Case Study:
Golisano Institute for Sustainability

SWBR

Rochester Institute of Technology - Golisano Institute for Sustainability

Sustainability Hall at Rochester Institute of Technology (RIT) is a LEED-Platinum certified research center that is home to the Golisano Institute for Sustainability (GIS).

The building is a spectacular, collaborative learning environment with academic labs, test beds, classrooms and offices that support the Institute's unique mission and research in sustainability. Displaying a wide array of sustainable design concepts, materials, systems and technologies, it is serves as a living laboratory for RIT's Architecture, Engineering and Sustainability programs.

Climate, context and the Institute's mission were key drivers that guided the overall design. The building is composed of two shifted "bars" that together form a central galleria. The four-story north bar contains laboratories and test beds, mechanical spaces, academic and student areas. The three-story south bar accommodates academic teaching spaces, administrative offices and support areas with a vegetated green roof above. The galleria, a central social/interactive space, connects and encloses part of the university's pathway system. A soaring roof canopy spans the galleria and extends outward, unifying the overall composition while providing an icon for the institute and a gateway for the quadrangle beyond.

GIS optimizes daylight and energy savings and provides great daylight autonomy. As a result of its passive design strategies, energy-efficient systems, high-performance facades, a 400kW fuel cell and a 40kW solar array, the building is designed to be 56% more efficient than a baseline building and reduced its carbon footprint by 61%, in alignment with AIA 2030 goals. Incorporating extensive data sensors, control systems, feedback loops and microgrid technology, RIT is able to monitor and inform building operations. The GIS building has the capacity to be one of the most informative green buildings in the world.

Extraordinary integration and collaboration between the architects, engineers, construction team, daylight & energy modelers and our client made this project extraordinary.

Building Area: (sf)
83,670 Square Feet

Cost per Square Foot:
$430

Construction Cost
$35,993,906

Date of Substantial Completion:
January 2013

Location of Project:
111 Lomb Memorial Drive
Sustainability Hall
Rochester, NY 14623

Type of Project:
New work

Construction materials, mechanical systems or other pertinent information:
Masonry wall, roof and curtain wall systems designed for high-performance

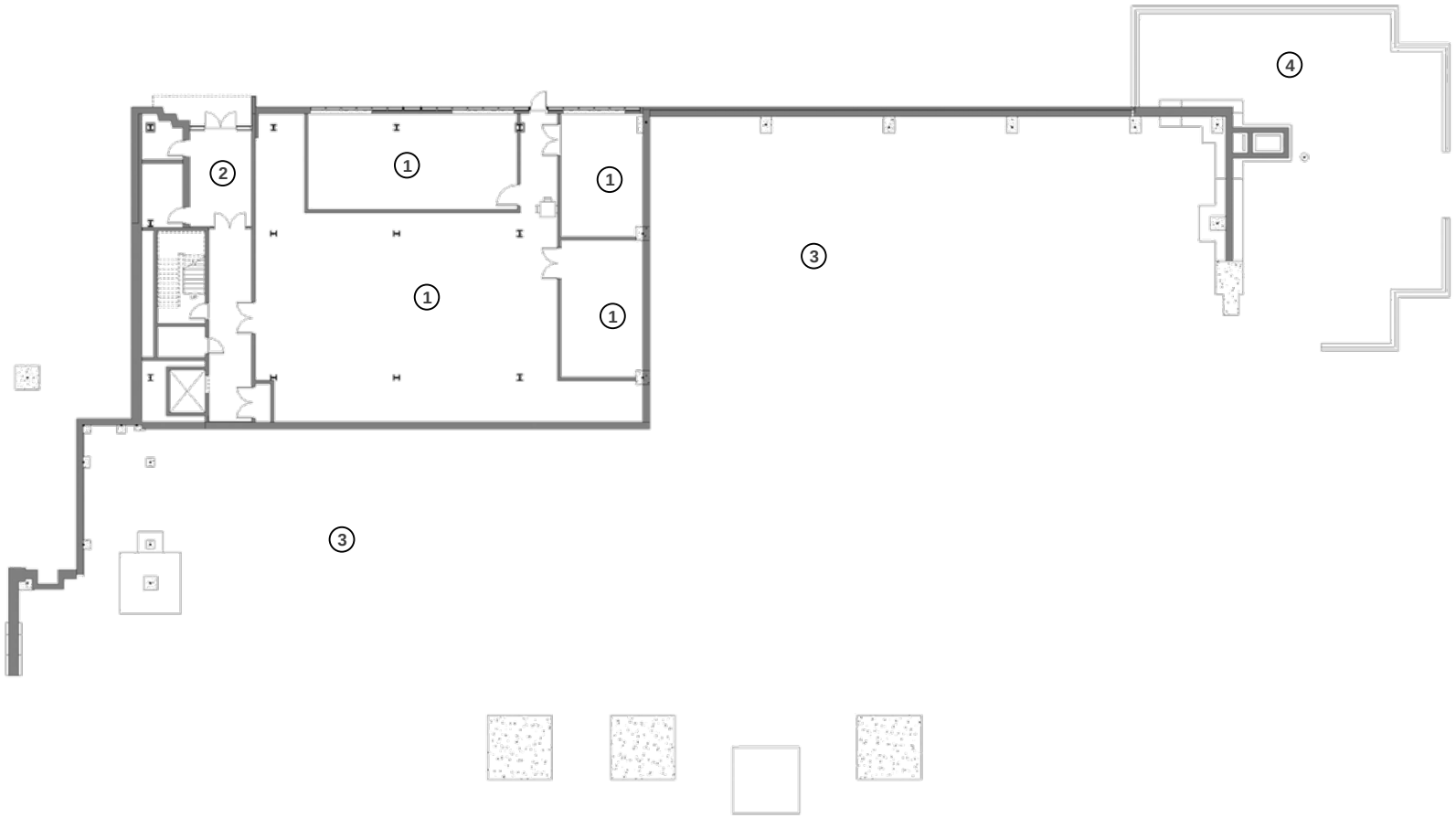
Facade and building systems coordination were tightly integrated. The south facade features solar shades designed to reduce direct solar heat gain by 70%, thereby reducing the building's cooling demand and enabling the use of active chilled beam technology for cooling. Perimeter radiation systems were eliminated throughout the building through the design of an advanced building envelope and the application of innovative new radiant glass technology..

