

HES & HKS return to Hall C

Dec 13, 2022

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Hall C Layout

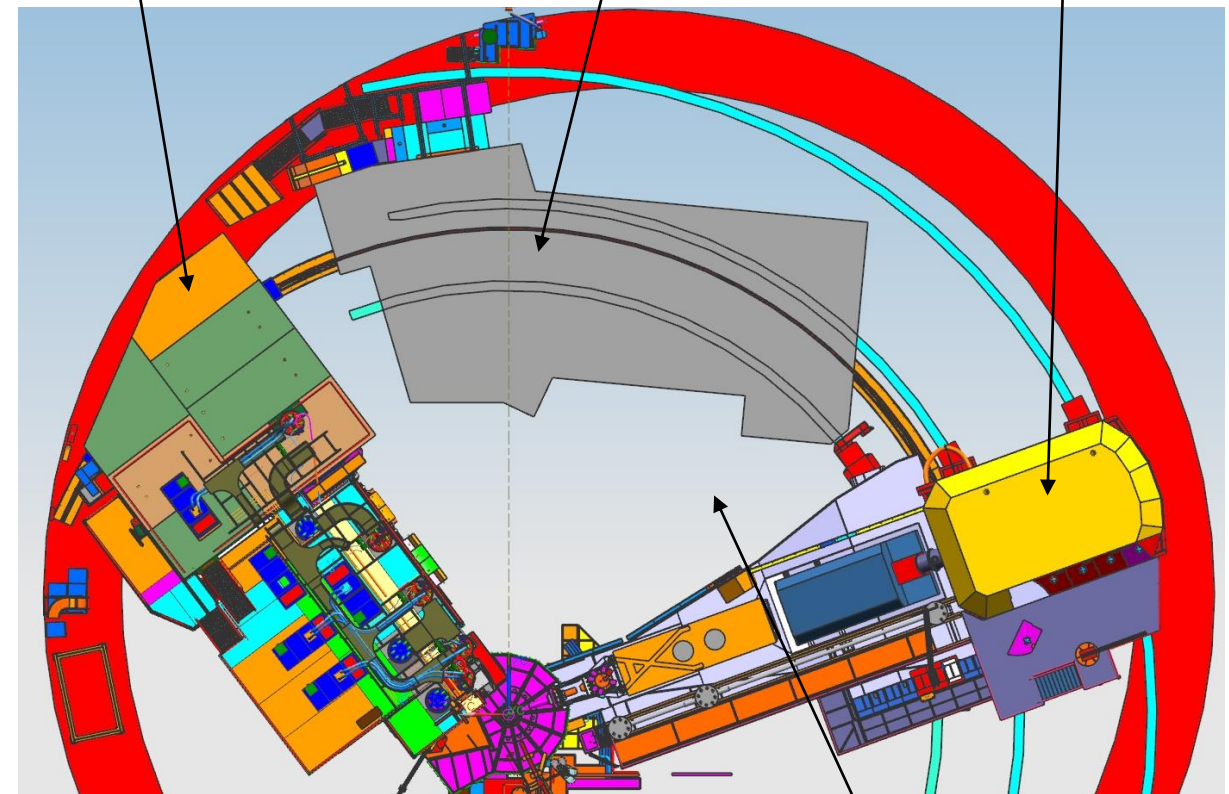
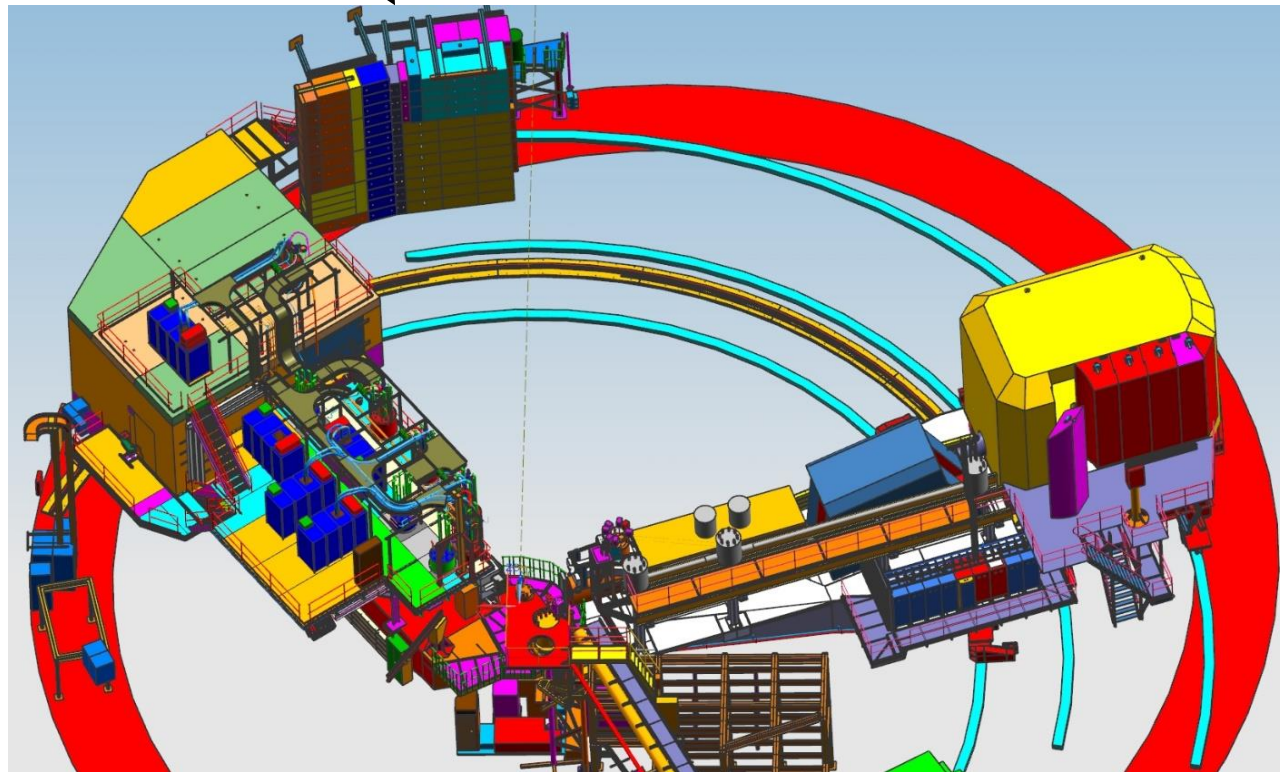
Existing Hall C Rear Shielding Wall
To be Used as the Rear Wall of the
HES Bunker

SHMS at 34°
could go to 38°

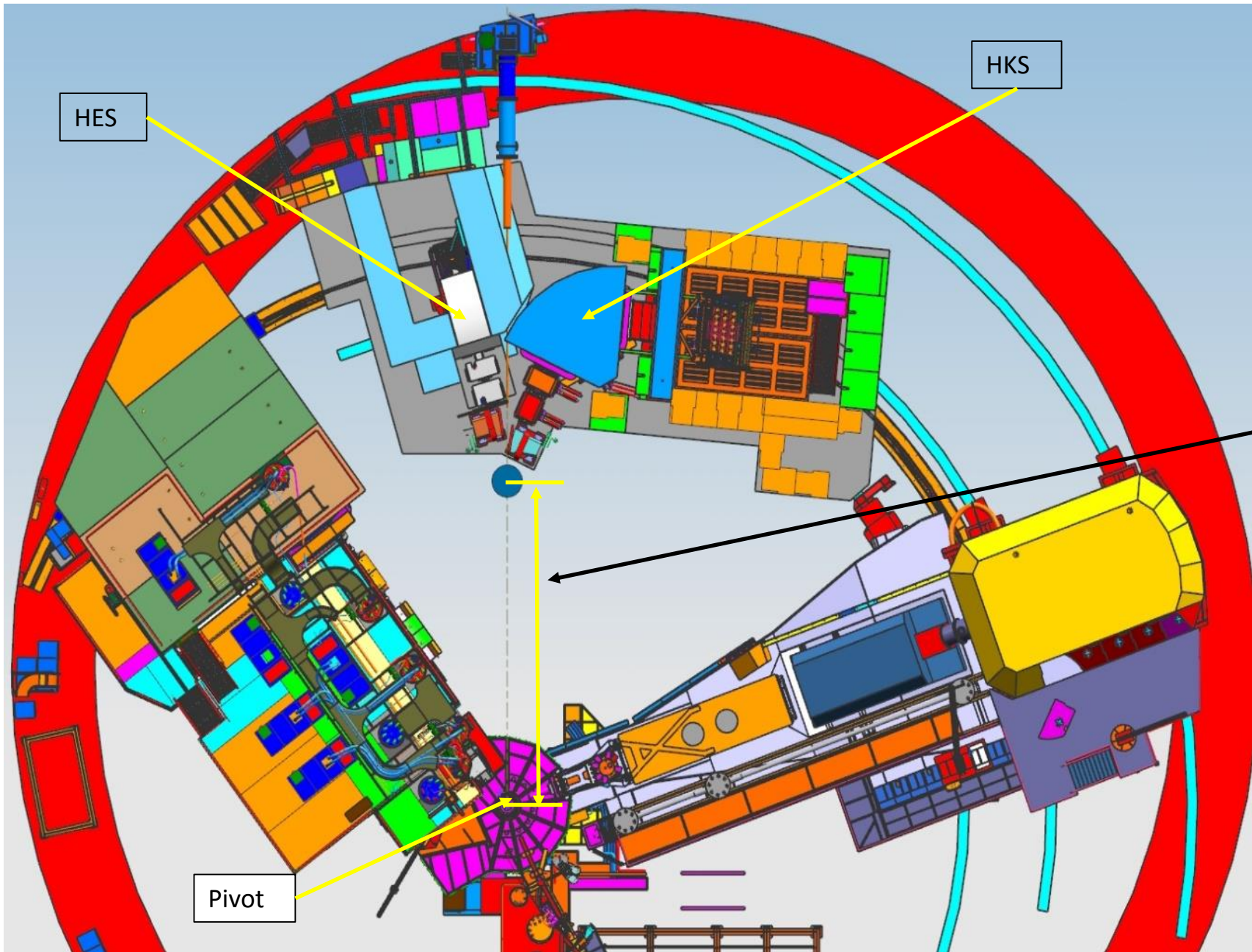
10" Concrete Pad to cover
SHMS and HMS rails

HMS at 70°
could go to 78°

Floor Distance from Beam to
Floor 156" (Ref)



Layout Top view



HES

HKS

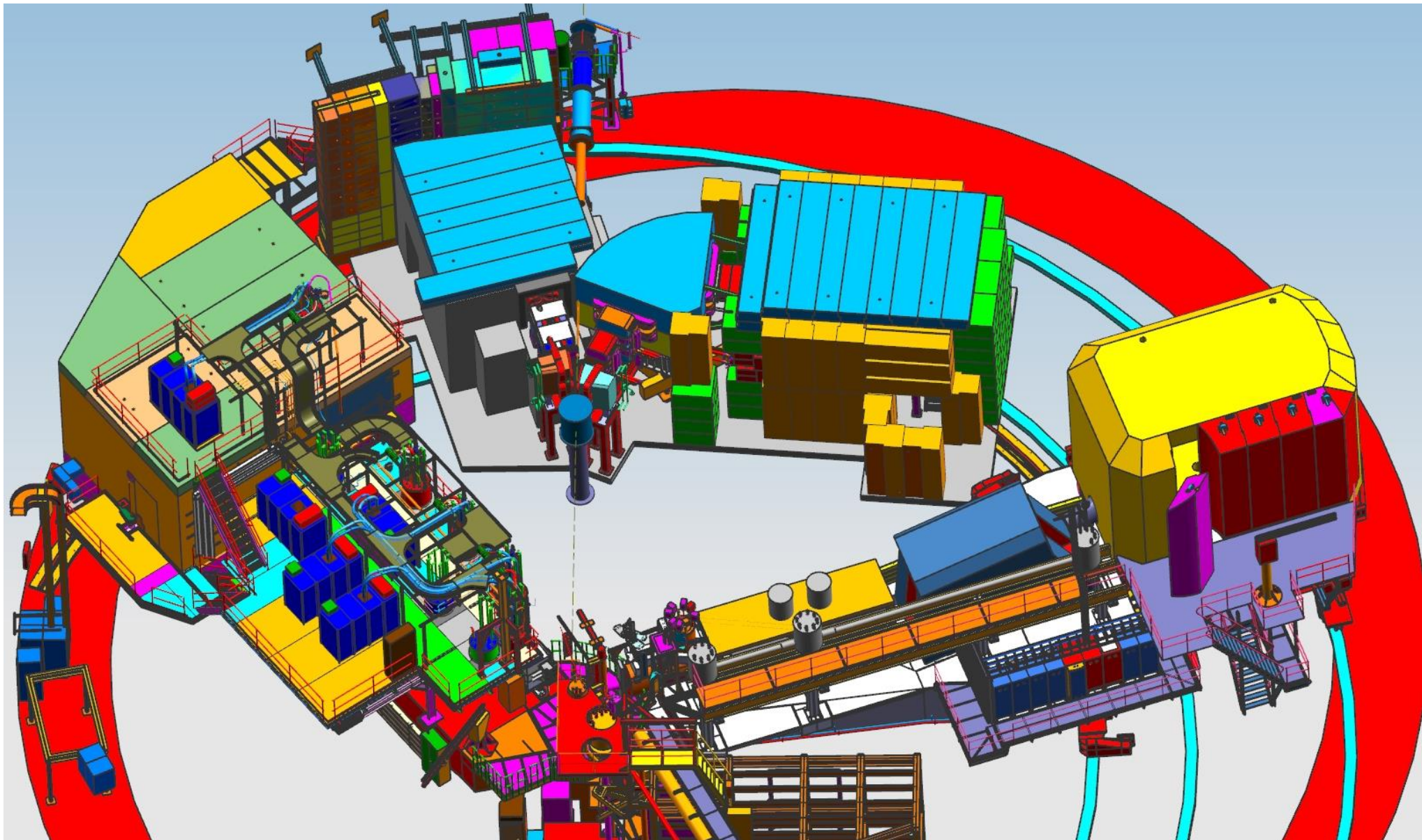
Pivot

Distance from Pivot to Target Center
11.24m (442.7in)

Will downstream target be too far
from last accelerator's corrector
magnet?

