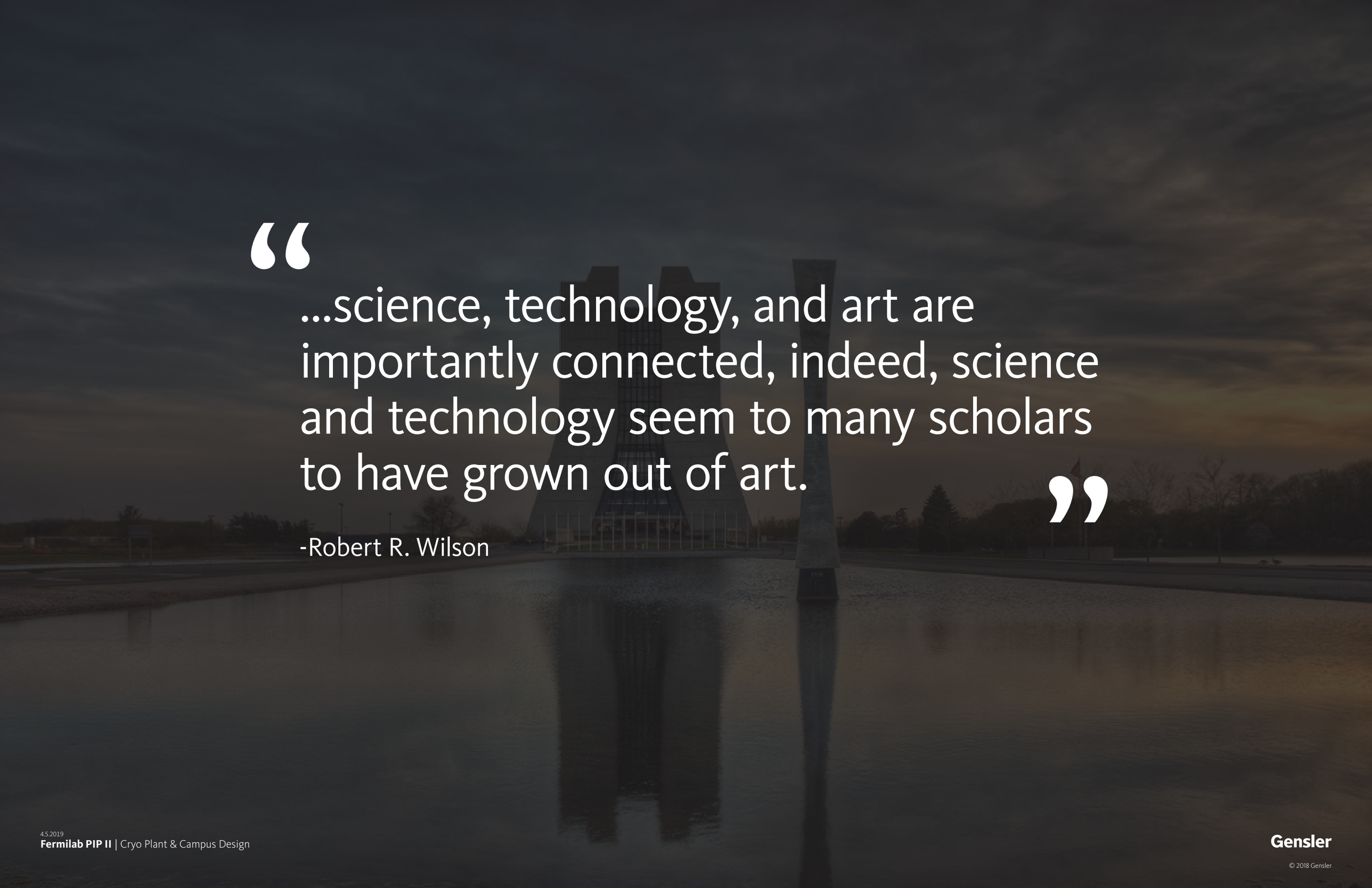
# Fermilab PIP-II

Campus & Cryo Plant Design | 4.5.2019

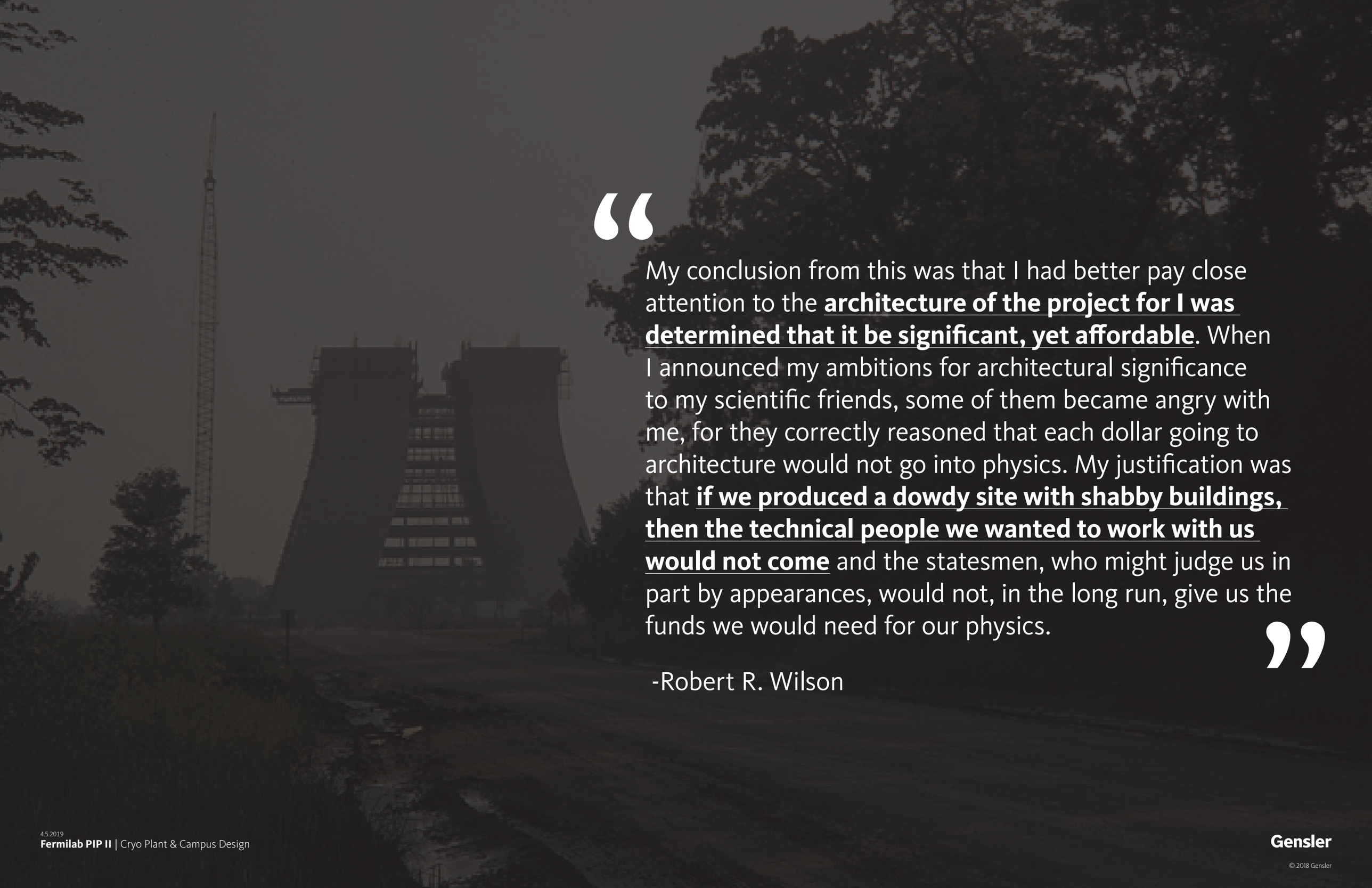


“...science, technology, and art are importantly connected, indeed, science and technology seem to many scholars to have grown out of art.”

-Robert R. Wilson



Gensler



“My conclusion from this was that I had better pay close attention to the **architecture of the project for I was determined that it be significant, yet affordable**. When I announced my ambitions for architectural significance to my scientific friends, some of them became angry with me, for they correctly reasoned that each dollar going to architecture would not go into physics. My justification was that **if we produced a dowdy site with shabby buildings, then the technical people we wanted to work with us would not come** and the statesmen, who might judge us in part by appearances, would not, in the long run, give us the funds we would need for our physics.”

-Robert R. Wilson



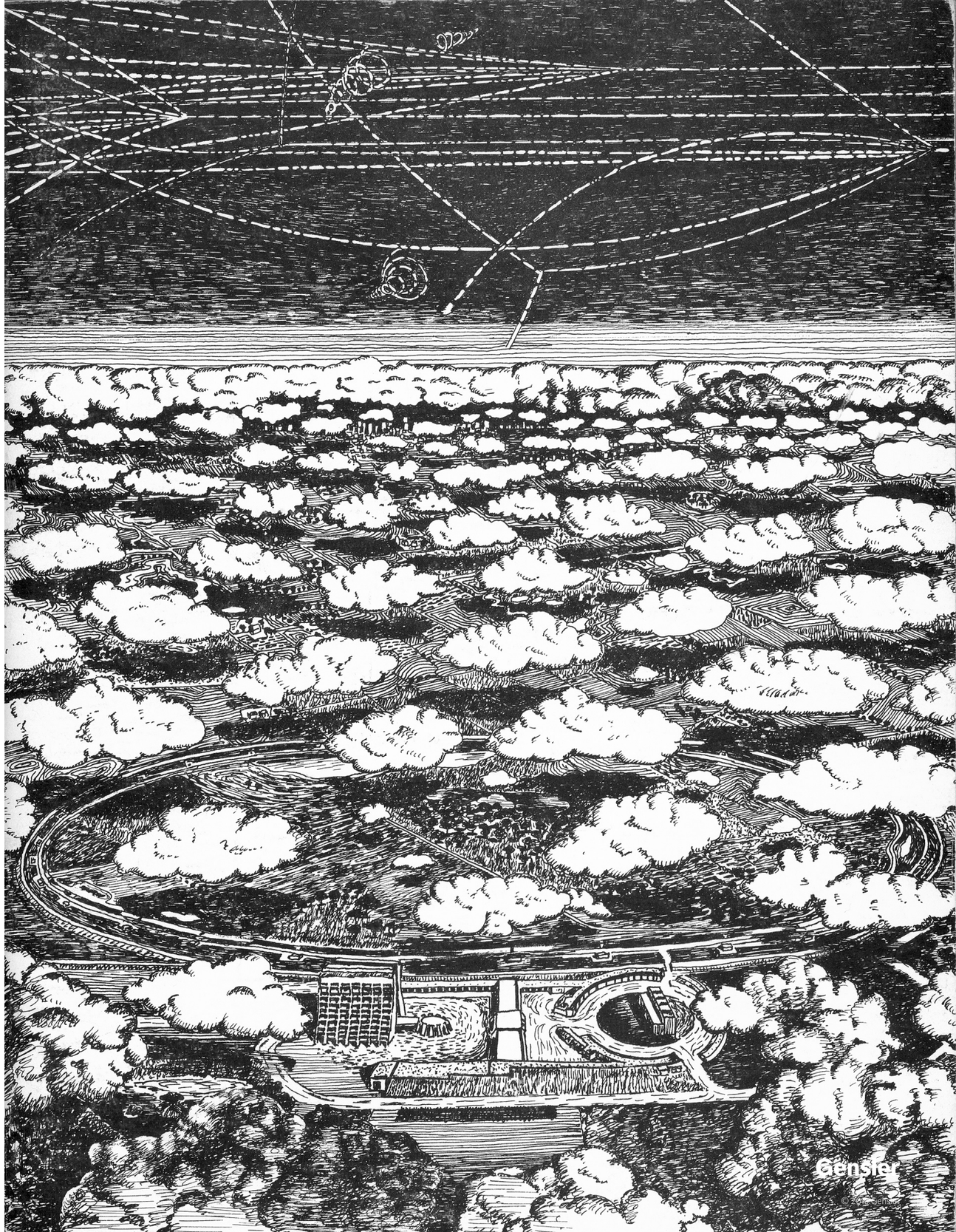
Gensler

# Place

*Planning to start up a particle physics lab? Better hire an*

That was Robert R. Wilson's thought in the 1960s, when he began forming what would become the Department of Energy's Fermi National Accelerator Laboratory. He wanted a space to do physics that would inspire all who set foot on the lab. He knew, even then, the importance of mingling art and science. The 11th person hired was artist Angela Lahs Gonzales, and in her three decades at the lab, she influenced the character and aesthetic of nearly every part of the site.

