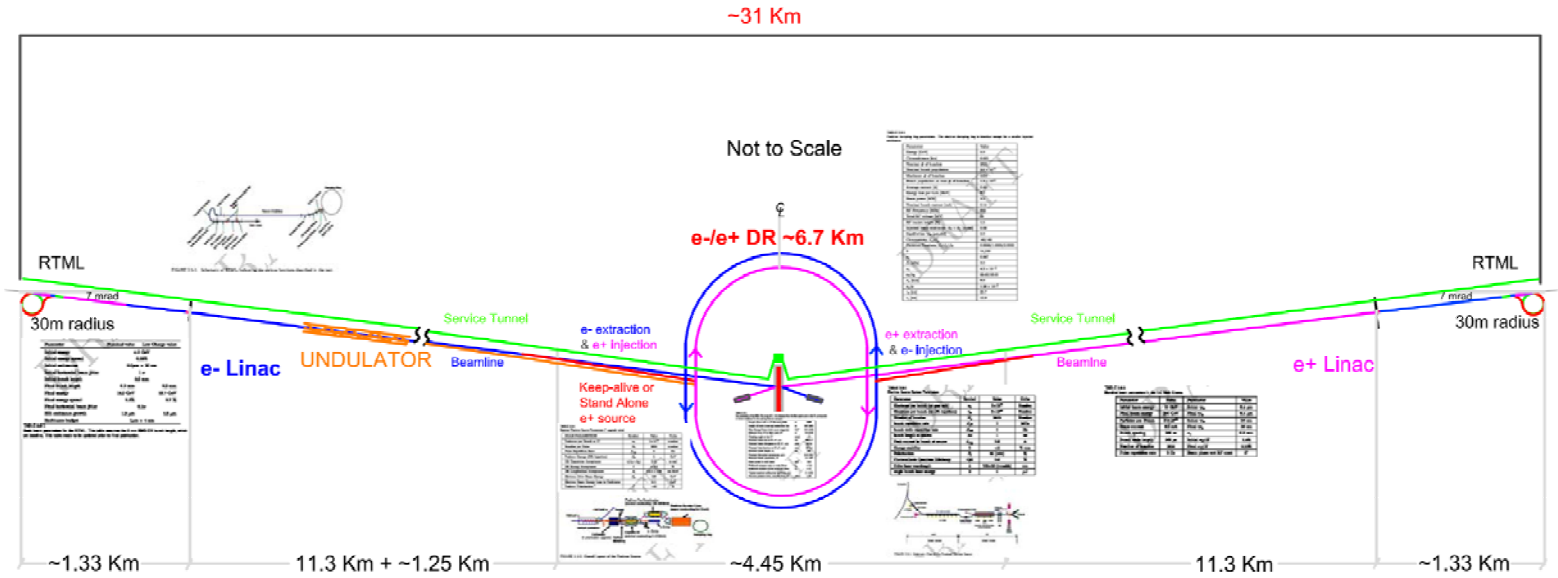
Beam Delivery System
&
Interaction Region

