

# ILC

## CERN 3D STUDIES for Civil Engineering

September 2009  
John Osborne / A.Kosmicki

A 3D CAD model of a particle accelerator component, likely a beam pipe or diagnostic chamber. The model is rendered in a light gray color against a dark blue background. It features several cylindrical sections connected by flanges and a central longitudinal passage. A coordinate system is visible in the top right corner, with axes labeled x, y, and z. The z-axis is vertical, the x-axis is horizontal, and the y-axis is diagonal. The model is shown from a perspective view, highlighting its complex geometry and assembly.

# ILC CFS AD&I Daresbury Lab

## Summary

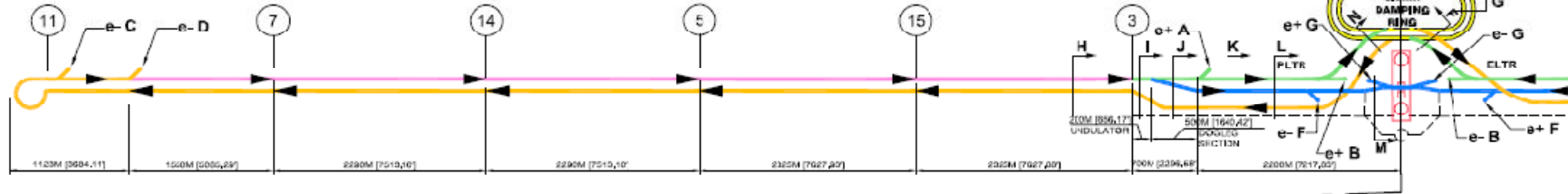
J.Osborne / V.Kuchler / A.Enomoto

| CFS AD&I MEETING AGENDA          |                                   | <u>Revised August, 31, 2009</u> |                           |  |
|----------------------------------|-----------------------------------|---------------------------------|---------------------------|--|
| Daresbury Laboratory, UK         |                                   |                                 |                           |  |
| September 3-4, 2009              |                                   |                                 |                           |  |
|                                  |                                   | September 3, 2009               | September 4, 2009         |  |
| Regional Meeting Times           | Topic                             | Area System Representatives     | Topic                     | Area System Representatives              |
| 0100-0215 SLAC<br>0300-0415 FNAL | 0900-1015 DL, UK<br>1700-1815 KEK | General Introduction            | In-House Participants     | Damping Ring<br>S. Giuducci              |
| 0215-0230 SLAC<br>0415-0430 FNAL | 1015-1030 DL, UK<br>1815-1830 KEK | Break                           |                           | Break                                    |
| 0230-0400 SLAC<br>0430-0600 FNAL | 1030-1200 DL, UK<br>1830-2000 KEK | e+ Source                       | J. Clarke<br>N.Collomb    | Beam Delivery System<br>D. Angal-Kalinin |
| 0400-0500 SLAC<br>0600-0700 FNAL | 1200-1300 DL, UK<br>2000-2100 KEK | Lunch                           |                           | Lunch                                    |
| 0500-0630 SLAC<br>0700-0830 FNAL | 1300-1430 DL, UK<br>2100-2230 KEK | RTML                            | N. Solyak                 | General Review<br>In-House Participants  |
| 0630-0700 SLAC<br>0830-0900 FNAL | 1430-1500 DL, UK<br>2230-2300 KEK | Break                           |                           | Break                                    |
| 0700-0800 SLAC<br>0900-1000 FNAL | 1500-1600 DL, UK<br>2300-2400 KEK | e- Source                       | A. Brachman<br>J. Shepard | Main Linacs<br>C. Adophsen               |
| 0800-0900 SLAC<br>1000-1100 FNAL | 1600-1700 DL, UK<br>0000-0100 KEK | Overview with E. Paterson       | E. Paterson               | Overview with E. Paterson<br>E. Paterson |

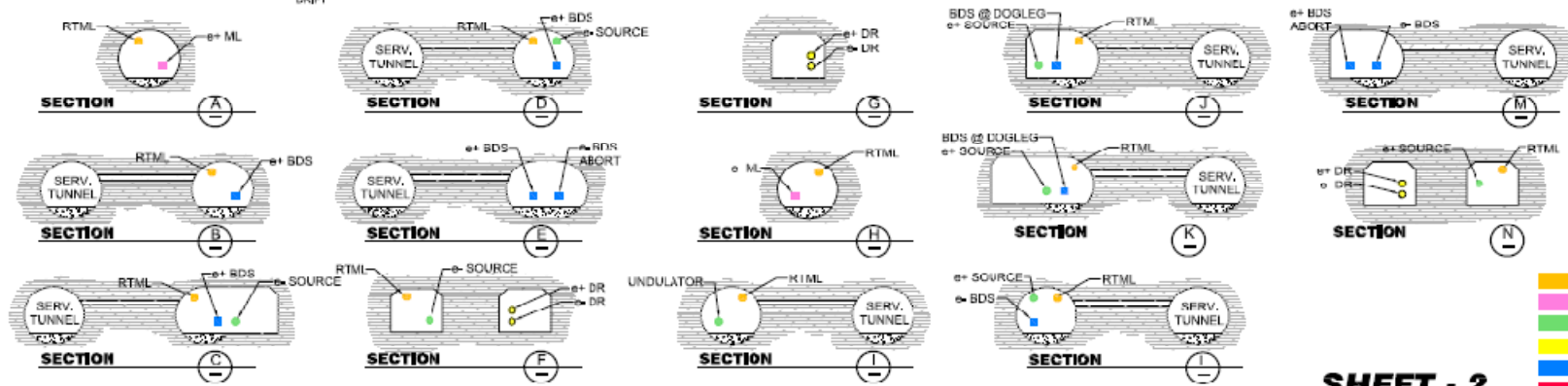
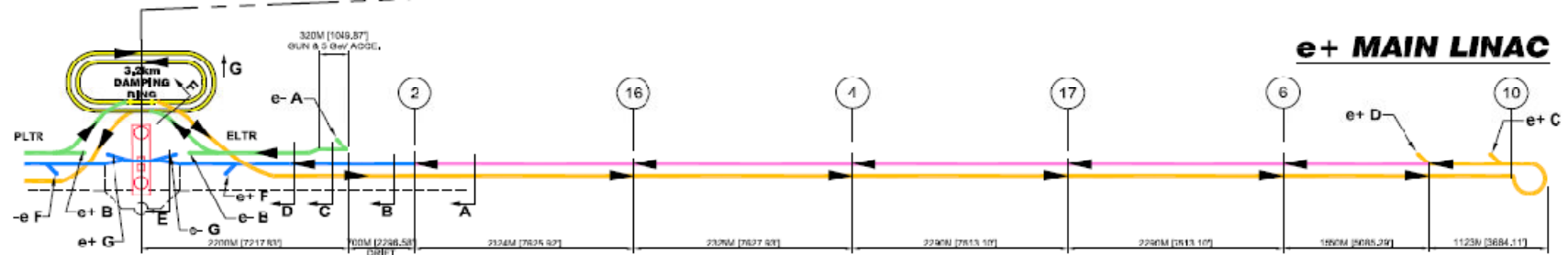
Material will be posted on Indico :

<http://ilcagenda.linearcollider.org/conferenceDisplay.py?confId=4146>

# e- MAIN LINAC



# e+ MAIN LINAC

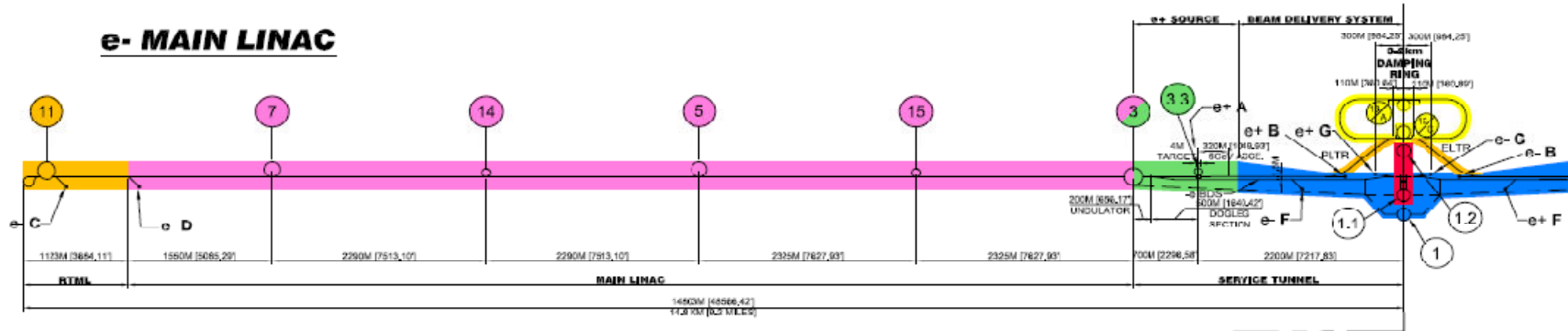


**LEGEND**

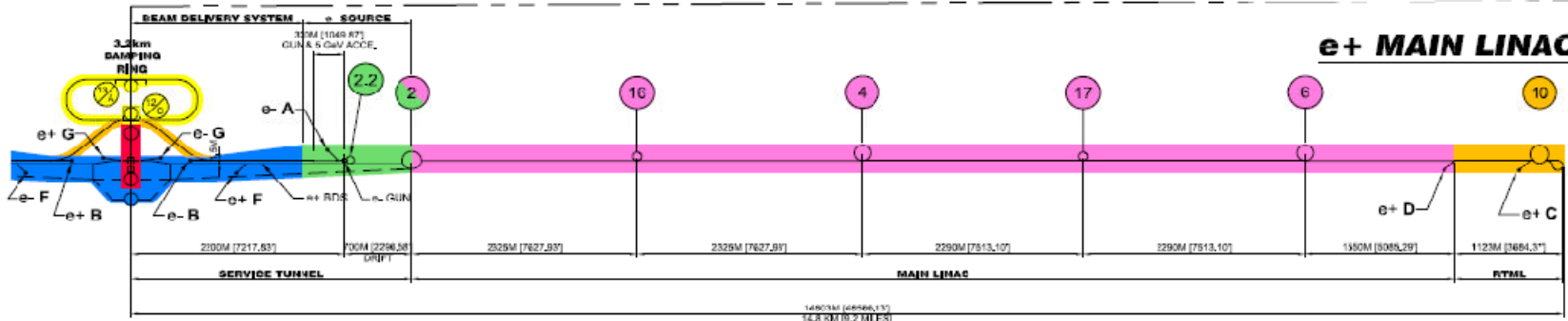
- RTML
- ML
- SOURCES
- DR
- BDS
- DETECTOR AREA
- SERVICE TUNNEL
- BEAM DIRECTION

**SHEET - 2**  
**Draft 8 28 09**

## e- MAIN LINAC



## e+ MAIN LINAC



SITE / TUNNEL LENGTHS (M)

| e- SIDE<br>ML + RTML | e+ SIDE<br>ML + RTML | B.D.S./SOURCES<br>SERVICE/FTRL/PTRL | DAMPING<br>RING | TOTAL |
|----------------------|----------------------|-------------------------------------|-----------------|-------|
| 13233                | 13233                | 5800 + 5890 + 600                   | 3238            | 41904 |

TUNNELS

| AREA<br>SYSTEM | e- INJECT.<br>BDS & SERVICE | D.R. | R.T.M.L.<br>BEAM | MAIN LINAC<br>BEAM | e+ INJECT.<br>BDS & SERVICE |
|----------------|-----------------------------|------|------------------|--------------------|-----------------------------|
| width M        | 8.9 + 5.2                   | 4.5  | 5.2              | 5.2                | 8.9 + 5.2                   |

SHAFT BASE CAVERNS

| POINT         | 2, 3, 4, 5, 6, 7, 10, 11 | 14, 15, 16, 17 |
|---------------|--------------------------|----------------|
| (L x W x H) m | 52 x 10 x 5.3            | 3 x 3 x SHAFT  |