SOUTH ELEVATION

The design process required close integration and analysis of the building envelope and the building systems, always coordinated with the project budget. Each of these components is considered to be an element of the larger whole and many analyses were done to evaluate active and passive design strategies throughout the course of the project.

The previously developed site consisted of significant hardscape and roadway with adjacent low-density development. The project sought to improve this site through sustainable infrastructure strategies that would provide permeability and rainwater management, including a bioretention area, dry swale, raingarden and green roof, Careful siting and form provided a more connected pedestrian environment.

Campus Master Plan



LEGEND

1. **BUILDING SYSTEMS**
2. **LOWER LEVEL ENTRANCE VESTIBULE**
3. **UNEXCAVATED**
4. **EXTERIOR STORAGE AND FUEL CELL**

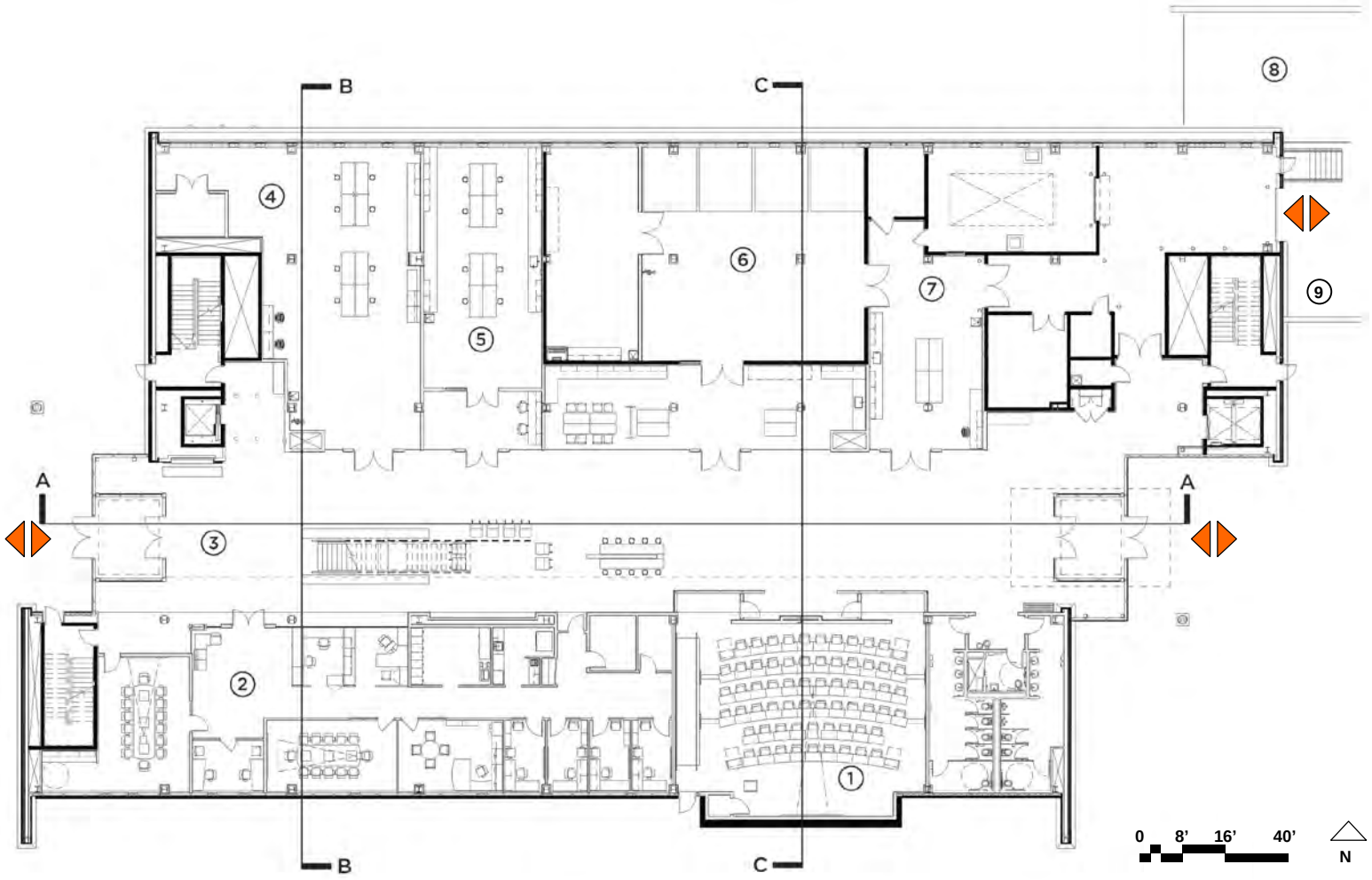
Significant cost savings was found in reducing basement area on this site. Water and electrical service was housed in the “A-Level” while mechanical systems were located on the fourth floor. This also permitted research spaces that required slab-on-grade conditions to accommodate significant structural loading to exist as part of the first floor program.