Fred Asiri
CF&S Point of Contact

Current Status CF&S

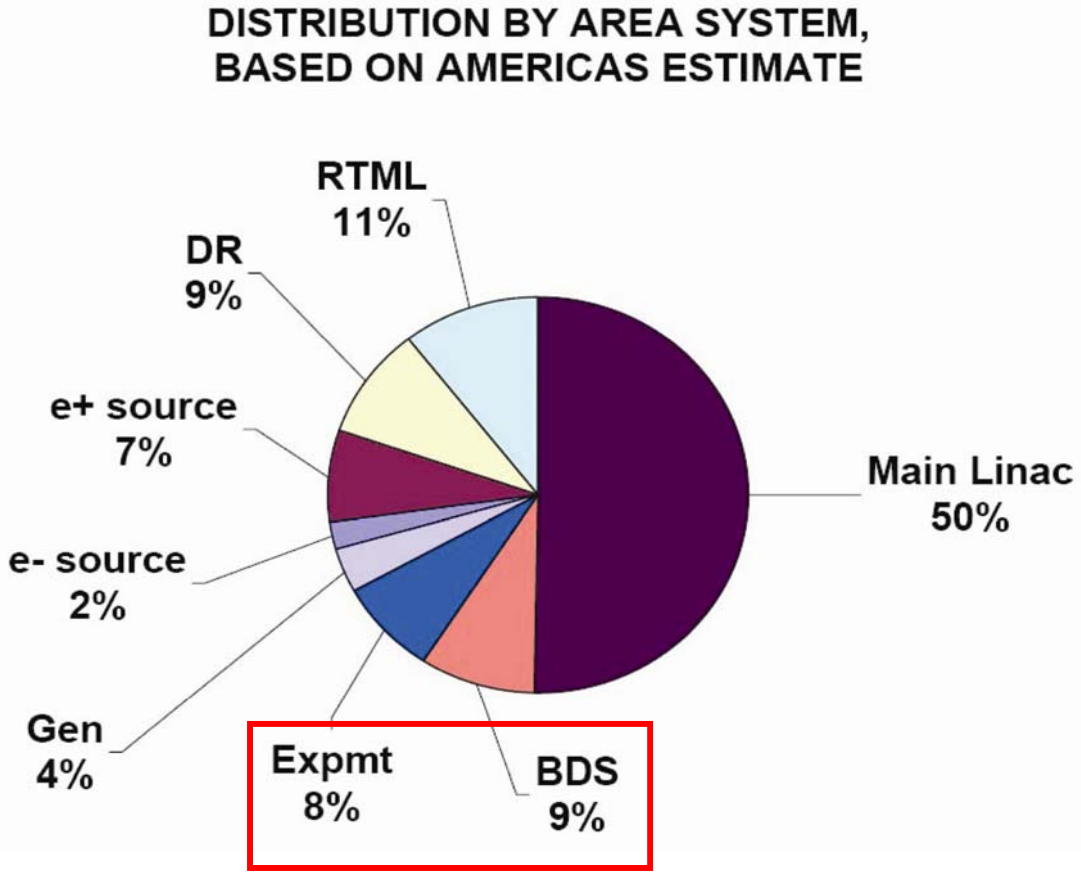


Schematic Layout - Plan View of the 500 GeV Machine

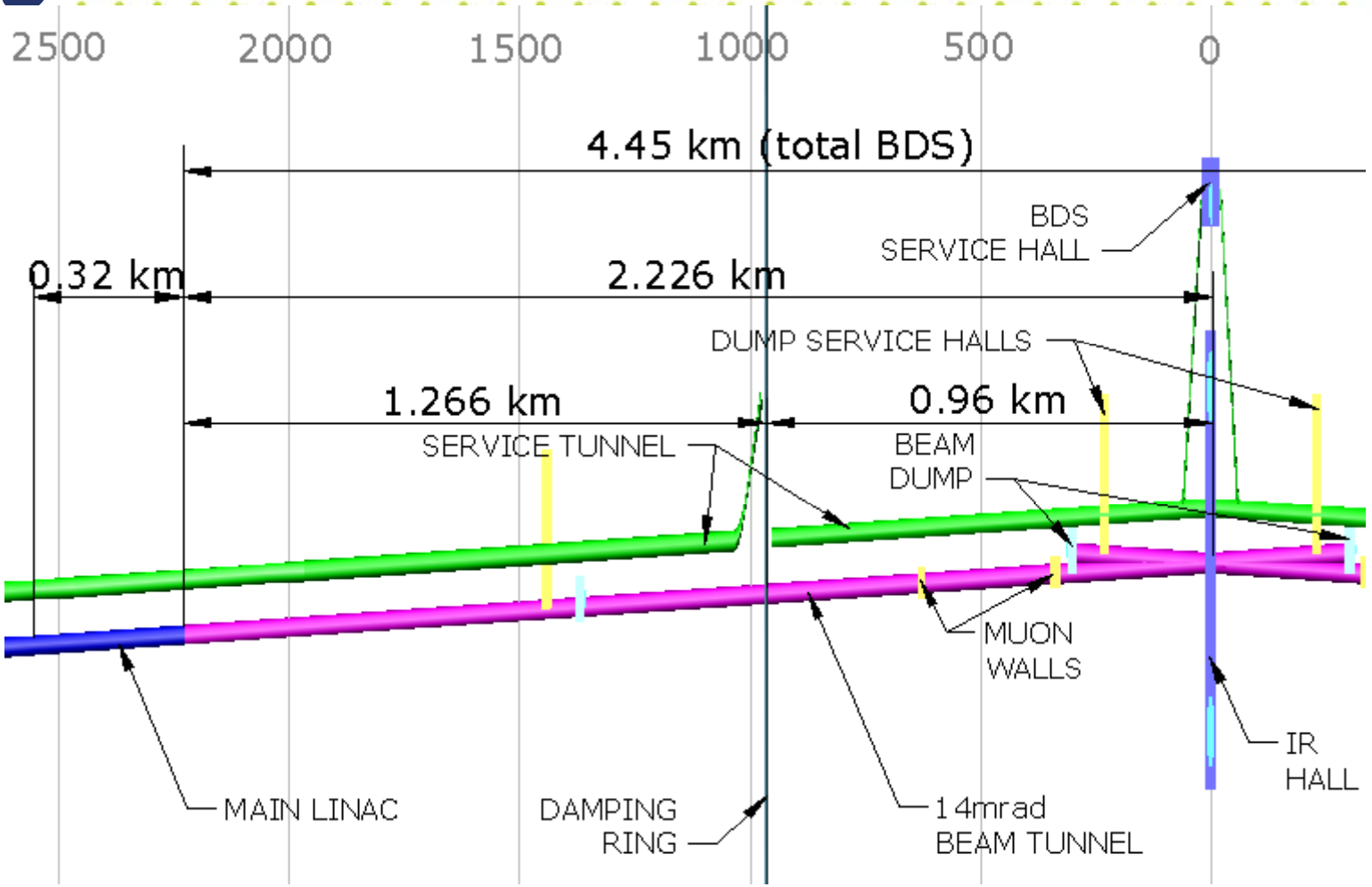
- Planning for EDR
  - **Prepare Engineering Project Description Document**
    - Defining physics requirement in RDR to engineering requirements
    - Defining boundaries, interfaces, utility needs and functional environment for each subsystem.

