

Conventional Facilities Considerations and Cost Drivers

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FESS/Engineering
Project X Siting Workshop
10/04/12



Siting History



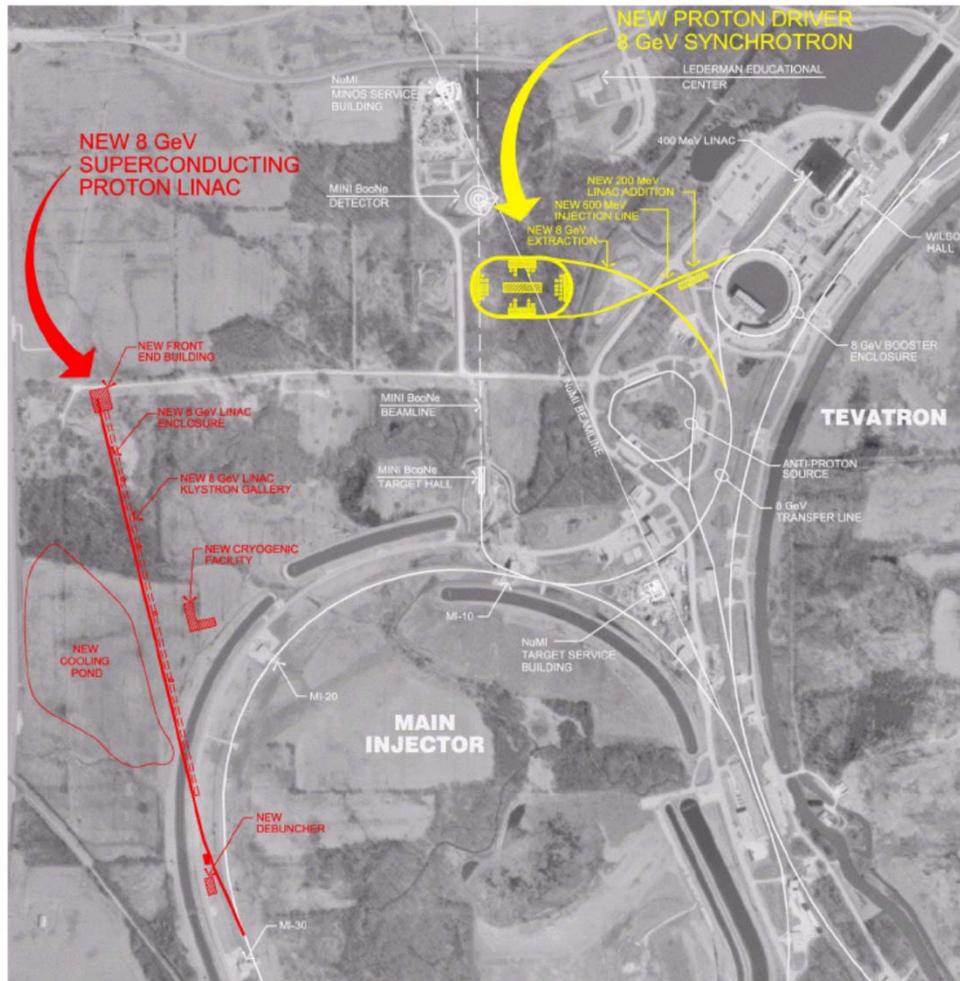
