

# CBETA Assembly Plan

June 19, 2018

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# CBETA Assembly Plan

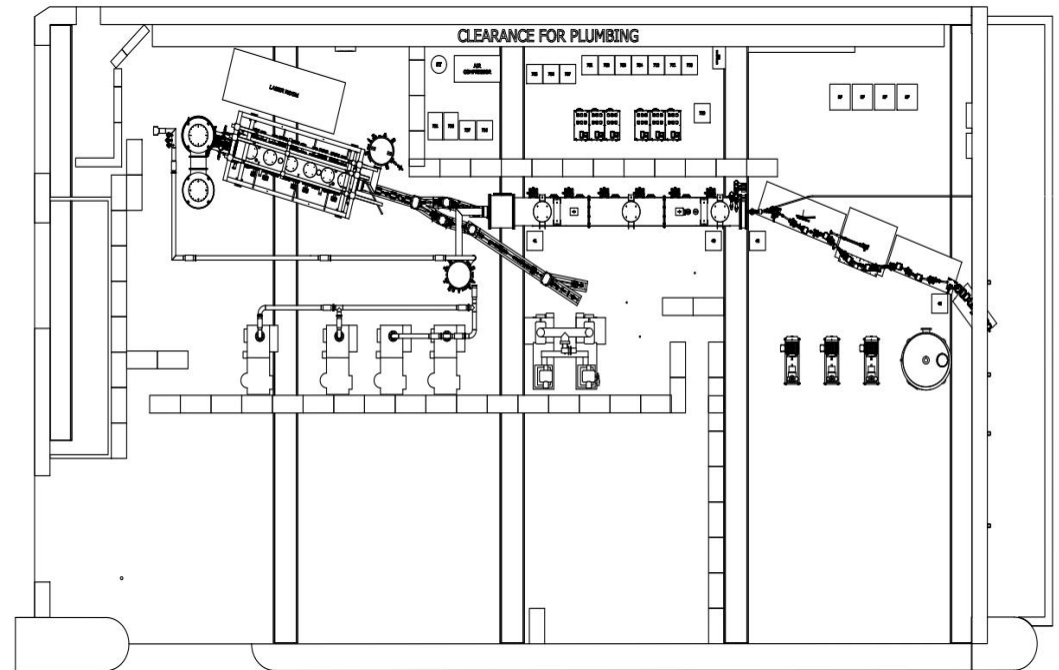
- Final assembly
  - EH&S
  - Limitations
  - Initial Actions
  - Infrastructure
  - Beamline installation
  - Utilities, Instrumentation and Controls
  - Schedule overview
  - Project Management Concerns

# CBETA Assembly Plan: EH&S Related

- Planning
  - Hazardous material survey
  - Storm water protection plan
  - Construction safety plan
  - Staff training, explicit for project
- Fire safety
  - Detection
  - Alarms
  - Suppression
- Personnel safety
  - Egress paths
  - Emergency lighting
  - Exit signage
  - Emergency response (IFD and CPD)