Current Status CF&S

Total CFS Costs and Statistics



Current Status BDS & IR

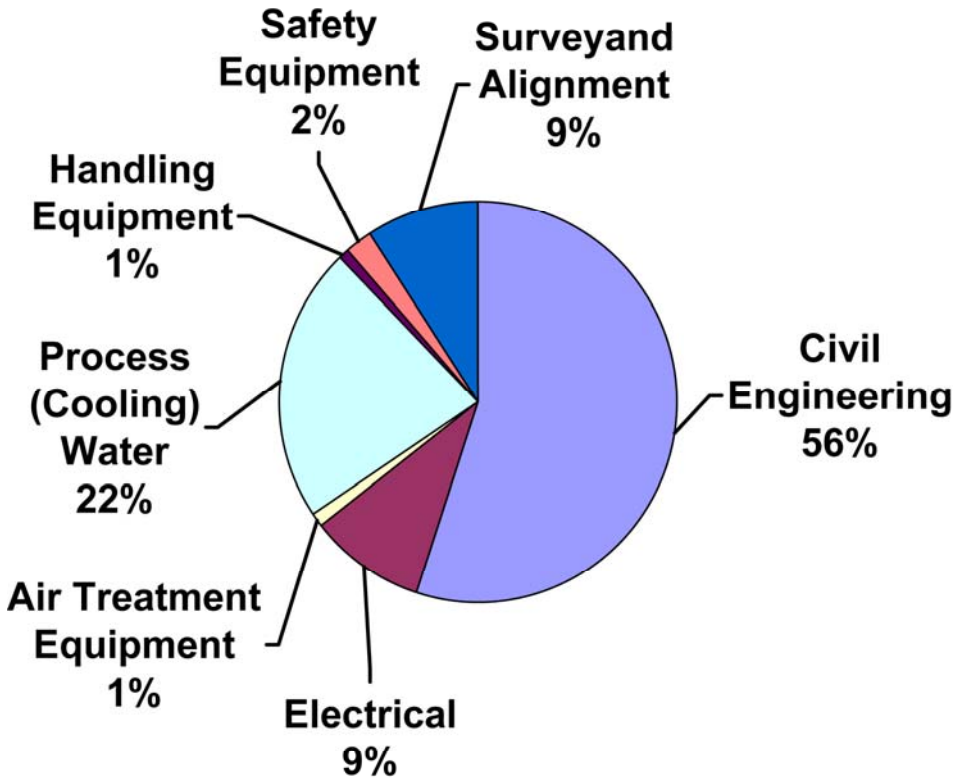


Snapshots at Beam Delivery Systems

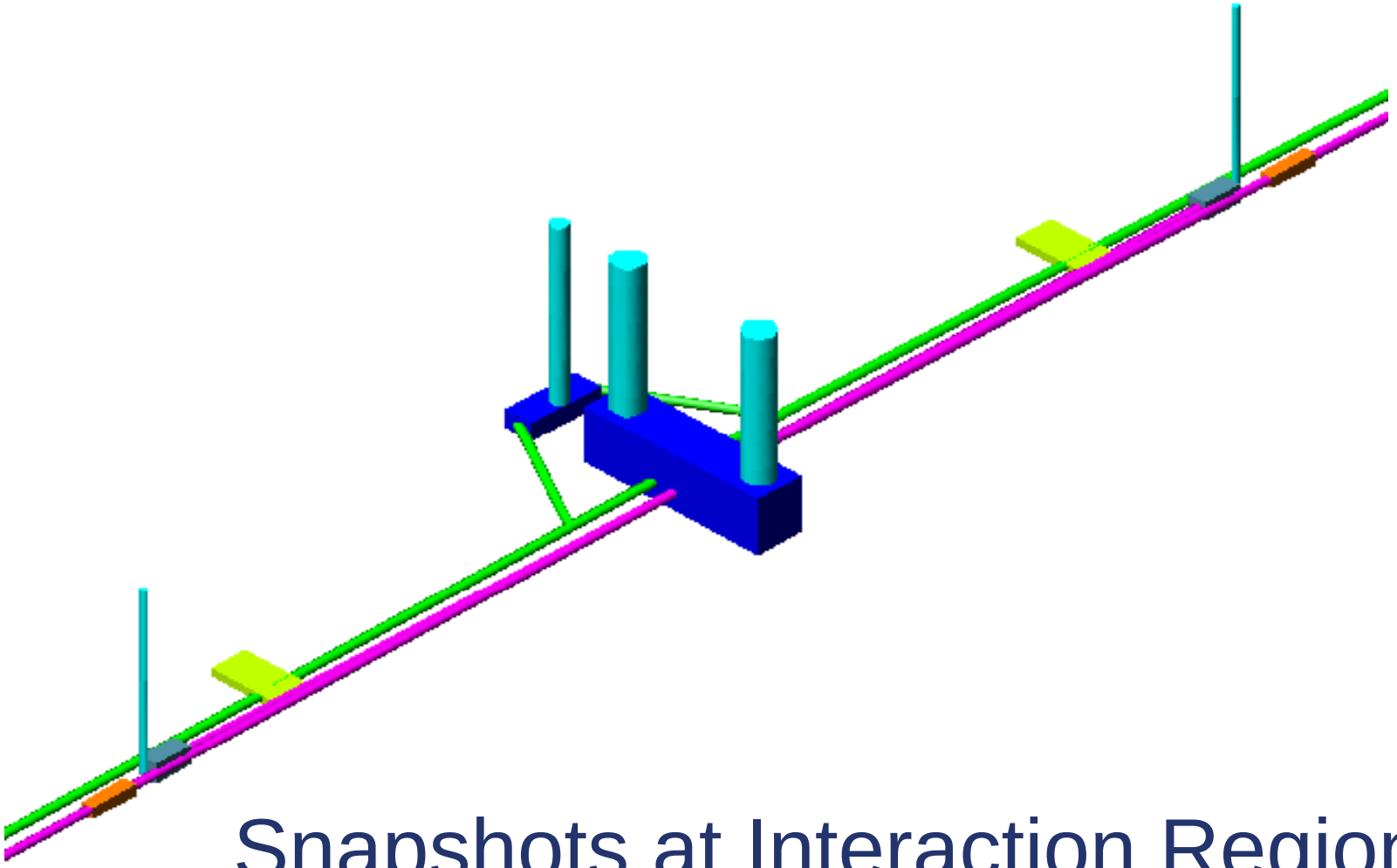
Current Status BDS & IR

Total CFS Costs and Statistics

**DISTRIBUTION BY CONTRACT TYPE,
BASED ON AMERICAS ESTIMATE**



Current Status BDS & IR

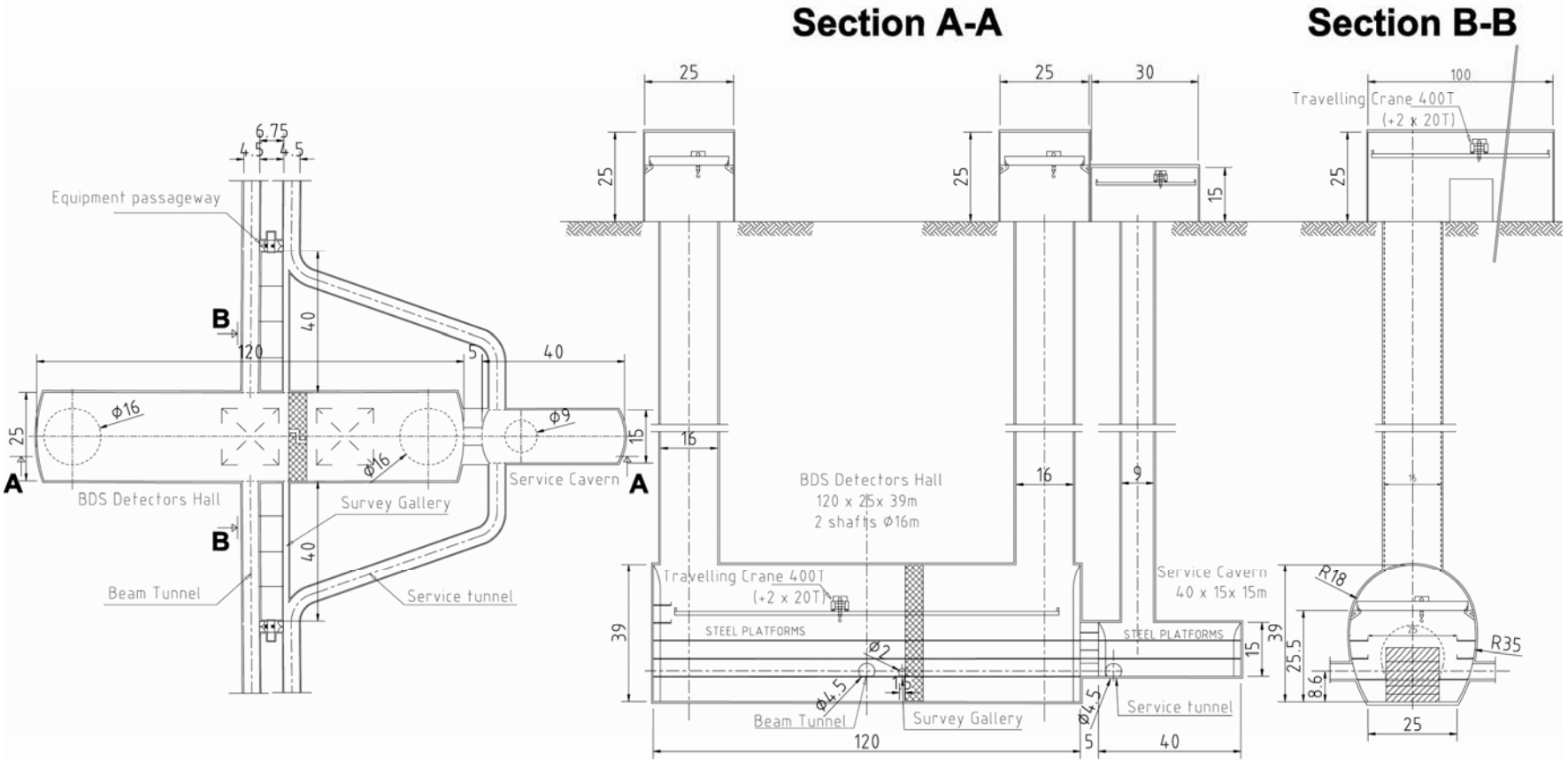


Snapshots at Interaction Regions

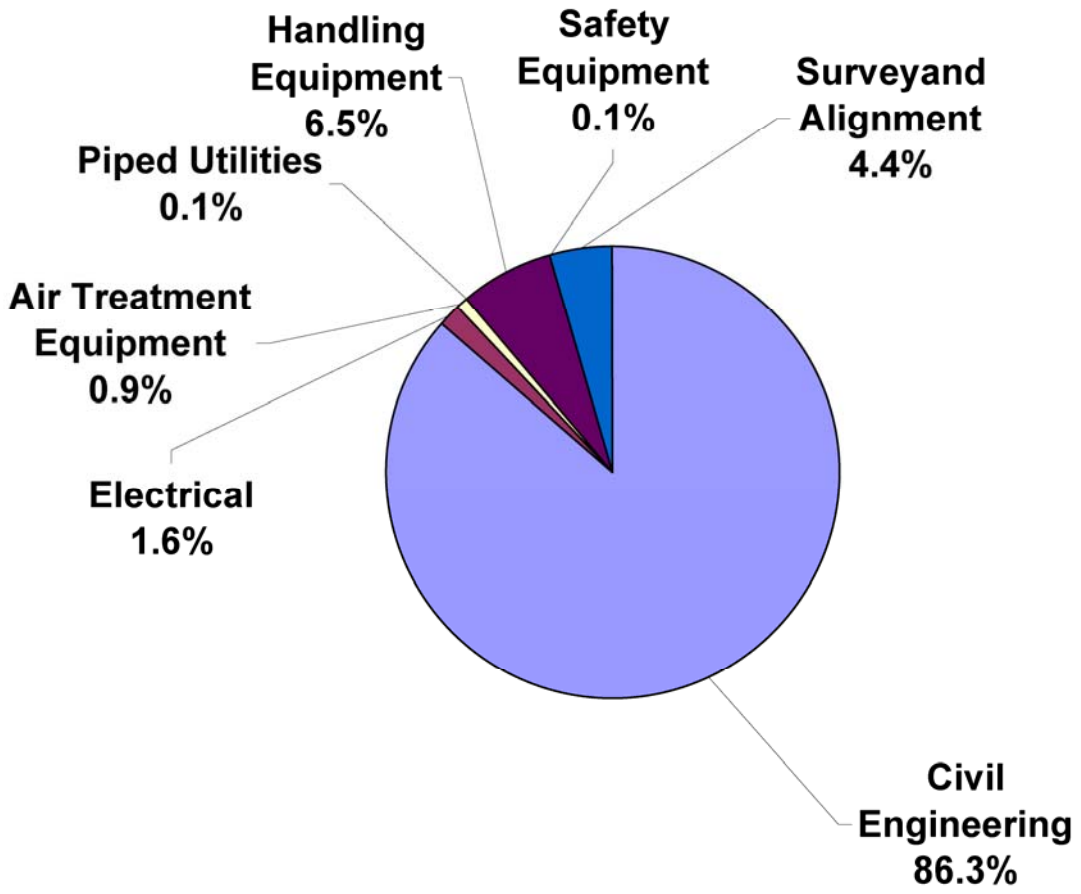
Current Status BDS & IR

Salient Design Features

Detector Hall, Service Cavern, Access Shafts and Surface Buildings
Plan View and Sections



Total CFS Costs and Statistics for Interaction Region/Experimental Hall



Generic CF&S- EDR Plan

- **Generic Goal:**