CPS target will be 6m from pivot.

HyperNuclear Hall C_11-29-22

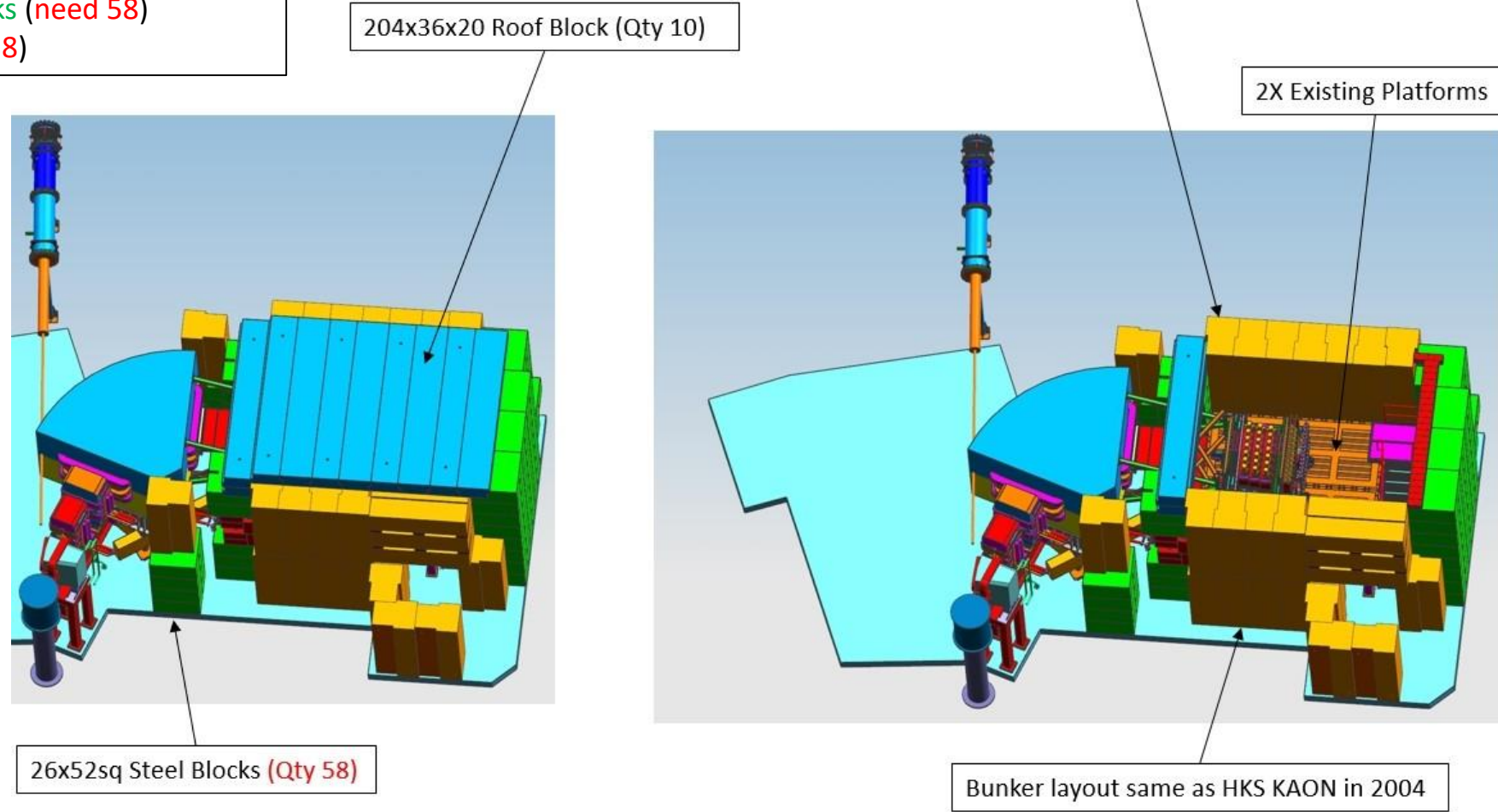


Shielding Block Inventory

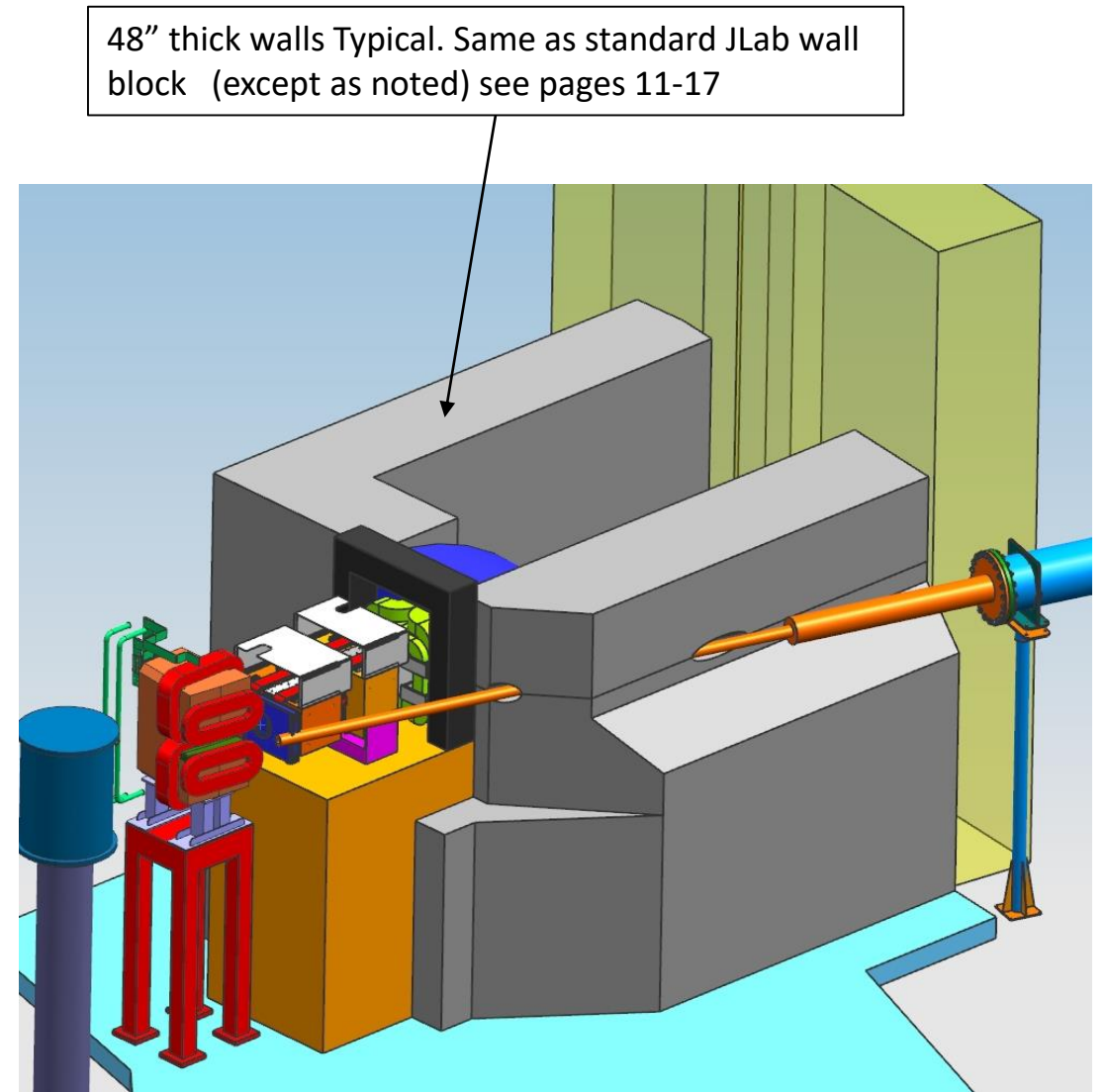
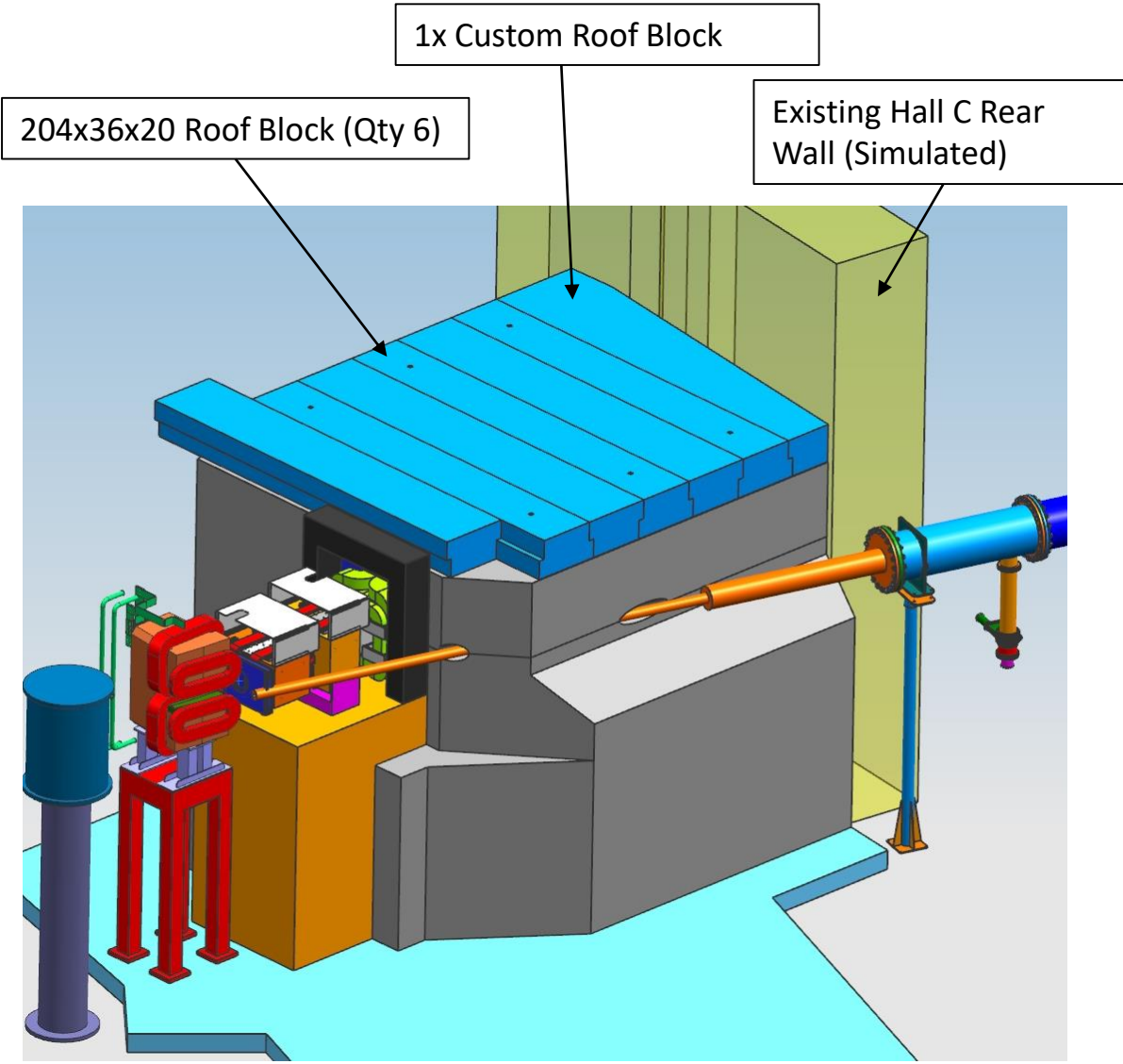
JLAB's inventory vs HKS and HES needs
Jlab has 19 204" Roof blocks (need 16 for HKS & HES)
Jlab has 39 Steel 26"x52" Steel blocks (need 58)
Jlab has 19 108" Wall blocks (need 38)