Siting History - 2000



Proton Driver Study 1
16 GeV Synchrotron



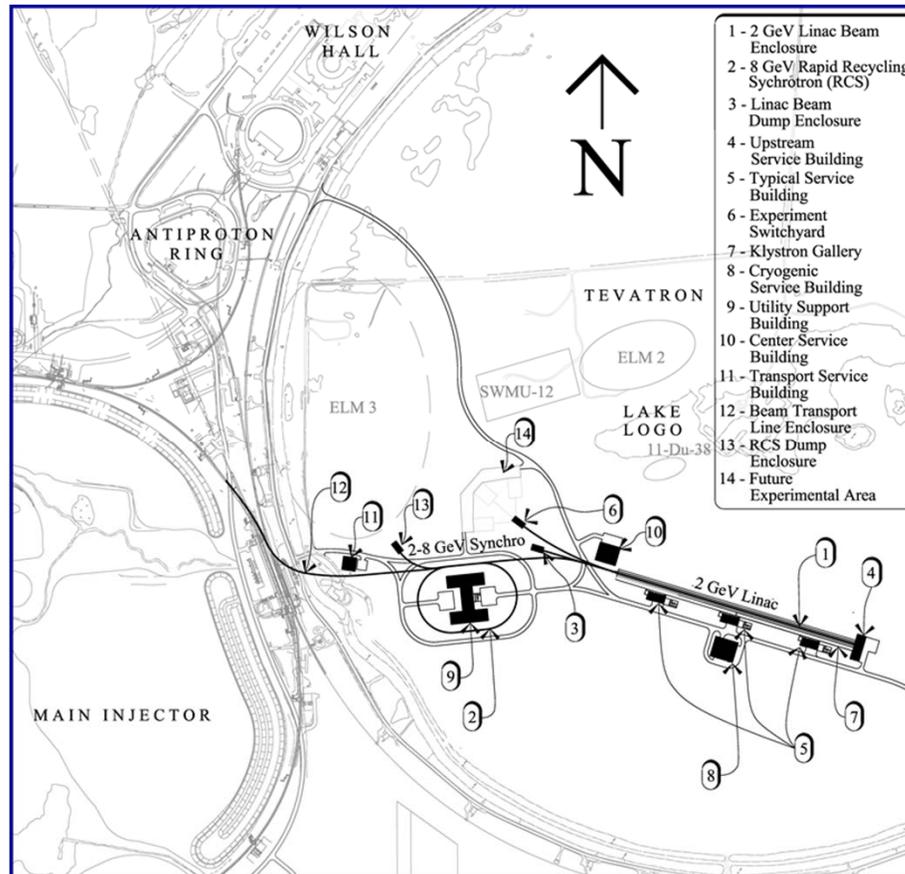
Siting History - 2003



Proton Driver Study 2
8 GeV Synchrotron
8 GeV SCRF Linac