SHAFTS

| POINT | 1.0 | 1.1 | 1.2 | 2  | 2.2 | 3  | 3.3 | 4  | 5  | 6 | 7 | 10 | 11 | 12/C | 13/A | 14 | 15 | 16 | 17 |
|-------|-----|-----|-----|----|-----|----|-----|----|----|---|---|----|----|------|------|----|----|----|----|
| Ø M   | 9   | 16  | 16  | 14 | 4   | 14 | 4   | 14 | 14 | 9 | 9 | 14 | 14 | 9    | 9    | 3  | 3  | 3  | 3  |

DETECTORS HALL

| POINT         | 1.1, 1.2       | 1.0          |
|---------------|----------------|--------------|
| (L x W x H) m | 120 x 25 x 3.9 | 40 x 15 x 15 |

MUON WALL WIDENINGS

| POINT         | BDS                        |
|---------------|----------------------------|
| (L x W x H) m | 25 x 7 x 6<br>+ 15 x 7 x 6 |

LEGEND

- RTML
- ML
- SOURCES
- DR
- BDS
- DETECTOR AREA

SOURCES CAVERNS

| POINT         | e+ SOURCE   |
|---------------|-------------|
| (L x W x H) m | 40 x 40 x 8 |

DAMPING RING

| POINT         | 12/C        | 13/A        |
|---------------|-------------|-------------|
| (L x W x H) m | 10 x 10 x 5 | 74 x 10 x 5 |

BEAM ABORT CAVERNS ( )

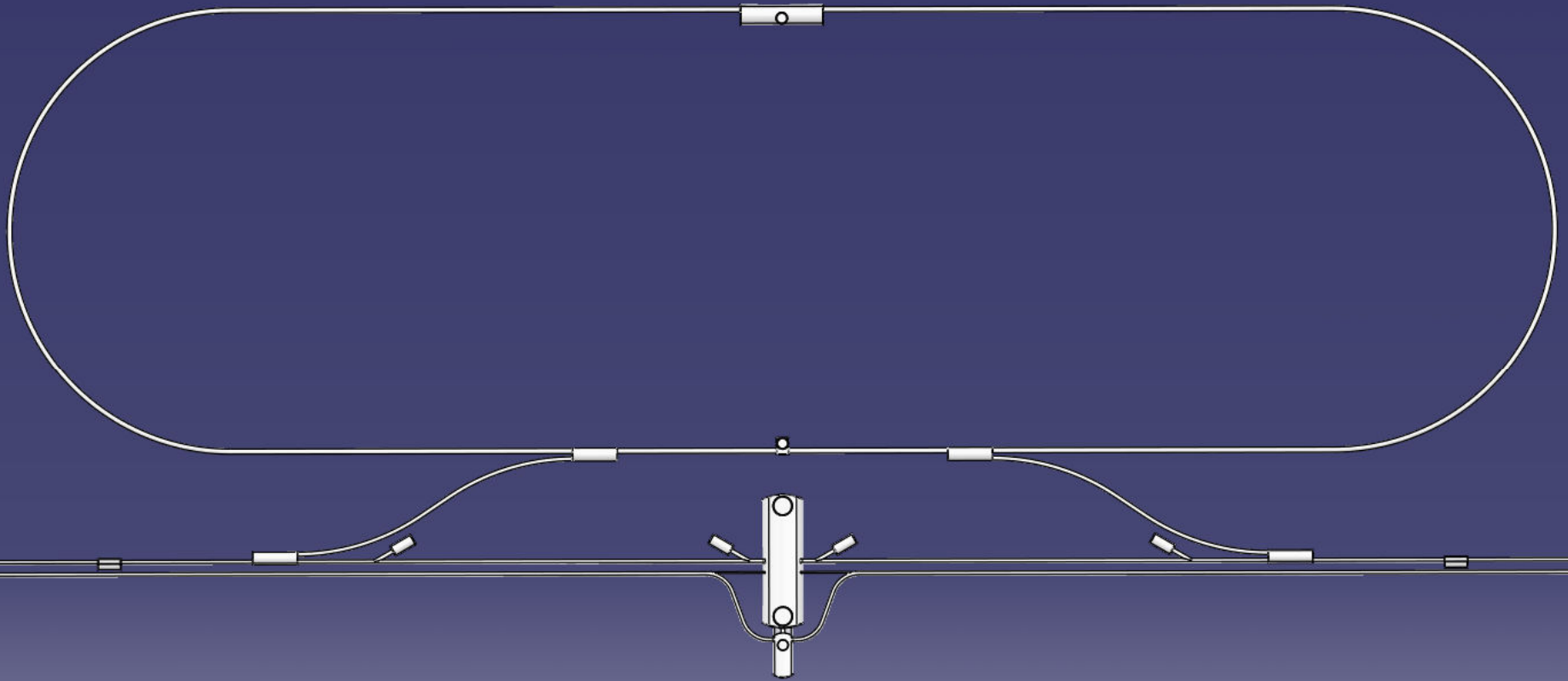
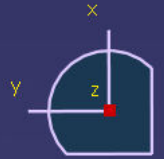
| POINT         | SOURCES<br>e-A & e+A | RTML<br>e-C, e-D, e+C & e+D | BDS<br>e-B, e-F, e-G, e+B, e+F & e+G |
|---------------|----------------------|-----------------------------|--------------------------------------|
| (L x W x H) m |                      | 5 x 4 x 4                   | 20 x 9 x 15<br>+ 1 STORY             |

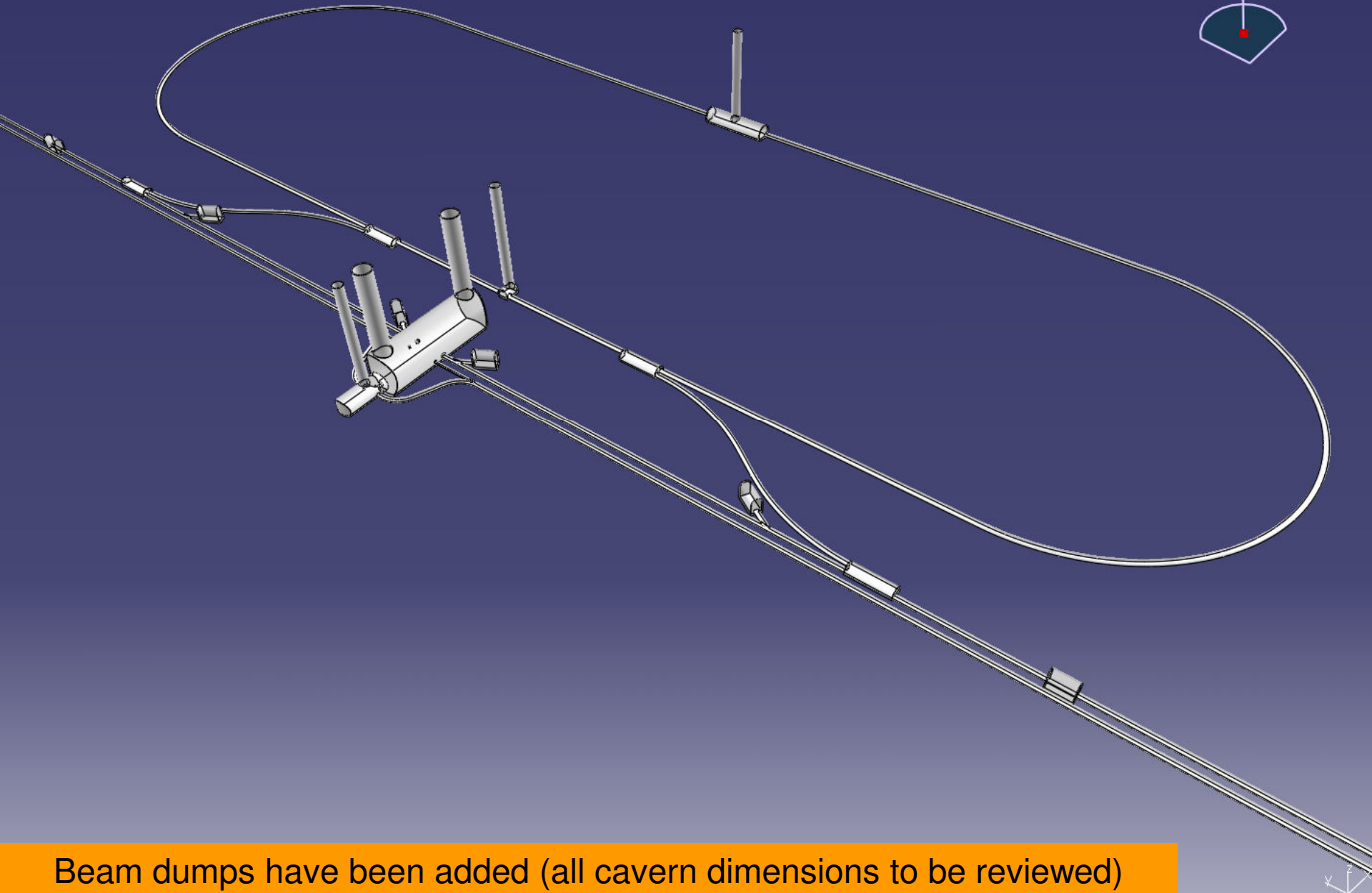
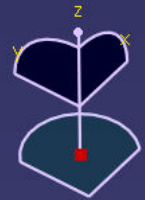
BEAM ABORT SERVICE HALLS ( )

| POINT         | BDS<br>e-B, e-G, e+B & e+G |
|---------------|----------------------------|
| (L x W x H) m | 30 x 20 x 10               |

