

THE **GALANTE** ARCHITECTURE STUDIO

SCHEMATIC DESIGN



TOWN OF BELMONT

BELMONT RINK & SPORTS FACILITY

March 9, 2023

The Galante Architecture Studio
146 Mount Auburn Street
Cambridge, MA 02138

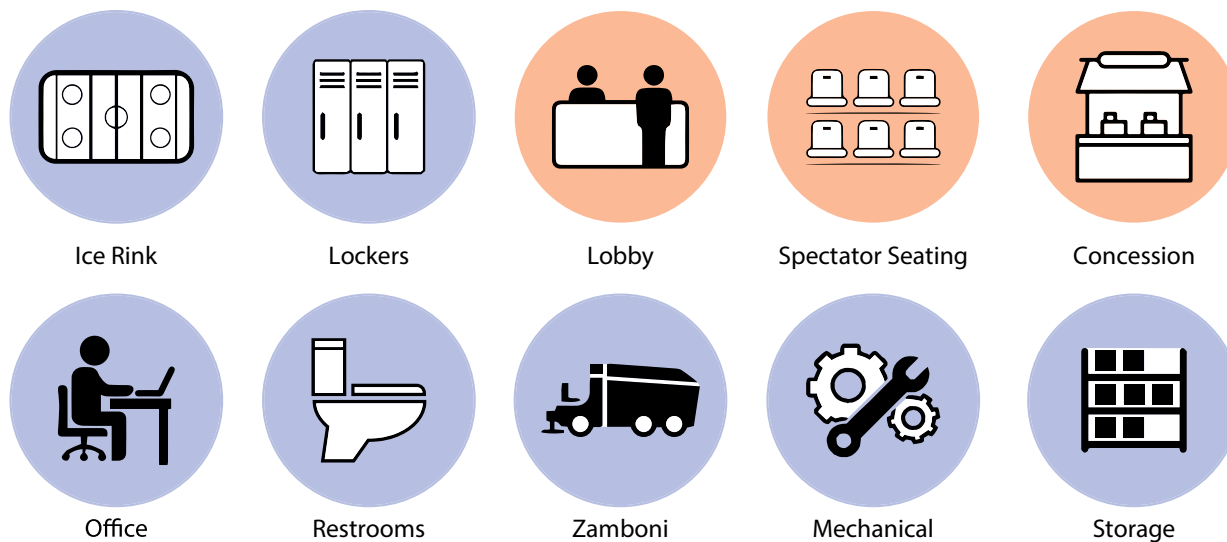
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galantearchitecture.com

Skip Viglirolo Skating Rink

Built in 1969
Completed in 1971

Thousands of young people participate in Youth
Hockey programs
High School Varsity and JV Hockey programs
Middlesex League titles
Appearances at MIAA Division I state tournaments
Champions 2020





Deficiencies

- Building not insulated
- Roof leaks
- Rusted structure



Deficiencies

- Envelope compromised
- Energy inefficiency
- Non-ADA compliant
- Non-MAAB compliant
- Walls crumbling





Rusted Purlin



Rusted bents



Cracked floor



Energy Waste

FEASIBILITY STUDY

Failing Systems

URGENT ACTION

Reports Dating Back to
1999

1999



SKIP VIGILROLO ICE RINK

Chan Krieger and Associates, Architects were tasked with investigating the condition of the Skip Vigilrolo Ice Rink. The following section is reproduced from the written analysis of their findings dated July 7, 1999.

Two major components make up the existing Skip Vigilrolo Ice Rink: the ice enclosure itself and the refrigeration equipment. A visual inspection and a tour through the facility led to the following observations.



THE ICE ENCLOSURE

The roofing panels keep most of the outside water out, so signs of corrosion are probably due to the high humidity generated inside by the activities and crowds, the flooding of the ice surface, and the fog thrown off by the ice on damp, warm days at the beginning and end of the season, as well as on the occasional warm day mid-season. The clips that hold the roof panels on and the superstructure itself are particularly vulnerable to this kind of corrosion since they are often colder than the ambient air, and thus perfect places for condensation to form. If not protected by a continuous coat of paint, this type of structure will inevitably corrode in a rink atmosphere. The superstructure has been painted at least once since it was erected and is in generally fair to good condition - with the exception of one bay over the header trench where a geyser-like leak of the refrigeration brine saturated the secondary framing. The brine contains various salts, and these appear to have worsened the corrosion of the roof structure in this area.



The insulation in the roof is suffering from an infestation of birds, who tear vinyl covering off the insulation to get at the fiberglass batting - presumably a cozy material for their nests. Designed to contain the insulation fibers, this vinyl covering also keeps the condensation away from the roofing panels. Like the fasteners and clips, the roofing panels are made of light gauge steel, so they are particularly vulnerable to corrosion.



The gutter and roof leader system is breaking away from the building and is corroded. Controlling the rainwater flowing off this large expansion of roof is vital, especially on the west side, as the regraded soccer field is at a higher elevation than the rink and appears to drain into its side wall, compounding an existing problem with the surface drainage. In New England, maintaining gutters on a roof this size is difficult because of the weight of the sliding snow. For this reason, gutter systems are sometimes designed to be "break-away", and this may be the case with the Belmont rink. At this point however, the system may simply be worn out.



III-9

1999 Report

Topic: Rink Condition

2014

3.5 | NARRATIVE OF FINDINGS

SMMA

JAMES P. "SKIP" VIGILROLO SKATING RINK

ARCHITECTURE

SMMA visited the site on the afternoon of April 25, 2014. The building is located behind the White Memorial Field house. Although there is signage on Concord Avenue, access to the rink is unclear and primarily through a service yard. The facility consists of a single story metal building with smaller masonry structures at each end housing restrooms, locker rooms, mechanical rooms and a concession area.

Enclosure

The metal framed building is clad with ribbed metal panel walls and a metal roof. Panels and roofing are heavily rusted and fasteners are corroded. Sections of the roof and gable ends are translucent fiberglass panels. The sloped metal roof has metal gutters and metal downspouts. Most downspouts are dented and damaged. Walls are not weather tight or insulated. Vinyl faced insulated panels are attached to the underside of the metal roof panels. Some of these panels are completely or partially missing. Vinyl facings are sagging, rippled, and punctured. Birds were observed in void spaces throughout the roof substructure materials. Brick masonry encloses functional spaces at the north end of the rink and CMU encloses locker rooms at the south end. At the south end there is a membrane roof on wood framing. This roof has no visible drains or gutters. The roof above locker rooms at the north end could not be observed.

The main entry has three glass and aluminum doors in a glass and aluminum storefront frame system. A pair of painted metal egress doors is located at the north end. Daylight is visible at the bottom of this door. All egress and entry doors have panic hardware. There are three motorized metal roll up service doors, two on the west side and one on the east. There is also a metal panel clad chain link fence gate on the east side. In addition to daylight from the translucent panels, there are seven small high horizontal windows and a teller type transaction window in the brick enclosed spaces.

Interior

Standard hockey rink construction consists of metal framed "boards" with plywood and vinyl cladding. Dasher is vinyl and "glass" is herculite material in aluminum stanchions. Protective mesh netting encircles the rink above the glass. Gates and equipment doors have steel hardware. Rink construction includes players, penalty and timekeepers benches. Interior surfaces surrounding the rink and in the adjoining functional spaces are basically the back sides of previously noted enclosure materials with painted finish. Rubber walking mats cover most of the floor area. Mats are stained, moldy and edges are curled presenting tripping hazards. Wood and steel fixed bleachers seating approximately 300 persons are located to the east of the rink. Steel frame and connections are heavily rusted. Roughly half those seats have sightlines suitable for game viewing. Lower rows of seating are severely splintered. A 10' high chain link fence runs just inside the metal panel walls on the east and west sides of the building.

Town of Belmont School Buildings Facilities Assessment
BELMONT, MASSACHUSETTS

11

2013 Report

Topic: Roof Purlin Structural Assessment

June 28, 2013

Department of Public Works
Homer Municipal Building
19 Moore Street
Belmont, Massachusetts 02478
Attn: Mr. Peter J. Castanino, Director

Subject: Belmont, Massachusetts
Skip Vigilrolo Ice Skating Rink
Roof Purlin Structural Assessment

Dear Mr. Castanino:

This letter report summarizes the results of a visual inspection conducted by Fay, Spofford & Thordike, LLC (FST) on March 17, 2013 to assess the general physical conditions of the roof purlins. The objective of the assessment was to investigate deterioration of the roof purlins and recommend applicable repairs.

Town of Belmont personnel directed FST to the area of concern, where small bits of debris from the roof had fallen onto the ice surface. Observations and a photographic inventory of noted deterioration was collected for the area of concern, as well as other representative areas of the roof. Visual observations were conducted using an aerial lift bucket truck provided and operated by the Belmont Municipal Light Department.

Verification of structural framing system conformity to the Massachusetts Building Code requirements is not included in the scope of this report.

Existing Conditions

According to drawings provided by the Town, the skating rink was originally constructed in 1968. The rink is a prefabricated steel building with welded steel plate columns and girders and light gage steel roof purlins. The corrugated roof panels are insulated and there is a translucent roofing system installed in some areas (photo No.1).

