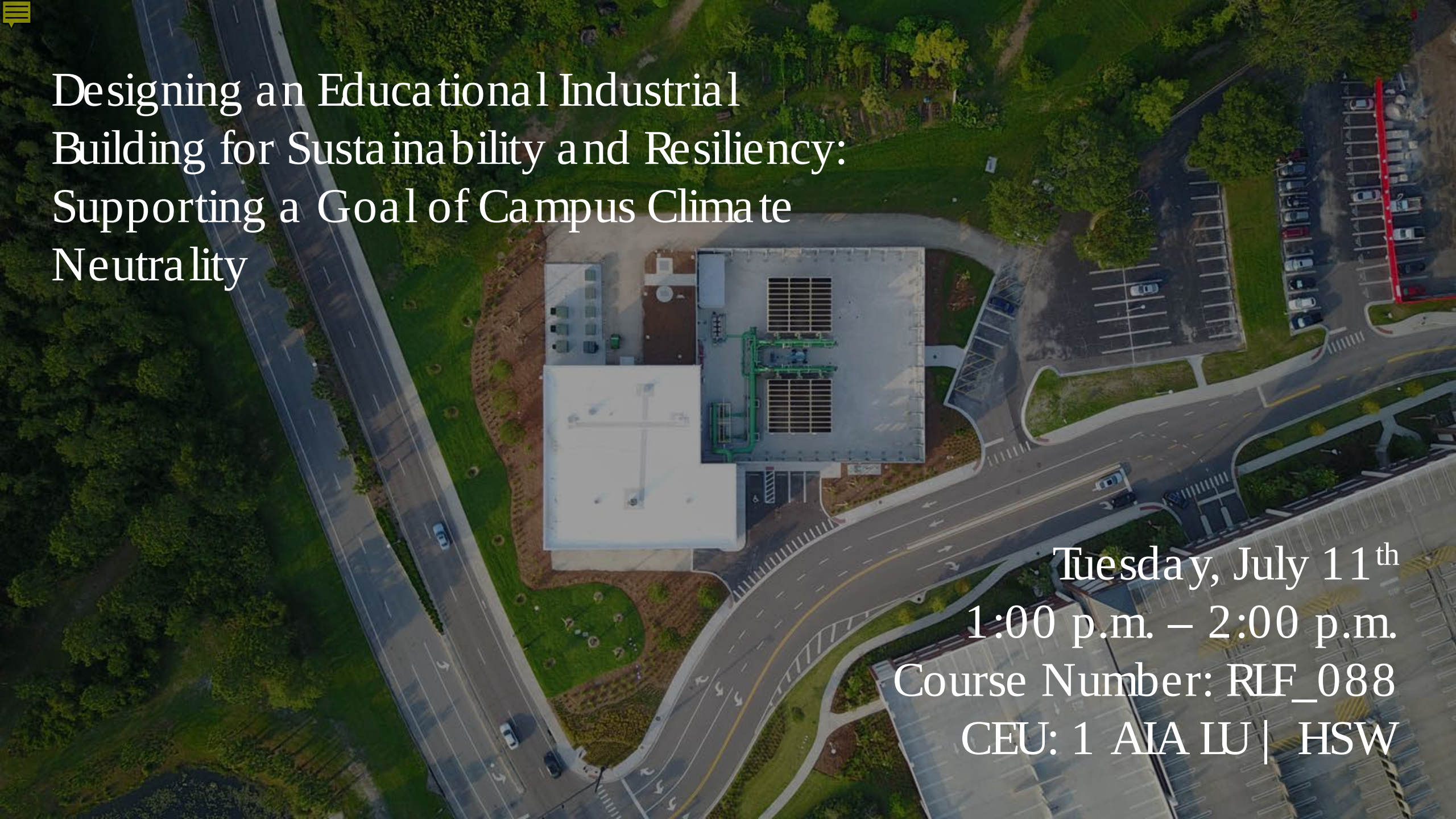
Designing an Educational Industrial Building for Sustainability and Resiliency: Supporting a Goal of Campus Climate Neutrality



Tuesday, July 11th

1:00 p.m. – 2:00 p.m.