A-LEVEL FLOOR PLAN

LABORATORY, TEST BED AND RESEARCH

GALLERIA

ACADEMIC/OFFICE



LEGEND

1. AUDITORIUM
2. GIS ADMINISTRATION OFFICES
3. GALLERIA
4. MICRO-GRID TEST BED
5. MATERIALS SCIENCE LAB
6. FUEL CELL TEST BED & ENERGY DEVELOPMENT ROOM
7. ELECTRICAL PROPULSION TEST BED
8. UTC 400 KW FUEL CELL
9. LOADING/ SERVICE/ RECYCLING

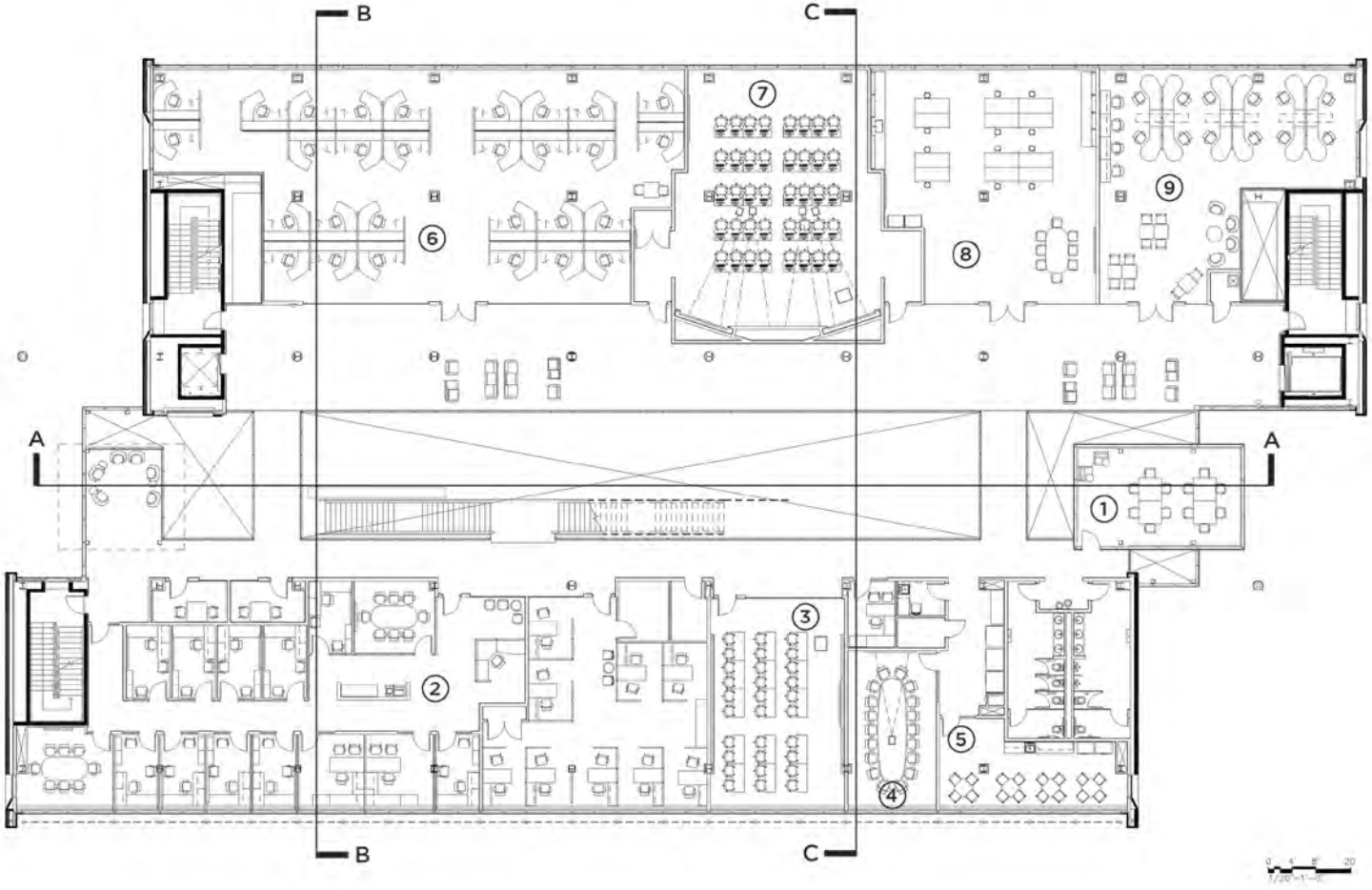
The building is organized to provide it's research spaces sufficient access to utilities at each end of the building with programmatic flexibility in between. Higher energy requirements and system demands exist on the research side of the institute with more passive design opportunities and systems on the less-demanding academic/office side of the building.