**-Symmetry** dimensions of particle physics 11/09/17



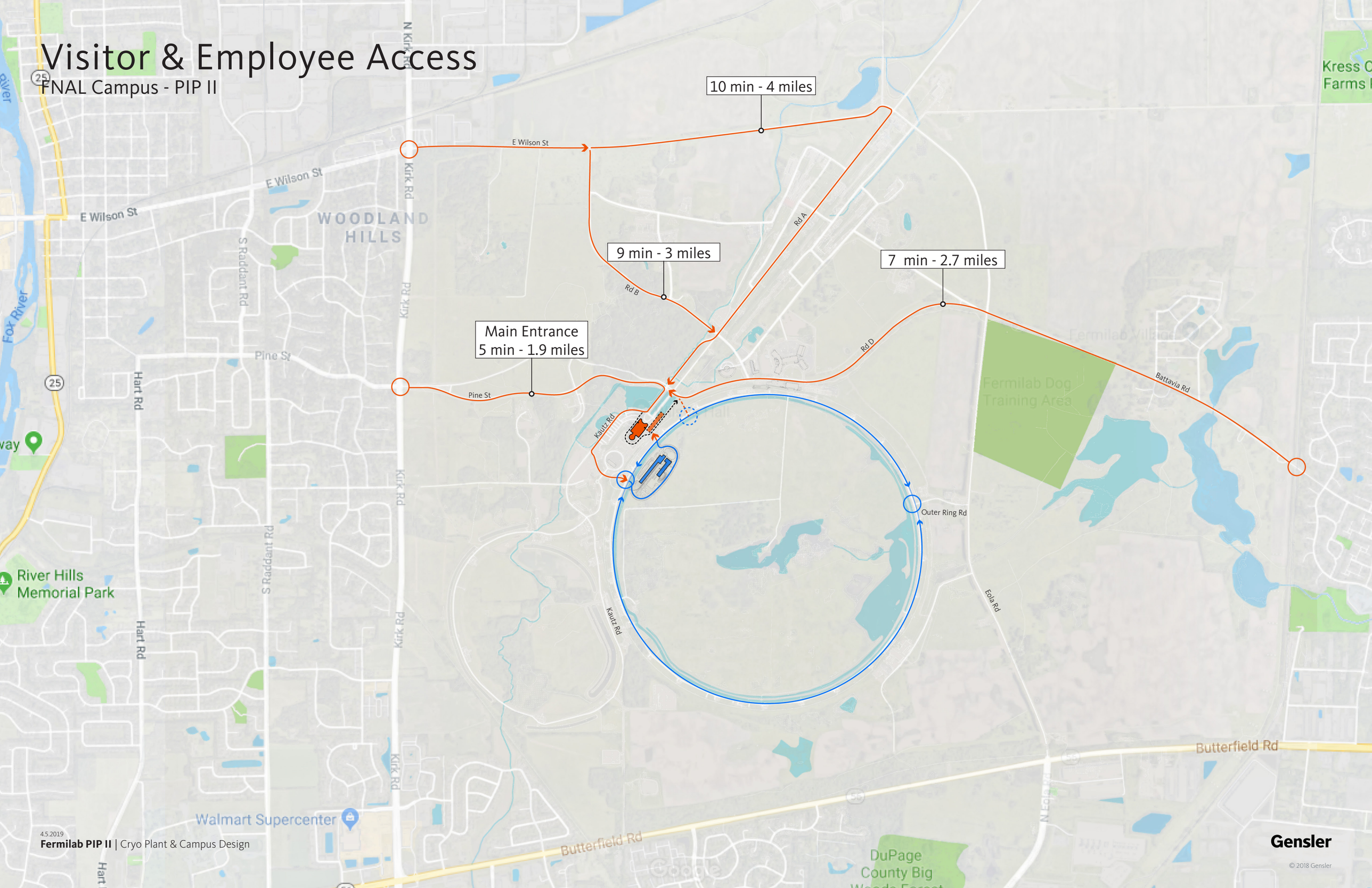
# The laboratory on the prairie



Gensler

# Visitor & Employee Access

FNAL Campus - PIP II

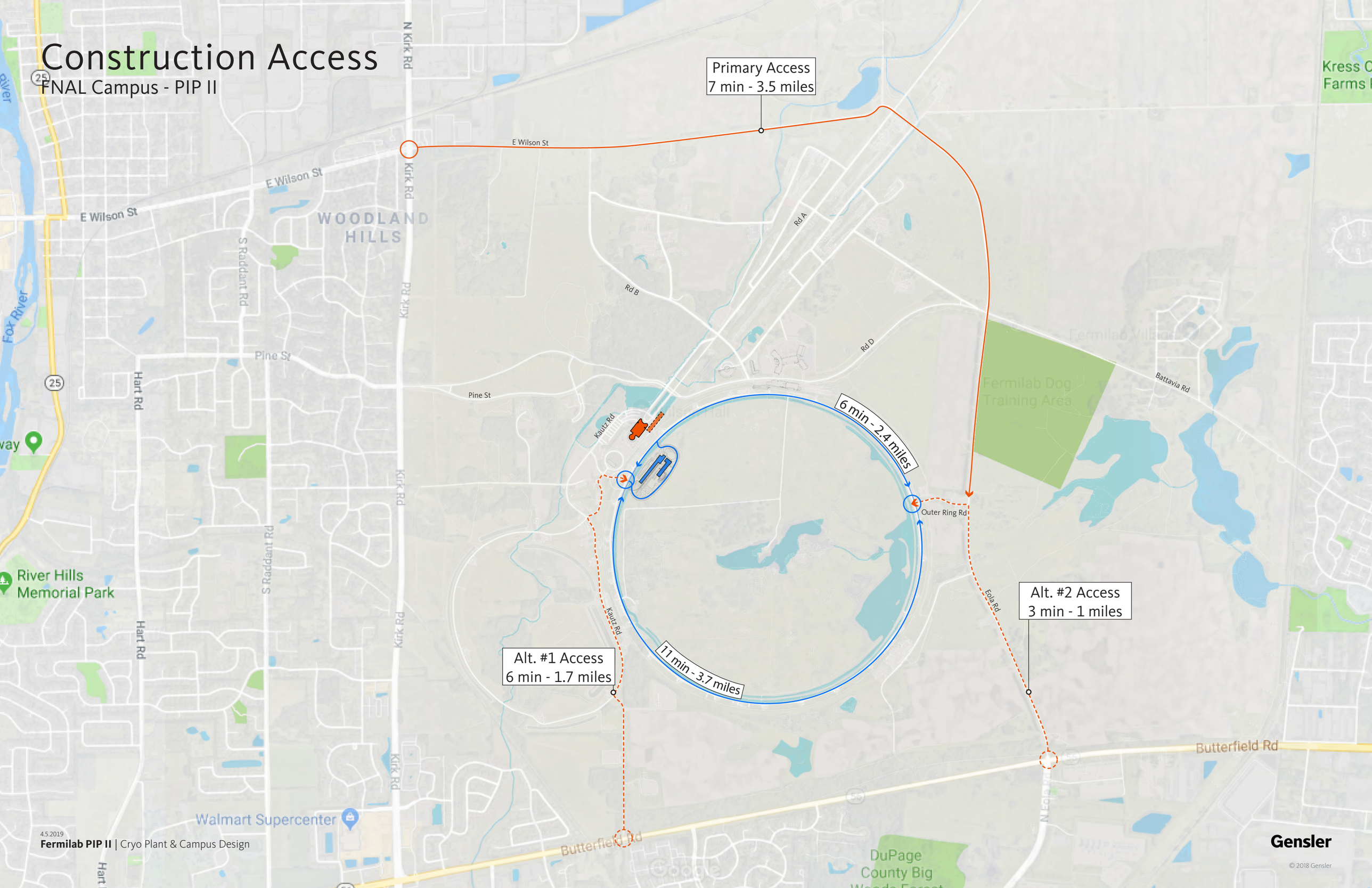





**Gensler**

# Construction Access

FNAL Campus - PIP II

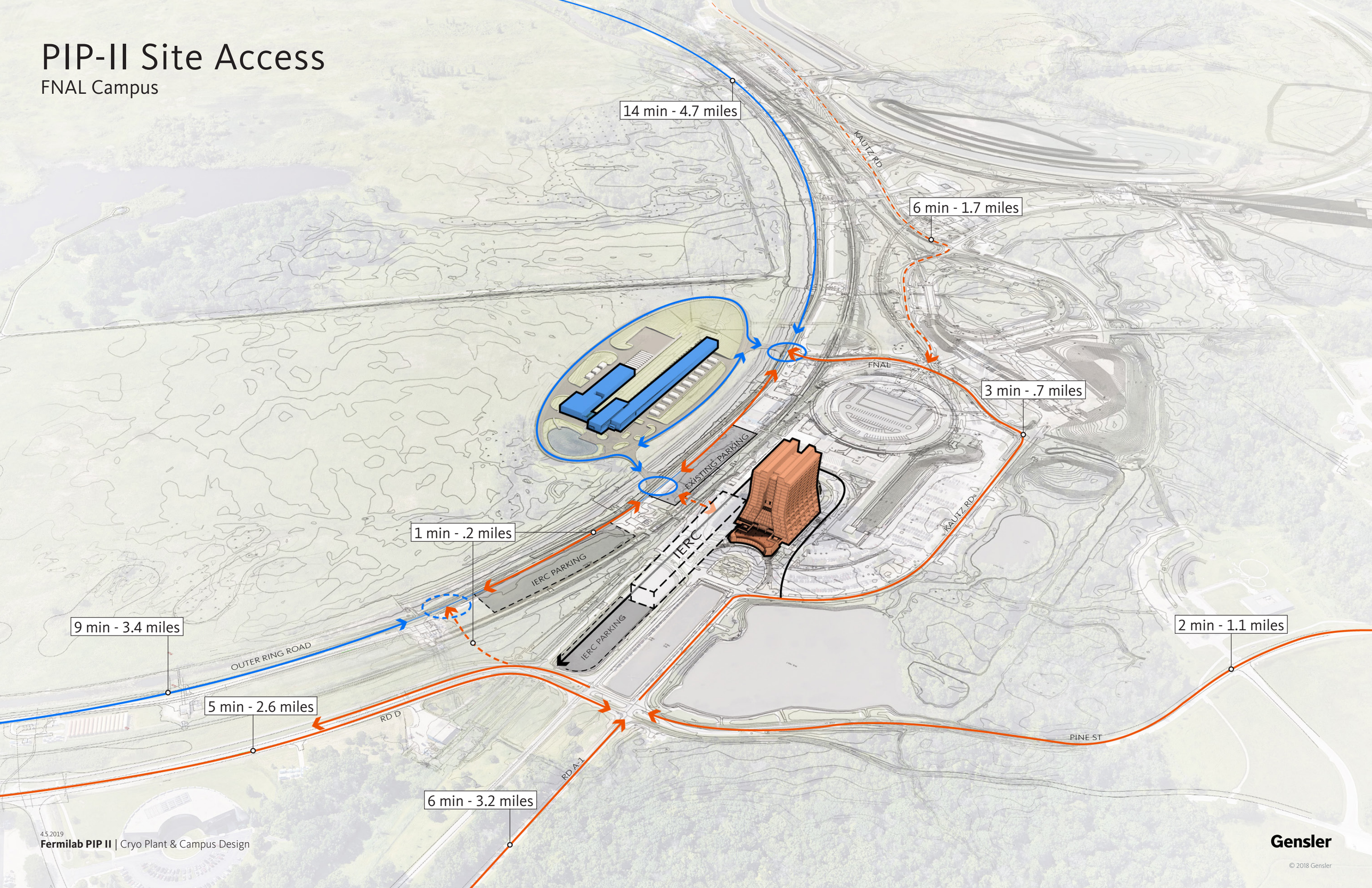





Gensler

# PIP-II Site Access

FNAL Campus




4.5.2019

**Fermilab PIP II** | Cryo Plant & Campus Design

Gensler




Gensler

# Purpose

Since 1967, Fermilab has worked to answer Fundamental questions and enhance our understanding of everything we see around us. As the United States' premier particle physics laboratory, you do science that matters. You work on the world's most advanced particle accelerators and dig down to the smallest building blocks of matter. You also probe the farthest reaches of the universe, seeking out the nature of dark matter and dark energy.

