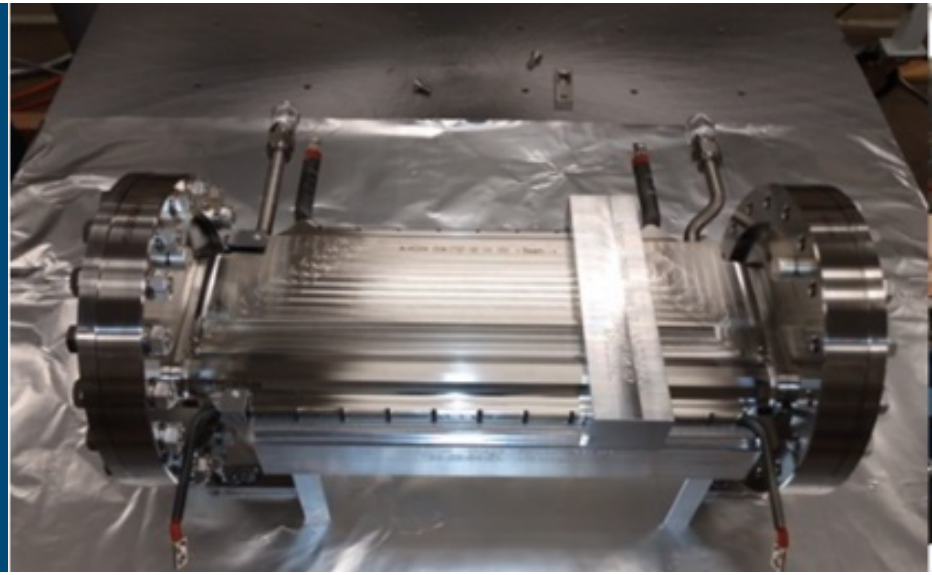
APS UPGRADE PROJECT STATUS UPDATE



First article keyhole vacuum chamber upon delivery to Argonne

Elmie Peoples-Evans
Deputy Project Manager, APS Upgrade Project

PSC All Hands Meeting
January 27, 2021

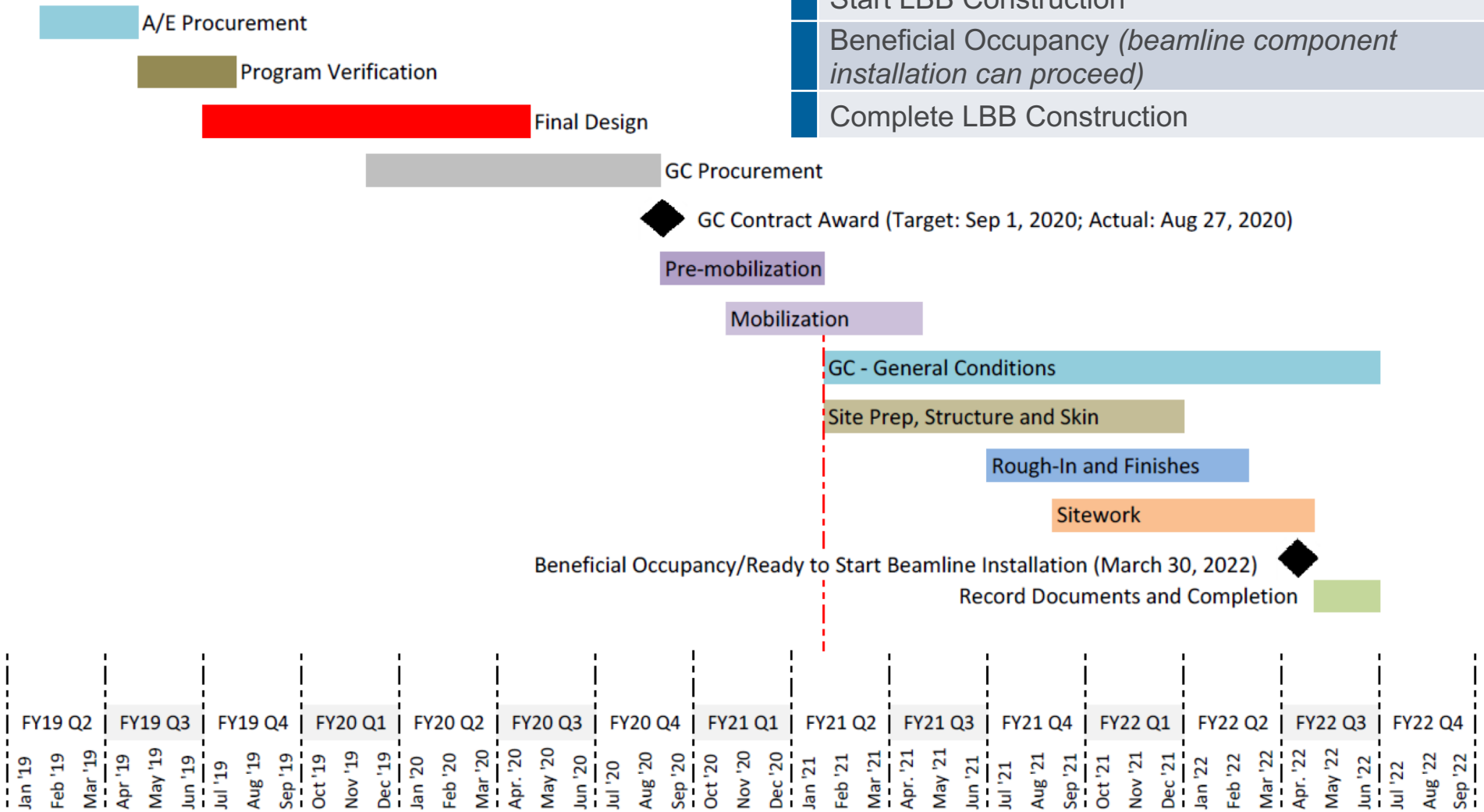
OVERALL

- On-site work continues on receipt, inspection, and assembly as items arrive
- Final Occupancy of Bldg. 981 (offsite space) received 1/19/2021
  - Deliveries, equipment setup and assembly efforts allowed to proceed as needed
- Placing procurements and vendor management remains a high priority
  - 28-ID enclosure fixes and transport work expected to be completed by end of January
  - 25-ID enclosure work started, but more delays expected as missing parts arrive from overseas around February/March
  - Enclosure contract award progressing and moving forward as fast as possible