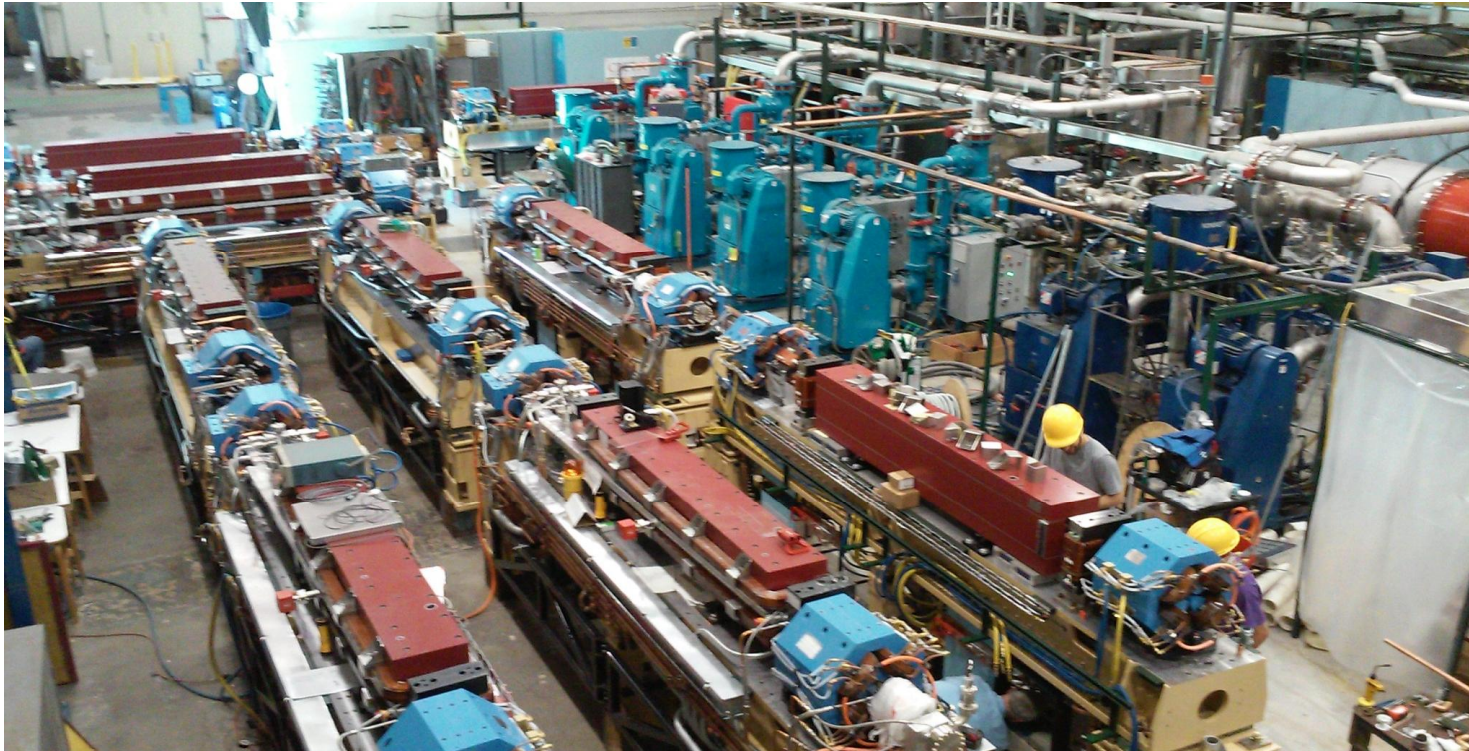
# CBETA Assembly Plan: **Limitations**

- Fractional Arc Configuration
  - Components occupy the north half of the high bay area (LOE)
  - South half is an assembly space for CHES Upgrade project
  - Electrical power and cooling water capacity is maxed-out
  - CHES-U project consumes the majority of technical resources from June to October, 2018



# CBETA Assembly Plan: **Limitations**

- CHESS Upgrade magnets (12) will start moving on July 18 and be all gone by October 1, 2018



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# CBETA Assembly Plan: **Limitations**

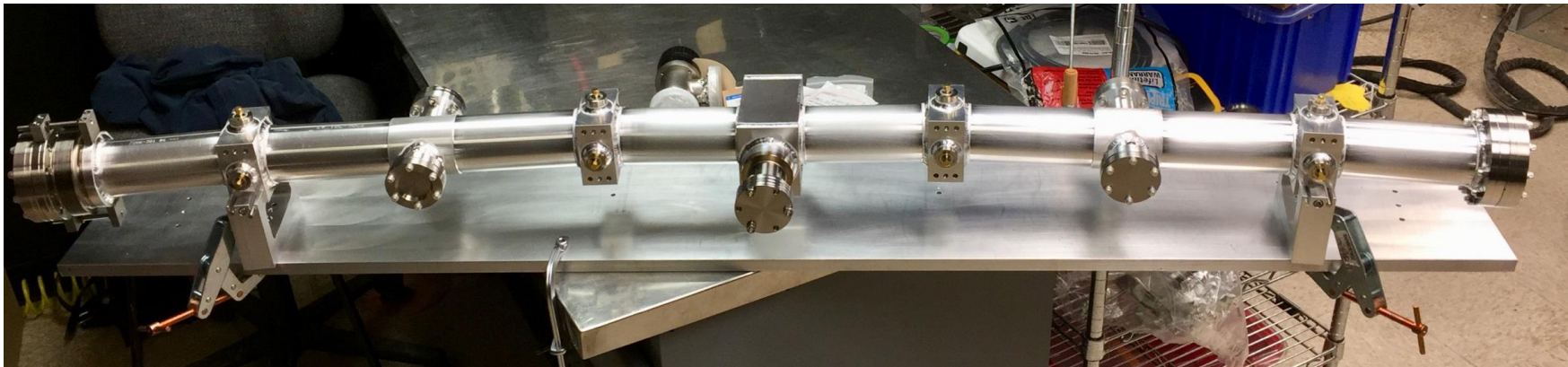
- As the CHES-U magnets move out, CBETA components will start to move in on the east side



