National Institute of Building Sciences

Provider Number: G168

Zero-Energy Geophysicists: Revolutionary Renovation of AGU Headquarters

WE3B

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January 10, 2018

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Course Description

The American Geophysical Union's (AGU) mission is "to promote discovery in Earth and space science for the benefit of humanity." In 2015, recognizing their headquarters needed a major renovation, AGU decided to lead by example: they developed a scientific approach to evolve their facility into an influential net-zero building within a tight urban footprint.

Learning Objectives

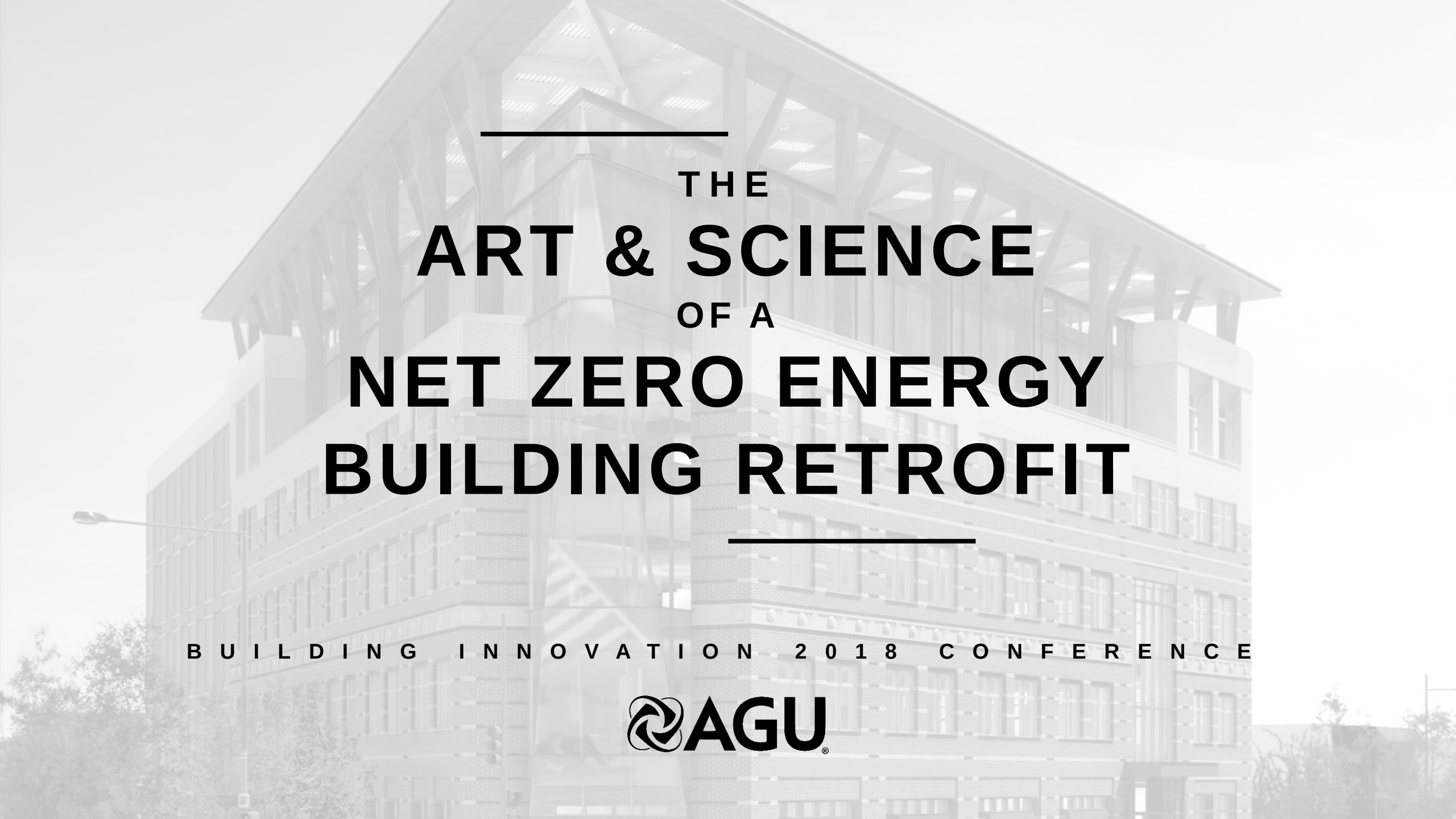
At the end of the this course, participants will be able to:

1. Develop an understanding of high-performance renovations.

2. Expand their understanding of innovative energy, water approaches, and designs needed to achieve net-zero performance in an existing building.

3. Acquire tools and strategies to apply in future net-zero renovations of existing buildings.

4. Learn how to incorporate an organization's mission and core principles into project design.



THE ART & SCIENCE OF A NET ZERO ENERGY BUILDING RETROFIT

BUILDING INNOVATION 2018 CONFERENCE

AGU

A FEW WORDS

ABOUT US

Chris McEntee

CEO

The American Geophysical Union

Joseph DiIenno

Associate

Interface Engineering

Guilherme Almeida

Senior Associate

Hickok Cole Architects

AGU

THE INTRODUCTION

AGU galvanizes a community of Earth and space scientists that collaboratively advances and communicates science and its power to ensure a sustainable future.

American Geophysical Union

What do we do?

The three S's…

AGU
American Geophysical Union

Strengthen the talent pool

AGU
American Geophysical Union

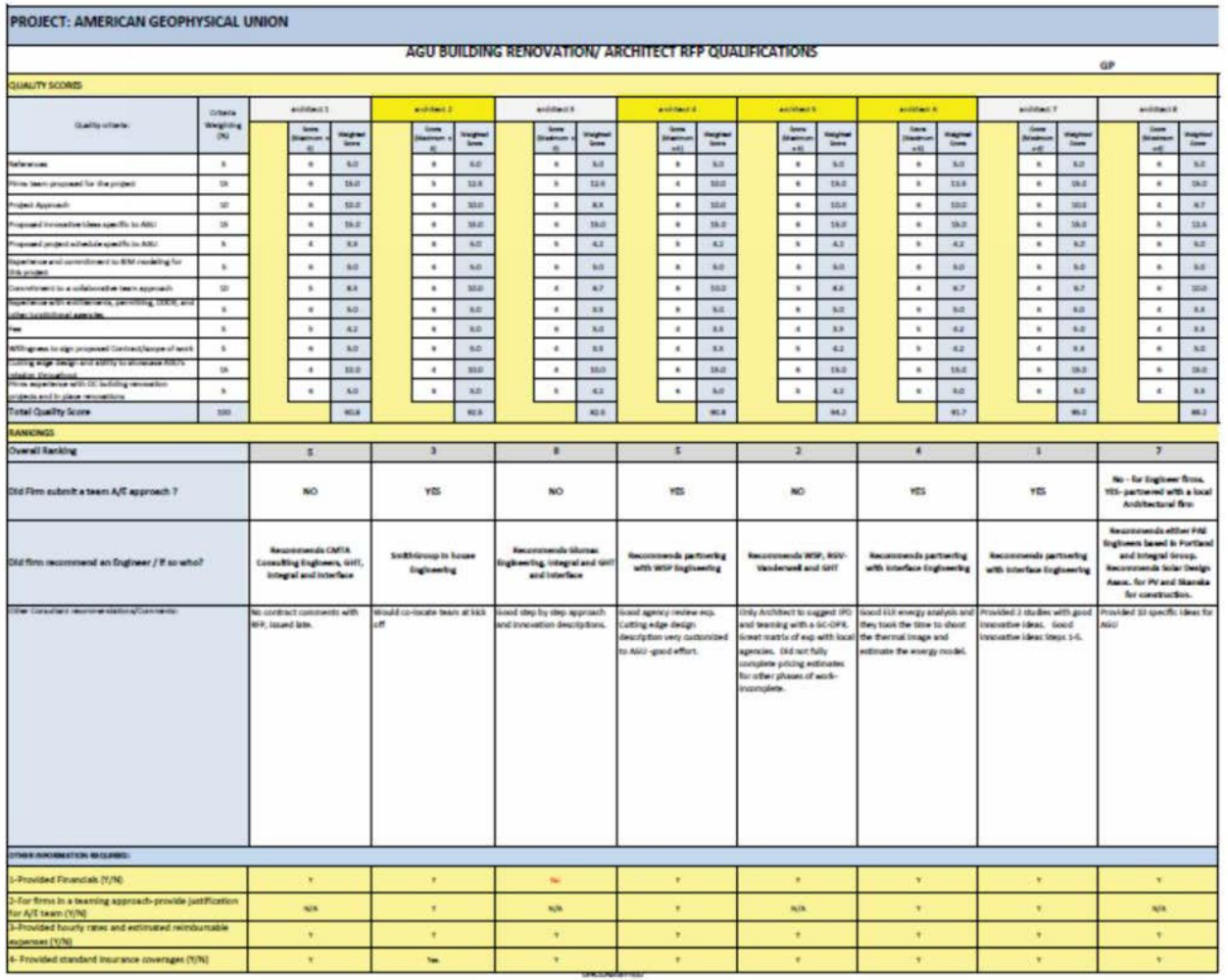

Support the science
Volcanology, Geochemistry and Petrology
Volcanology, Geochemistry and Petrology
AGU
American Geophysical Union

Share our science

AGU
American Geophysical Union

THIS IS NOT

‘BUSINESS AS USUAL’



PROJECT: AMERICAN GEOPHYSICAL UNION

AGU BUILDING RENOVATION/ ARCHITECT RFP QUALIFICATIONS

GP

QUALITY SCORES

Quality criteria	Criteria Weighting (%)	architect 1		architect 2		architect 3		architect 4		architect 5		architect 6		architect 7		architect 8	
		Score (Maximum = 6)	Weighted Score	Score (Maximum = 6)	Weighted Score	Score (Maximum = 6)	Weighted Score	Score (Maximum = 6)	Weighted Score	Score (Maximum = 6)	Weighted Score	Score (Maximum = 6)	Weighted Score	Score (Maximum = 6)	Weighted Score	Score (Maximum = 6)	Weighted Score
References	5	6	5.0	6	5.0	6	5.0	6	5.0	6	5.0	6	5.0	6	5.0	6	5.0
Firms team proposed for the project	15	6	15.0	5	12.5	5	12.5	6	15.0	6	15.0	6	15.0	6	15.0	6	15.0
Project Approach	10	6	10.0	6	10.0	5	8.3	6	10.0	6	10.0	6	10.0	6	10.0	4	6.7
Proposed innovative ideas specific to AGU	15	6	15.0	6	15.0	6	15.0	6	15.0	6	15.0	6	15.0	6	15.0	5	12.5
Proposed project schedule specific to AGU	5	4	3.3	6	5.0	5	4.2	5	4.2	5	4.2	5	4.2	6	5.0	6	5.0
Experience and commitment to BIM modeling for this project	5	6	5.0	6	5.0	6	5.0	6	5.0	6	5.0	6	5.0	6	5.0	6	5.0
Commitment to a collaborative team approach	10	5	8.3	6	10.0	4	6.7	6	10.0	5	8.3	4	6.7	4	6.7	6	10.0
Experience with entitlements, permitting, USACE, and other local/federal agencies	5	6	5.0	6	5.0	4	3.3	5	5.0	6	5.0	6	5.0	6	5.0	4	3.3
Fee	5	5	4.2	6	5.0	6	5.0	4	3.3	4	3.3	5	4.2	6	5.0	4	3.3
WSP agrees to sign proposed Contract/Scope of work	5	6	5.0	6	5.0	4	3.3	4	3.3	5	4.2	5	4.2	4	3.3	6	5.0
Cutting edge design and ability to showcase AGU's vision throughout	15	6	15.0	6	15.0	6	15.0	6	15.0	6	15.0	6	15.0	6	15.0	6	15.0
Firms experience with DC building renovation projects and in-place renovations	5	6	5.0	6	5.0	5	4.2	6	5.0	5	4.2	6	5.0	6	5.0	4	3.3
Total Quality Score	100		90.8		92.5		82.5		90.8		84.2		91.7		86.0		86.2

RANKINGS

Overall Ranking	1	3	6	5	2	4	1	7
Did Firm submit a team A/E approach ?	NO	YES	NO	YES	NO	YES	YES	No - for Engineer firms. YES- partnered with a local Architectural firm
Did firm recommend an Engineer / If so who?	Recommends CMTA Consulting Engineers, GHT, Integral and Interface	SmithGroup in house Engineering	Recommends Glumac Engineering, Integral and GHT and Interface	Recommends partnering with WSP Engineering	Recommends WSP, RGV-Vanderweil and GHT	Recommends partnering with Interface Engineering	Recommends partnering with Interface Engineering	Recommends either PAE Engineers based in Portland and Integral Group. Recommends Solar Design Assoc. for PV and Skanska for construction.
Other Consultant recommendations/Comments:	No contract comments with RFP, issued late.	Would co-locate team at kick off	Good step by step approach and innovation descriptions.	Good agency review orgs. Cutting edge design description very customized to AGU -good effort.	Only Architect to suggest IPD and teaming with a GC-CPFF. Great matrix of exp with local agencies. Did not fully complete pricing estimates for other phases of work- incomplete.	Good EUI energy analysis and they took the time to shoot the thermal image and estimate the energy model.	Provided 2 studies with good innovative ideas. Good innovative ideas steps 1-5.	Provided 10 specific ideas for AGU