HES will need poured Walls

HKS Magnet and Bunker



HES Bunker

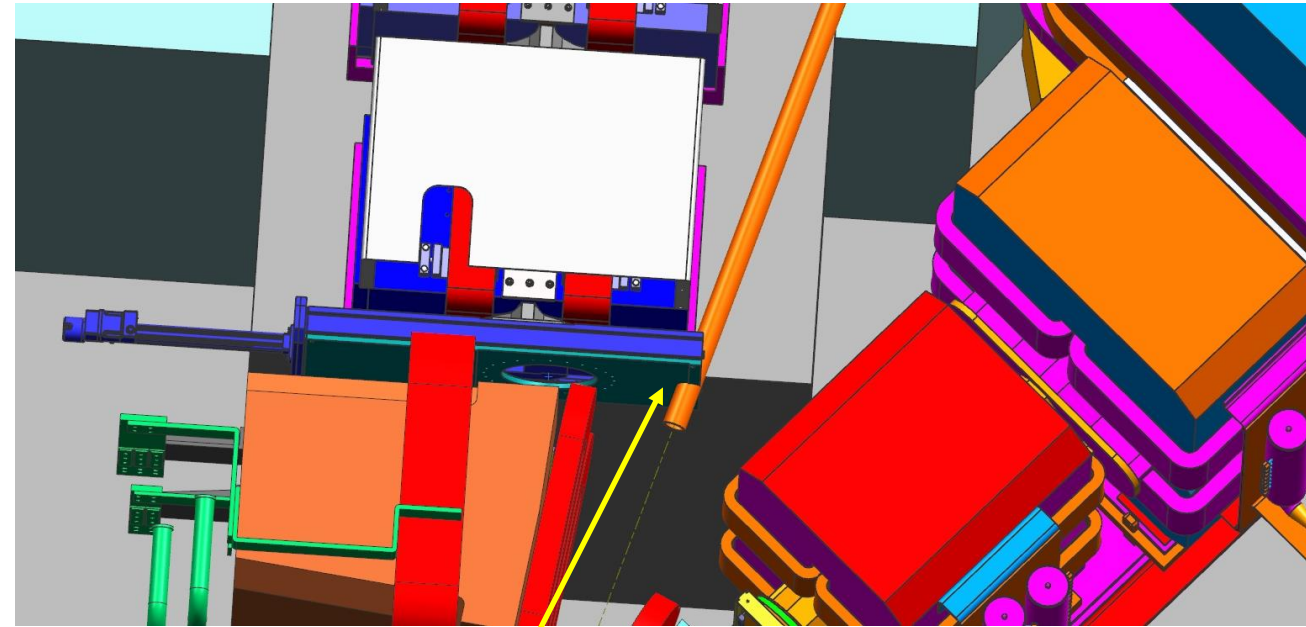
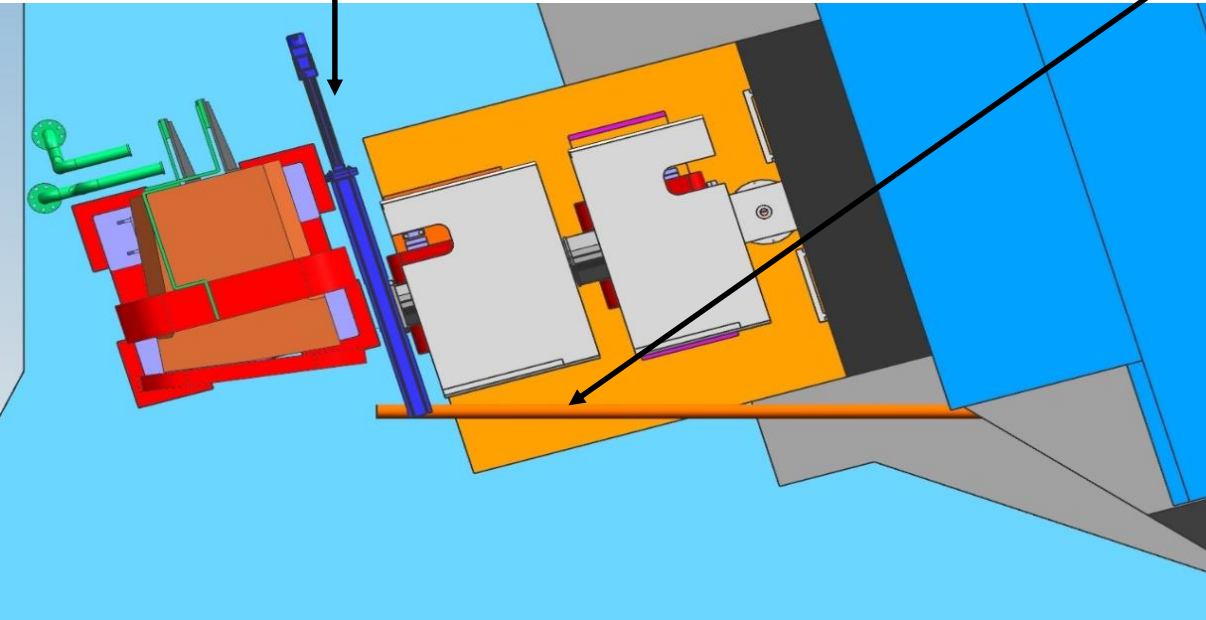


HES and beamline close-up

Possible Reuse of Sieve Slit but only if rotated and even then heavily modified

Sieve Slit assembly rotated

3" OD Beam Pipe Size same as HKS in 2004
Could go to 5.25" OD before contact with Q1



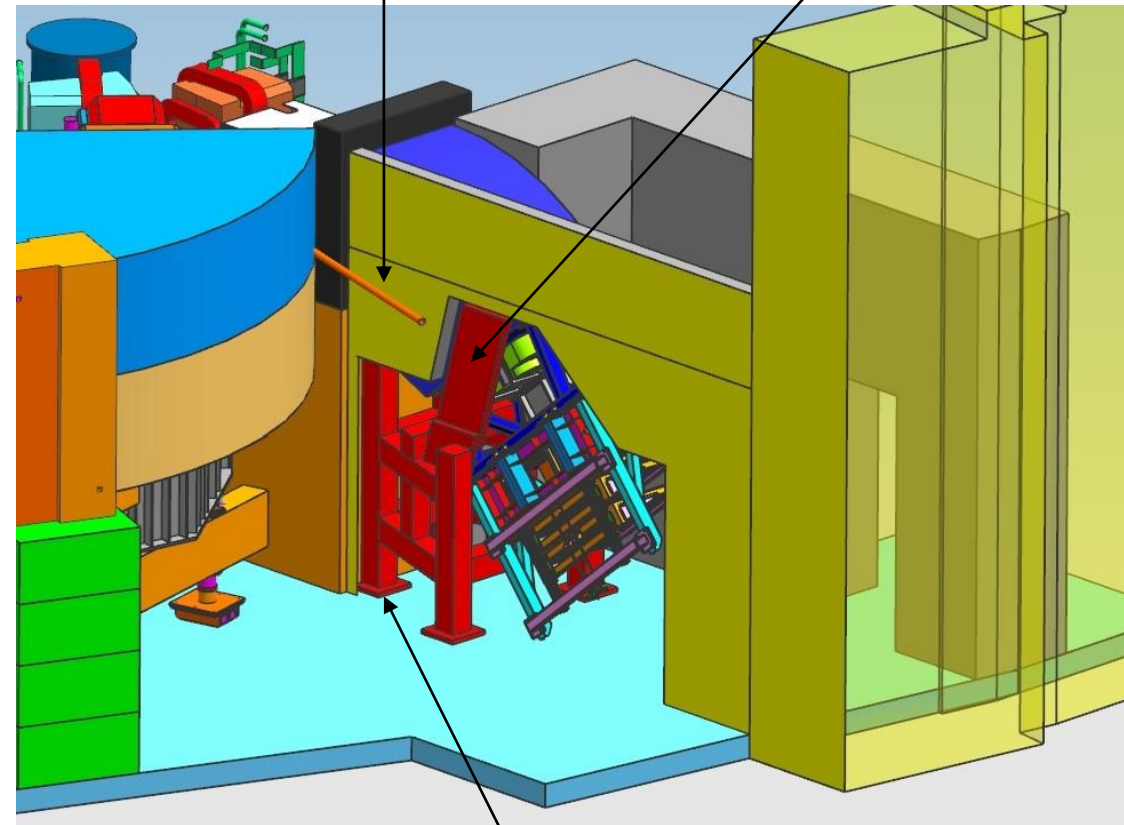
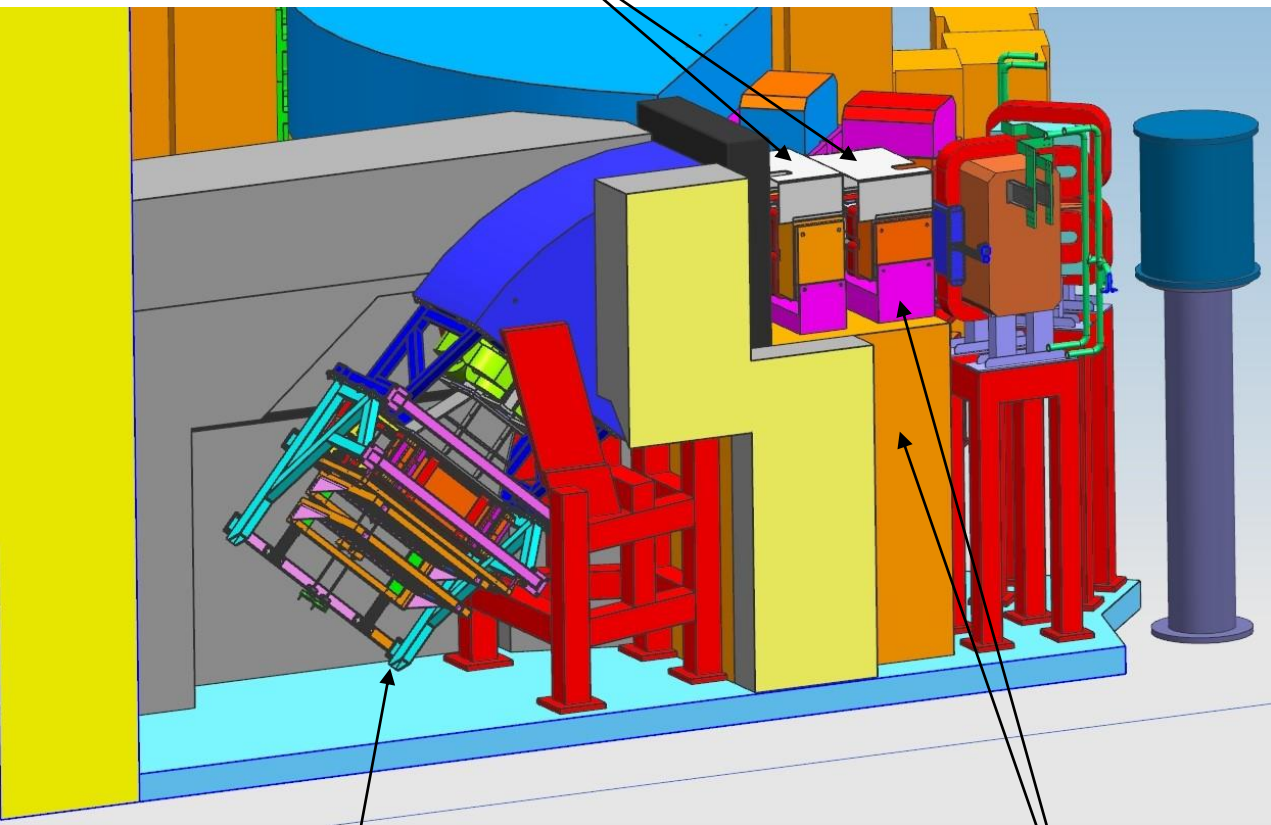
Sieve Slit Bottom Plate modification

HES Magnets and Support

Q1, Q2 Electrical on Upper Side
Magnets rotated 90

HES Dipole upper support needs
to be thin in this area (affects
shielding thickness)

3" Beam Pipe

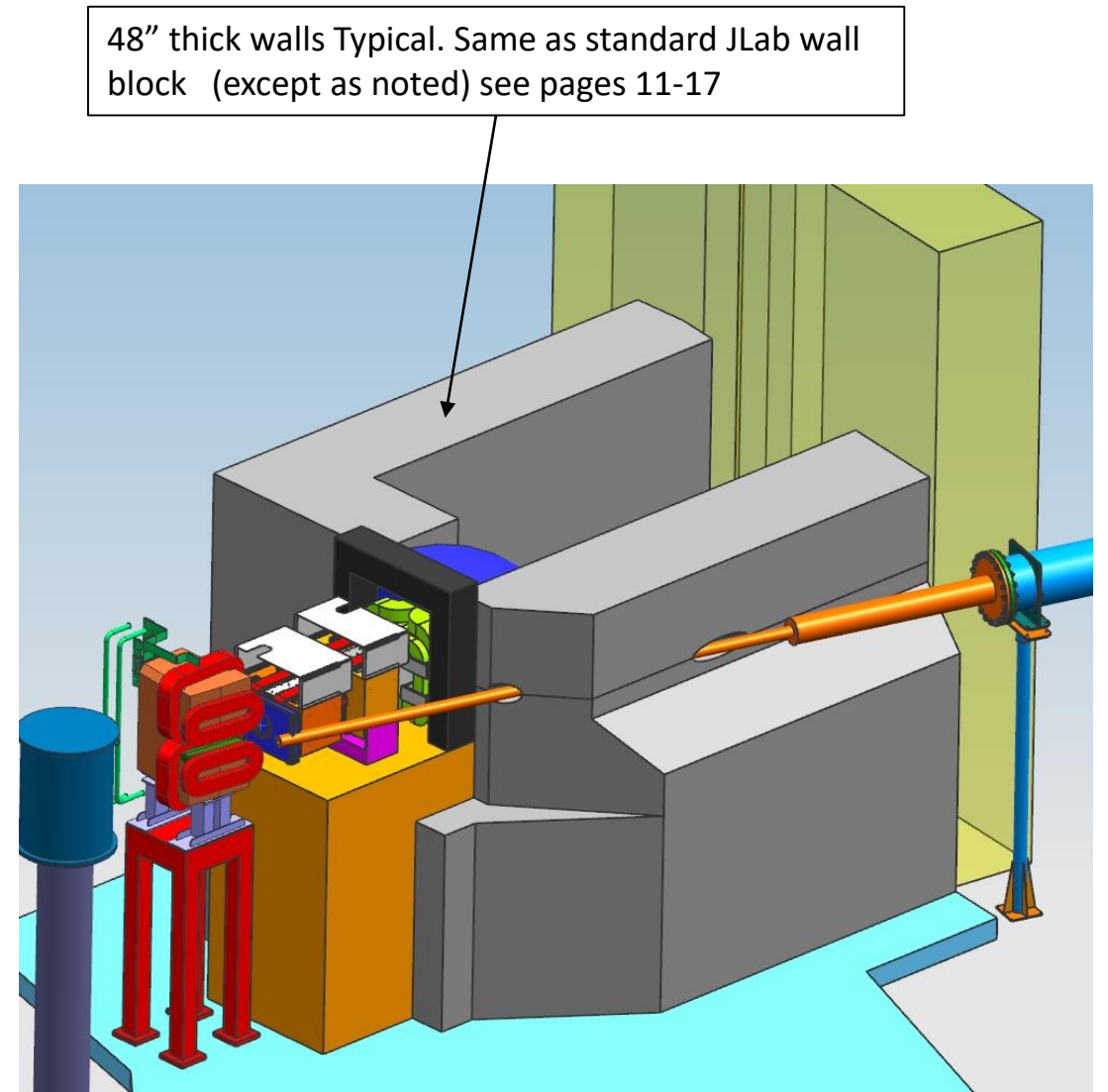
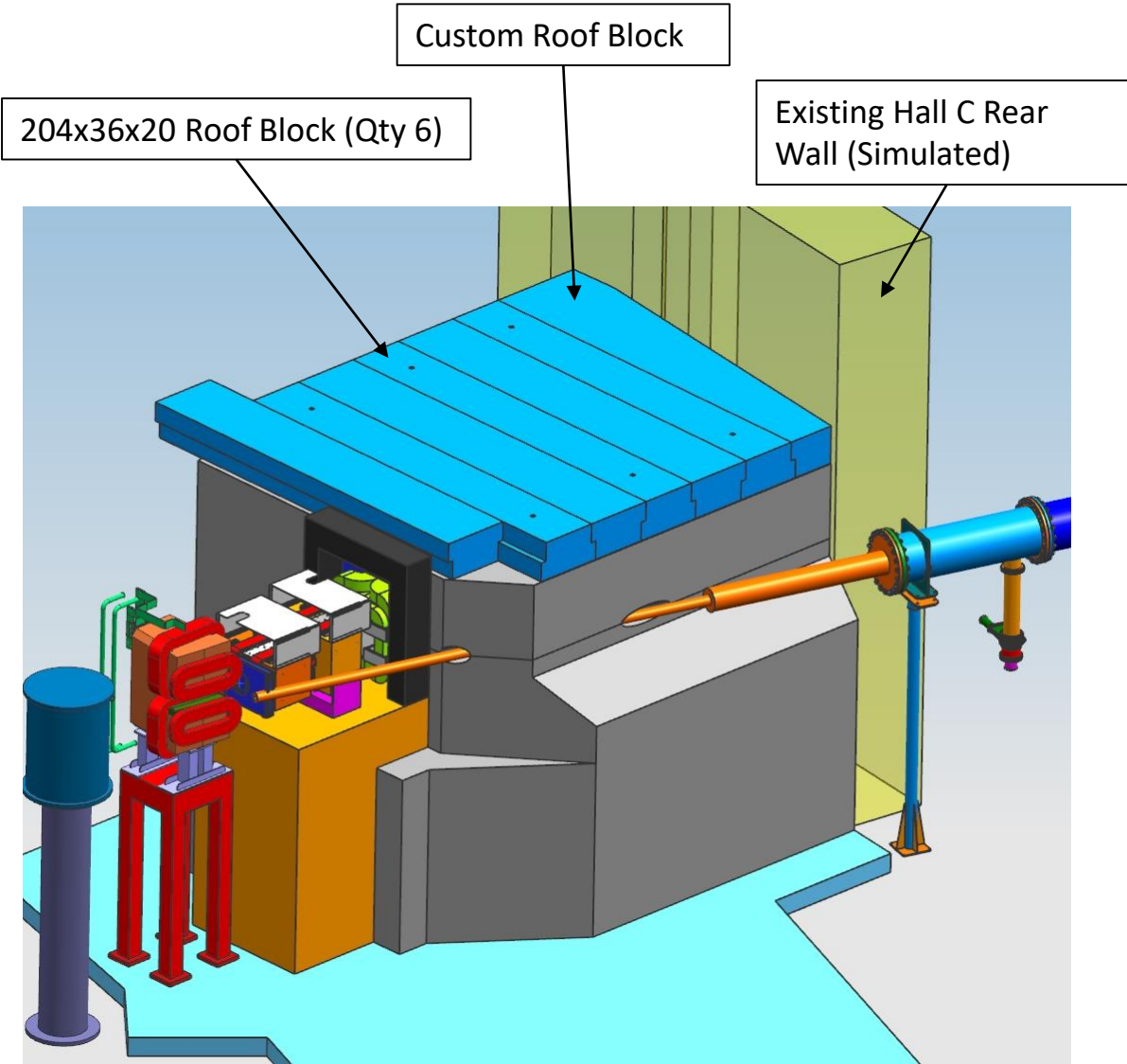


