



PIP-II WB 121.06 Risk Overview

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Risk Workshop
12,13-Jul-2018

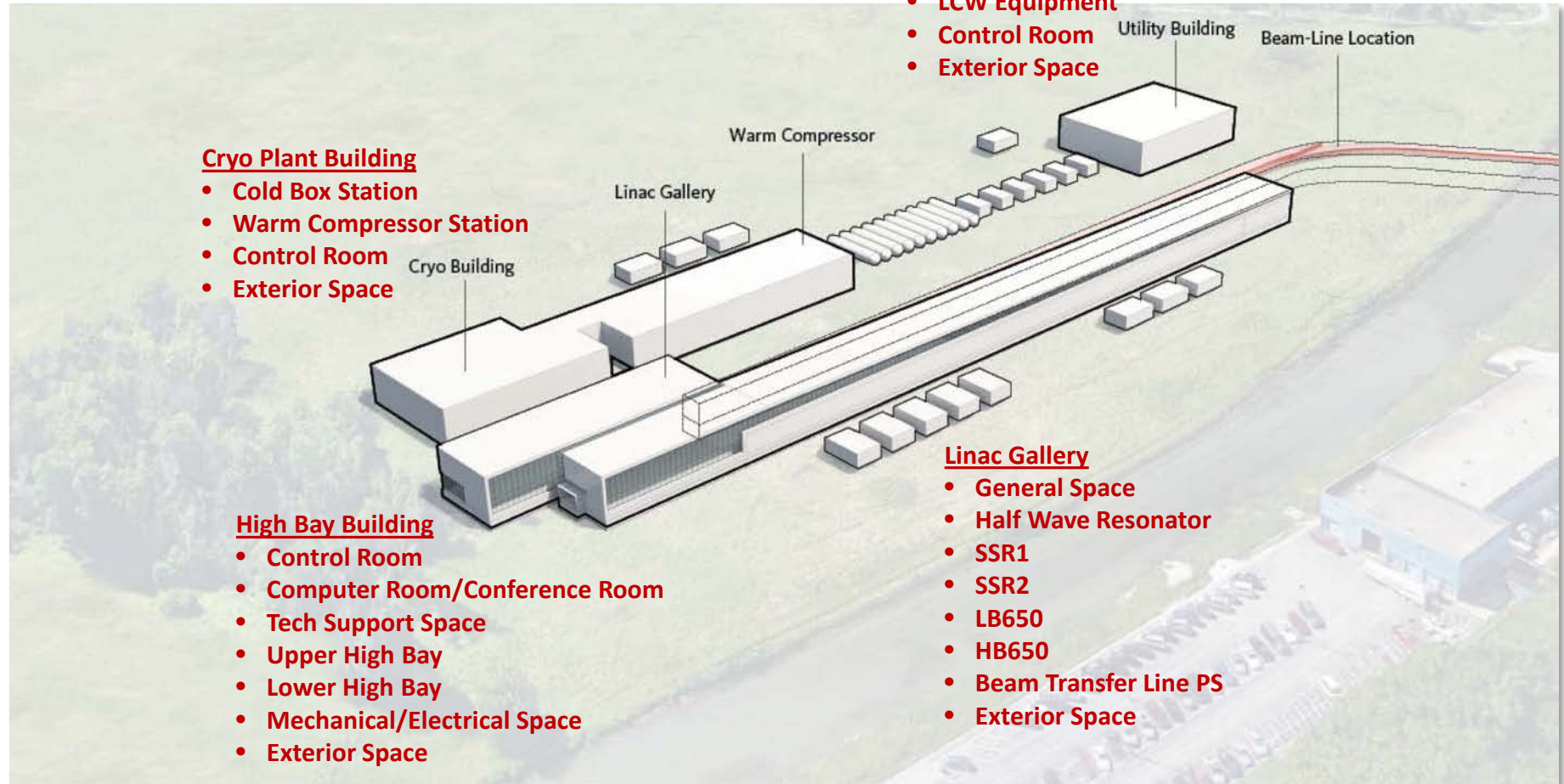
In partnership with:
India/DAE
Italy/INFN
UK/STFC
France/CEA/Irfu, CNRS/IN2P3

Agenda

- Scope Overview
- Critical Technology Elements
- Key System Interfaces
- Key Assumptions
- Cost and Schedule
- Risk Categories

