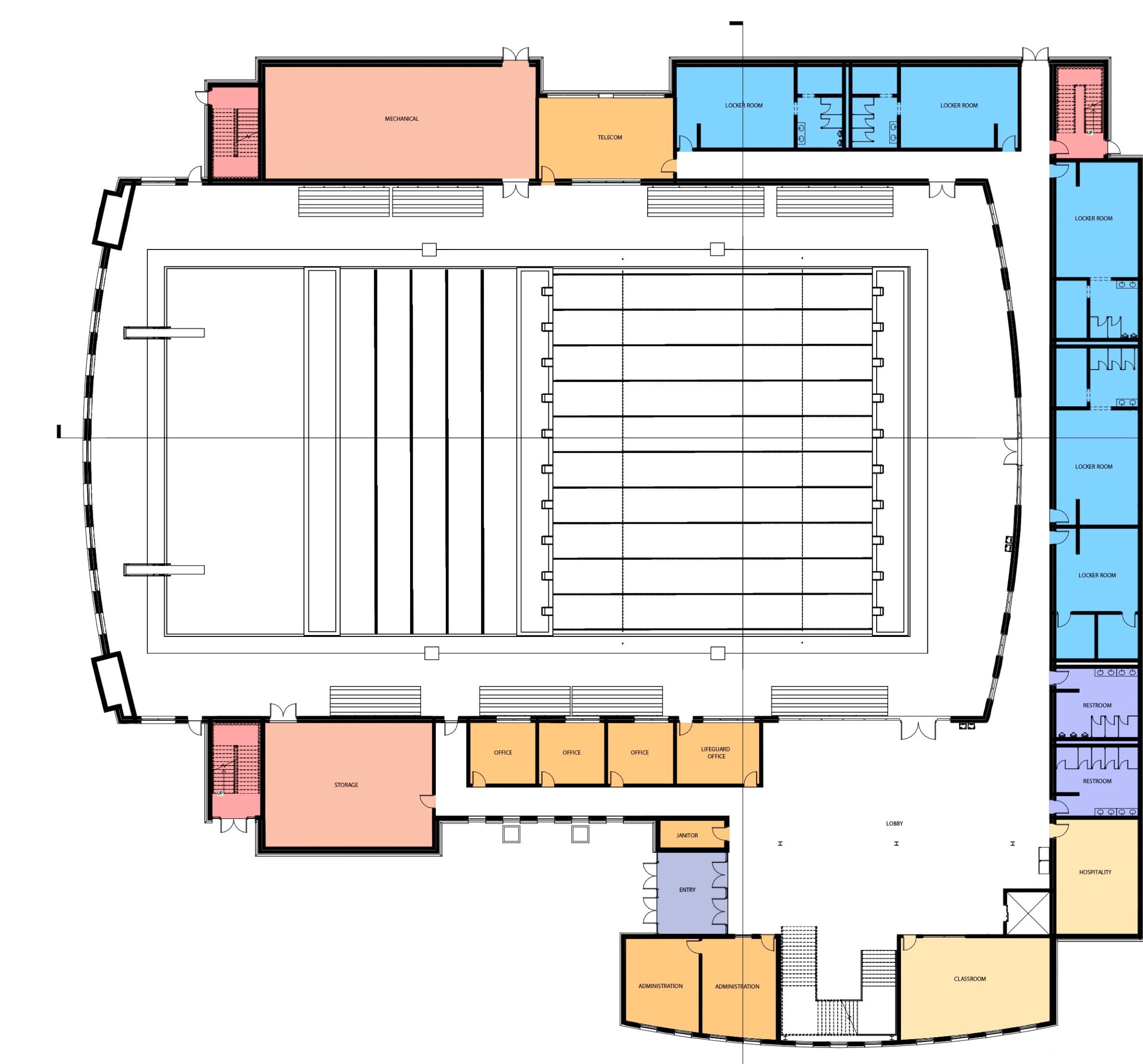


SECOND FLOOR PLAN
SCALE: 3/16" = 1'



FIRST FLOOR PLAN
SCALE: 3/16" = 1'