  - Monitoring vendor COVID impacts & issuing mitigations where possible
- DOE Status Review as early as May/June, Director's Review as early as April
  - Major topics include schedule to downtime, and potentially COVID cost and schedule impacts on TPC and CD-4
- Holding current downtime date by allowing assembly work to occur during the downtime for modules, front ends, and IDs only.
- Continue to strive to enable new science with the Upgrade as soon as possible

LONG BEAMLINE BUILDING (LBB)

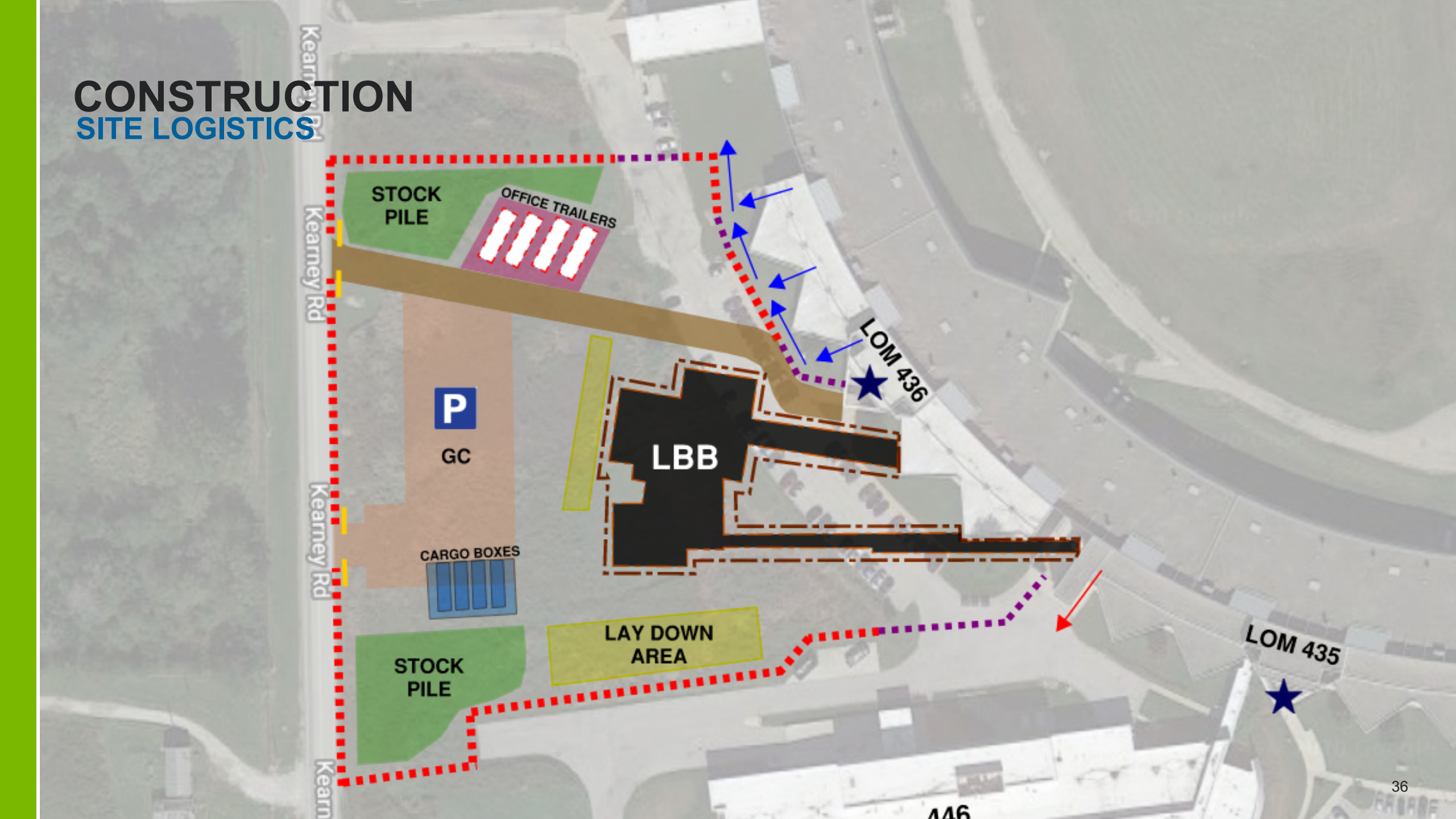
SUMMARY SCHEDULE

Milestone	Date
Award LBB Construction Contract	September 2020
Start LBB Construction	September 2020
Beneficial Occupancy *(beamline component installation can proceed)*	March 2022
Complete LBB Construction	June 2022



CONSTRUCTION
CURRENT SITE (January 2021)

