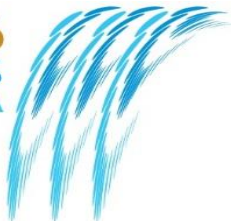


# The Toronto Pan Am Sports Centre

Delivering Extra Value to the University  
Through Partnerships With Outside  
Organizations: A Case Study

**ERAPPA 2016**  
NIAGARA FALLS  
ONTARIO CANADA

*Navigating in a  
Climate of Change*



## AIA Learning Outcomes

1. Explore the requirements and processes that lead to innovative public and private sector partnerships including City of Toronto, University of Toronto, Pan Am Toronto 2015 and Canadian Sports Institute Ontario
2. Identify sustainable design principles that lead to overall reduction in operational costs including but not limited to: ground source heat pumps and photovoltaics.
3. Describe the creation of a unique, accessible, legacy facility for the University and the Community at large.
4. Recognize the delivery of a legacy project through an alternative finance and procurement model.



**Andrew Arifuzzaman**

Chief Administrative Officer  
University of Toronto Scarborough



**David Clusiau**

Senior Principal, Architectural Design  
NORR Limited Architects and Engineers

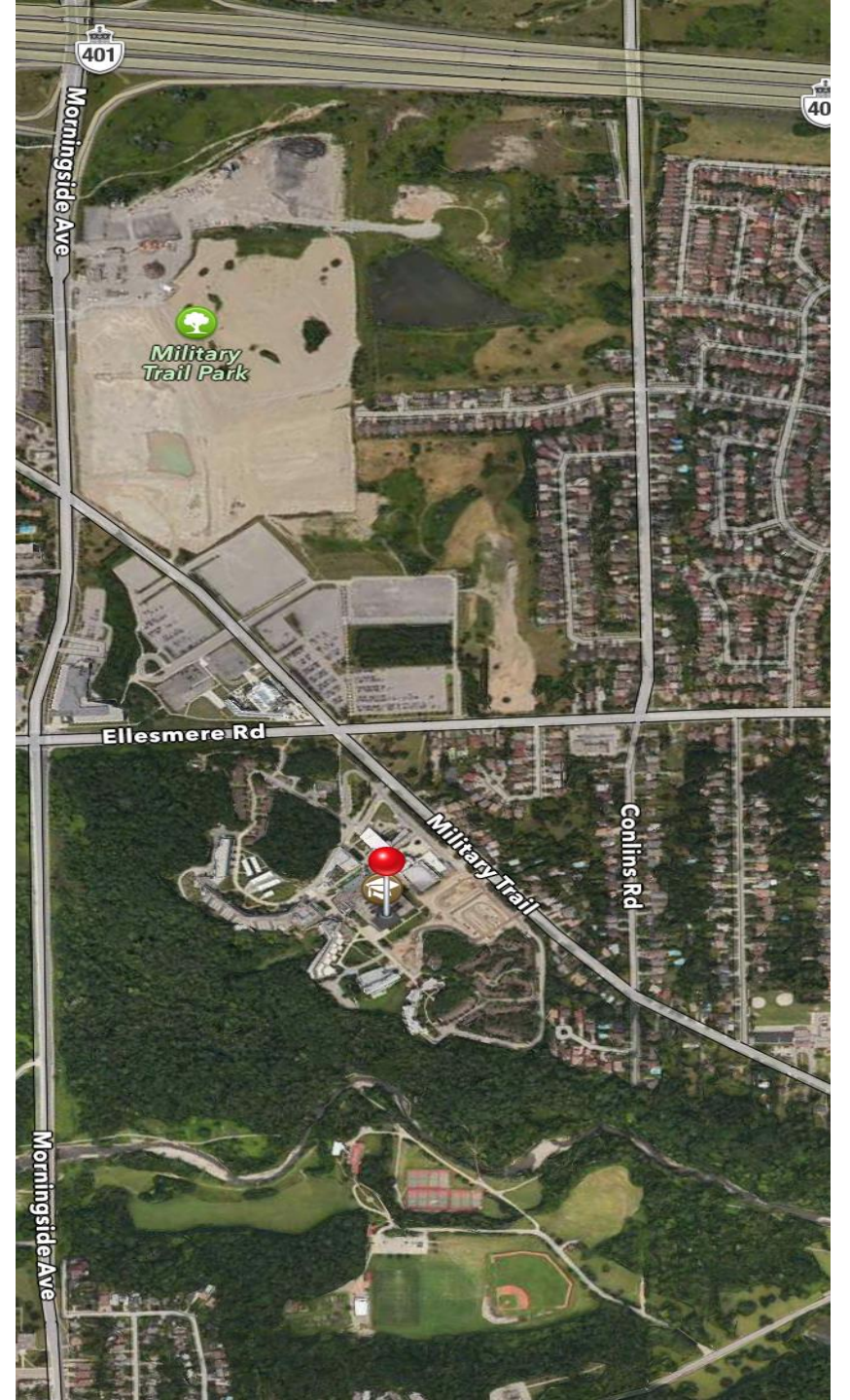
# AGENDA

- Facility Needs and Drivers
  - Opportunity for Synergy
  - Goals
  - Delivery Method – Design Build Finance
- Design Solution
  - Flexibility
  - Accessibility
  - Green Standards
  - Energy features
- Results

# Eastern Gateway to the City of Toronto

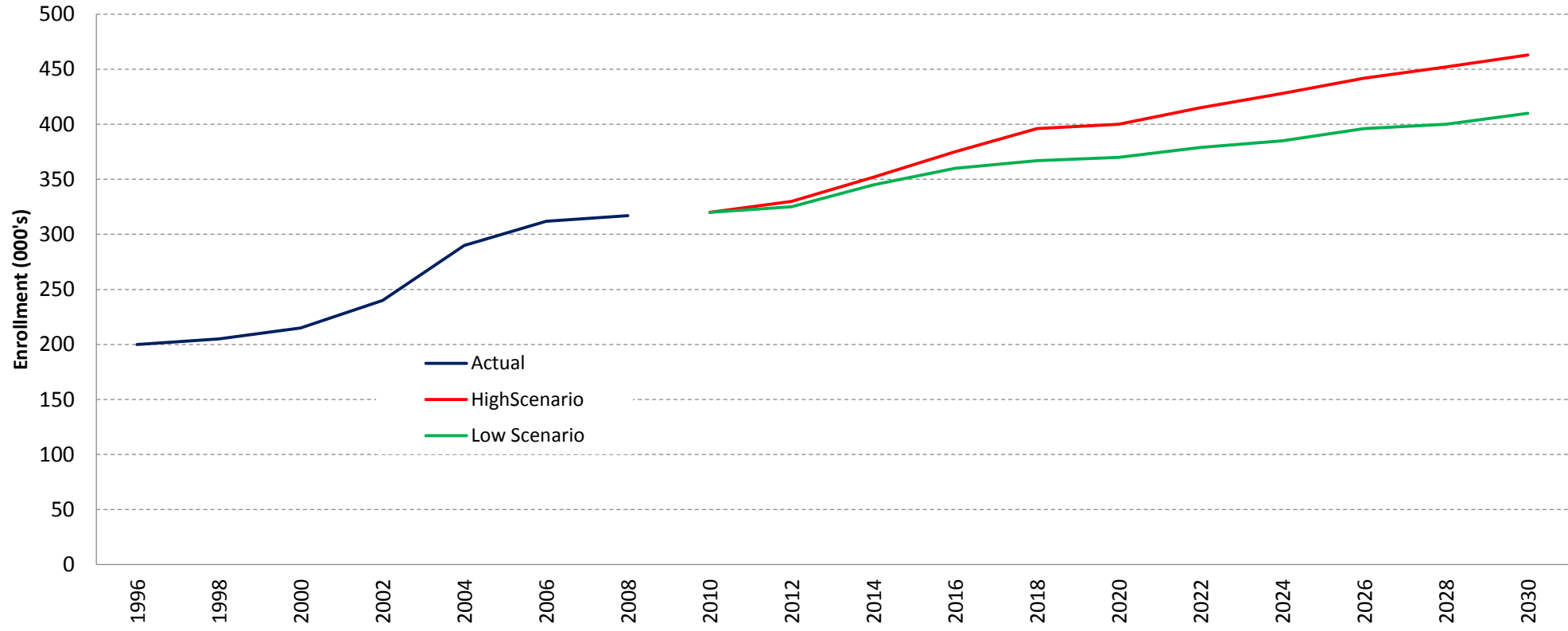


- UTSC is a comprehensive research intensive university in the U of T tri-campus system
- UTSC Currently has +14,000 students
- Growth over the next 5 years to 16,000+ students
- More than 1,000 Staff and Faculty
- Total UTSC student population on Campus will over 20,000 by the end of the decade
- The Toronto Pan Am Sports Centre (TPASC) Facility has created a regional draw for Campus for decades to come