Need to Re-Design Detector Frames for
New Load Direction

Q1, Q2 Adjusters and Shield Block

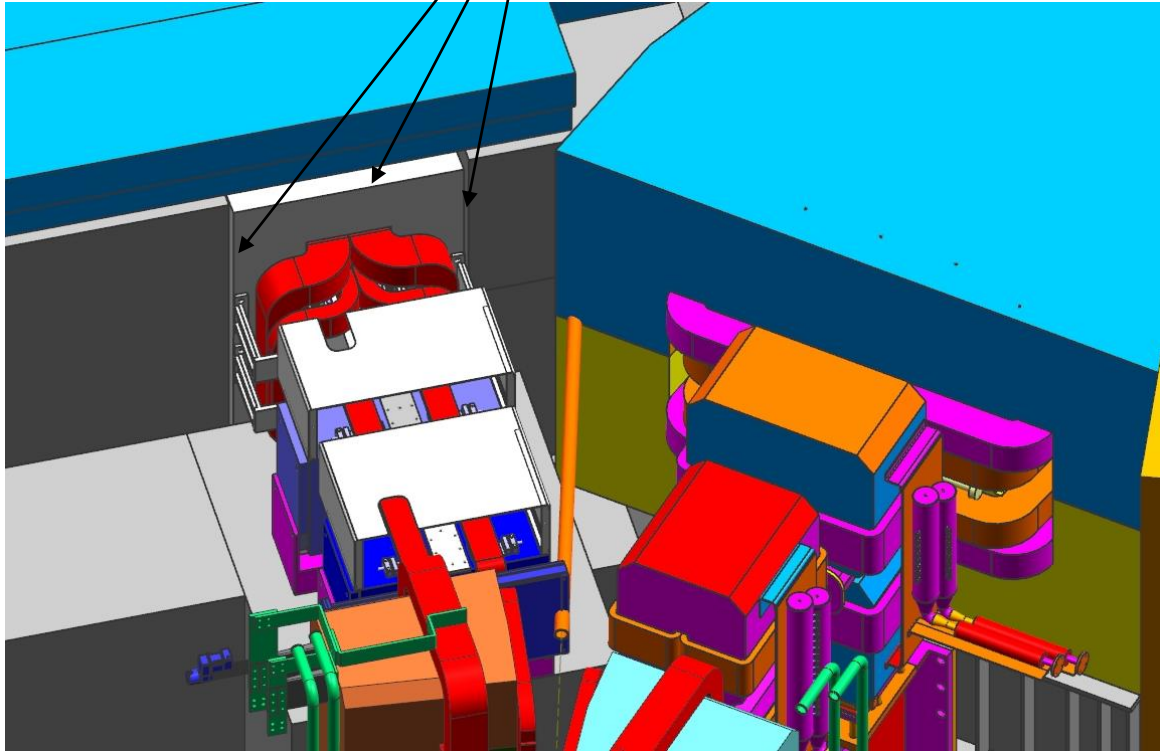
HES Dipole support and adjusters needs to be
narrow in this front (affects shielding thickness)

HES Bunker

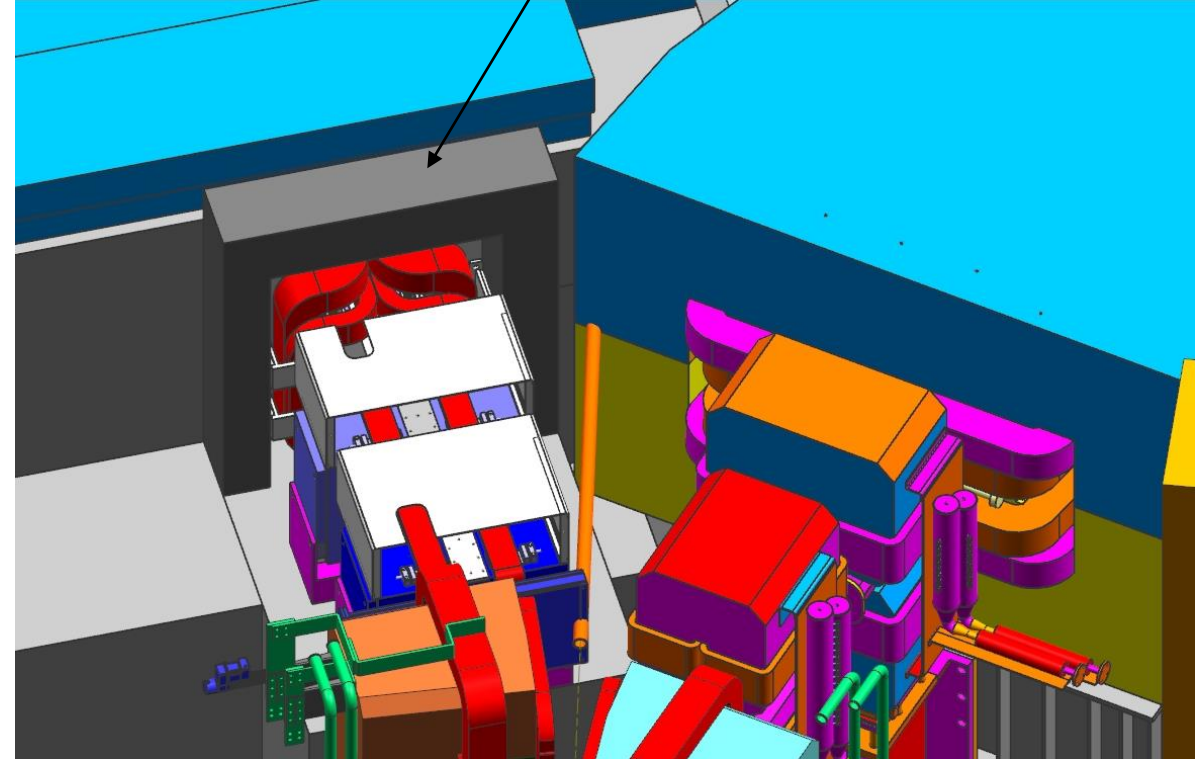


Filling in the gaps

HES Dipole Gap.

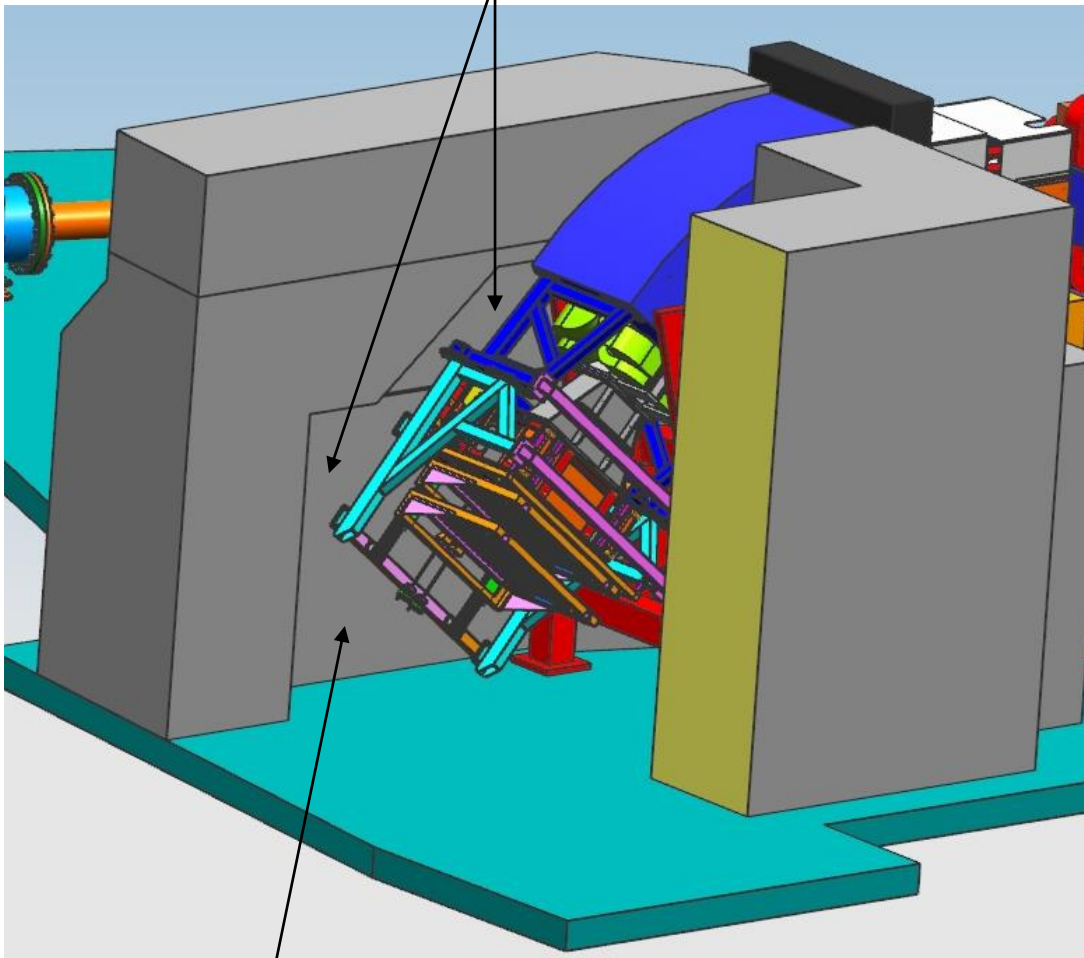


Fill with Pb bricks and steel holding plates
16" of Lead. (Same as SHMS Dipole)



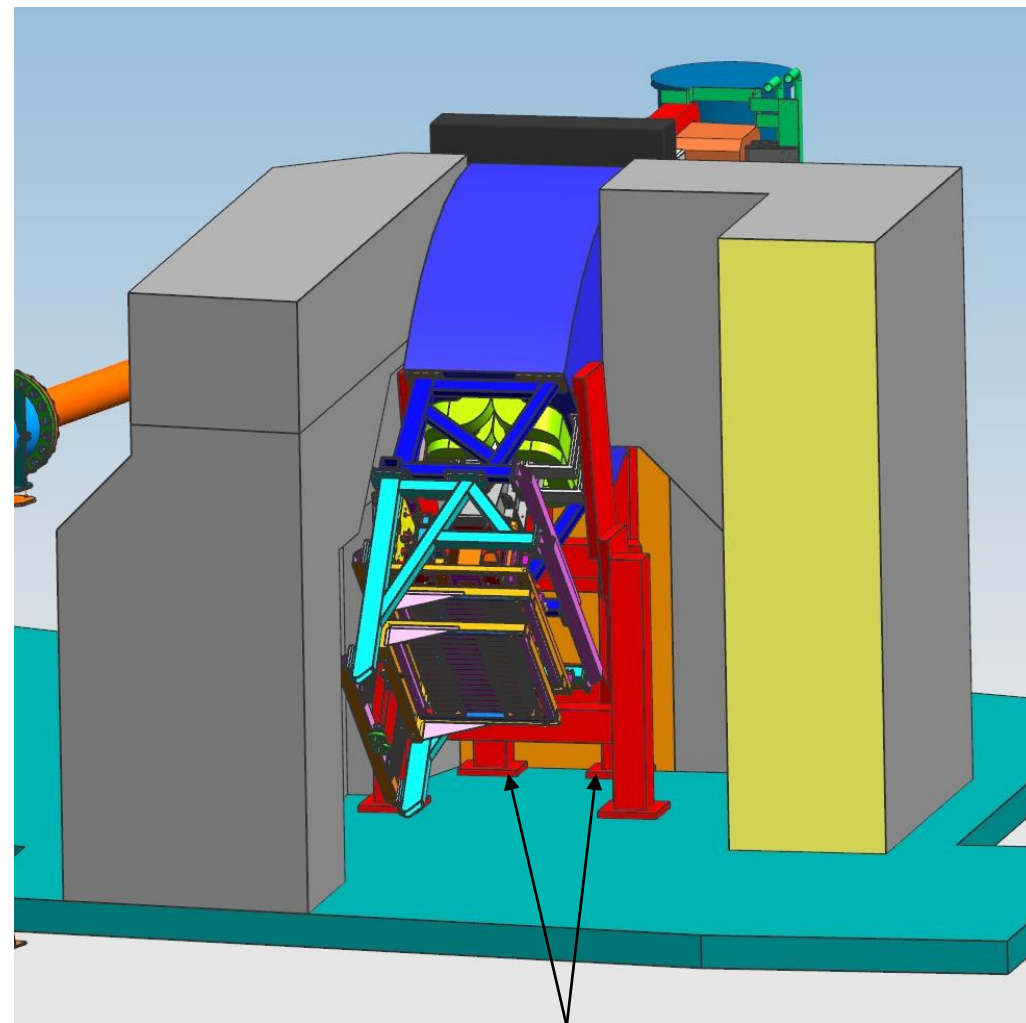
HES Bunker Details

Recess In Concrete for Dipole and Detector Support Frame



24" back access (If needed)