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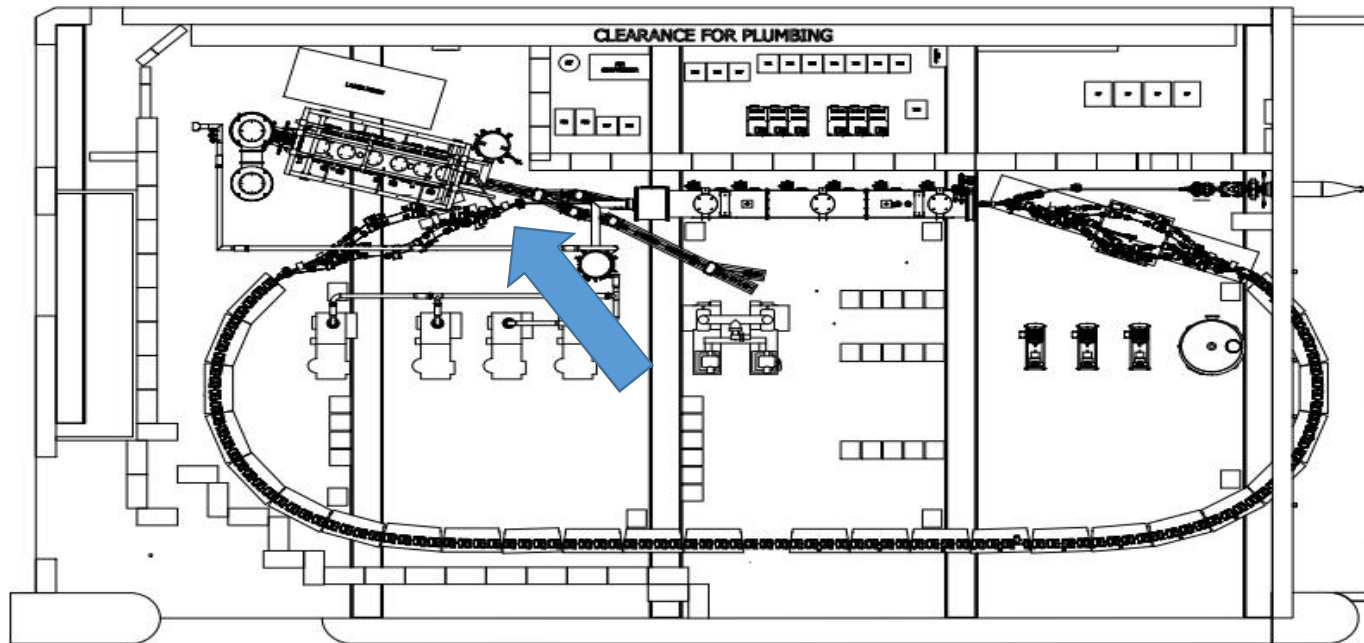
# CBETA Assembly Plan: **Initial Actions**

- Vacuum beamline chambers (27) for the permanent magnet sections are being fabricated at Cornell and delivered to BNL
- BNL is assembling the magnet girders, with delivery starting in September