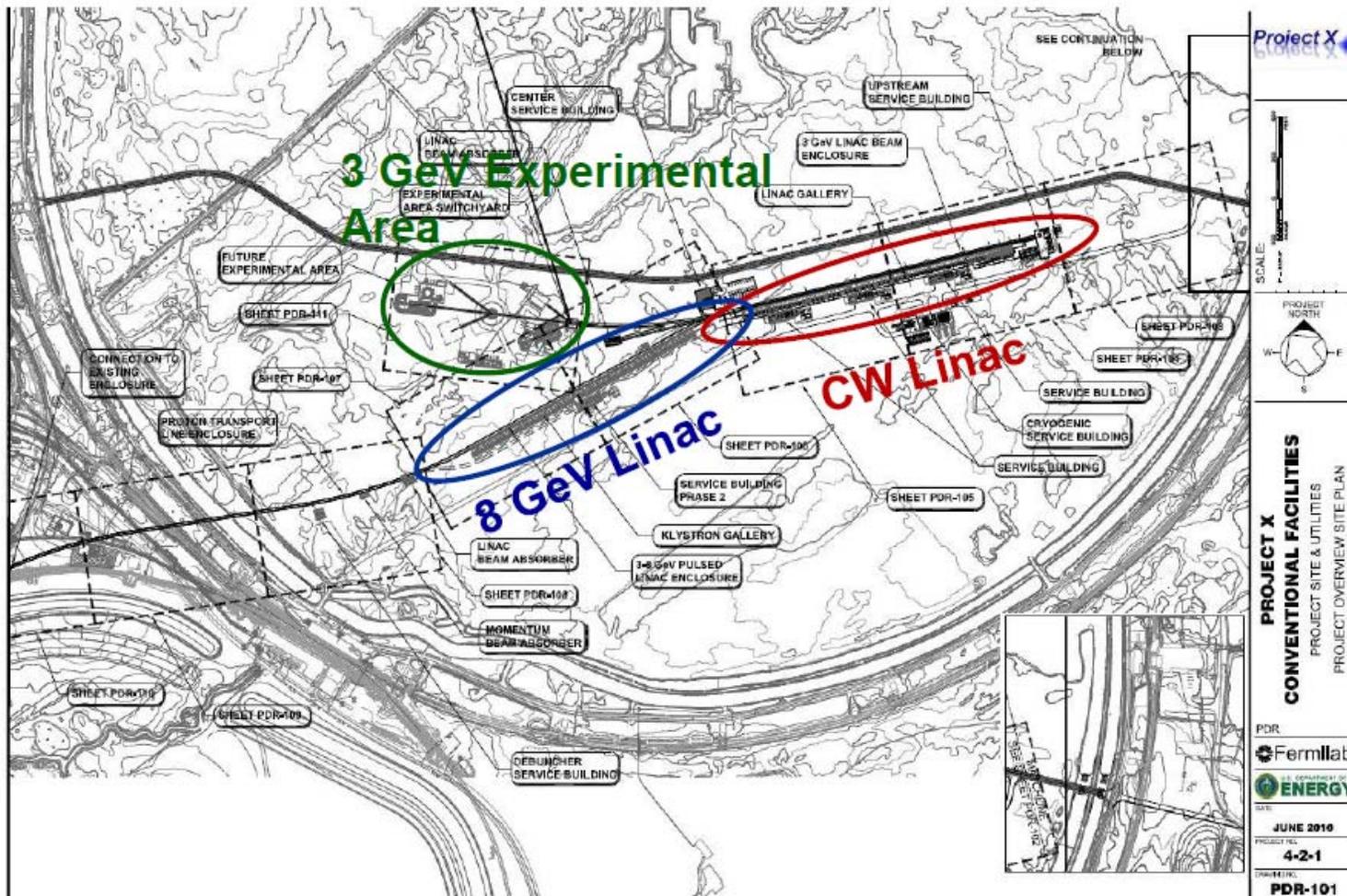
Siting History - 2008



ICD-2/3



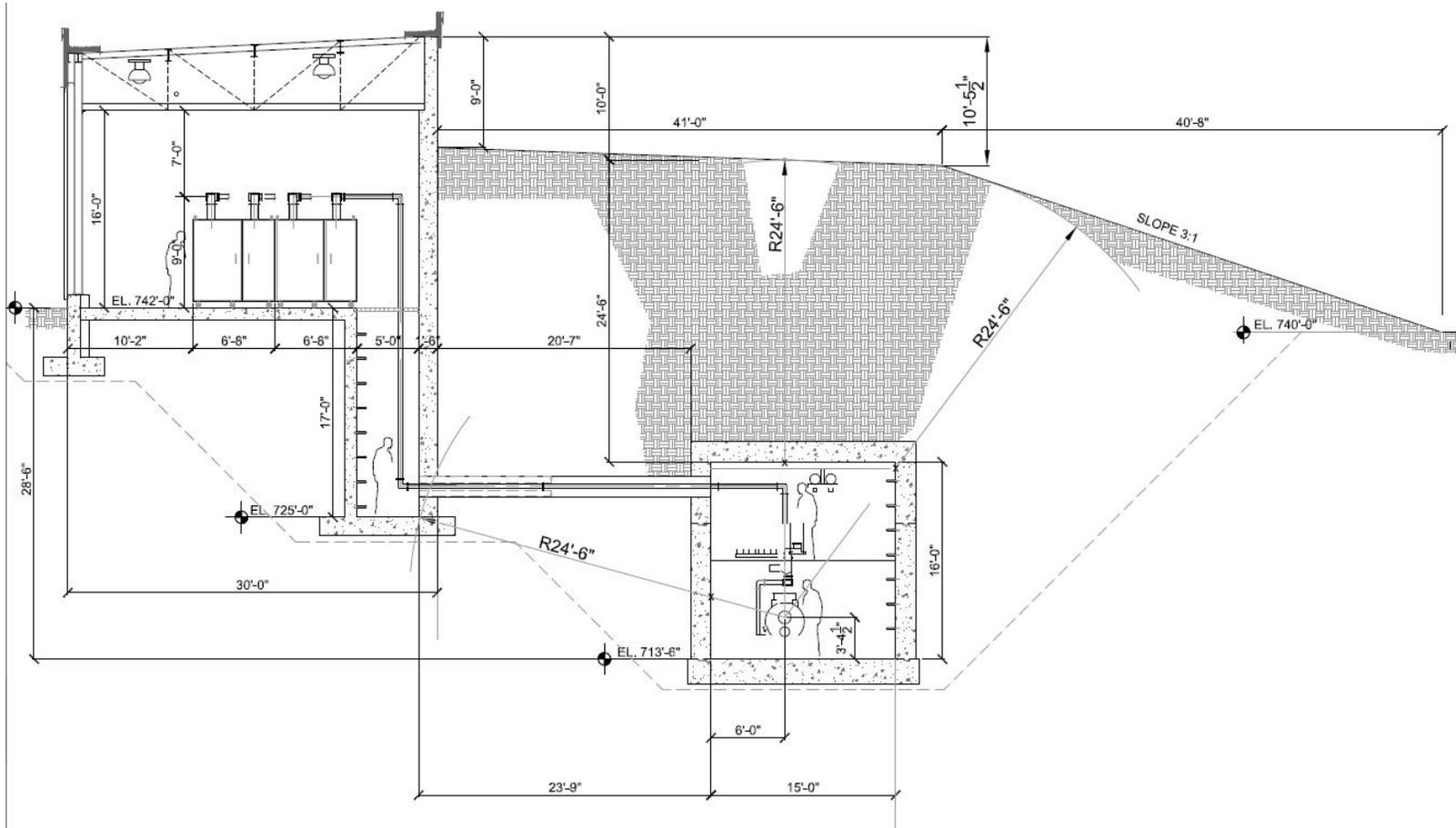
Siting History - 2010



REFERENCE DESIGN



Siting History - 2010