- EGRESS
- MECHANICAL/STORAGE
- FACULTY
- CLASSROOM/HOSPITALITY
- ENTRANCE
- LOCKER ROOM
- RESTROOM



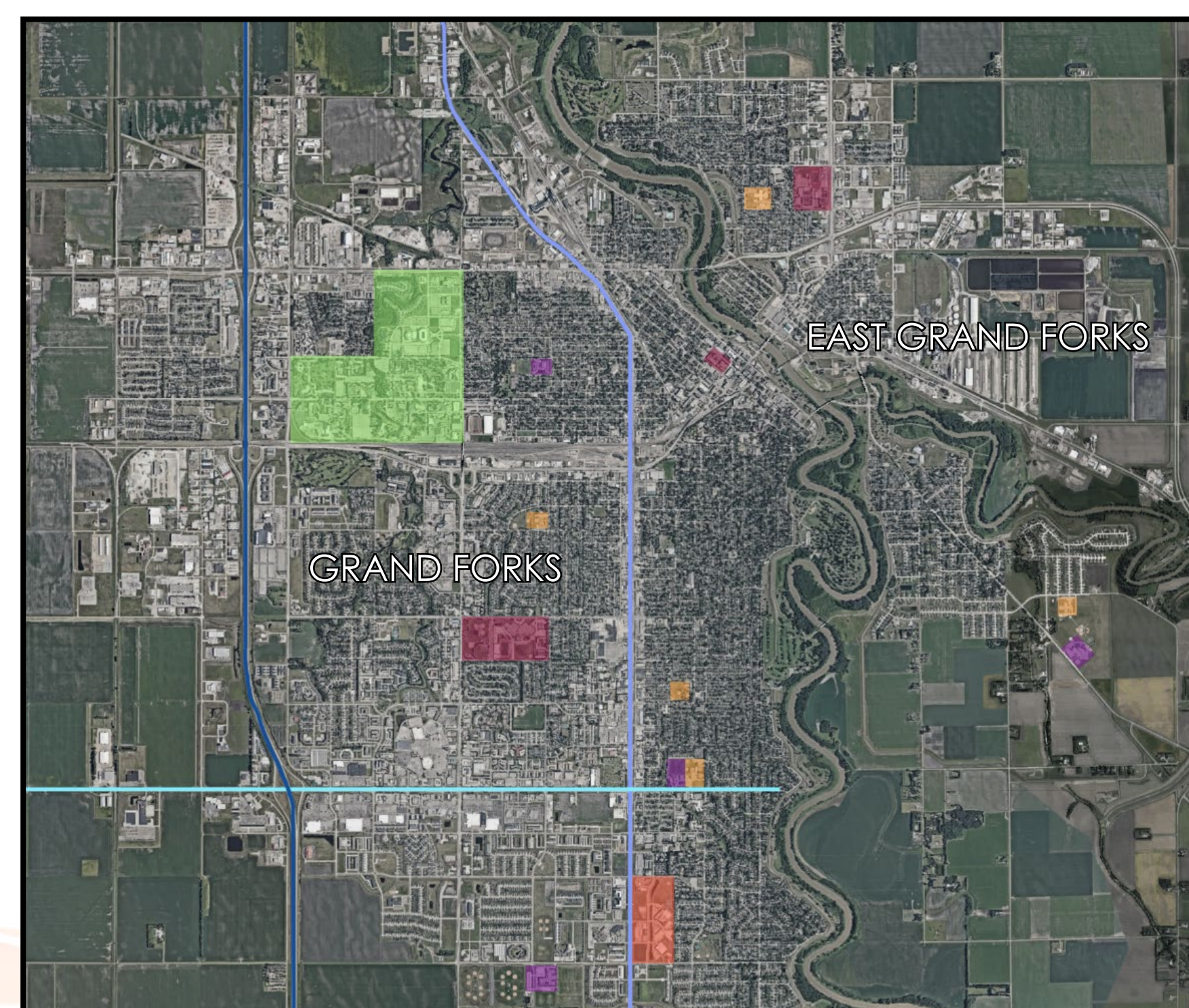
CIRCULUS AQUATILIS

DESIGNING AIR CIRCULATION FOR A BETTER SWIMMING EXPERIENCE

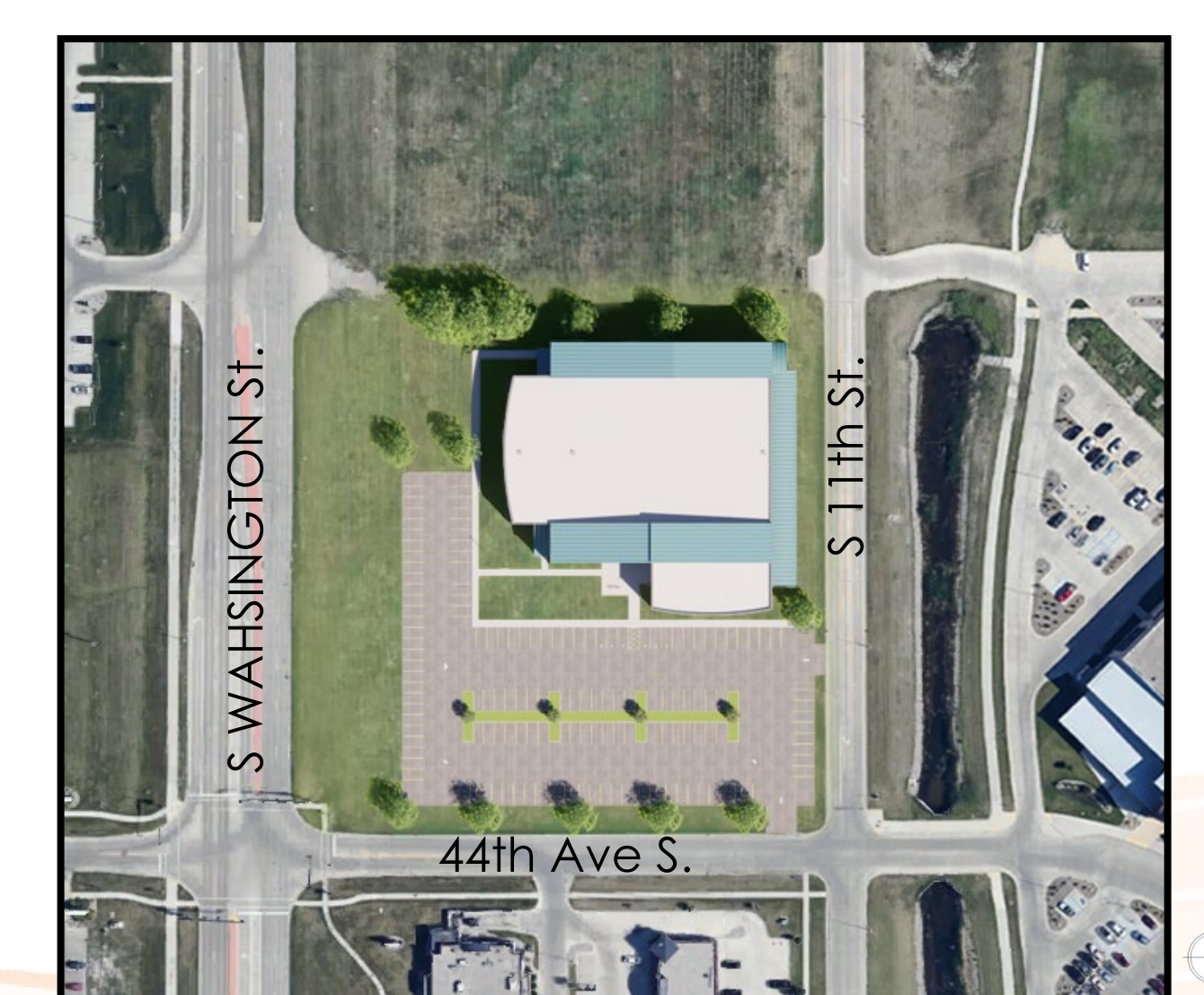
The Grand Forks Aquatic Center project is a study of the air circulation of an indoor natatorium and how to prevent water damage within the walls of the facility. This site was chosen because the indoor pools in Grand Forks are shutting down due to damages that are too expensive to repair. This has the potential to close down many swimming programs that the city provides.