# CBETA Assembly Plan: **Initial Actions**

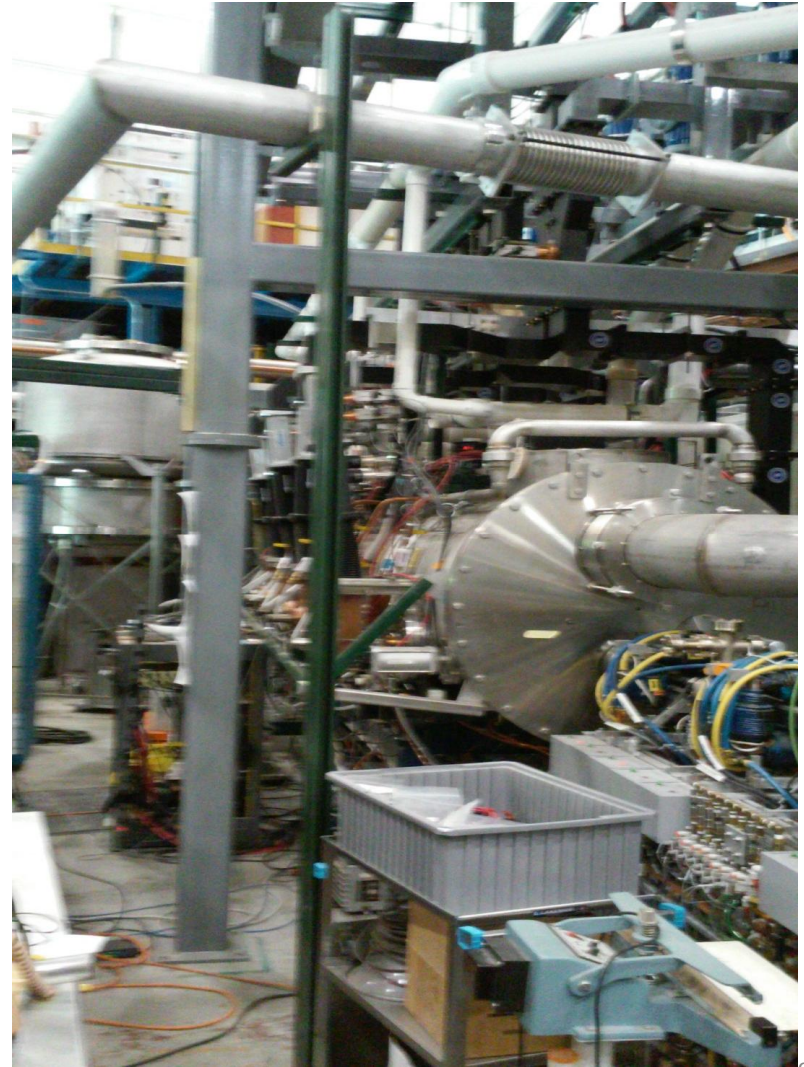
- Opportunities to install key components, such as the combiner table should be taken, if labor is available during the summer
- First step is to clear the IN-DI area and modify ICM structure





# CBETA Assembly Plan: Initial Actions

- The ICM waveguide support prevents installation of the RX tables
- A new vertical support will be installed
- Three tables may be installed to permit assembly the four RX beamlines
- Cryogenic line supports also need to be modified



# CBETA Assembly: Initial Actions

- In parallel with RX beamline assembly, work could progress this summer on the SX lines, since the tables are already in place
- The work on the RX and SX lines is under consideration to make use of probable technician availability that often arises on big projects during slower periods

