



Thoughtful Design Considerations for an Enhanced Quality of Life

Technical Mitigation Plan

Stouffville Sports Dome

Project Overview & Site Metrics



Proposed Structure

Multi-sport air-supported dome (year-round turf, pickleball, and hard courts).



Maximum Peak Height

45 m (engineered height-to-width safety ratio).



Nearest Residential Boundary

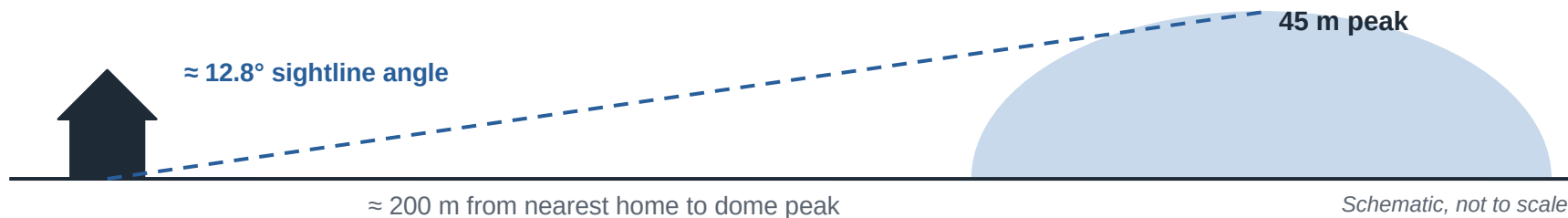
200 metres to peak of dome on west side only.



Primary Design Objective

Proactive community integration via strict visual, light, and acoustic isolation engineering.

Sightline: Approx. 200 m to Nearest Home



Horizon Footprint

The peak of the dome is approximately 200 metres from the nearest home. With a peak height of 45 m, this separation produces a ground-level vertical sightline angle of only approximately 12.8° to the top of the dome, substantially reducing its apparent height and visual presence.

Ontario Planning Context

Municipal planning and urban-design guidelines commonly use angular planes, setbacks and separation distances to protect access to sky views, daylight and appropriate transitions to lower-scale residential areas. Ontario's planning framework provides useful comparative benchmarks, including a 45° angular plane in certain transition contexts. Viewed against that benchmark, the dome's approximately 12.8° sightline angle is less than one-third of that angle.

Separation & Visual Impact

Ontario's Tall Building Design Guidelines also use separation and setback principles to mitigate perceived crowding between tall structures, including a 25-metre tower separation and associated 12.5-metre setbacks in applicable circumstances. While these standards are designed for tall urban buildings and are not directly applicable to the dome, the approximately 200-metre distance from the dome peak to the nearest home represents a substantially greater degree of physical separation.

Shadow Impact

The approximately 200-metre separation also significantly limits the potential for off-site shadow impacts on nearby residential properties. Combined with the dome's low 12.8° vertical sightline angle, the site configuration provides substantial separation intended to preserve open-sky exposure, ambient daylight and the overall sense of openness for surrounding homes.

Light Mitigation (0.0 Lux Target)



100% Opaque Blockout Membrane

The dome will be manufactured with a multi-layer specialized opaque blockout inner liner. This material guarantees zero light transmittance through the fabric, preventing the dome from creating an external "glow" at night.



Asymmetric Down-Angled LED Fixtures

Internal lighting will utilize high-efficiency sports LEDs angled downward directly onto the turf and hard courts. No fixture will point upward at the ceiling, eliminating ambient internal reflection and escaping glare.



Operational Curfew

Facility lights will dim by 50% by 11:00 PM (or in strict accordance with municipal noise and light bylaws).

Acoustic Control Plan



The Pickleball High-Frequency Challenge

Pickleball paddle impacts produce sharp, distinct frequencies (1 kHz to 2 kHz range).



Interior Acoustic Liner Blanket

To completely suppress court noise, internal acoustic insulation panels will be suspended from the ceiling of the dome structure. This fabric absorbs internal sound waves rather than allowing the outer vinyl skin to act as a speaker diaphragm.



Internal Zoning Buffer

Hard courts and pickleball zones will be positioned on the far interior side of the complex, using the expansive open turf field as an additional internal 50+ metre sound buffer before the exterior wall facing the neighbours.

Mechanical System Dampening

dB(A)

HVAC unit at 1 m



Quiet rural night



Arrival level at property line



75 dB(A) at 1 m minus ~48 dB over 245 m of open air (6 dB per doubling of distance) = under 30 dB(A) at the property line.

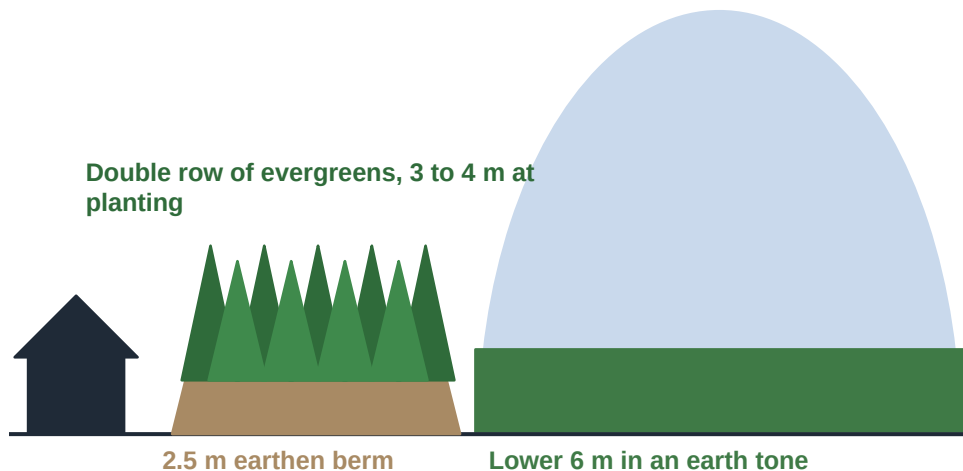
HVAC Ultra-Setback (245 m). The heavy climate-control and air-handling infrastructure is strategically placed on the far side of the facility, creating a 245-metre acoustic buffer zone to the nearest home. Industrial HVAC units typically output roughly 75 dB(A) at 1 metre; over a 245-metre open-air distance, sound pressure levels naturally drop by ~48 dB(A).

Ambient Submergence. The resulting sound level arriving at the residential property line from the HVAC units will be under 30 dB(A). This is lower than the background noise of a quiet rural night (~35 dB(A)) and mathematically renders the HVAC units completely inaudible.

Mechanical Enclosures. To guarantee this whisper-quiet operation, blowers will be housed inside sound-attenuating masonry structures with all exhaust and intake valves facing directly away from the residential zone. In addition, air-flow ducts are all placed sub-terrain, mitigating sound emissions as well as providing geothermal efficiencies.

Air-Lock Sound Dampening. Heavy-traffic revolving doors and air-locks feature soft-closing gaskets. Fast-cycling pressure-relief valves are fitted with slow-release electronic dampers to avoid loud, sudden hissing or popping noises during pressure shifts.

Biophilic Camouflage & Civil Integration



Schematic, not to scale

Visual Softening

The lower 6 metres of the dome's exterior membrane will be finished in an earth-toned colour to visually blend with local foliage.

Perimeter Landscape Berm

The project includes the construction of a 2.5-metre-tall earthen berm along the residential boundary line.

Staggered Vegetative Screen

The berm will be planted with a double row of fast-growing, evergreen Leyland Cypress or Arborvitae trees (initially installed at 3 to 4 metres in height). This creates an immediate, highly effective visual and physical sound barrier.