CONSTRUCTION
SITE LOGISTICS



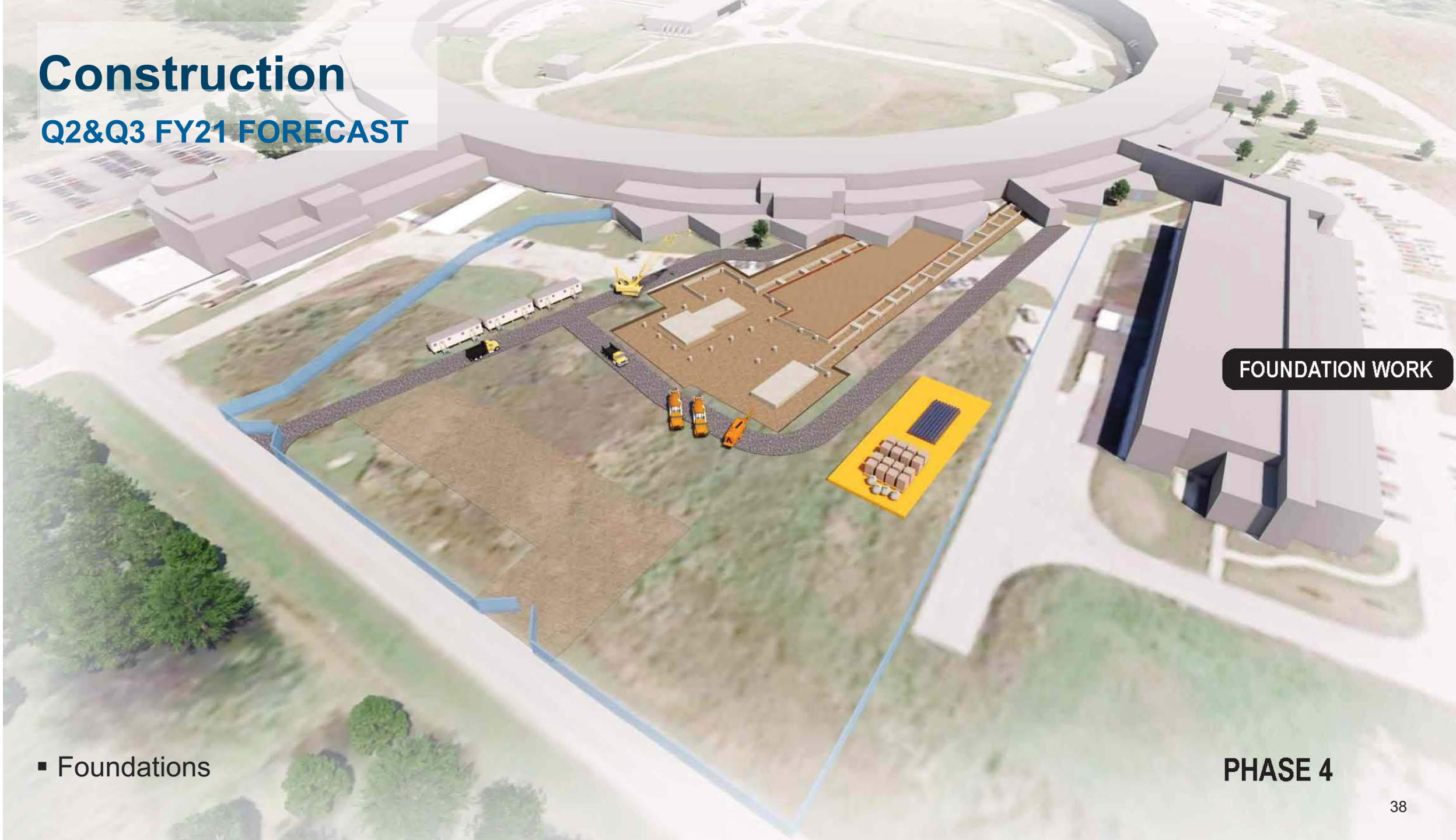
Construction

Q2 FY21 FORECAST

- Site Prep

Construction

Q2&Q3 FY21 FORECAST



- Foundations

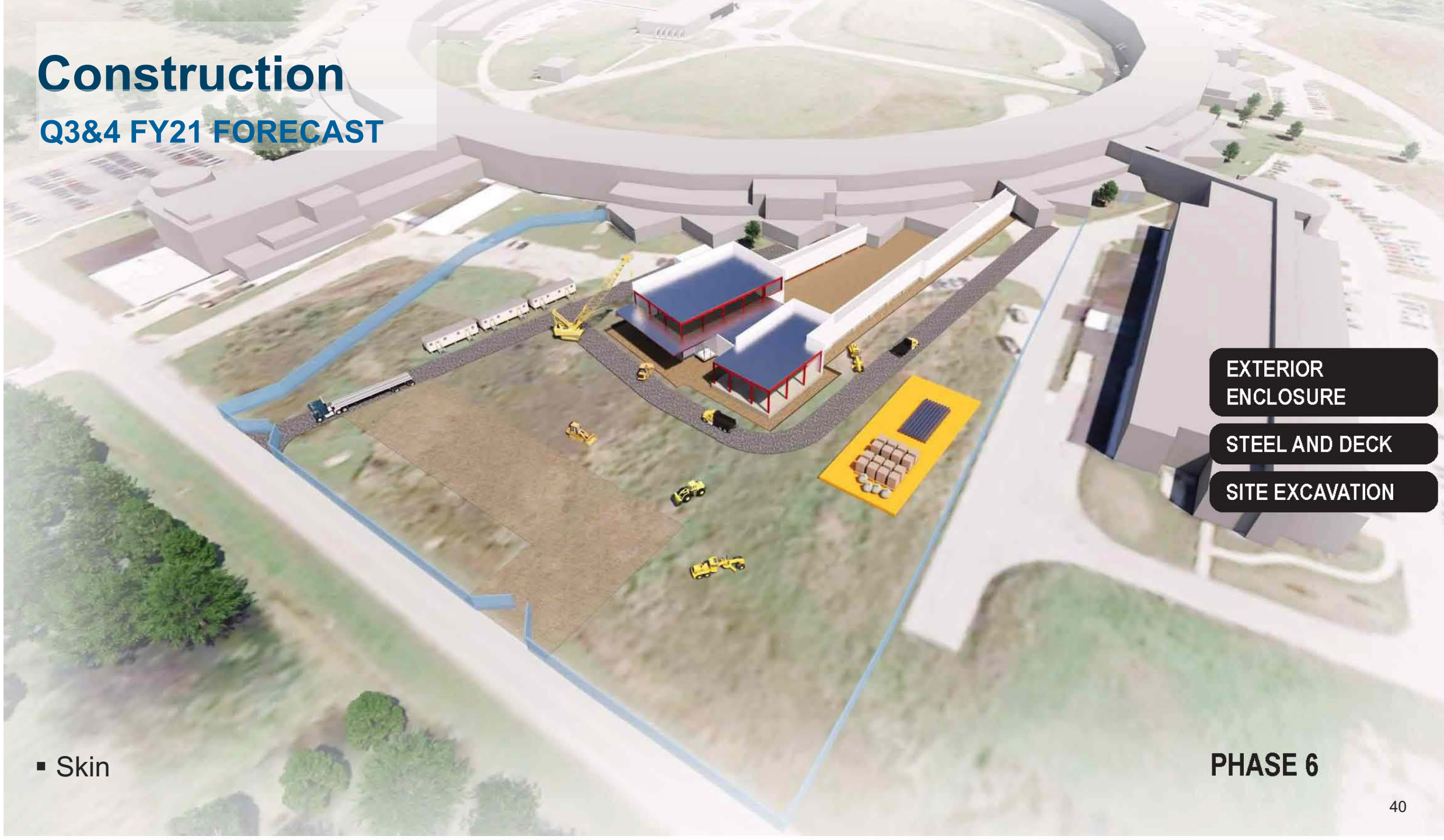
Construction

Q3 FY21 FORECAST