# University System Growth In Ontario

## Ontario Undergraduate Full-time Demand Scenario Projections





TRENT UNIVERSITY

UOIT  
CHALLENGE INNOVATE CONNECT

YORK UNIVERSITY  
UNIVERSITY UNIVERSITY  
redefine THE POSSIBLE.

UNIVERSITY OF TORONTO  
SCARBOROUGH

RYERSON UNIVERSITY

UNIVERSITY OF TORONTO  
ST GEORGE

UNIVERSITY OF TORONTO  
MISSISSAUGA

UNIVERSITY OF GUELPH



University of Waterloo

McMaster University

# City Building: Our Opportunities

## Intellectual, Innovation, Cultural and Sporting Hub



- Teaching and Research



- Athletics Centre



- Retail, Industry & Partnerships



- Places to hang out



- Student Housing



- Public Transit



- Hotel/Conference Centre



- Image

## Master Plan: New Intellectual and Cultural Hub

- Cohesive Academic Draw
- Academic/Industry Partnerships
- Residential Development
- Pan Am and Legacy



## The Project – Partnerships in the Toronto Pan Am Sports Centre

### Programs provided by the following:

- Toronto Pan Am Sports Centre Inc.
- City of Toronto, Parks, Forestry and Recreation
- University of Toronto Scarborough
- National and Provincial Sport Organizations
- Canadian Sport Institute Ontario



## Individual Objectives

### University

Leverage investment to create an athletics facility to meet the needs of student sport and rec requirements for the long-term

### City

Create a facility that address shortage of facilities in eastern GTA

### Canada

Create facility that can host TO2015 and provide High Performance training Facility in Ontario

## Opportunity for Synergy – Partnerships have Challenges

- Internal Challenges
  - Needing partnerships?
  - Giving up sole control
    - Design
    - Financial
    - Development
    - Systems
- External
  - Variability in stakeholder interests
  - City recreation programs
  - Elite High Performance
  
  - Near term Games
  - Long term operations

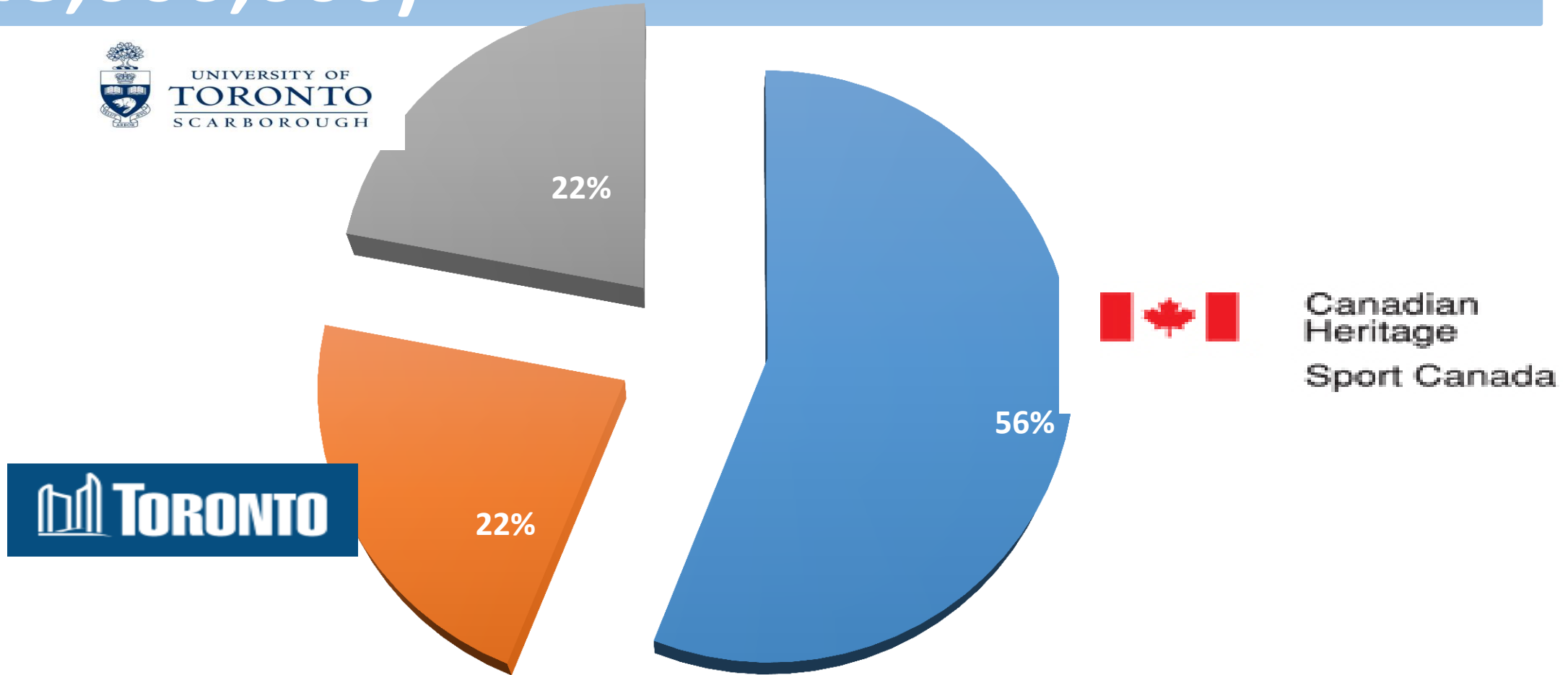
## Space Allocation

- All Space has been allocated based on the use of “fields of play”:
  - 31% to the City
  - 17% to the University
  - 30% to High Performance (NSOs and PSOs)
  - 22% to Permit / Rental Groups
- The cost of space is charged back to each group based on the percentage allocated

## LEGACY GOALS

- Puddle to podium for all ages and all calibers – from recreational to high performance
- Destination for the local and regional communities
- Signature gateway for the UTSC Campus
- Hub for students and amateur athletes
- Attract secondary benefits -new transit, community investment and student jobs
- Bring multicultural community together through sport and recreation
- Sustainable facility (environmentally and financially) for the long-term

# Capital Contributions (TPB \$248,000,000)



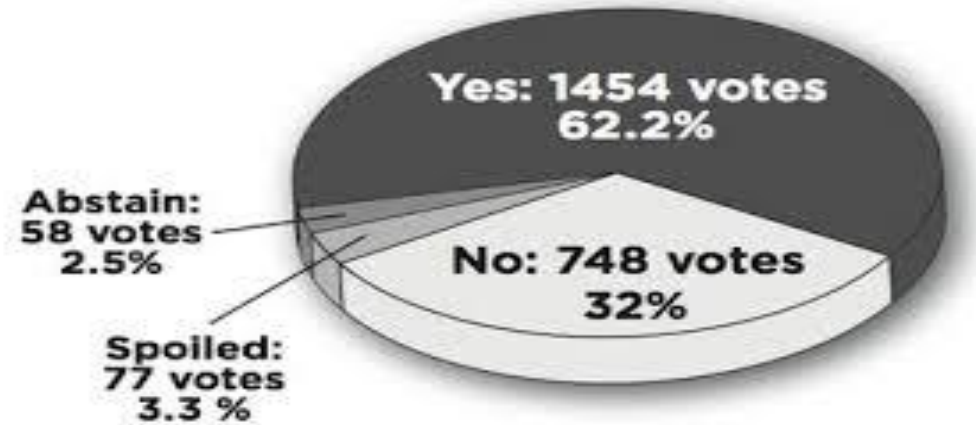
# Students Partner with the University

**I DESERVE  
WORLD  
CLASS...  
VOTE  
YES!**

**VOTE ON MARCH  
17, 18, 19 IN THE  
STUDENT CENTRE**

**[WWW.SCSU.CA/YES](http://WWW.SCSU.CA/YES)**

Logos for the University of Toronto, SCSU, and SCAR are at the bottom.