Same as SHMS Bunker and Detectors

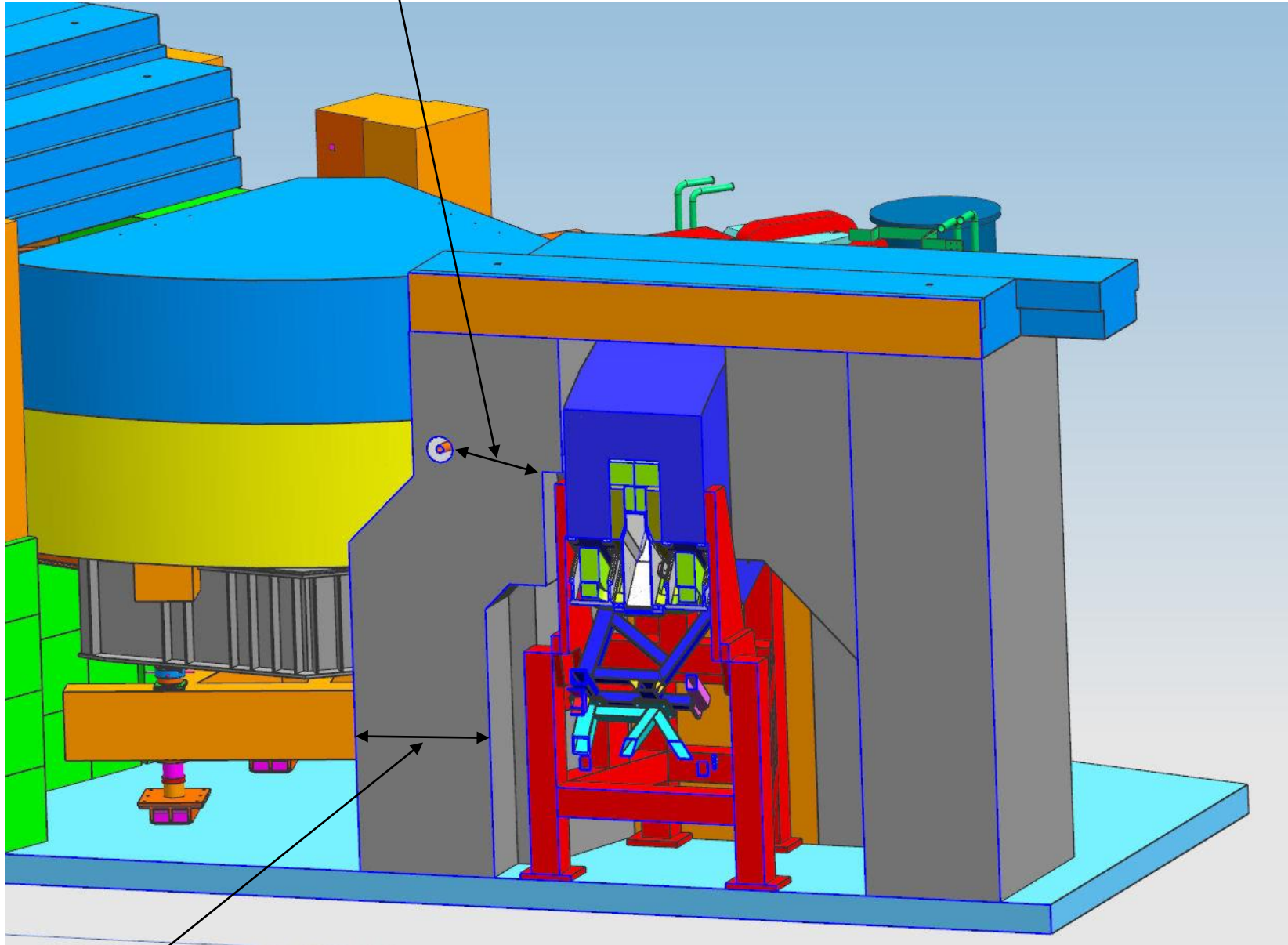


Dipole Support Adjusters only Accessible from 2 sides

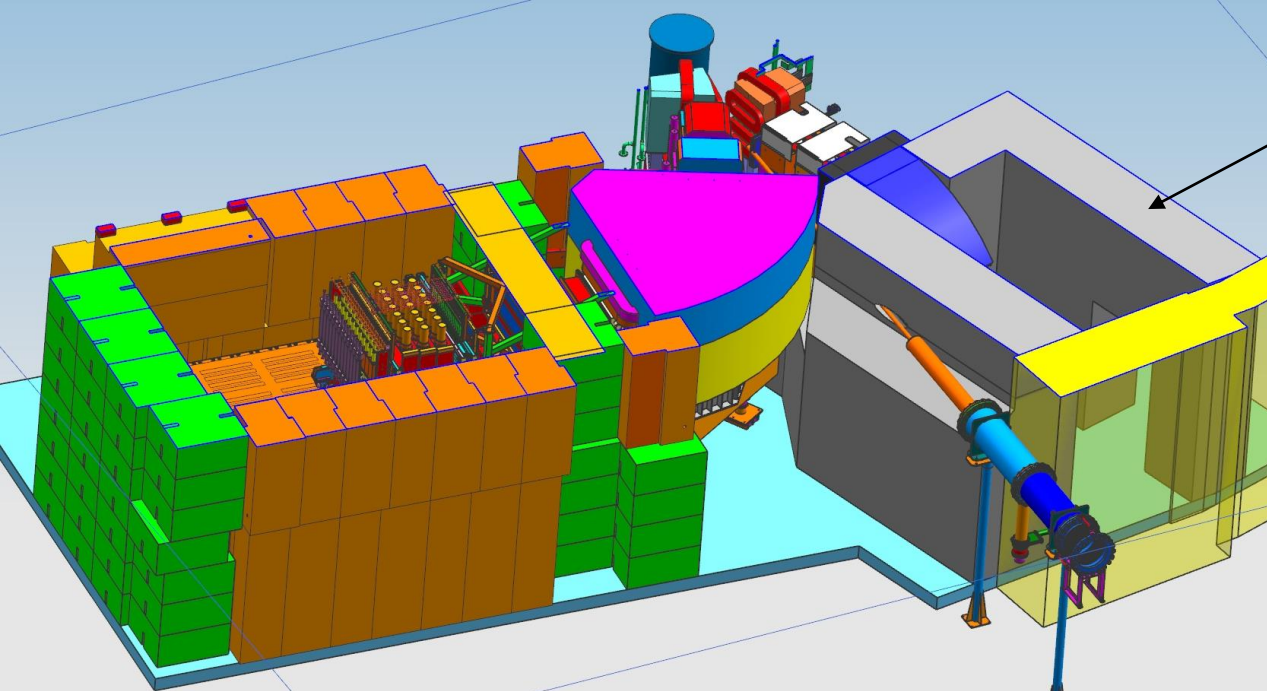
32" of Shielding

HES Section Cut

Cut Normal to magnet



48" of Shielding (Typ)



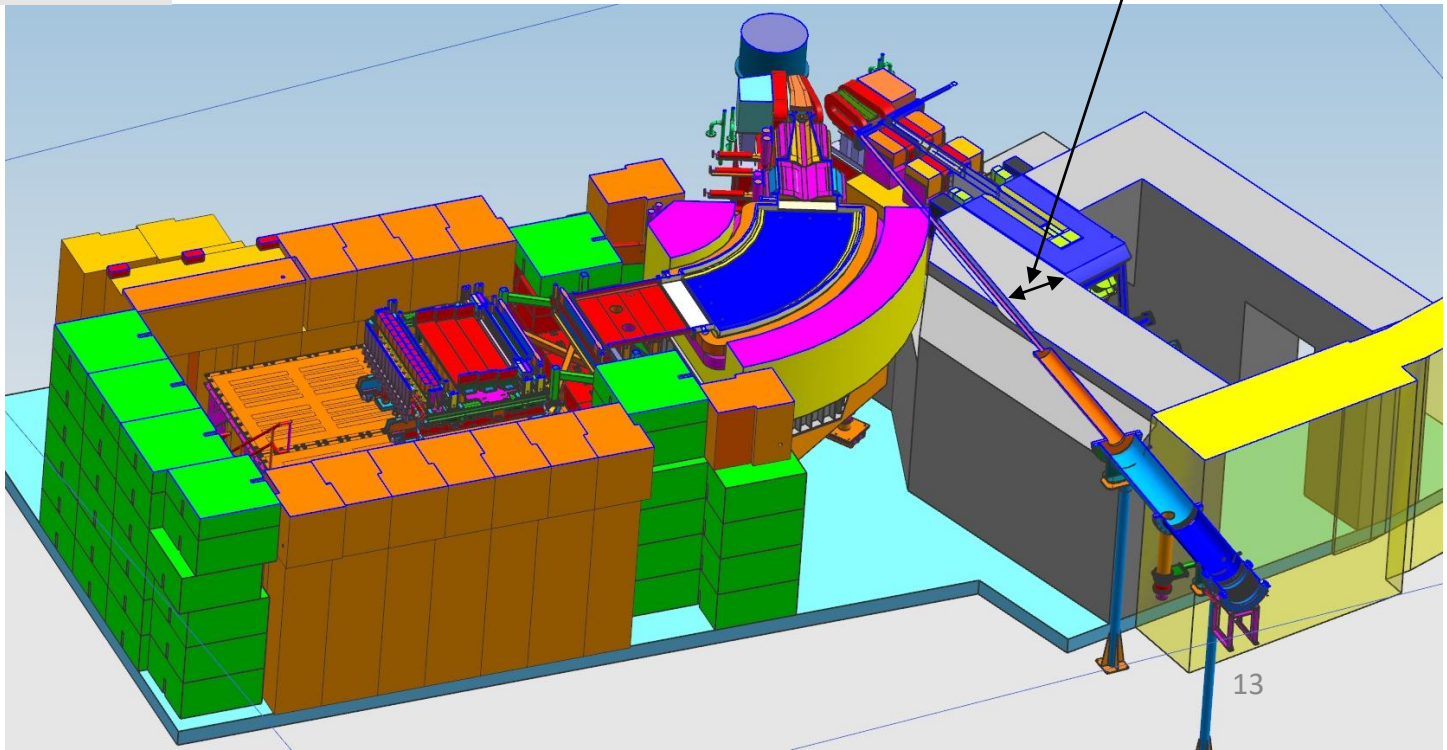
48" of Shielding (Typ)

Section cut at +36"

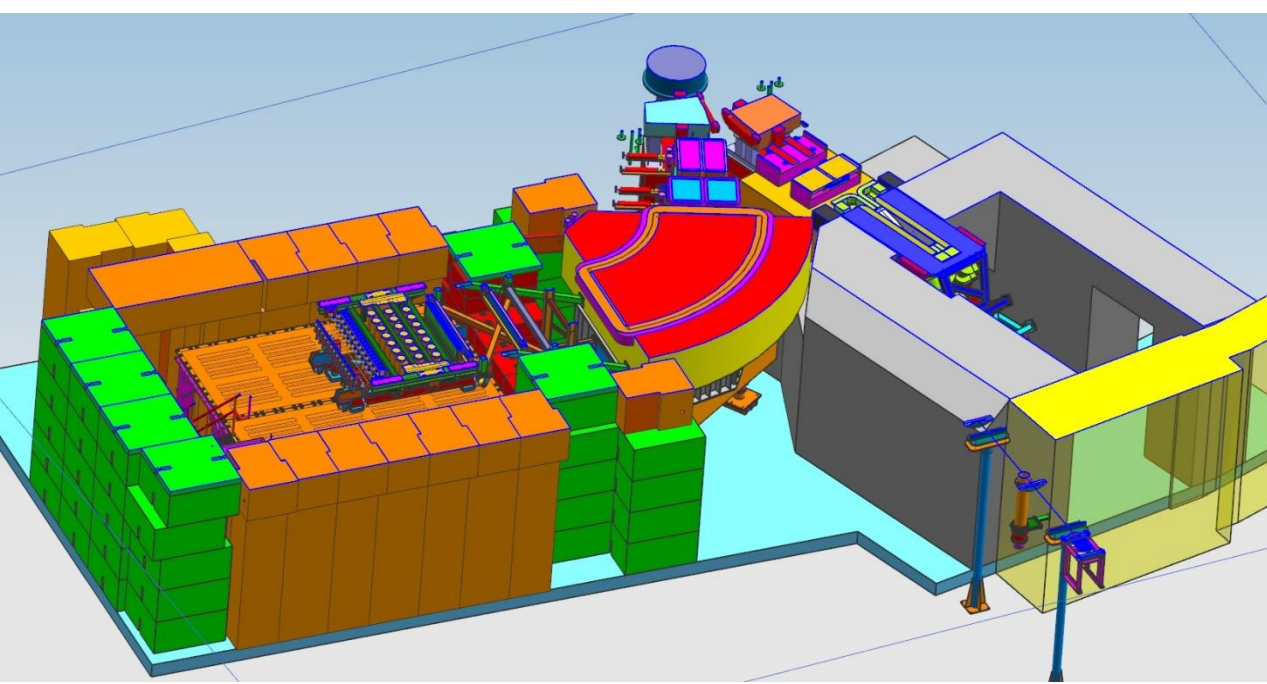
Section Cuts

Cut From Beamline 0"