  - **To Provide Facility Design that Meets Requirements at the Lowest Cost**
- **Assumption for Planning Purposes**
  - **Concept Design Document by FY10**
  - **Start of Site Selection Process and Preliminary design, FY 10**
  - **Start of Construction, FY 12**
- **In US, Prerequisite to start the preliminary design are:**
  - **To have the Project Engineering and Design (PED) Funds available**
    - We need the development of a 35% design for the project
  - **To have a site selected**
    - We need to obtain rights of access to the site for surveying and site characterization work
    - This implies that the National Environmental Policy Act (NEPA) process should be made prior to start of preliminary phase.
    - DOE, NEPA Process can take on average 2-4 years or more

Thus, it does not seem feasible to start the ILC construction in American region as early as 2012, if we have to adhere to the above rules.

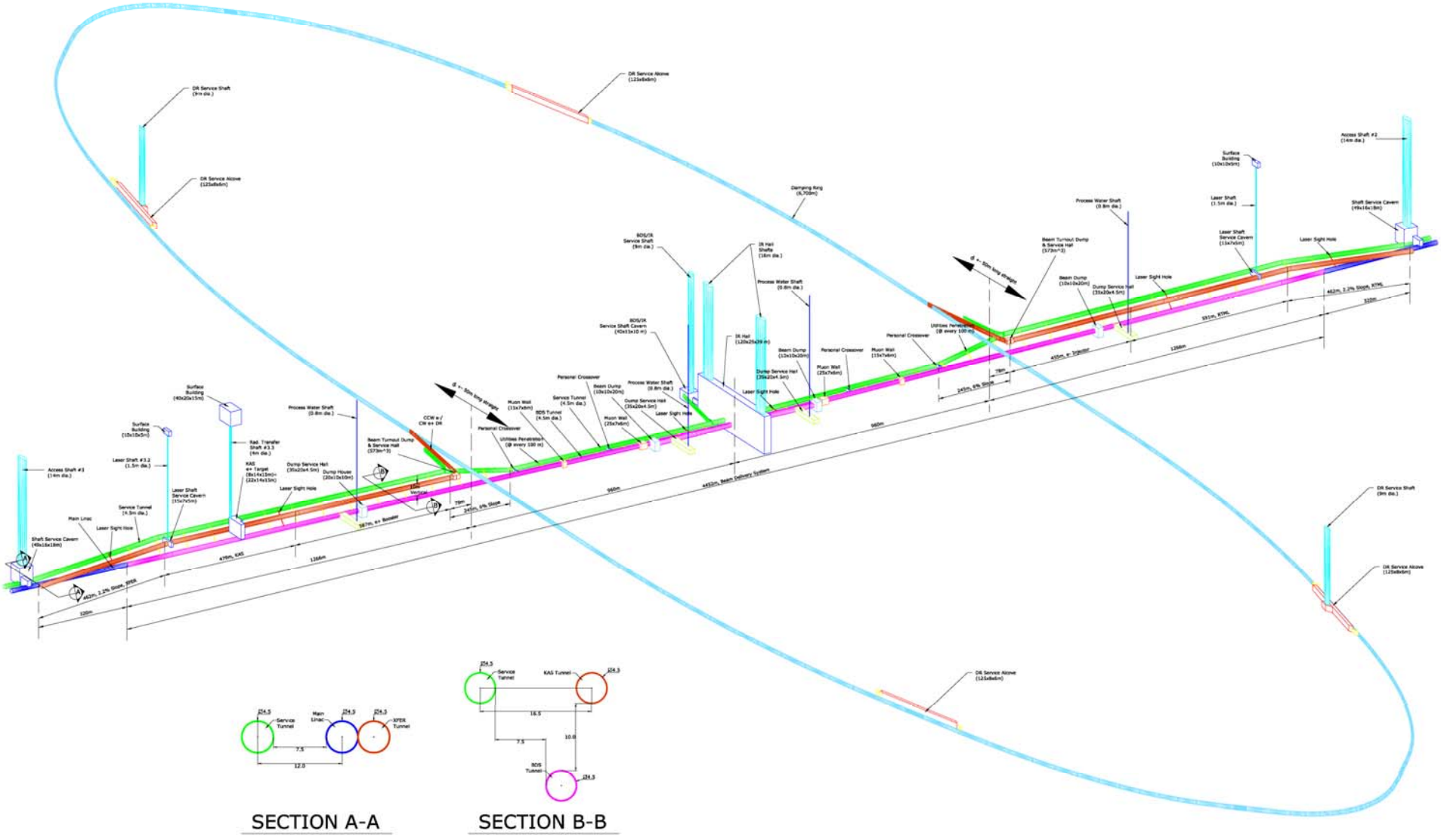
Generic Approach for EDR Plan

Based on Systems Engineering Management Approach

- Functional Requirements Identification
- Design Configuration Control Document
- Interface Control
- Optimization Studies
  - **Design Alternatives Trade-Offs**
  - **Trade Studies**
  - **Constructability Studies**
  - **Value Engineering Study**
- Preliminary verification of suitability of American Region Candidate Site
  - **Preliminary Site Characterizations**
  - **Initial Environmental Assessment**