# Project Partners

Owners/Capital  
Funders/Land  
Contributors



Capital Funders



High Performance  
Sport Partners



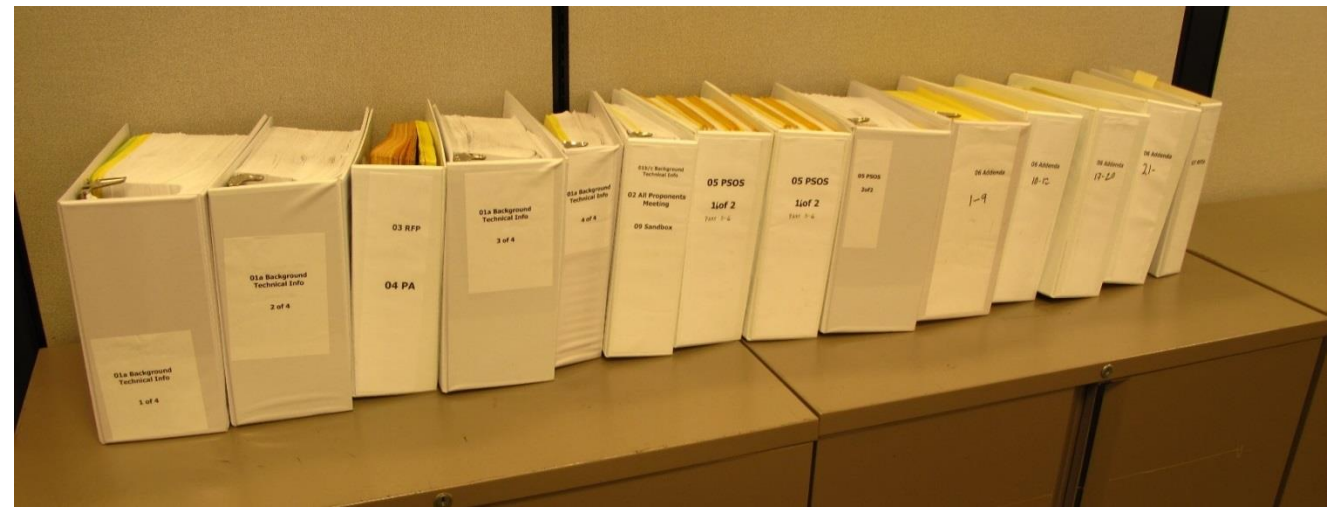
# Delivery Method – Design Build Finance



- **Responsibility**
- DBcF
- Procurement
- Project Specific Output Specifications
- Project management
- Provide Financial backstop for cost overruns

## ADDED COMPLEXITY UNIQUE TO PAN AM

- Multiple phases
  - Pre games facility
  - Games facility
  - Post games legacy facility
- Multiple clients
  - Infrastructure Ontario
  - Toronto 2015
  - University of Toronto
  - City of Toronto



## Project Team



**CONSTRUCTION LEADERS**



Design and Construction



Project Management



Ownership



## DESIGN CONSULTING TEAM

- Architects
- Structural Engineers
- Mechanical and Electrical Eng.
- Aquatic Design
- Landscape Architects



NORR Limited Architects and Engineers  
Halsall Inc.  
Smith + Anderson  
Counsilman-Hunsaker  
Janet Rosenberg + Associates

## Critical Elements to Deliver the Toronto Pan Am Sports Centre

- Site of facility
- Landfill remediation
- Student support
- Project Delivery via Infrastructure Ontario
- Creating a model for operations

## Land Fill and Site Remediation

- 300,000 tones of Landfill removed
- Over 100 Transport trucks per day
- Work started in summer of 2011 and completed in summer of 2012



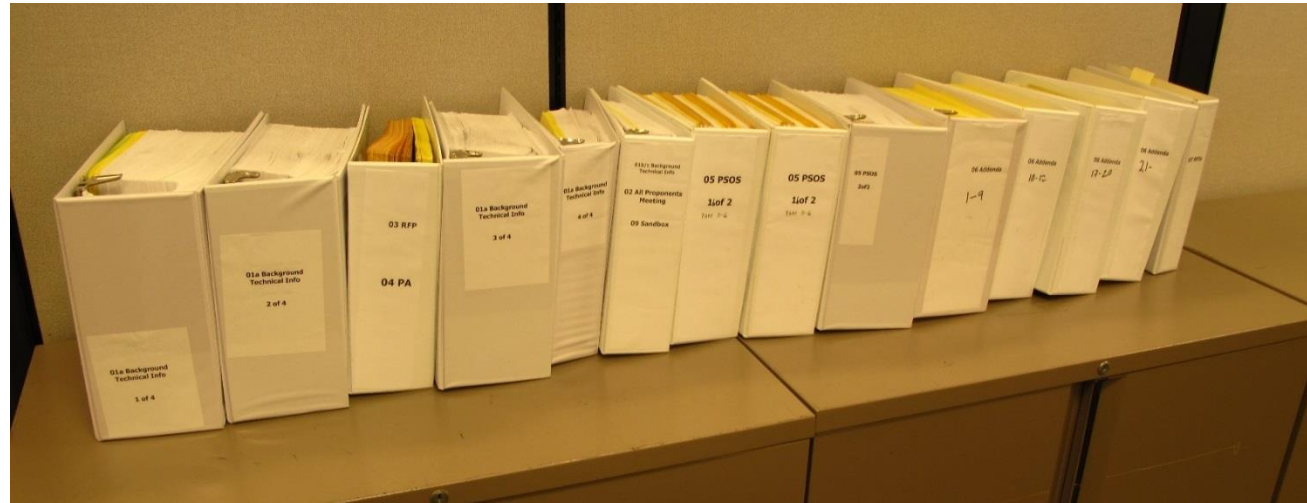
## TPASC Site

- Collocated on City and University Lands
- Built in a way that function in the near-term and long-term
- Master plan Road infrastructure in place





# Design Solution



## PROGRAMME REQUIREMENTS

- Aquatics Component
  - 2- FINA Regulation 50m Competition Pools
  - 1- 10 m Dive Tank
  - 3200 permanent seats
- Fieldhouse
  - FIBA Basketball
  - FIVB Volleyball
  - 1200 permanent seats
- Fitness Centre
  - Teaching Studios
  - Rock climbing
  - Fitness area
- Canadian Sports Institute Ontario (CSIO)
  - Training facility for elite athletes
  - Administration
- Support Spaces,
  - Administration Offices
  - Daycare,
  - Food Services,