**SHEET - 1**  
**Draft 8 28 09**

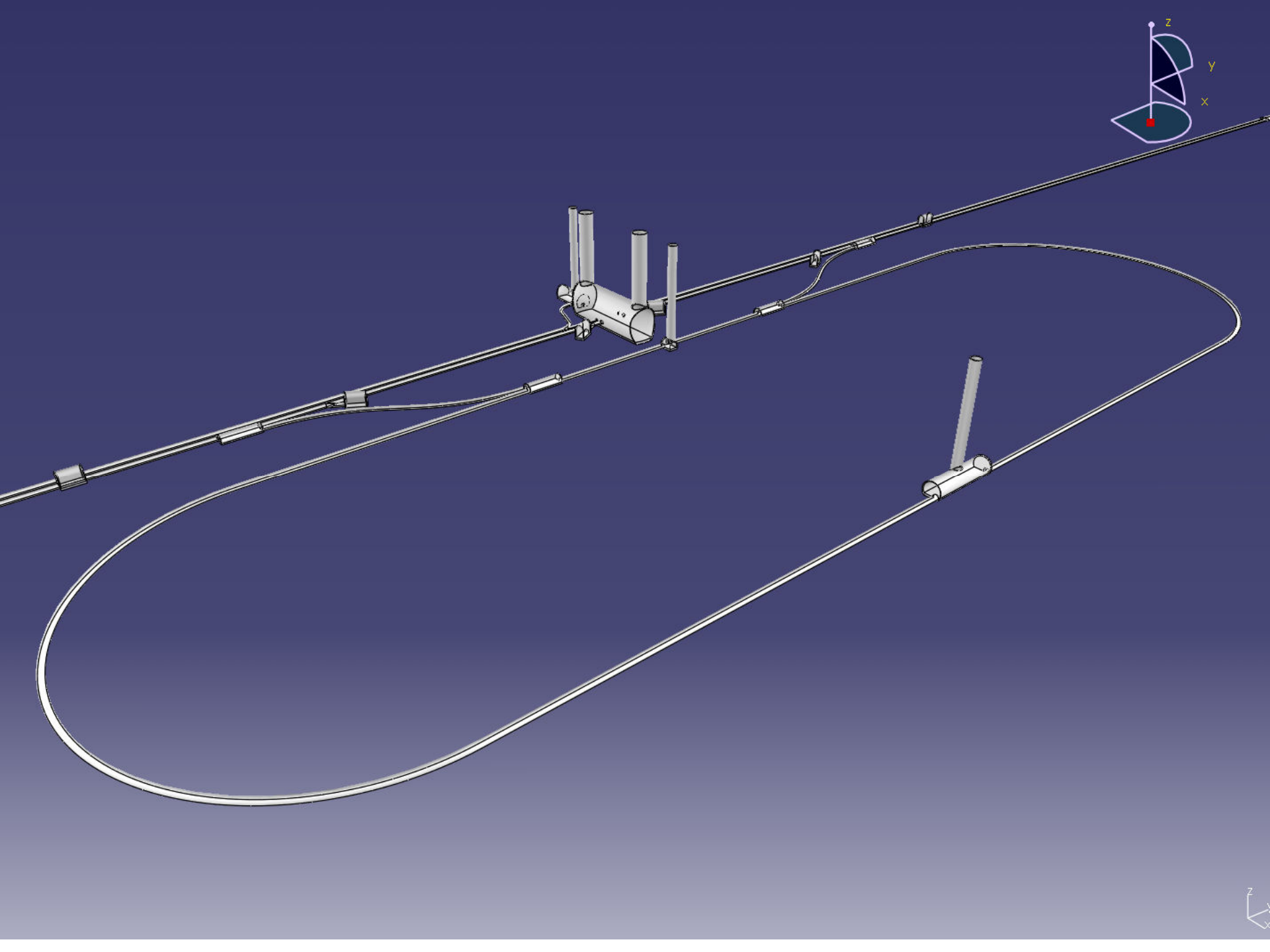
# 3.2km long 'racetrack' damping ring





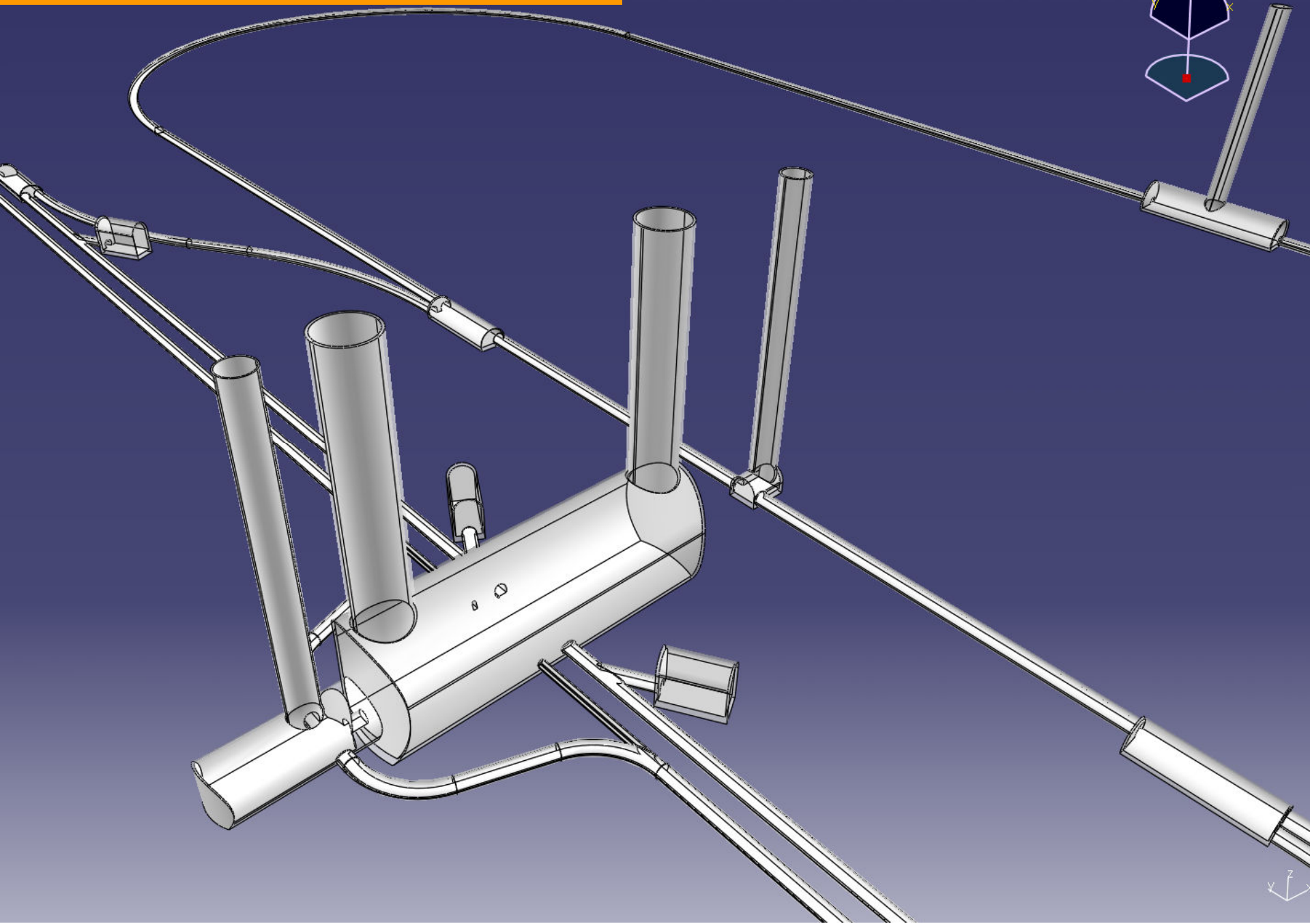
Beam dumps have been added (all cavern dimensions to be reviewed)

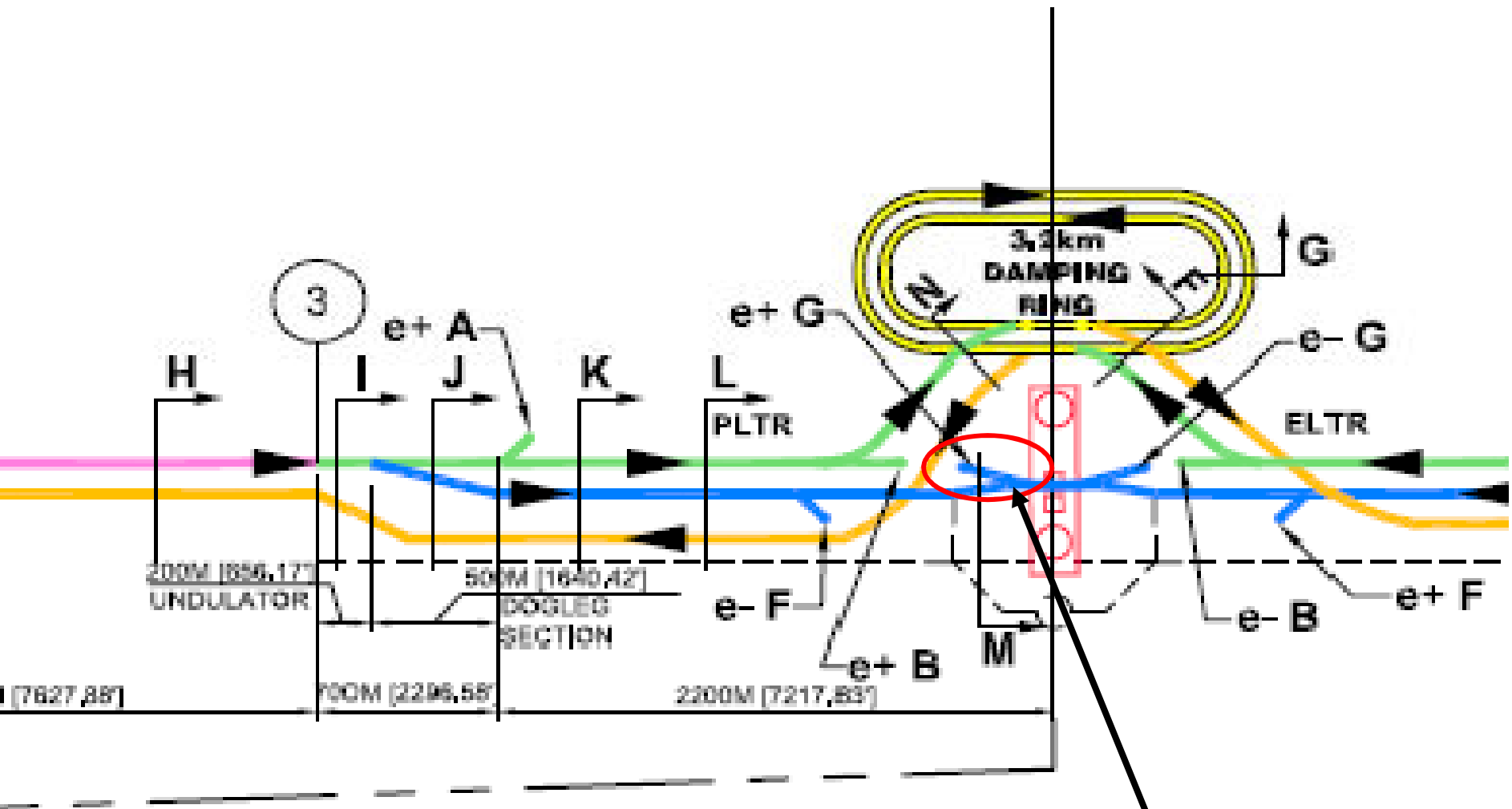






# Interaction Region

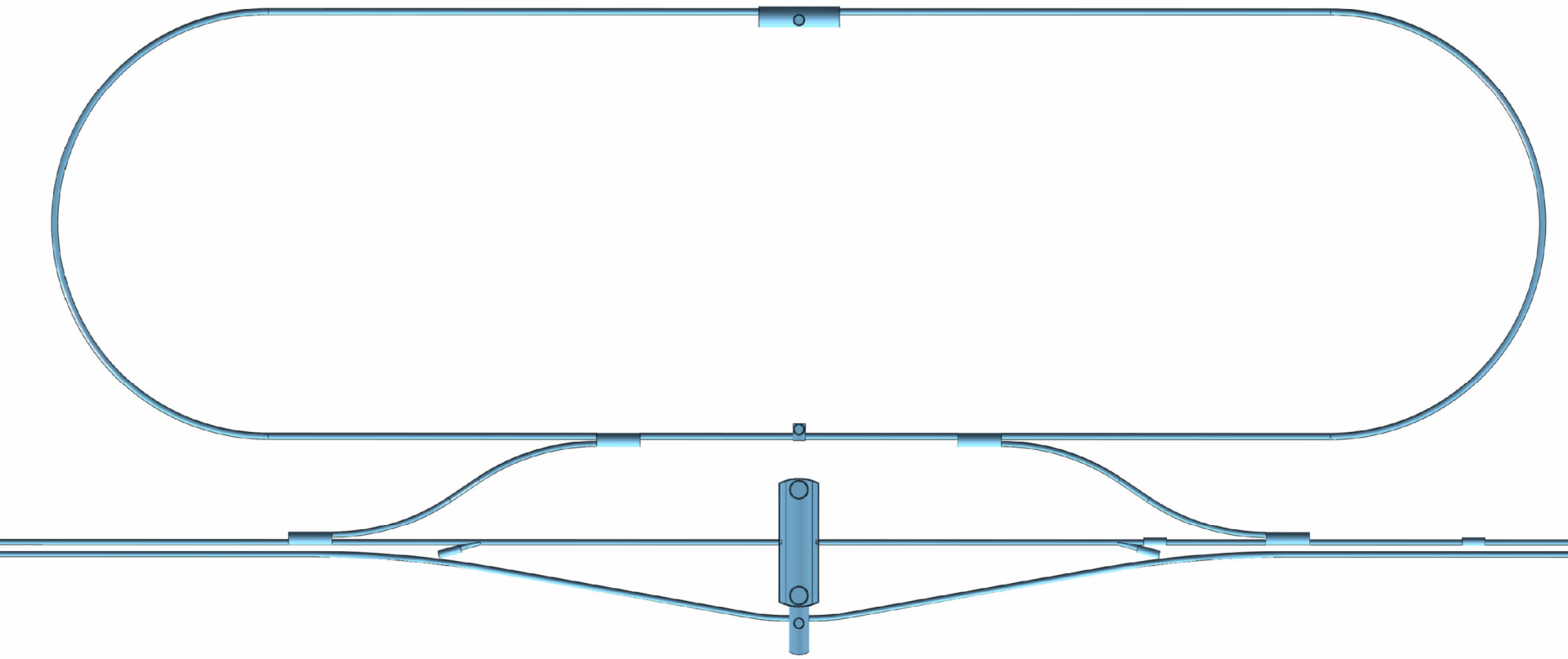




Main Beam dumps need to be moved to 'south side' i.e. opposite side of DR pointing downwards on this drawing.