Course Number: RLF_088

CEU: 1 AIA LU | HSW

PRESENTERS

BEN FAUSER

PE, LEED AP

Mechanical Engineer

UCF

JACOB ANDERSON

PE, LEED AP

Director of Mechanical Engineering

RLF

STEVE LANGSTON

AIA, ACHA, EDAC, LEED AP

Vice President | Design

RLF

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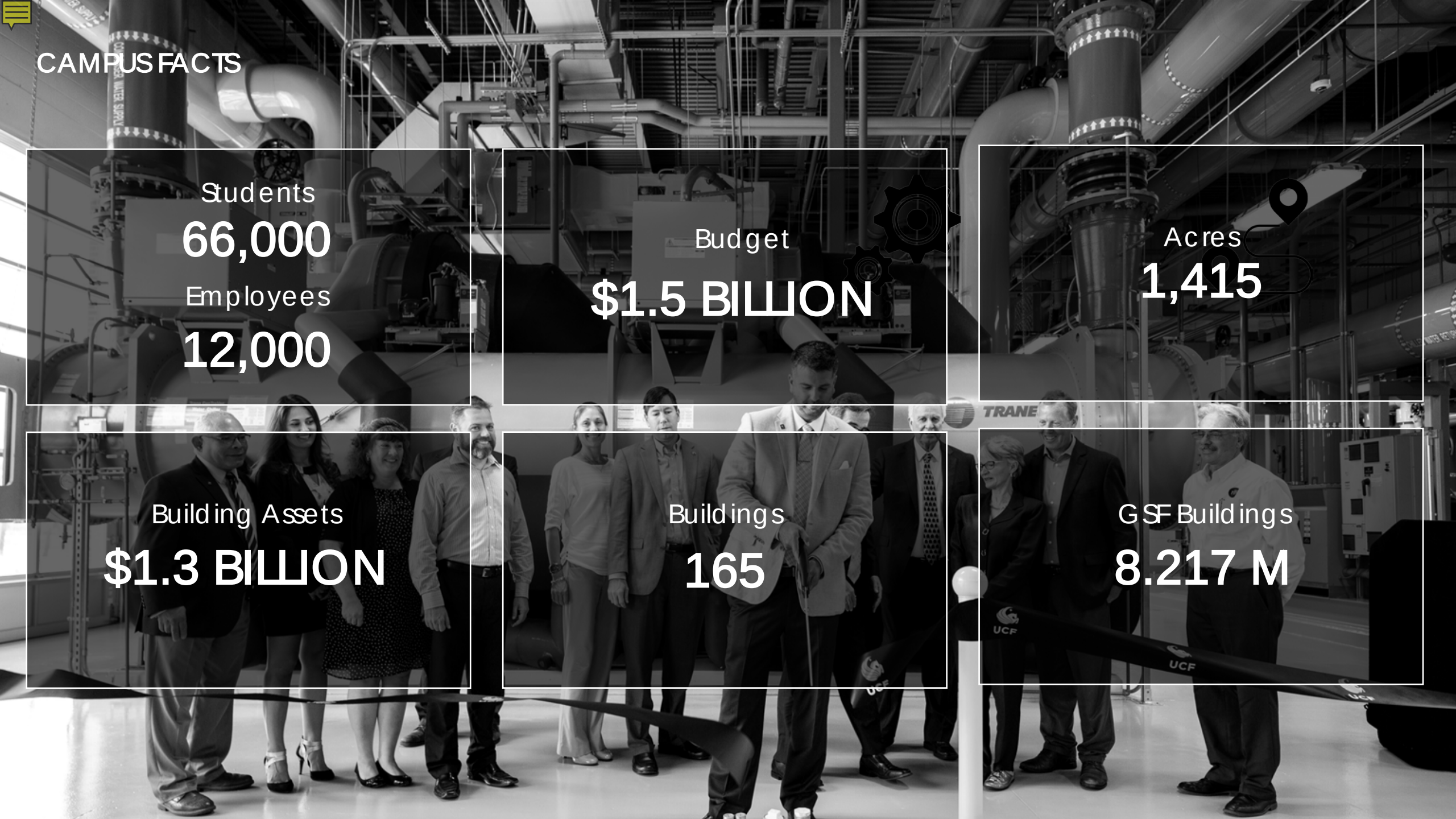
AIA continuing education Learning Units earned upon completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

COURSE LEARNING OBJECTIVES

1. Describe the building systems and sustainability strategies used to achieve Leadership in Energy and Environmental Design (LEED) Gold certification.
2. Identify building design strategies incorporated for teaching without distracting from the cooling plants operations.
3. Explain how the District Energy Plant (DEP) IV design ties into the university's goal of achieving climate neutrality.
4. Explain how the design solution addresses the architectural compatibility of neighboring buildings.