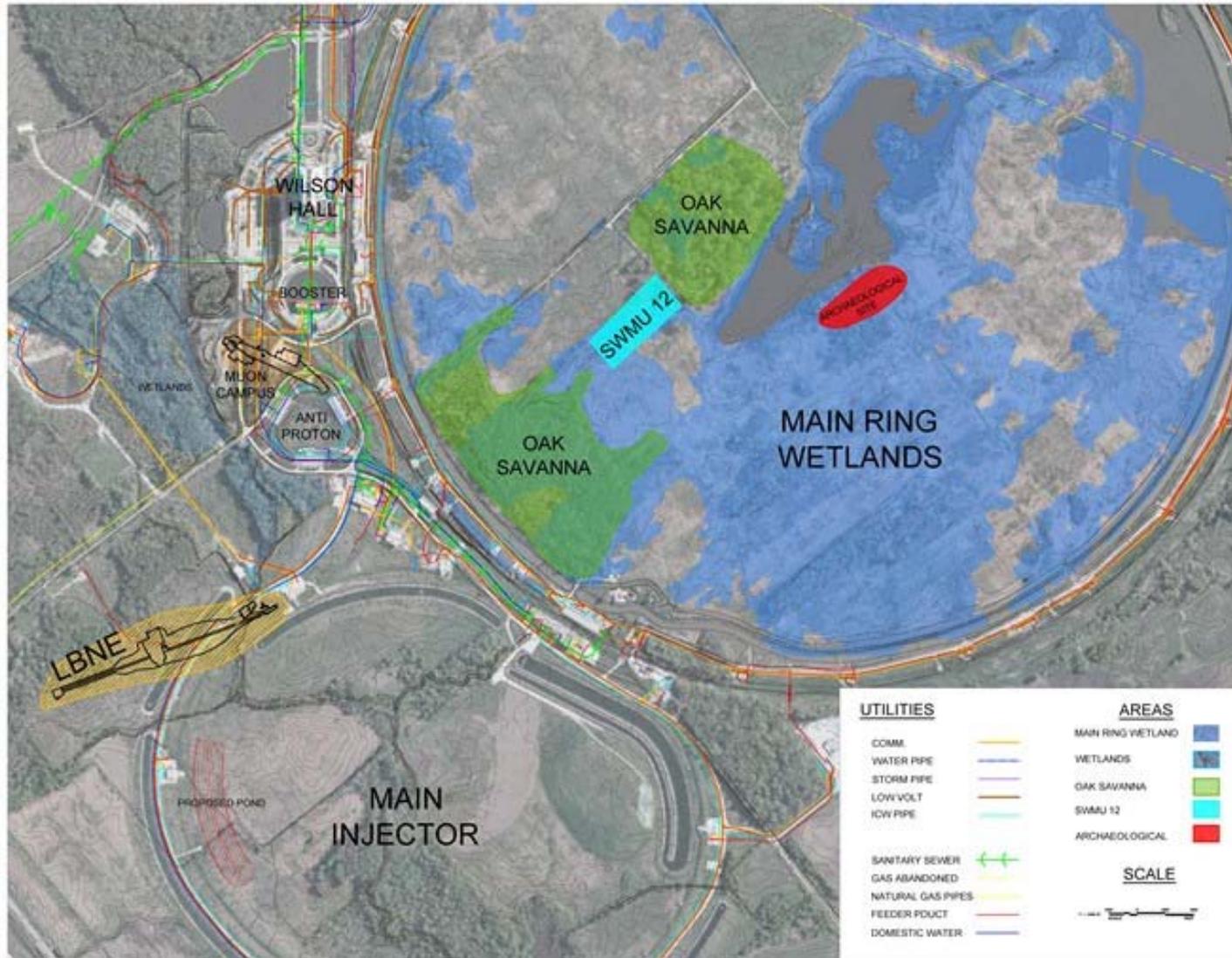
REFERENCE DESIGN



Siting Considerations



Siting Considerations





Siting Considerations

Muon Collider Conceptual Layout

Project X

Accelerate hydrogen ions to 8 GeV using SRF technology.

Compressor Ring

Reduce size of beam.

Target

Collisions lead to muons with energy of about 200 MeV.

Muon Capture and Cooling

Capture, bunch and cool muons to create a tight beam.