Visual Observations

In general, the building components are beyond their anticipated 30 to 35 year life span and require major renovation. The majority of roof purlins exhibit minor rusting and some of the translucent panels appear to be allowing water penetration. The purlin above the fallen debris shows visible loss of section (photos Nos. 2 & 3). In some areas, previously attached equipment

Failing Building



Excerpts from the three reports show

- The building has been failing for at least 23 years – since 1999.
- None of the required repair work has been done.
- The building has one year at best, possibly much less than that. Should it continue to be used for occupants?
- The roof structure could collapse. Thus a need for bussing and scheduling and a massive emergency to demolish and safely remove the building. The **cost** would be more than a managed dismantling as part of a planned facility.
- If facility is removed, the **cost** is no Belmont Skating Rink and loss of most programs that use that rink.
- Chains and padlocks lock the main egress doors. The **cost** is a beyond unsafe and dangerous condition, one not befitting for a town such as Belmont, or any town.
- Code violations appear in many areas, and the “accessible ramp” is a significant issue. The **cost** is risk of injury or lawsuit.
- There are large gaping holes, no wall insulation, and minimal ceiling insulation.
- The ceiling insulation has been infested with birds since before 1999.
- Insulation should be considered non-existent. An uninsulated building wastes more energy than might be imagined.
- All Mechanical, Electrical, and Plumbing systems are outdated. The **cost** is to continue wasting energy and money.
- The **cost** is to host a building in Belmont that contributes to global warming not aligning with being a green community.

Current rink repair needed

- Rink cannot operate next year without significant investment
 - Condensers leaking - unrepairable
 - R-22 refrigerant has been banned for environmental reasons
 - Existing chiller about to fail

Substantial year over year spending

- Plumbing - leaking
- Plumbing - weak spot potential for pipe break
- 2 hot water heaters need replacement
- Partial HVAC Loss
- Electrical system compromised
- Outdated / Failing mechanical systems
- Significantly failing building envelope
- Lack of energy efficiency or energy savings

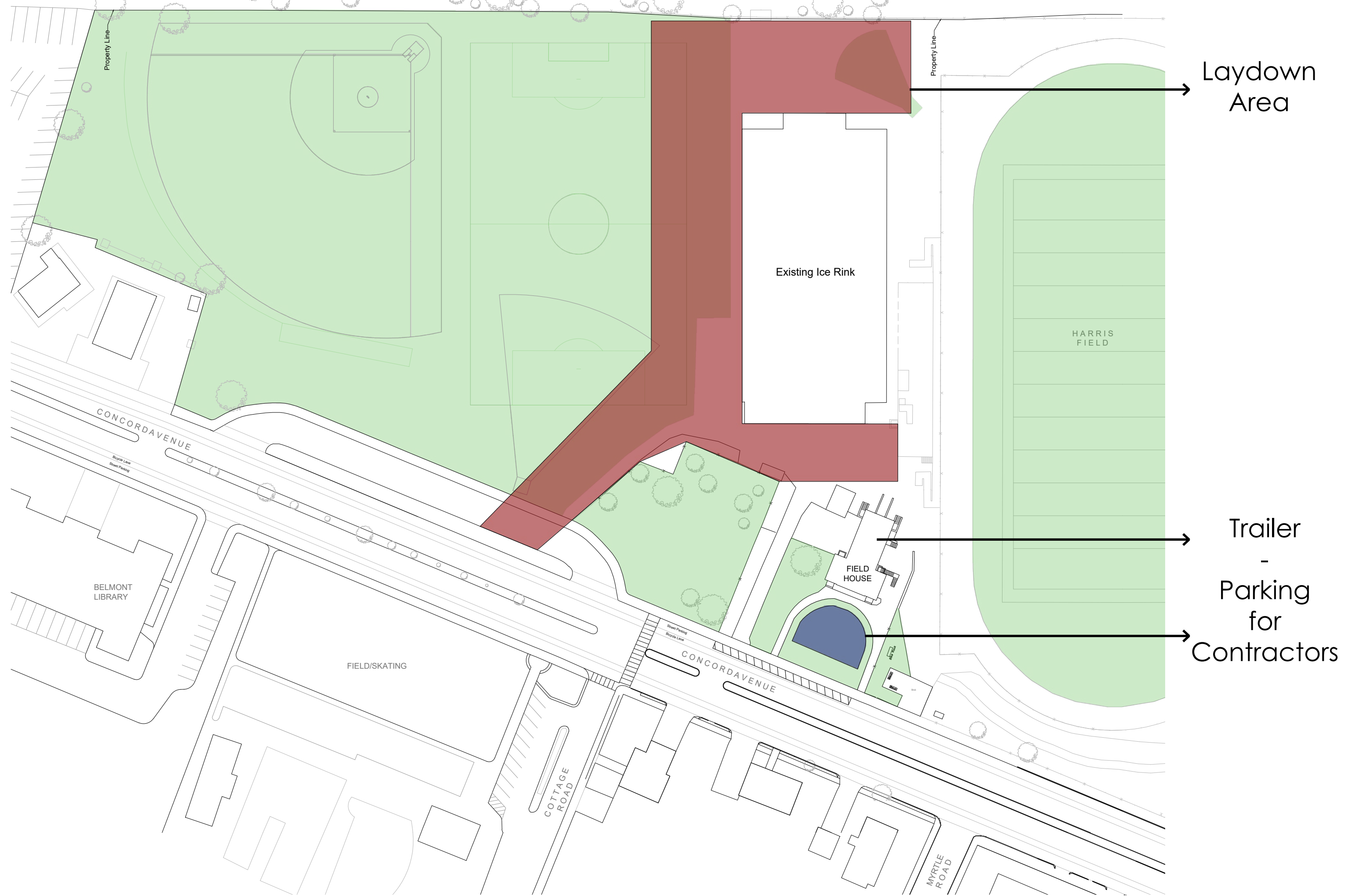
Multiprogramming

Proposed Design



Existing Site Plan





Laydown
Area

Trailer
-
Parking
for
Contractors

Laydown and Trailer Area

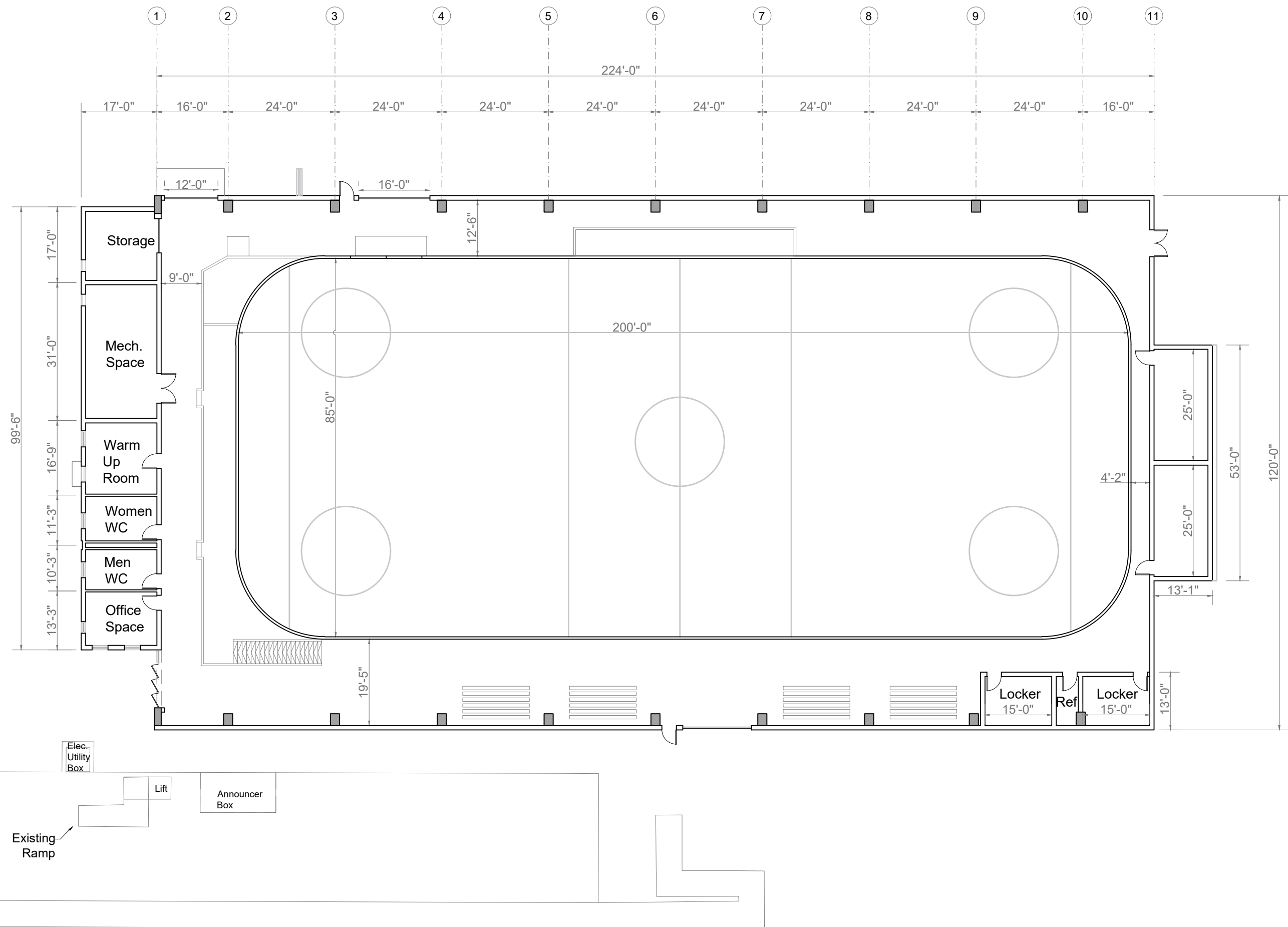
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PROPOSED