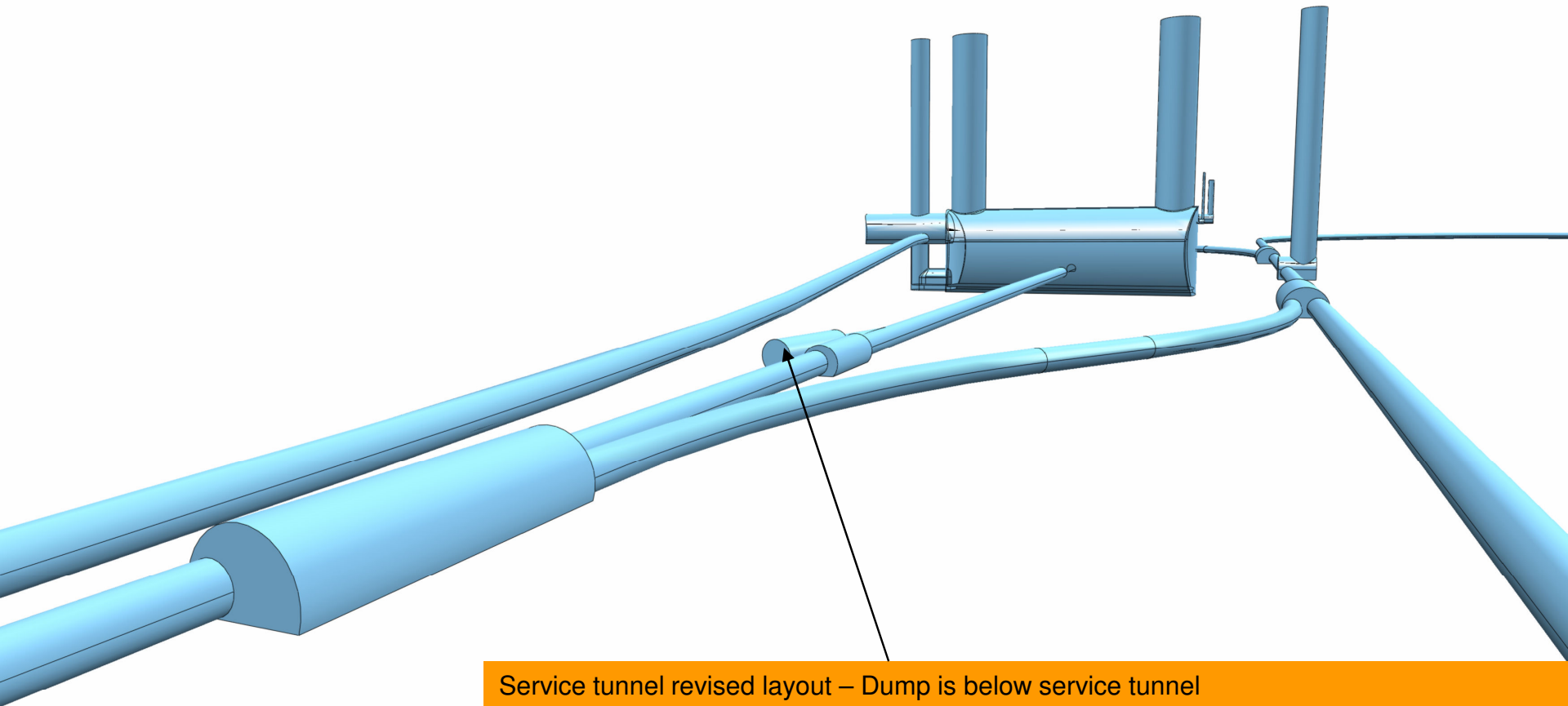
This means, due to Muon radiation, level of service tunnel needs to be adjusted