The primary focus of this project is to design the air circulation system. This system is what prevents the build up of chlorine particles which cause respiratory problems if not maintained properly. It also is used to help keep the room at a comfortable temperature and slow the build up of condensation which can get trapped within the walls, damaging them.

The secondary focus is to provide a well-designed natatorium for the club and high school teams to practice in and host larger meets. This will also be a facility for the community to use and provide swim lessons for those new to swimming.



- I-29
- S WAHSINGTON ST.
- 32nd AVE S.
- MIDDLE SCHOOL
- HIGH SCHOOL
- ELEMENTARY SCHOOL
- SITE
- UND



SITE PLAN

CITY CONTEXT



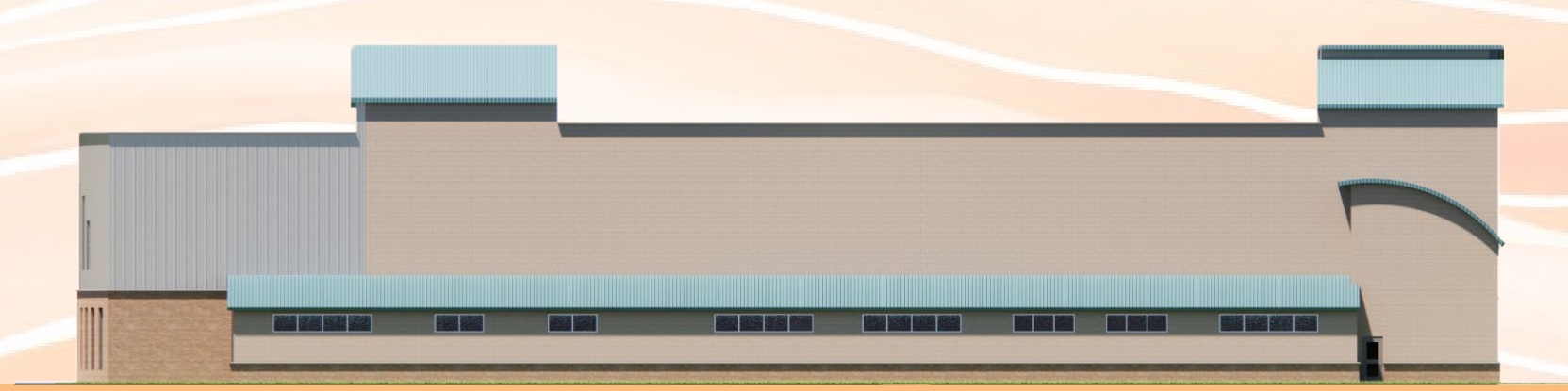
SOUTH ELEVATION
SCALE: 1/8" = 1'



WEST ELEVATION
SCALE: 1/8" = 1'



NORTH ELEVATION
SCALE: 1/8" = 1'



EAST ELEVATION
SCALE: 1/8" = 1'