- Structure

Construction

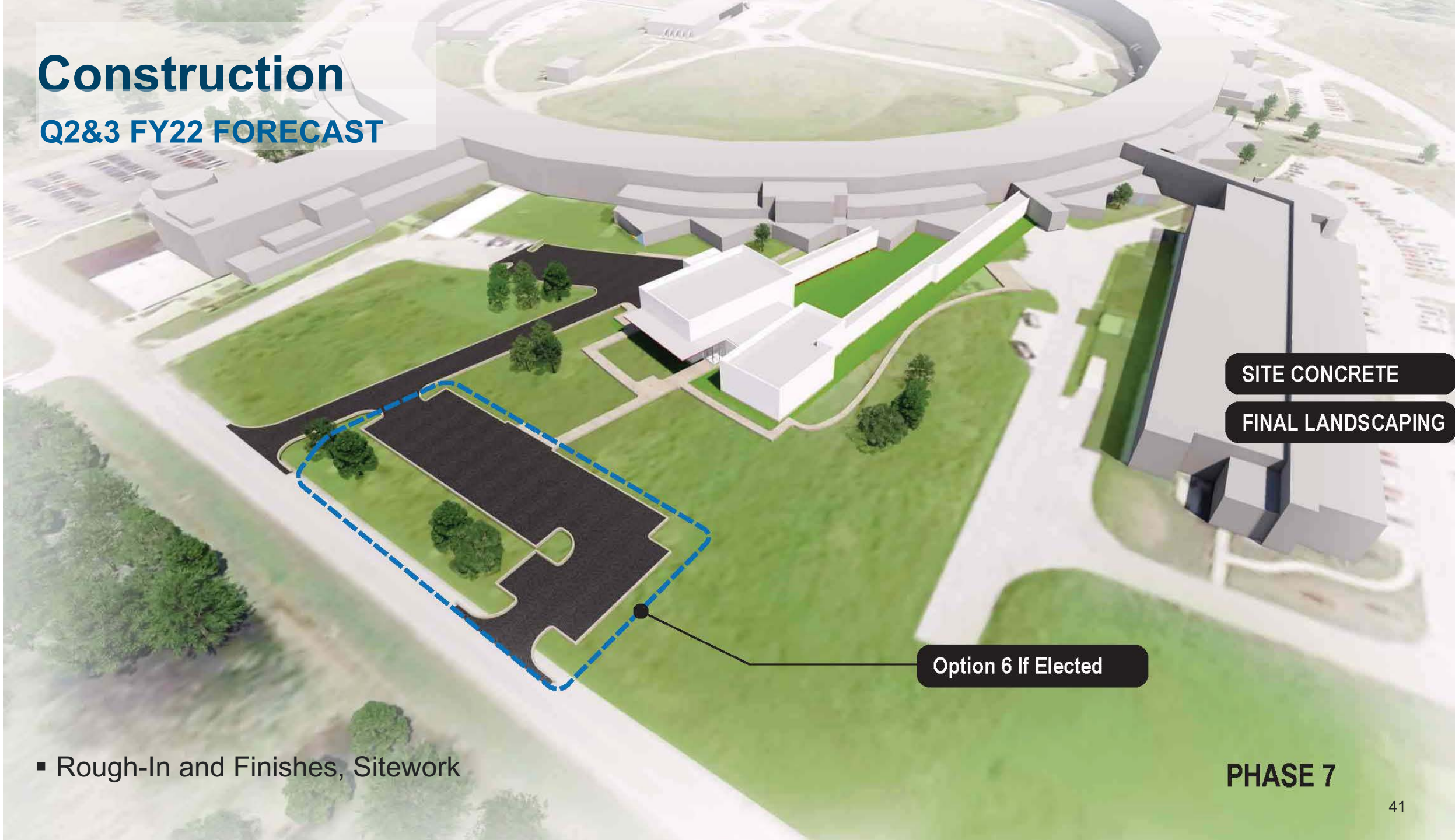
Q3&4 FY21 FORECAST



- Skin

Construction

Q2&3 FY22 FORECAST



- Rough-In and Finishes, Sitework

SCHEDULE

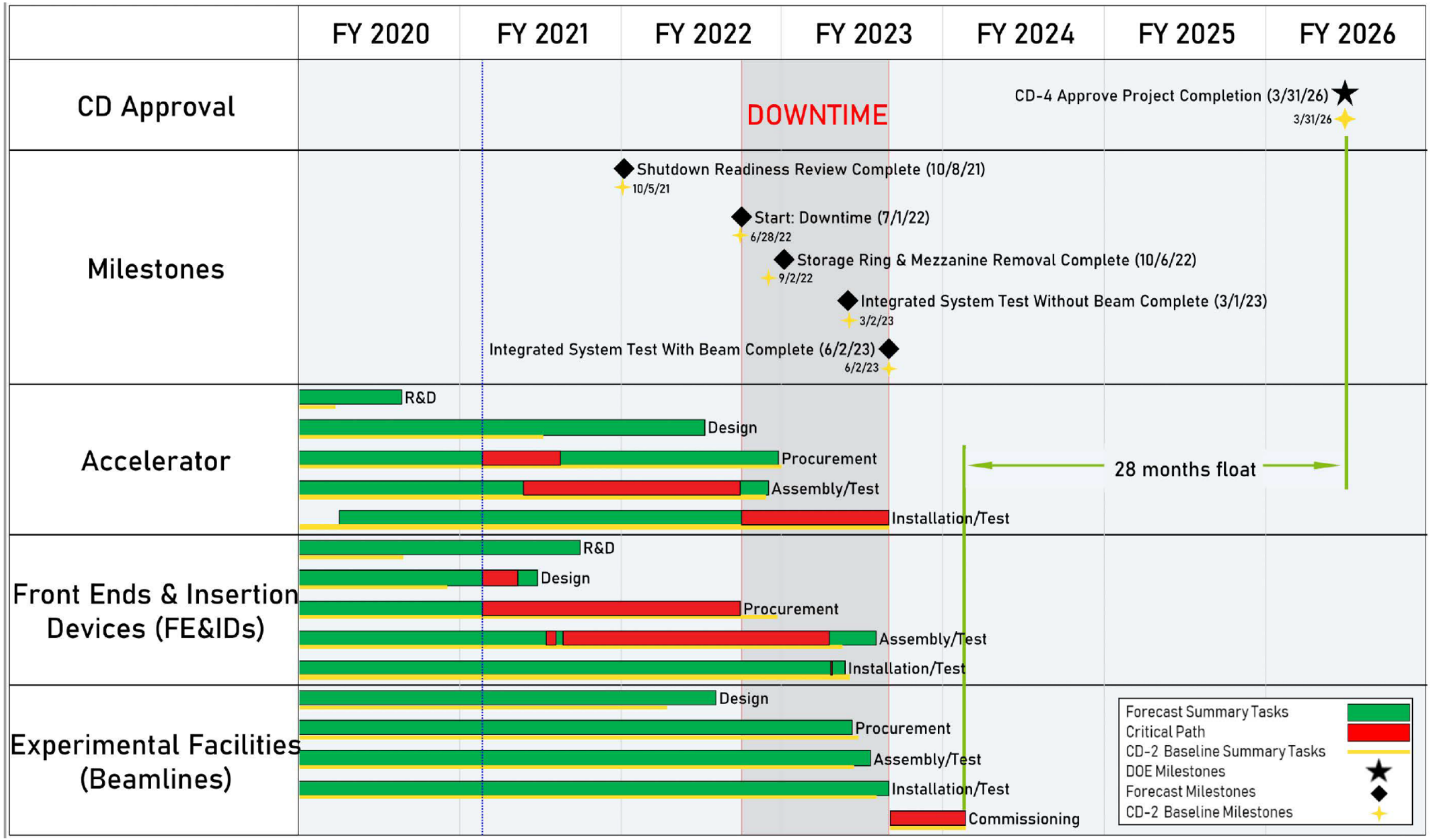