**Note** : Some of these issues are refinements of the RDR rather than SB2009 !

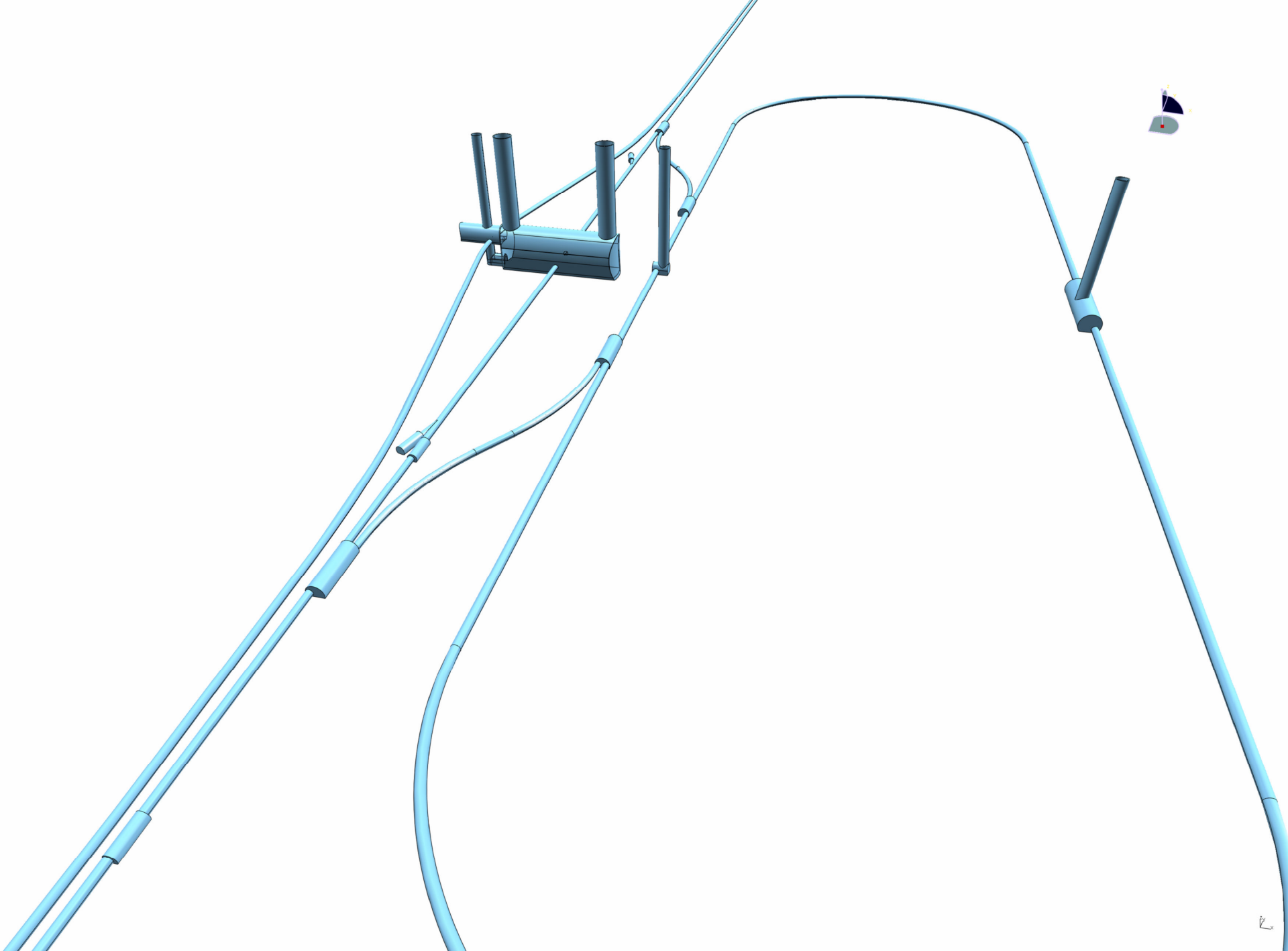


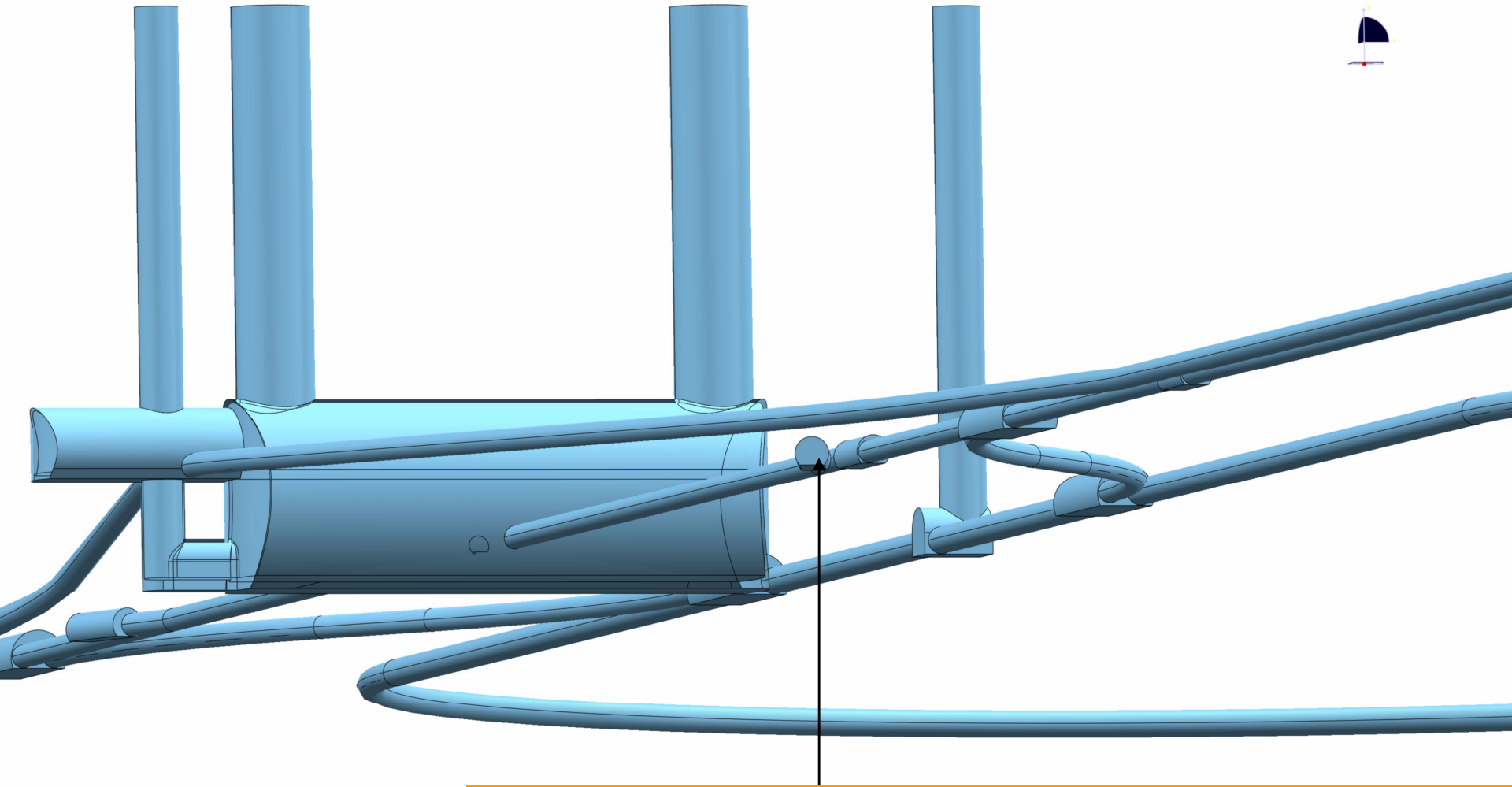
Service tunnel revised layout



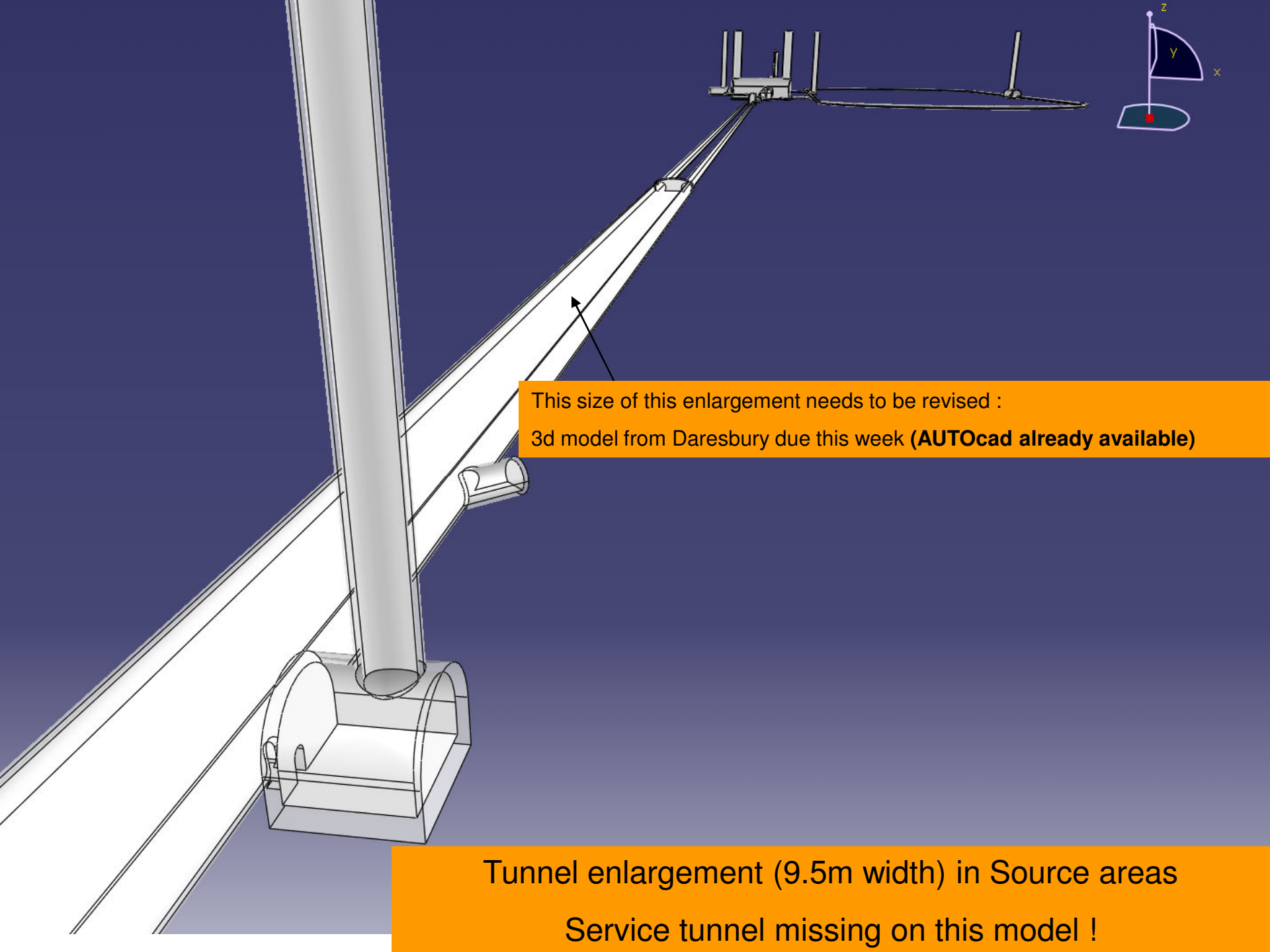


Service tunnel revised layout – Dump is below service tunnel





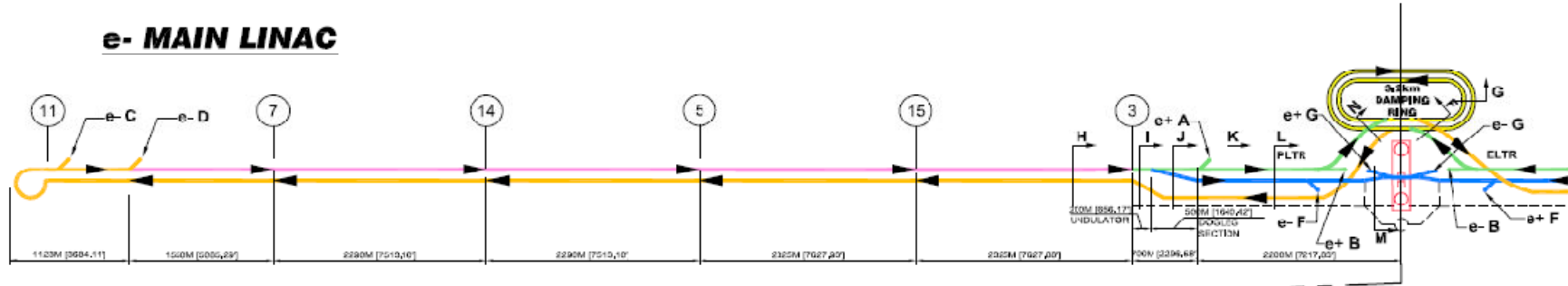
Service tunnel revised layout – Dump is below service tunnel



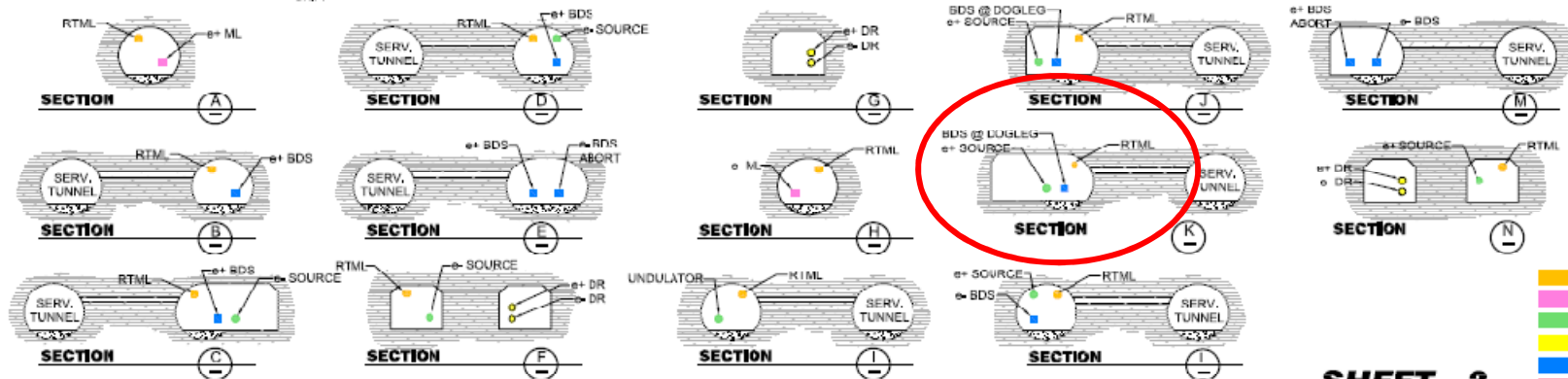
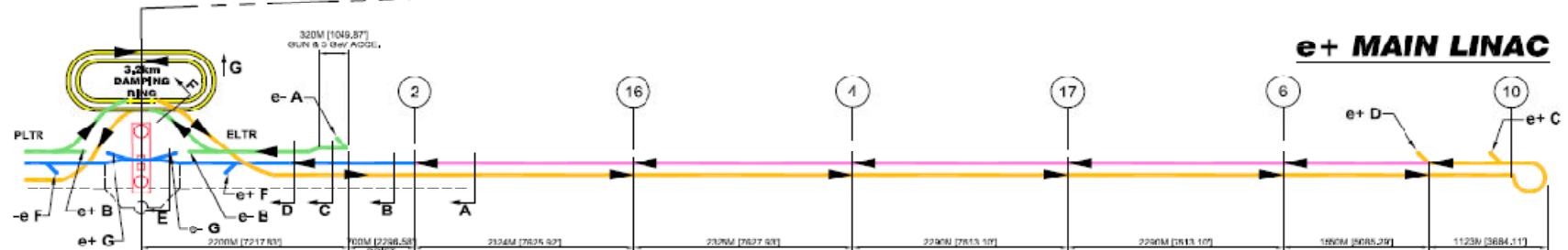
This size of this enlargement needs to be revised :  
3d model from Daresbury due this week (**AUTOcad** already available)

Tunnel enlargement (9.5m width) in Source areas  
Service tunnel missing on this model !

# e- MAIN LINAC



# e+ MAIN LINAC



- LEGEND**
- RTML
  - ML
  - SOURCES
  - DR
  - BDS
  - DETECTOR AREA
  - SERVICE TUNNEL
  - BEAM DIRECTION

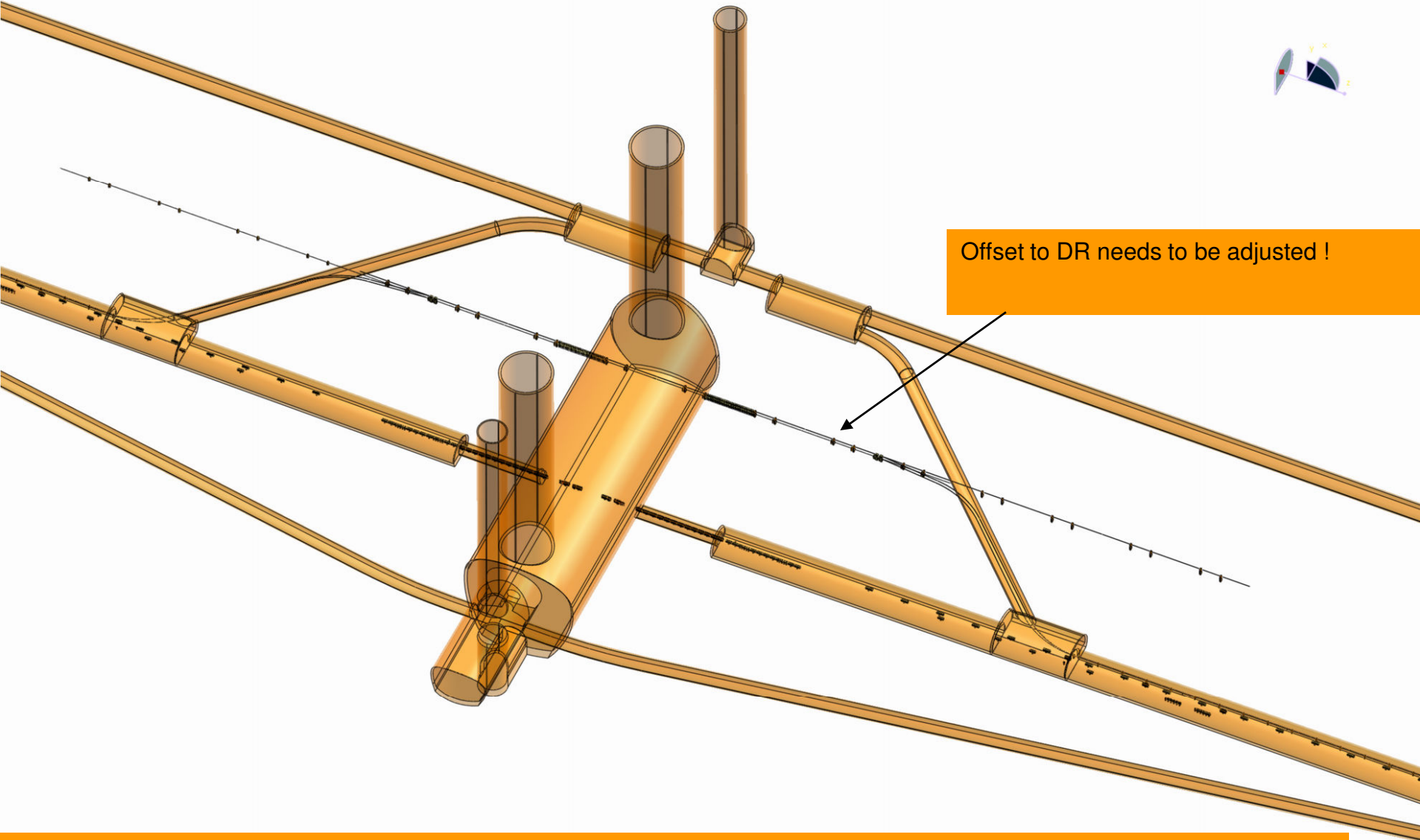
**SHEET - 2**  
**Draft 8 28 09**

Tunnel enlargement (9.5m width) in Source areas needs to be reviewed (transport corridor on one side is acceptable?)