LOBBY



COMPETITION POOL



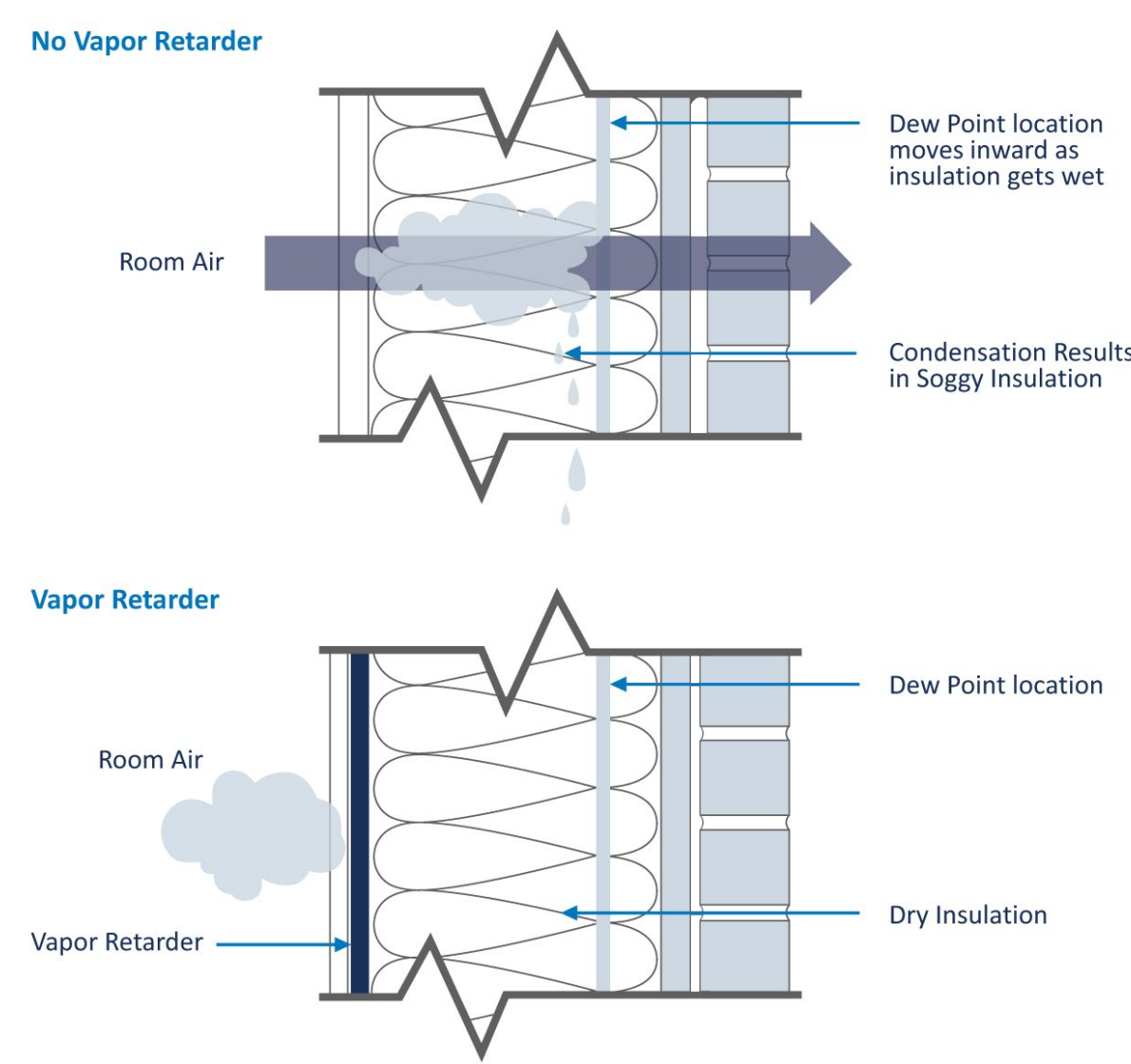
SPECTATOR LOUNGE



LOCKER ROOM



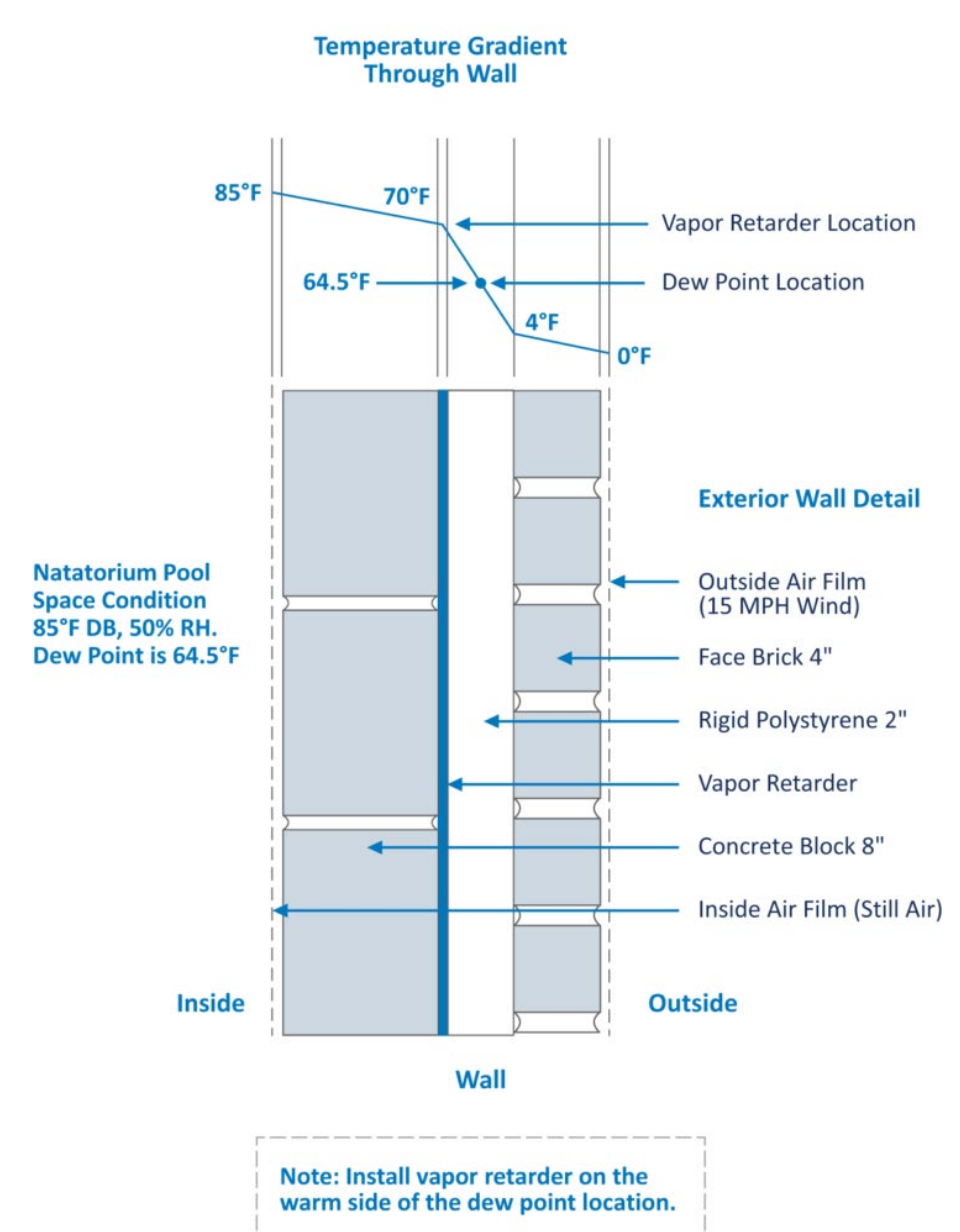
COMPETITION POOL



Do not build an indoor pool without a vapor retarder.