**-fnal.gov** mission statement

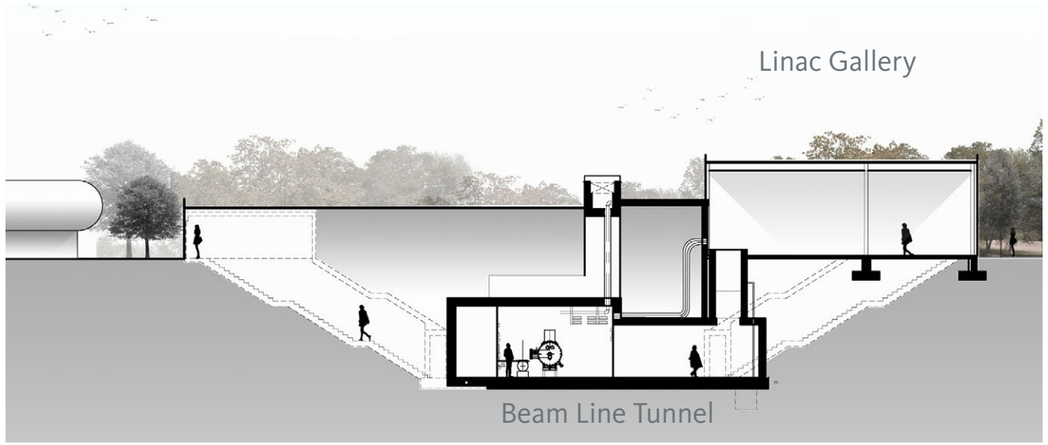


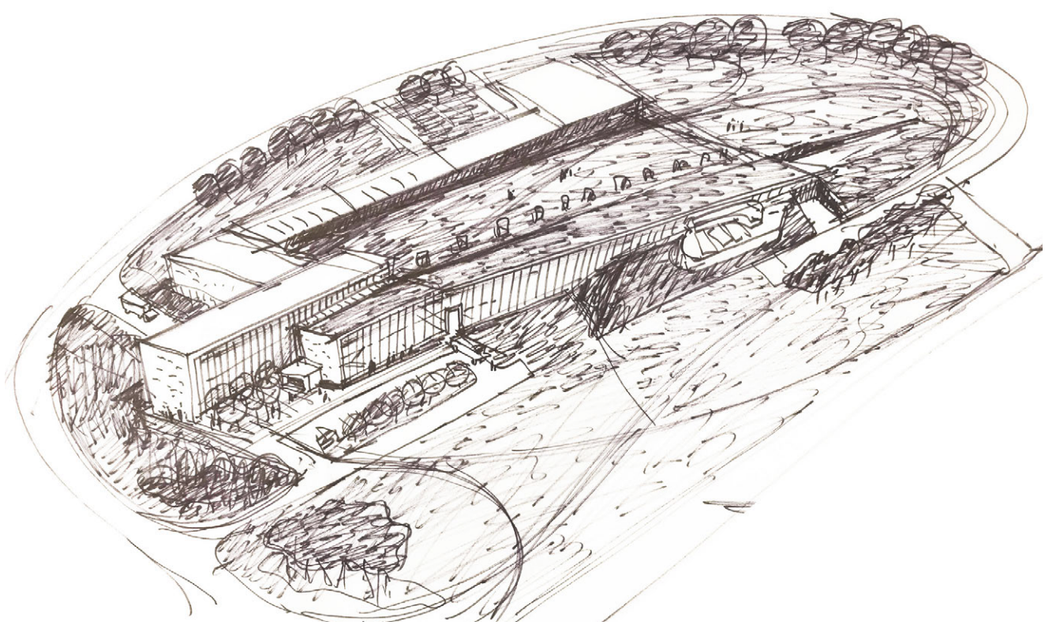

**Gensler**

# Engagement

Blending Science, Building and Landscape

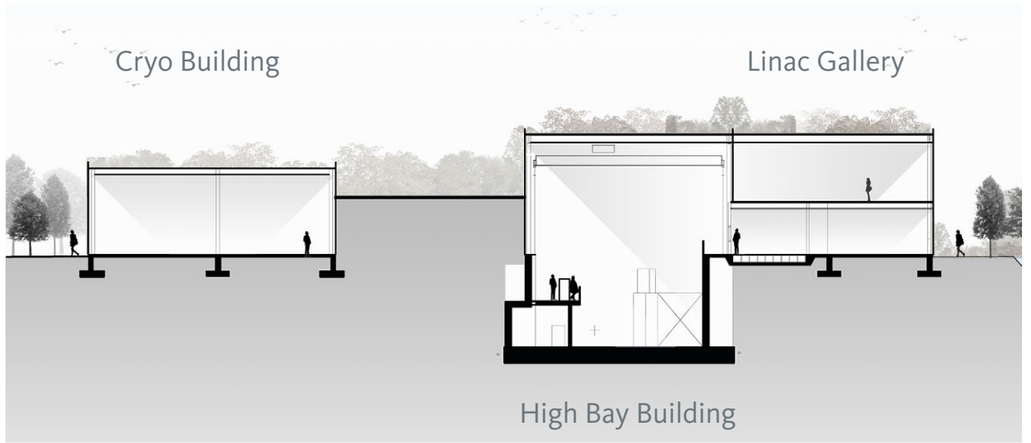
## Engaging Science and People

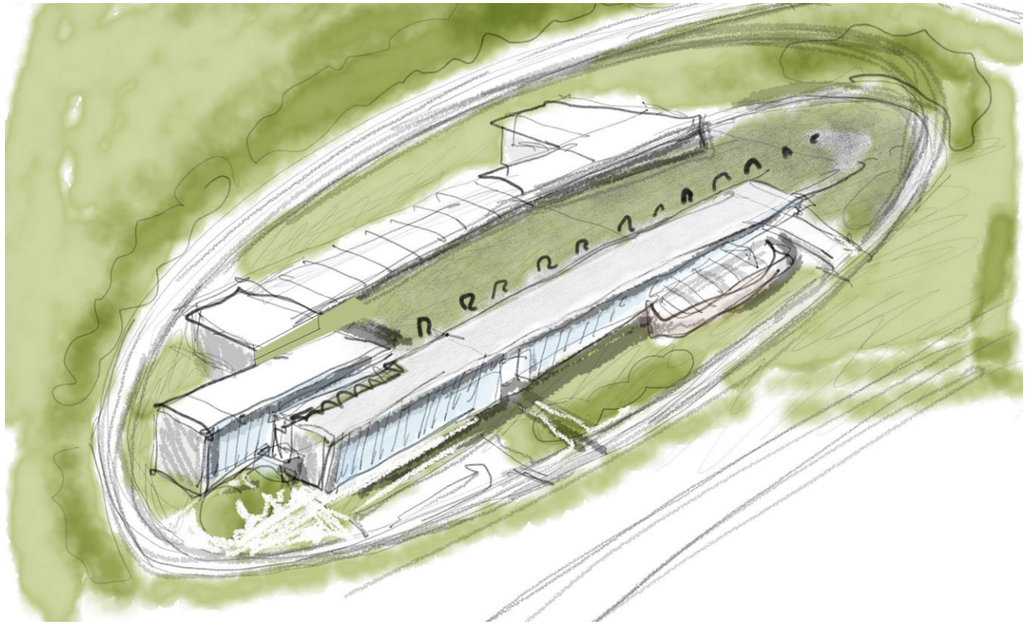


&

## Building and Landscape





Gensler

# Prairie

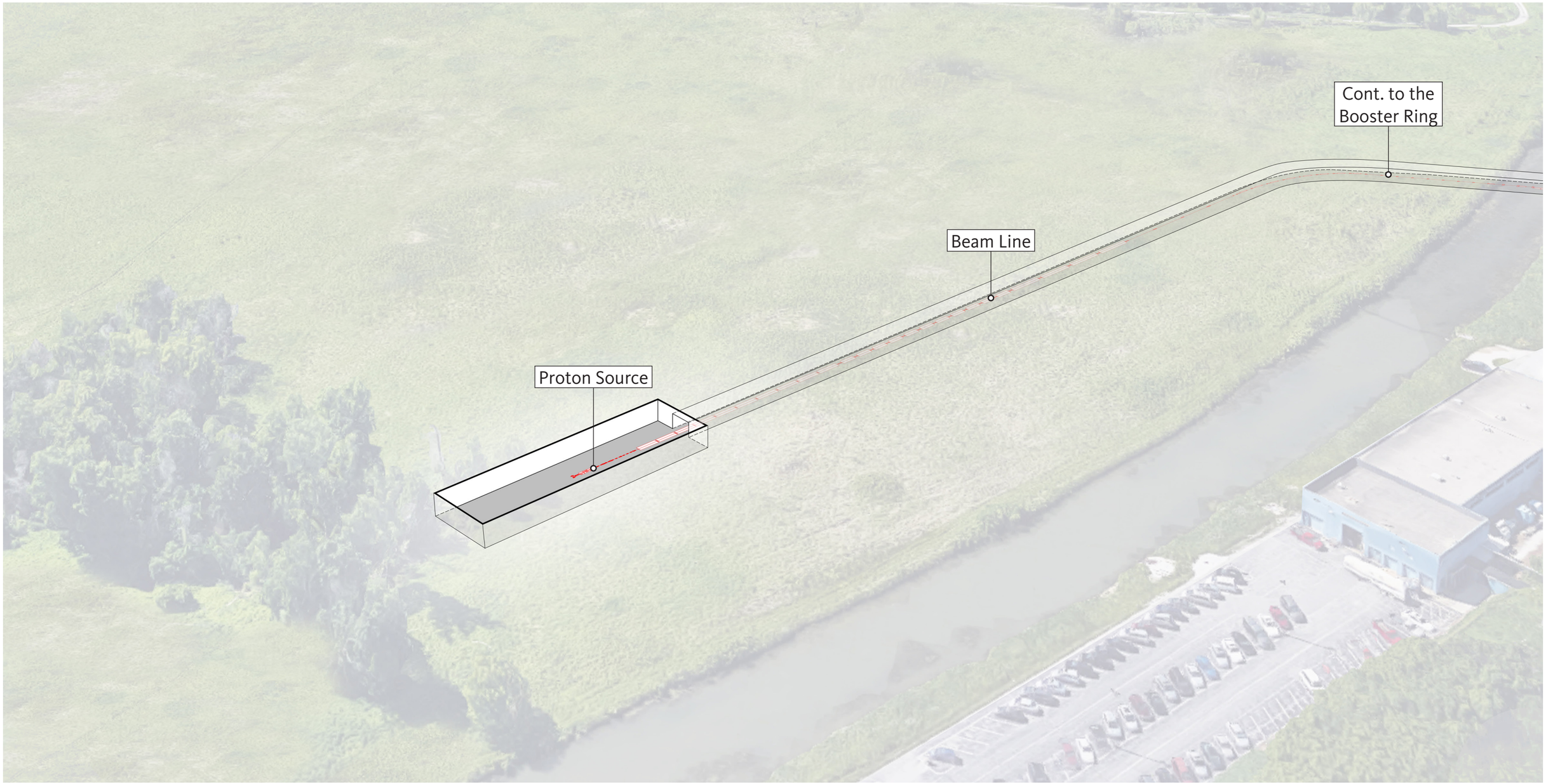
PIP-II Site



Gensler

# Proton Source

PIP-II Site

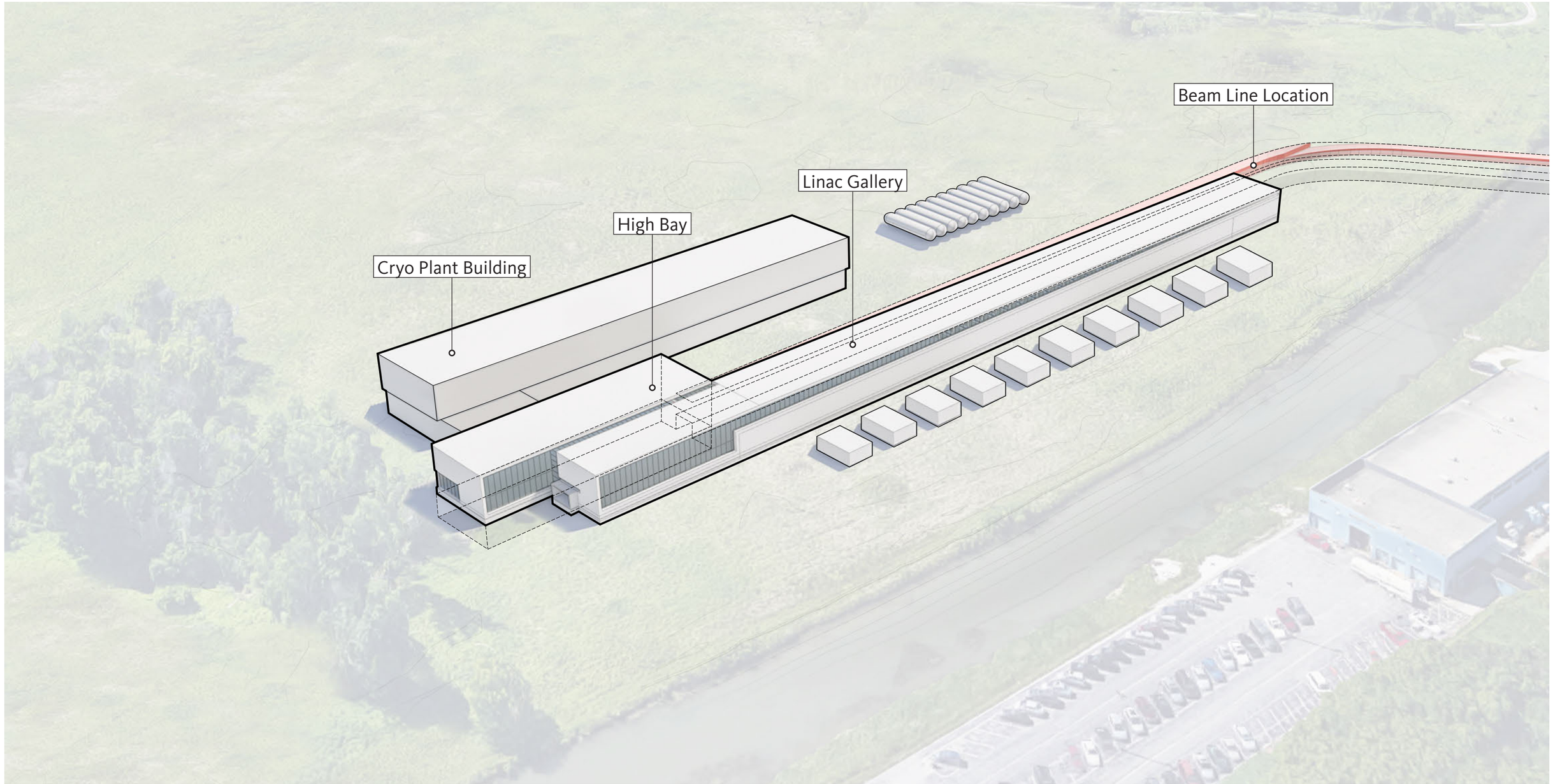





Gensler

# Programs

## PIP-II Purpose

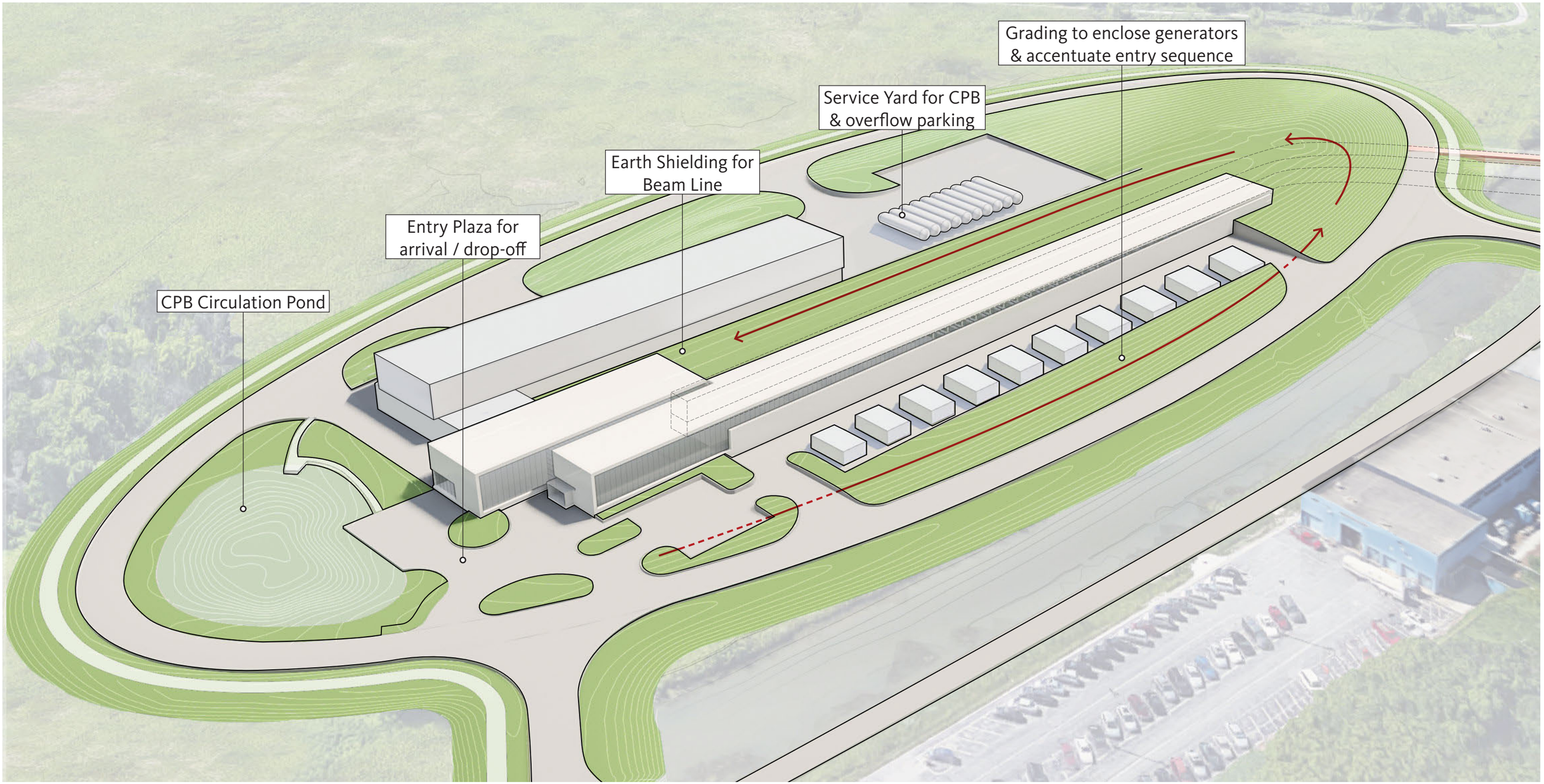





Gensler

# Place

PIP-II Campus





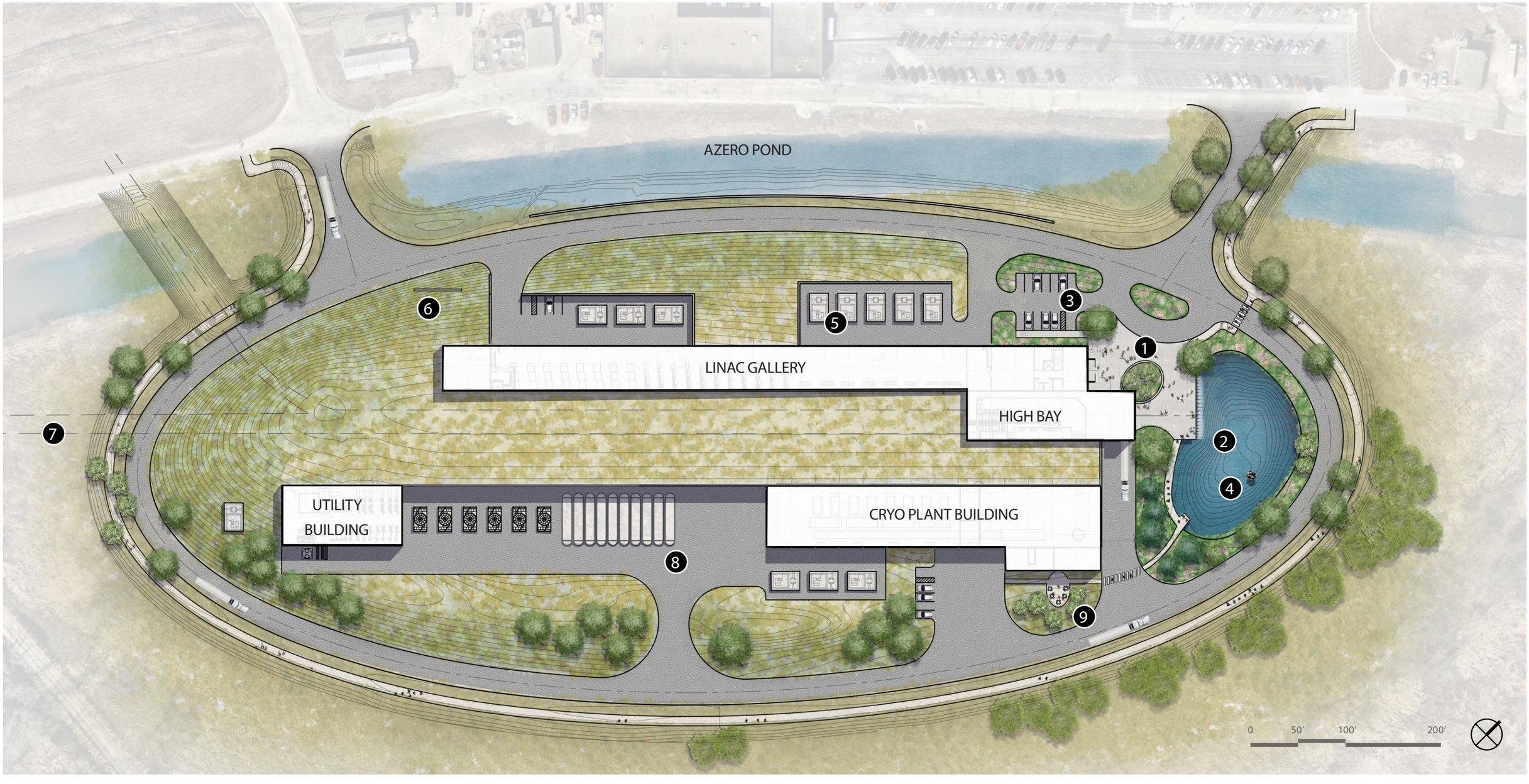

Gensler

# Landscape Plan - Previous

AAB Meeting 06.28.18

LEGEND

1. ENTRY PLAZA
2. CRYO CIRCULATION POND