Overall Schedule & available float unchanged since CD-3

Critical path refined as procurements are placed and execution plans are updated

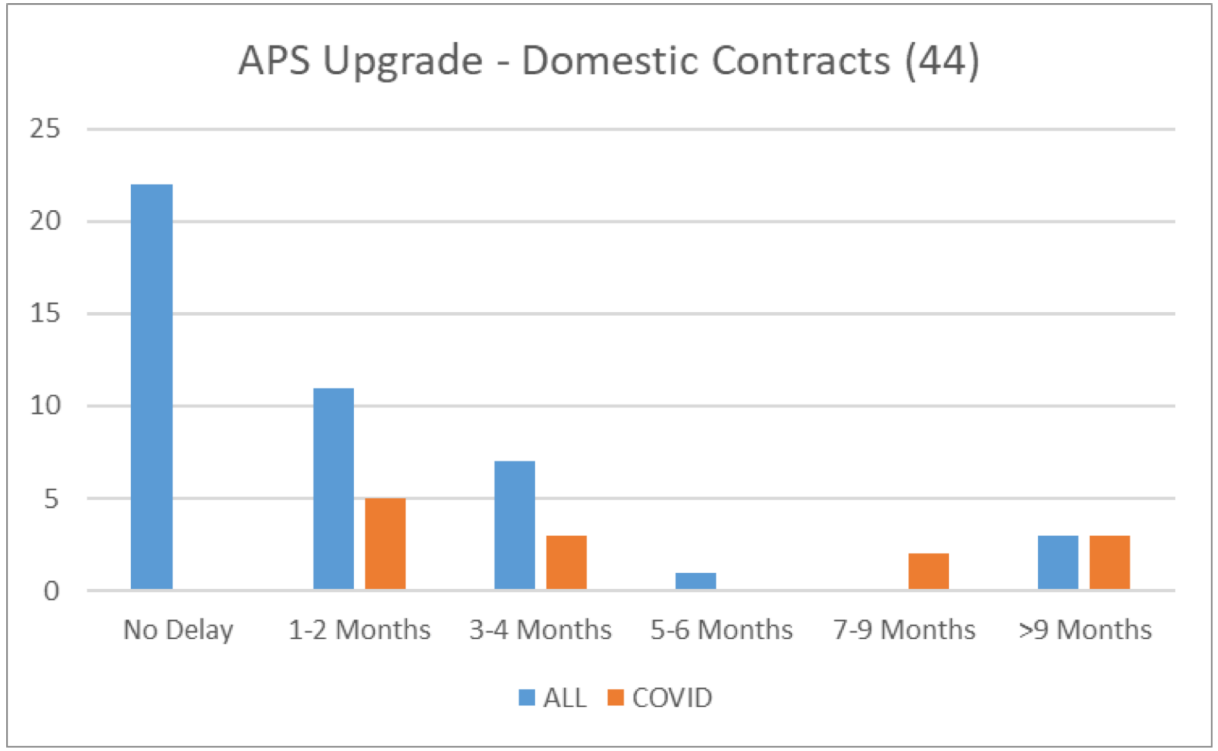
Hiring technicians to ramp up assembly and survey and alignment work