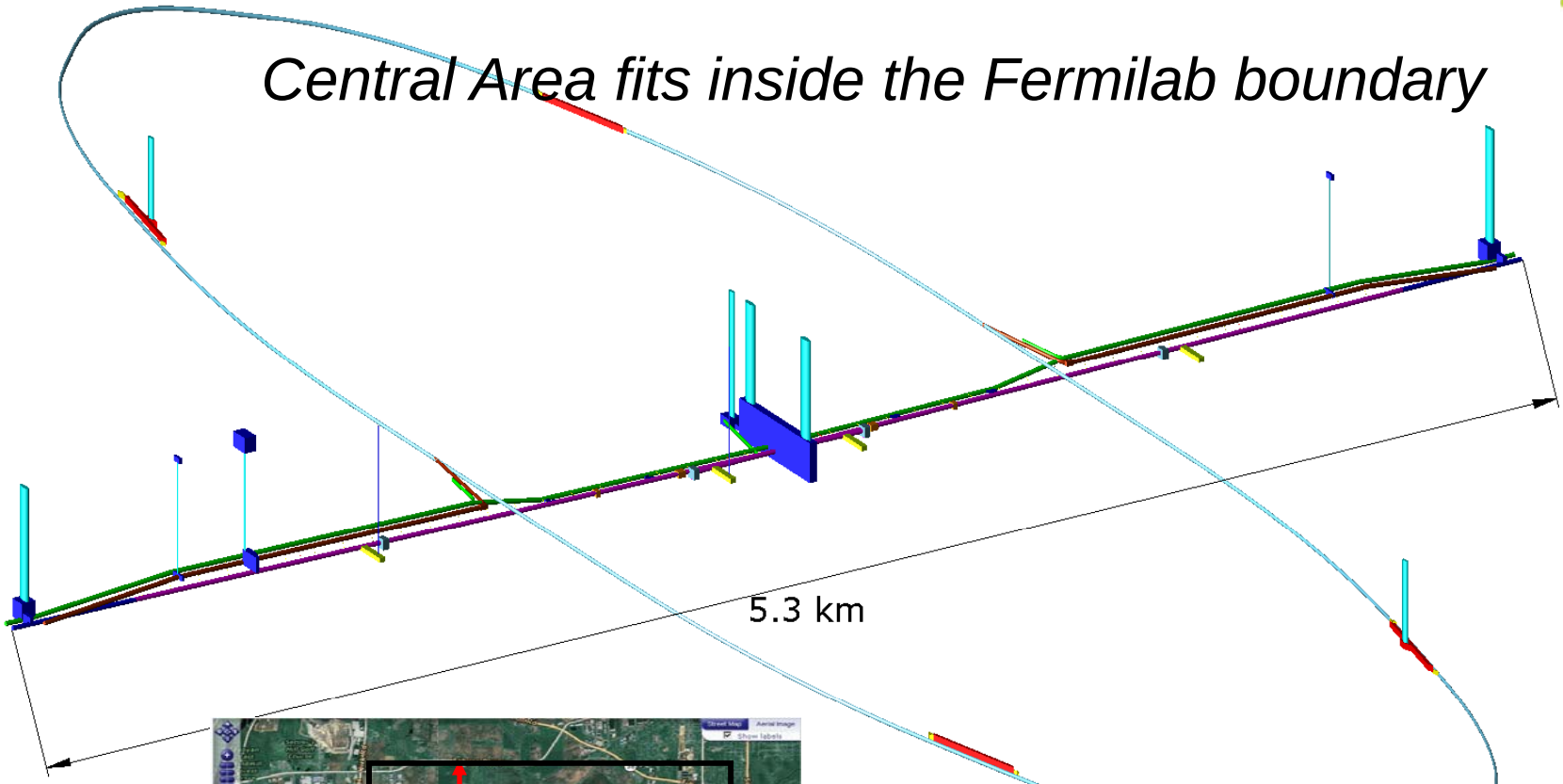
Current Status BDS & IR

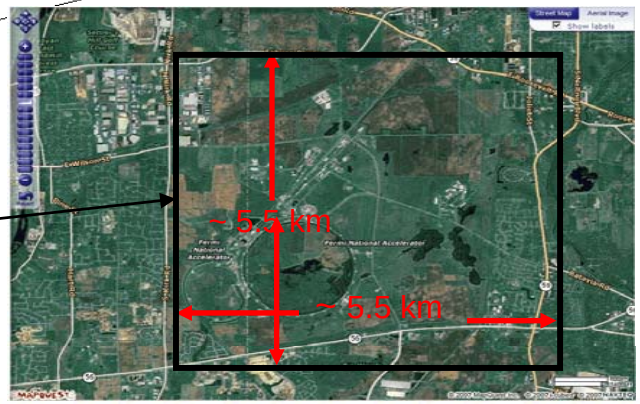
Beam Delivery System & Interaction Region are an integral part of the Central Area