3. VISITOR PARKING
4. SCULPTURE
5. TRANSFORMER, TYP.
6. ENTRY SIGN
7. PIP-III (FUTURE)
8. SERVICE YARD
9. CRYO OUTDOOR GATHERING





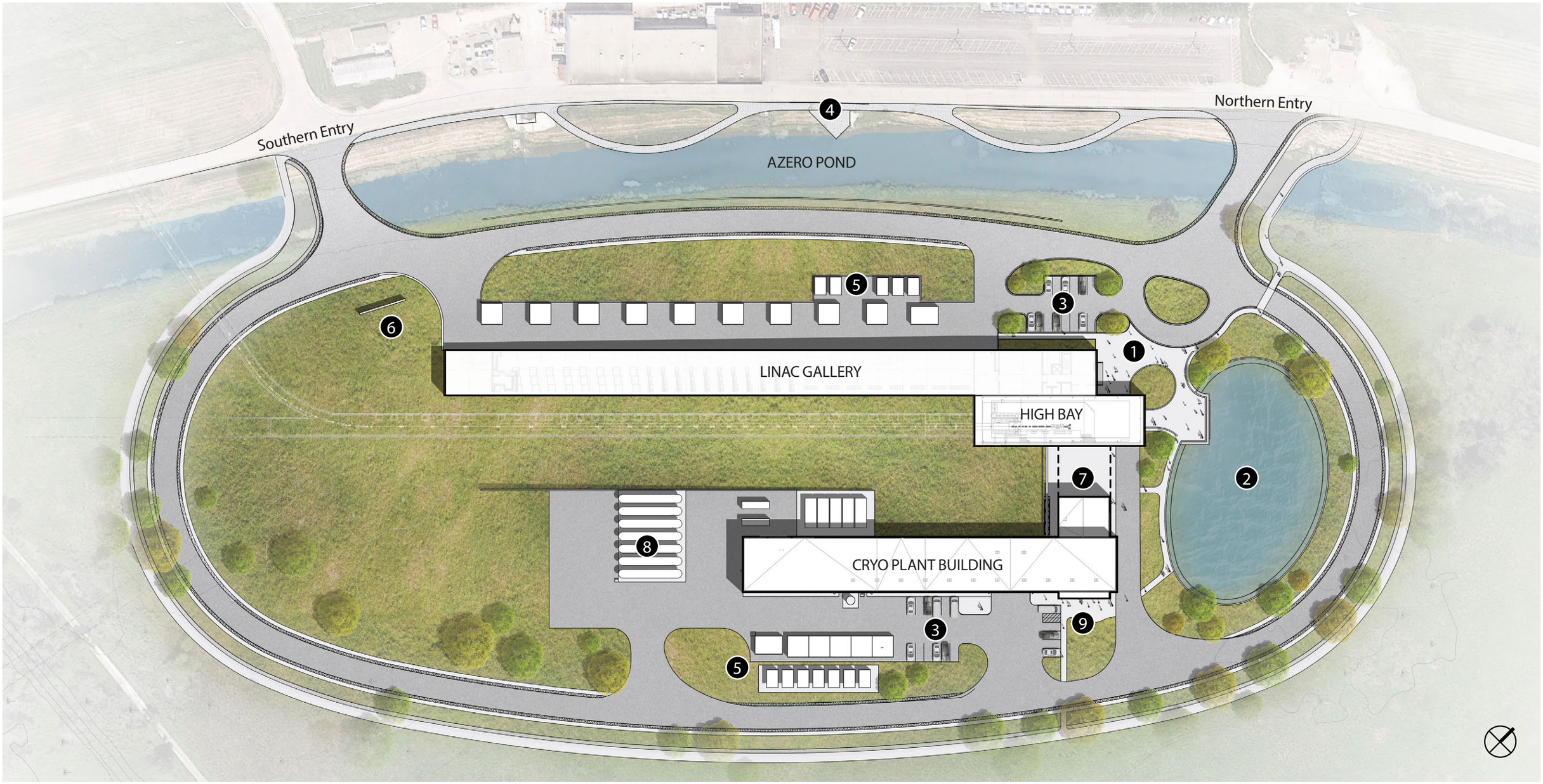

Gensler

# Landscape Plan - Current

AAB Meeting 04.05.19

LEGEND

1. ENTRY PLAZA
2. CRYO CIRCULATION POND
3. PARKING
4. AZERO POND LOOKOUT
5. TRANSFORMER, TYP.
6. CAMPUS SIGN
7. FUTURE LINAC CONNECTION
8. SERVICE YARD
9. CRYO OUTDOOR GATHERING





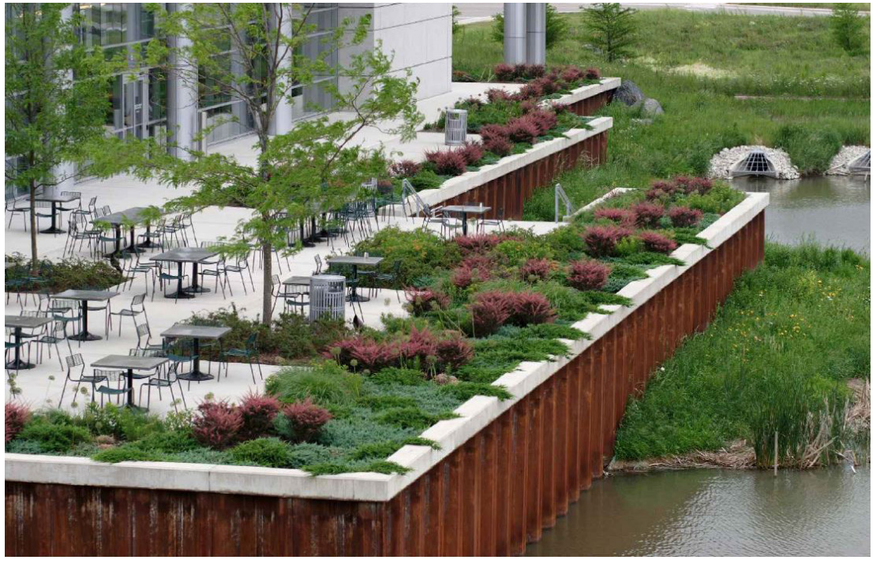

Gensler

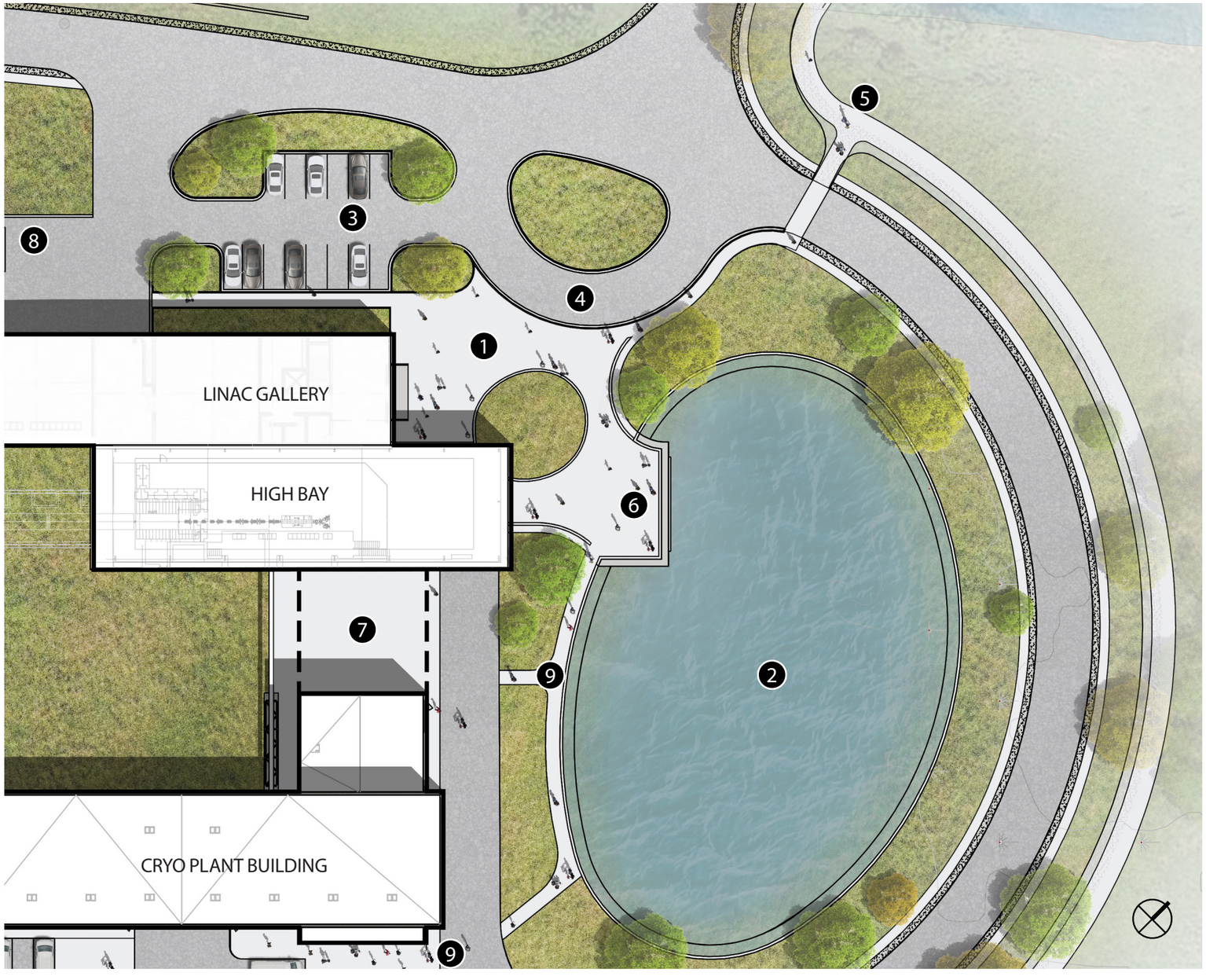
# Entry Plaza

## Outer Ring Road Connection

LEGEND

1. ENTRY PLAZA
2. CRYO CIRCULATION POND
3. PARKING
4. ENTRY DROP-OFF
5. PEDESTRIAN SITE ACCESS & PATH
6. POND OVERLOOK
7. FUTURE LINAC CONNECTION
8. SERVICE YARD
9. CRYO OUTDOOR GATHERING