A 3D CAD model of a mechanical assembly, possibly a turbine or engine component, rendered in a light gray wireframe style. The assembly consists of a central cylindrical component with various ports and connections. A large orange rectangular box is overlaid on the center of the image, containing the text "Post Daresbury Meeting". In the top right corner, there is a small 3D coordinate system with x, y, and z axes. In the bottom right corner, there is a small 2D coordinate system with x and y axes.

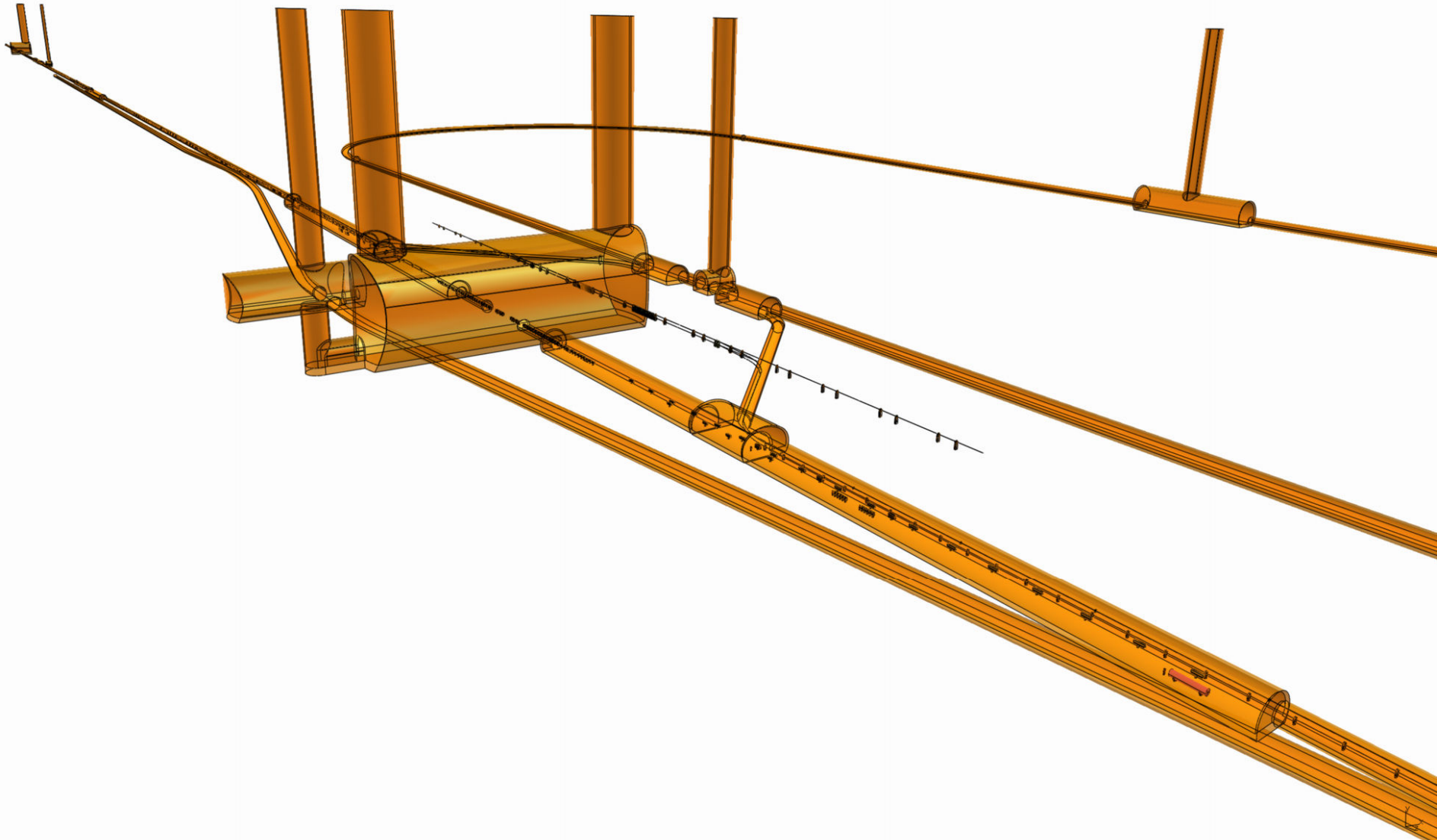
# Post Daresbury Meeting



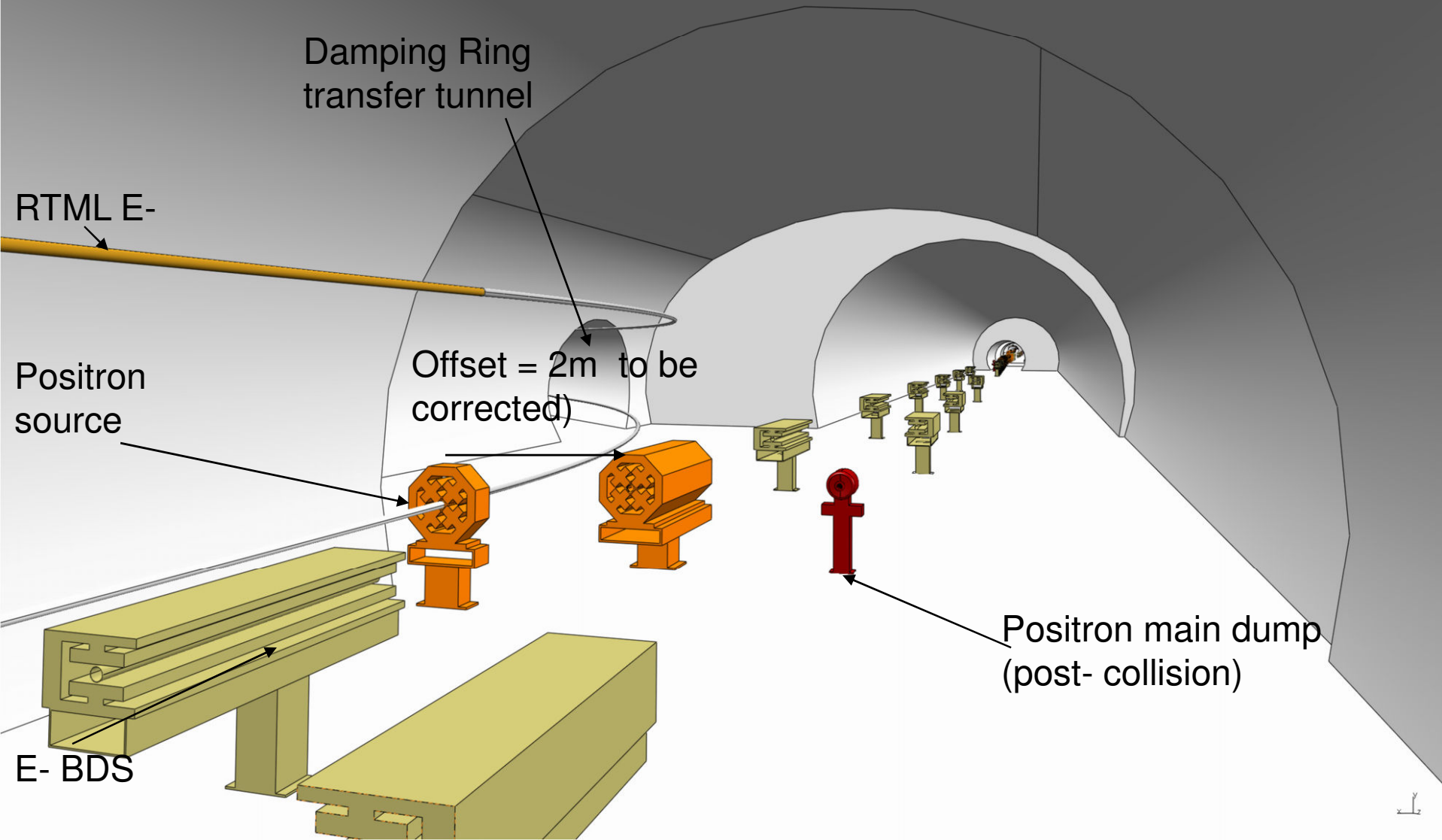
Offset to DR needs to be adjusted !