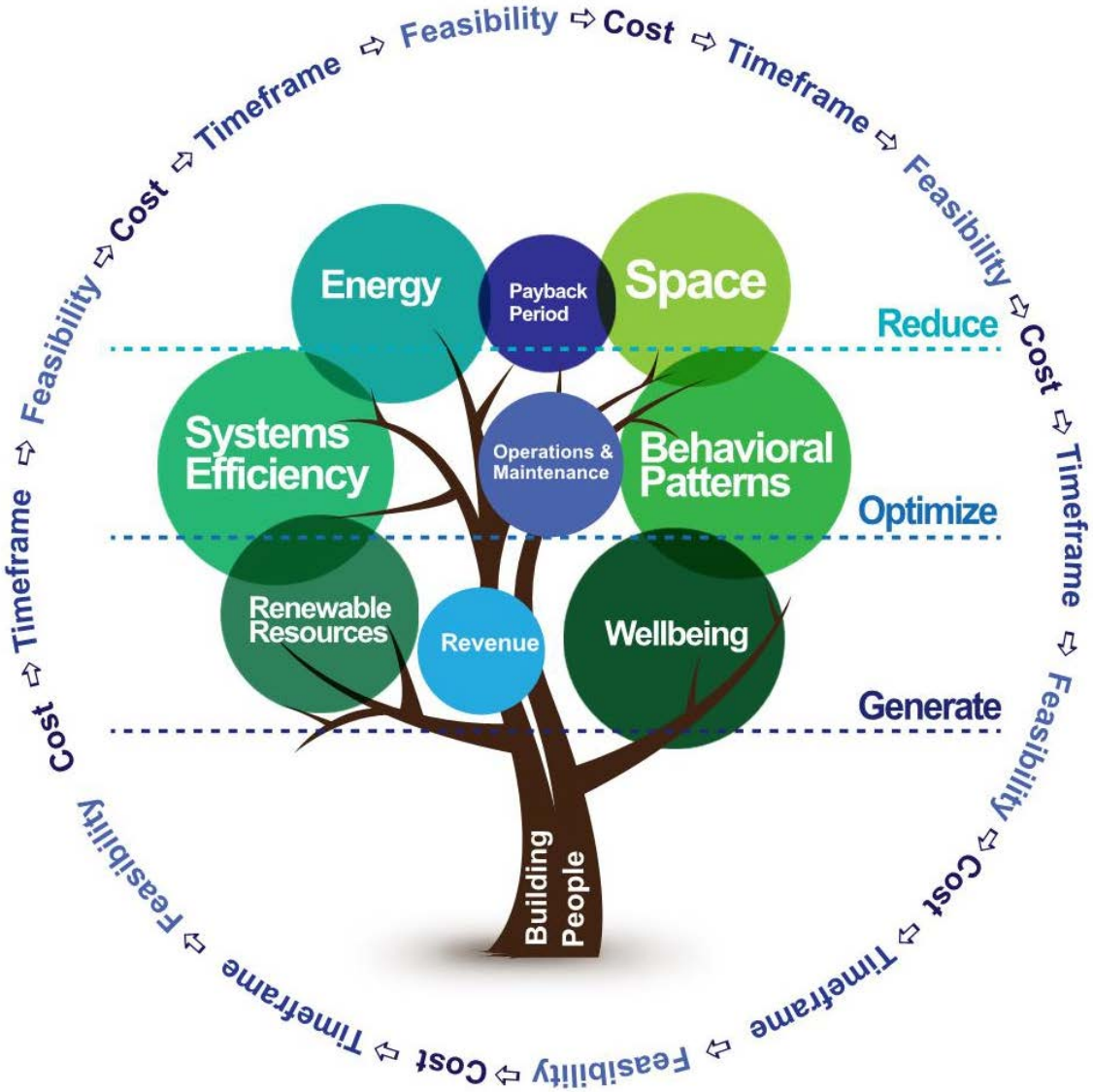
OTHER INFORMATION REQUIRED:

1-Provided Financials (Y/N)	Y	Y	No	Y	Y	Y	Y	Y
2-For firms in a teaming approach- provide justification for A/E team (Y/N)	N/A	Y	N/A	Y	N/A	Y	Y	N/A
3-Provided hourly rates and estimated reimbursable expenses (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y
4- Provided standard insurance coverages (Y/N)	Y	Yes	Y	Y	Y	Y	Y	Y

PROJECT

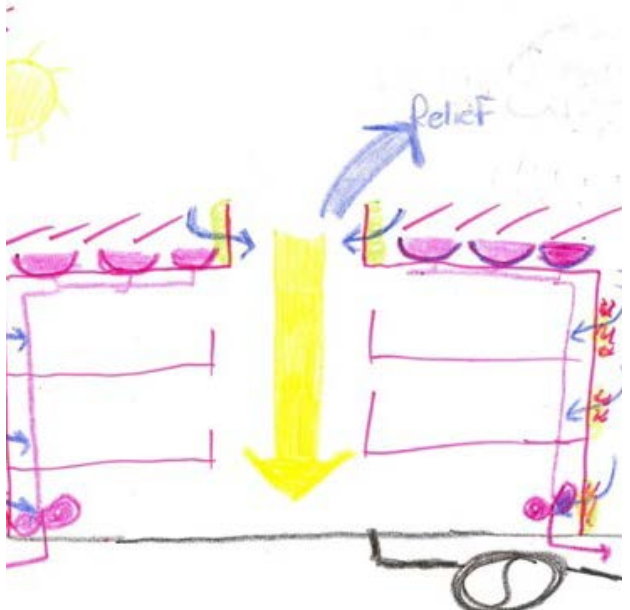
GOALS

- Develop a workplace environment that is state of the art
- Consistent, flexible and adaptable 21st century work environment
- Work environment that makes it easy to collaborate with our members and other partners/ vendors
- Showcase the contributions of Earth and space science
- Push the limits of the building performance in terms of energy, water, the work environment; Net Zero
- Raise the visibility of AGU through this project



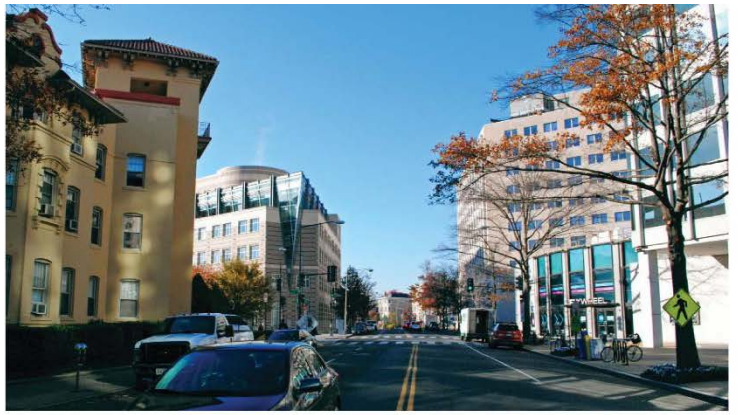
ALL HANDS
ON DECK

Inclusive design charrette with stakeholders & early team selection



THE

EXISTING BUILDING



LOOKING WEST ON FLORIDA AVENUE

CORNER OF 20TH STREET AND FLORIDA AVENUE

LOOKING NORTH UP 20TH STREET

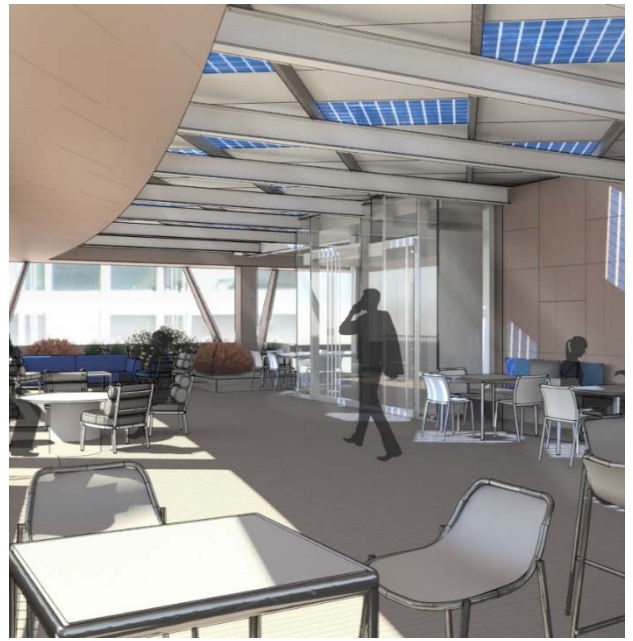
LOOKING EAST ON FLORIDA AVENUE

CURRENT

PROPOSED

THE
A & E

1. Radiant Ceiling Grid & DC lights
2. The Hy-Phy wall and Biophilia
3. PV Array as Amenity on the Roof
4. Transparency and Openness



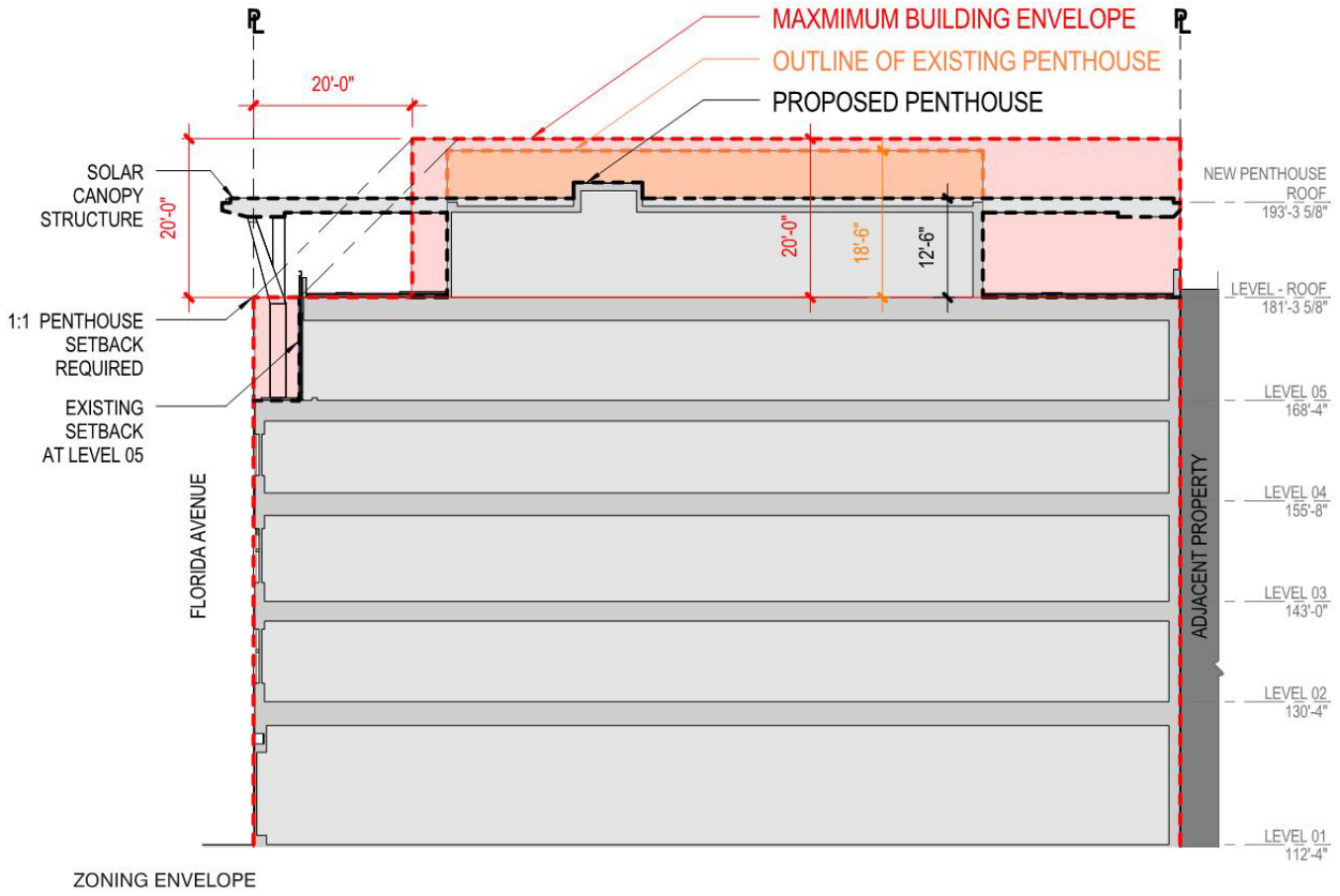
JURISDICTIONAL

CHALLENGES & APPROVALS

COMMUNITY ENGAGEMENT

- **ZP&D COMMITTEE OF THE ANC** (2/25)
- **DUPONT CIRCLE CONSERVANCY** (3/08)
- **DUPONT CIRCLE CITIZENS ASSOCIATION** (3/16)
- **COMMUNITY MEETING AT AGU** (3/16)
- **HISTORIC PRESERVATION REVIEW BOARD HEARING**
- **ZP&D COMMITTEE OF THE ANC** (4/06)
- **DUPONT CIRCLE CONSERVANCY** (4/12)
- **ANC 2B APRIL MEETING** (4/13)
- **DUPONT CIRCLE CITIZENS ASSOCIATION** (5/20)

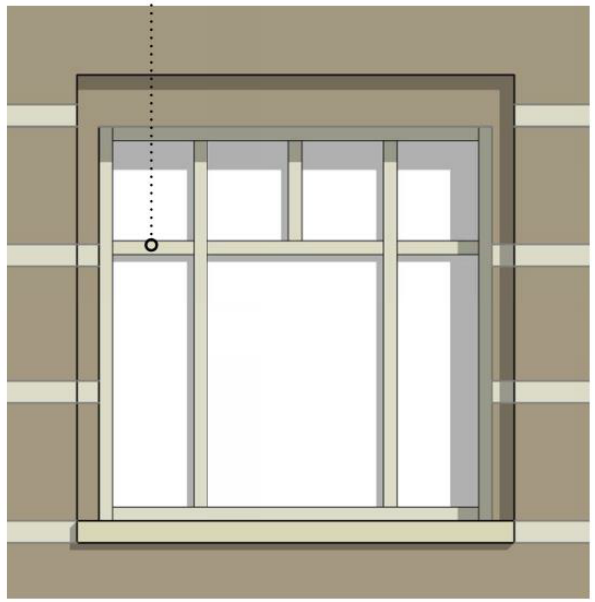
RENOVATION@AGU.ORG



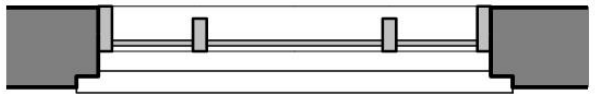
MARRYING THE

ARCHITECTURE & ENGINEERING

FULLY CAPTURED MULLIONS WITH CONSISTENT DEPTH AND PROFILE AT ALL OPENINGS THROUGH OUT BUILDING



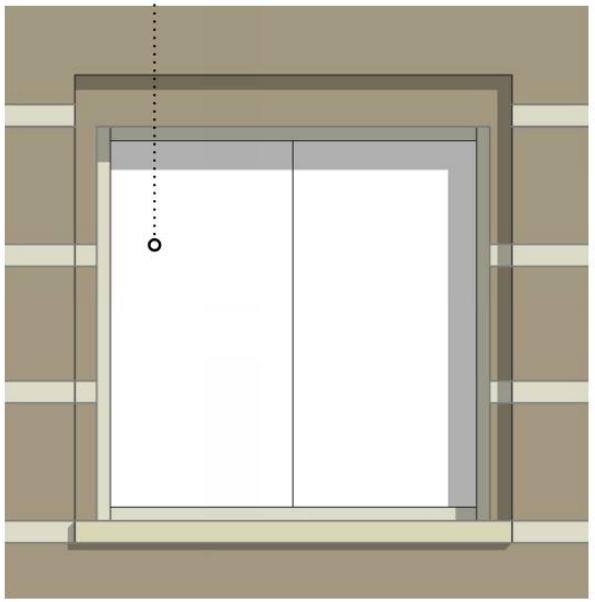
ELEVATION



PLAN

EXISTING CONDITIONS

2 SIDED STRUCTURALLY GLAZED SYSTEM WITH CAPUTRED MULLIONS AT PERIMETER. PRE-WEATHERED STEEL CLAD ACCENTS AT VITRINE ROOF

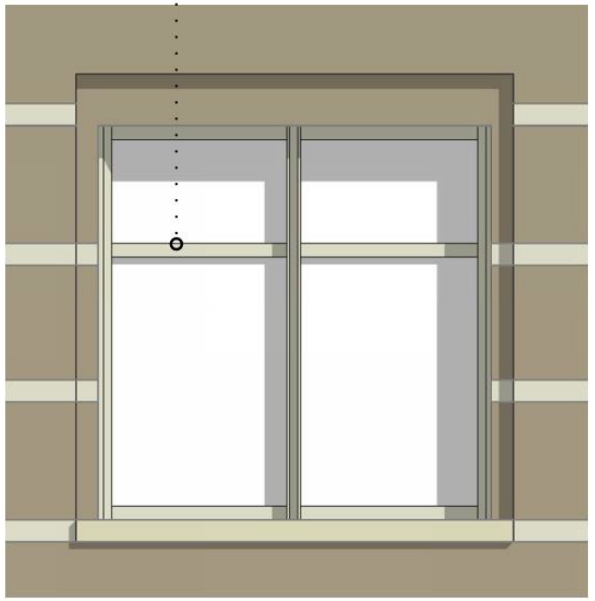


ELEVATION

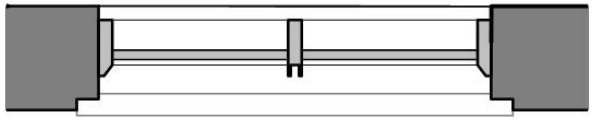
PLAN

3/24 PREVIOUSLY PROPOSED

FULLY CAPTURED MULLIONS AT PUNCHED WINDOW OPENINGS WITH MULLIONS OF VARYING PROFILES AND DEPTHS.