Gensler

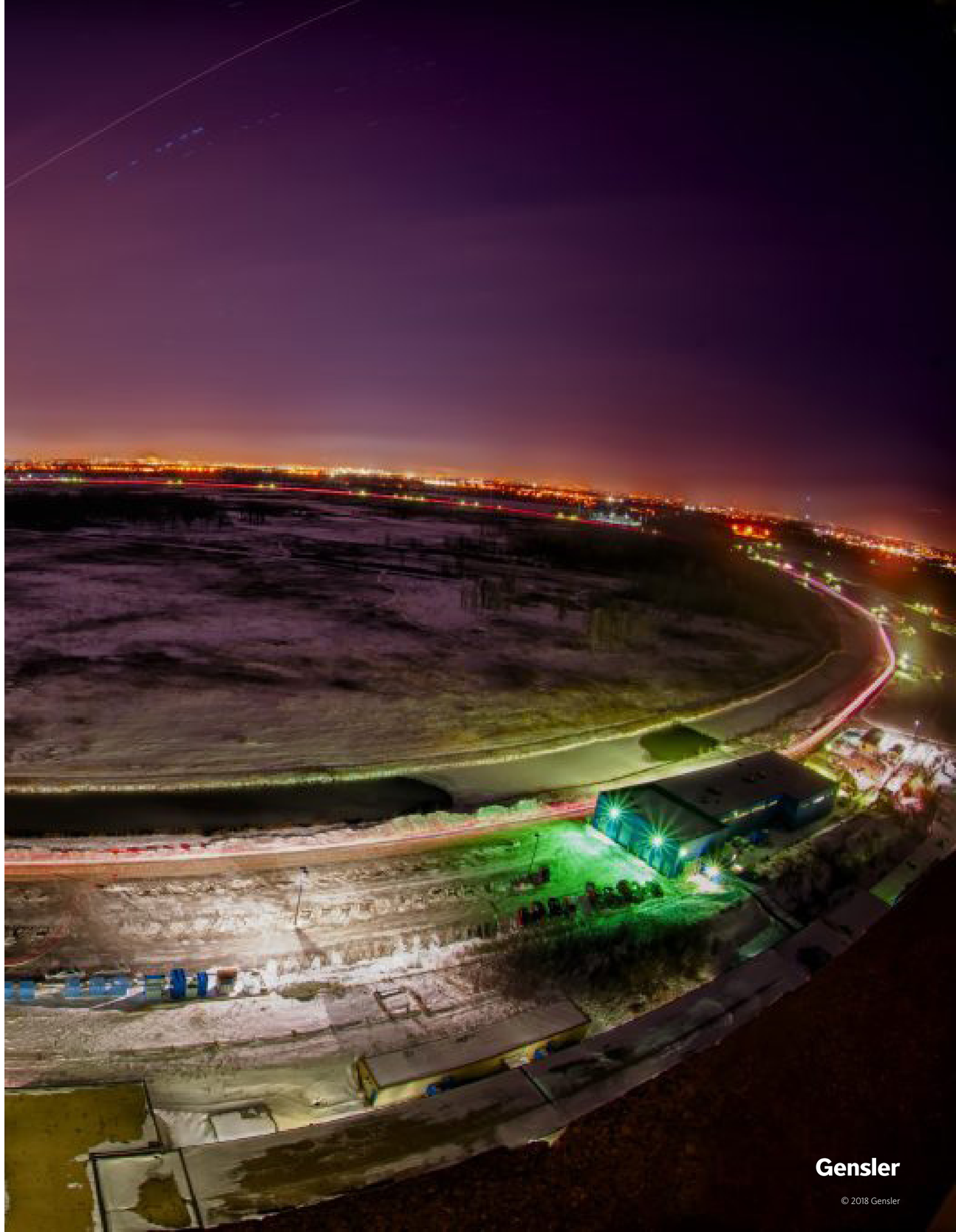
# Precedent

“The laws of physics express in such elegant form, that we can compare them to poetry”

**-Robert Wilson**

Geometry offers the most obvious connection between the two disciplines. Both art and math involve drawing and the use of shapes and forms, as well as an understanding of spatial concepts, two and three dimensions, measurement, estimation, and pattern.





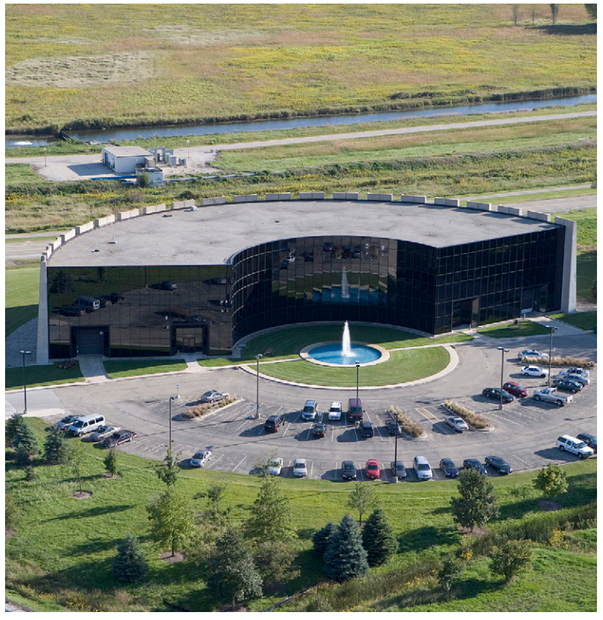
# Building Appearances

## Existing Fermilab Building Languages

**Wilson Hall**
1971-73

**The Pagoda: Proton Control Center**
December 1988

**Feynman Computing Center**
February 1976



**Illinois Accelerator Research Center** February 2011

**Neutrino Dome**
February - 1972

**Meson Lab**
November 1972

**Fermilab Cryomodule Test Facility**

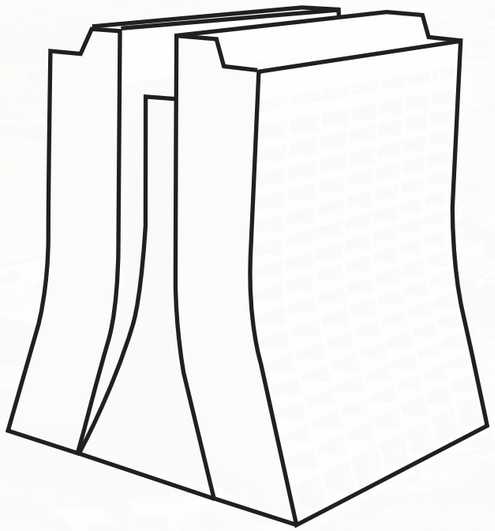


Gensler

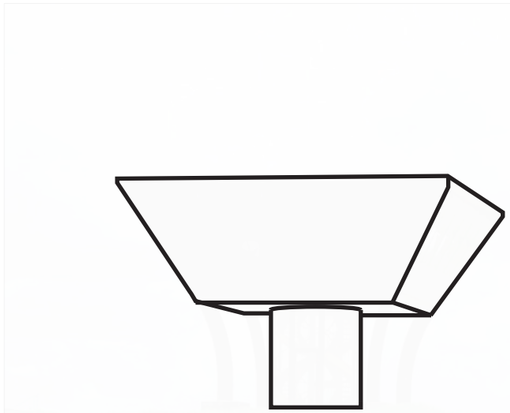
# Strong Geometries

## Iconic Structures for an Iconic Campus

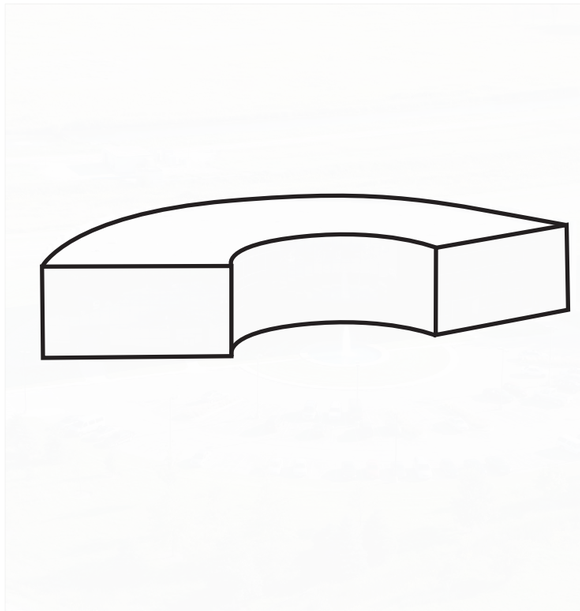
**Wilson Hall**
1971-73



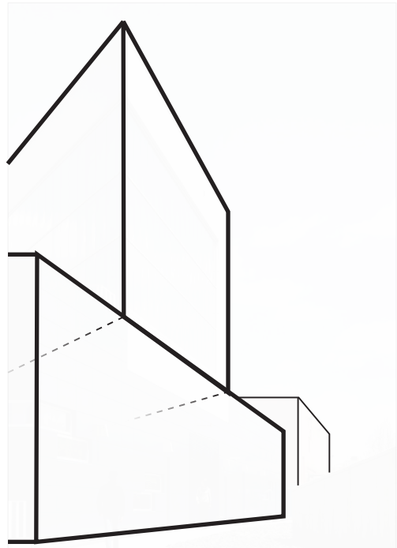
**The Pagoda: Proton Control Center**
December 1988

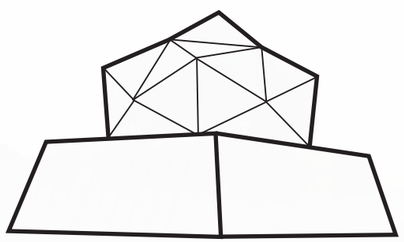


**Feynman Computing Center**
February 1976

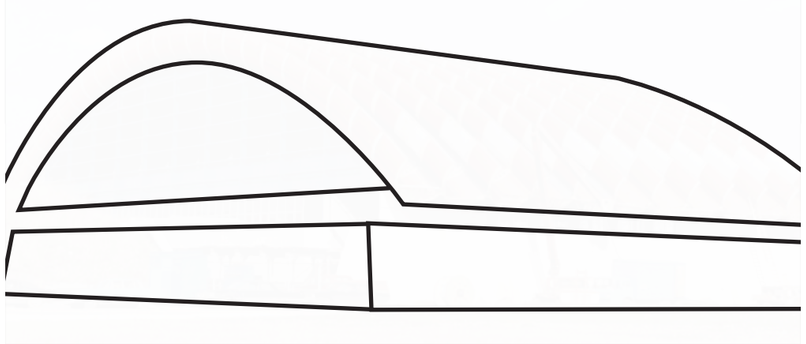


**Illinois Accelerator Research Center** February 2011

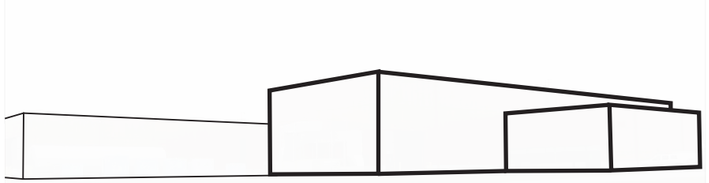




**Neutrino Dome**
February - 1972



**Meson Lab**
November 1972



**Fermilab Cryomodule Test Facility**



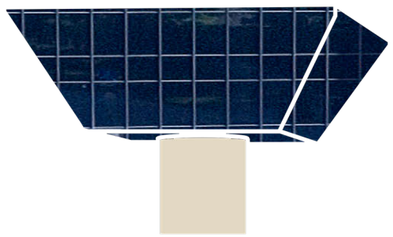
Gensler

# Humble Materials

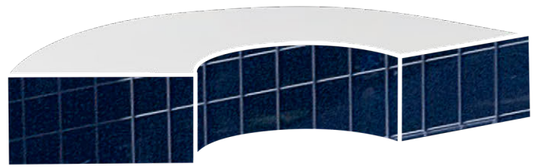
## Place & Purpose Driven Aesthetic

**Wilson Hall**
1971-73

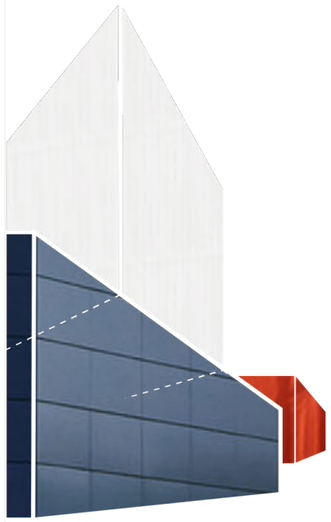
**The Pagoda: Proton Control Center**
December 1988



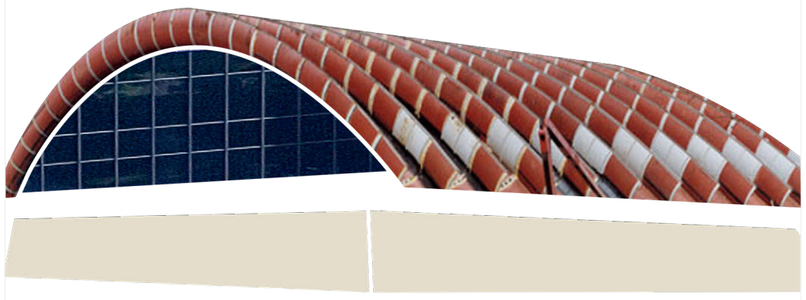
**Feynman Computing Center**
February 1976



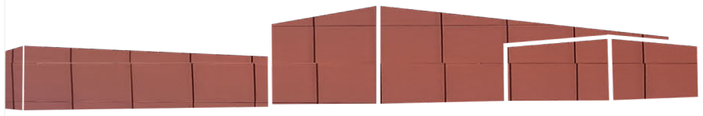
**Illinois Accelerator Research Center** February 2011