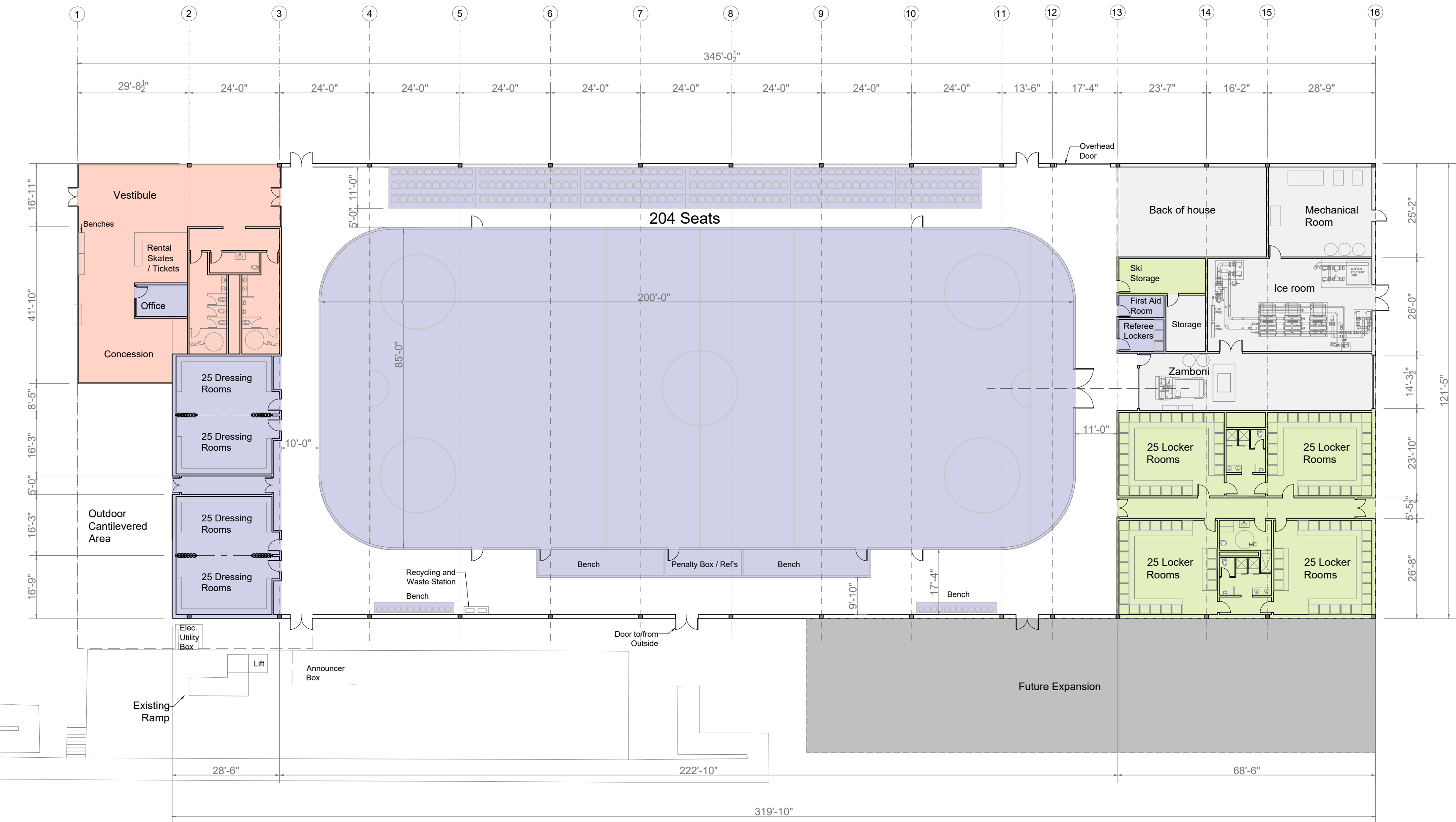




Proposed Site Plan - Photovoltaic Panels



Existing Floor Plan ± 29,600 sf
Building occupied for 4 months

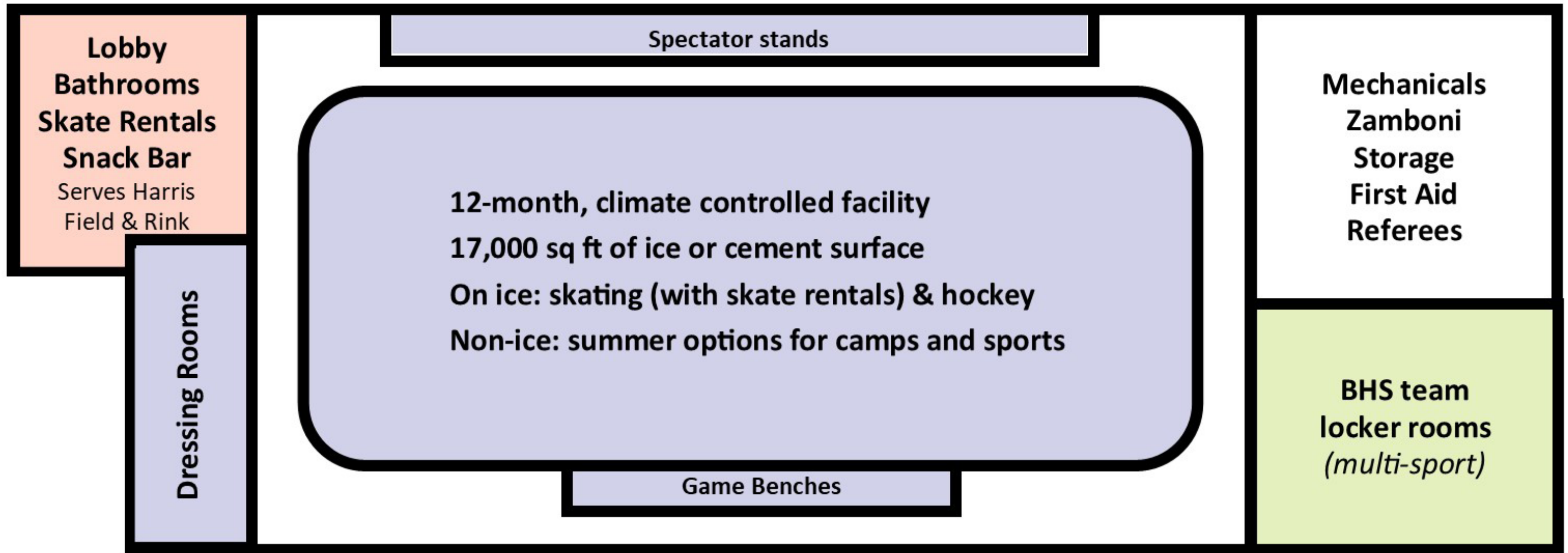


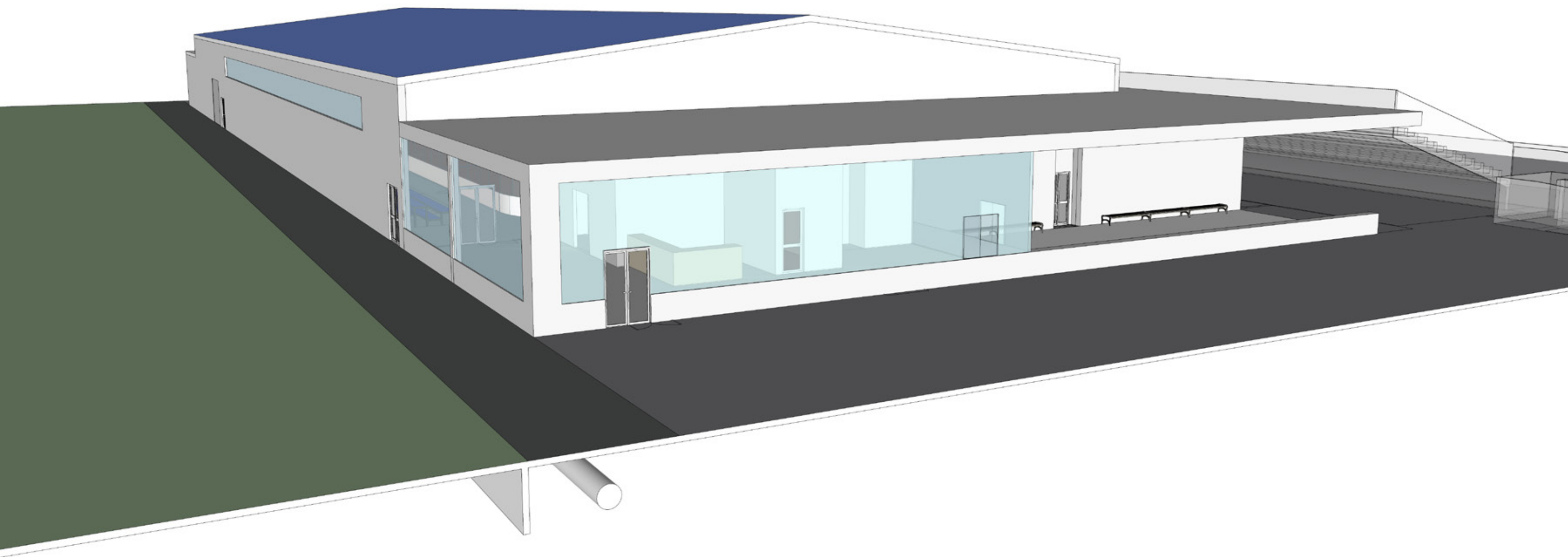
Spring 2023 - Proposed Floor Plan ± 40,313 sf
 Building occupied for 12 months for Athletic and Recreation programs