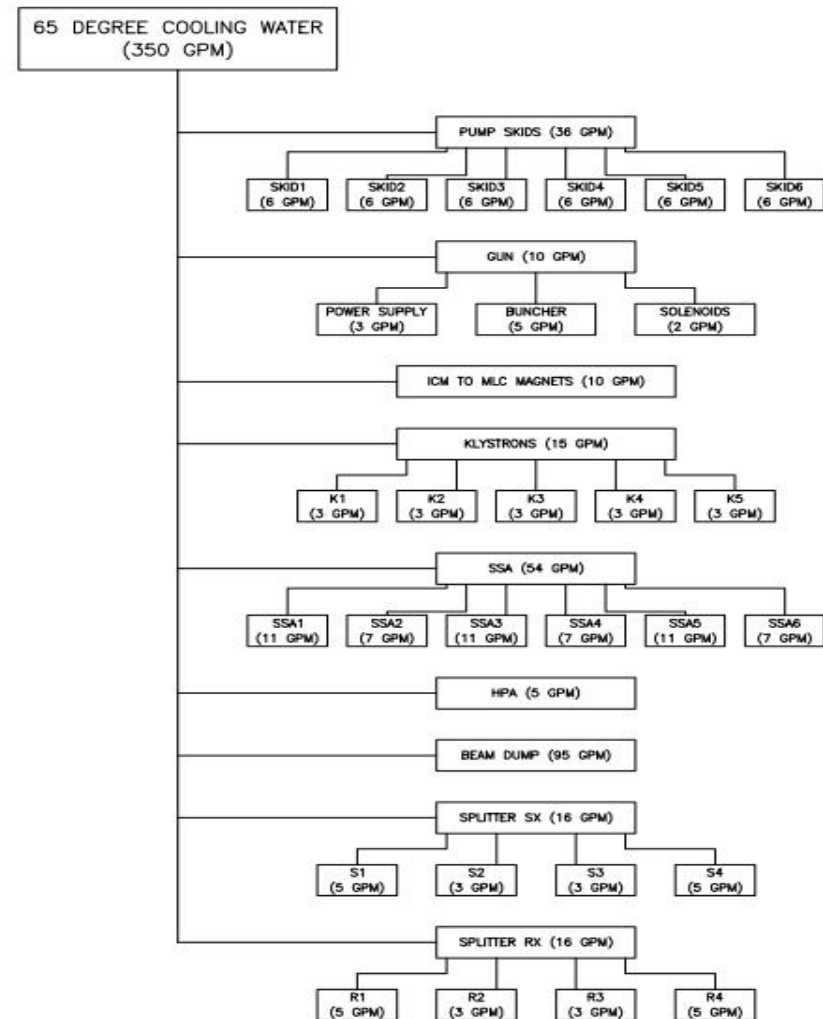
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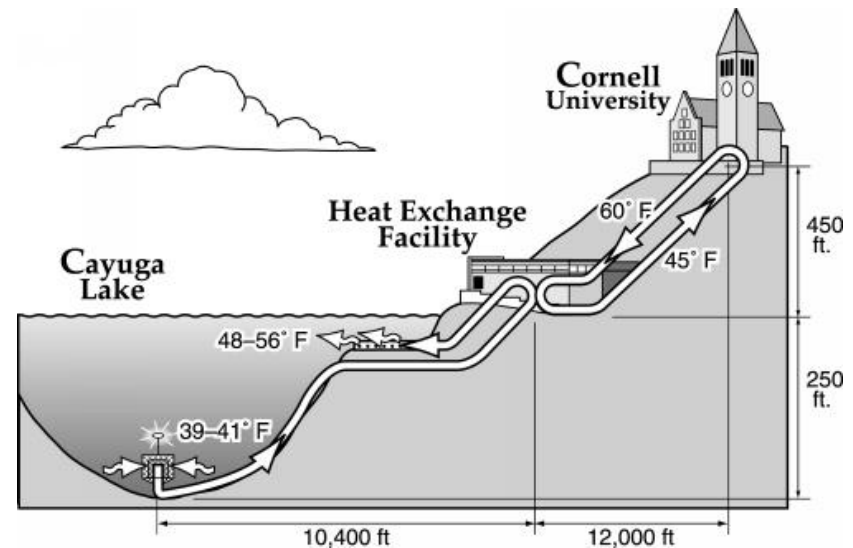
# CBETA Assembly Plan: Infrastructure

- First challenge is how to cool the beamline components
- The existing deionized system are inadequate for the projected CBETA heat loads



# CBETA Assembly Plan: Infrastructure

- [CBETA water cooling system](#)
- Campus Chilled Water heat exchanger 4<sup>th</sup> floor
- Deionized: Conductivity: 2-M $\Omega$ /cm
- Supply pressure: 150-psi max
- Heat load: 500-kW
- Flow: 350-gpm
- Temperature supply: 65°F (18°C)
- Tolerance:  $\pm 2.5^\circ\text{F}$  ( $\pm 1.4^\circ\text{C}$ )
- Temperature return: 75°F (24°C)
- M/E Engineering is designing the system





# CBETA Assembly Plan: Infrastructure

- New electrical feed (800A@480V) is under design by Delta Engineering. It will run from the existing Wilson Lab transformer pad outdoors to the new mezzanine.
- Design includes transformers and panels for 208V/110V distribution to beamlines, electronics racks and similar components



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# CBETA Assembly Plan: **Infrastructure**

- A new equipment platform is required to install the electrical upgrade in the northeast corner, also improves personnel access



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# CBETA Assembly Plan: Beamline Installation

## The plan:

RX: November (earlier?)