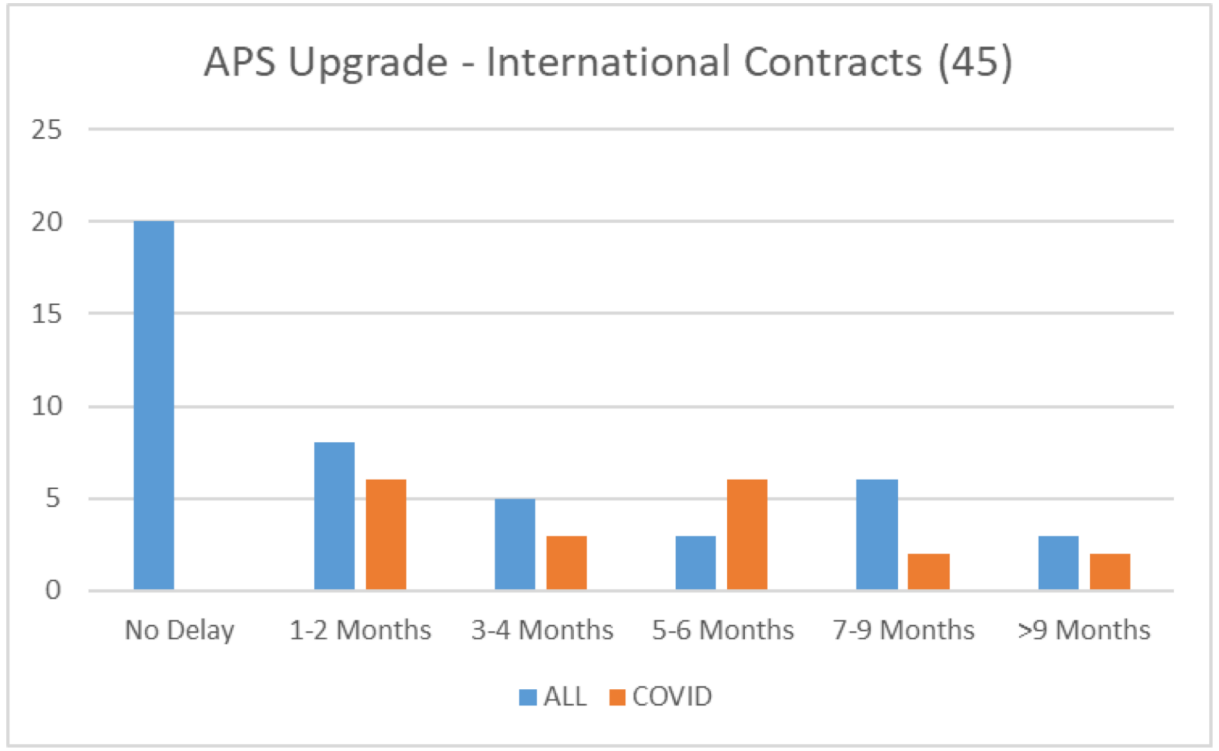
Schedule is assessed monthly as new information becomes available

Assembly efficiency rates and the enclosure installation schedule are critical elements required to confirm the downtime period



VENDOR PERFORMANCE





- 89 contracts >$750K currently tracked
- 32 of the 89 contracts have incurred a COVID-19.
- Recent impacts due to holiday shutdowns, COVID outbreaks with key personnel, and revised COVID guidance by vendors' respective governing bodies.

OFFSITE SPACE (BLDG. 981) STATUS – READY TO GO

Retractable clean rooms & cranes inside module assembly area (Bay 1 of 3)

Front Ends clean room area (Bay 1 of 3)

Receiving area storage (Bay 2 of 3)

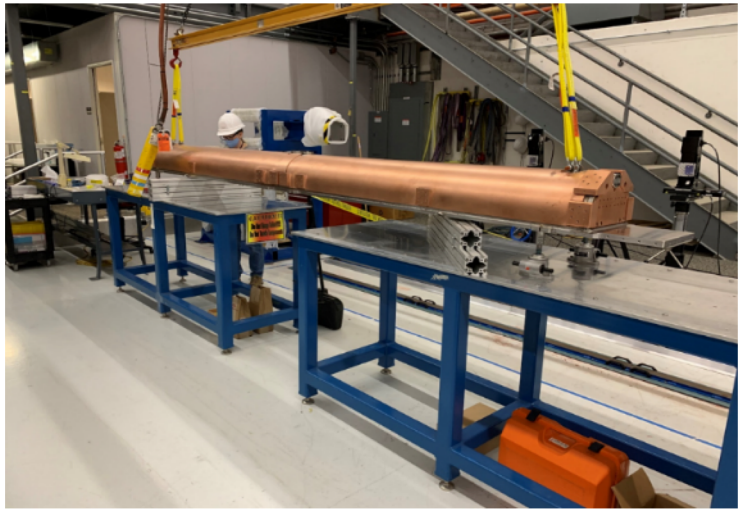
Consumables stock room (Bay 1 of 3)

Storage area (Bay 3 of 3)