## PAN AM REQUIREMENTS

### Pan Am Games Mode

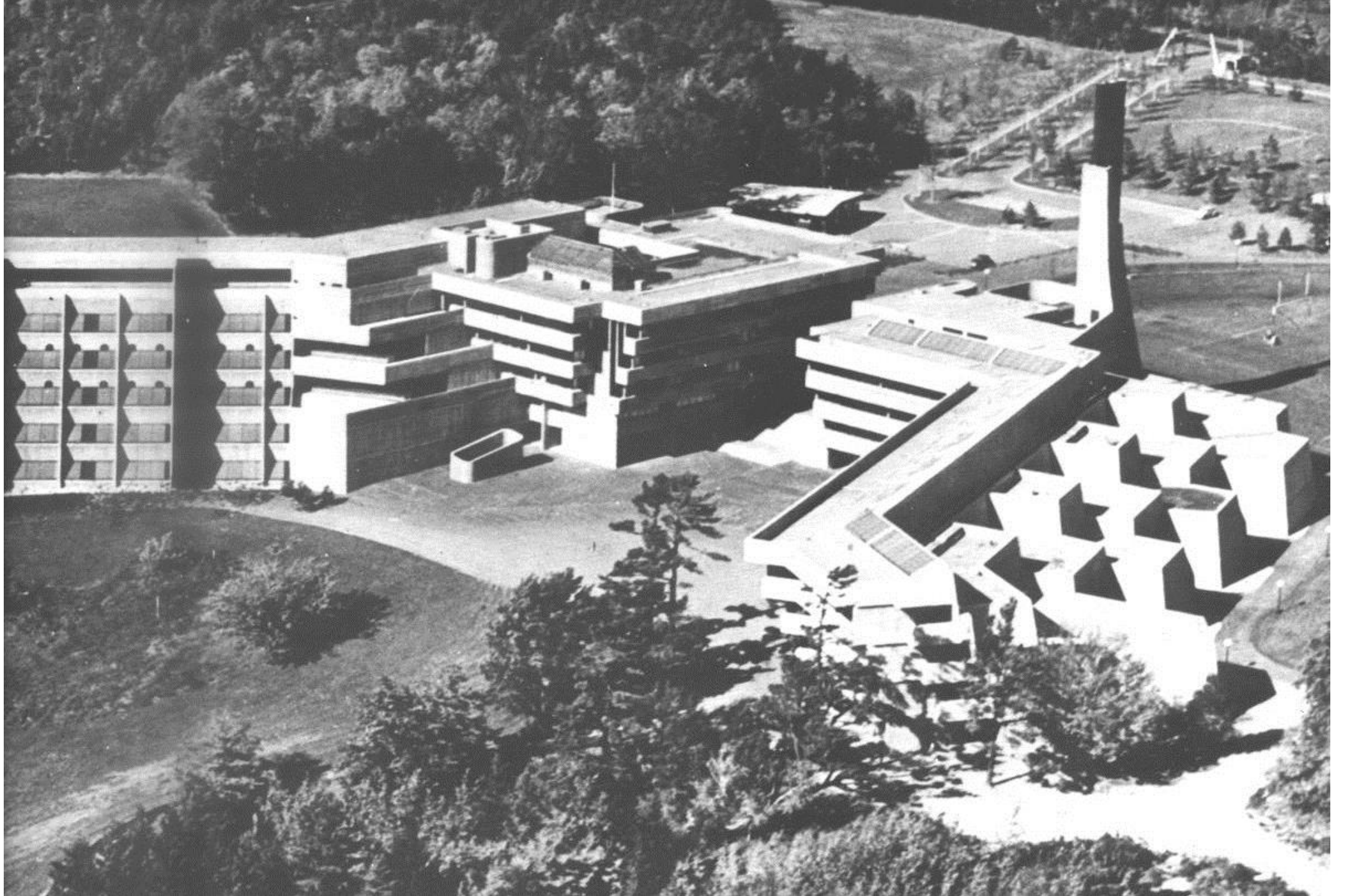
- Swimming and Diving events
- Modern Pentathlon
- Fencing
- 6000 seats (2800 temporary seats)

### Para Pan Games Mode

- Swimming and Diving events
- Seated Volleyball

## DESIGN INSPIRATION

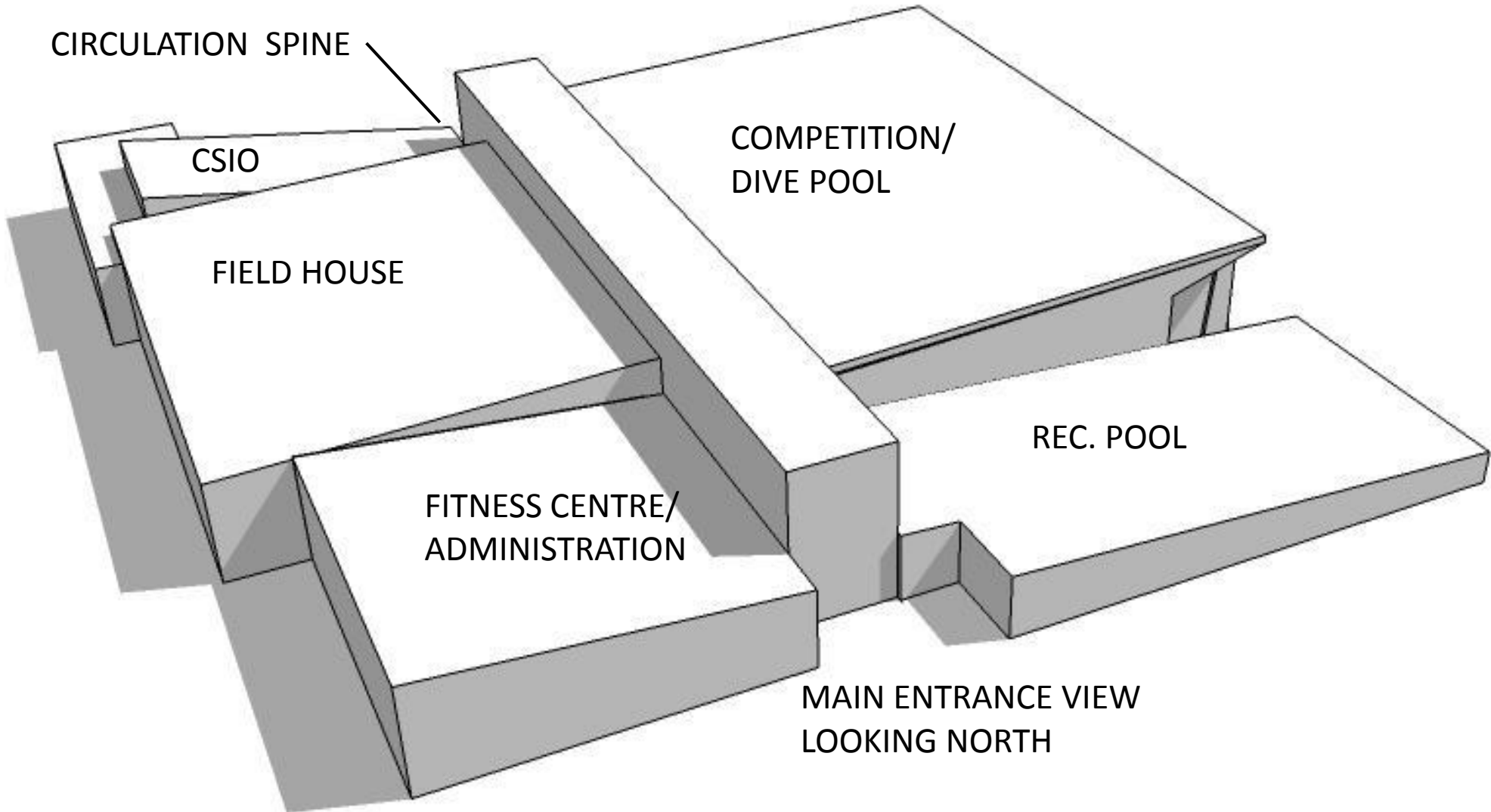




# DESIGN







CIRCULATION SPINE

CSIO

FIELD HOUSE

FITNESS CENTRE/  
ADMINISTRATION

COMPETITION/  
DIVE POOL

REC. POOL

MAIN ENTRANCE VIEW  
LOOKING NORTH



LEVEL 3  
TEACHING STUDIOS  
ADMINISTRATION

LEVEL 2  
(GROUND LEVEL)