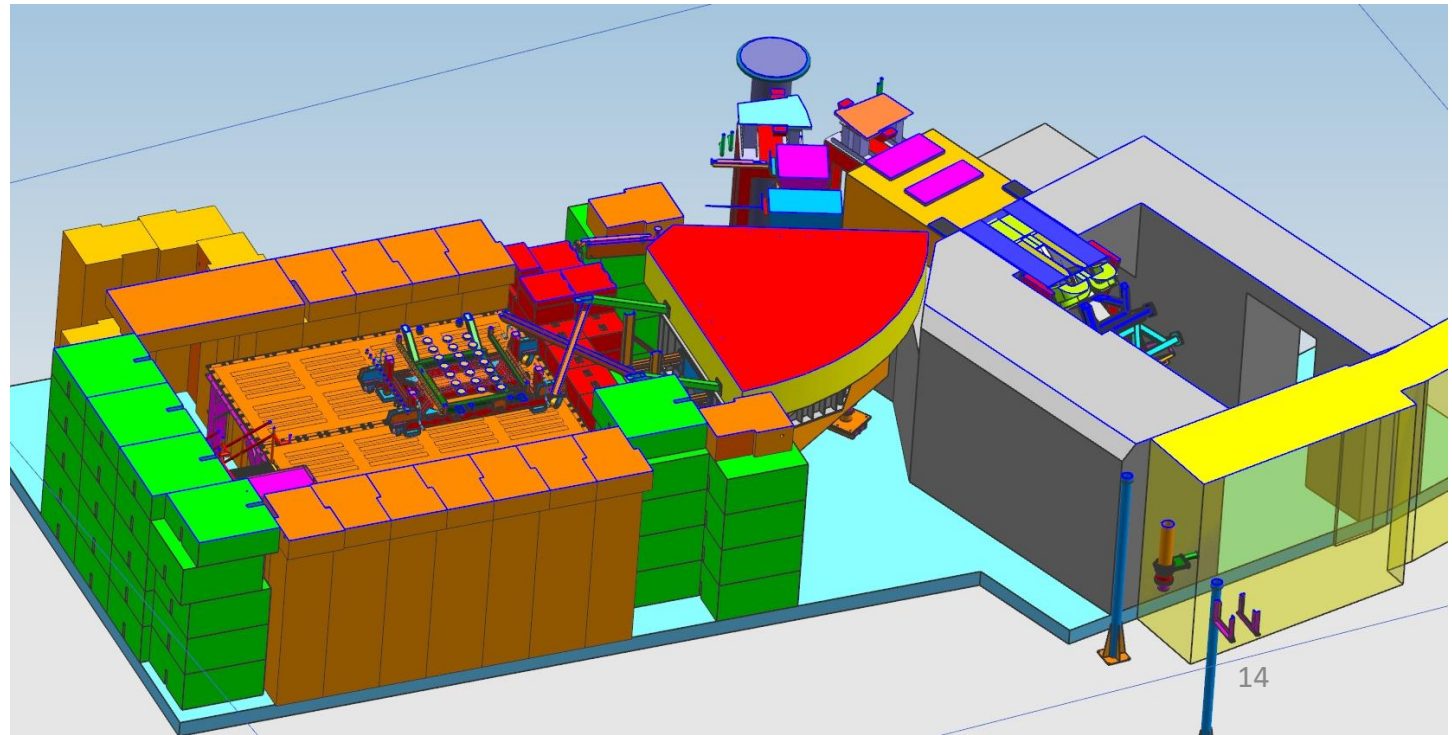
Beamline Section cut at 0"



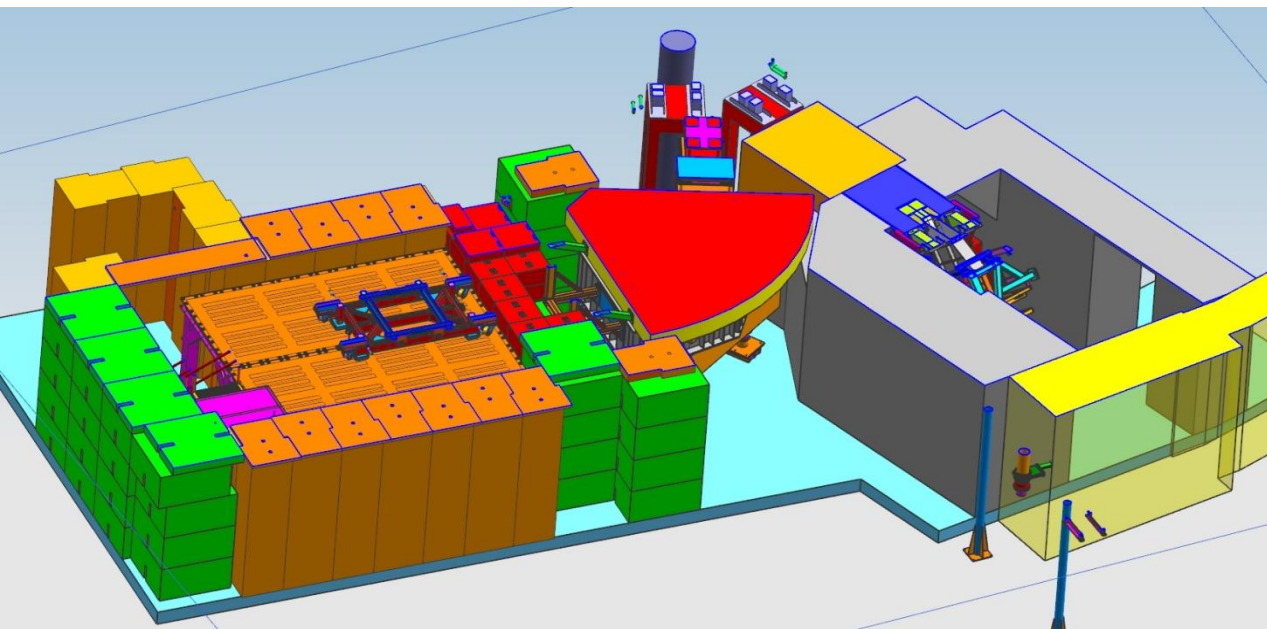
43" of Shielding



Section cut at -12"
below beam line



Section cut at -24"

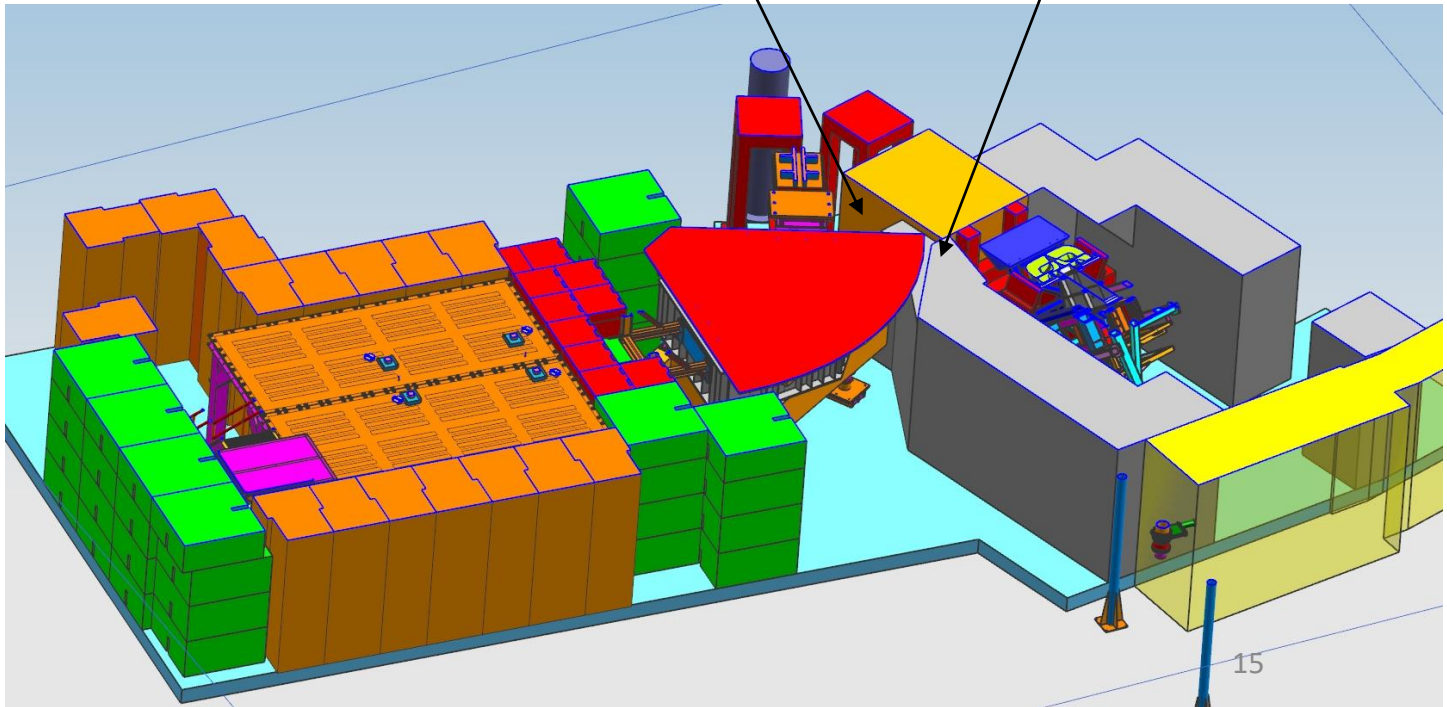


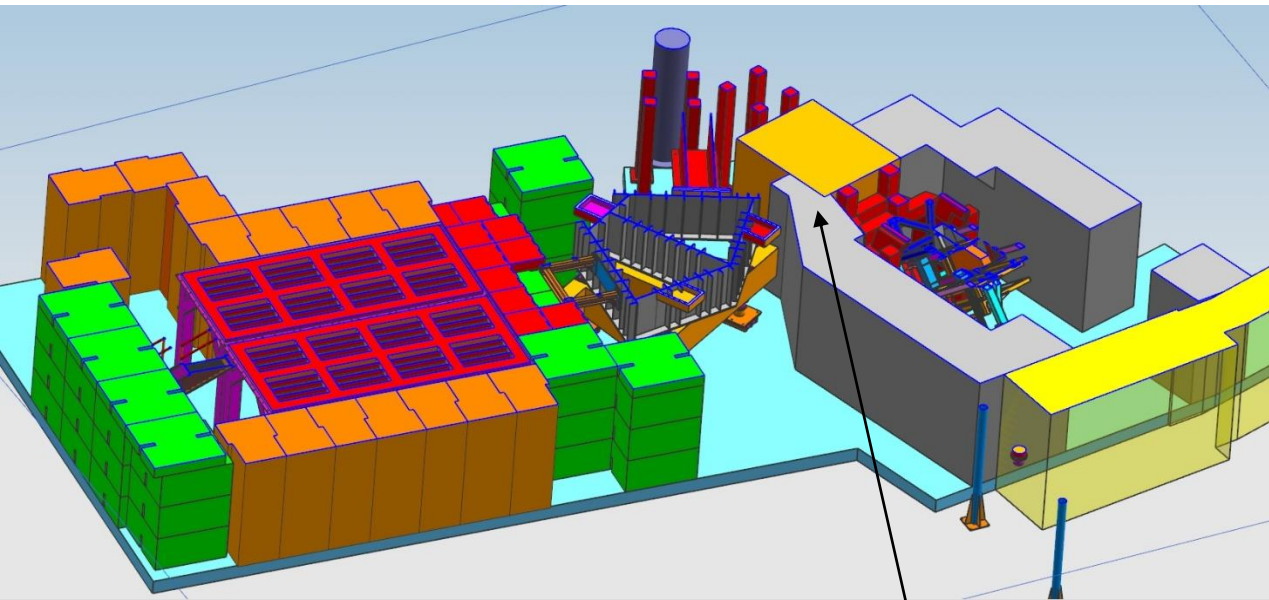
Section cut at -36"

Add Shielding this area

Thin Shielding

Section cut at -48"



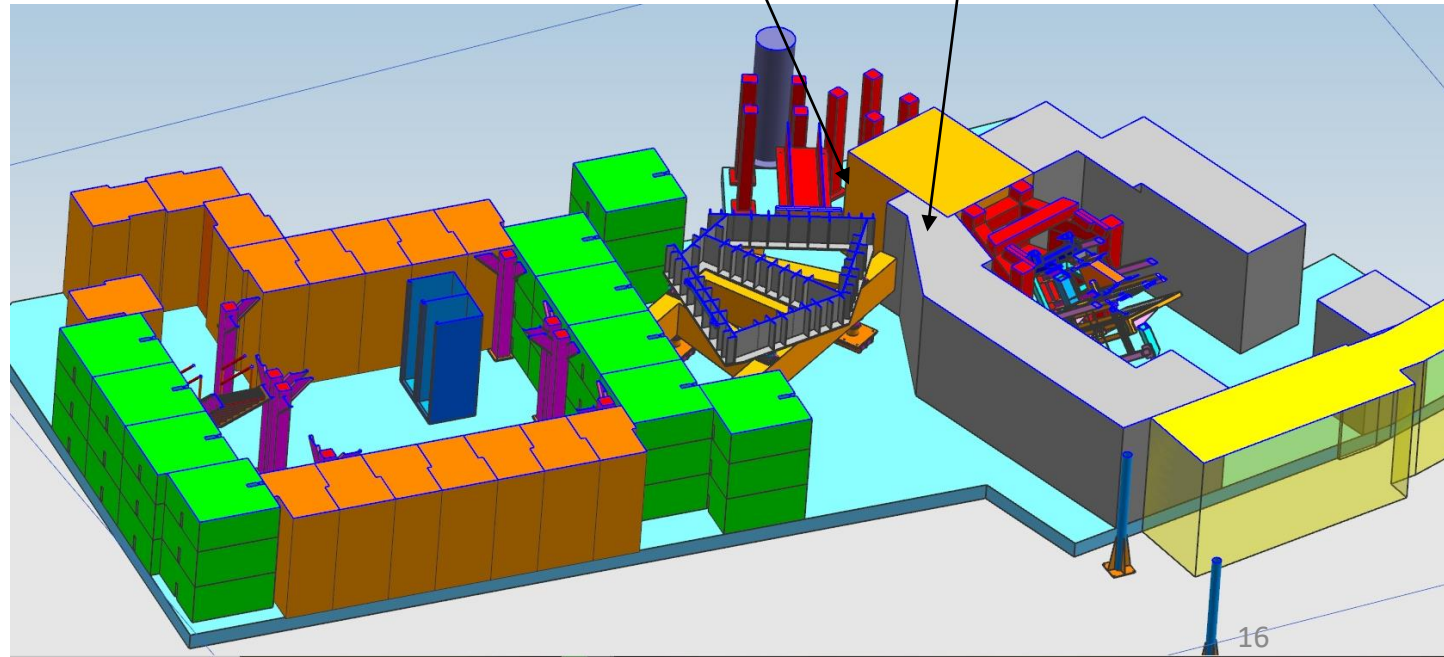


Section cut at -60"