FIRST FLOOR PLAN

LABORATORY, TEST BED AND RESEARCH

GALLERIA

ACADEMIC/OFFICE



LEGEND

1. COLLABORATION ROOM
2. GIS FACULTY OFFICES
3. CLASSROOM
4. CONFERENCE ROOM
5. BREAK ROOM
6. PHD WORKSTATIONS
7. DECISION THEATER
8. SUSTAINABLE INNOVATION + ENTEPRENEURSHIP LAB
9. MASTER OF SCIENCE WORKSTATIONS

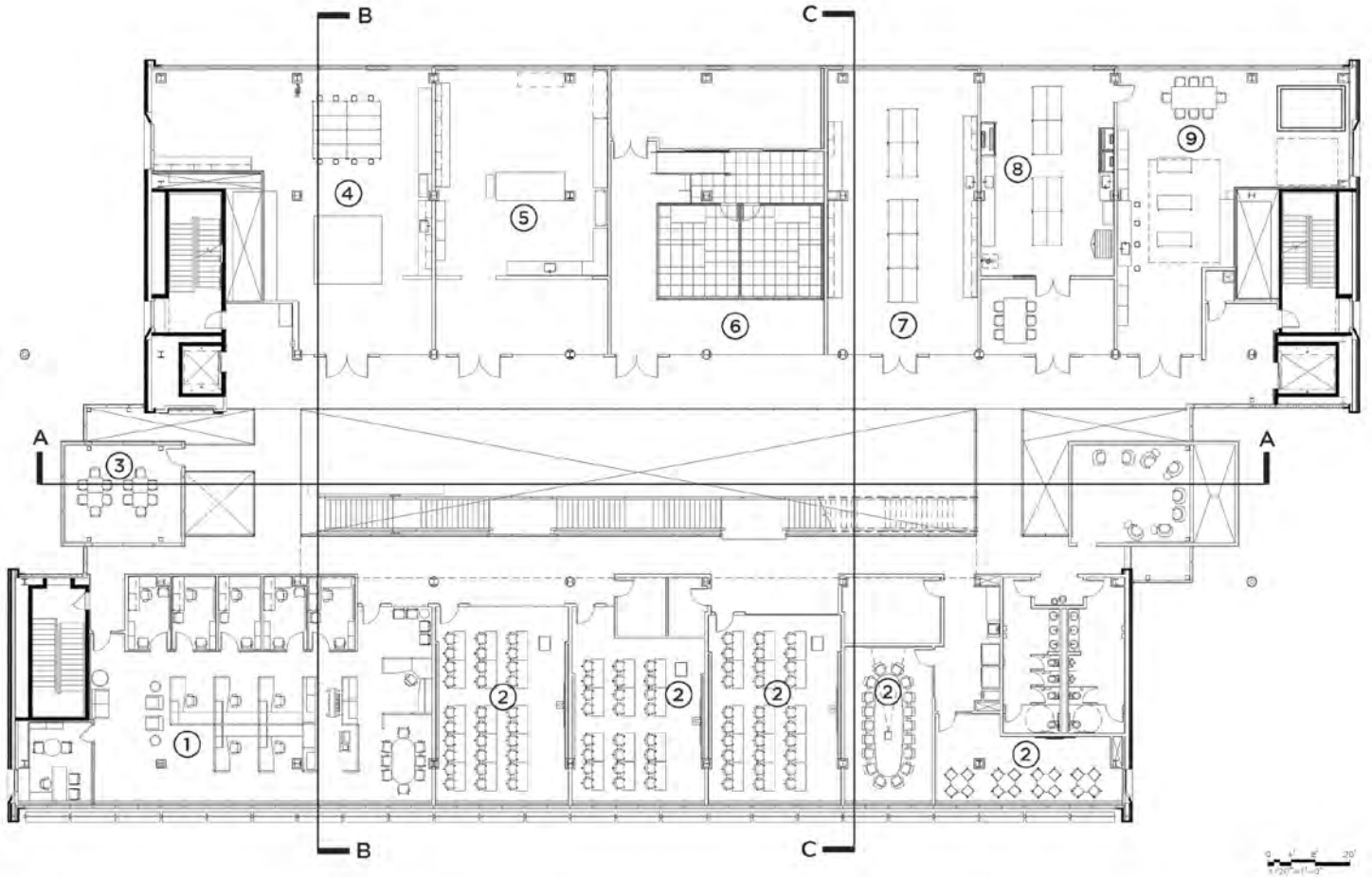
Second Floor accommodates faculty and student program spaces as desired adjacencies and allows for environments that accommodate various work styles and maintain views to the exterior. Classroom, conference spaces and high-tech computing facilities are all available.