**3d machine model from Norbert Collomb (Daresbury) used to 'size' the enclosures around the components**

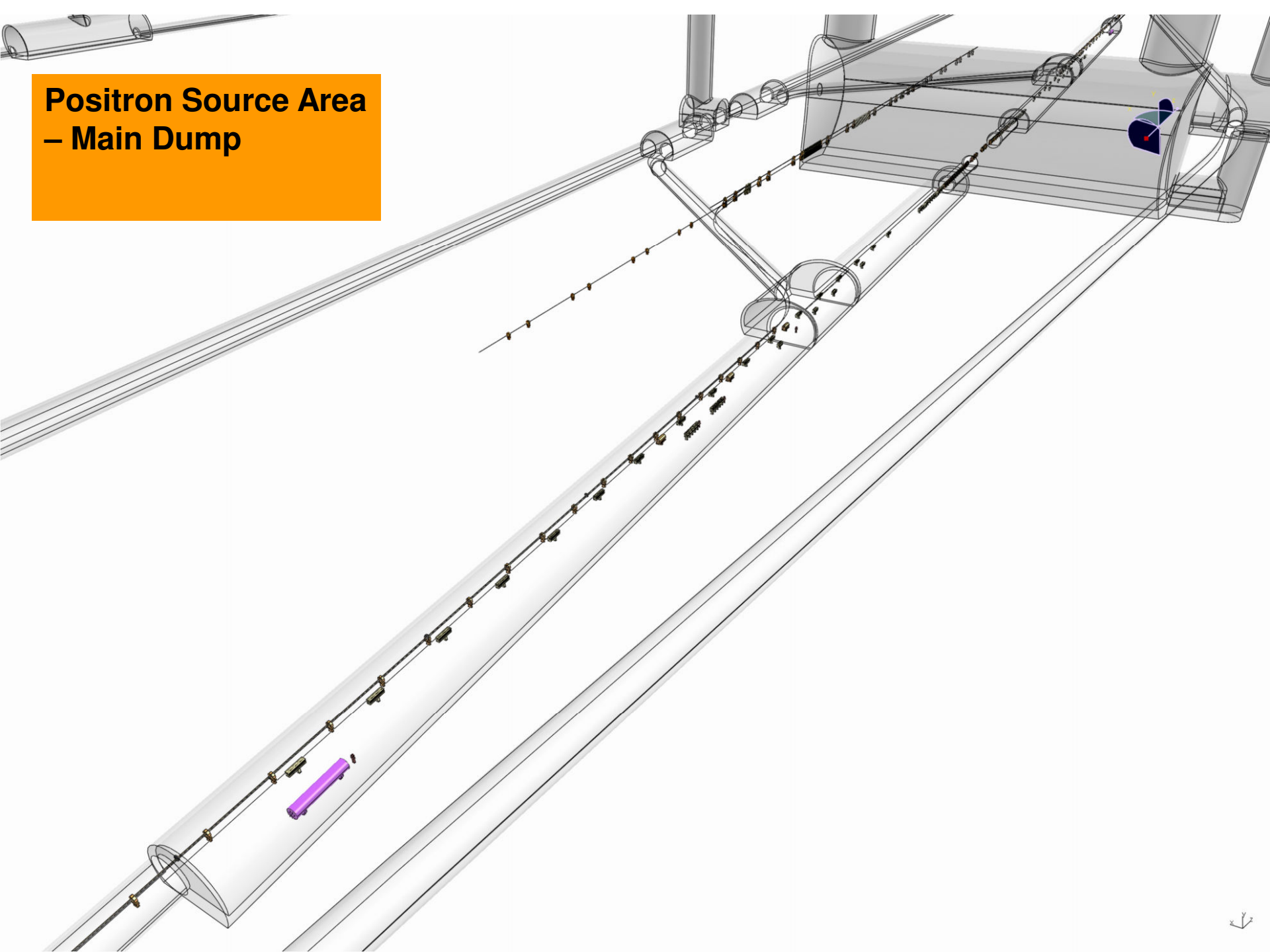




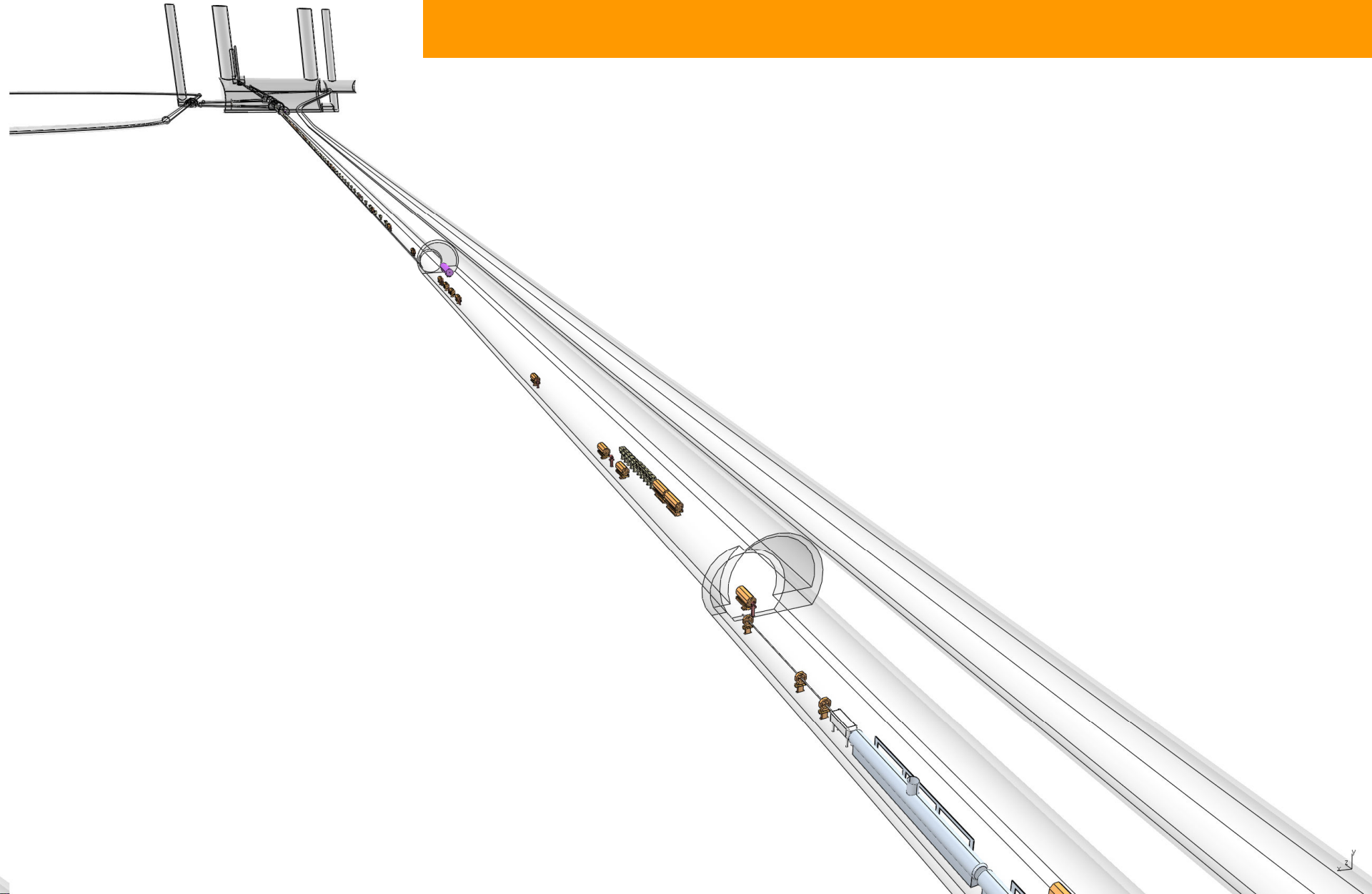
# Positron Source Area

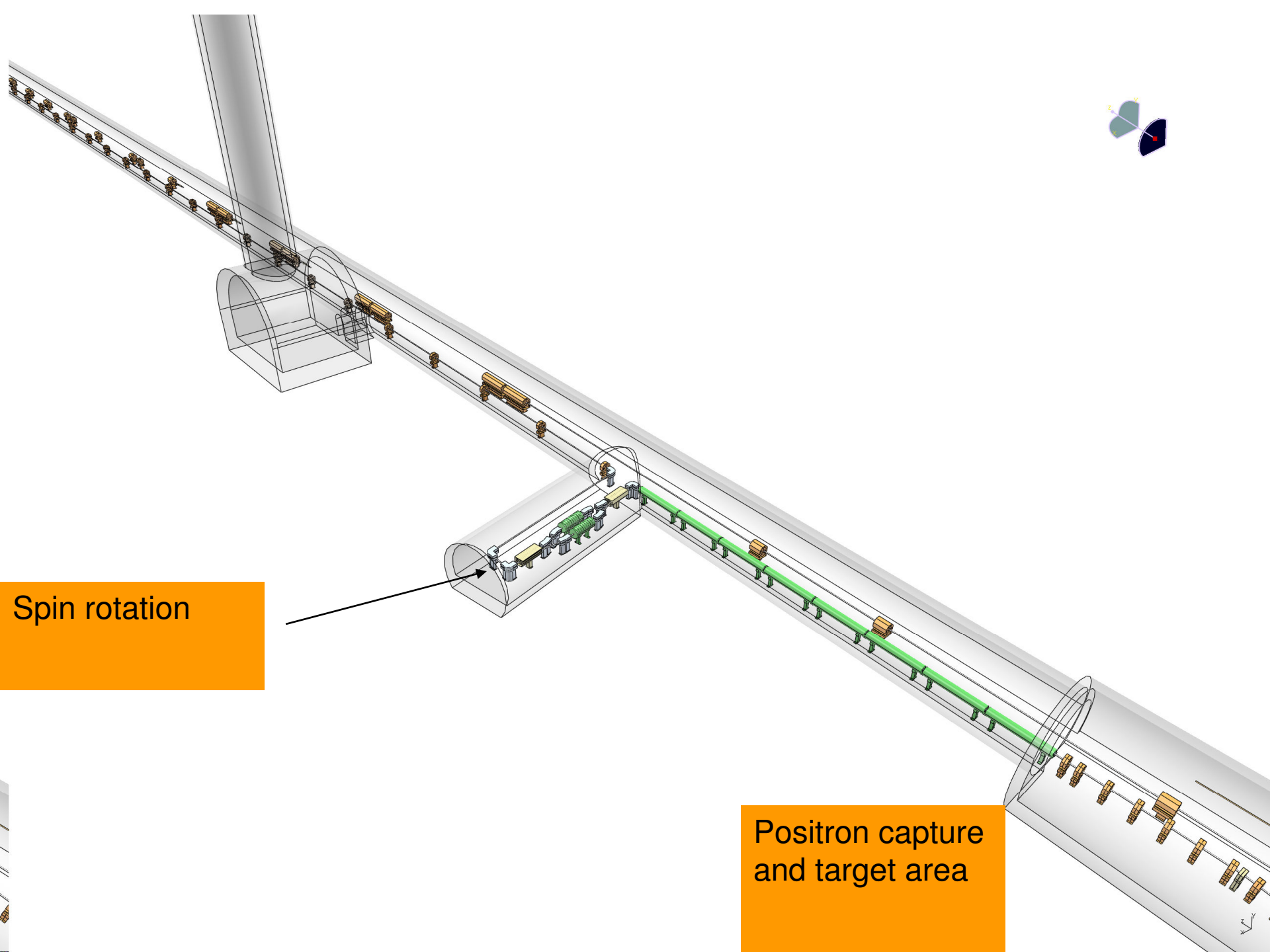


**Positron Source Area  
– Main Dump**



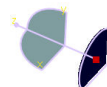
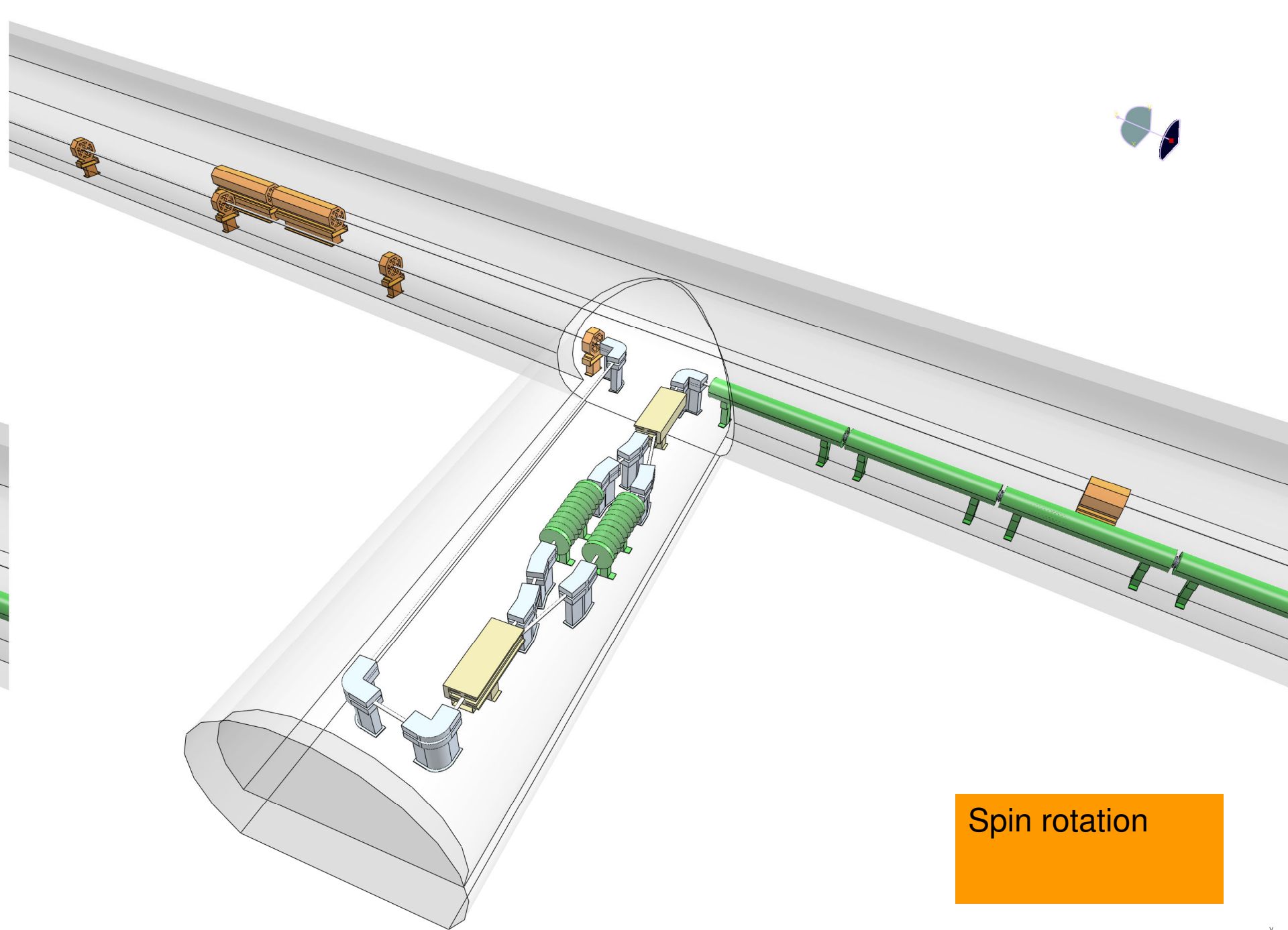
# Positron Source Area – Tunnel sizes still need further optimisation / correcting