SX: January (earlier?)

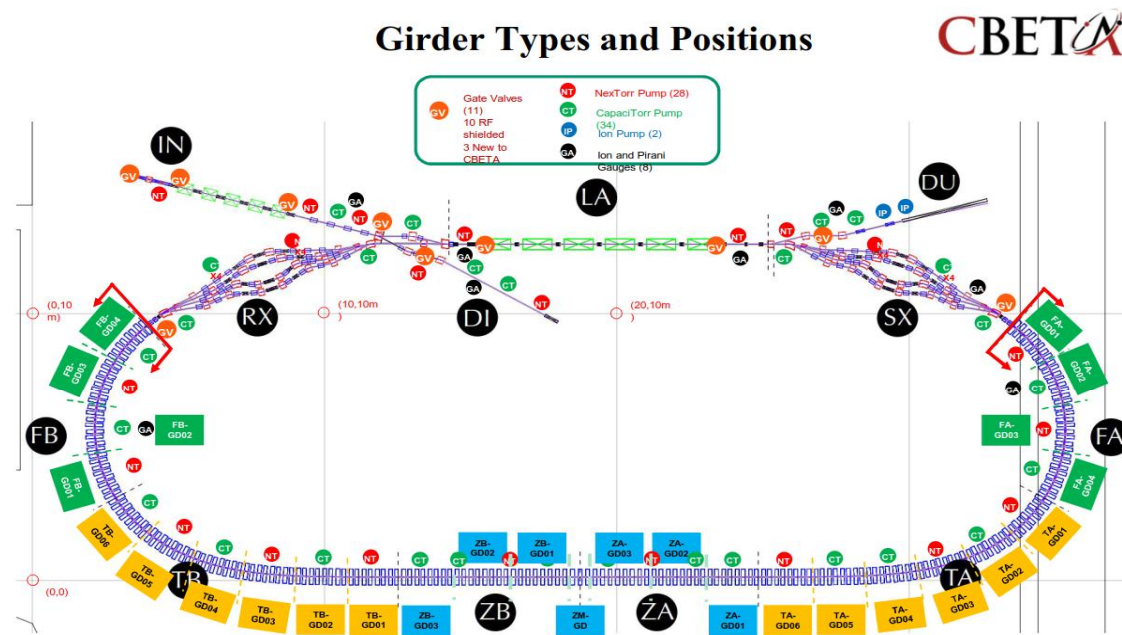
FA: October

TA: November

FB: November

TB: December

ZB-ZA: December



Tuozzolo@bnl.gov – February 22, 2018 CBETA Advisory Committee Board Meeting, Cornell

# CBETA Assembly Plan: **Utilities, Instrumentation and Controls** (Installation)

- Electrical upgrade: September-October
- Cooling system: September-October
- HVAC upgrade: September-October
- PM stabilization: November
- Equipment and BPM racks: December (sooner?)
- Electrical distribution: December-February
- Instrumentation/control/BPM cables: December-January
- Beamline cooling: December-January

# CBETA Assembly: **Schedule Overview**

- Predicted labor ramp-up is October 29
- Completion target is February 28
- Majority of effort is November-January (3-months)
- February is primarily cable pulls and terminations, checkouts
- Work during Holiday break period is possible

## CBETA Assembly Plan: **Project Management Concerns**

1. CHESS Upgrade project does not release resources as predicted
2. Town of Ithaca building permit requirements
3. Schedule acceleration
4. Vacuum chamber fabrication for RX and SX sections
5. Assembly of RX and SX sections
6. Radiation shielding (southeast)
7. Contractor coordination for Electrical, Water and HVAC upgrades