SECOND FLOOR PLAN

LABORATORY, TEST BED AND RESEARCH

GALLERIA

ACADEMIC/OFFICE

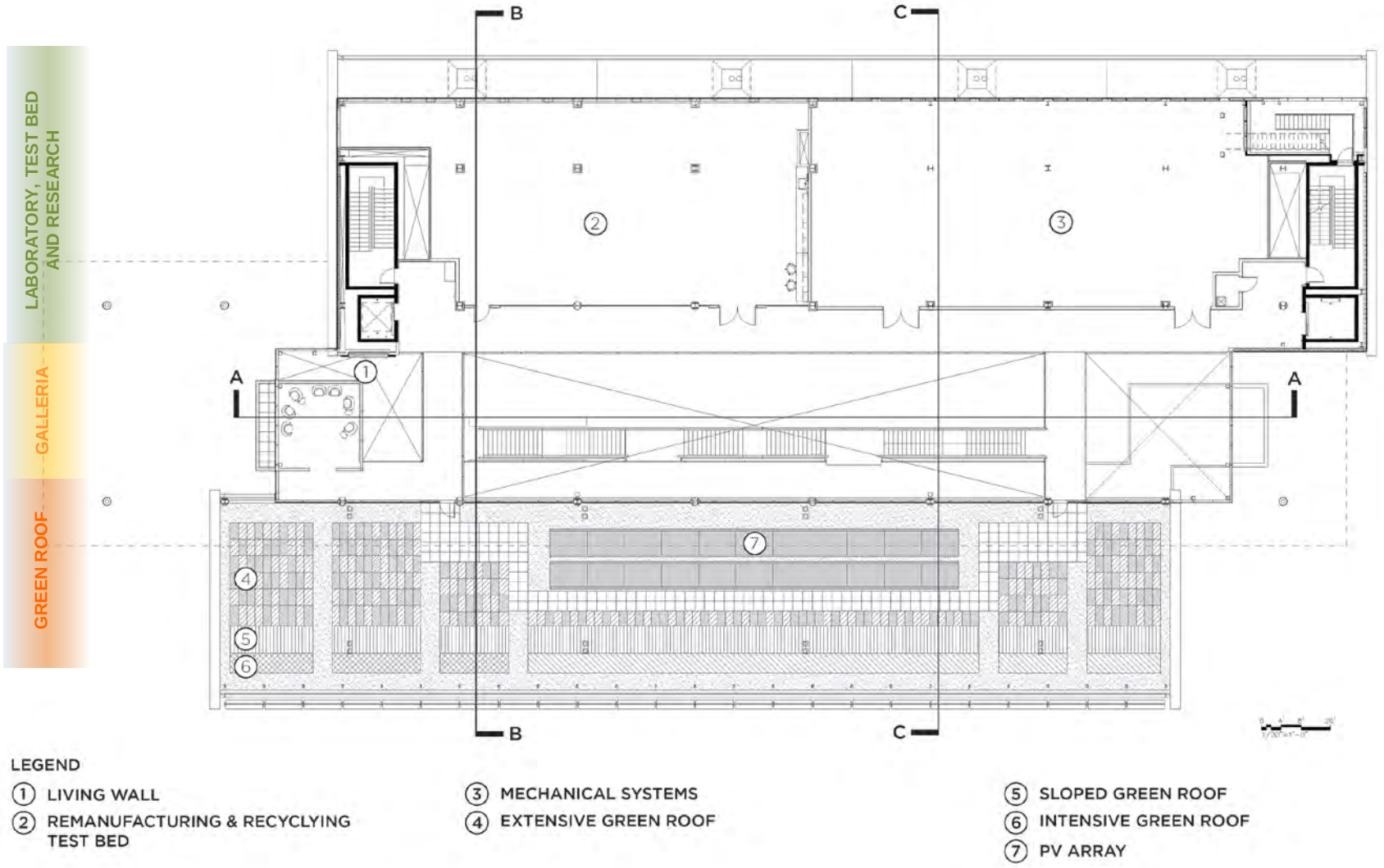


LEGEND

1. MASTER OF ARCHITECTURE-FACULTY OFFICES
2. CLASSROOMS / CONFERENCE ROOMS
3. COLLABORATION ROOM WEST
4. NANO MATERIALS INTEGRATION LAB
5. STAPLES LAB
6. ECO - IT & SYSTEMS MODELING & SIMULATION TEST BED
7. ELECTRONICS LAB
8. ENVIRONMENTAL CHEMISTRY LAB
9. SUSTAINABLE BUILDING MATERIALS LAB

Third Floor accommodates a variety of research spaces, several classrooms, collaboration areas and conference rooms.