FRONT ENDS & INSERTION DEVICES

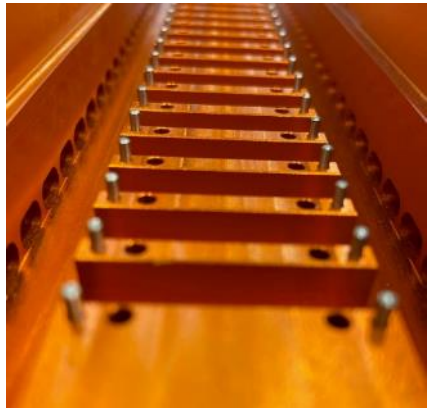
- All CU FE and HHL FE tables received and accepted
- All CU FE and HHL FE spool pieces received at ANL
- Good progress on the canted GRID support system by Tru-stone (MN)
- First 1.9m core successfully wound and waiting for epoxy impregnation
- Three additional 1.9m long SCU cores (3 Keller, 1 Dynomax) successfully e-coated
- Full-length 2.5cm monokeepers fabrication completed; inspection, anodizing, final dowel pin insertion and inspection remain
- First article 2.1cm monokeepers for canted length received at ANL
- First article ID vacuum chamber from Saes Rial (Italy) received at ANL

First article IDVC being inspected at ANL



Assembly table with LHe tank for long SCU system

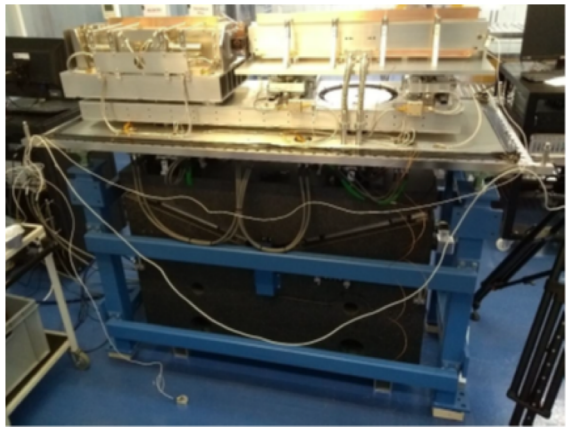
Canted GRID XBPM support system under fabrication at Tru-stone, MN



2.1cm monokeepers during final inspection

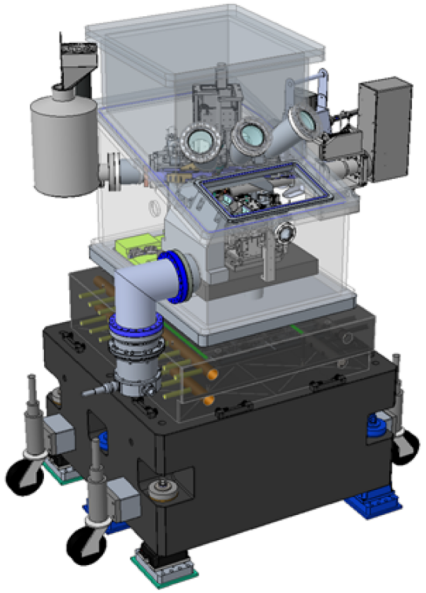
EXPERIMENTAL SYSTEMS

- Support system for the 26-ID double mirror system is assembled and is undergoing vibration measurements at FMB Oxford, expected delivery in April 2021
- Meeting held to discuss the final details of the diffractometer for 8-ID
- FMB Oxford, manufacturer of the primary mirror system for 5 feature beamlines, has provided plans for approval prior to procuring the mirror substrate
- FDR of the Bionanoprobe-II instrument for 2-ID is scheduled for January 2021

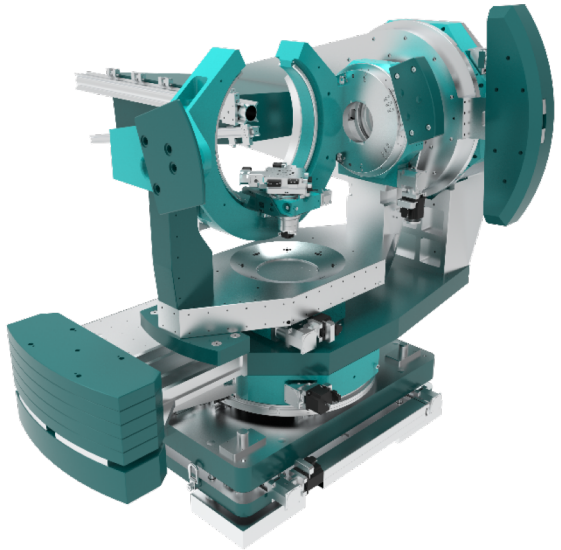


26-ID Double mirror system undergoing vibration measurements at FMB Oxford

- PRR for prefigured KB mirrors for 4 feature beamlines and 3 enhancement beamlines (total of 16 mirrors) conducted on Dec 18, 2020
- PRR for the RIXS-II spectrometer (designed by BNL) conducted on Dec 8, 2020.
- Proposals received from vendors to design/build the Mechatronics Core of the Ptychoprobe instrument. Have sought clarification on the proposals prior to finalization
- Caratelli currently onsite at ANL completing the 28-ID enclosure fixes and transport installation