PROPOSED

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PROPOSED

MORE than a Skating Rink

Building Use

A Facility For You



PICKLE BALL



TENNIS

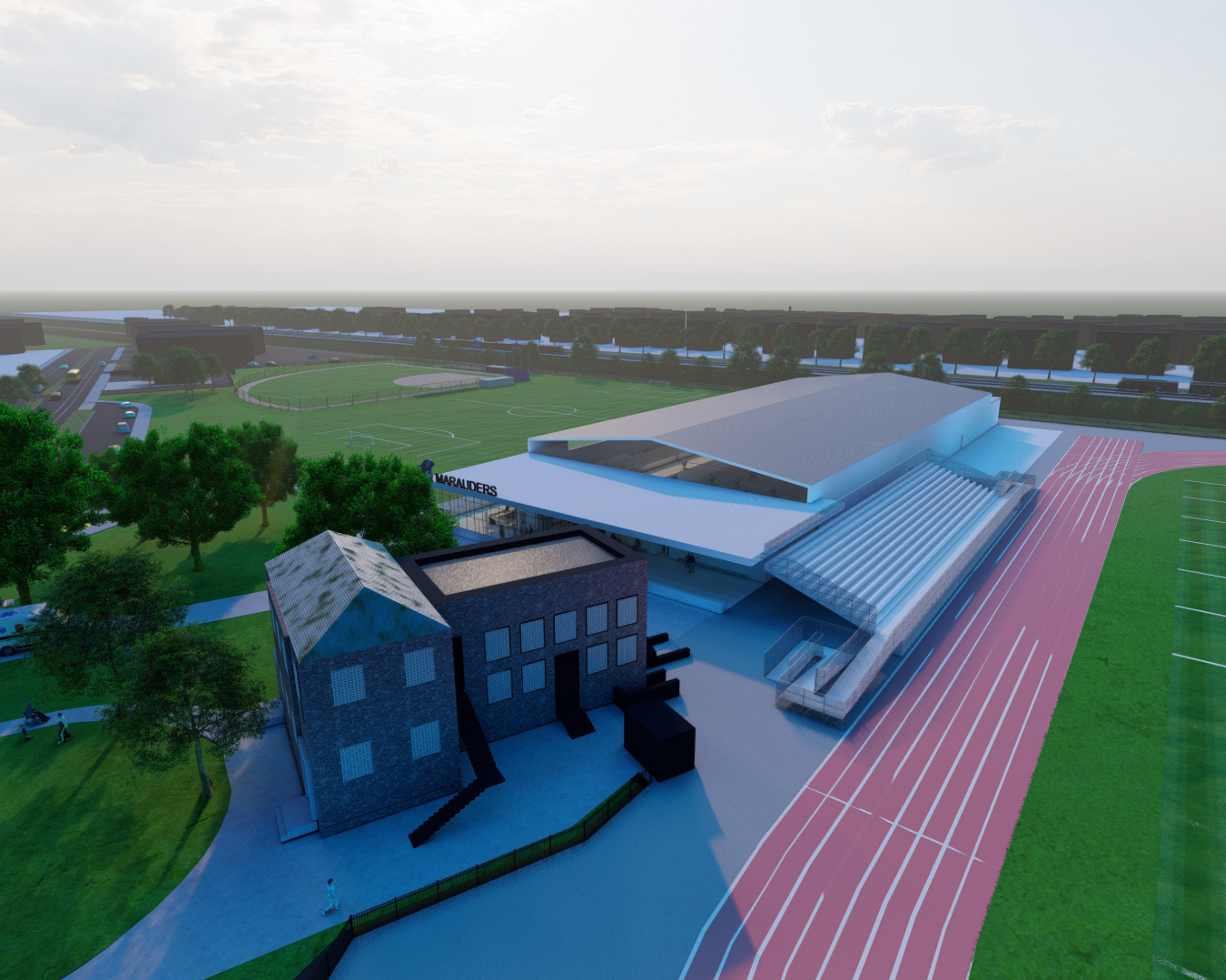


FUTSAL



INDOOR SOCCER





MARTIAL ARTS



YOGA



PILATES



LOW IMPACT AEROBICS





BOX LACROSSE



BADMINTON



DOG TRAINING



VOLLEYBALL





BASKETBALL



NETBALL



BOWLS



GYMNASTICS





STRETCHING & MOBILITY



DANCING



SPIN CLASS



SELF DEFENSE





FITNESS GROUP



ROLLER HOCKEY



ROLLER SKATING



CRICKET




POSSIBILITIES

Summer Sports





SUMMER CAMPS

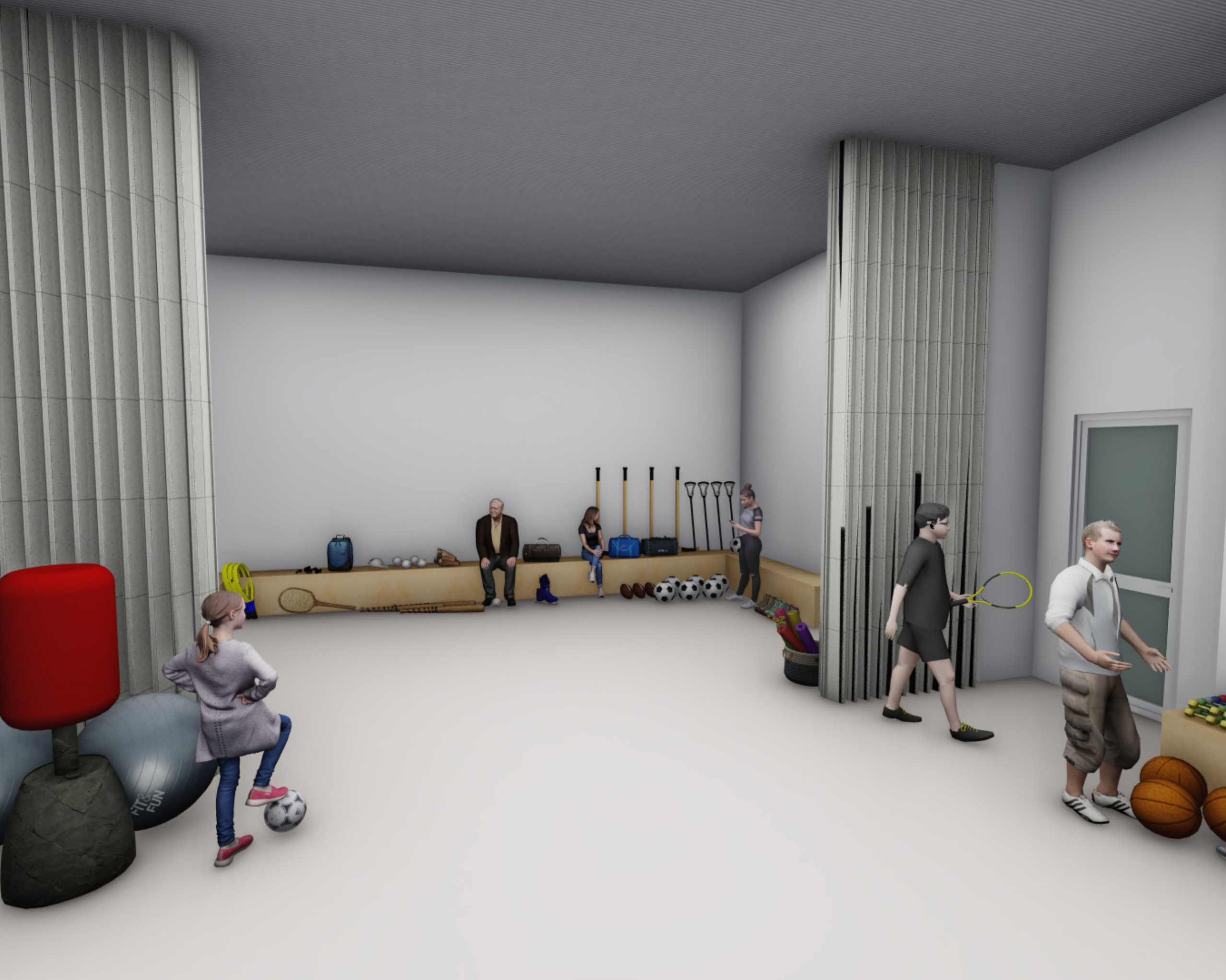


STREET HOCKEY