ELEVATION

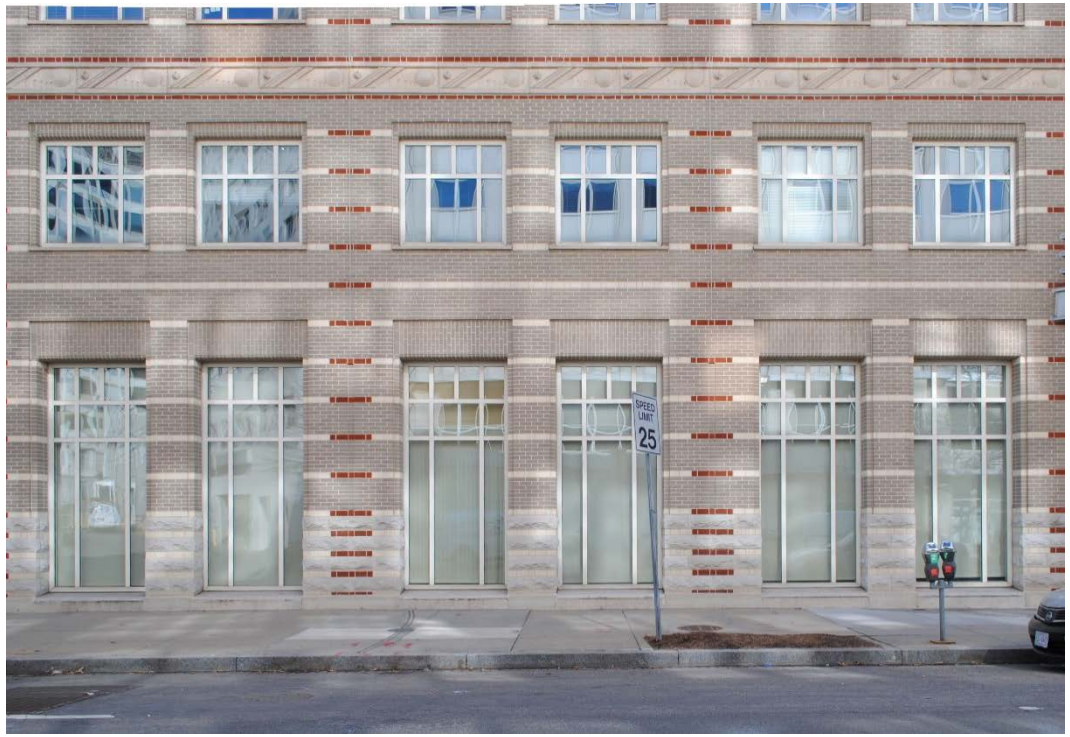


PLAN

5/26 REVISED STOREFRONT

MARRYING THE

ARCHITECTURE & ENGINEERING

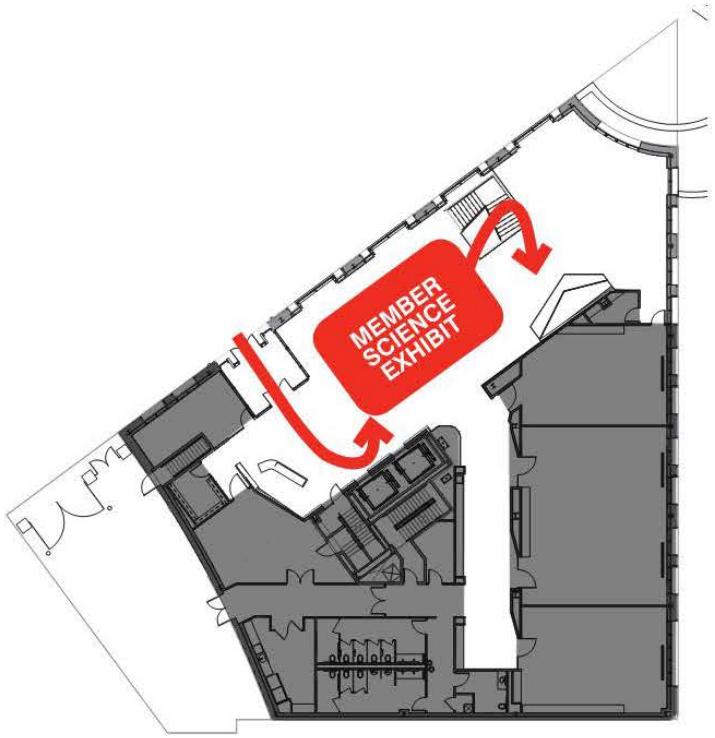


CURRENT

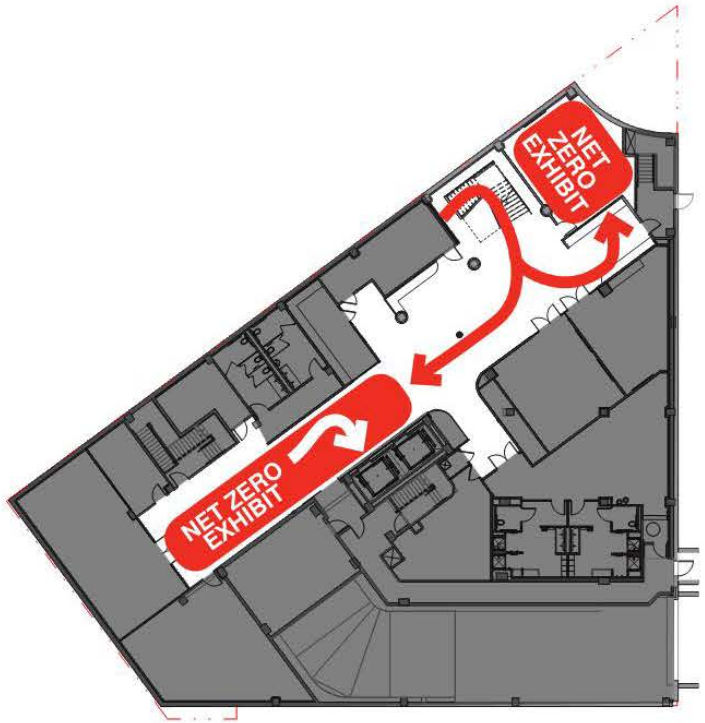
PROPOSED

ENGAGING THE PUBLIC

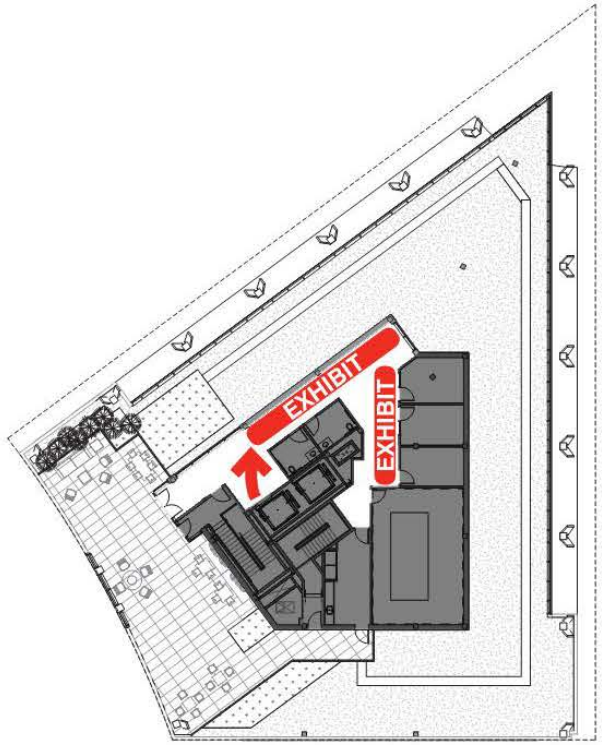
TELLING THE STORY OF AGU



GROUND LEVEL



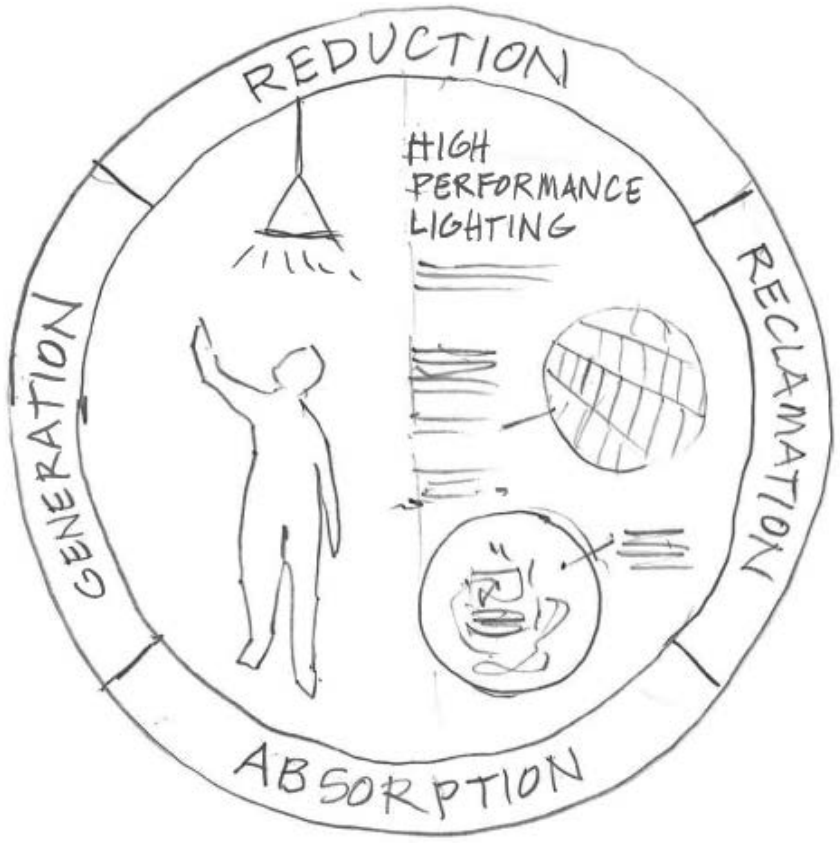
LOWER LEVEL

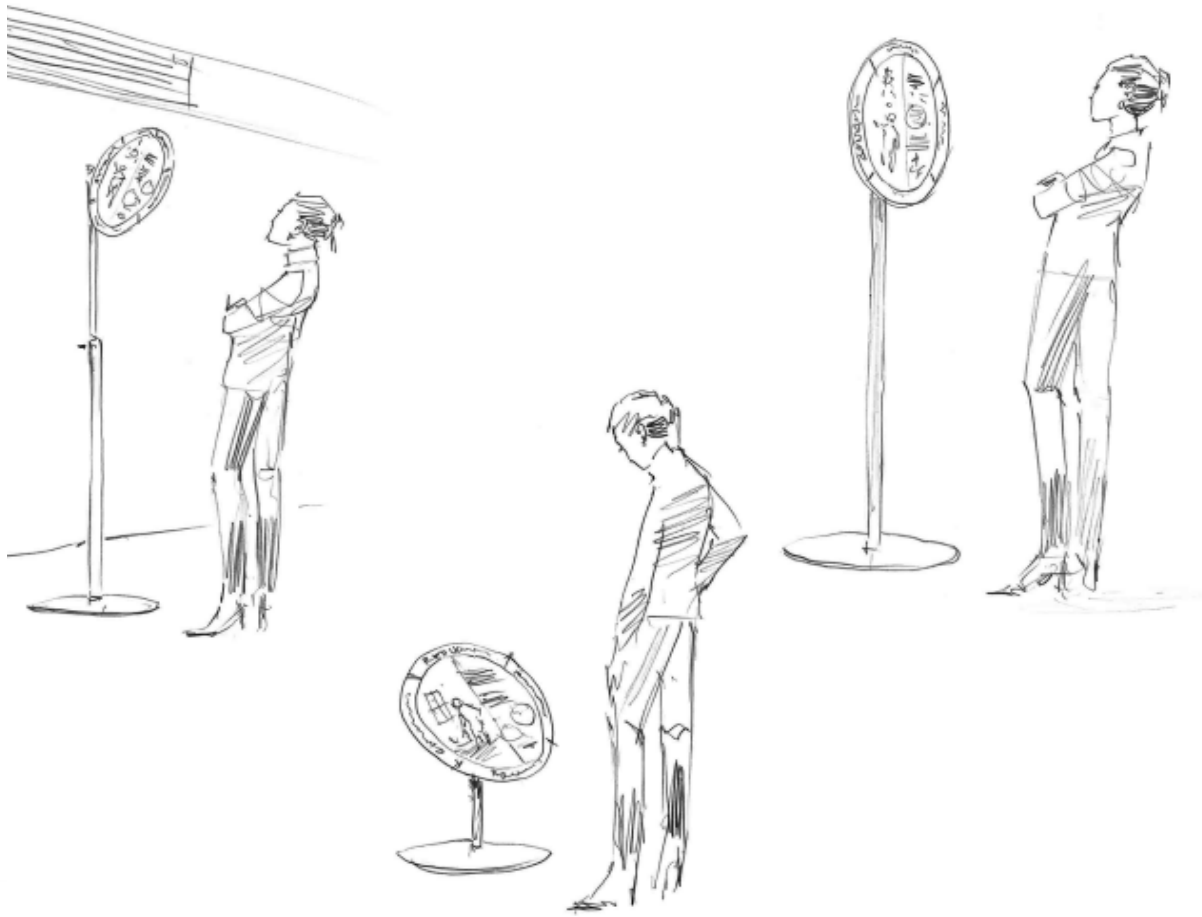


ROOF LEVEL

ENGAGING THE PUBLIC

TELLING THE STORY OF AGU





Courtesy C&G Partners

ENGAGING THE PUBLIC

TELLING THE STORY OF AGU

AGU Member Lounge

Exhibit / lobby looking toward Conferencing

Reception & Member Science Wall

A NEW WAY OF WORKING

EMBODY THE MISSION

Typical Open Office

A NEW WAY OF WORKING

EMBODY THE MISSION

SHARED SPACES
PRE-FUNCTION SPACE AT
EXECUTIVE CONFERENCING

SHARED SPACES
SEMI-PRIVATE MEETING
SPACES FOR OPEN TEAMING

QUIET SPACES
FOR FOCUSED WORK OR
PRIVATE MEETINGS

IMPROVED CIRCULATION
PERIMETER & VERTICAL
CONNECTION AT ALL AGU
WORK FLOORS

FORMAL CONFERENCING
AT PROW

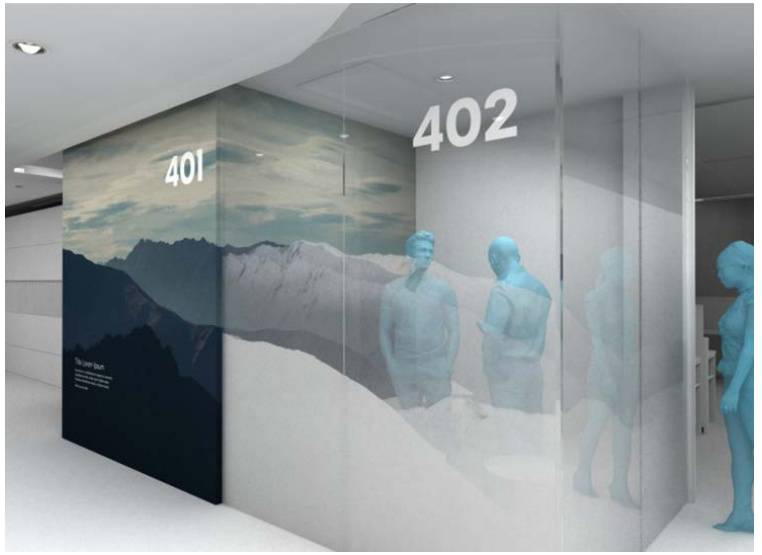
ARRIVAL LOBBY
FEATURING “CROSS
SECTION THROUGH
MEMBER SCIENCE”
WALL

OPEN OFFICE
PERSONAL WORKSPACE
FOR INCREASED