**Neutrino Dome**
February - 1972



**Meson Lab**
November 1972



**Fermilab Cryomodule Test Facility**



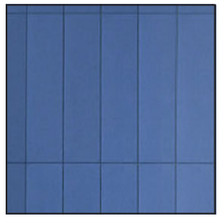
Gensler

# Compositional Palette

## Place & Purpose Driven Aesthetic

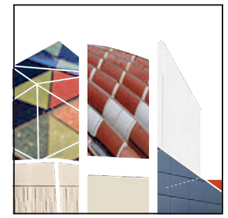
Board Form - Precast Concrete

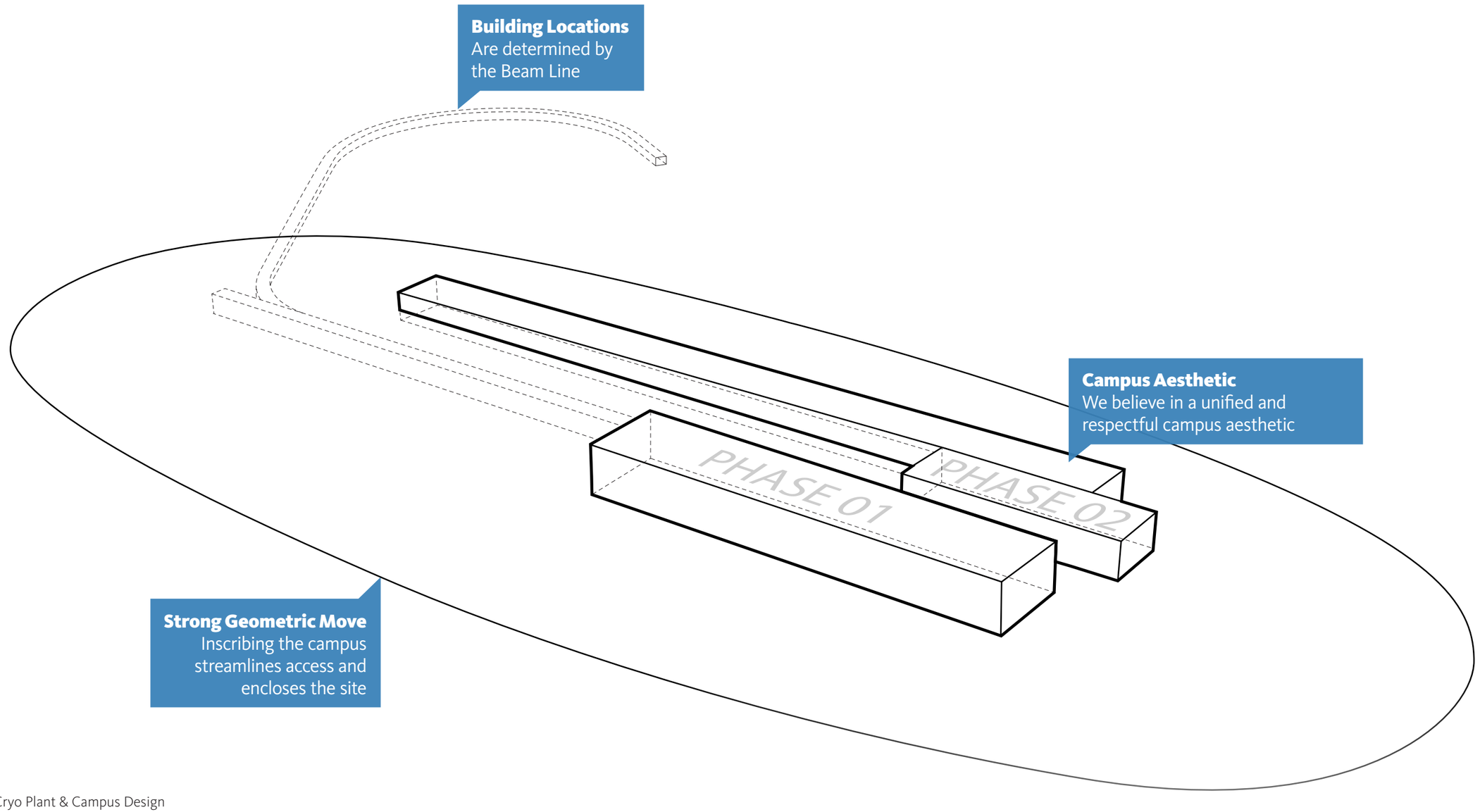
Metal Panel



Glass

Program Expression







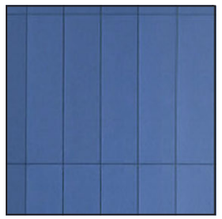

Gensler

# Compositional Palette

## Place & Purpose Driven Aesthetic

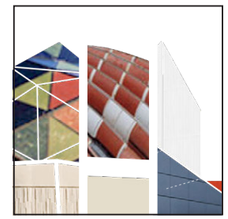
Patterned - Precast Concrete

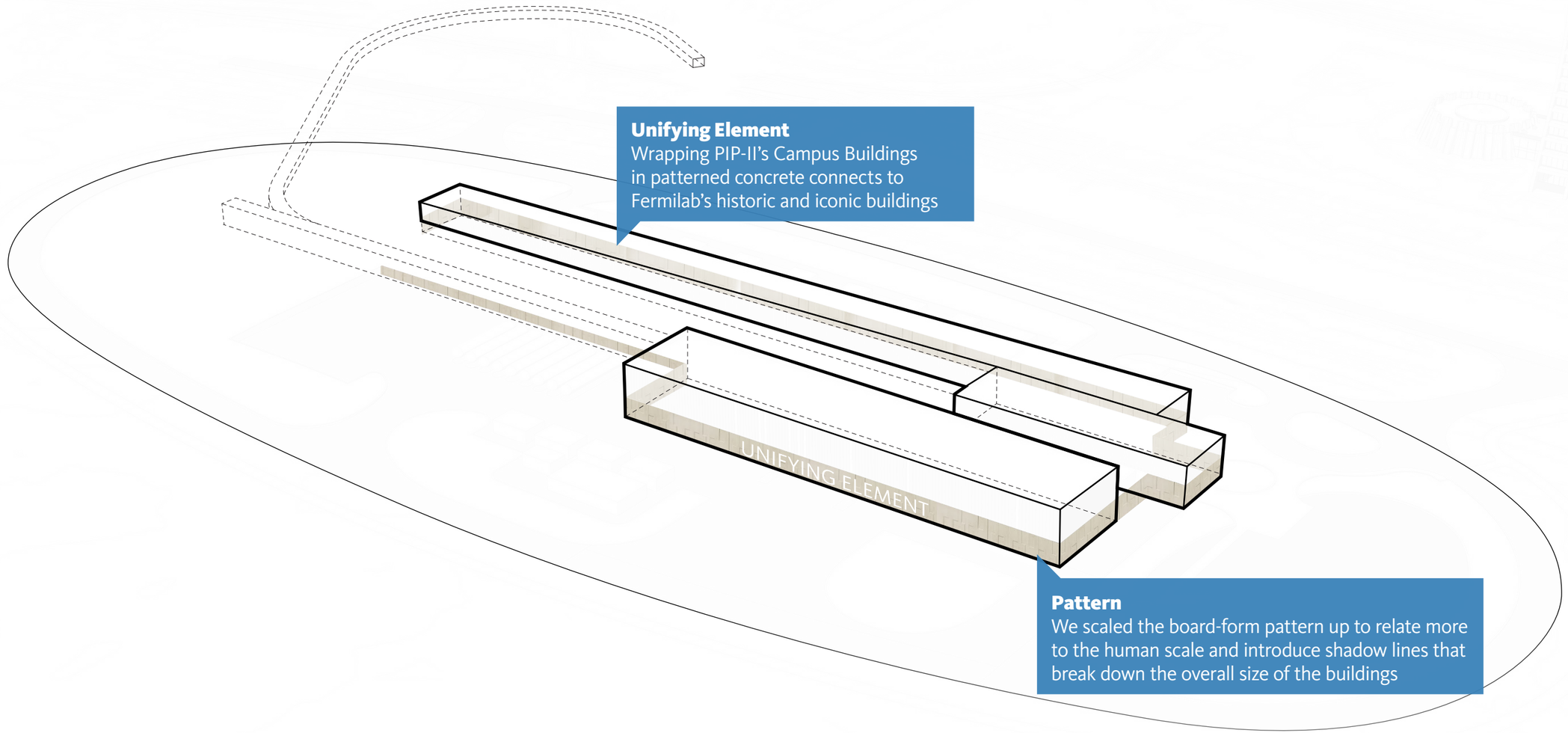
Metal Panel



Glass

Program Expression






**Unifying Element**
Wrapping PIP-II's Campus Buildings in patterned concrete connects to Fermilab's historic and iconic buildings

**Pattern**
We scaled the board-form pattern up to relate more to the human scale and introduce shadow lines that break down the overall size of the buildings



Gensler

# Compositional Palette

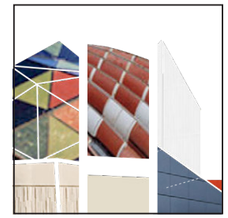
## Place & Purpose Driven Aesthetic

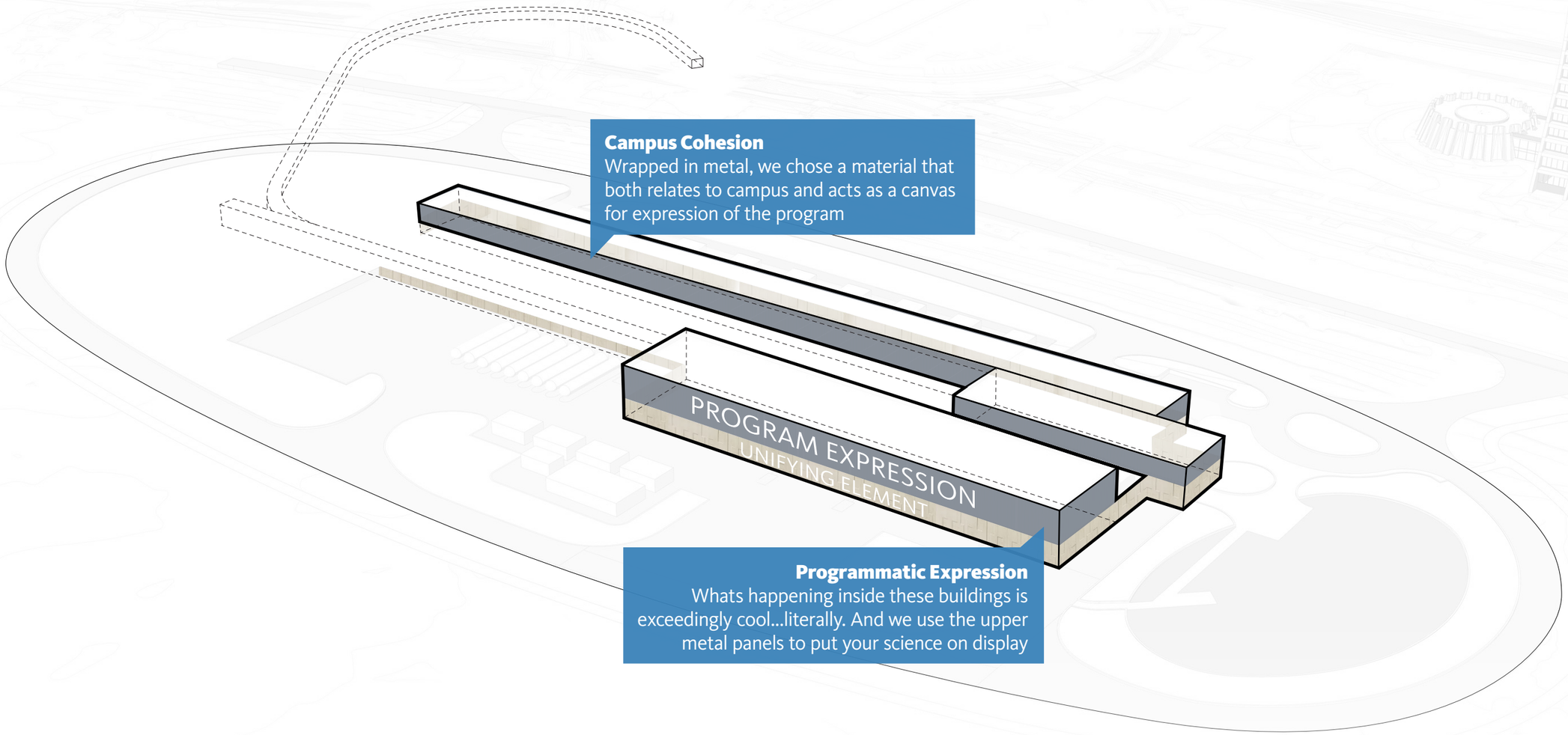
Patterned - Precast Concrete

Metal Panel

Glass

Program Expression






**Campus Cohesion**
Wrapped in metal, we chose a material that both relates to campus and acts as a canvas for expression of the program

**Programmatic Expression**
Whats happening inside these buildings is exceedingly cool...literally. And we use the upper metal panels to put your science on display