THIRD FLOOR PLAN

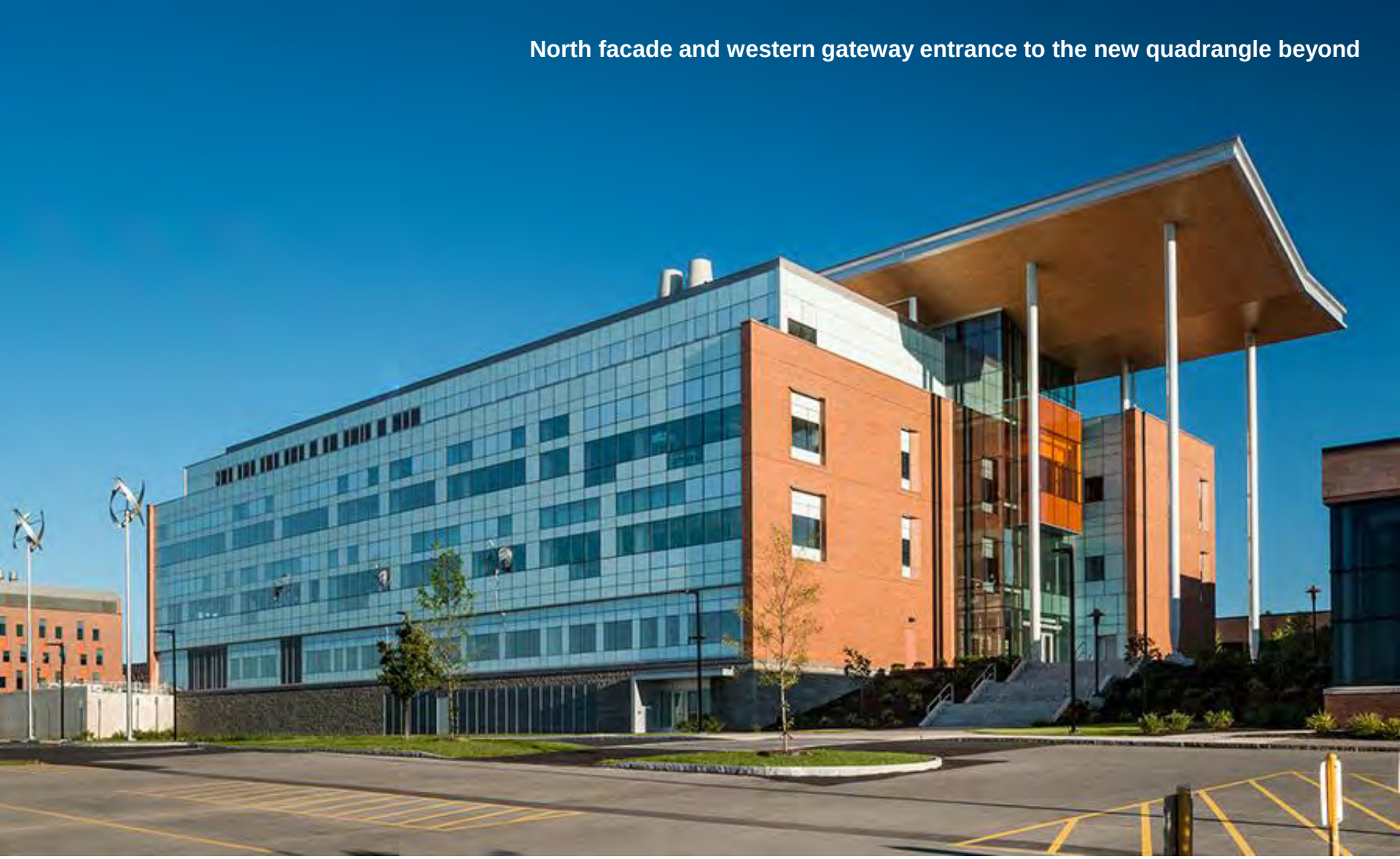


LEGEND

1. LIVING WALL
2. REMANUFACTURING & RECYCLYING TEST BED
3. MECHANICAL SYSTEMS
4. EXTENSIVE GREEN ROOF
5. SLOPED GREEN ROOF
6. INTENSIVE GREEN ROOF
7. PV ARRAY

The fourth floor test bed space offers views north to the city skyline and south to a beautiful roof garden. The vegetated green roof was designed to be accessible and includes both extensive and intensive systems and supports a “Roof Lab” – a hands-on