COLLABORATION

A NEW WAY OF WORKING

EMBODY THE MISSION

Level 3 Environmental Graphics



Level 4 Environmental Graphics

Level 5 Environmental Graphics

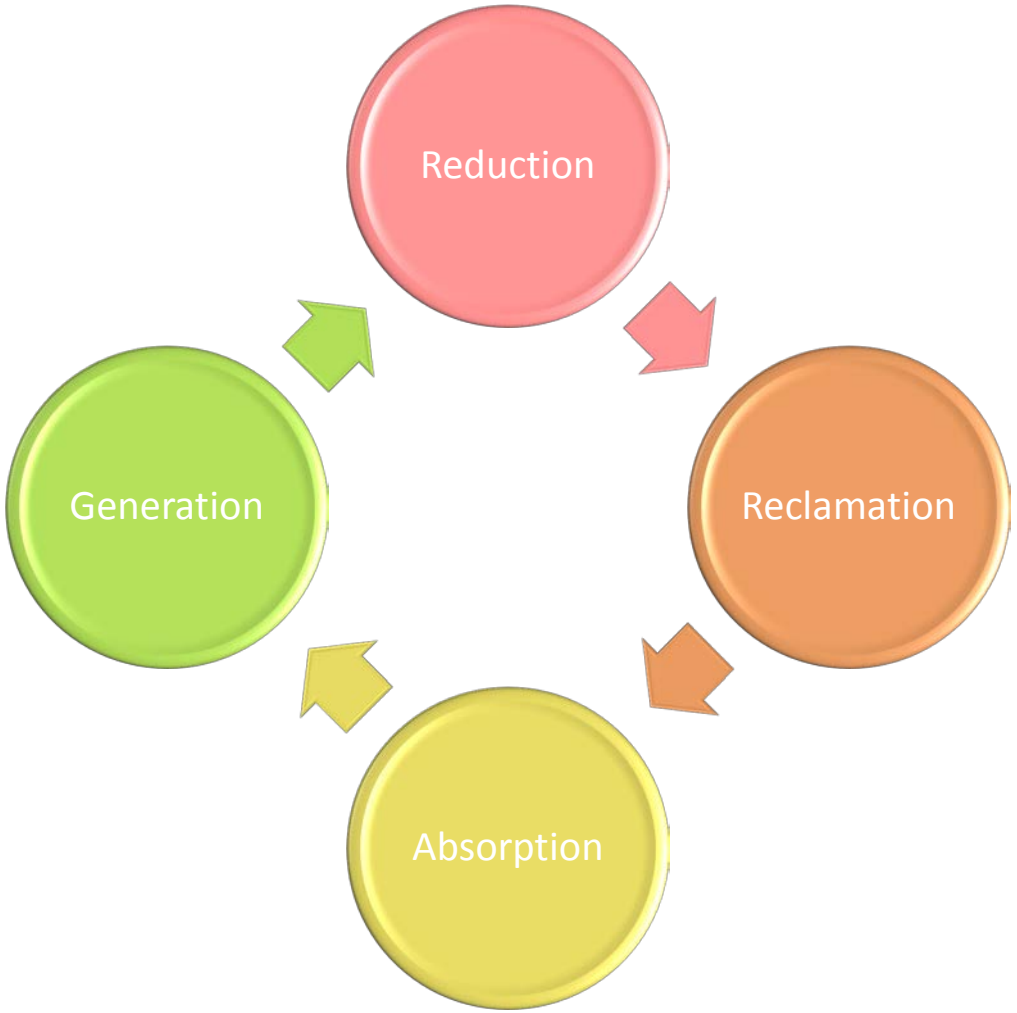
Courtesy C&G Partners

A NEW WAY OF WORKING

EMBODY THE MISSION

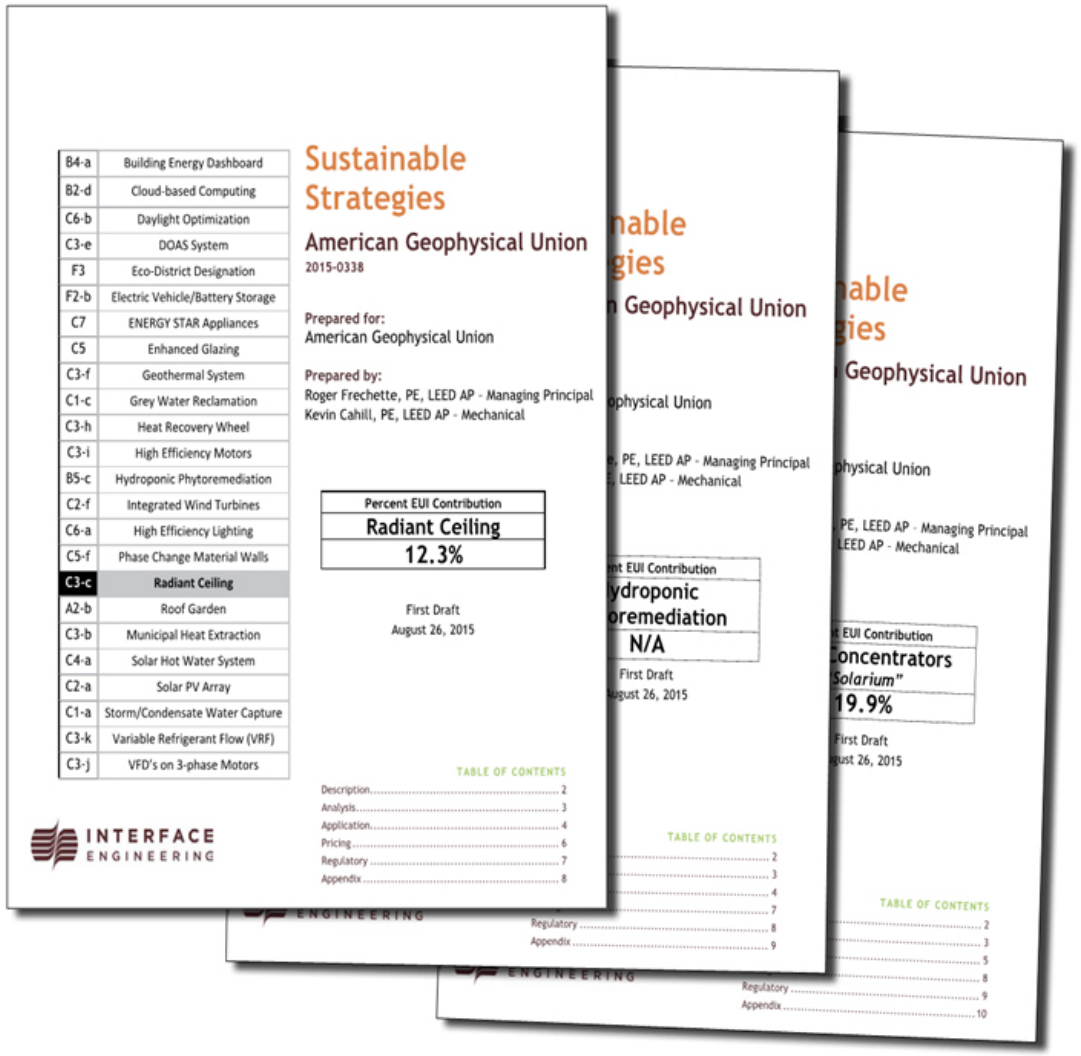
HIGH PERFORMANCE DESIGN

STRATEGIES



EXPLORING

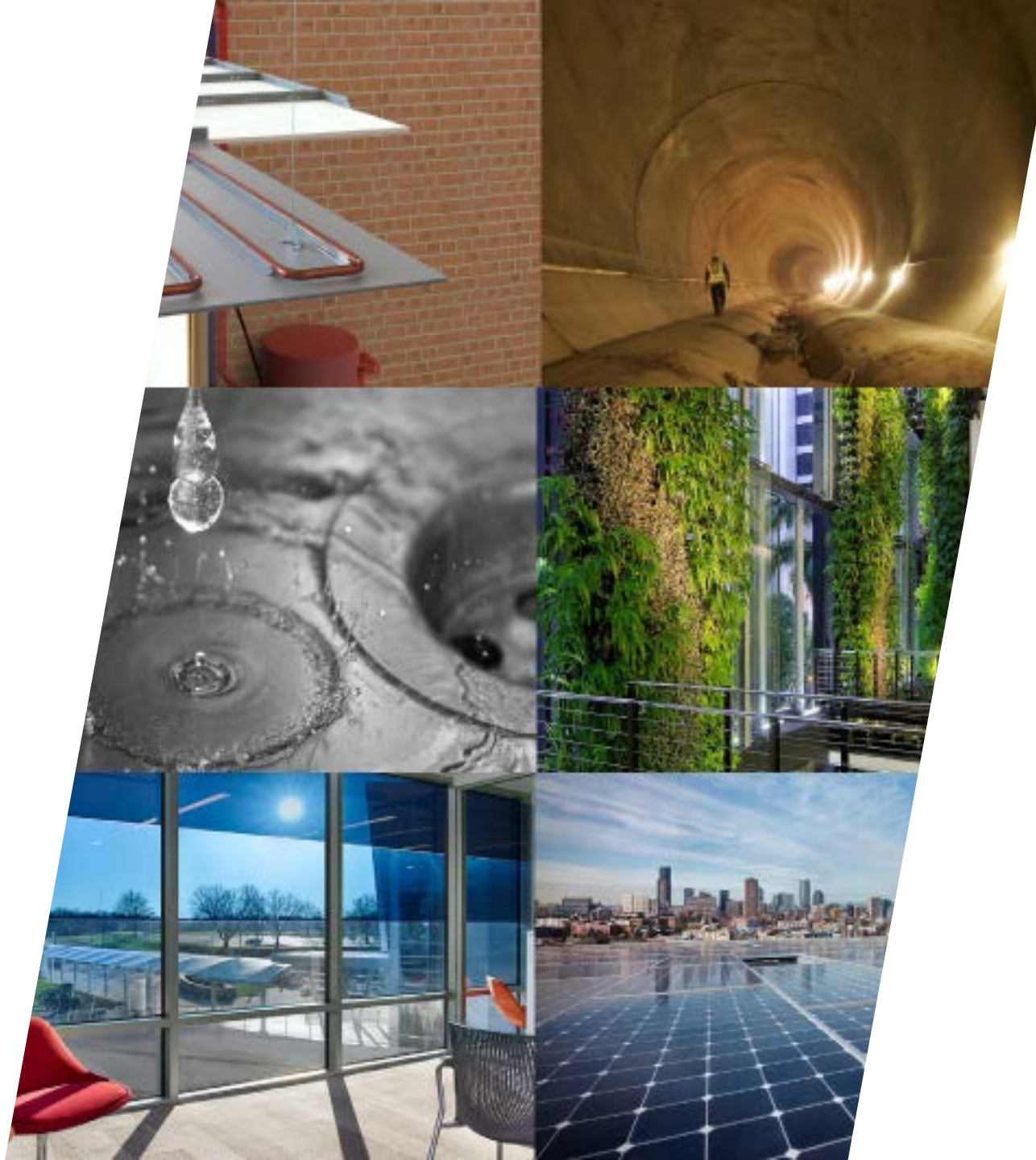
ALL OF THE OPTIONS



HIGH PERFORMANCE DESIGN

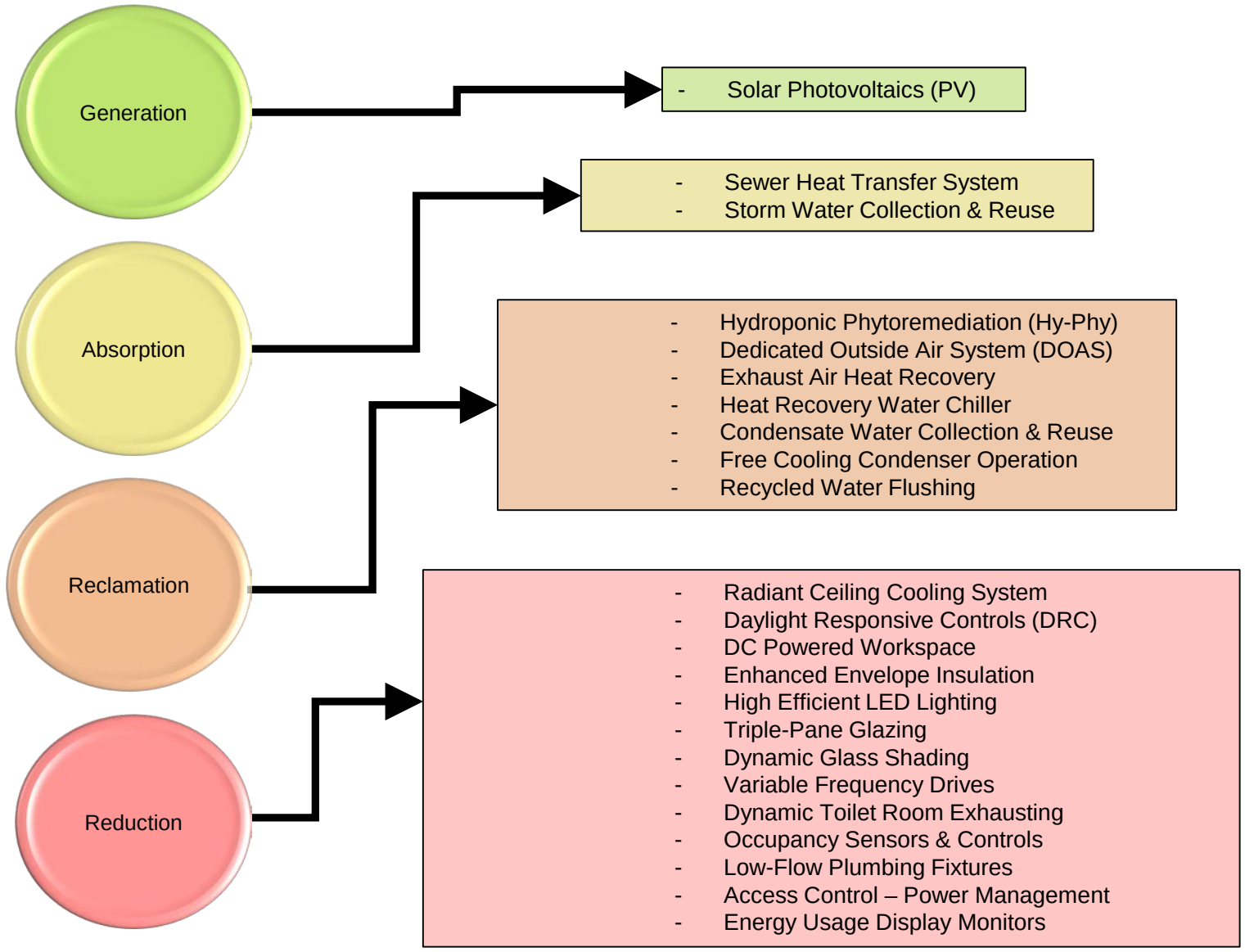
STRATEGIES

- Solar Photovoltaics (PV)
- Sewer Heat Exchange System
- DC Powered Workspace
- Direct Current LED Lighting
- Hydroponic Phytoremediation (Hy-Phy)
- Radiant Ceiling Cooling System
- Heat Recovery Water Chiller
- Storm Water Collection & Reuse
- Dynamic Glass Shading
- Dedicated Outside Air System (DOAS)
- Exhaust Air Heat Recovery
- Daylight Responsive Controls (DRC)
- Enhanced Envelope Insulation
- Free Cooling Condenser Operation
- Dynamic Toilet Room Exhausting
- Triple-Pane Glazing
- Variable Frequency Drives
- Occupancy Sensors & Controls
- Condensate Water Collection & Reuse
- Low-Flow Plumbing Fixtures
- Recycled Water Flushing
- Access Control – Power Management
- Energy Usage Display Monitors