CAMPUS FACTS

Students
66,000

Employees
12,000

Budget
$1.5 BILLION

Acres
1,415

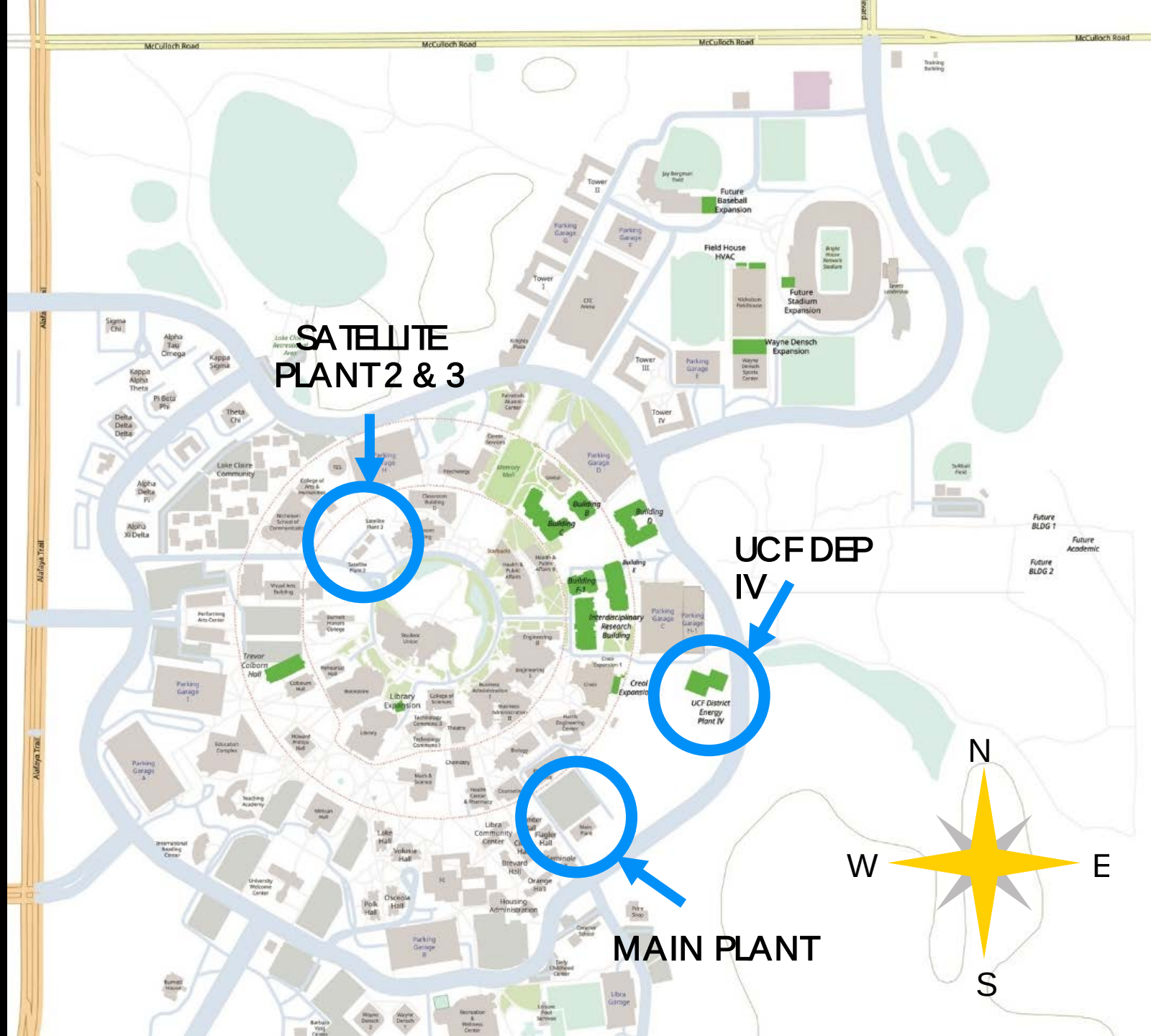
Building Assets
$1.3 BILLION

Buildings
165

GSF Buildings
8.217 M

MISSION

- **17,000 tons existing capacity**
  - 2 Chiller plants – Main and Satellite plant
  - Thermal Energy Storage Tank
  - Absorption Chiller
- **2000 Ton Chillers**
  - (2) Operational
  - (2) Future
- **160 Ton Heat Recovery Chillers**
  - (1) Operational
  - (1) Future
- **Hydraulic Modeling**
  - ~157 buildings served by the campus chilled water system
  - DEP IV allows for the future expansion of 1.2 million sqft