CURLING





SLED HOCKEY



WHEELCHAIR RUGBY



POWER SOCCER





VALLEY HOCKEY



YANKEE GIRLS HOCKEY



BYH



BHS





PTA SKATE NIGHTS



STICK & PUCK



WOMENS/MENS HOCKEY PUBLIC SKATE





PUBLIC FIGURE SKATING



SKATING LESSONS



BIRTHDAYS



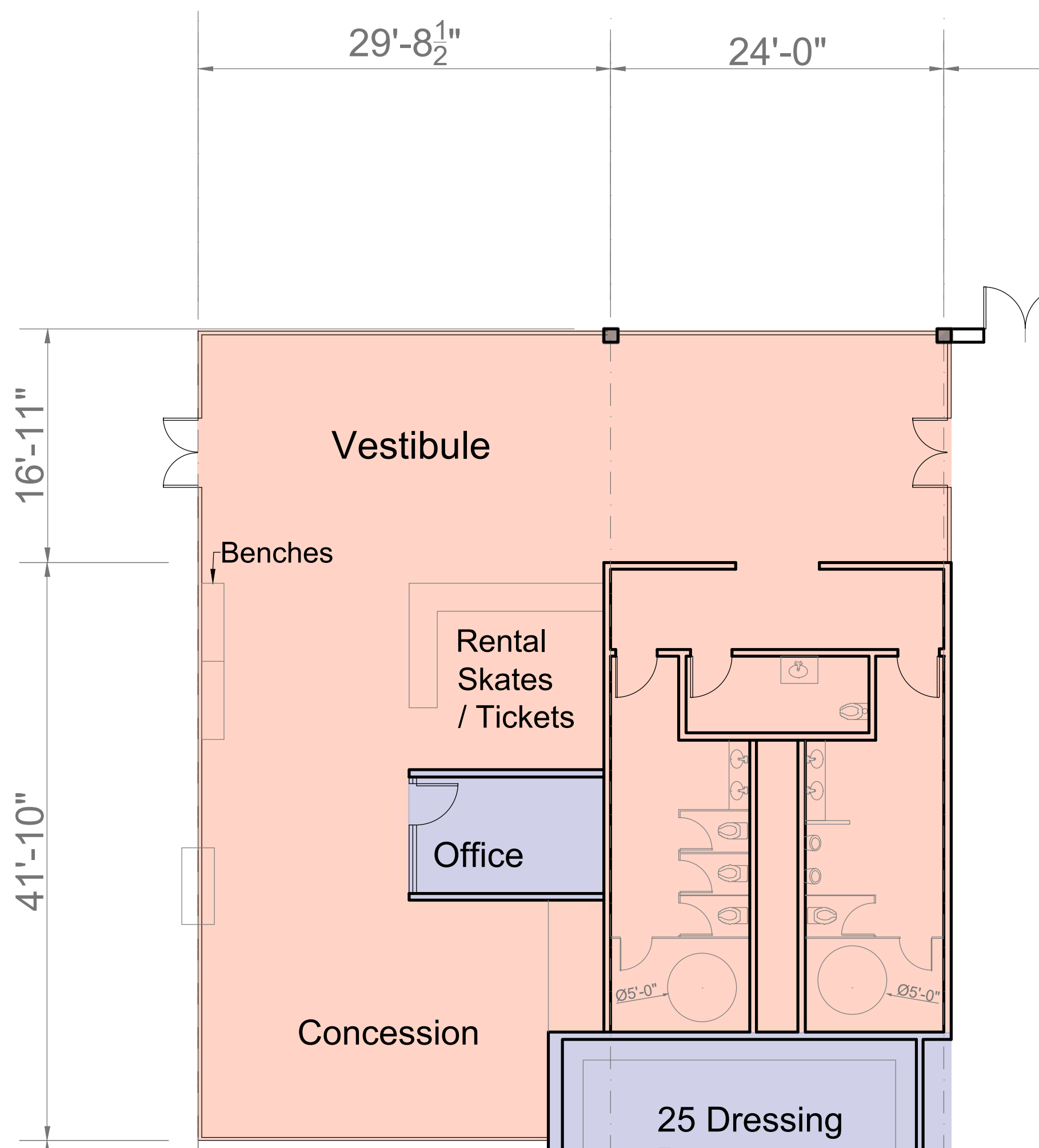
ADAPTIVE SKATING



Public Community Use

Lobby

Concessions & Restrooms



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PROPOSED





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PROPOSED

Community Concession & Restrooms





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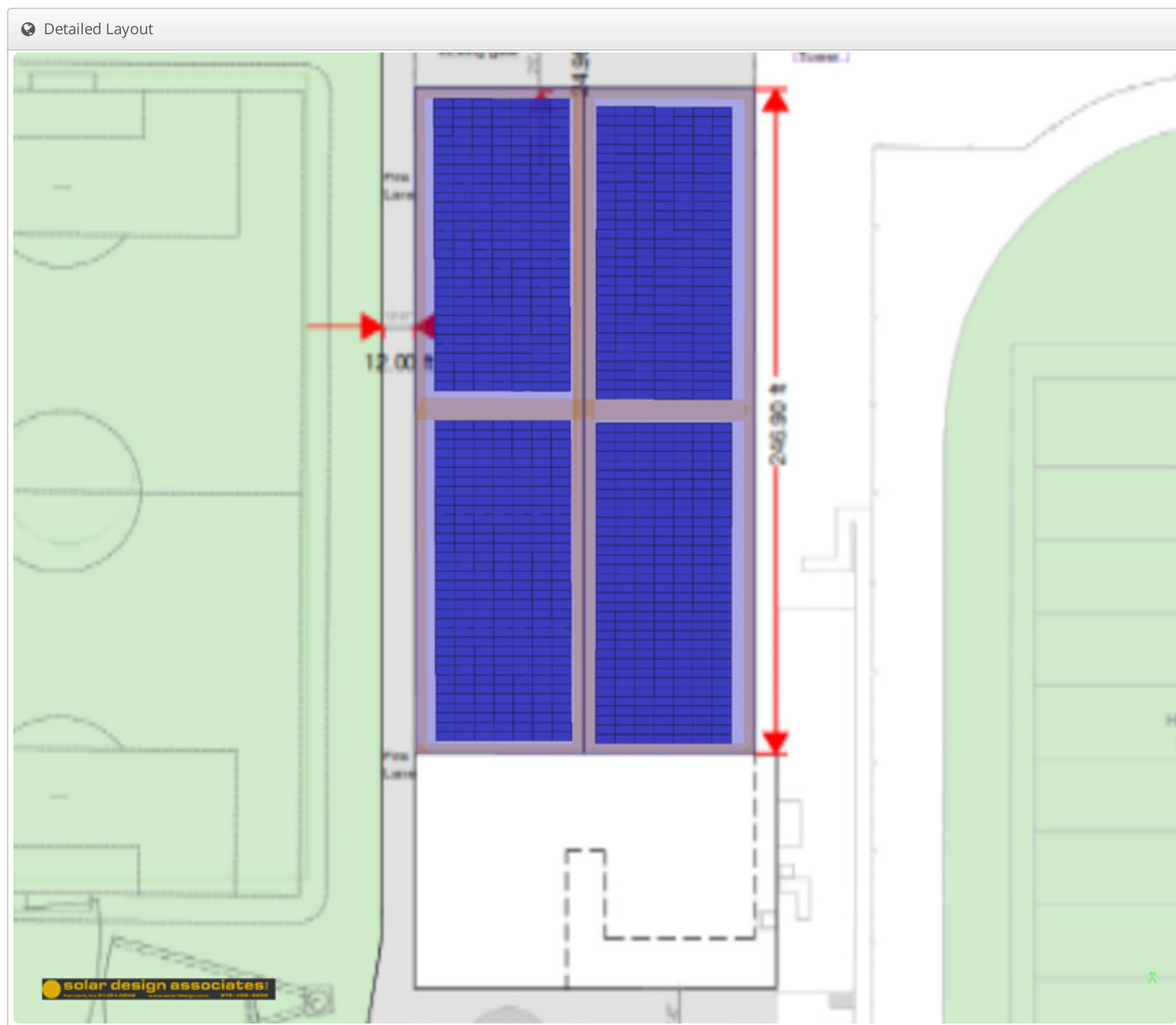
PROPOSED