VAPOR BARRIER DETAIL

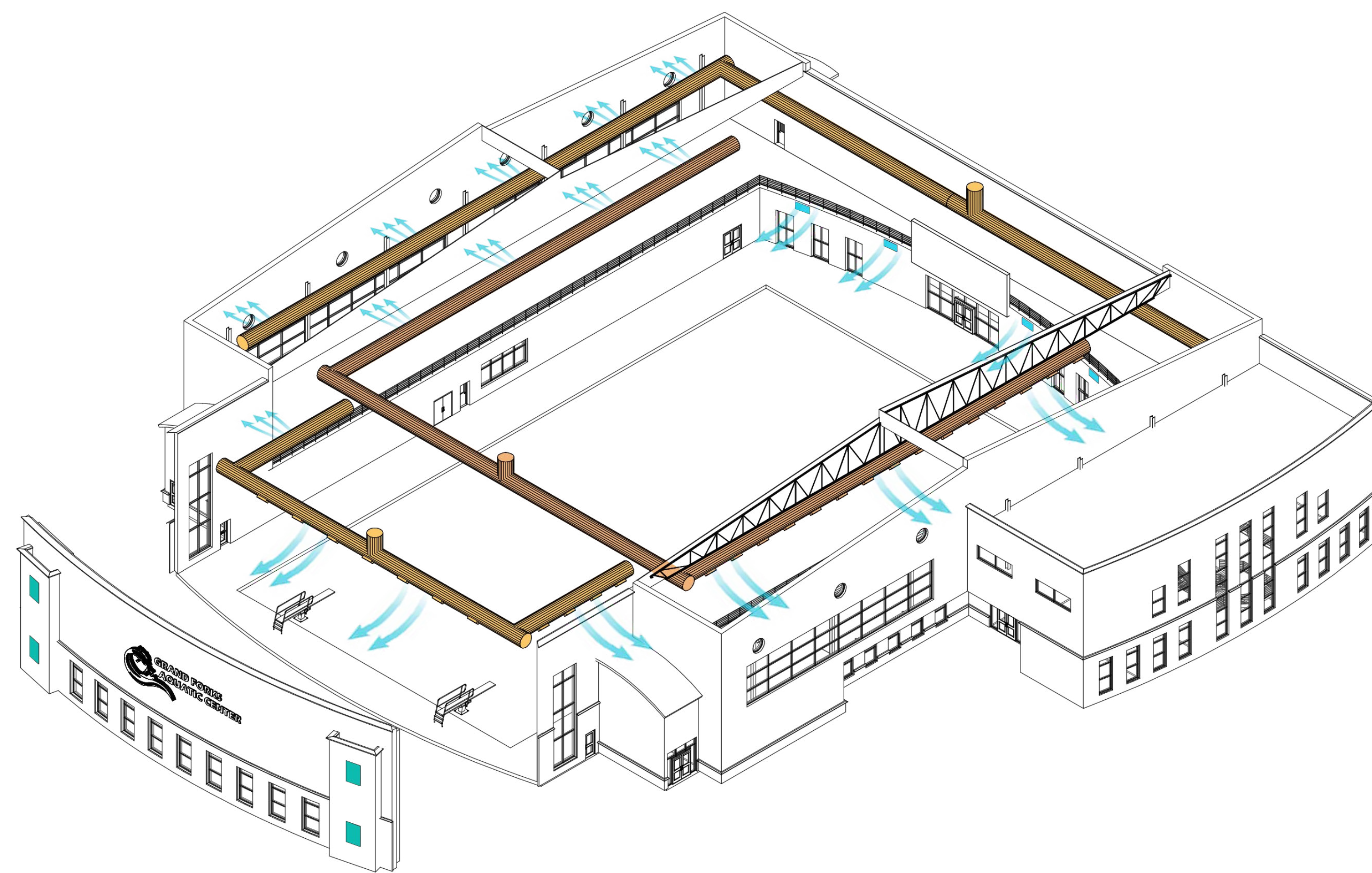
Figure 1: <https://dehumidifiedairsolutions.com/natatorium-design-guide/>



Note: Install vapor retarder on the warm side of the dew point location.