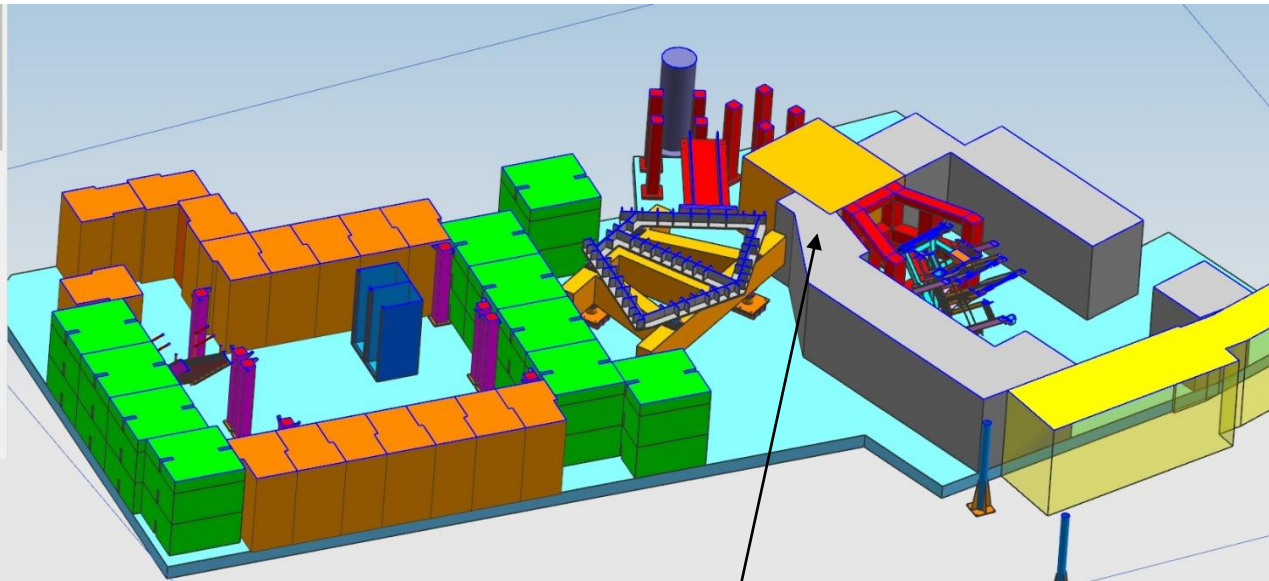
Add Shielding this area

32" Shielding

32" Shielding



Section cut at -72"



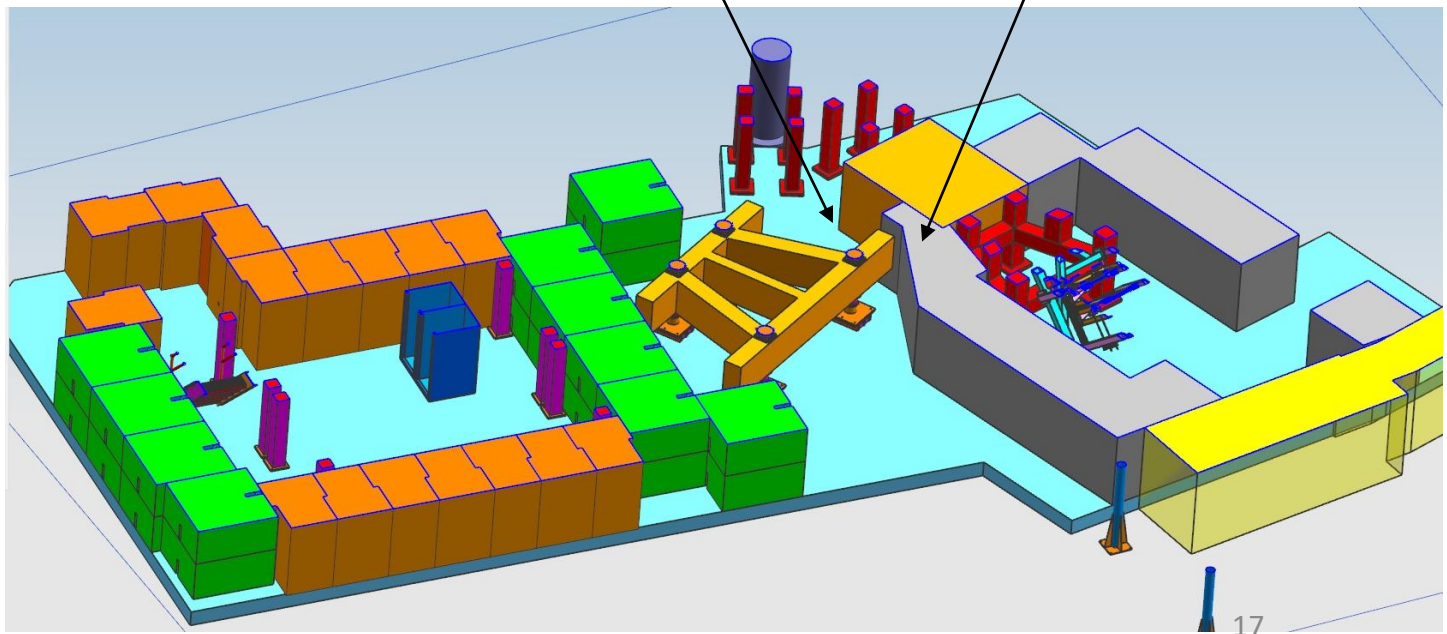
Section cut at -84"

32" of Shielding

Add Shielding this area

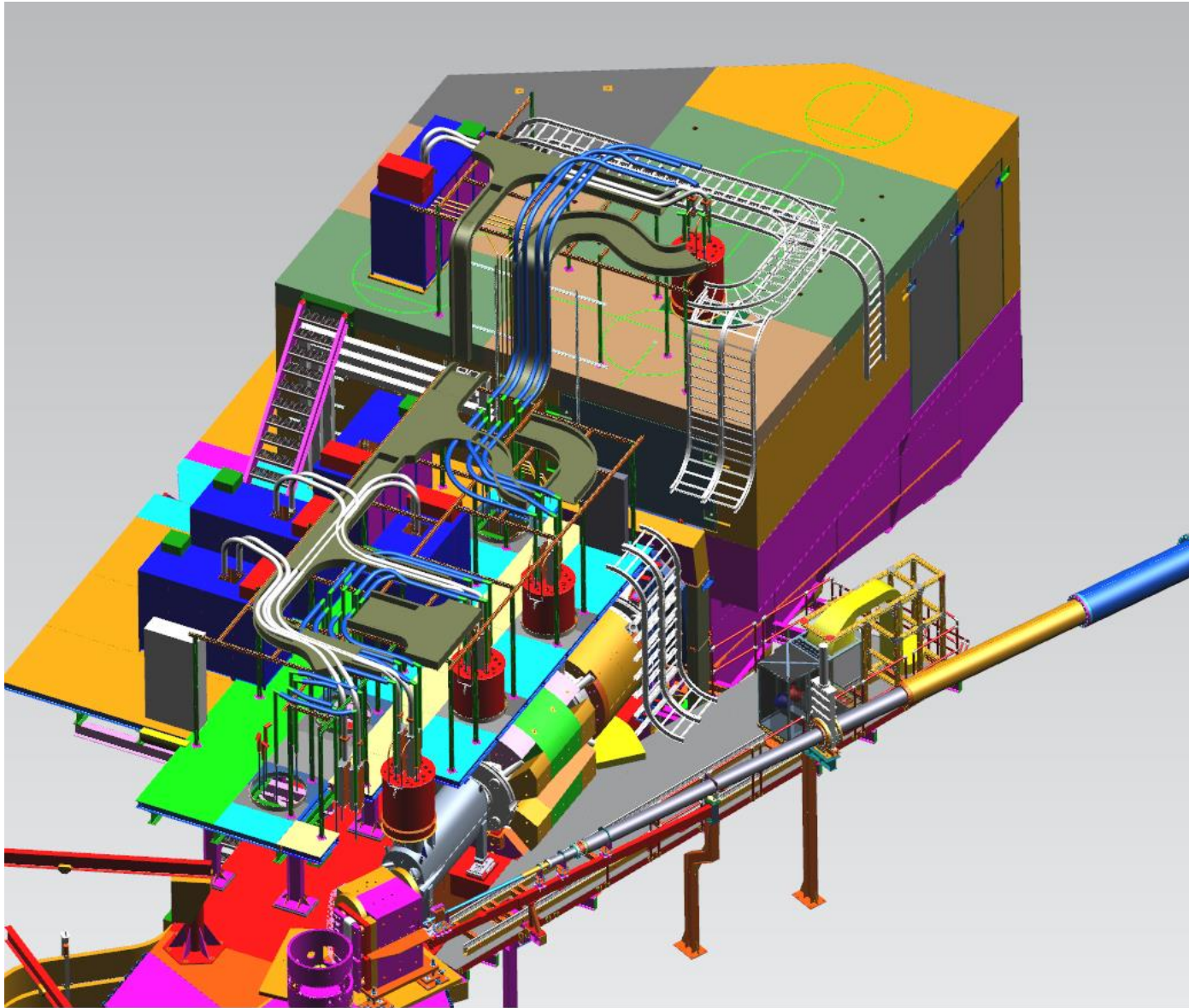
32" of Shielding

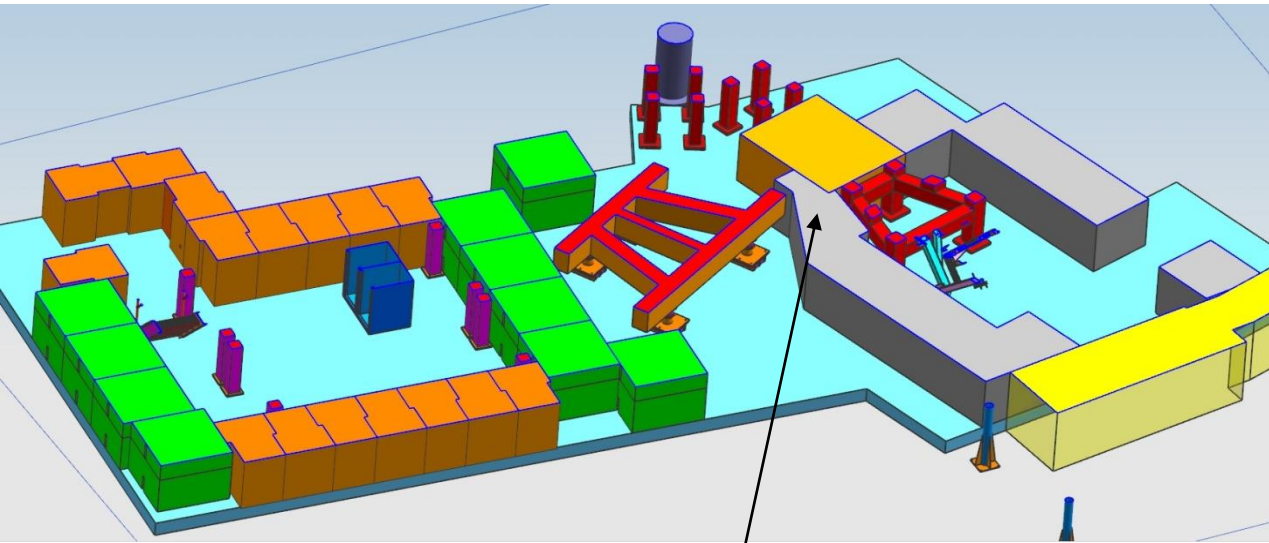
Section cut at -96"