Gensler

# Compositional Palette

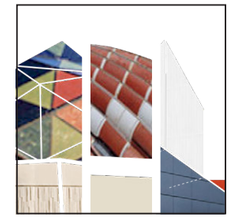
## Place & Purpose Driven Aesthetic

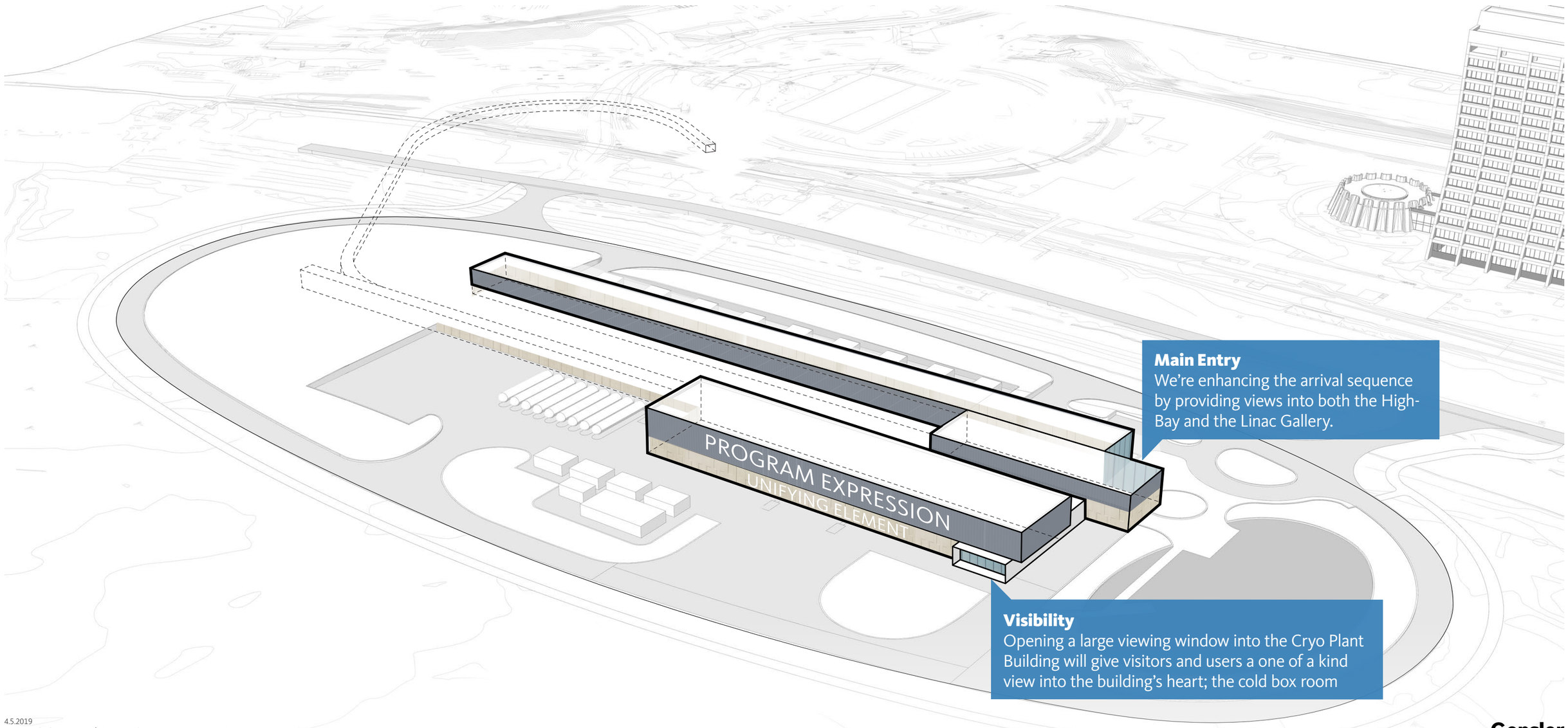
Board Form - Precast Concrete

Metal Panel

Glass

Program Expression






**Main Entry**
We're enhancing the arrival sequence by providing views into both the High-Bay and the Linac Gallery.

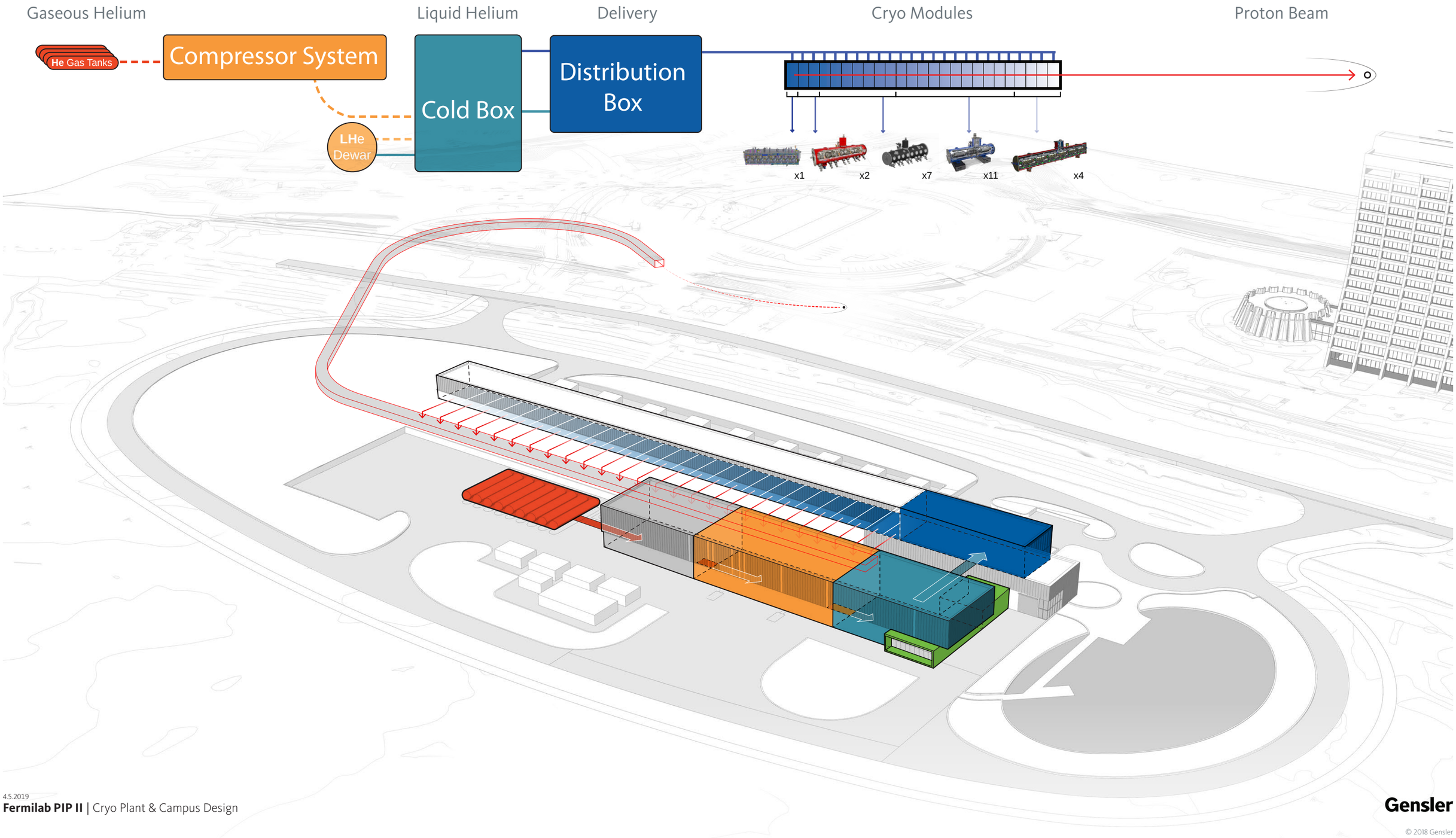
**Visibility**
Opening a large viewing window into the Cryo Plant Building will give visitors and users a one of a kind view into the building's heart; the cold box room



Gensler

# Campus Programs

## Campus Function



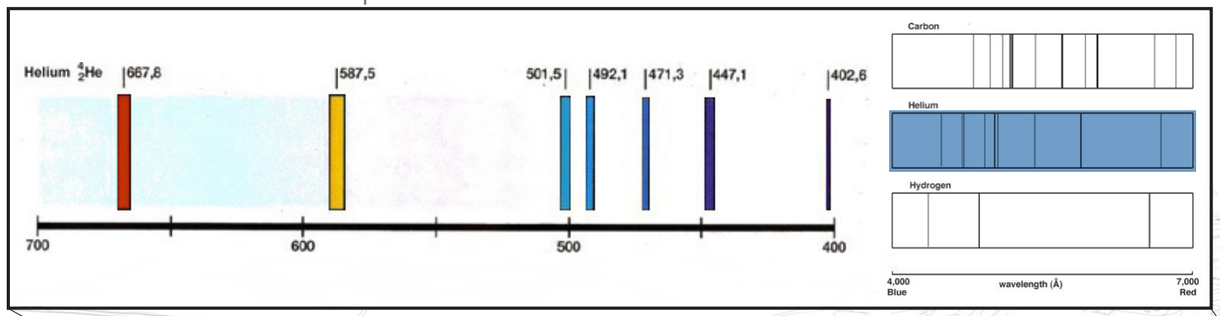



Gensler

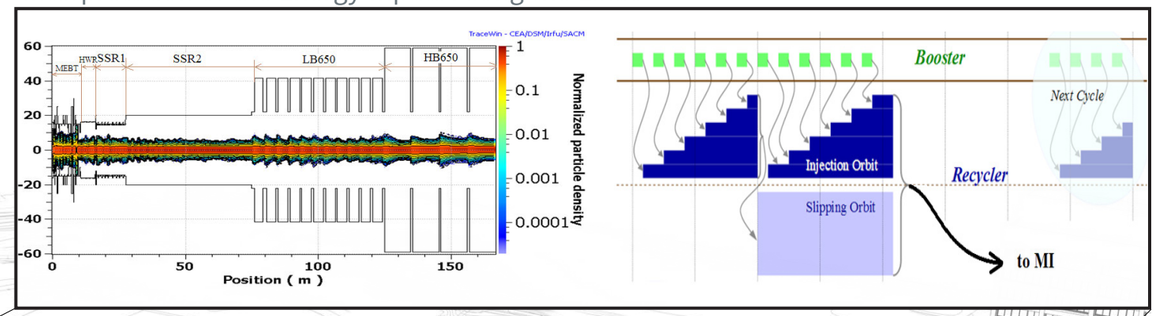
# PIP-II Building Expression

## Campus Distinction

### Abstratction of the Helium Spectral Series




### Interpretation of the Energy Inputs Along the Linac




PROGRAM EXPRESSION
UNIFYING ELEMENT



Gensler

# Cryo Plant Exterior Design - Previous

AAB Meeting 06.28.18



Gensler

# Cryo Plant Exterior Design - Current

Striated Metal Panels & Precast Concrete

South West Perspective



Gensler

# Cryo Plant Exterior Design

Striated Metal Panels & Precast Concrete

South West Perspective



Gensler

# Cryo Plant Exterior Design

Striated Metal Panels & Precast Concrete

South East Perspective



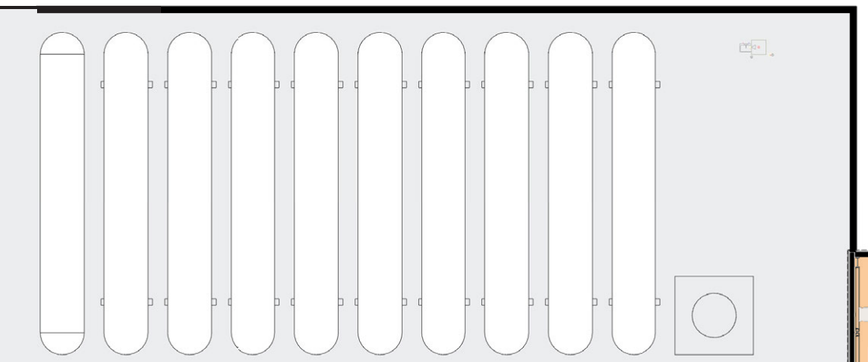
Gensler

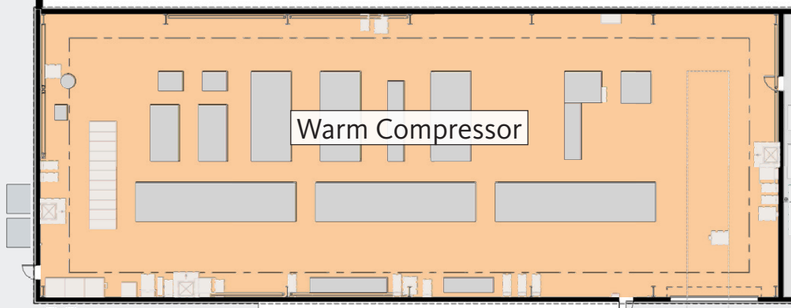
# Cryo Plant Plan - Previous

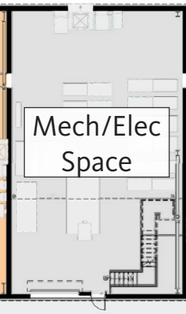
## AAB Meeting 06.28.18

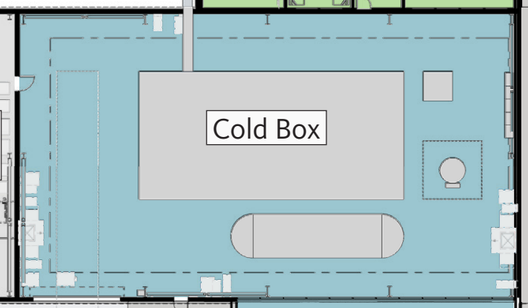
Previous

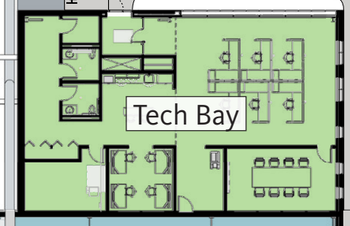
| | |
|---|---|
| Total sf: | 18,340 sf |
| Tech Bay: | 1,339 sf |
| CPB: | 17,001 sf |
| Width: | 59’ - 10” |
| Length: | 298’ - 10” |
| Height: | 38’ - 0” |
| Parking: | 5+ |

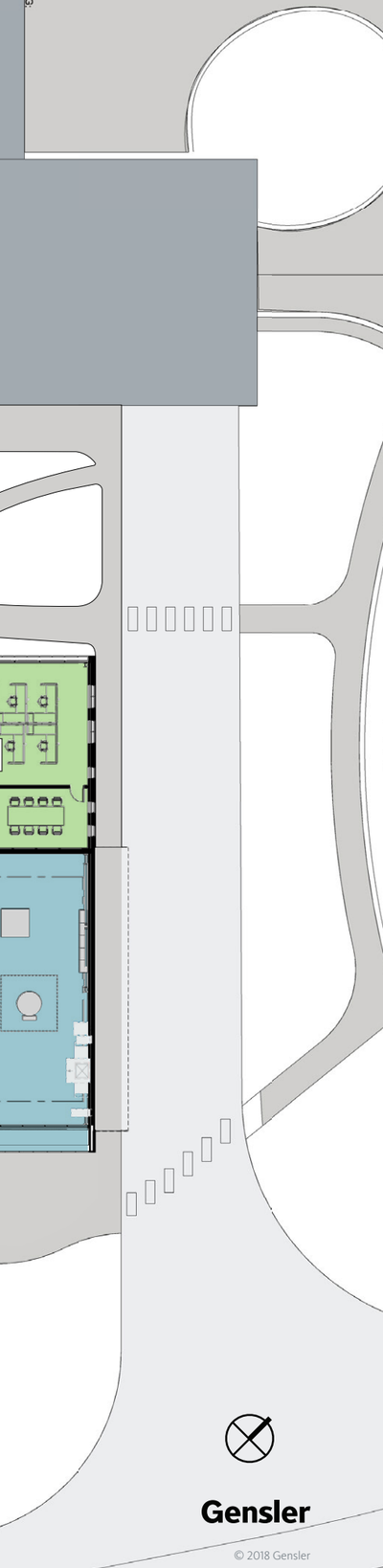




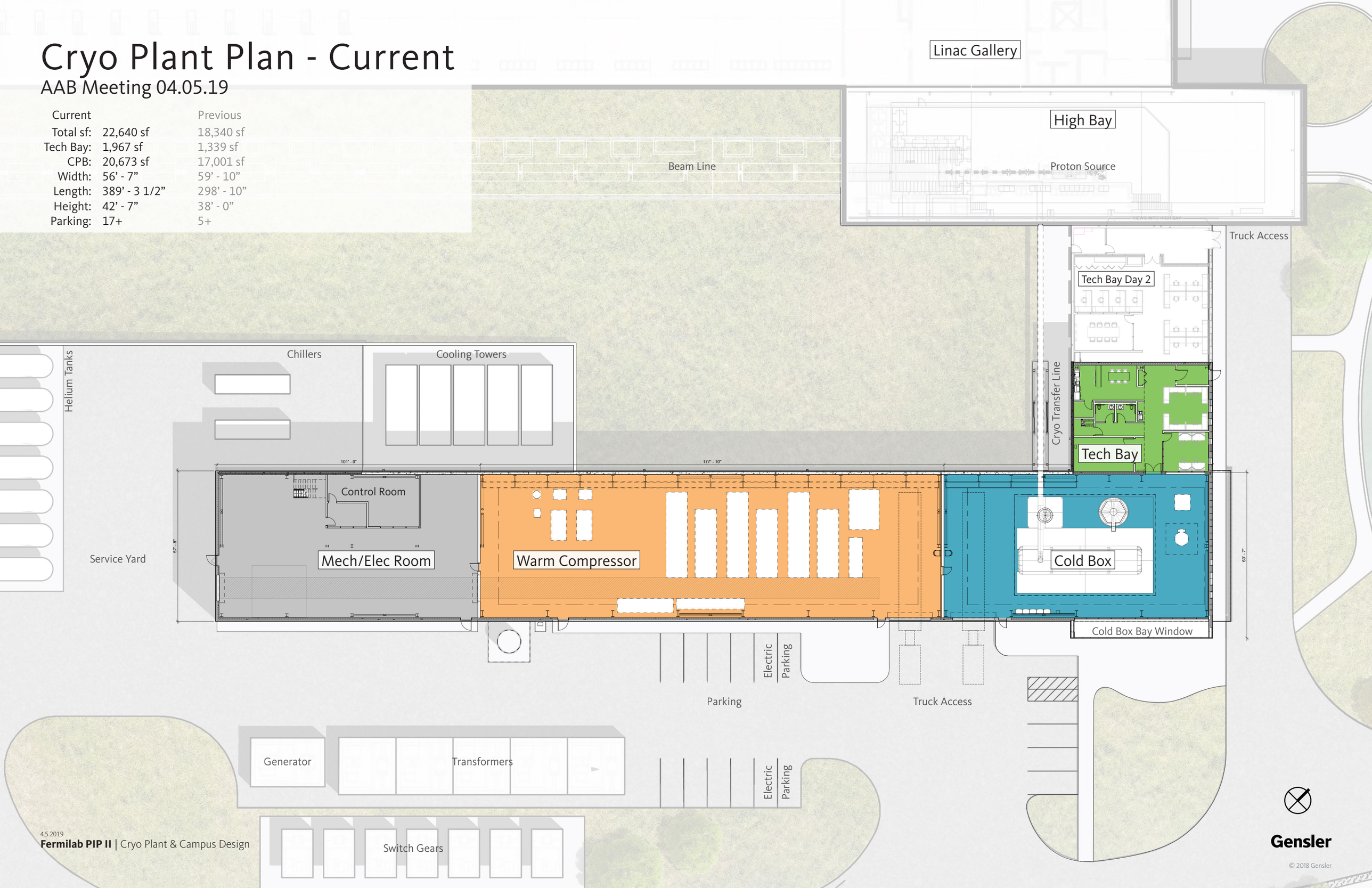


Gensler

# Cryo Plant Plan - Current

## AAB Meeting 04.05.19

| Current | | Previous |
|---|---|---|
| Total sf: | 22,640 sf | 18,340 sf |
| Tech Bay: | 1,967 sf | 1,339 sf |
| CPB: | 20,673 sf | 17,001 sf |
| Width: | 56’ - 7” | 59’ - 10” |
| Length: | 389’ - 3 1/2” | 298’ - 10” |
| Height: | 42’ - 7” | 38’ - 0” |
| Parking: | 17+ | 5+ |