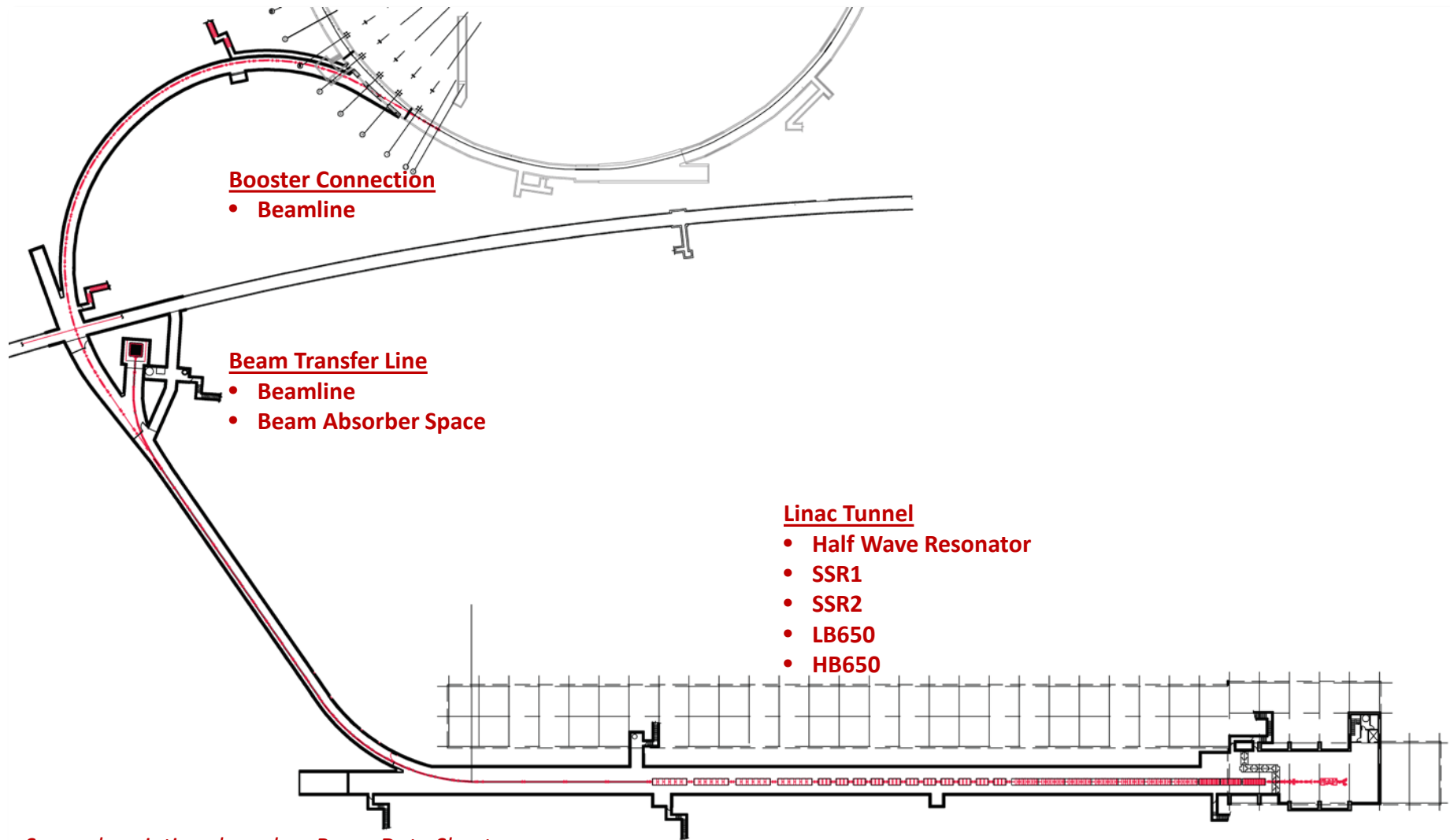


121.06 - Scope Overview – Above Grade



Space descriptions based on Room Data Sheets

121.06 - Scope Overview – Below Grade



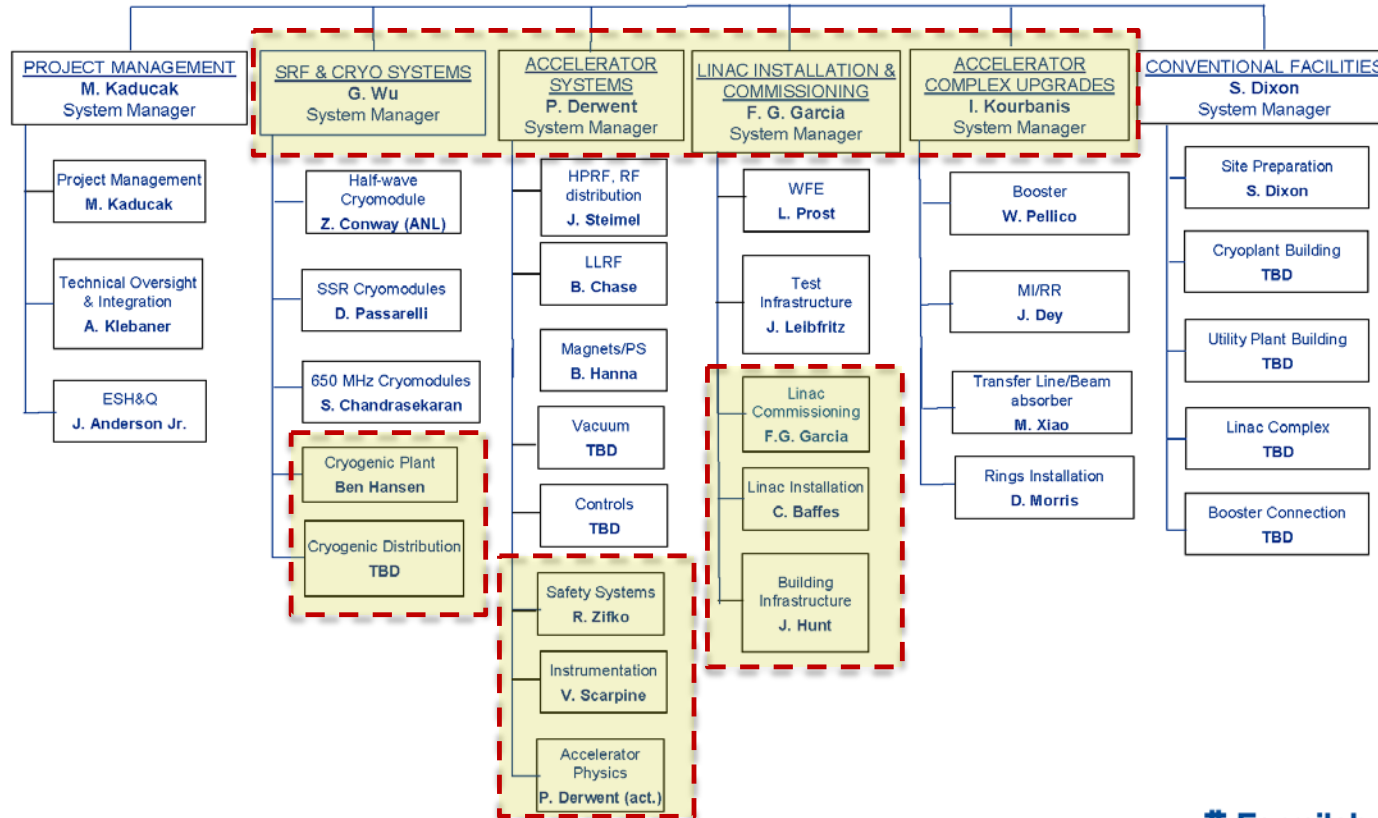
Space descriptions based on Room Data Sheets

121.06 - Critical Technology Elements

- Conventional Facilities does not contain critical technology elements

121.06 - Key System Interfaces

Level 3 Systems & Managers



121.06 - Key Assumptions - Scope

- Conventional Facilities provides the space and related infrastructure to the building;
- Building infrastructure extensions and installation of technical components is by others;
- Continuous Wave operation will be required as part of the base scope;

121.06 - Key Assumptions - Scope

Conventional Facilities Assumptions

4 CONVENTIONAL FACILITIES ASSUMPTIONS

Conventional facilities include all facilities and systems required to house and provide utilities support for the technical equipment for PIP-II technical equipment. The conventional facilities are described in the *PIP-II Conceptual Design Report*, and extend existing Fermilab utility infrastructure to the project site. This section outlines the assumptions that are used in developing the estimates and budget for the conventional facilities.

