

Rainwater Harvesting and Reuse system

CARRIER DOME

MELISSA CADWELL



Carrier Dome



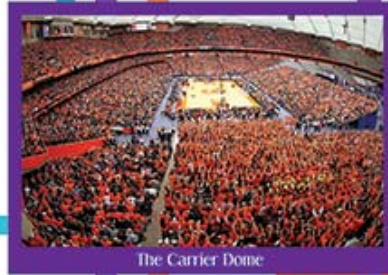
Carrier Dome

- Located in the City of Syracuse
- Seats approximately 49,262
- Host a variety of events
- Air supported roof
 - 6.5 acre
- 6.5 million gallons of rainwater is estimated to fall on the roof annually

Rainwater Harvesting

A Little Rain Goes

A Long Way



The Carrier Dome



Public Viewing with Interactive Touch Screen



Mechanical Equipment

- The Carrier Dome is a 50,000-seat air supported domed sports stadium located at Syracuse University
- Approximately 6.6 million gallons of rainwater per year fall on the Carrier Dome's roof and eventually ends up in the local combined sanitary/storm sewer.
- The harvested rainwater includes systems serving public restrooms which include water for flushing urinals and water closets within public restrooms.
- The runoff from the roof is collected by a large gutter system that runs around the entire perimeter of the dome and contains a total of 36 roof drains that tie into rain leaders that direct the water into the underground cisterns.



Rainwater Harvesting System

- Received a \$1.35 million state grant
- \$1.5 million total
- System
 - Two exterior 25,000 gallon storage tanks
 - Two interior 4,500 gallon tanks
 - 12 roof drains to each tank
 - 1000 feet of piping
 - Gutter system Collects approximately 13% of water annually that runs on the roof



Rainwater System Controls

- Standard Industrial grade PLC controller
- Electronic sensors and valve operators
- Vortex solids separator
- Standard (100 gpm) submersible pump transfers the water from cisterns to mechanical room
- Treatment equipment
 - Cleanable 100-micron sediment filter
 - 25-micron bag filter
 - 120-gpm UV light system
 - Chlorine injection/recirculation
 - Dry injection system
- Triplex booster pump draws water from
 - Two interior tanks to supply the public bathrooms

Benefits

- Mechanical system was designed to be visible
- Engaged students
 - Communication design students -
 - School of Architecture
 - Civil and Environment Engineering students
- Large touchscreen informational kiosk that interacts with LED spotlights
- System keeps rainwater out of aging sewer system
- Uses rain water instead of highly treated and processed municipal water
- 2016 Diamond Award
 - American Council of Engineering Companies- NY Chapter
 - C&S was the engineer behind the project

Challenges

- Outdoor space for the two 25,000 gallon below-grade cisterns
- A viewing room
- Tying into the existing rain leader system with minimal disruption of the facility
- Municipal water backup system was necessary
- Bringing the students in too late to utilize their design elements
- System does not last a full football game
- Drought