Community Concession & Restrooms



Photovoltaic Panels

Solar Design



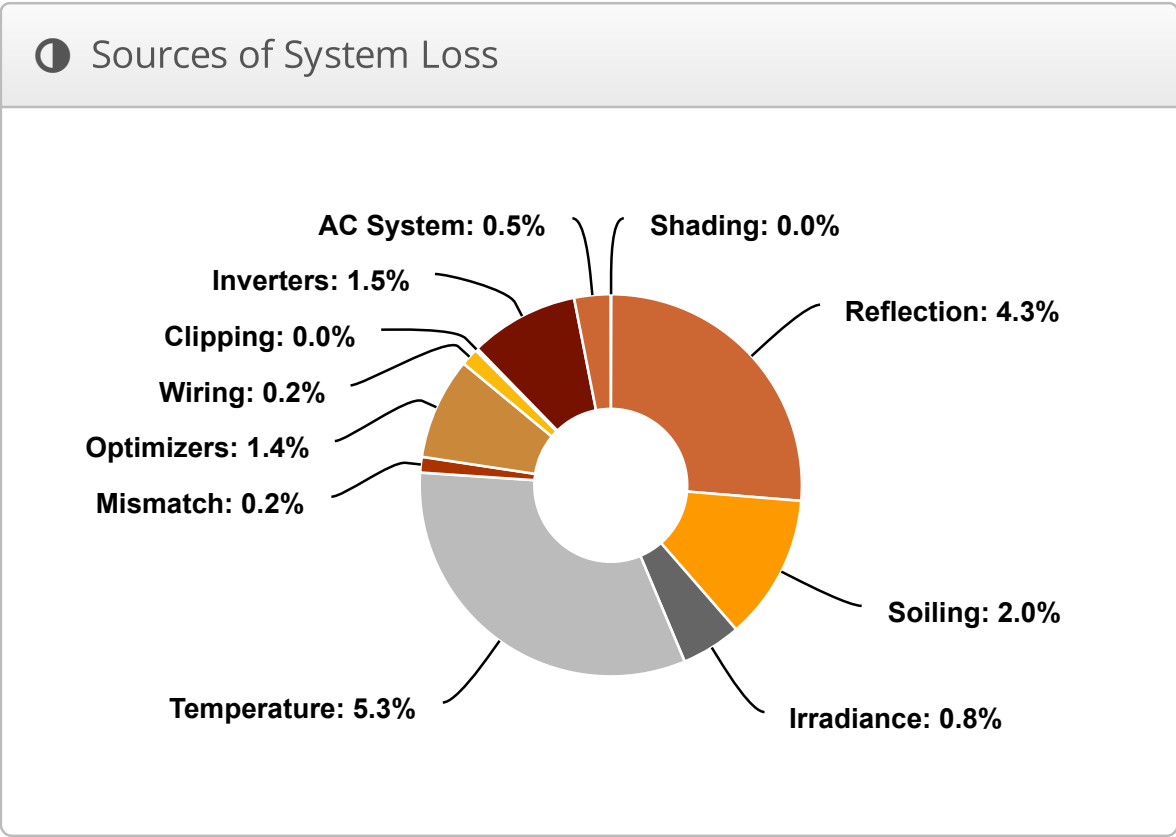
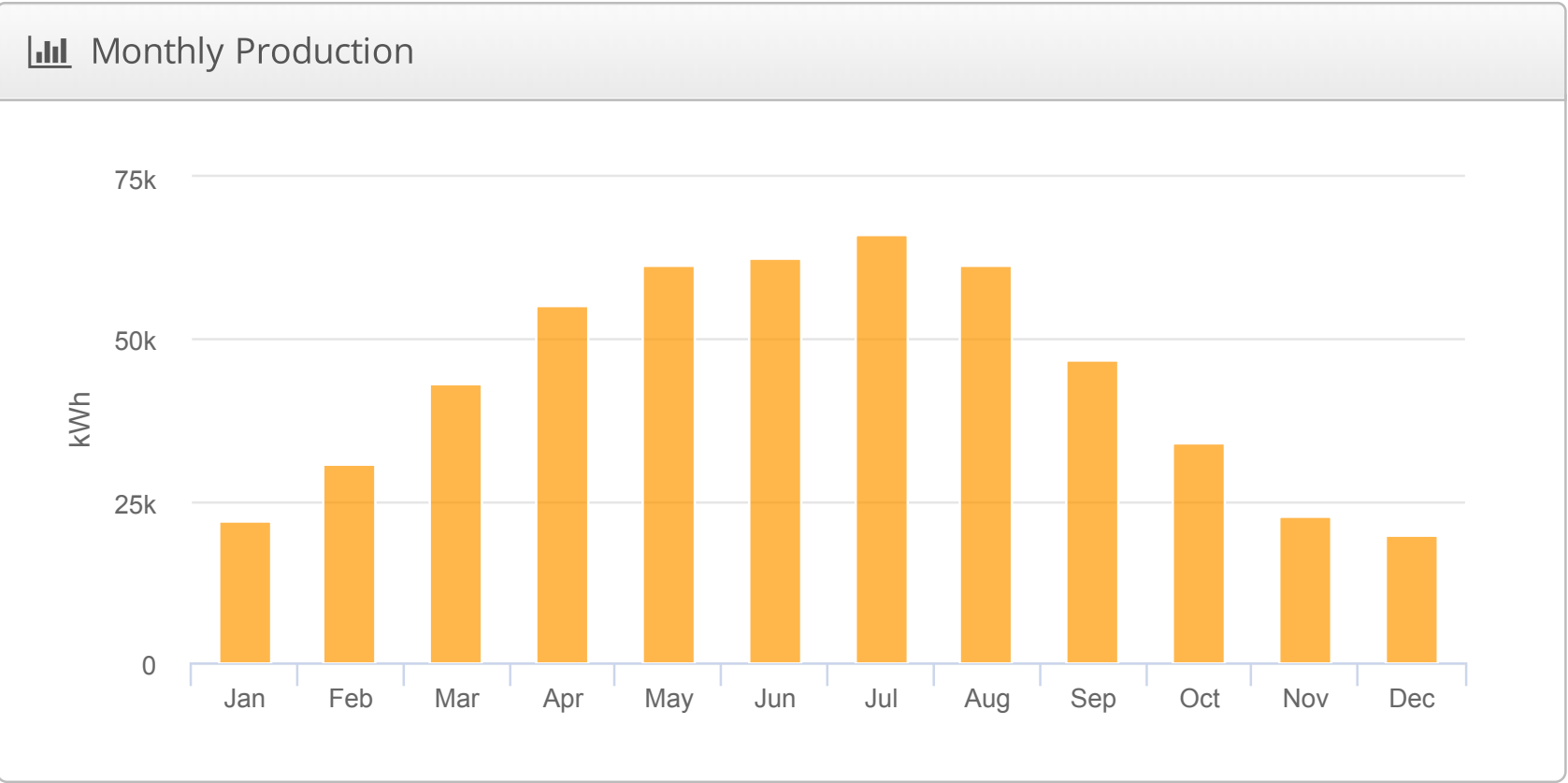
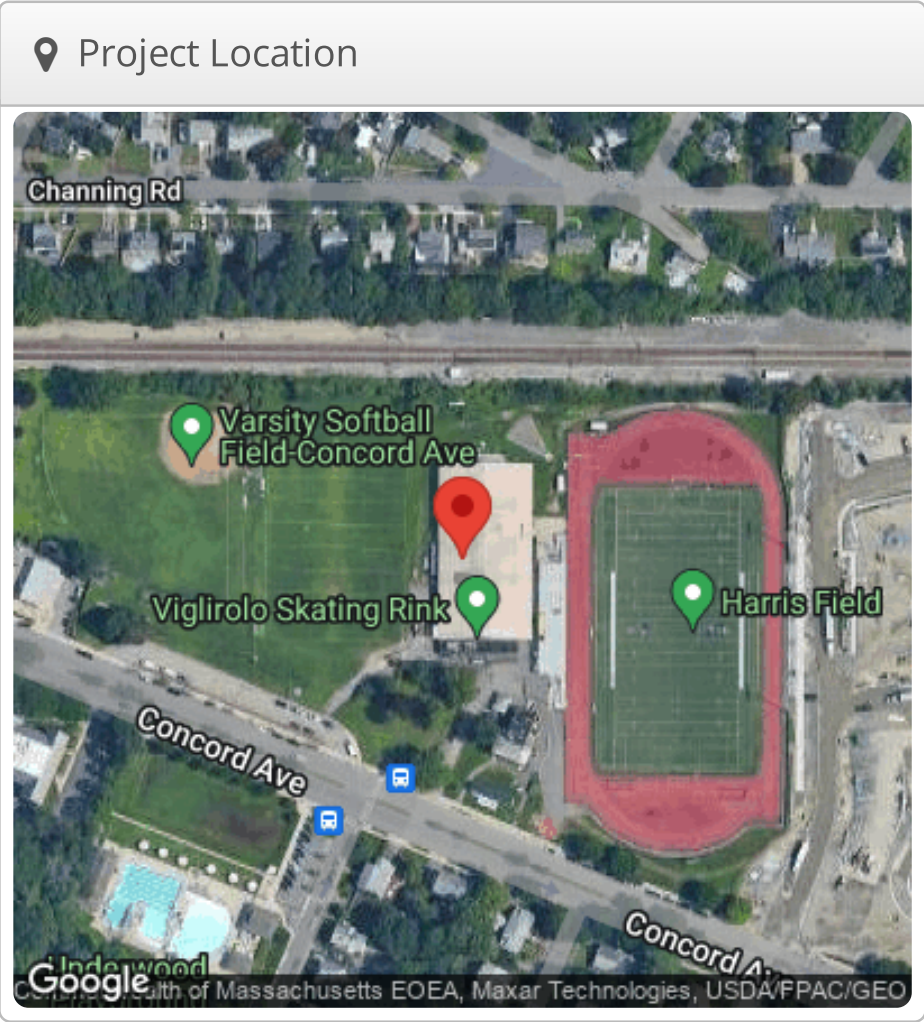
Preliminary estimate at system sizing and cost:

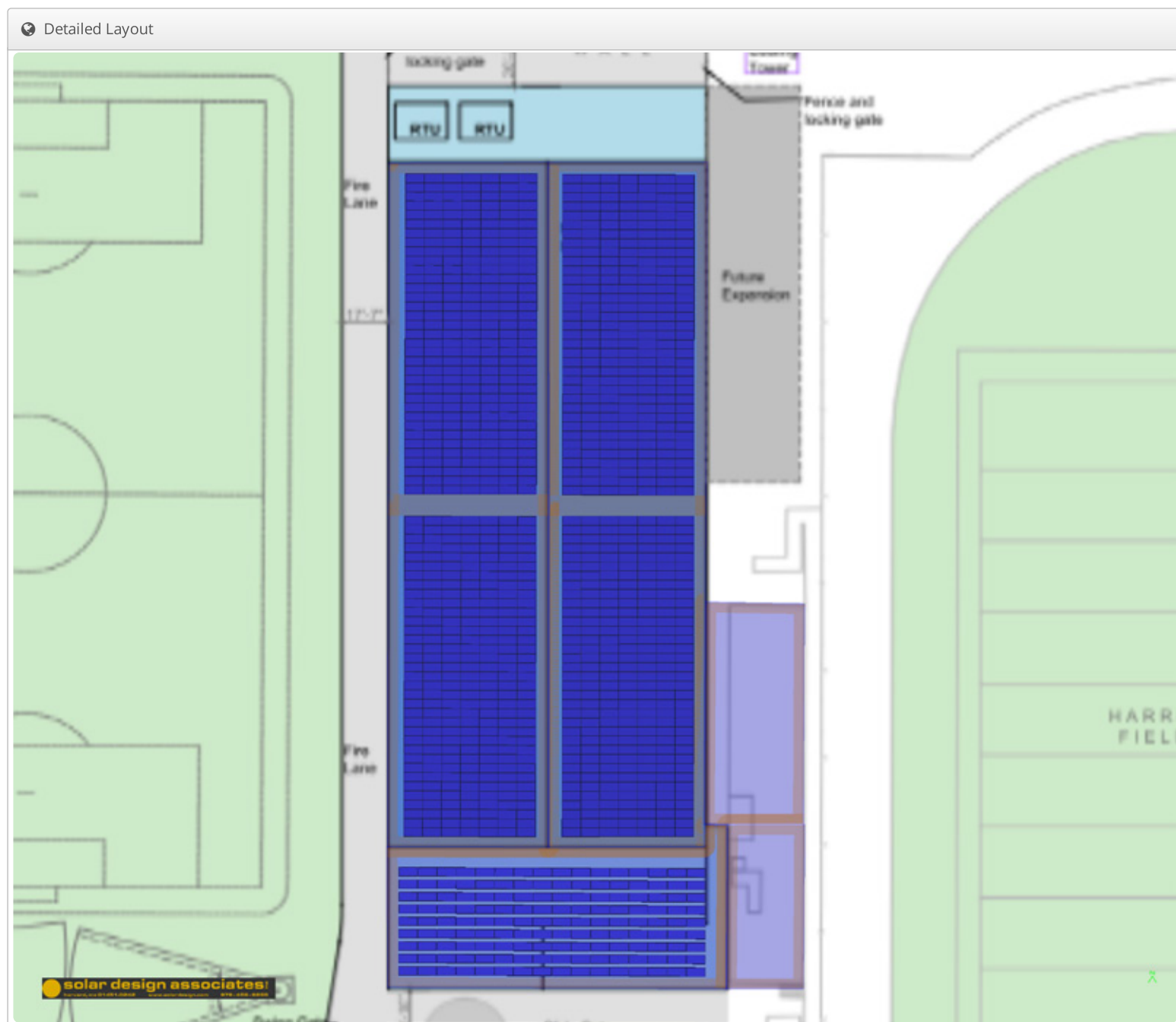
- 436.8 kWdc
- 400.0 kWac
- 526,070 kWhr/year
- \$1,092,000 total system cost, assuming \$2.50/Wdc

As a note: under the IRA, municipal projects now qualify for an ITC direct payment of ~26.5% of the total system cost, or ~\$289,380. This should be vetted by town officials and lawyers.

🔧 Report	
Project Name	Belmont Skating Rink
Project Address	221 Concord Ave, Belmont, MA 02478
Prepared By	Nicholas Lawrence nlawrence@solar design.com

📊 System Metrics	
Design	Parametric design 1
Module DC Nameplate	436.8 kW
Inverter AC Nameplate	400.0 kW Load Ratio: 1.09
Annual Production	526.1 MWh
Performance Ratio	84.8%
kWh/kWp	1,204.4
Weather Dataset	TMY, 10km grid (42.35,-71.15), NREL (prospector)
Simulator Version	42f17df9d2-29fbd7cae3-be39569fd0-3d3015eac0





Preliminary estimate at system sizing and cost:

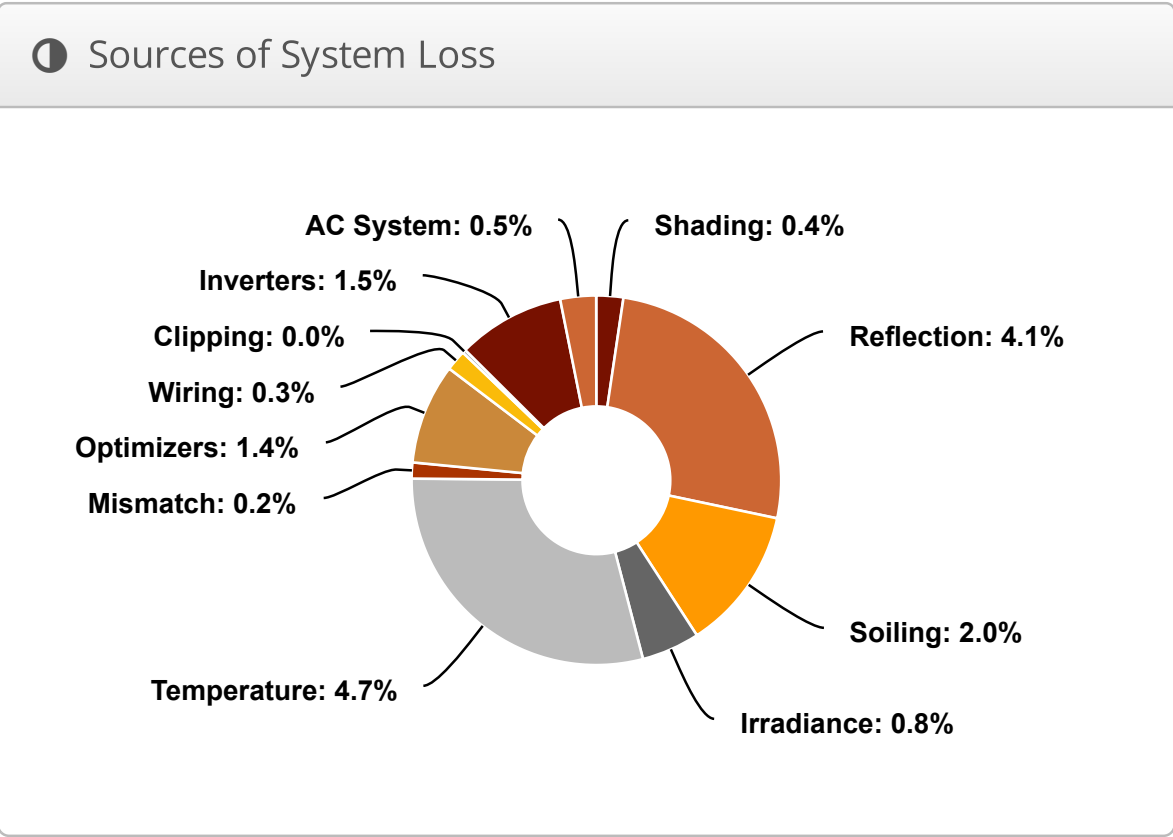
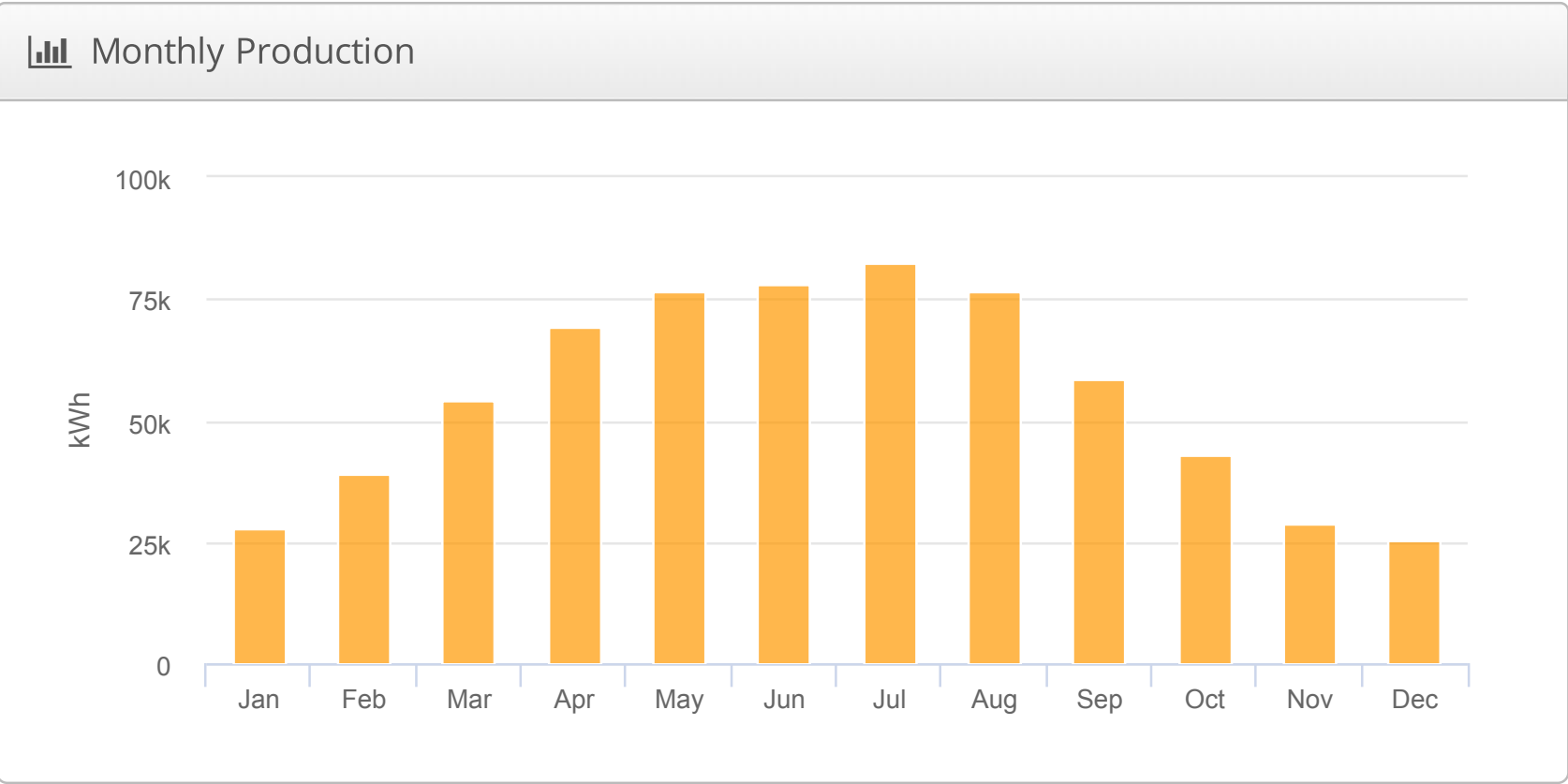
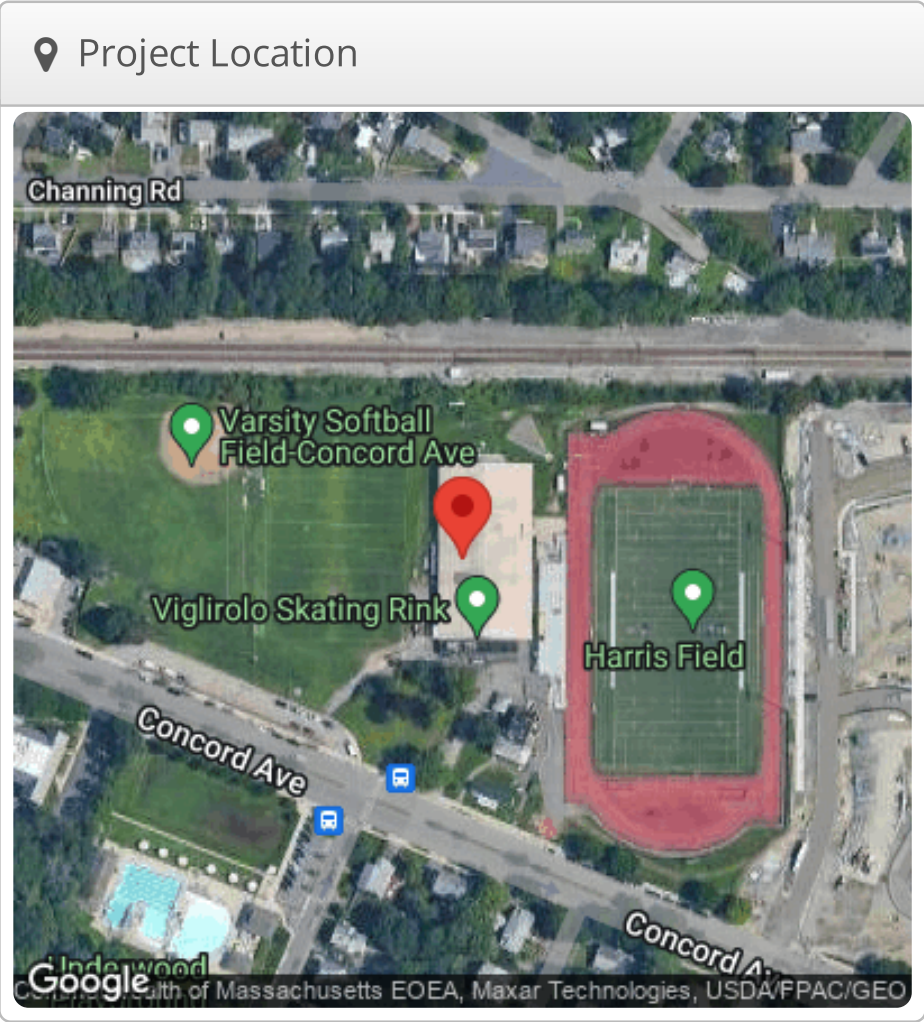
- 539.5 kWdc
- 466.6 kWac
- 659,242 kWhr/year
- \$1,349,000* total system cost, assuming \$2.50/Wdc

As a note: under the IRA, municipal projects now qualify for an ITC direct payment of ~26.5% of the total system cost, or ~\$289,380. This should be vetted by town officials and lawyers.

*To be confirmed

🔧 Report	
Project Name	Belmont Skating Rink
Project Address	221 Concord Ave, Belmont, MA 02478
Prepared By	Nicholas Lawrence nlawrence@solar design.com

📊 System Metrics	
Design	Parametric design 2
Module DC Nameplate	539.5 kW
Inverter AC Nameplate	466.6 kW Load Ratio: 1.16
Annual Production	659.2 MWh
Performance Ratio	85.1%
kWh/kWp	1,221.9
Weather Dataset	TMY, 10km grid (42.35,-71.15), NREL (prospector)
Simulator Version	a5a2eb7823-61c71e8a65-d850928be8-6d900b2c1d



Cost Projections

New Belmont Municipal Skating Rink at 40,313 sf

Trade Costs	\$	15,163,735
Solar PV	\$	1,092,000
GCs and Fee	\$	2,729,472
Sub-total	\$	18,985,207
Projected Cost Escalation of 11%	\$	2,088,373
Sub-total	\$	21,073,580
Design Contingency - 16%	\$	3,371,773
Owners Contingency - 5%	\$	1,053,679
Sub-total	\$	25,499,032
Allowances		
Hazardous Materials - Rink	\$	400,000
Sub-total	\$	400,000
Design & OPM Fees		
Architecture & Engineering Fees - 10%	\$	2,550,000
Solar Design (allowance)	\$	125,000
OPM Fees	\$	906,000
Sub-total	\$	3,581,000
Project Related Costs		
Legal Fees & Advertising	\$	30,000
Owners Insurance	\$	100,000
Geotech & GeoEnvironmental	\$	50,000
Site Survey	\$	18,000
Utility Company Fees	\$	25,000
Testing Services	\$	100,000
Furniture Fixtures & Equipment	\$	100,000
Technology	\$	50,000
Sub-total	\$	473,000
Total Project Cost	\$	29,953,032

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