- 1,400 gallons per minute of industrial cooling water (ICW) will be available for PIP-II process loads. This flow will be available in all operating conditions. The connection location from the existing site-wide ICW will be in the vicinity of AZero;
- ICW will be utilized for Fire Protection. The connection location will be in the vicinity of AZero;
- The PIP-II ICW return discharge will be routed to the existing AZero cooling pond. It is assumed that the existing system to pump the ICW to the Casey's Pond system is adequate for this flow.
- 250 tons of chilled water will be available from the Central Utility Building (CUB) for use by PIP-II. The connection point for the chilled water will be in the vicinity of CUB;
- PIP-II will require six (6) 13.8 electrical feeders, fed from the Master Substation (MSS);
- Existing feeder 46A, fed from the Kautz Road Substation, will be used for backup of critical PIP-II systems;
- PIP-II will install new electrical breakers at MSS;
- Existing electrical ductbanks will be utilized for PIP-II feeders from MSS to manhole P-71 in the main ring;
- New PIP-II electrical ductbanks will be extended from the existing electrical system at manhole P-71;
- New electrical ductbanks will follow the latest safety isolation standards;
- A new utility corridor with natural gas, domestic water supply (DWS), sanitary sewer, data/communications and chilled water will be extended from the vicinity of CUB to the PIP-II project site;
- Maintenance of systems/buildings/structures will be transferred from the PIP-II project to Fermilab at the time of Beneficial Occupancy;
- Conventional facilities will be responsible for the mechanical equipment required for oxygen deficiency hazard (ODH) mitigation. The design, installation and commissioning of the control portion of the ODH system will be accomplished by the Accelerator Division (AD) controls group;
- The maintenance interface point for systems utilizing ICW will be the heat exchanger. FESS will be responsible for operation and maintenance of the system up to and including the heat exchanger while AD will be responsible for the process side of the system as defined as the flanges on the process side of the heat exchanger;
- For systems utilizing ICW without heat exchangers, the interface point will be the strainer/filter. FESS will be responsible for operation and maintenance of the system up to and including the strainer/filter while AD will be responsible for the process site of the system as defined as the pipe flanges on the downstream side of the strainer/filter;
- The maintenance interface point for electrical systems will be the transformers. FESS will be responsible for the operation and maintenance of the system up to and including the transformers and secondary connections at the incoming service panelboards. AD will be responsible for the electrical distribution systems within the buildings.

Conventional Facilities Assumptions

- Compliance with "One-for-One" Replacement legislation will be accomplished by design the conventional facilities to meet design guidance and reporting of square footage to DOE through standard FESS methods [8].
- Where readily available, Fermilab will provide to the PIP-II project existing precast concrete shield blocks at no charge. The type and quantity will be determined as part of the refinement of the design of the conventional facilities. In the event substantial effort is required to access existing shielding, the project will be responsible for access.
- The existing Booster Tower Southeast (FIMS No. 208) will be demolished as part of the PIP-II project after decommissioning by Fermilab. Delineation of the responsibilities for this work are found in the PIP-II Fermilab Interface document [9].

121.06 - Key Assumptions - Design

- Conventional Facilities will be built using normal construction techniques;
- Building infrastructure extensions and installation of technical components is by others;

121.06 - Key Assumptions - Estimate

- Conventional Facilities will be built using normal construction techniques;
- Construction sequence is generally serial (see schedule slide)
- Estimate assumptions are taken from PIP-II-doc-333

FERMILAB - PIP-II
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Exhibit C – Assumptions and Clarifications
May 19, 2017

We have listed below certain assumptions and clarifications with the express intent that both the Owner and the CM fully understand what is and what is not included in the conceptual design estimate. These Assumptions and Clarifications are specifically used to establish the basis of the conceptual design estimate and as such are intended to clarify details or items indicated on the concept documents.

Our proposal specifically excludes:

1. Hazardous Materials Removal, including Asbestos, Mold, & Lead, etc.
2. Builders Risk Insurance. - By owner.
3. Premium time for schedule acceleration.
4. Building permits and permit expediting. - By owner.
5. All temporary utility consumption charges & natural gas for temporary heat. – By owner
6. Excludes seismic restraints or vibration isolation requirements.
7. State Sales Tax
8. Soil boring and soil reports
9. Temporary conditions required for out of sequence work (shoring, underpinning, etc.).
10. Escalation Projections
11. Design and Owner Contingencies

Our proposal is based on the following documents:

1. Fermilab PIP-II Conceptual Drawings dated February 01, 2017.
2. Estimate Assumptions for The PIP II Conventional Construction Conceptual Design dated March 1, 2017.