learning area for PV and other “plug-and-play” sustainable technologies.

FOURTH FLOOR PLAN

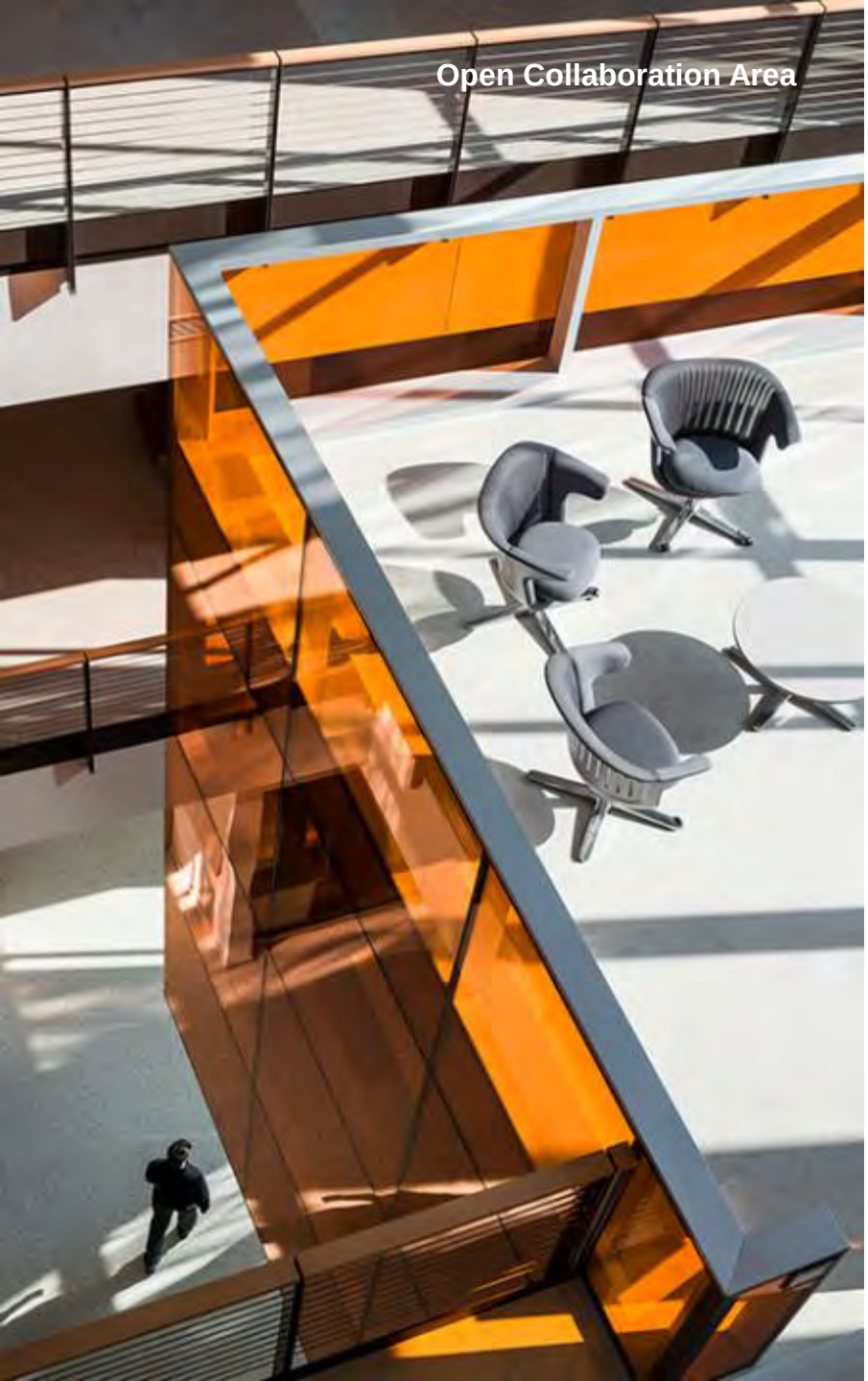


North facade and western gateway entrance to the new quadrangle beyond

The north facade design reflects the interior program and vision glazing specifications are uniquely “tuned” to this elevations environmental requirements. East and West masonry wall systems features a unique high performance wall assembly designed to achieve an R-31.

