Die-cast aluminum ballast housing with acrylic electrocoat gray paint finish inside and out (for integral ballast units)
- Enclosed, gasketed, filtered optical with AGCAS finish on aluminum reflector and tempered glass closure
- Thermal separation of ballast from socket and lamp
- Removable cover for access to ballast and wiring compartment (for integral ballast units)
- No-weep-hole condensate drain when aimed down
- Built-in cable and strain relief bushing
- Mogul base socket-C86 standard
- Corrosive resistant hardware
- Position oriented socket available for minimum 14.5 factor lamp—contact factory
- Available with or without UL™ optics

Data
- Approximate net weight: 14-120 lbs. 6.4-54 kg.
- Effective projected area: 31 sq. ft. max. 309 sq. ft. max.

Dimensions
- Angled Trunnion
- Straight Trunnion
Ulc™ (Ultimate Light Control) Sports Lighting Systems
Remote Ballast Lighting Structure

- Underwriters Laboratory listed lighting system with all components “suitable for wet location”.
- Modular Wiring Harness from lighting assembly to Remote Ballast Enclosure.
- Modularly constructed units with plug together connectors for fast and easy job site assembly.
- All components designed for ease of service and public safety.
- Low Epa, galvanized or plated powder coated steel construction for maximum life.
- Lighting Systems available in 1000W, 1500W, and 1650W, 120V thru 480V single or three phase power systems.
- Multi-circuit systems available.

Applications:
- Baseball Fields
- Marinas
- Soccer Fields
- Stadiums
- Industrial Applications
- Tennis Courts
- Parking Facilities
- Ski Slopes
- Football Fields
- Golf Courses

All components are Hot Dipped Galvanized for corrosion resistance and long life.

- Complete lighting system UL listed “Suitable for Wet Location”
- Completely enclosed wiring within the lighting structure from fixture to underground
- 7 years warranty on entire system--see manufacturer's Warranty
- (10 year optional)

Modular wiring harness from lighting assembly to remote ballast enclosure

Rugged concrete or steel support pole for improved system performance

Cold rolled steel remote ballast enclosure conforms all lighting system components on a convenient height for service permanence.

GE Sports Lighting Systems, L.P.
10 Fixture Pole Assembly
General Detail (Remote Ballast)
Remote Ballast
Enclosure & Wiring Harness

- Top hinged cover latches into open position for servicing and easy ballast removal for additional security
- Ballast coils located in upper compartment to isolate heat from sensitive components and provide more efficient operation and longer life
- G.L. ballasts are manufactured to demanding quality standards
- Electrical disconnects and independent fuse protection accessible in service compartment without removing transformer base panels
- Dead front panels prevent inadvertent contact with high voltage components of the electrical system (not shown)
- Thermal resistance system provides barrier that transfers from the ballast enclosure. This allows more efficient operation and less energy consumption
- Remote ballast enclosure meets UL Standard 9212

- Modular plug-in connector
- Non-black and numbered terminals
- Heavy duty cable designed for vertical installations complete with support hangers

APPENDIX B
PROPOSED ELECTRICAL DRAWINGS
UNIVERSITY OF GUELPH ATHLETIC AND RECREATION MASTER PLAN • MARCH 2007

APPENDIX ELECTRICAL REPORT

173
INTEGRATED POWER CENTRE (IPC)
(TYPICAL FOR IPC’S #1, 2 & 3)
INTEGRATED POWER CENTRE (IPC)

FOR IPC #4 ONLY

[Diagram of an electrical system with labels and components, including
154V CAMPUS LOOP FEEDER, 154V CAMPUS LOOP FEEDER, etc.]

LEGEND

ITEM No. | DESCRIPTION
---|---
1 | 154V RATED LOAD BREAK SWITCH OR SF6 INSULATED MINI-SWITCH ASSEMBLY.
2 | CAST COIL TYPE POWER TRANSFORMER 154V-600/547V, 3PH, 480V WITH INSULATING SF6 GAS.
3 | ENERGY EFFICIENCY REQUIREMENT: 80/92 WATTAGE.
4 | SF6 BREAKER C/W LIGG PROTECTION DEVICES.
5 | BACK TO BACK MOUNTED 42 CIRCUIT, 225A MAINS, 547V LIGHTING PANEL.
6 | LOW VOLTAGE LIGHTING RELAY PANEL (48 RELAYS)
7 | UNIT ASSEMBLY SHALL BE OF NEMA 4R WITH TAPERRUPTING ENCLOSURE, EACH SECTION.
8 | EPOXY FILLED DRY TYPE DISTRIBUTION TRANSFORMER AS PER SF6 80/92 EFFICIENCY REQUIREMENTS: 454KVA, 600-120/208V.
9 | BACK TO BACK MOUNTED: 42 CIRCUIT, 225A MAINS, 120/208V, 3PH, 48 RECEPTACLE PANELS FITTED WITH RESIDUAL CURRENT PROTECTOR UNIT (TYPICAL).