FITNESS  
ATRIUM

CSIO  
MAIN CONCOURSE  
LOADING

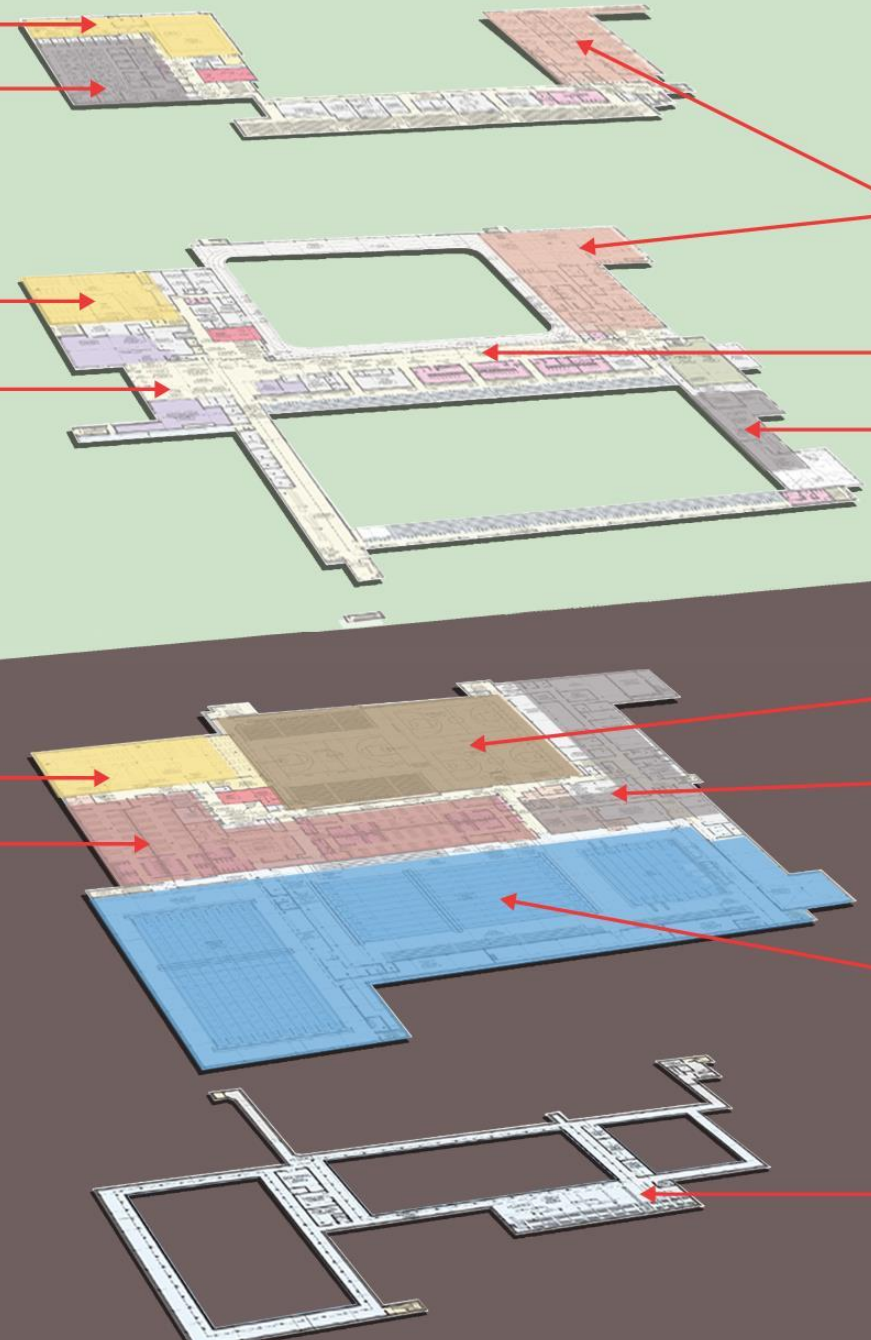
LEVEL 1

FITNESS  
CHANGE ROOMS

FIELD HOUSE  
STAFF AND  
STORAGE AREA  
AQUATICS

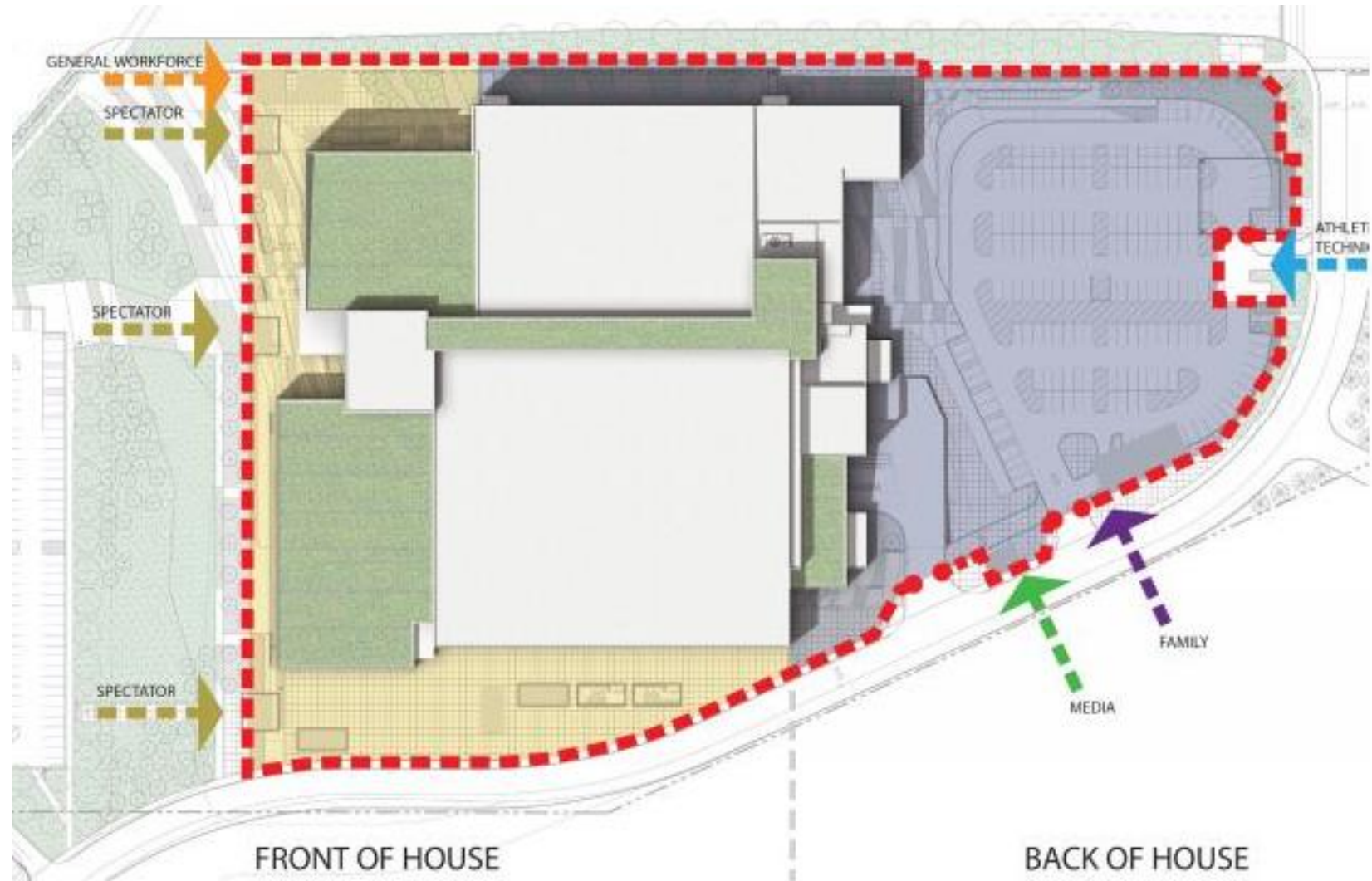
LEVEL 0

SERVICE LEVEL



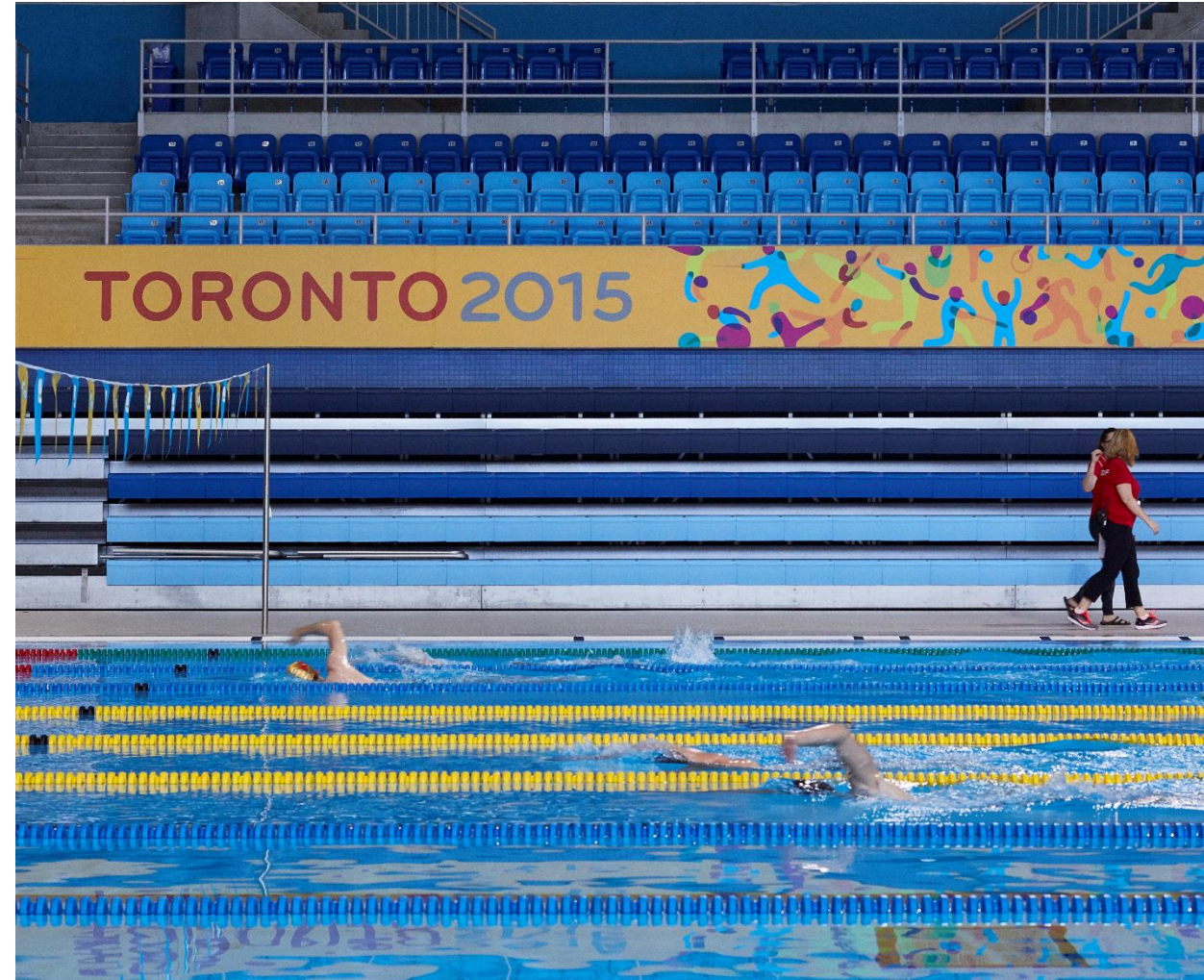
## SHORT TERM INTERVENTIONS

- Fencing ceiling clearances in the fitness area
- Delayed Change cubicles in the universal change room
- Exits used as temporary games entrances



## NO SPACE CREATED JUST FOR GAMES

- Pan Am Family Lounge = Legacy board room