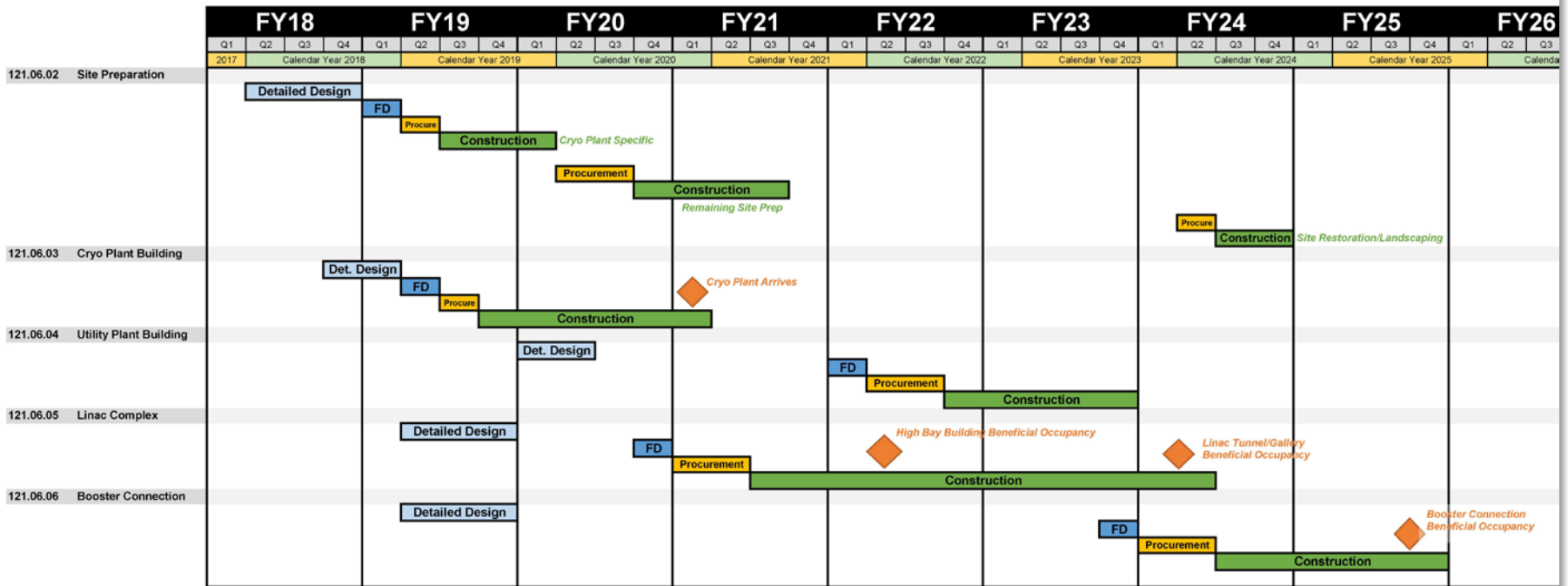
Statements on construction cost escalation, estimate, and schedule accuracy:

1. Construction Cost Escalation: According to Turner's Chicago quarterly escalation for the past 5 years the average escalation is about 1.0% per quarter. Turner recommends any projections for future costs be escalated at a rate of 1.0% per quarter. Turner also recommends that any project escalated for future cost be escalated to the mid-point of construction.
2. Estimate Accuracy: The information provided in the conceptual documents was more developed than industry standard. This has allowed for a highly detailed conceptual estimate, which results in an accuracy range of -10% to +10%.
3. Schedule Accuracy: The construction schedules have been prepared using industry standard production rates and normal weather. Additionally, the 8 WBS components have not been assigned specific calendar start dates or sequence in which they would be constructed. Given that, these conceptual schedules have an accuracy range of -10% to +20%.