NPS Cable Patch Panel

1080 data and HV cables





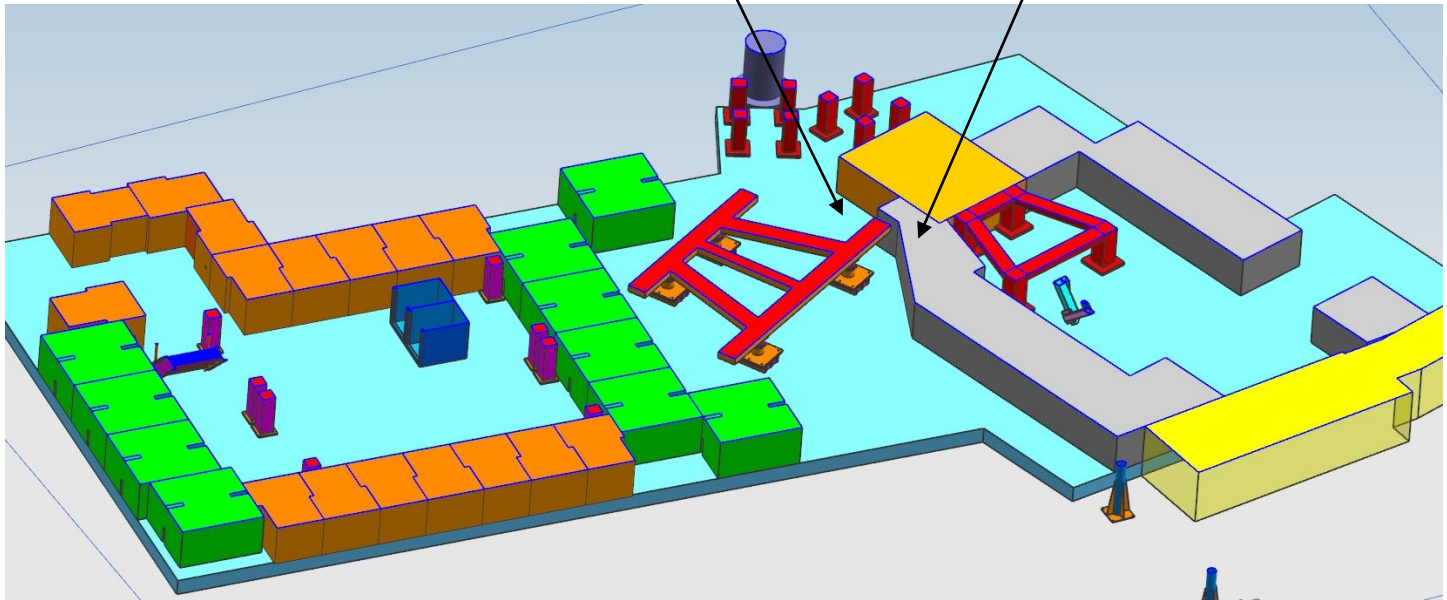
Section cut at -108"

32" of Shielding

Add Shielding this area

32" of Shielding

Section cut at -120"

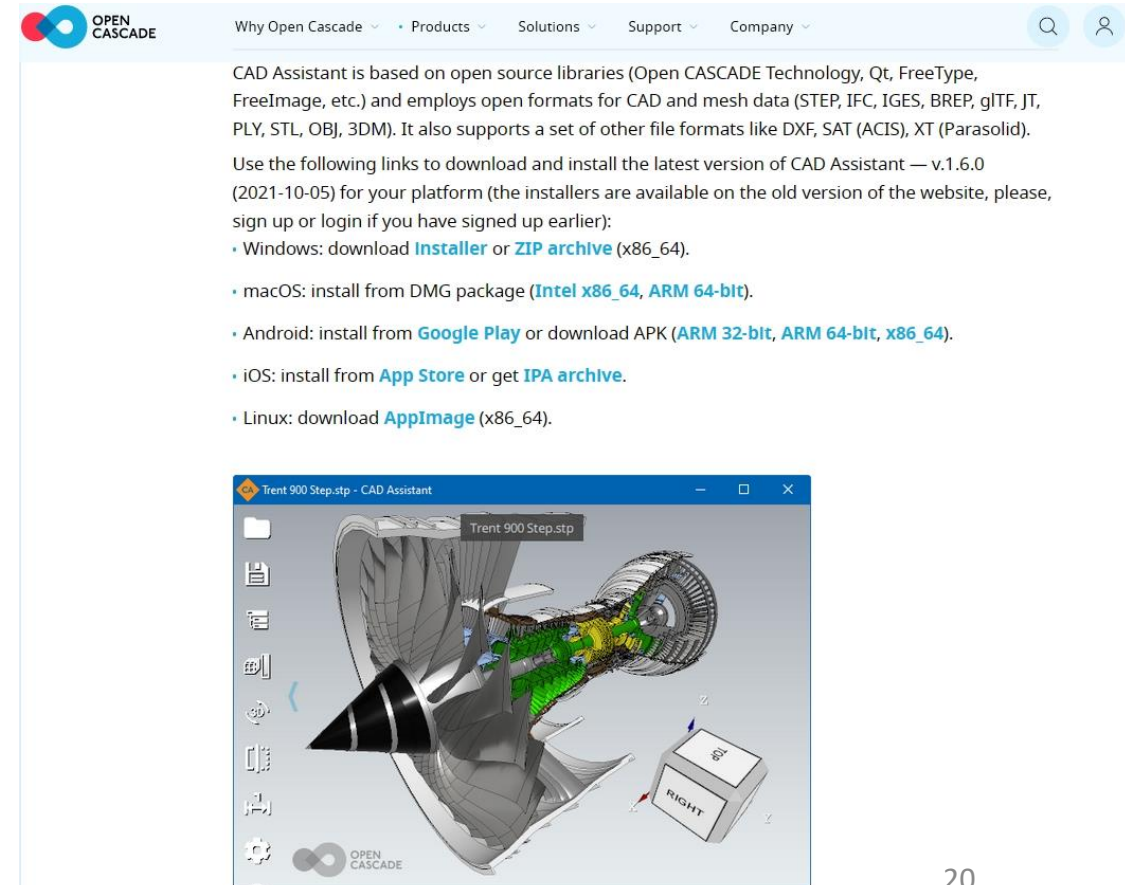


3D Models Available

- JT, STP files (JT are faster for viewing) (STP is for CAD use)
- You can install "CAD Assistant" on your Phone or PC to view JT, STP files
- Phone file download location its in the APP store "CAD Assistant" (free)
- PC file download location <https://www.opencascade.com/products/cad-assistant/>

- JT, STP files download location <https://userweb.jlab.org/~metzger/HyperNuclear>

CAD Assistant Website



The screenshot shows the CAD Assistant website interface. At the top, there is a navigation bar with the Open CASCADE logo and menu items: "Why Open Cascade", "Products", "Solutions", "Support", and "Company". A search icon and a user profile icon are also present. The main content area contains the following text:

CAD Assistant is based on open source libraries (Open CASCADE Technology, Qt, FreeType, FreeImage, etc.) and employs open formats for CAD and mesh data (STEP, IFC, IGES, BREP, glTF, JT, PLY, STL, OBJ, 3DM). It also supports a set of other file formats like DXF, SAT (ACIS), XT (Parasolid).

Use the following links to download and install the latest version of CAD Assistant — v.1.6.0 (2021-10-05) for your platform (the installers are available on the old version of the website, please, sign up or login if you have signed up earlier):

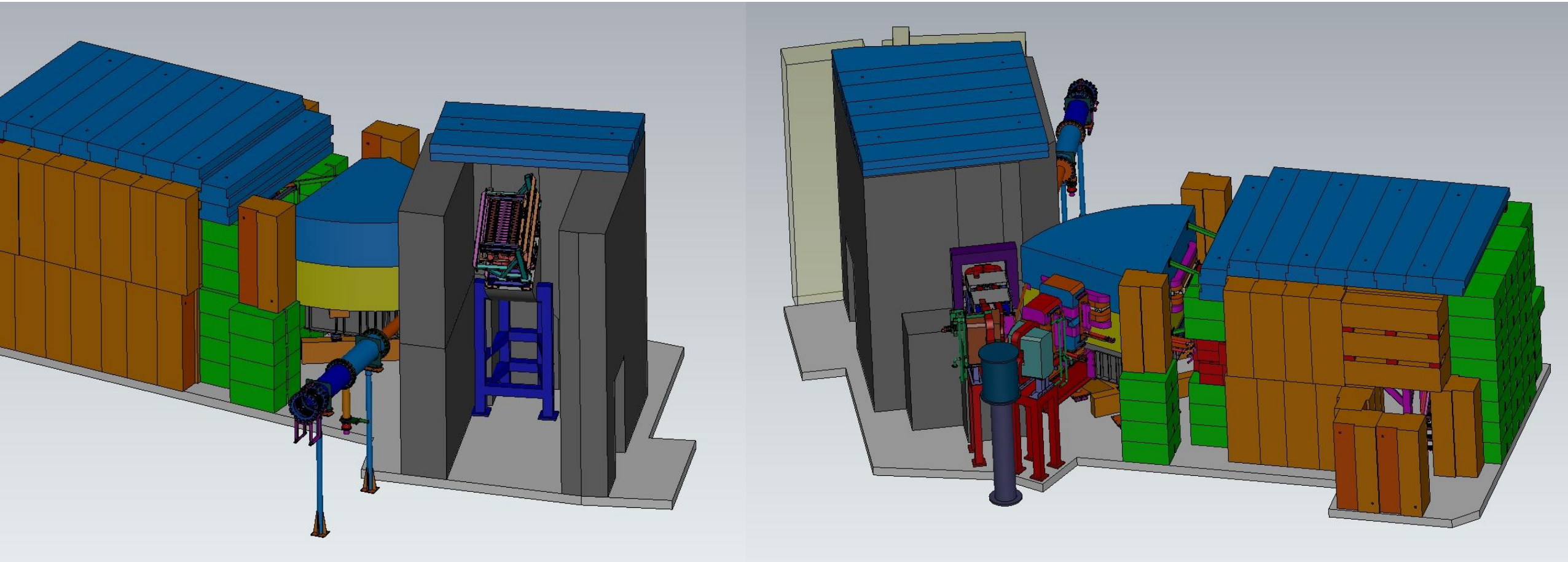
- Windows: download [Installer](#) or [ZIP archive](#) (x86_64).
- macOS: install from DMG package ([Intel x86_64](#), [ARM 64-bit](#)).
- Android: install from [Google Play](#) or download APK ([ARM 32-bit](#), [ARM 64-bit](#), [x86_64](#)).
- iOS: install from [App Store](#) or get [IPA archive](#).
- Linux: download [AppImage](#) (x86_64).

Below the text is a screenshot of the CAD Assistant application window. The window title is "Trent 900 Step.stp - CAD Assistant". The main view shows a 3D model of a complex mechanical part, likely a turbine or engine component, rendered in a semi-transparent style to show internal features. The model is displayed in a 3D perspective view. A coordinate system is visible in the bottom right corner, with axes labeled "RIGHT", "UP", and "FRONT". The Open CASCADE logo is visible in the bottom left corner of the application window.

Conclusion

- Shield Blocks inventory may be insufficient for current layout
- Shielding needs to be simulated for effectiveness.
- Target being 11.24m downstream of pivot, may need an updated girder for beam steering.
- Layout doesn't show any major hurdles.

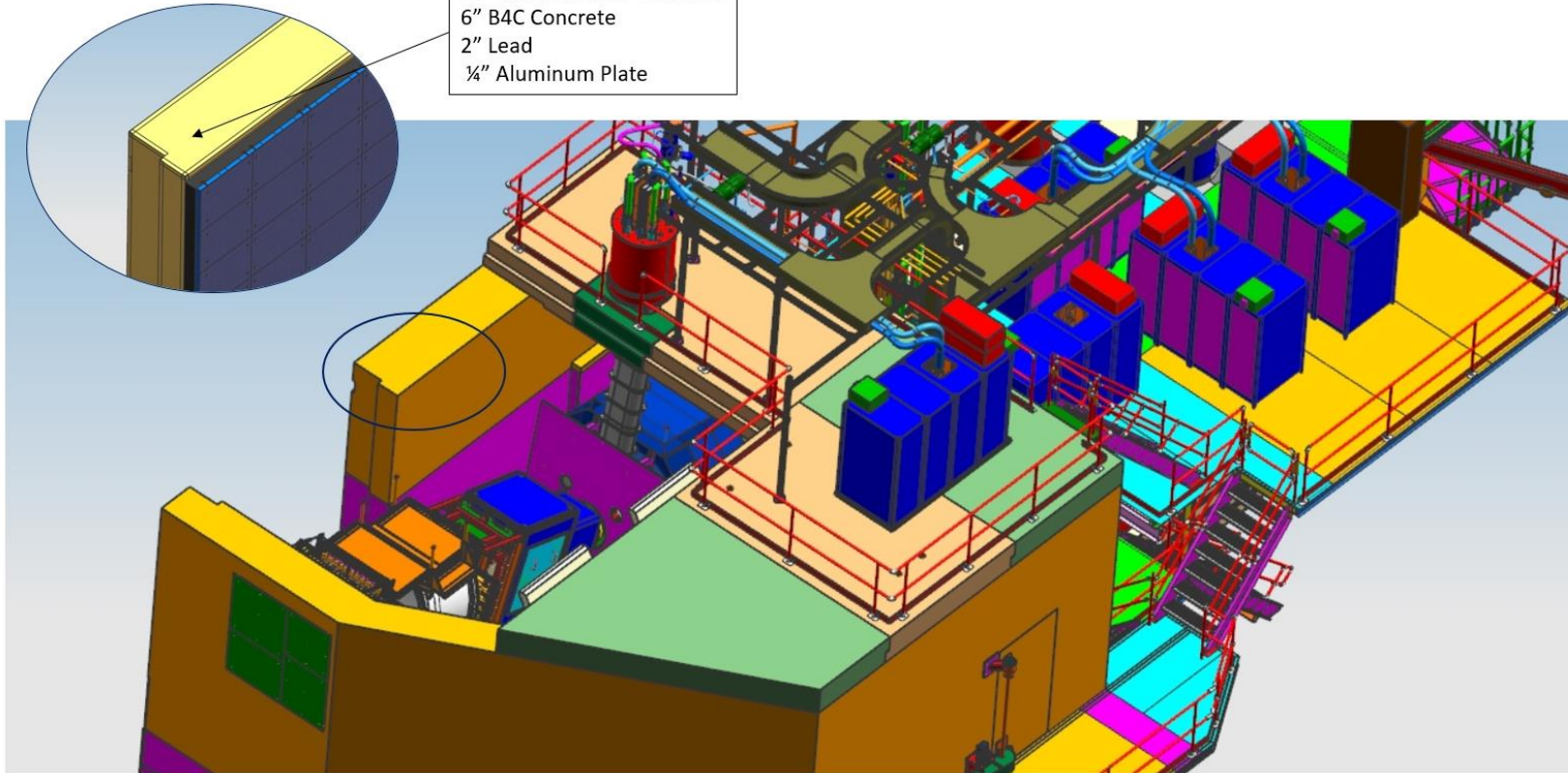
HES with an upward bend Conceptional



SHMS Shield Hut Composition and Thickness

SHMS Beamline Wall Thickness

35" Plastic loaded Concrete
6" B4C Concrete
2" Lead
¼" Aluminum Plate



NPS Patch Panel cabling routing could be used for Hypernuclear

~1080 data
and HV patch
panel