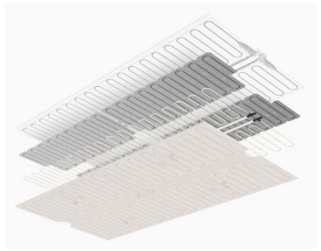


HIGH PERFORMANCE DESIGN

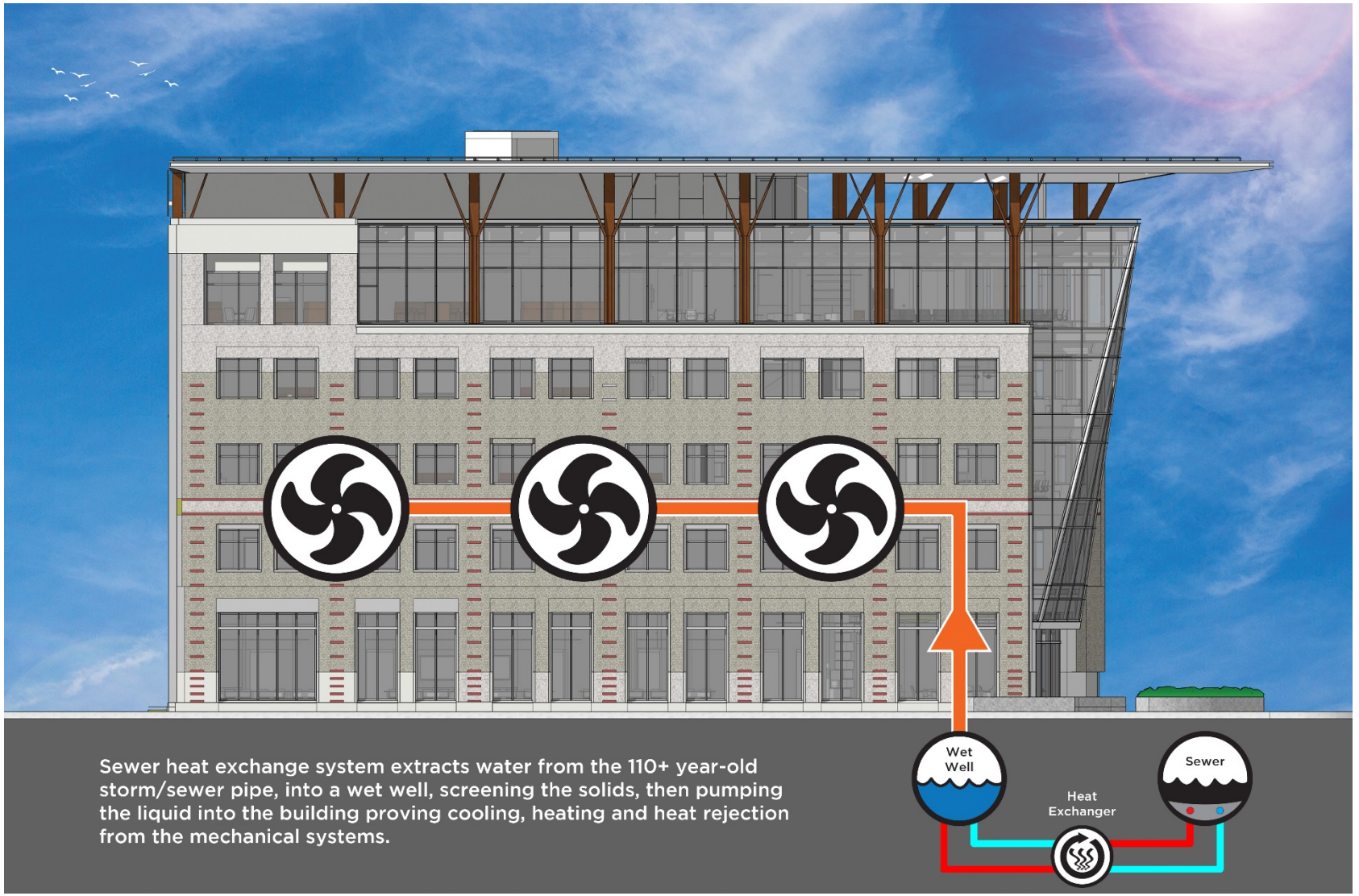
STRATEGIES



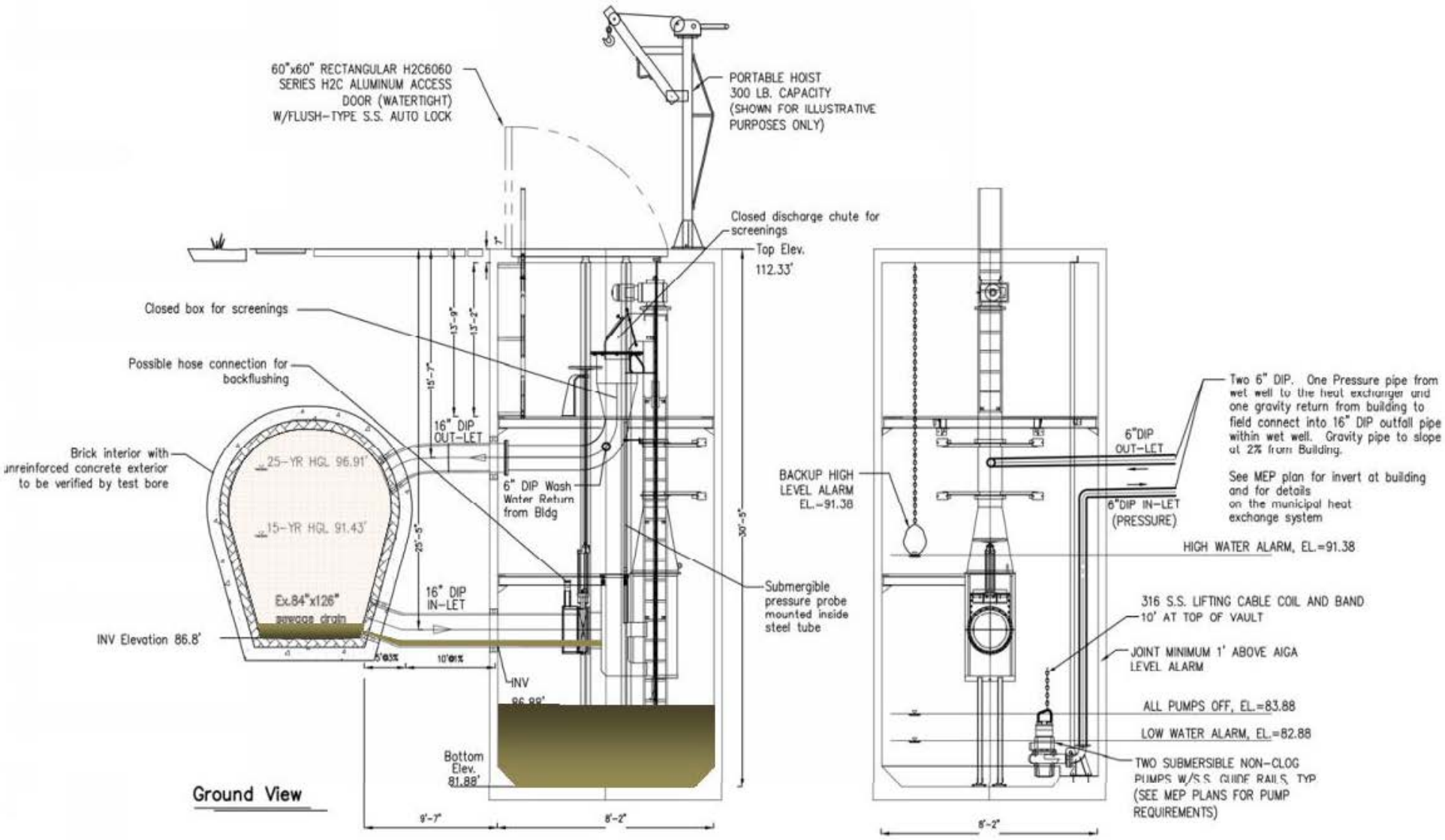
8’ x 8’ – 150 year old sewer



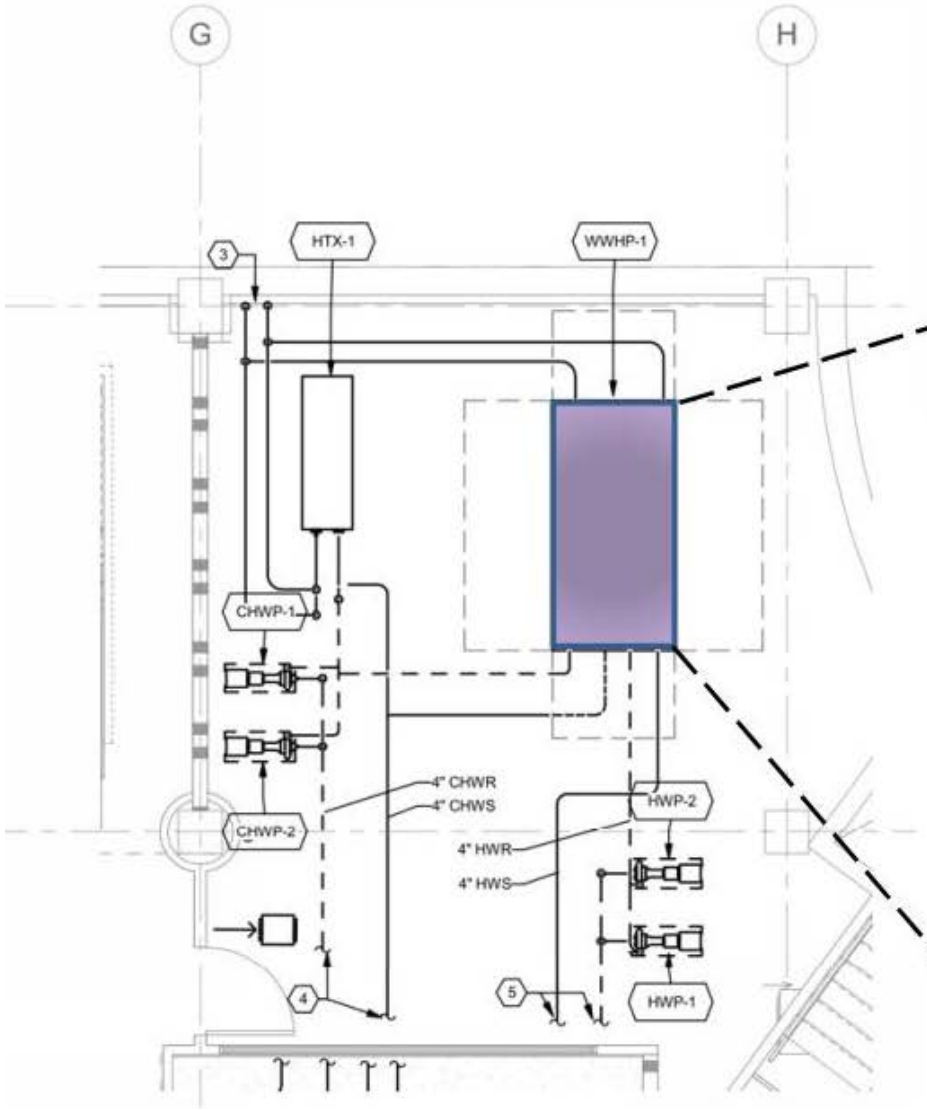
Radiant Ceiling Cooling System



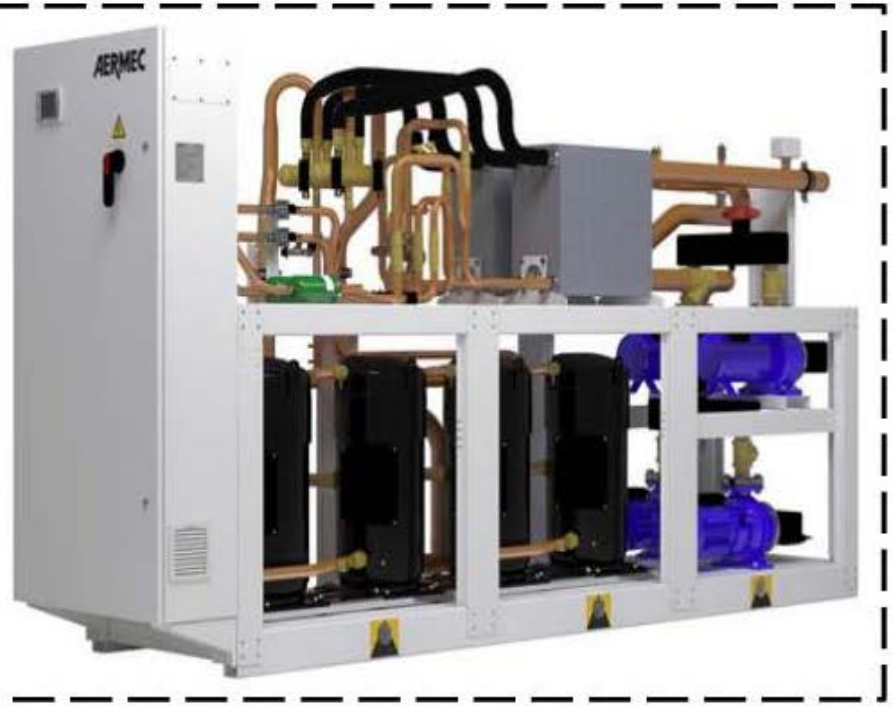
MUNICIPAL HEAT EXCHANGE & RADIANT CEILING SYSTEM



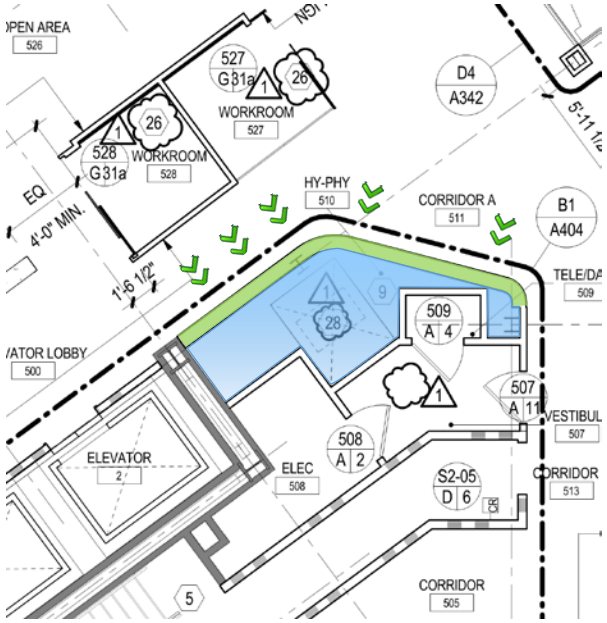
MUNICIPAL HEAT EXCHANGE & RADIANT CEILING SYSTEM

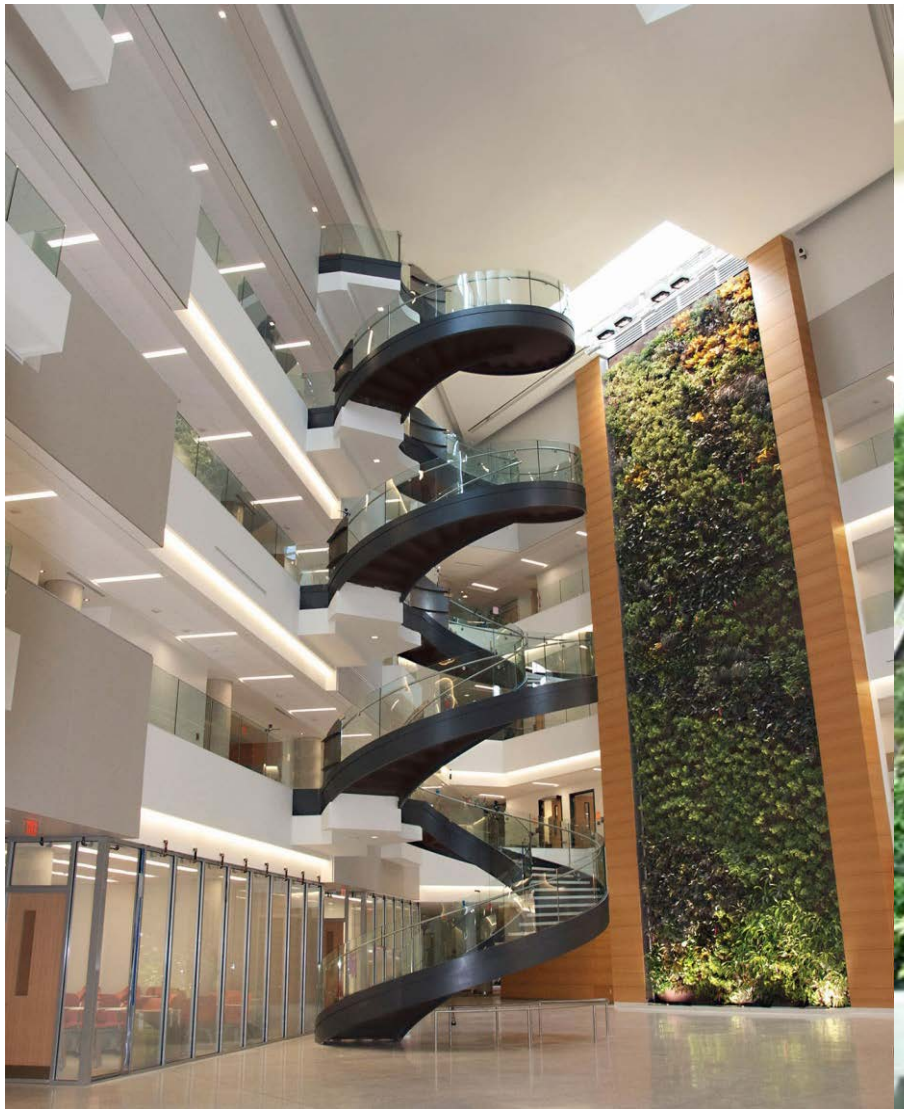


Cooling Capacity = 1,200 MBH