PROJECT FACTS

1st industrial building on campus to achieve

LEED GOLD

Designed

16 MONTHS

Constructed

13 MONTHS

Total construction cost

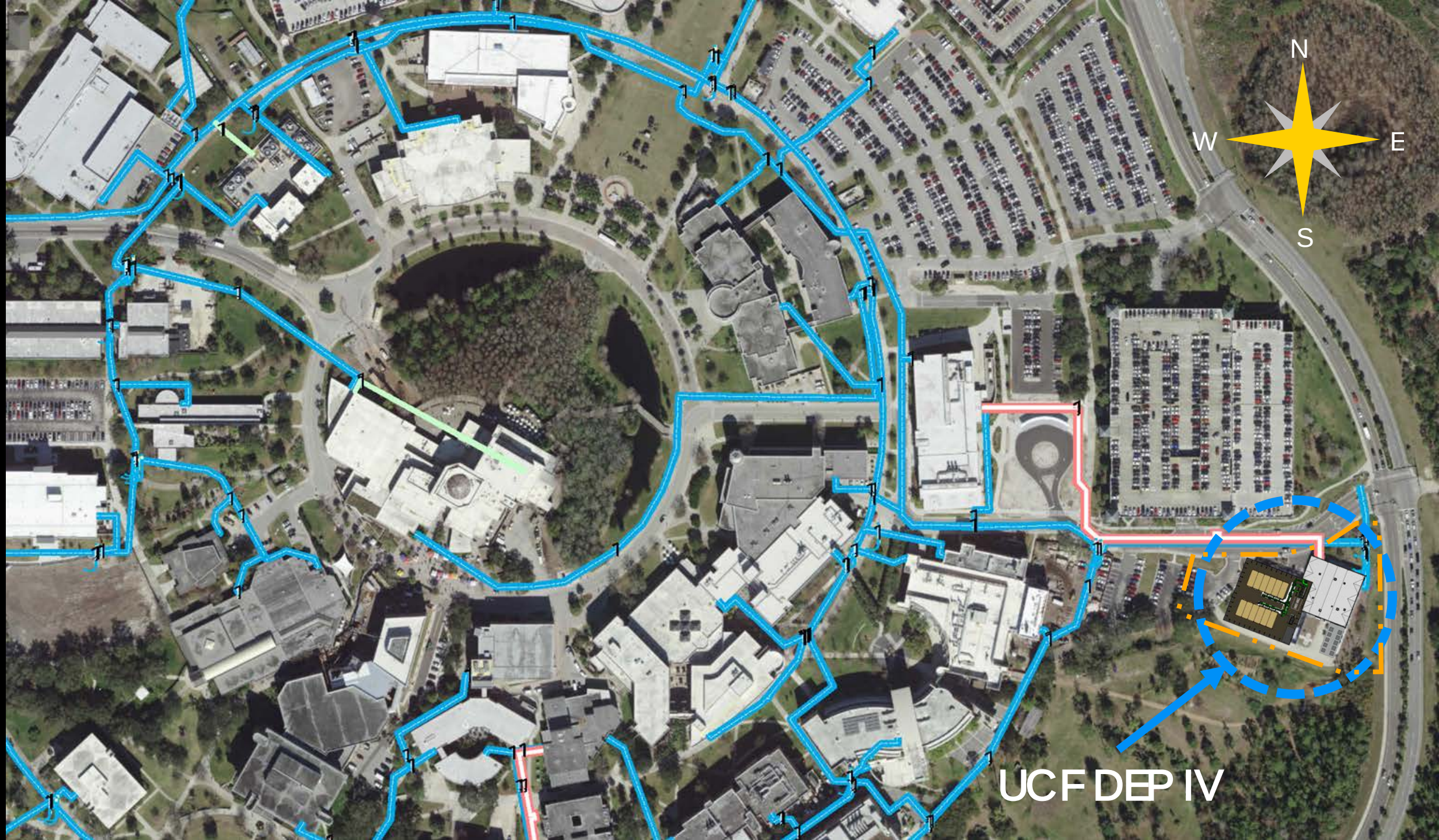