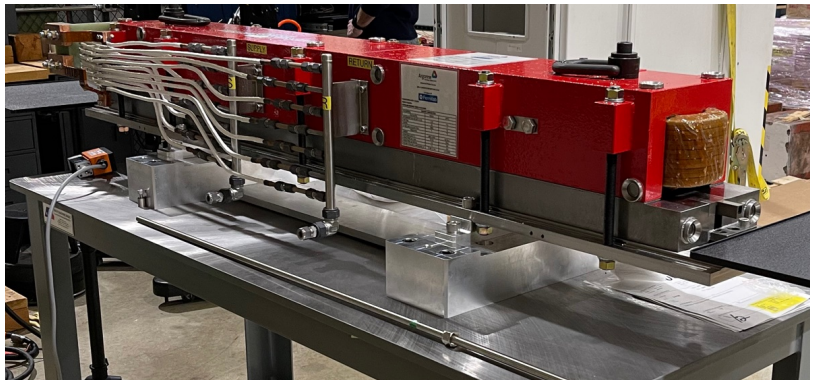


Bionanoprobe-II instrument for 2-ID



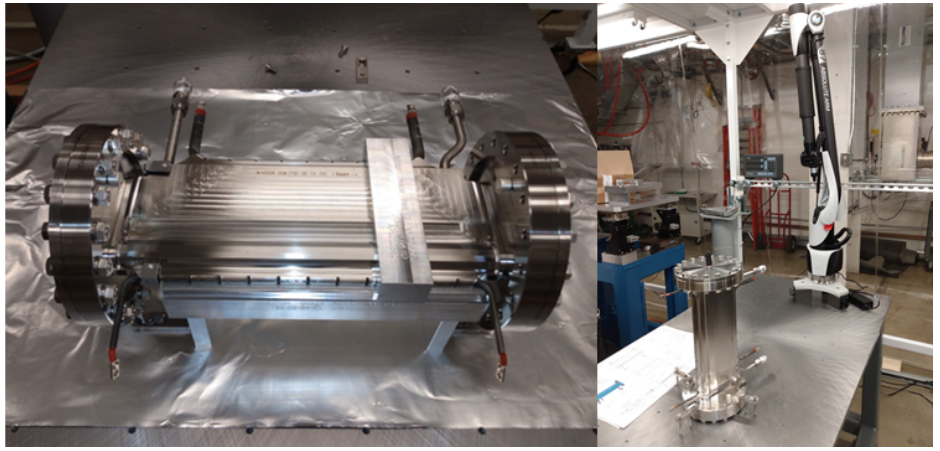
8-ID Diffractometer being built by Huber

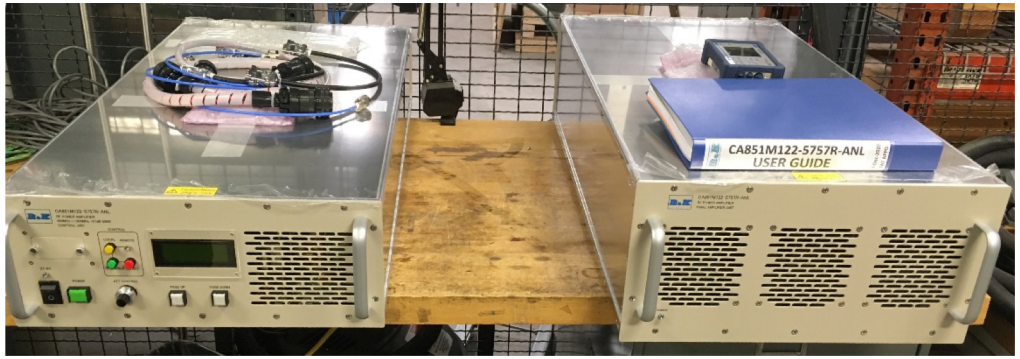
ACCELERATOR



Lambertson Septum at ANL on measurement stand.

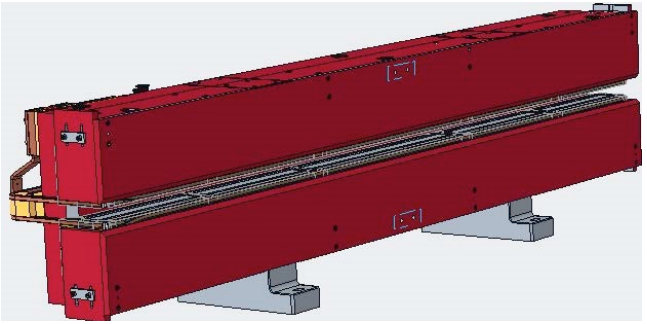
First article keyhole vacuum chamber undergoing QA testing at ANL.





Control unit (left) and power unit (right) of first article longitudinal feedback power amplifier.

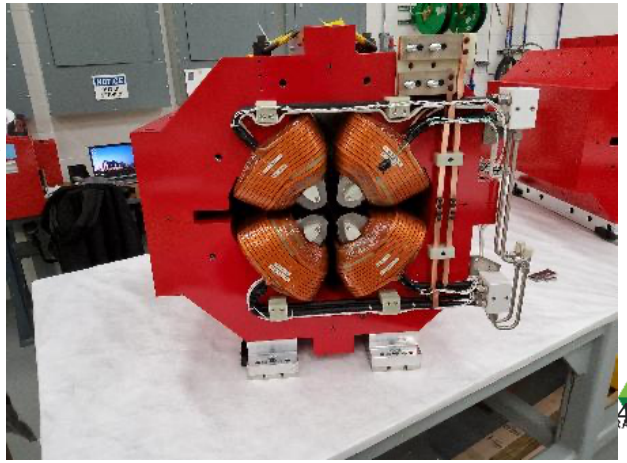
1st DLMA girder assembly with measured flatness of 10 microns (30 microns rms alignment tolerance specified).



First article M2 longitudinal-gradient dipole onsite. Magnet Model

First eight M3 transverse-gradient dipoles have arrived.

770 of 1355 magnets on site.



SUMMARY

- Substantial technical progress in all areas of the project.
- Infrastructure aspects of the project such as LBB are moving along very well.
- Vendor updates are collected regularly and used to determine major schedule impacts, if any exist.
- Despite COVID delays, assembly and testing activities are ramping up as many more components arrive onsite.
- Original proposed downtime still appears achievable due to allowing assembly work to overlap with removal and installation.
- Major project reviews are estimated to occur in Spring 2021.
- **Constantly evaluating our work environments to ensure we're working in a safe manner for everyone.**
- **Please continue to be safe, and take care of yourself, your family, and your friends**.