Initial Acceleration

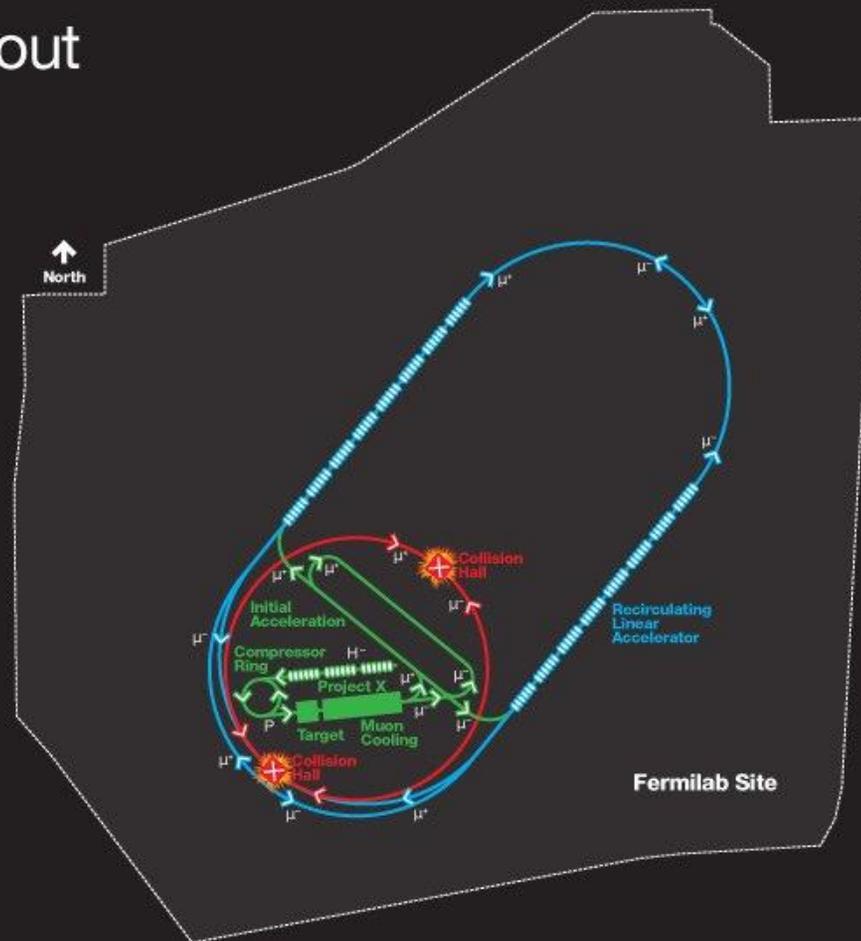
In a dozen turns, accelerate muons to 20 GeV.

Recirculating Linear Accelerator

In a number of turns, accelerate muons up to 2 TeV using SRF technology.