$12.8 million

Total chilled water generation capacity

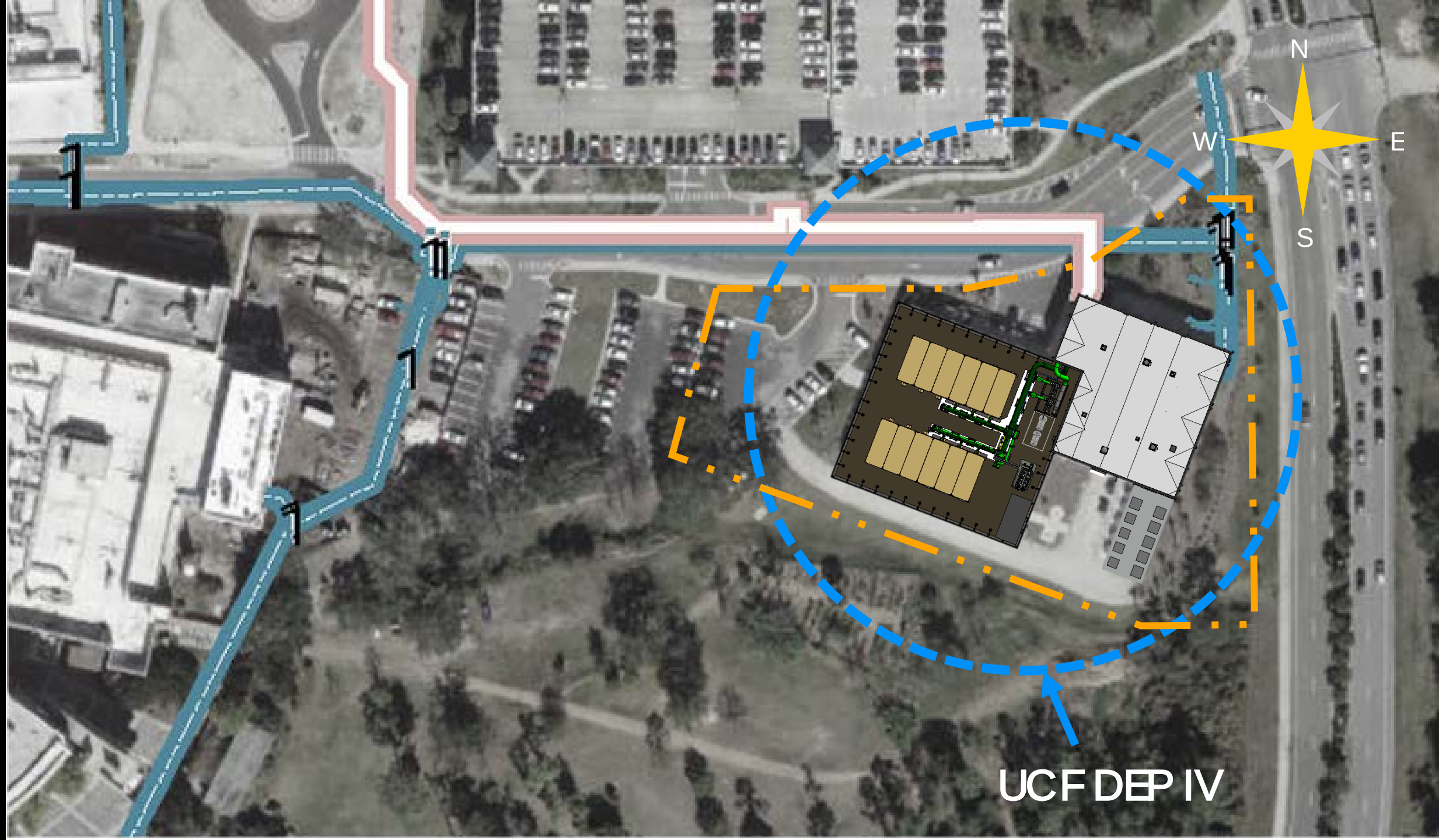
4,180 tons

Total plant efficiency

< ~0.70kw/ton



SITE PLAN