Heating Capacity = 1,500 MBH

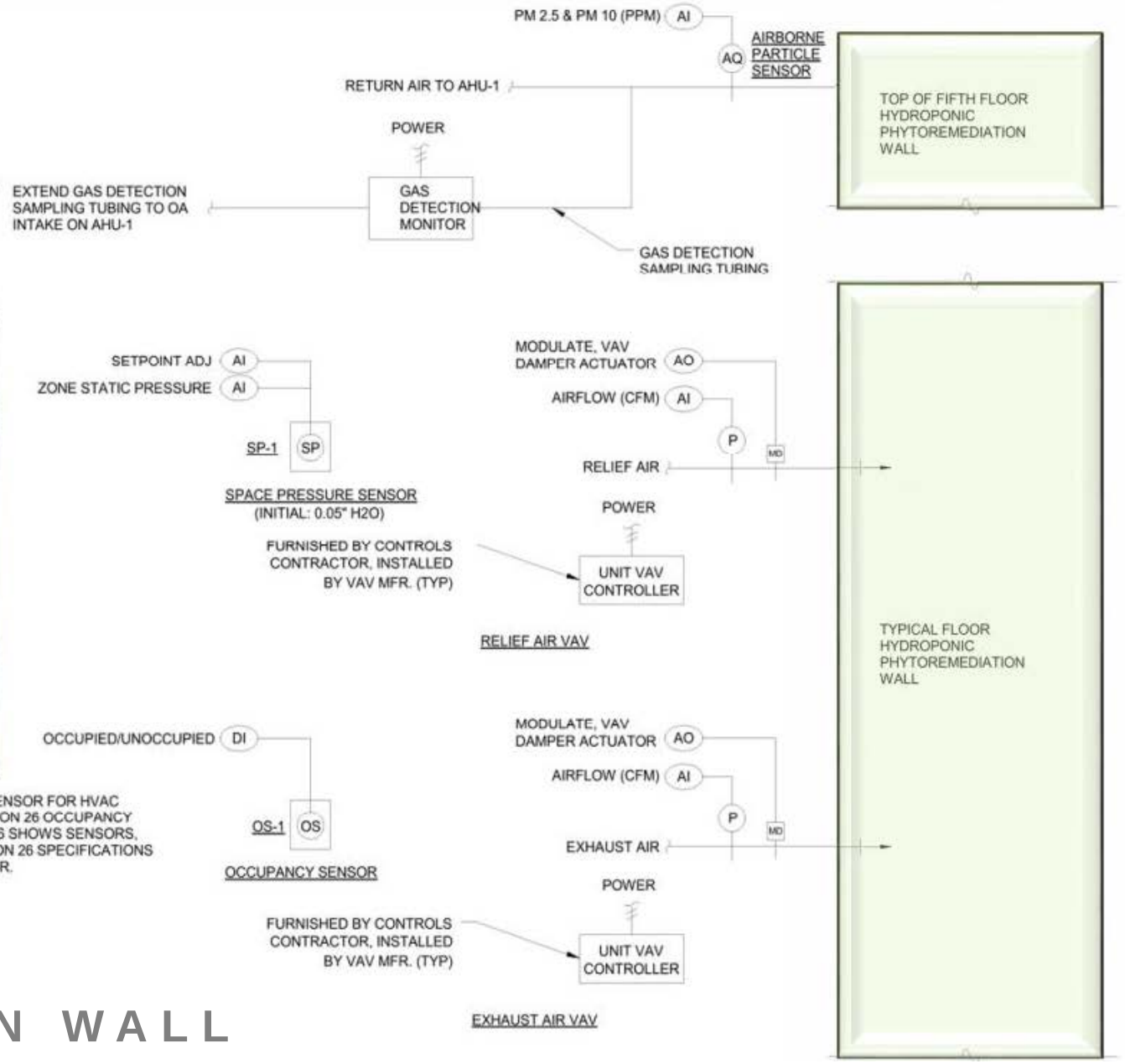


MUNICIPAL HEAT EXCHANGE & RADIANT CEILING SYSTEM



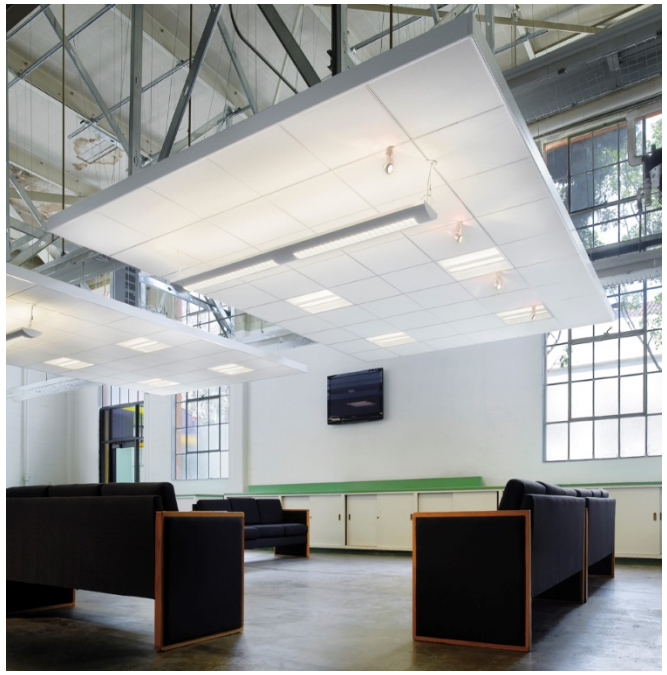


HYDROPONIC PHYTOREMEDIATION WALL

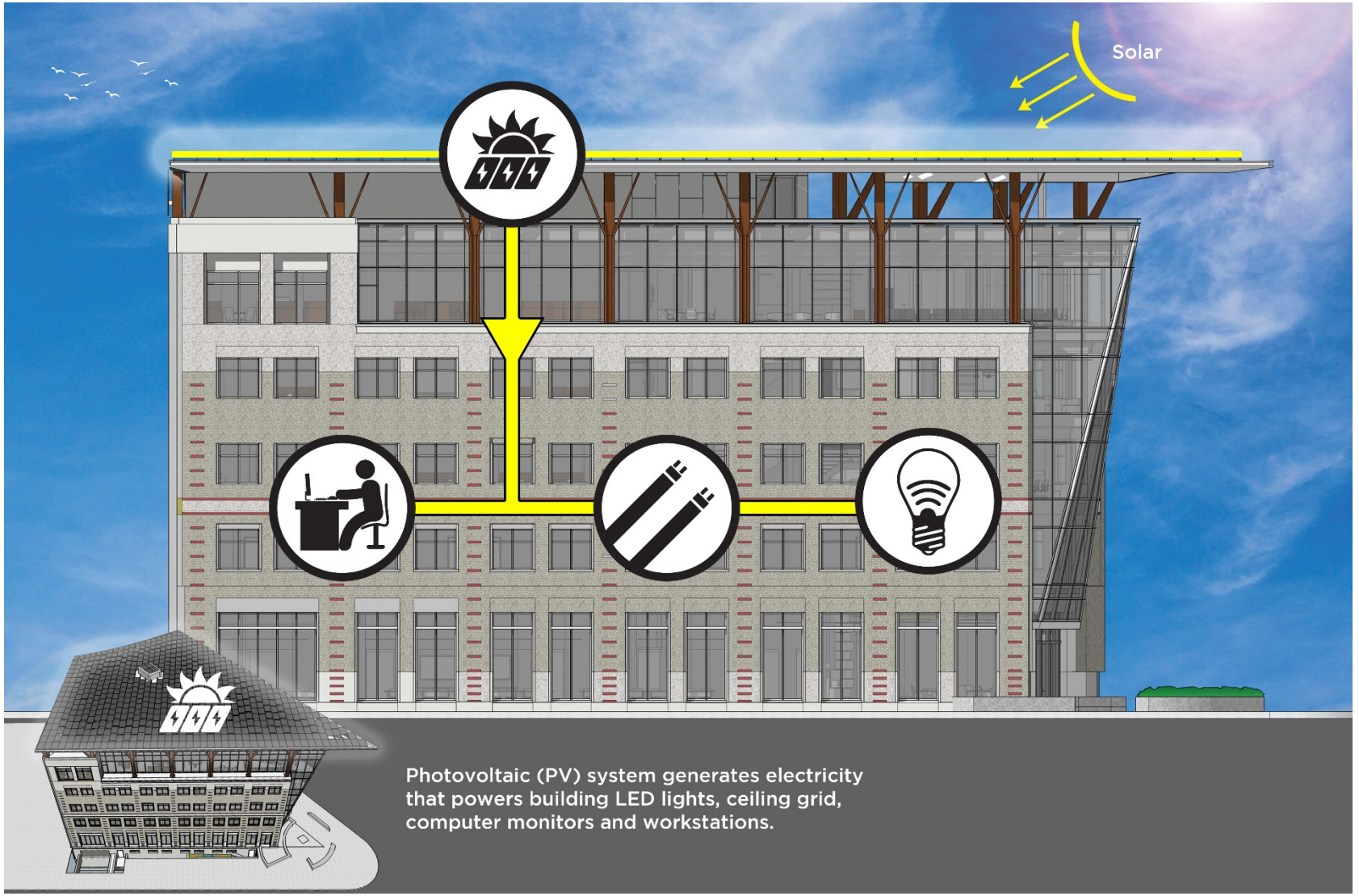


HYDROPONIC PHYTOREMEDIATION WALL

16-Port DC Power Module



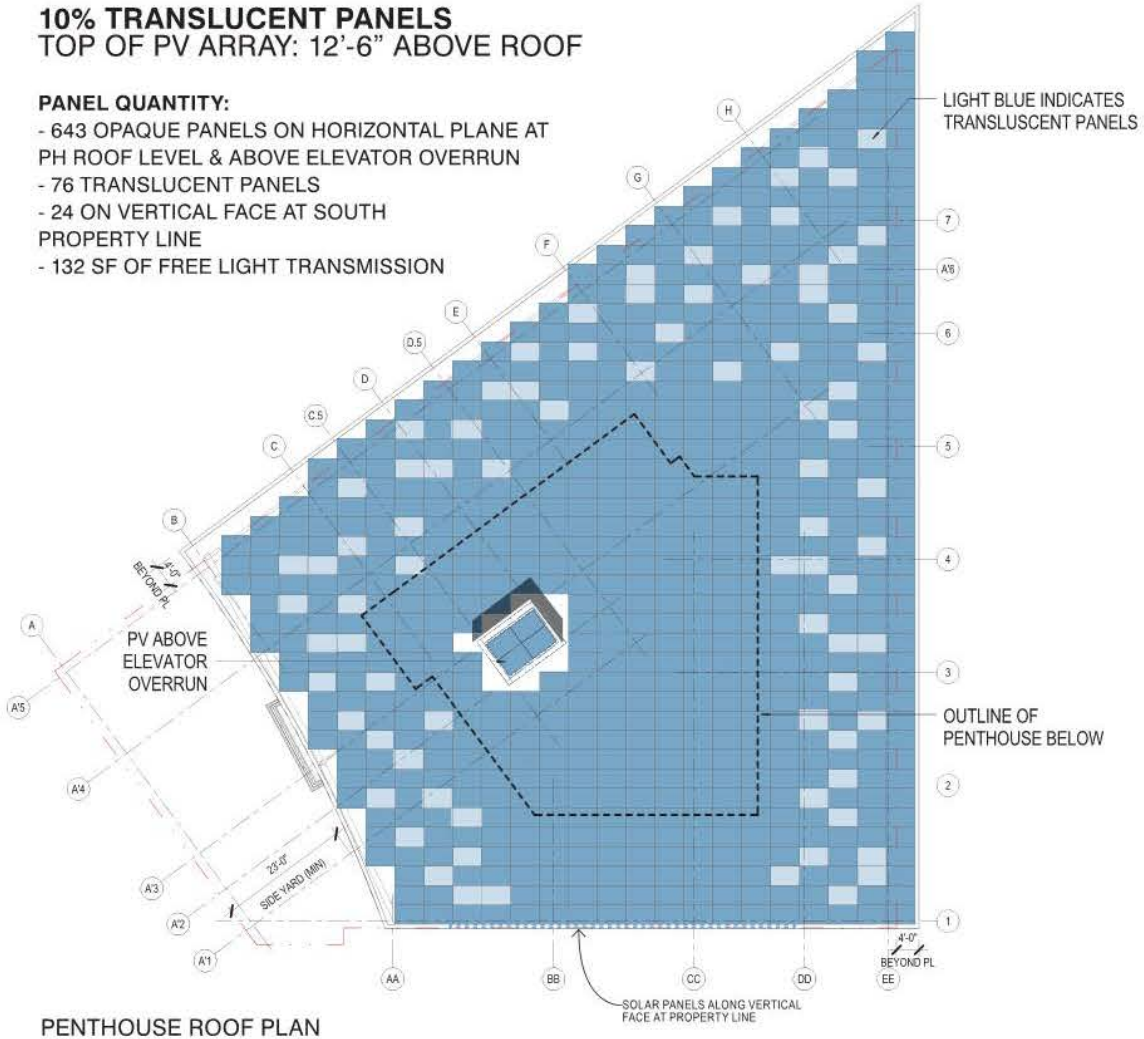
Electrified Ceiling Grid



PHOTOVOLTAIC ARRAY AND THE DC GRID

10% TRANSLUCENT PANELS
TOP OF PV ARRAY: 12'-6" ABOVE ROOF

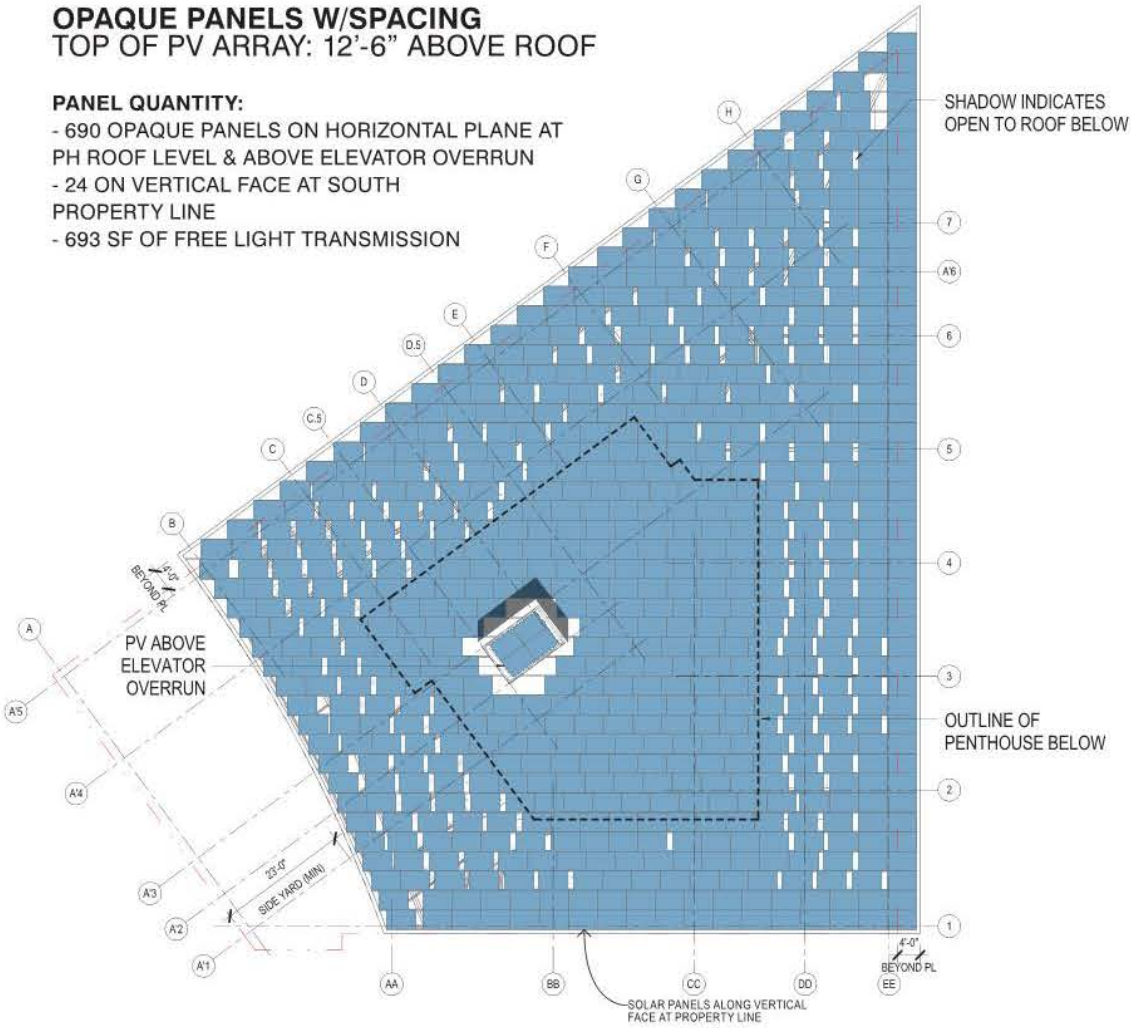
PANEL QUANTITY:
- 643 OPAQUE PANELS ON HORIZONTAL PLANE AT PH ROOF LEVEL & ABOVE ELEVATOR OVERRUN
- 76 TRANSLUCENT PANELS
- 24 ON VERTICAL FACE AT SOUTH PROPERTY LINE
- 132 SF OF FREE LIGHT TRANSMISSION



PENTHOUSE ROOF PLAN
5/26 - HPRB SUBMISSION

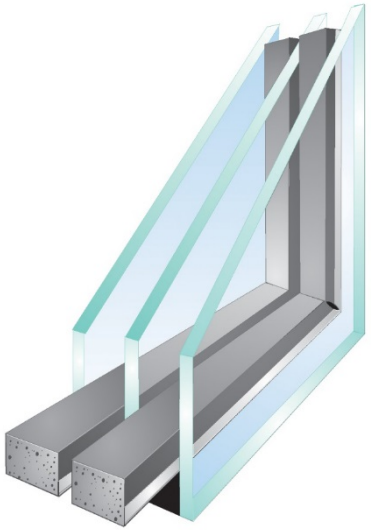
OPAQUE PANELS W/SPACING
TOP OF PV ARRAY: 12'-6" ABOVE ROOF

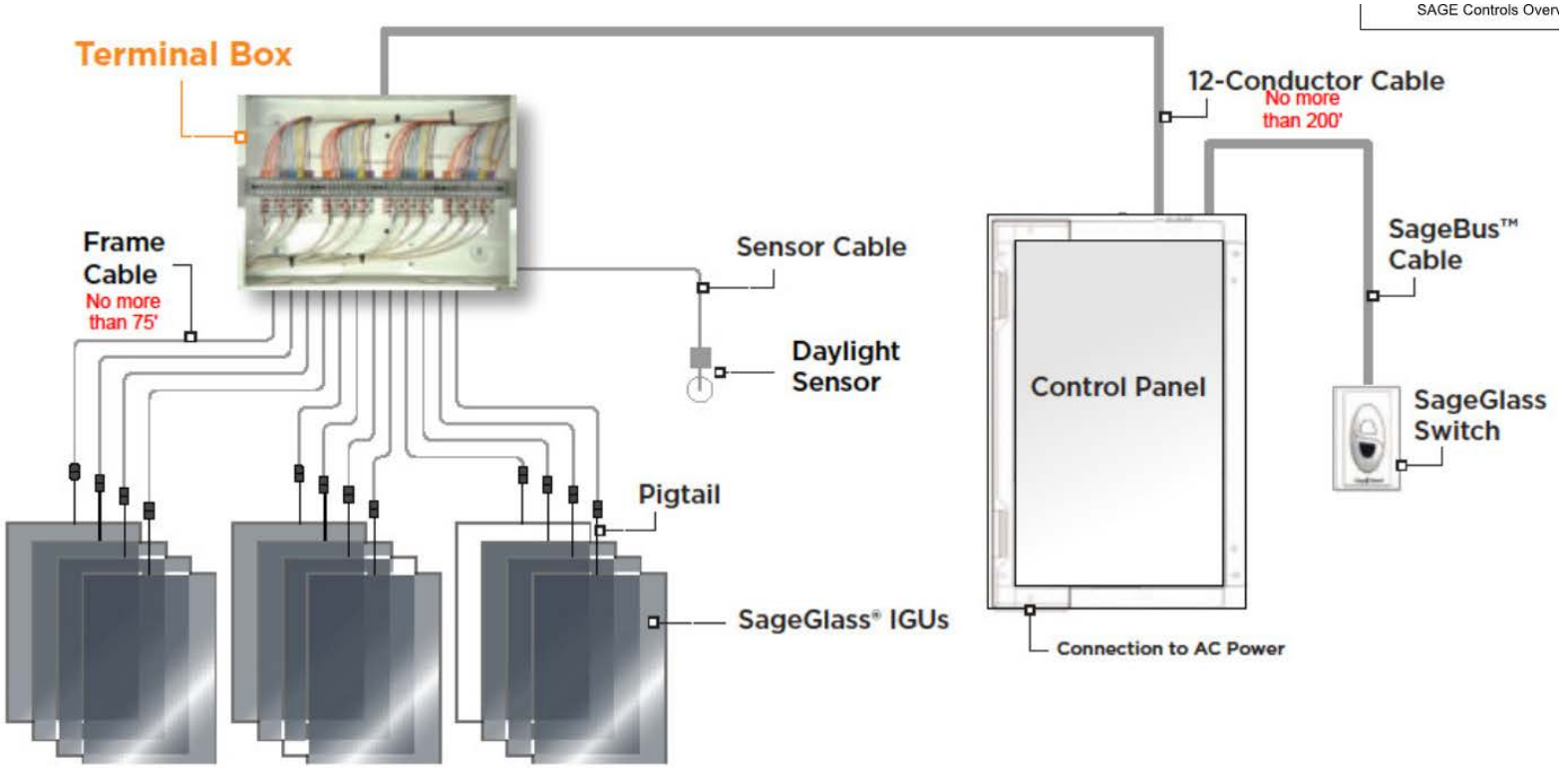
PANEL QUANTITY:
- 690 OPAQUE PANELS ON HORIZONTAL PLANE AT PH ROOF LEVEL & ABOVE ELEVATOR OVERRUN
- 24 ON VERTICAL FACE AT SOUTH PROPERTY LINE
- 693 SF OF FREE LIGHT TRANSMISSION