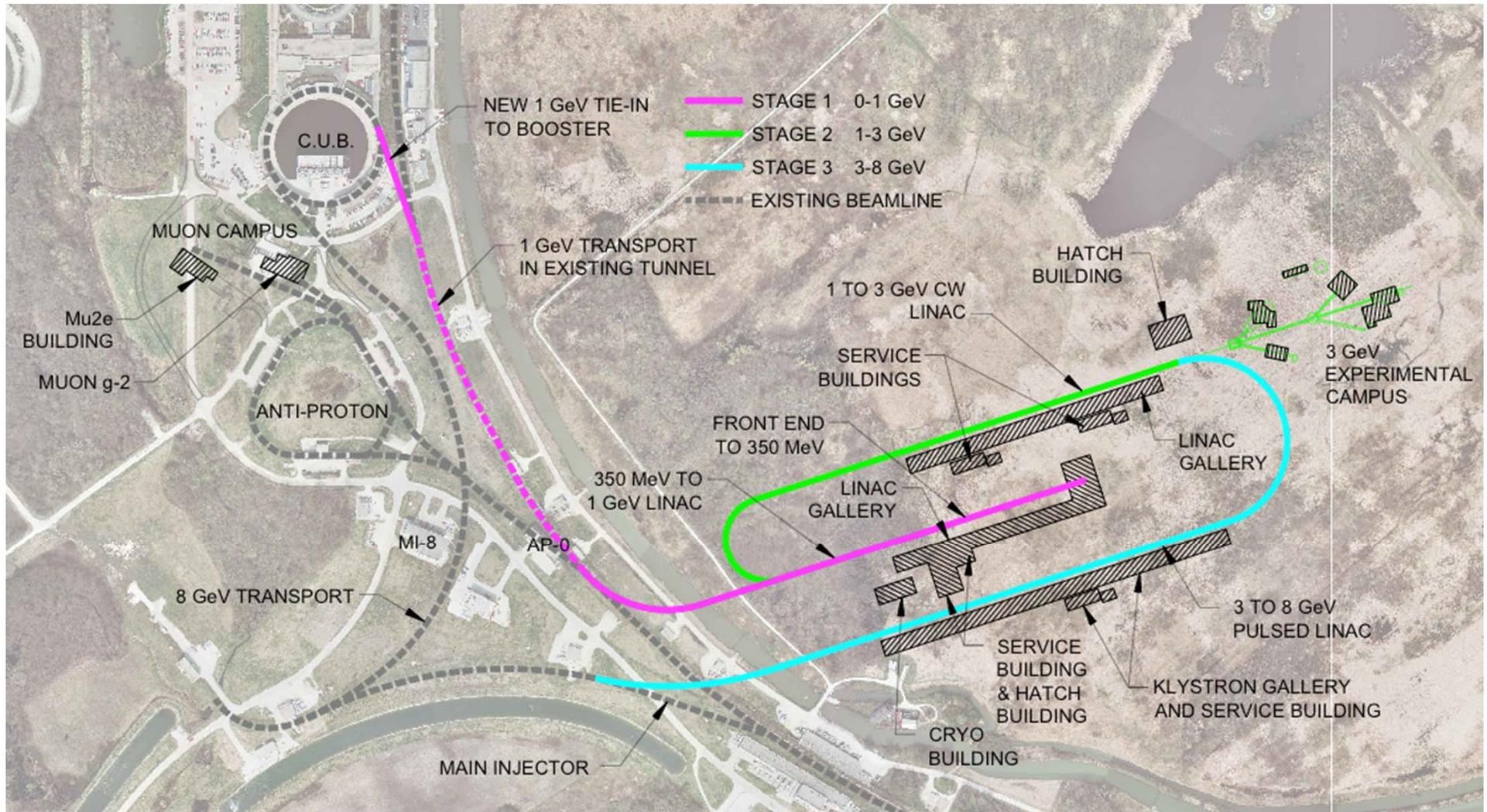
Collider Ring

Bring positive and negative muons into collision at two locations 100 meters underground.