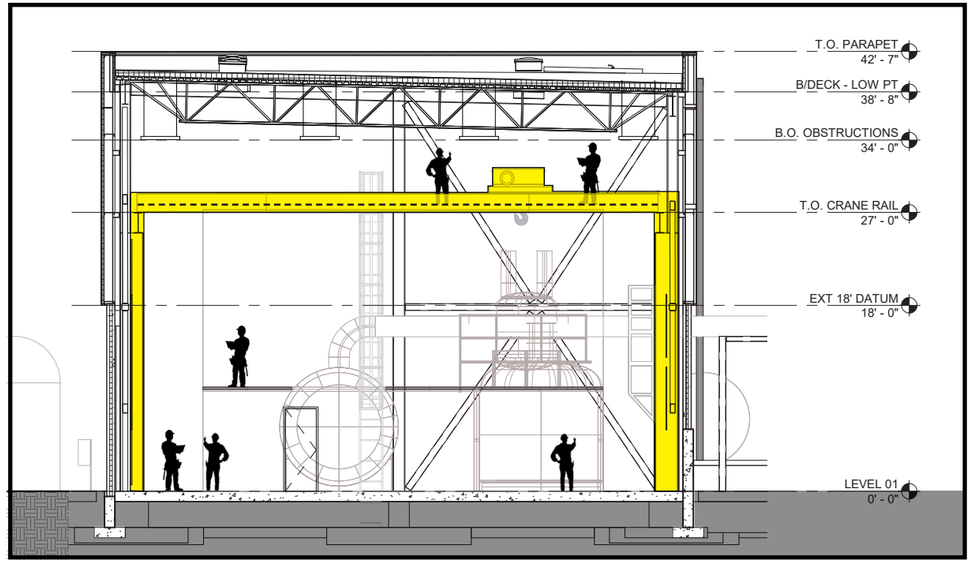





Gensler

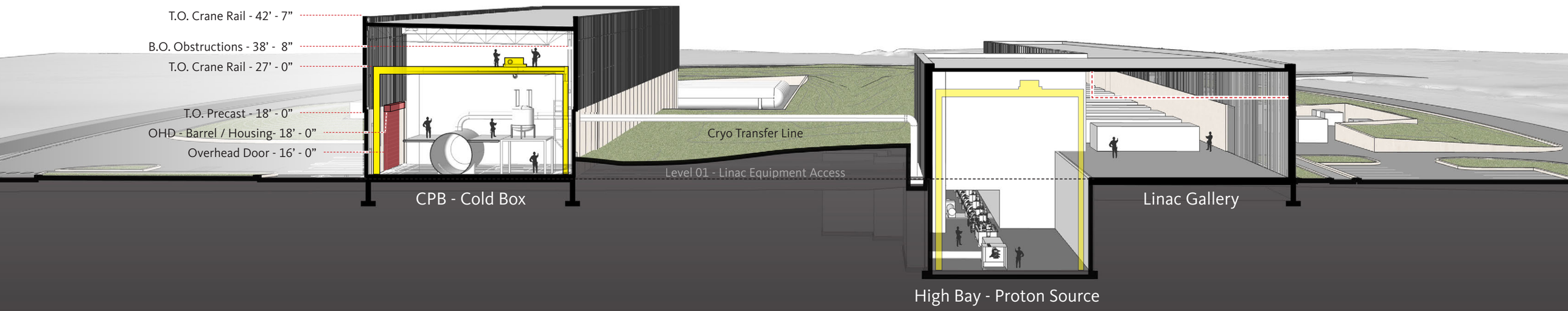
# PIP-II Section

## CPB + Pre-Design Linac Connection




CPB - Cold Box Section

FNAL Cranes



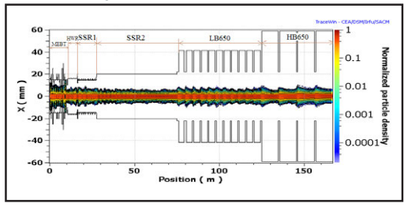



Gensler

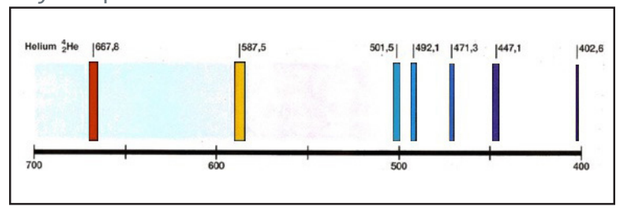
# PIP-II Campus - Previous

AAB Meeting 06.28.18

Linac Expression




Cryo Expression



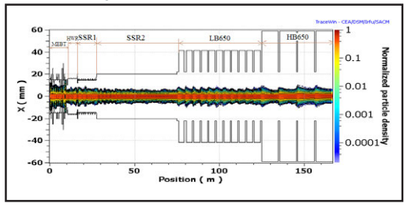



Gensler

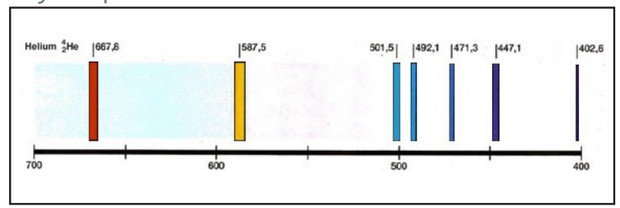
# PIP-II Campus - Current

AAB Meeting 04.05.19

Linac Expression




Cryo Expression



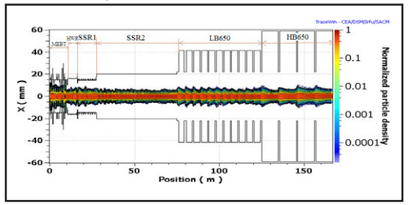



Gensler

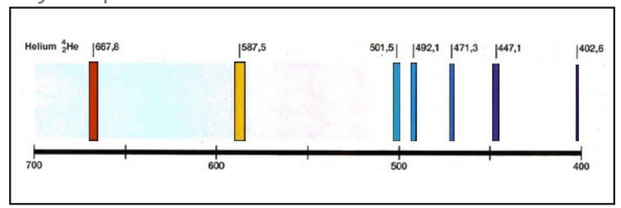
# PIP-II Campus

## View Towards the Main Entrance

Linac Expression




Cryo Expression






Gensler

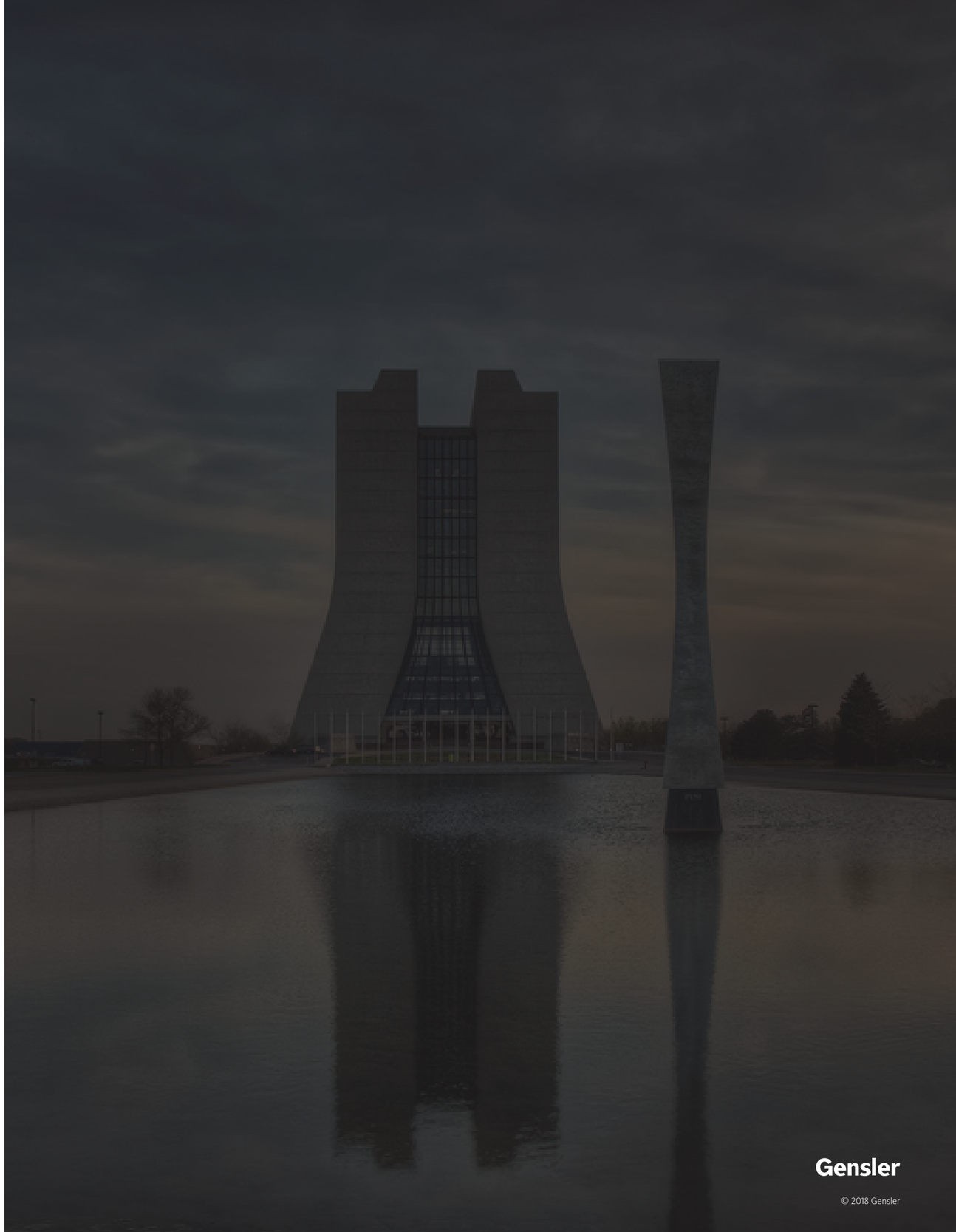
# Appendix

I CPB Elevation Considerations
Eight Cladding Explorations

II Linac Massing Considerations
Pre-Design Linac Phase Explorations

III Legacy Presentation Material
Previous Design Content





Gensler

# Current PIP-II Campus Elevation

Uniform Metal Panels & Kalwall, Precast Concrete



Gensler

# Cryo Plant Elevation - Current

Uniform Metal Panels & Kalwall, Precast Concrete

South West Perspective




Gensler

# Cryo Plant Stepped 01

Stepped Metal Panels & Kalwall, Precast Concrete

South West Perspective




Gensler

# Cryo Plant Stepped 02

Stepped Metal Panels & Kalwall, Precast Concrete

South West Perspective




Gensler

# Cryo Plant Glazed

## Uniform Metal Panels & Glazing, Precast Concrete

South West Perspective




Gensler

# Cryo Plant Stepped 01

Stepped Metal Panels & Glazing, Precast Concrete

South West Perspective




Gensler

# Cryo Plant Stepped 02

Stepped Metal Panels & Glazing, Precast Concrete

South West Perspective

East Elevation



Gensler

# Cryo Plant Sloped 01

Sloped Metal Panels & Glazing, Precast Concrete

South West Perspective




Gensler

# Cryo Plant Sloped 02

Sloped Metal Panels & Glazing, Precast Concrete

South West Perspective




Gensler

# Cryo Plant Sloped 03

Sloped Metal Panels & Glazing, Precast Concrete

South West Perspective




Gensler

# CPB Alternate Elevations

Translucent Panel - Considerations

Current Elevation with Translucent Panels


Stepped 01


Stepped 02




Gensler

# CPB Alternate Elevations

Glazed Panel - Considerations

Current Elevation with Glazing

Stepped 01 with Glazing

Stepped 02 with Glazing



Gensler

# CPB Alternate Elevations

Glazed Panel - Considerations Cont.

Sloped Elevation 01

Sloped Elevation 02

Sloped Elevation 03



Gensler

# PIP-II Campus - Previous

AAB Meeting 06.28.18



Gensler

# PIP-II Campus - Current

AAB Meeting 04.05.19



Gensler

# Linac Stepped Massing 01

Stepped Linac Gallery & Precast Concrete

# Linac Stepped Massing 02

Stepped Linac Gallery, Sloped Precast Concrete

# Linac Stepped Massing 03

Stepped Linac Gallery, Metal Panels & Precast

# Linac Sloped Massing 01

Swept Metal Panels & Glazing, Stepped Precast Concrete

# Linac Sloped Massing 02

Swept Metal Panels & Glazing, Swept Precast Concrete

# Linac Massings
Pre-Design Considerations

## Current Linac Massing

## Stepped Linac Massing 01

## Stepped Linac Massing 02



Gensler

# Linac Massings

## Pre-Design Considerations

Stepped Linac Massing 03

Sloped Linac Massing 01

Sloped Linac Massing 02



Gensler

# Thank You



Gensler