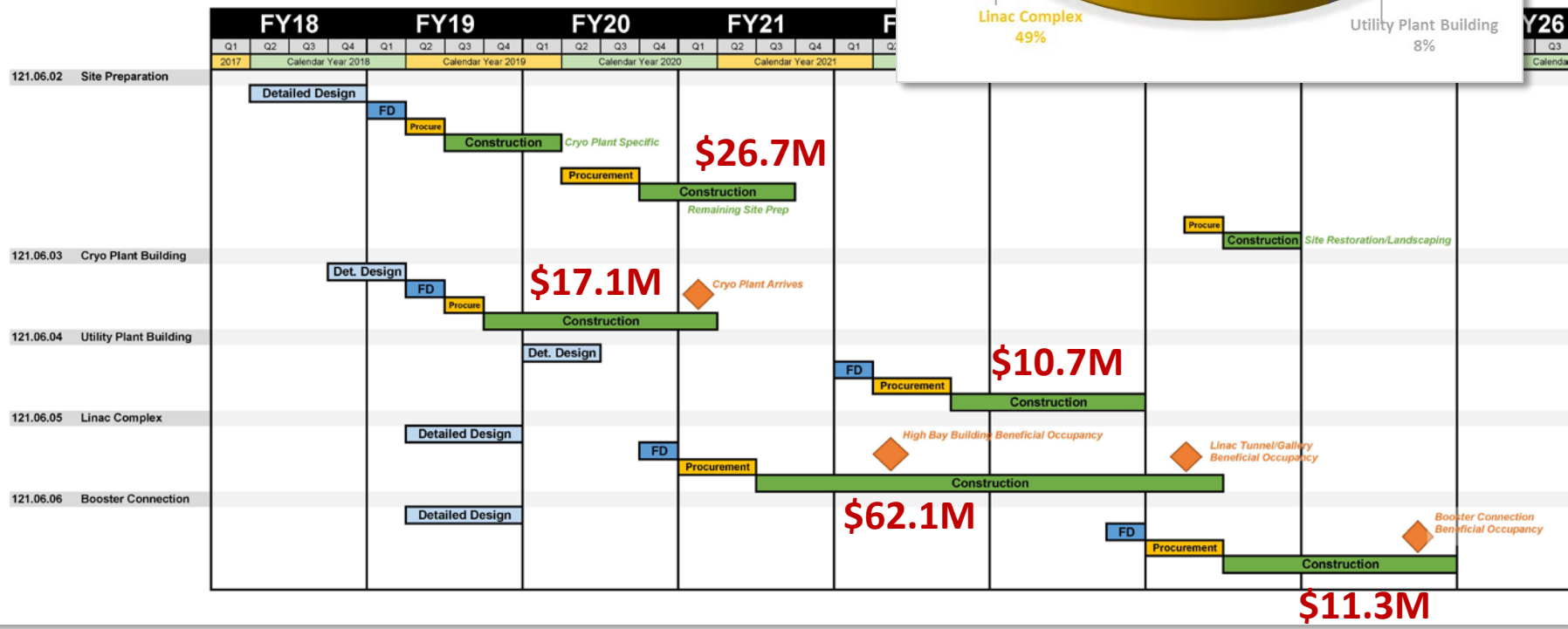
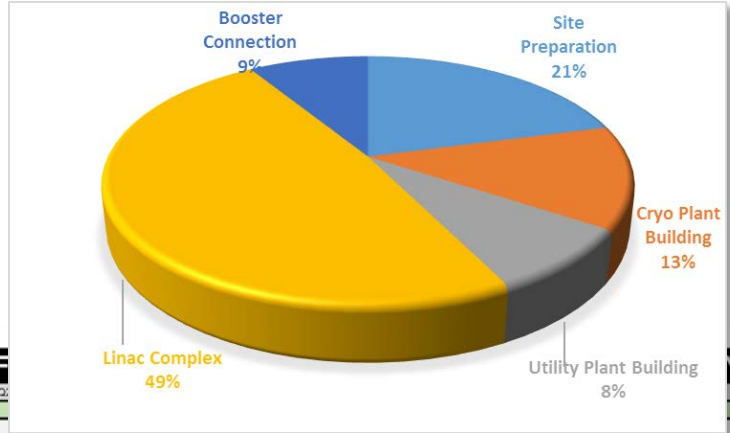
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From Construction Package Cost Estimate (PIP-II-doc-333)

121.06 - Schedule



121.06 - Cost



Cost shown are **Base Cost + Estimate Uncertainty** only in **FY18** dollars
 (no escalation, EDIA, Indirects or Risk Based Contingency)

121.06 - Risk Categories

- Unclear/Changing Technical Requirements
- Interface with Laboratory
- Conventional Facilities Design/Construction

END