The central Galleria stair is an element of “active design”, more visible and easy to access than elevators and consequently presents a healthier and less energy intensive choice to building occupants. Additionally, it provides an amazing means to experience the Galleria as it takes occupants from the main entrance directly to the fourth floor green roof area.

Galleria

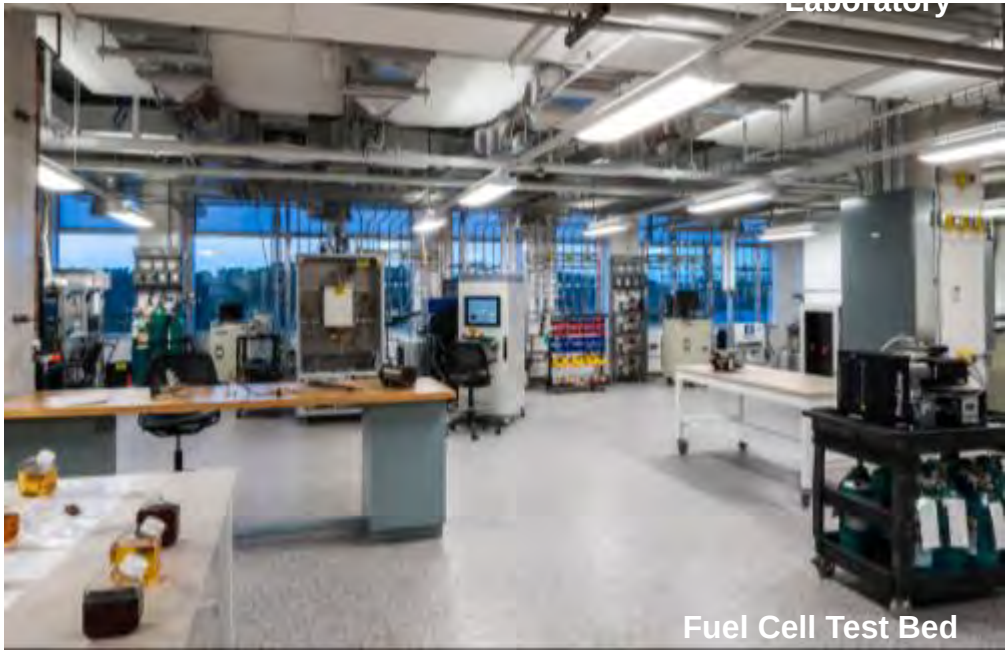


An innovative classroom environment that enables students to see a panorama of projection screens including high-end 3D simulations and data sets.

A variety of classrooms offer writeable walls and excellent daylight without glare.

East entrance features a Collaboration Room as canopy

Environmental Chemistry



Fuel Cell Test Bed

Vegetated Green Wall

Green Roof

Collaboration with our zoo's Butterfly Beltway program resulted in a 3,300 SF combination vegetated green roof and butterfly habitat and serves RIT as a cross-curricular education component. Easily visible and accessible from the fourth floor, there is also 'plug-and-play' capability for rooftop solar and other technologies that makes this a unique academic laboratory for RIT.

A beautiful, thirty-eight foot green wall is featured in the Galleria. Its multi-story height allows occupants to engage and appreciate it from various levels of the building.

In a rare event, the building is all lit up at night for our photographer.

SOUTH FACADE AT DUSK

LEED-PLATINUM CERTIFIED, FEBRUARY 2014

CONTRIBUTIONS TO ENERGY SAVINGS

Envelope Performance:	15%
Systems Performance:	31%
Exterior Fuel Cell:	11%

DESIGN ENERGY SAVINGS BEYOND ASHRAE 90.1: 56.5%

LEED 2009 EAc1 offers a maximum of 19 points at 48% savings. GIS earned exemplary performance in this category.

REDUCTION IN ANNUAL CARBON FOOTPRINT: (AIA 2030 GOAL OF 60%)	61%
PERCENT ONSITE RENEWABLE ENERGY:	5.1%
PERCENT RENEWABLE ENERGY CERTIFICATES:	100%
ANNUAL WATER SAVINGS:	75%
RECYCLED + REGIONAL MATERIALS (EACH):	25%
FOREST STEWARDSHIP COUNCIL CERTIFIED WOOD:	88%
RECYCLED CONSTRUCTION WASTE:	80%
OCCUPANTS WITH QUALITY VIEWS TO THE EXTERIOR:	90%

Annual Water Savings

(over baseline):