SITE PLAN


STOP
NO PARKING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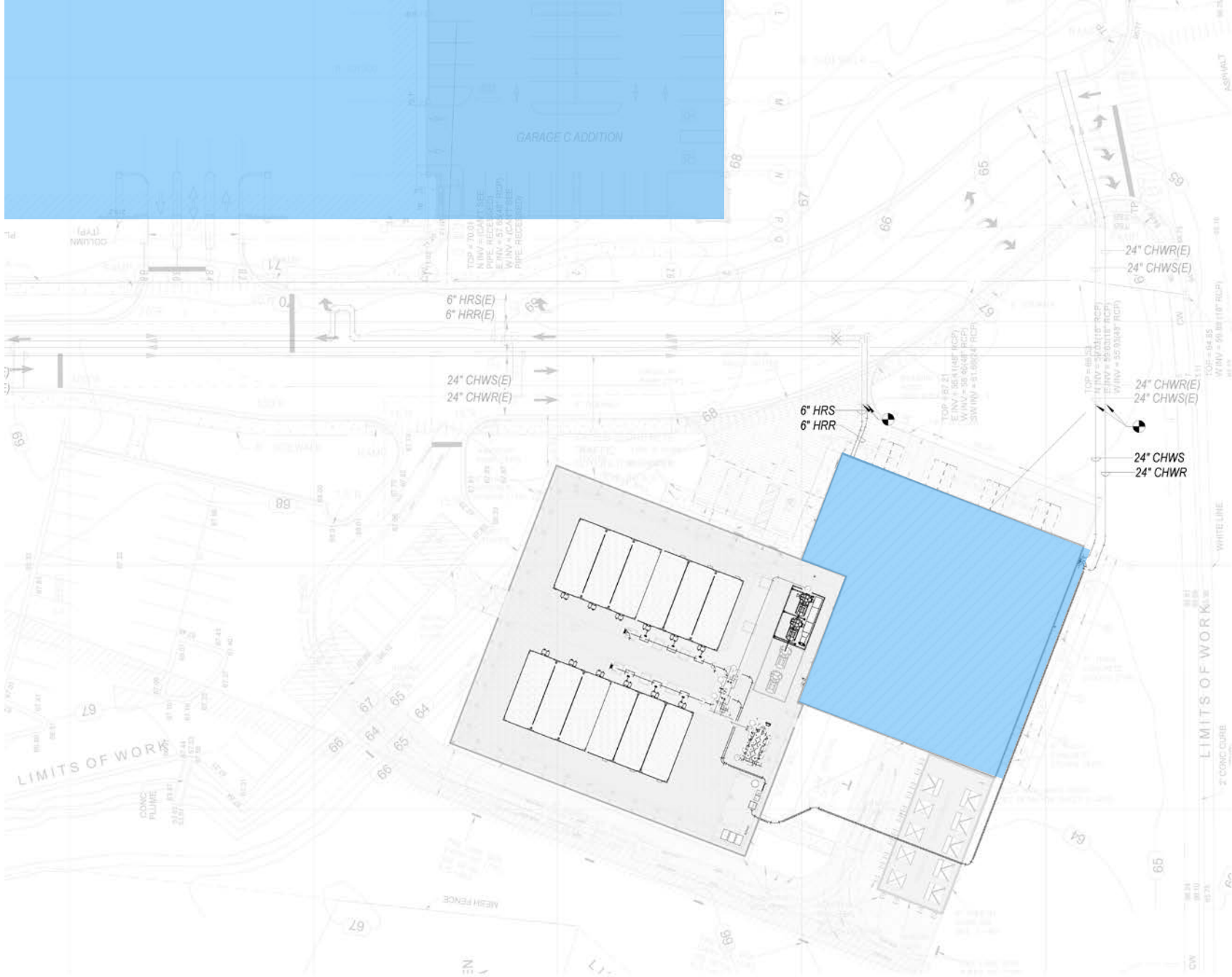
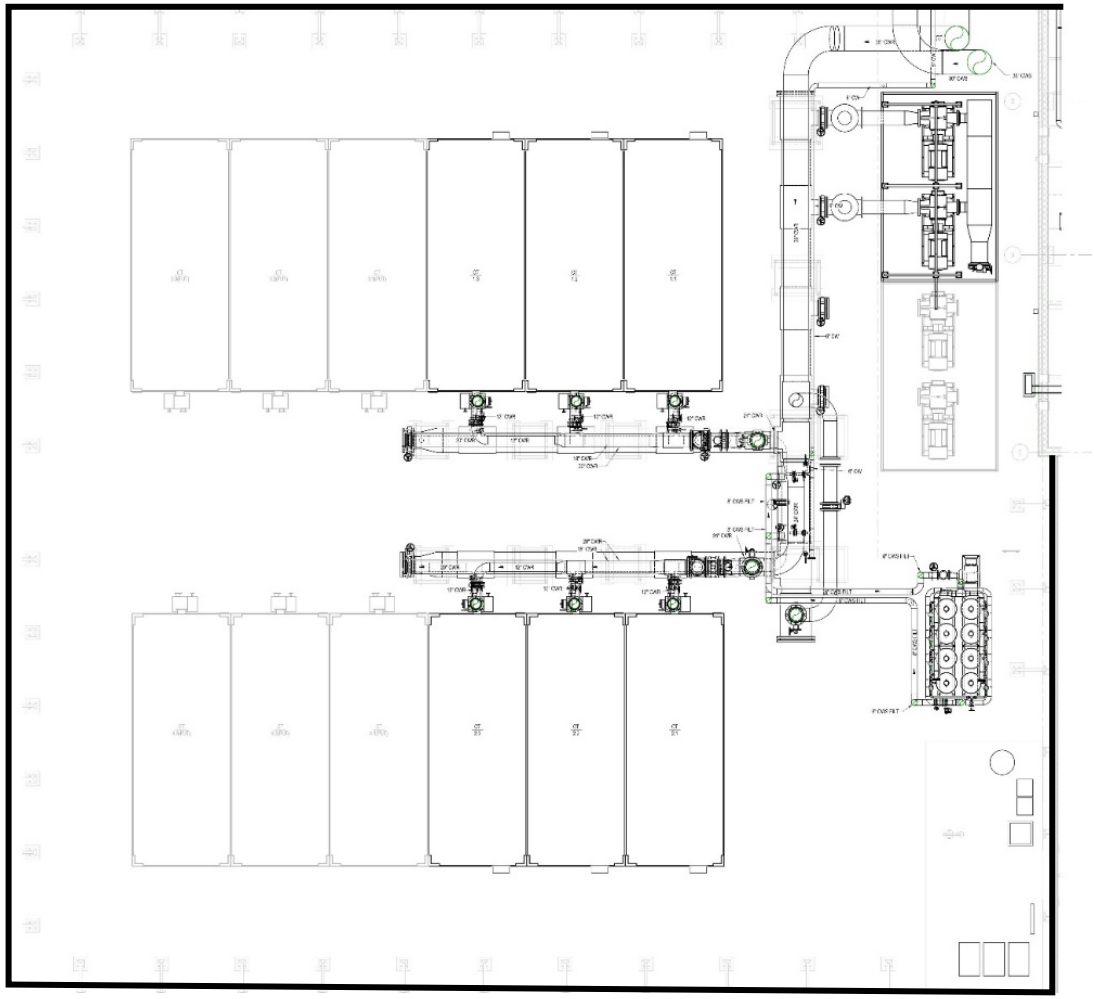
SITE PLAN