- Pan Am Press Centre = Sports Medicine Clinic
- Pan Am equipment, operating technology massage and extra doping facilities = storage in the legacy facilities
- Games broadcast and operations compound = post games north parking lot
- Landscaping delayed to allow games access in certain areas



## TEMPORARY SEATING

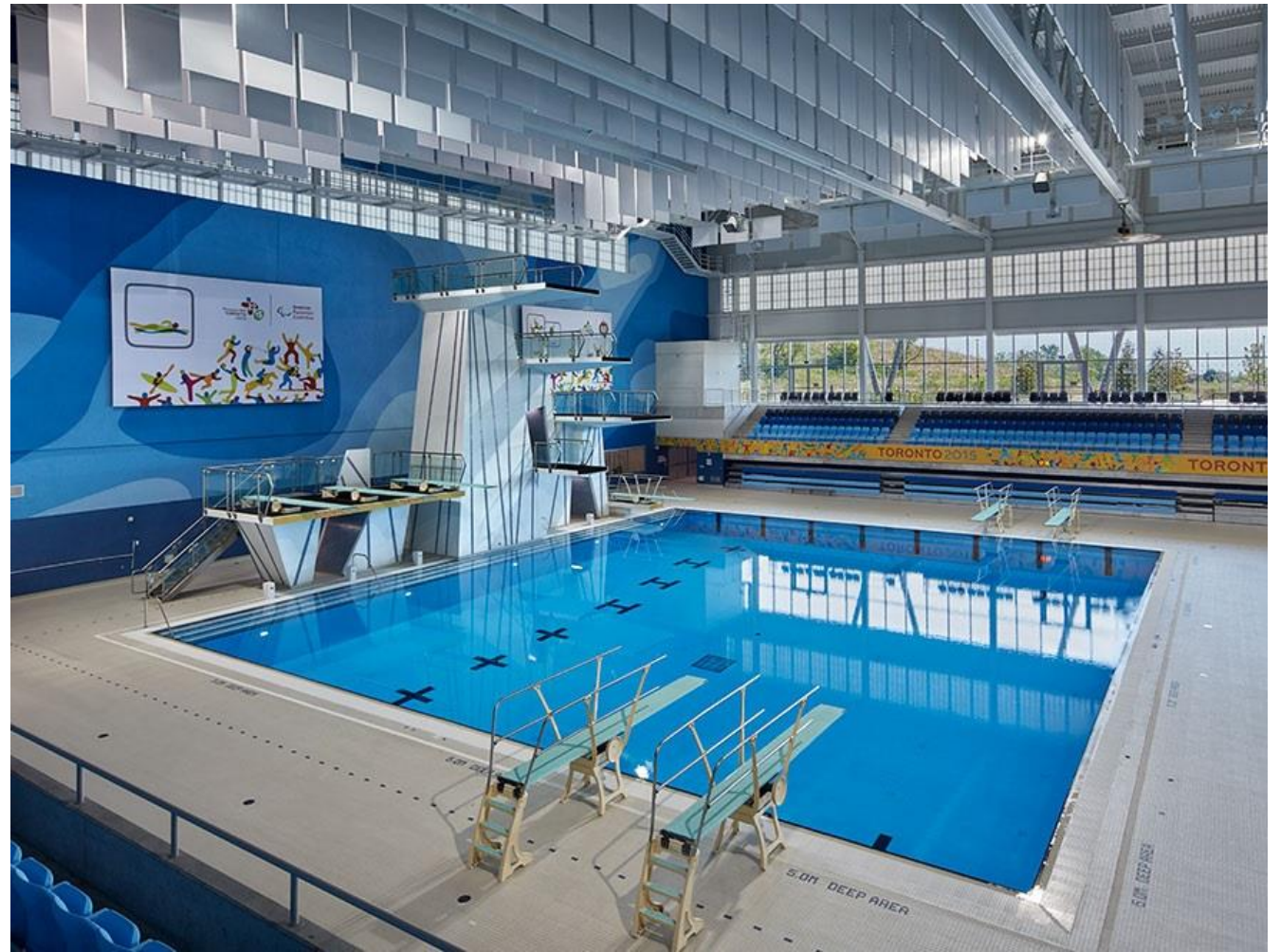


- Temporary seating enclosure for the aquatic venue
  - Roof retained as a permanent feature
  - Roof support designed based on summer roof loading to achieve a column free viewing during the games