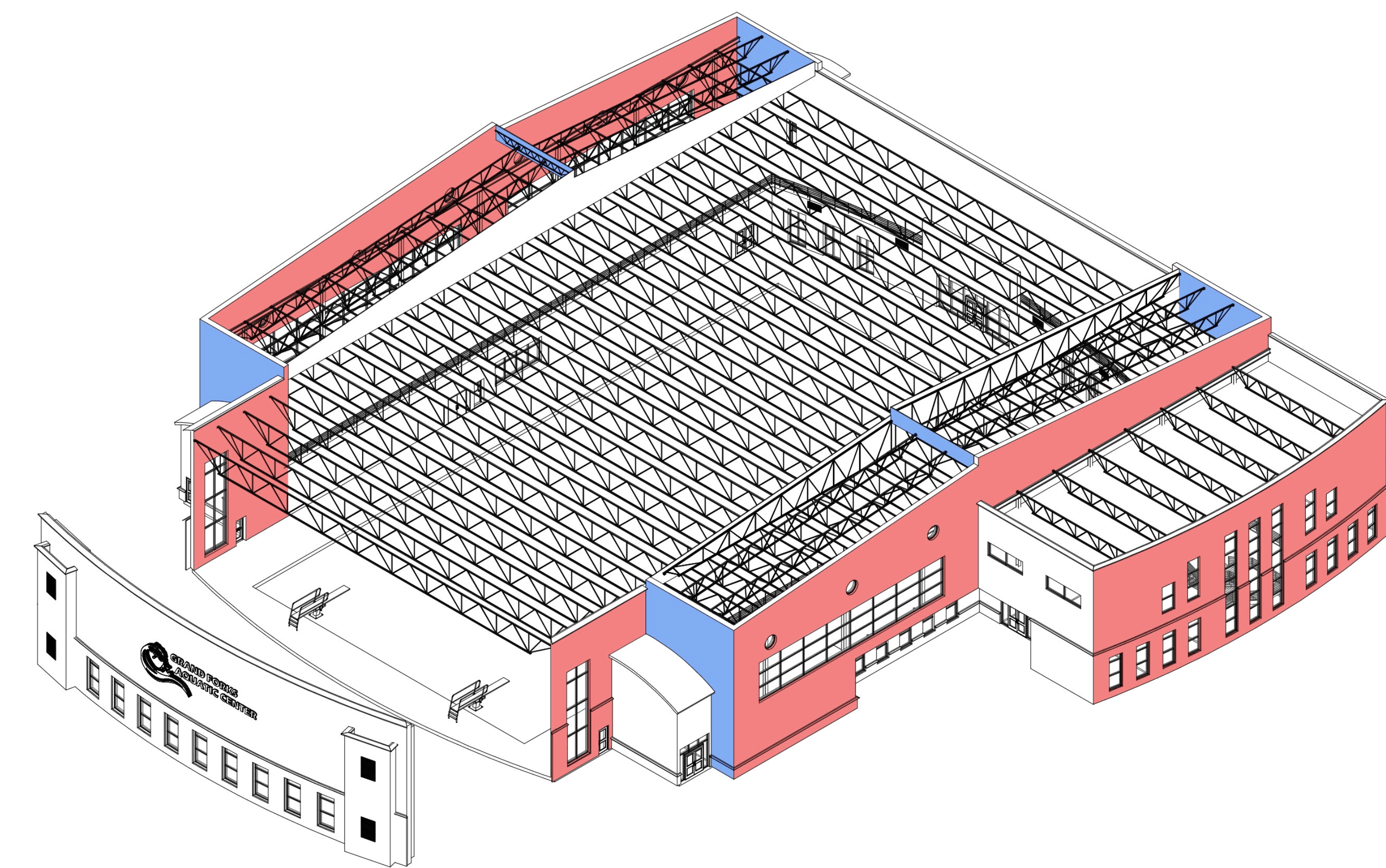
WALL DETAIL

Figure 2: <https://dehumidifiedairsolutions.com/natatorium-design-guide/>



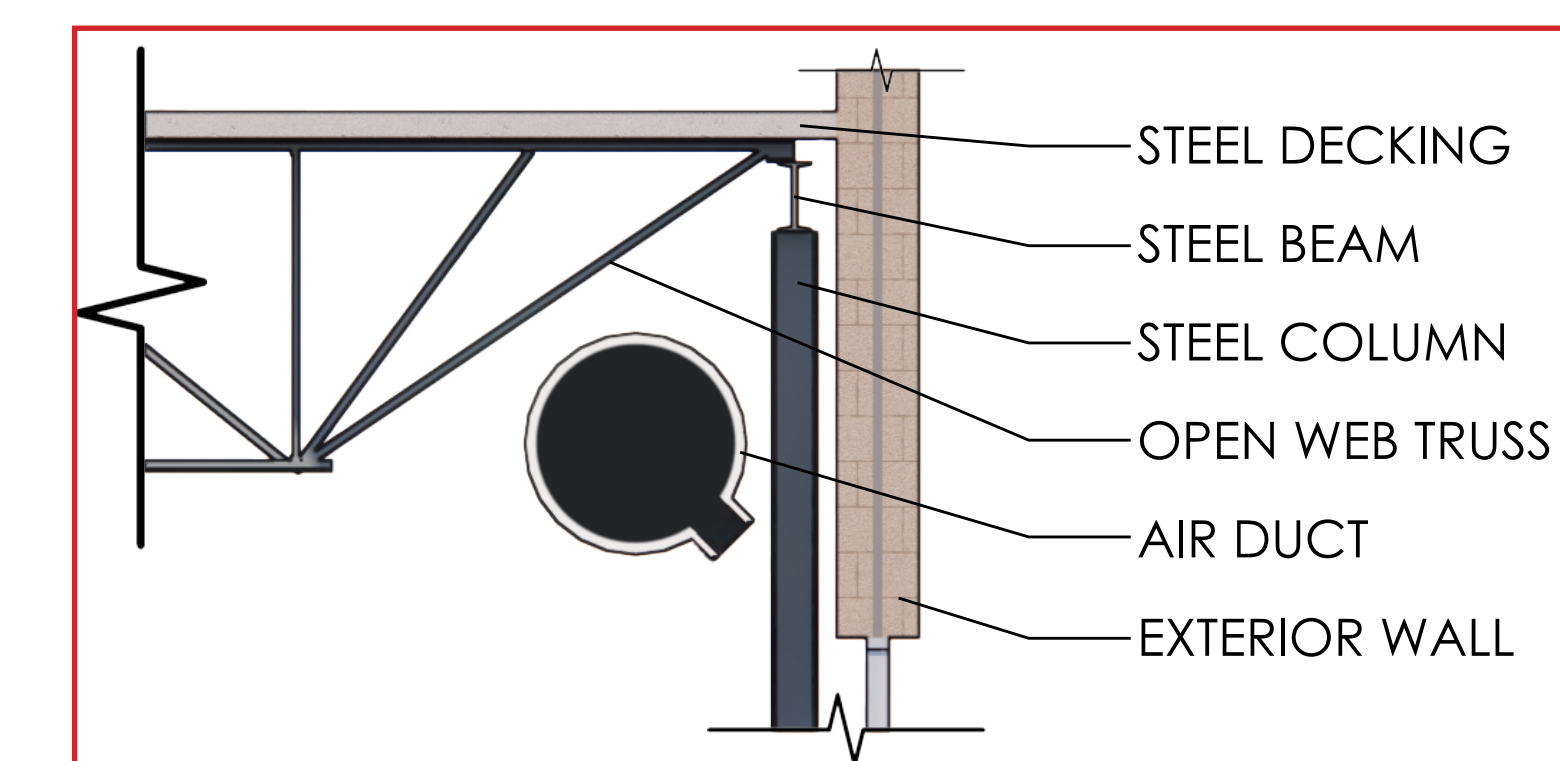
HVAC DIAGRAM

- PRIMARY AIR CIRCULATION
- EXHAUST FLOW
- SECONDARY AIR CIRCULATION
- RETURN



STRUCTURE DIAGRAM

- PRIMARY STRUCTURE
- SECONDARY STRUCTURE



TRUSS DETAIL



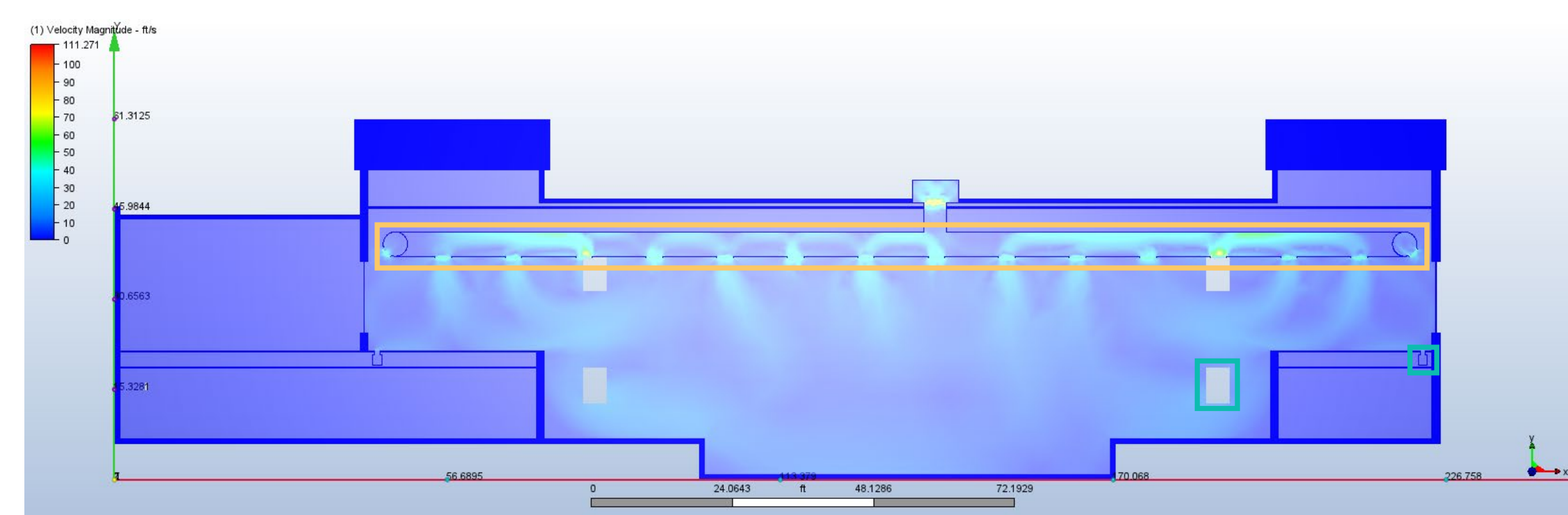
SECTION CUT

SCALE: 1/4" = 1' 0 10 30 50 100

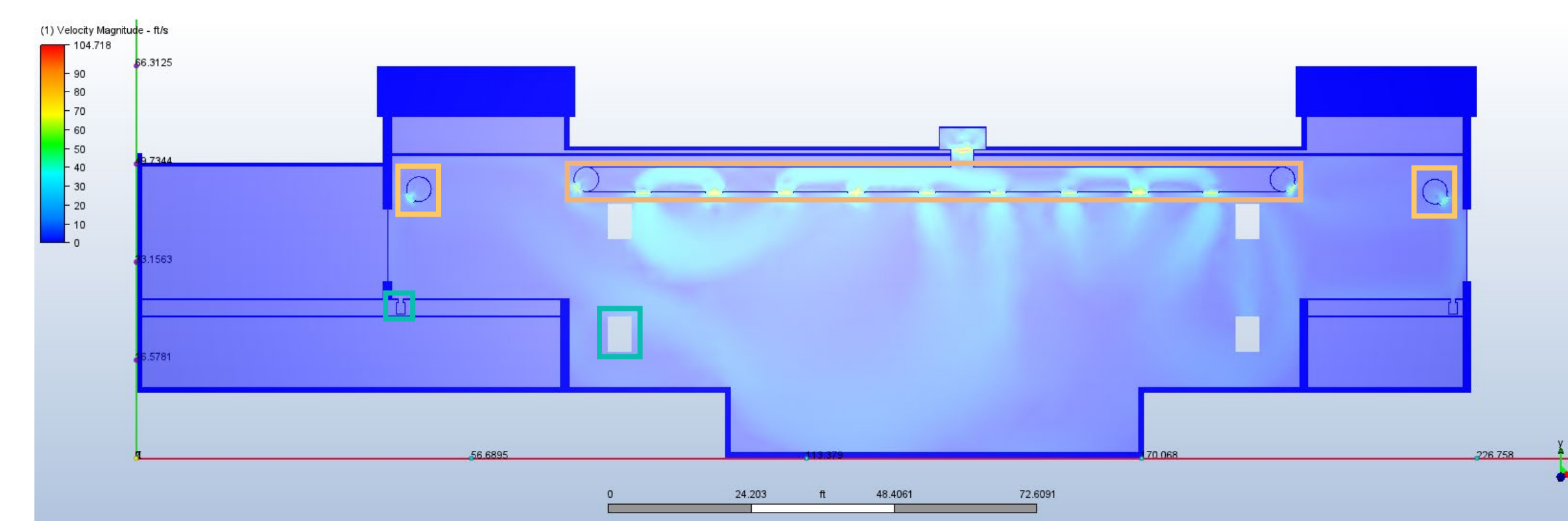


CROSS SECTION CUT

SCALE: 1/4" = 1'

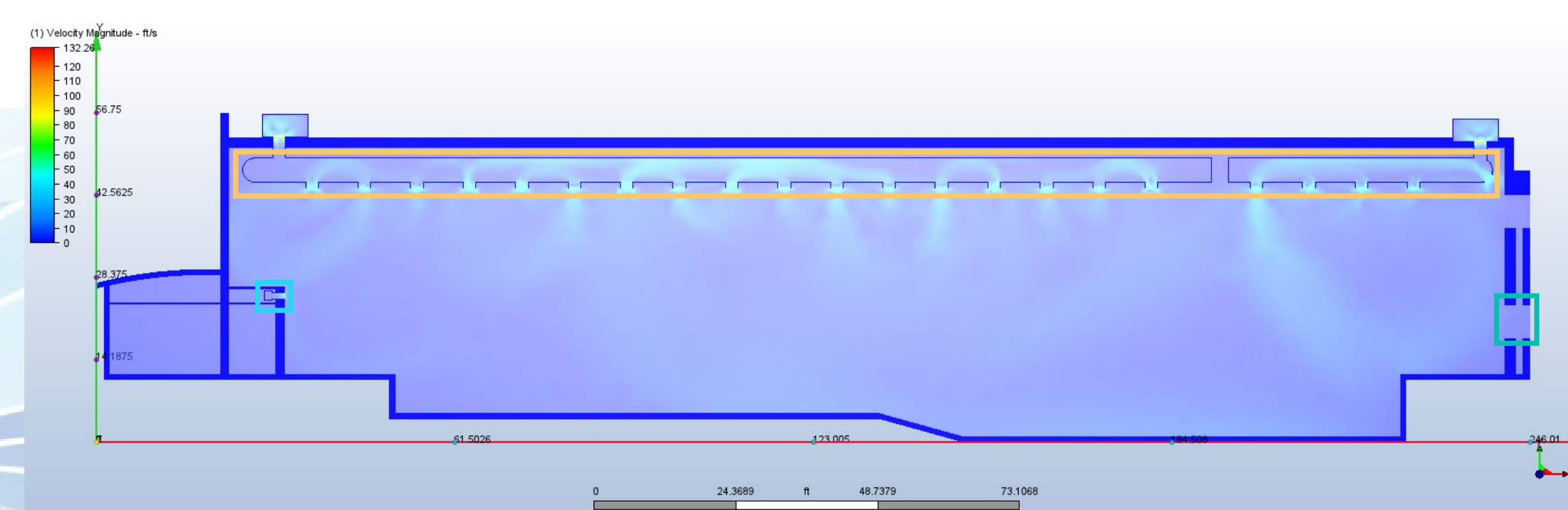


AIR FLOW DIAGRAM SHALLOW END



AIR FLOW DIAGRAM DEEP END

- SUPPLY AIR: 75 ft/s
- SUPPLY AIR: 50 ft/s
- EXHAUST: 30FT/S
- RETURN



AIR FLOW DIAGRAM POOL LENGTH

For this pool to function properly the HVAC system needs to provide 6-8 air changes per hour. This allows the air inside to properly ventilate and not become stagnant. If the air becomes stagnant the chlorine particles will build up making it difficult to breathe or even cause respiratory issues like asthma, or chlorine burn on the skin.

The simulations shown here were made using Autodesk CFD. This is a tool used to simulate air flow within a designed space. The items highlighted by the yellow boxes constantly blow air on the windows and walls reducing the buildup of condensation and preventing water damage to the interiors of the walls. In orange is the air supply that circulates the rest of the air and cooling the spectators at a higher air pressure. Highlighted in blue is the exhaust, this pushes air and chlorine particles across the pool to the return ducts circled in green to help circulate the lower section of the pool deck.