Suggestion for American Region

Central Area fits inside the Fermilab boundary





~ Boundary of Fermilab

Site Characterization of the Central Area can be done

Tentative CF&S for EDR Plan

- **General Description** – There are three phases in this plan; Concept Design Phase; Preliminary Design Phase; and Final Design/Build Phase.
  - **This requires taking exception to the DOE rules by proposing alternative ways that have certain element of risks.**
- **Plan**-To presents a tentative work plan for the ILC in the America Region (Fermilab) in accordance with the RDR.
  - **Because the ILC configuration of the underground facilities for the central area is very difficult and it is Located in the Fermilab boundary, it is prudent to have a complete Concept level Design prepared for this area. This should also include site characterization and environmental assessment of this region. These efforts, not only will provide a reliable cost estimate and verifiable bases for the EDR, but also provides a compelling argument for considering the Fermilab as the ILC American candidate site.**

Tentative CF&S for EDR Plan

- **Concept Design Phase** – Consists of the following Major Efforts:
  - **Generic Design** – **In-house team** provides conventional facilities concept level design for non site specific as well as details of all major components of the machine and the utilities interfaces.
  - **Geotechnical Investigations-** A geotechnical firm will be selected to drill 5 for preferably 7 borings about 100 m into the Galena-Platteville rock. Field and laboratory testing of both the overburden soil and rock will be performed to enable to perform geotechnical analysis of the Central Area, as well as an assessment of the rest of the alignment.
  - **Environmental Assessment** – This task will provide focused consultant effort and expertise to understand and characterize the environmental aspects of a regionally specific site. Initial work in this area will concentrate on the characterization and assessments of the Central Area as well as the understanding of the mitigation process, information and documents needed to meet all of the environmental requirements applicable to the project for the American region.

Tentative CF&S for EDR Plan

- **Concept Design Phase** – Consists of the following Major Efforts (2):

  - **Vibration Characterization of IR**– This task will provide actual a vibration measurements by performing cross-hole, down-hole (up-hole) testing using 3 of the borings at the Interaction Region, as well as 3D computer modeling and vibration propagation analysis of the IR using the SASSI.

  - **Site Specific Concept Design of the Central Area -** An Architect-Engineer will be selected to prepare drawings, specification and cost estimates that defines the facilities to house machine. Details will be based on machine design (prepared by in-house), machine specifications, ILC RDR, R&D studies, and information obtained from the above tasks .

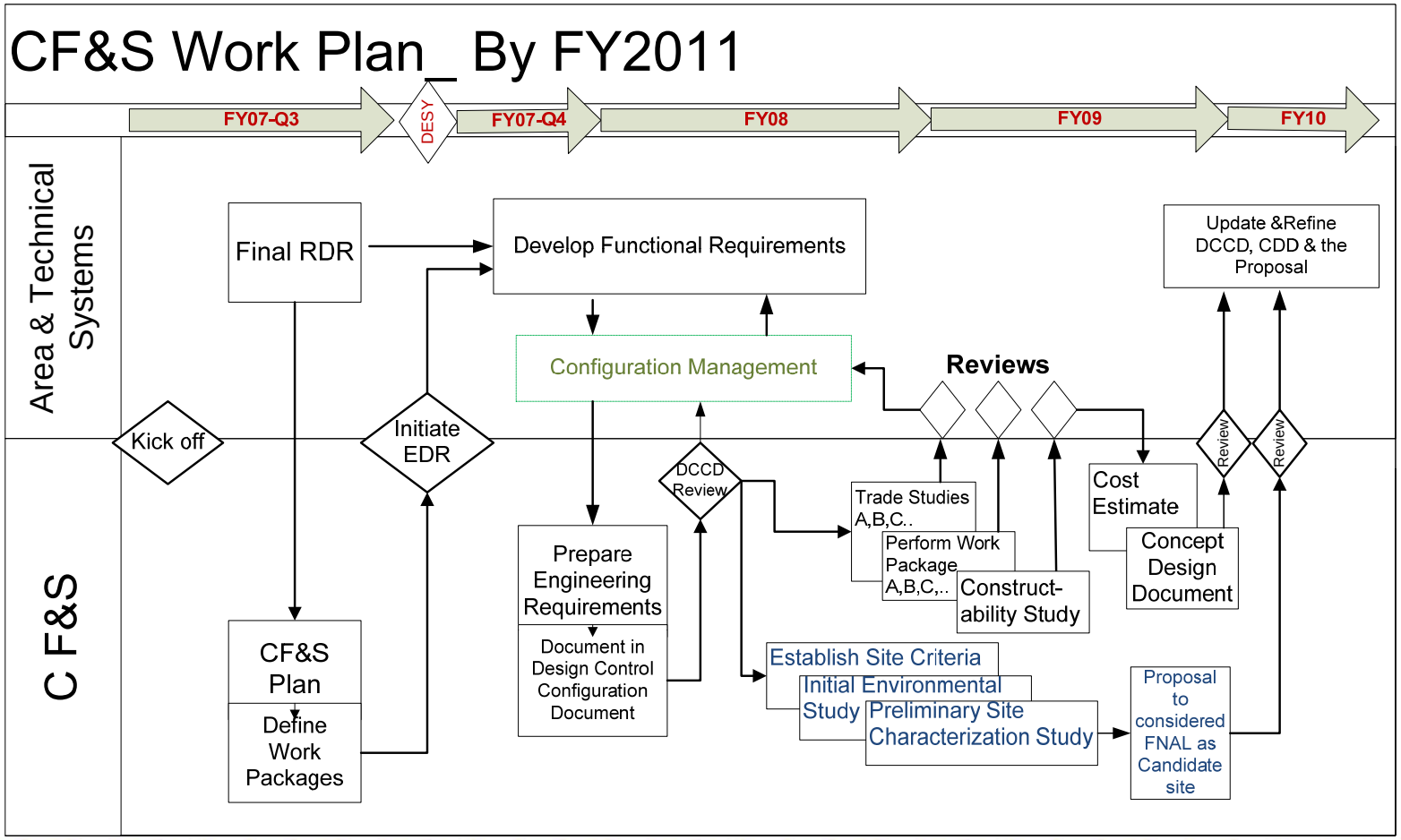
    - **The A-E must provide assurances that the construction of these facilities at Fermilab is totally feasible. This effort will lead to development of the Proposal to Consider Fermilab as an American Candidate Site for ILC.**