7/15 REVISED - PV PANEL LAYOUT

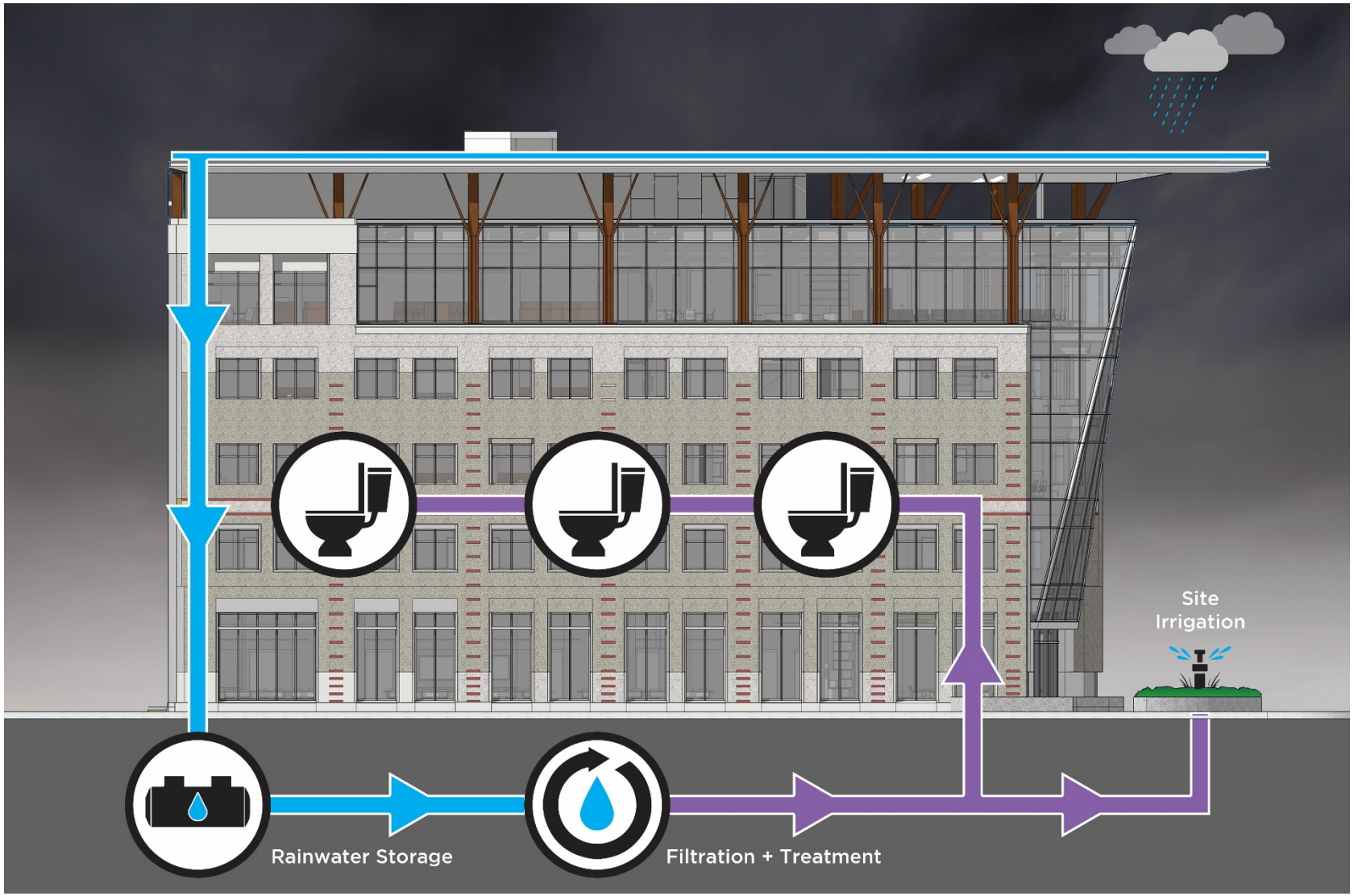
PHOTOVOLTAIC ARRAY AND THE DC GRID

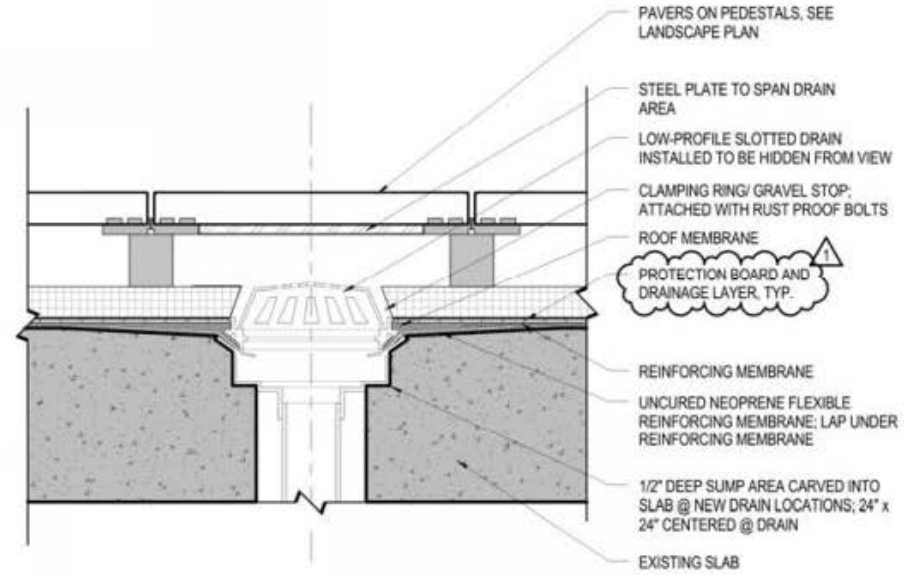




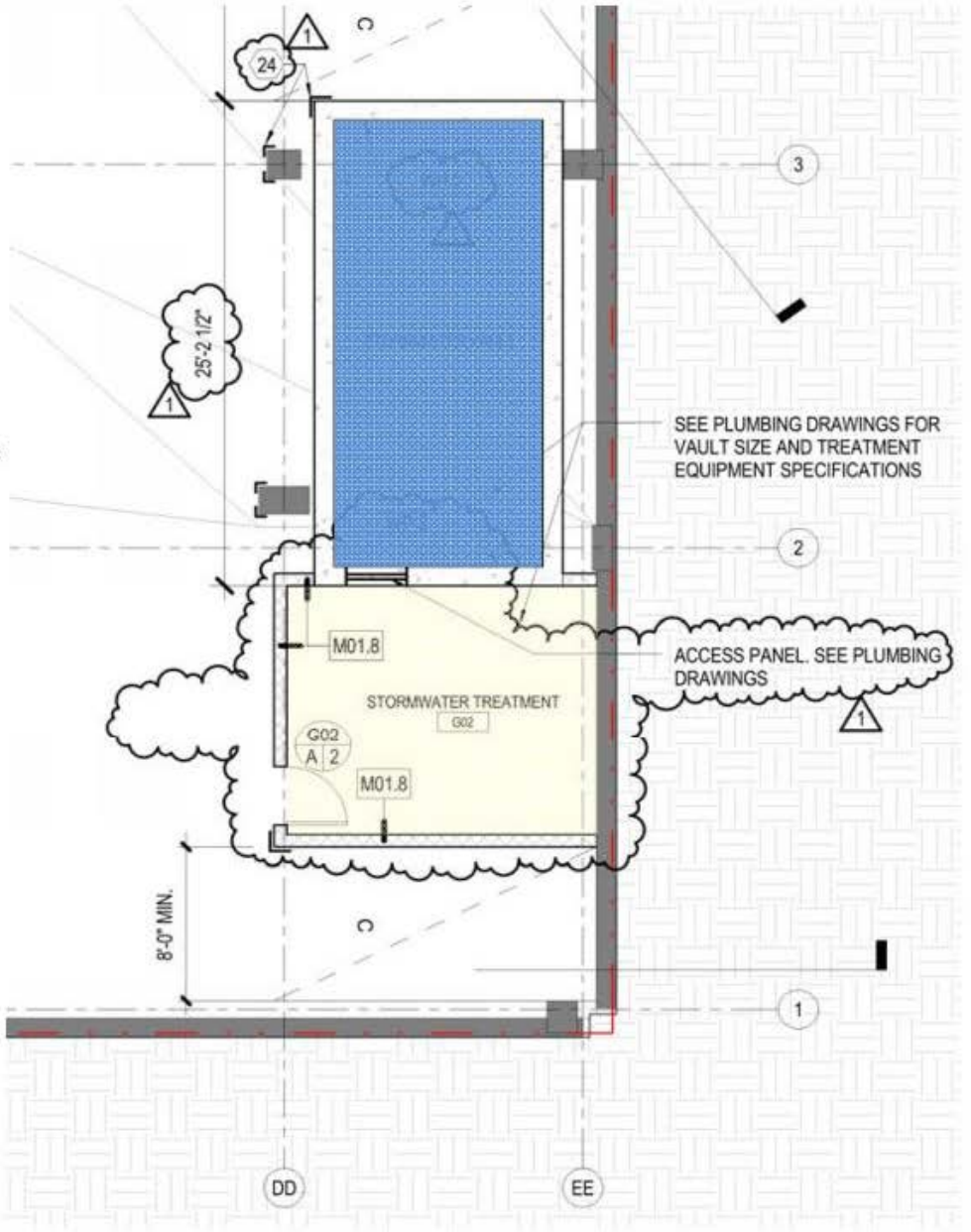
ELECTROCHROMIC GLAZING

WATER CAPTURE AND REUSE





Storage Capacity
Storm Water Vault
= 11,300 gallons



WATER CAPTURE AND REUSE

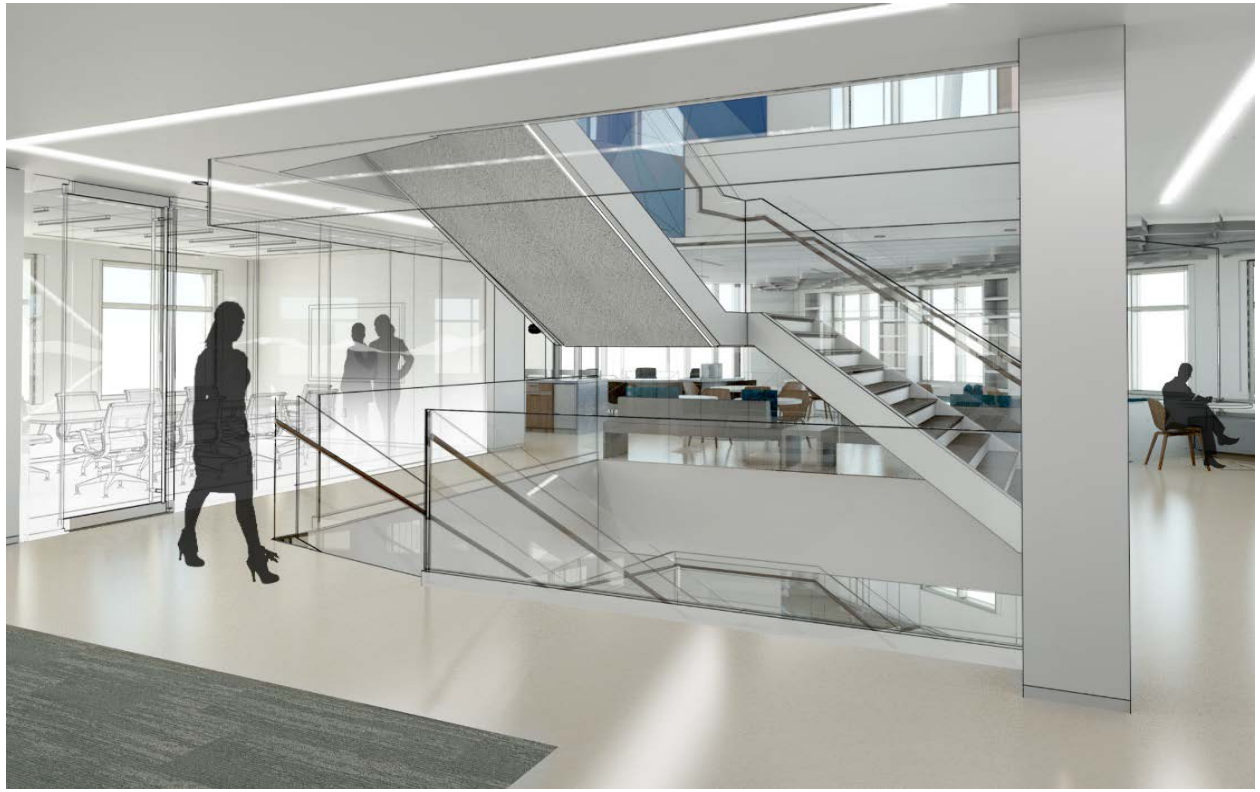
4 PLATFORMS

INTEGRATED BUILDING TECHNOLOGIES

1. OPERATIONS & MAINTENANCE
2. STAFF & PUBLIC
3. DATA FOR RESEARCH
4. VENDOR & THE MARKET

THINKING ABOUT THE OCCUPANTS

WELLNESS




OPENING UP
THE NEW BUILDING

A 21st CENTURY

HEADQUARTERS

Questions?

BUILDING INNOVATION 2018

National Institute of BUILDING SCIENCES

CONFERENCE & EXPO

This concludes The American Institute of Architects
Continuing Education Systems Course

CONTINUING EDUCATION AIA