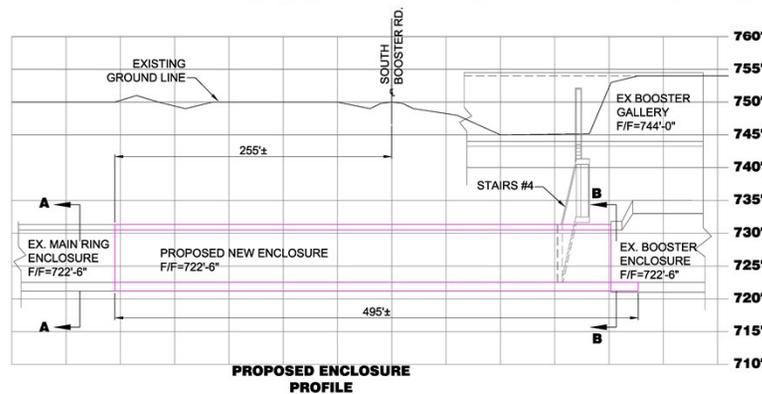
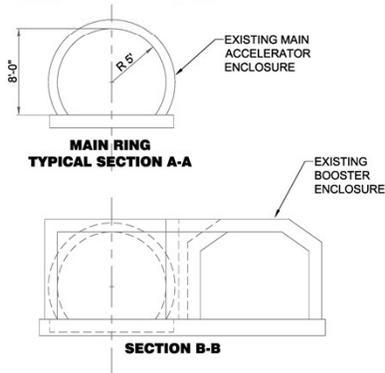
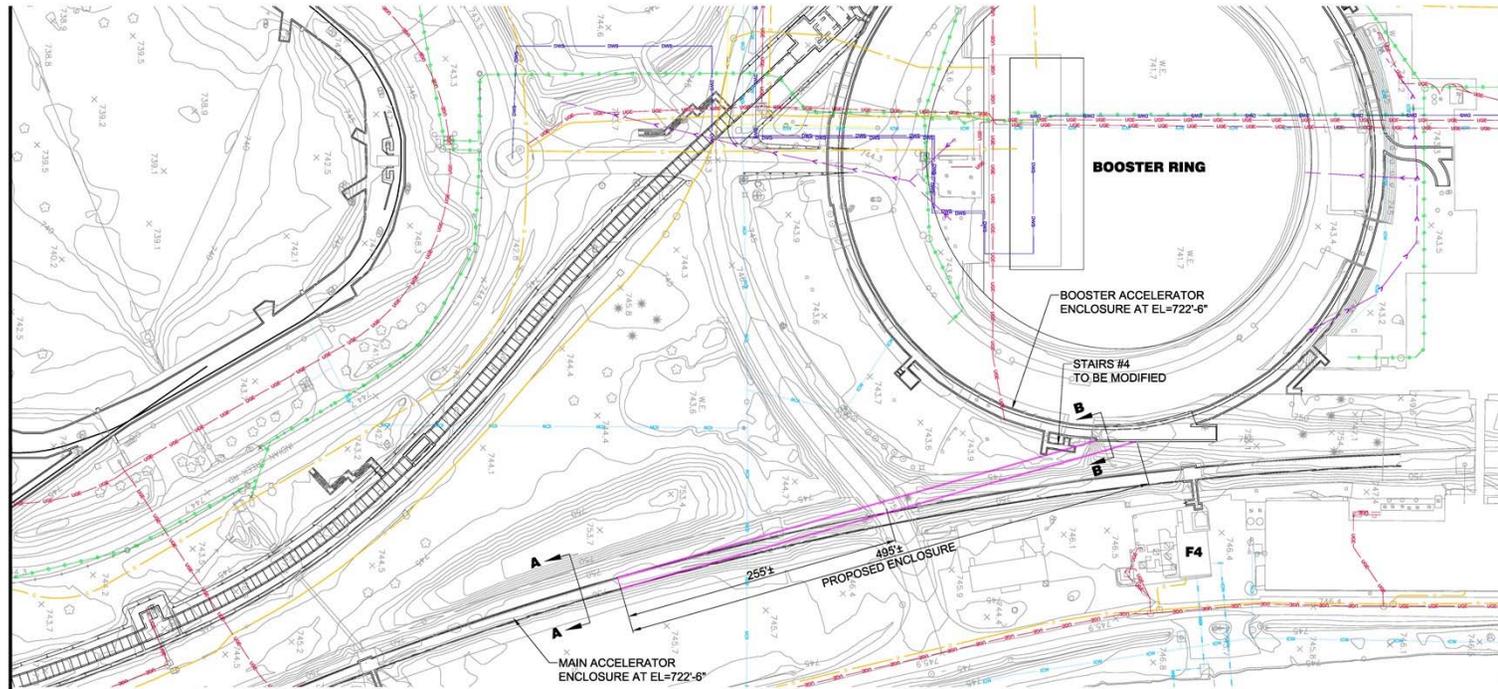


Siting Considerations





Siting Considerations



SCALE:
1" = 50'-0" HORIZONTAL
1" = 10'-0" VERTICAL

PROJECT X
PLAN AND PROFILE

CDR
Fermilab
U.S. DEPARTMENT OF ENERGY
DATE
SEPT, 2012
PROJECT NO.
4-2-1
DRAWING NO.
EXH B



Cost Considerations



Cost Considerations

Linac Tunnel	\$4,900 lin-ft		
Linac Gallery	\$10,400 lin-ft	\$300 sq-ft	
Utility Cooridors	\$1,500 lin-ft		
ICWS	\$100 lin-ft		
ICWR	\$100 lin-ft		
DWS	\$75 lin-ft		
SAN	\$100 lin-ft		
GAS	\$75 lin-ft		
CHWS	\$200 lin-ft		
CHWR	\$200 lin-ft		
Electrical Ductbank	\$300 lin-ft		
Communication Ductbank	\$300 lin-ft		
Wetland Mitigation (4.5:1)	\$85,000 acre		
Access Stairs every 300'	\$500 lin-ft	\$150,000 each	
Transport enclosure total	\$6,900 lin-ft		
Tunnel	\$4,900		
Utility Cooridor	\$1,500		
Access Stairs	\$500		

RDR – 65 Acres @ \$85K
= \$5.5M !!
(LBNE estimates \$125K/acre)