Tentative CF&S for EDR Plan

Concept Design Must Be Based on Validated Requirements

- **Requirements should have a range;**

  Acceptable, Preferable, Desirable



Tentative CF&S for EDR Plan

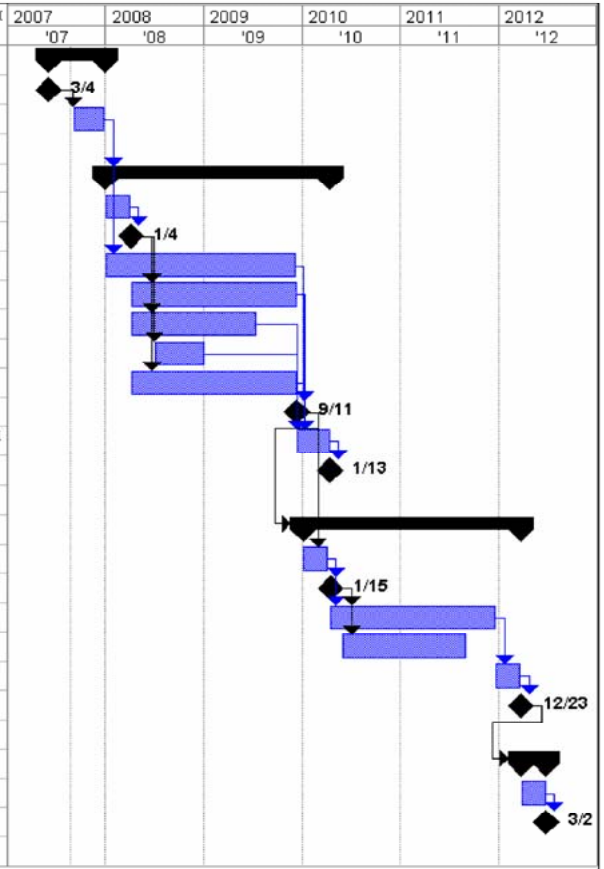
- **Preliminary Design Phase**
  - **The in-house team in Fermilab will continue to provide conventional facilities preliminary level design for non site specific and managing and interfacing with outside the A-E firms, as a well as interfacing with all major components of the machine and the utilities.**
  - **Three (3) A-E firms will be selected to make each a competitive preliminary design for the total ILC Conventional Facilities. The design will be based on the approved concept design and any new developments generated by on-going R&D efforts, tests and detailed machine design. Each firm will make a lump sum bid for Final Design/Build of the project. The bid most advantageous to the DOE/Project management will be selected to execute the Final Design/Build for the C.F. portion of the ILC project for the Lump Sum bid. All three firms (bidders) will be paid for their effort.**
    - Firms selected for this preliminary design effort must agree to the selection of one geotechnical firm doing the geotechnical investigation of the whole site and must agree to accept this firm findings and recommendations.

Tentative CF&S for EDR Plan

- **Final Design/Build Phase**
  - **The present in-house team in Fermilab and SLAC will continue to provide conventional facilities design for non site specific and managing and interfacing with the A-E firm, as a well as interfacing with all major components of the machine and the utilities.**
  - **One A-E firm will be selected to perform the final design and build the CF for the project through evaluation and negotiation process from among the three firms under.**

Tentative CF&S for EDR Plan

ID	Task Name	Duration	Start	Finish	Predec
1	**EDR_ Preparation**	**150 days**	**March 4**	**September 28**	
2	Notice to Proceed with EDR	0 days	March 4	March 4	
3	Define Scope and Work Packages	85 days	June 4	September 28	2
4					
5	**Concept Level Design Phase**	**598 days**	**October 1**	**January 13**	**3**
6	Define Requirements & SOW	3 mons	October 1	December 31	
7	Select Firms & Labs for Major Tasks	0 days	January 4	January 4	6
8	Generic Design_ In-house	23 mons	October 1	September 7	3
9	Site Specific Design of Central Area	20 mons	January 7	September 11	7
10	Geotechnical Investigations of Central Area	15 mons	January 7	April 10	7
11	Vibration Characterization of Central Area	6 mons	April 1	October 1	7
12	Environmental Assessments of Central Area	20 mons	January 7	September 11	7
13	Submit Draft of EDR	0 days	September 11	September 11	8,9
14	Prepare Proposal for American Site	4 mons	September 14	January 13	10,12,11
15	Submit Proposal for American Candidate Site	0 days	January 13	January 13	14
16					
17	**Preliminary Design Phase**	**580 days**	**October 5**	**December 23**	**13**
18	Down Select 3 Firms	3 mons	October 5	January 4	13
19	Decision to Use Fermilab as American Site	0 days	January 15	January 15	18
20	Prepare Preliminary Design (By 3 Firms)	20 mons	January 15	September 22	19,18
21	Geotechnical Investigations	15 mons	March 1	June 3	19
22	Review and Evaluate the Reports	3 mons	September 23	December 23	20
23	Make Recommendation	0 days	December 23	December 23	22
24					
25	**Final Design/Build Phase**	**66 days?**	**December 26**	**March 26**	**23**
26	Negotiations	3 mons	December 26	March 26	
27	Notice to Proceed	0 days	March 26	March 26	26
28					



DRAFT

Project: CF&S-American Plan-Tentative
Date: May 22

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

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