GARAGE C ADDITION
6" HRS(E)
6" HRR(E)
24" CHWS(E)
24" CHWR(E)
6" HRS
6" HRR
24" CHWR(E)
24" CHWS(E)
24" CHWS
24" CHWR
LIMITS OF WORK
LIMITS OF WORK
N

COOLING TOWER YARD

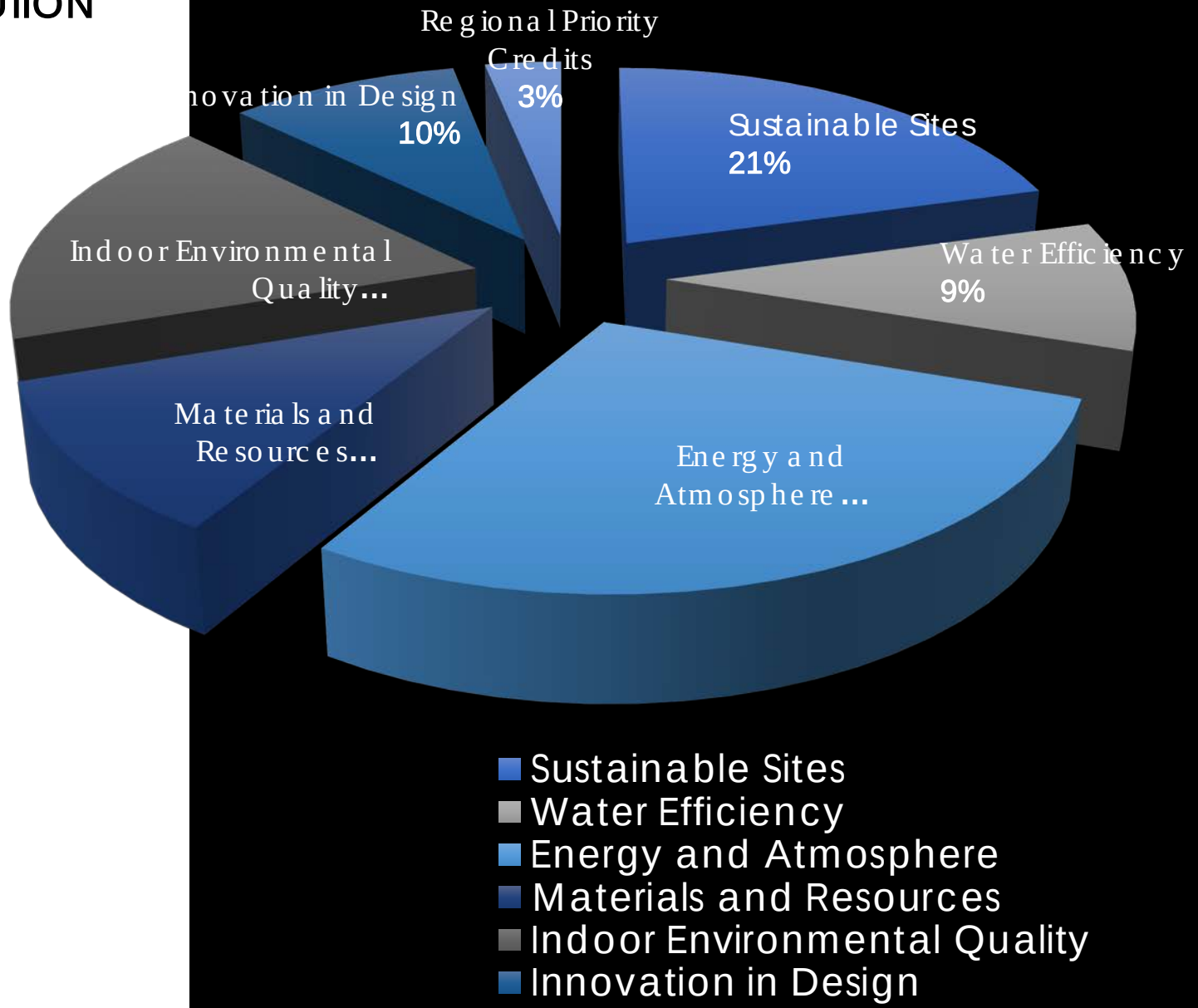
> Fiberglass Reinforced Polyester (FRP), counter flow cooling tower 12,000 GPM of Condenser Water