Field house designed to achieve required field of play for key events with additional temporary seating for games events



2800 temporary aquatic seating



## FLEXIBILITY

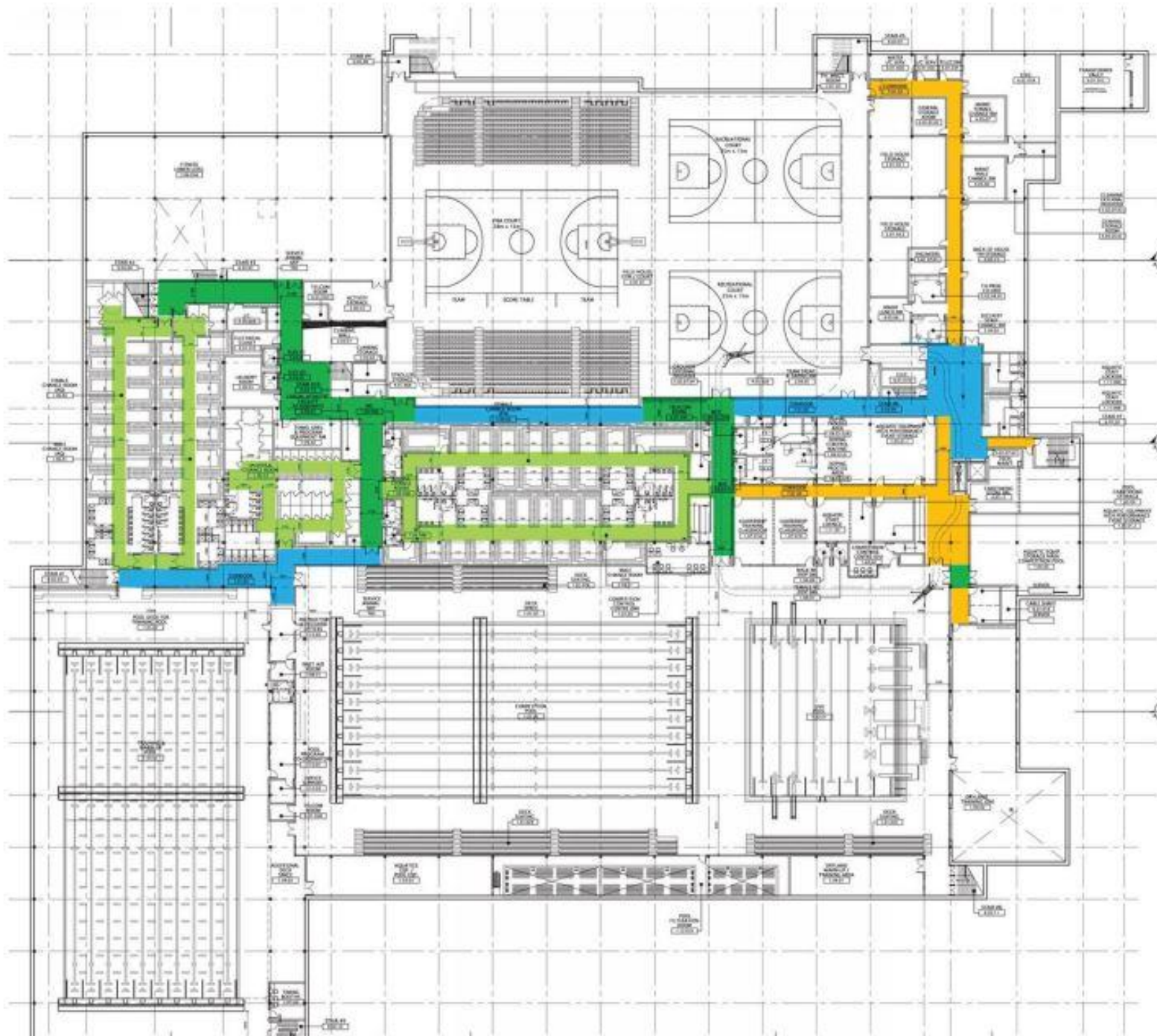
- 3 meter deep 50 meter warm up pool with a retractable floor
- baby room and daycare to all participation by additional community members










## ACCESSIBILITY

- Responding to the Para pan requirements drove a new level of accessibility
- Flow through elevators
- Hierarchy of corridors
- Seating standards
- Barrier free washrooms, change/ locker rooms
- Universally accessible change rooms
- Accessible change rooms
- Barrier free hardware- push pads





-  9 meter
-  4.2 meter
-  6.2 meter
-  3.1 meter
-  2.5 meter
-  2 meter
-  1.8 meter

LEVEL 1 CIRCULATION



## ACCESSIBILITY

- Philosophical approach overcoming cultural and economic barriers
- Community accessibility
  - Building transparency
  - Venues on display inviting participation
- Culturally accessibility
  - Designed to allow privacy and women only swimming
- Educational accessibility
  - Impact of using a university faculty, breaking down barriers to higher education







## TORONTO GREEN STANDARDS

- bird friendly frit
  - Shading and energy reducing component
  - Branding and identity opportunity