CHILLED WATER RETURN
CHILLED WATER SUPPLY

ACHIEVED LEED CREDIT CATEGORY DISTRIBUTION

	POINTS
Sustainable Sites	13
Water Efficiency	6
Energy and Atmosphere	18
Materials and Resources	7
Indoor Environmental Quality	11
Innovation in Design	6
Regional Priority Credits	2
TOTAL:	63



ENERGY CONSCIOUS DESIGN FEATURES

- Optimized building envelope insulation values
- Energy efficient LED fixtures
- Premium efficiency motors
- Fan coil units selected with large water temperature differentials
- Direct digital control (DDC) systems for precise equipment control
- Variable-primary pump configuration
- Used pipe sizing criteria for low energy consumption
- Use of high-efficiency water chillers
- Heat recovery water chiller system
- Counterflow cooling towers
- No Chlorofluorocarbons (CFC's) used in

CLIMATE NEUTRALITY

Energy Conservation

Building schedules

Changing culture through communication

Energy Efficient

Ongoing commissioning

New construction LEED

Fuel Switching

Switch from current "cleaner" fuel purchase or production

Renewable Energy

Photovoltaic installation

Combined heat and power (CHP) on-site generation

Carbon Mitigation

On-site sequestration

Purchase offsets

"American College & University Presidents' Climate Commitment (ACUPCC) defines climate neutrality as having no net greenhouse gas (gHg) emissions—or gases that cause the greenhouse effect—by minimizing these emissions as much as possible and using carbon offsets, or other measures, to mitigate the remaining emissions."

What are UCF's energy goals?

Have there been challenges in achieving these goals?

What challenges did you encounter during this process (budgetary, regulatory, construction, etc.)?

Describe the teaching components incorpora ted into the building and how they are working.


CHILLED WATER RETURN
CHILLED WATER SUPPLY

How did you provide expansion capability for the future for this facility and how difficult would it be to implement?

What have been the results of the DEP performance? Did it meet or exceed the design goals?

QUESTIONS?


CAT


C375
MAXIM
C375


JLG
JS20


JLG


Genie GTH-844
JLG
JS20


TEREX
RKM


TEREX
RKM


DEERE


3169


SUNBELT RENTALS
JLG
MAXIM
TOWER TECH
TOWER TECH
TOWER TECH


MAXIM
80100
3169


SUNBELT RENTALS
SUNBELT RENTALS


RSS
Roofing Services & Solutions
407-426-0400


JS16


JCB
TowerTech
TowerTech


SUNBELT RENTALS
TOWER TECH
TOWER TECH
TOWER TECH


TOMRA TECH
TOMRA TECH
TOMRA TECH


TowerTech
TowerTech
TowerTech
BOMAG


LIEBHERR
Bobcat
TowerTech
TowerTech
TowerTech


UCF
RECYCLES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