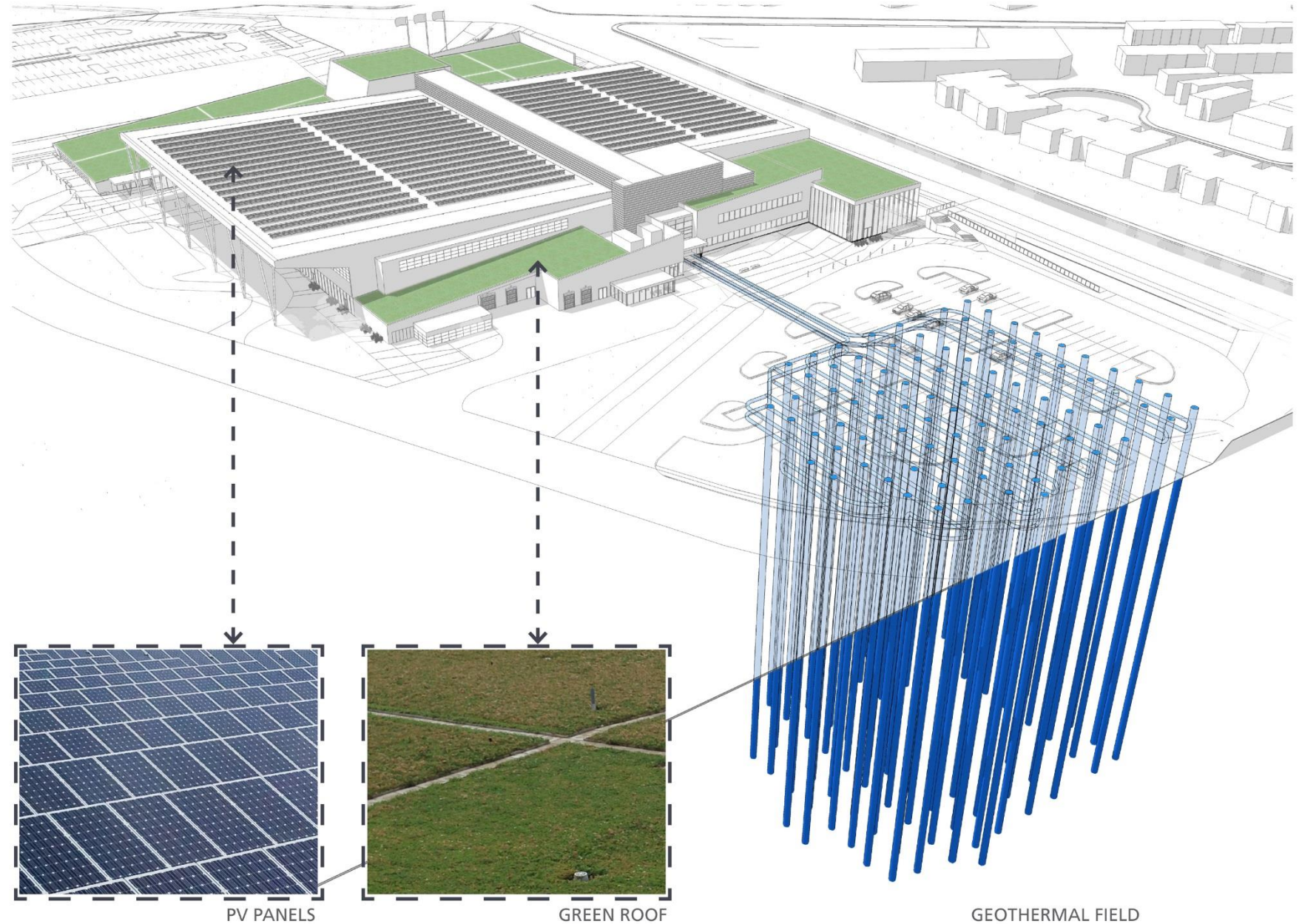




## Environmental Highlights

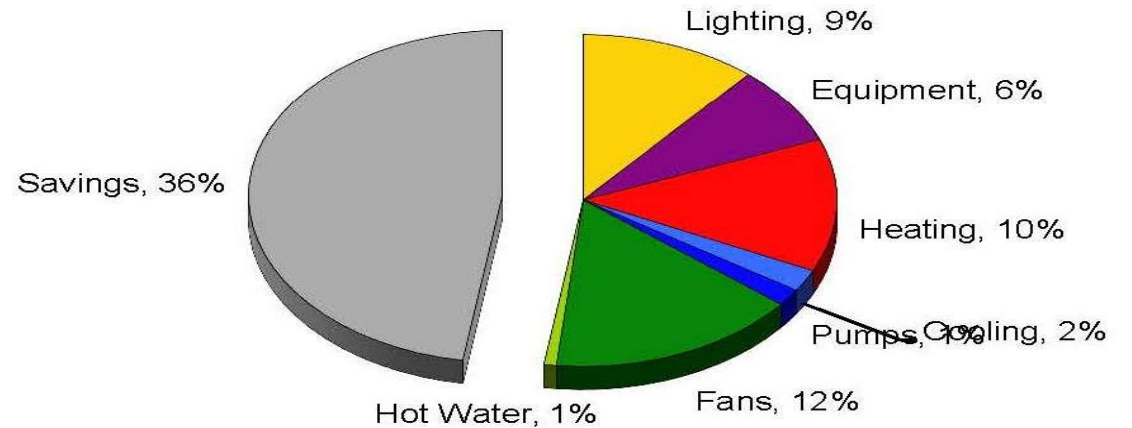
- LEED Gold
- Brownfield (Soil Remediation – 400,000 MT)
- 95% construction waste diverted from landfill
- 30% of materials in building contain recycled material
- Rain fed irrigation system
- Green roof and Low albedo roof

- 1.3 acres of green roof
- 2.2 acres of PV panels  
(500 Kilowatts)
- 100 geothermal wells  
600 Feet deep



## Energy Highlights

- 36 % Less energy than MNECB Reference building
  - LED Lighting throughout
- 500 KW Solar PV Array =
  - 75 Homes off the grid
- Geothermal
  - Provides HVAC Efficiency in Pool Dehumidification Process
  - 4000 Tons of GHG Emissions saved annually



## Geothermal

- Heat pump chiller is 1<sup>st</sup> stage of cooling and rejects heat to the geothermal field ( 320 tons of building cooling load)
- In the winter it is reversed and is used to generate low grade heat for the air handling units
- Given heating dominated nature of the building the building automation system limits winter runtime to maintain thermal balance of the field
- the number and depth of bore holes resulted in a fair number of broken drill bits
- Bed was one of first stages of the construction given the site phasing
- 15 year pay back given present gas prices and significant green house gas reductions

## Photo Voltaic

- Late addition to the project
- Structural modifications required to the long spans in order to support the extra loads
- 5,223 sm of solar panels installed Generates 500 kilowats of energy annually
- 15% of building energy needs
- Provides 100,000-150,000 savings annually and has a 14 year payback

## Other energy saving features

- Achieves 6 LEED energy points
- High efficiency condensing boilers and magnetic bearing chillers to supplement heat pump chiller
- Enthalpy wheels and heat pipes
- Low grade heat recovery loop for pool dehumidification units capturing waste heat to pre heat pool water
- Use of high volume low speed ceiling fans in in natatoriums to reduce air handling requirements

## RESULTS

- Energy performance
- Community and University Use
- 80 % of 1400 students have visited the facility in first year of 14,000
- Planned for 900 community members actual have 2300
- Great facilities -Fast water
- Games results – Women's Olympic team train in this pool
- Architectural Awards

Resident High-Performance Sport Organizations Training or Competing at Toronto Pan Am Sports Centre

# Training Community



Regularly Training at Toronto Pan Am Sports Centre



Offices located at Toronto Pan Am Sports Centre



## Records

Over 100 World, National and Pan American records broken in the facility in first 2 years of operation

*“a demonstration of the building’s superb competitive athletic venues, fast water and its supportive environment in which elite athletes are encouraged to deliver their best.”*

Enroute magazine



Penny Oleksiak  
2016 Olympic Gold Medalist

## Awards

- 2014 Large Project Achievement Award – Toronto Construction Association
- 2015 Facility of Merit–Athletic Business Magazine
- 2016 Parks and Recreation Ontario Awards – Excellence in Design Award
- 2015 Design Award Winner: Best Stadium Area – Precast /Prestressed Concrete Institute
- 2015 Ontario Concrete awards – Architectural Institutional Building
- 2015 Best Project in Ontario – Ontario General Contractors Association
- 2015 Athletic Business Facility of Merit- Athletic Business Conference & Expo
- 2016 Engineering News Record’s Global Best Project Awards
- 2016 Communication Arts Magazine – Design Environmental, Sports
- 2017 Graphis Magazine – Design Annual

## Conclusion

- Widely recognized as the most successfully delivered sports facility of the 2015 Pan Am games
- Delivered on time and on budget
- Result of the specific individuals involved and the collaborative environment that was nurtured from the inception with all participants willing to compromise to achieve an overall success.
- This spirit was carried through the design and construction process and now into the operations phase

# Questions

## Canadian Sports Institute Ontario

- 5,000 sq. ft of Strength & Conditioning Space
  - State-of-the-art equipment including cardio machines, stationary bikes, weights and lifting platforms
  - Woodway Blade Treadmill – oversized and embedded in the floor for accessibility
- Biomechanics Suite
  - Complete with motion capture cameras and video analysis
- 35m 3-lane track
  - 4 force plates embedded in the track
  - Opens to the 200m track in the greater TPASC facility
- Altitude Chamber (K2Room)
  - Anti-gravity treadmill

### Recovery and Regeneration Centre

Hydroworx 2000 pool with moveable floor, treadmill, and video analysis  
Hot and Cold Pools

### Sport Lab

DXA Body Scan for accurate body composition analysis

### Sport Performance Kitchen

Instructional and  
Demonstration Stations  
Induction cook-tops

### Athlete Lounge

### Medical Offices

CSIO Administrative Offices , Board room

Meeting space