Spin rotation

Positron capture and target area



Spin rotation



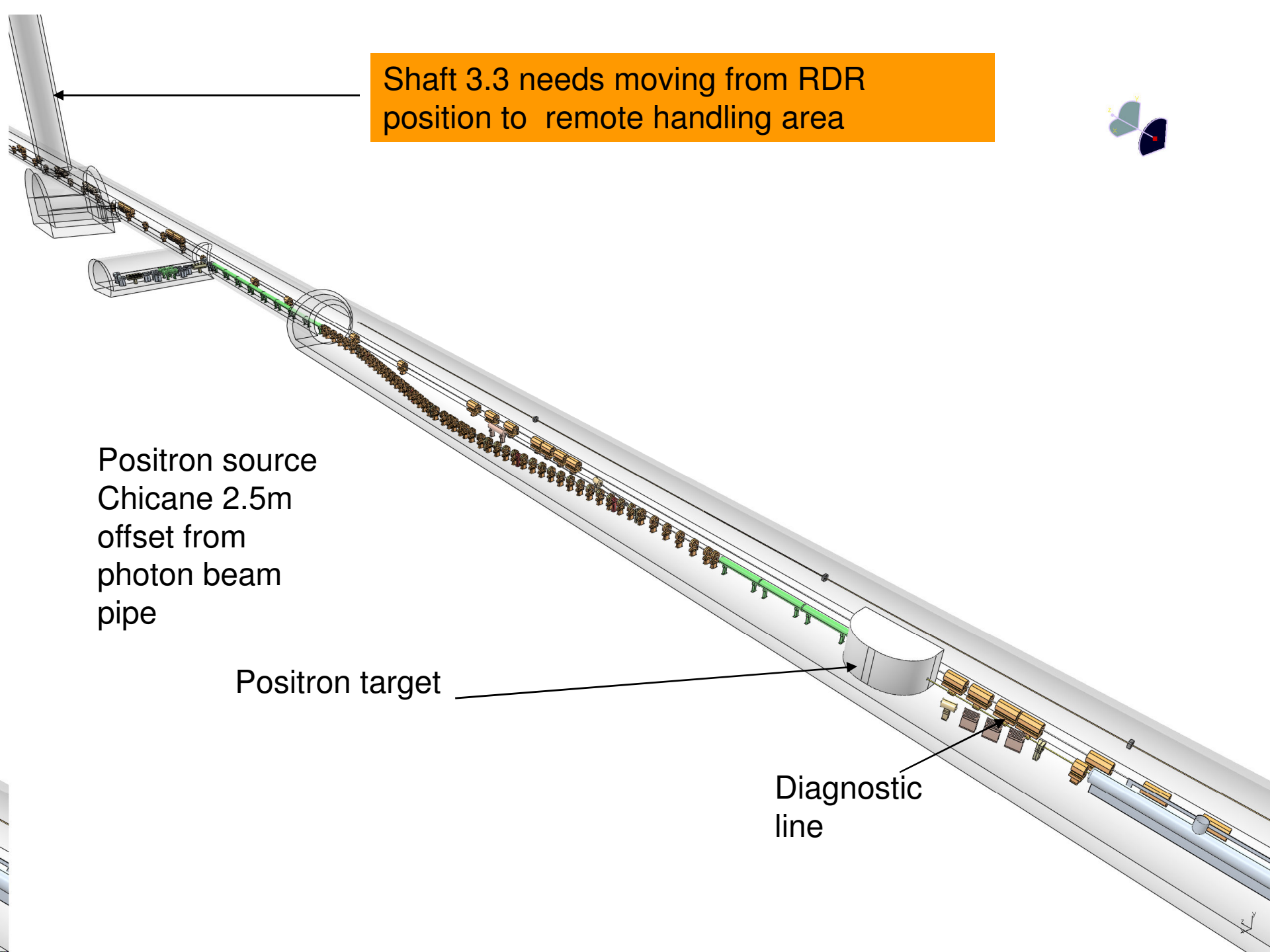
Shaft 3.3 needs moving from RDR position to remote handling area



Positron source  
Chicane 2.5m  
offset from  
photon beam  
pipe

Positron target

Diagnostic  
line

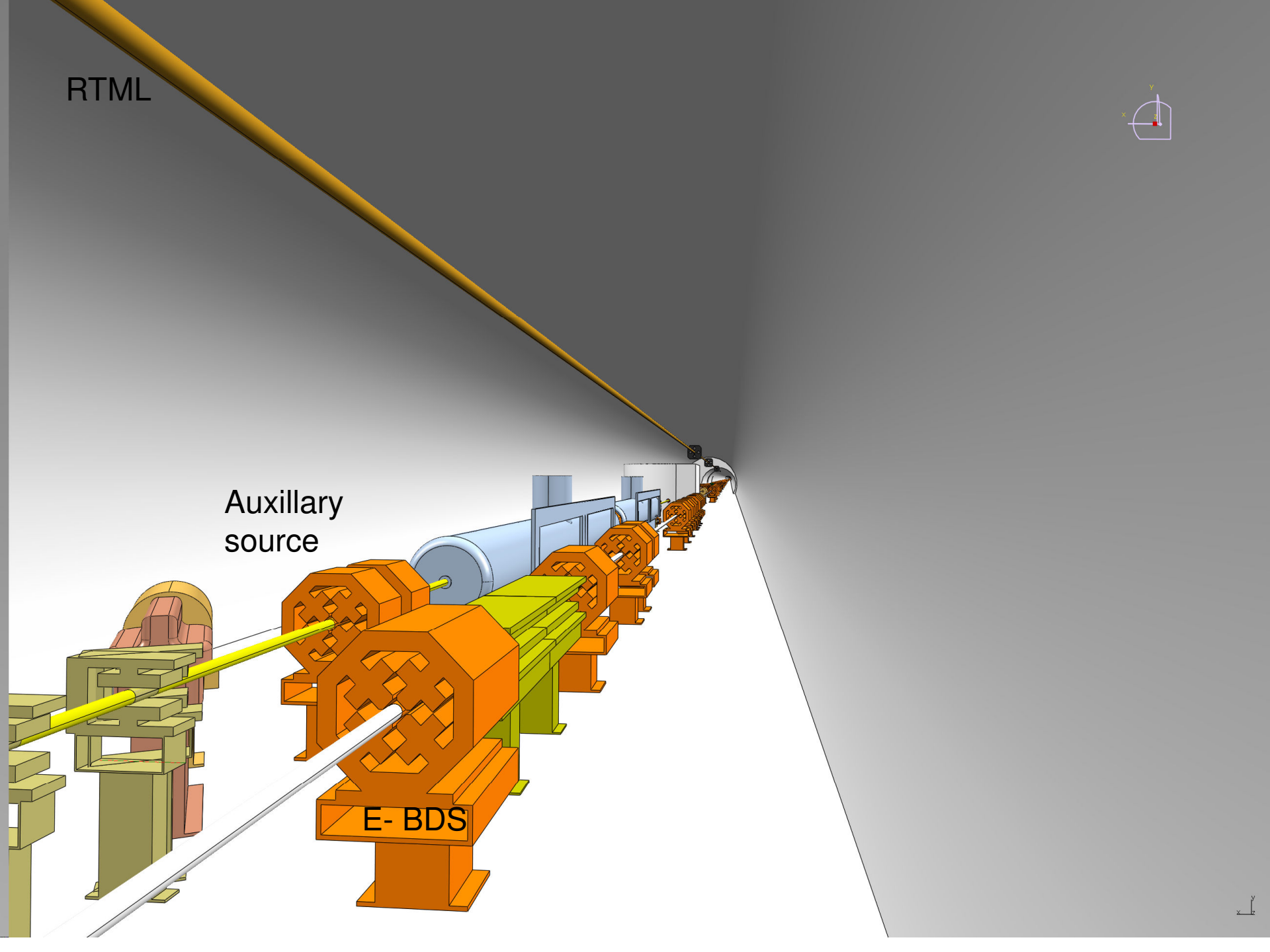


RTML

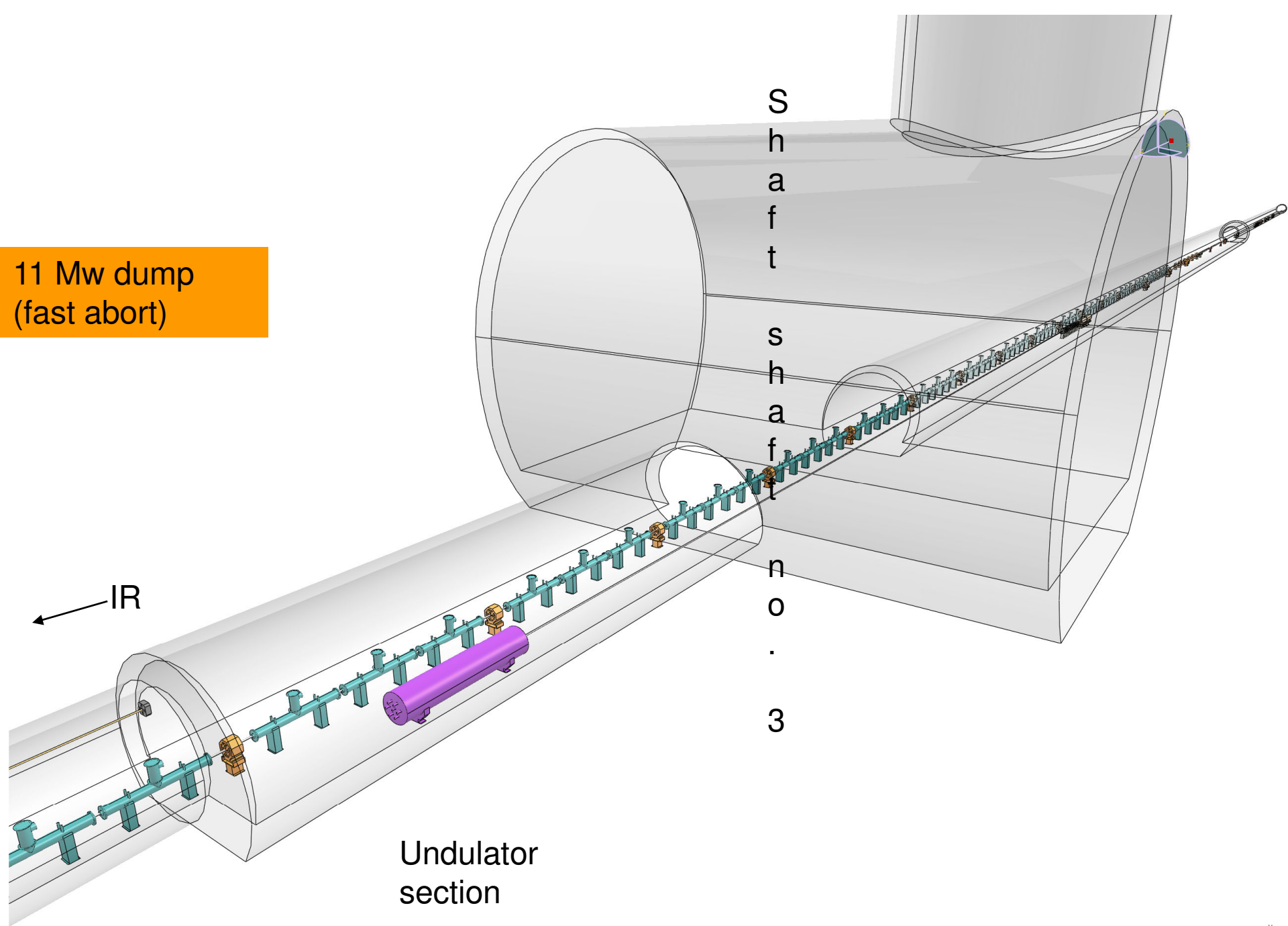


Auxillary source

E- BDS



11 Mw dump  
(fast abort)

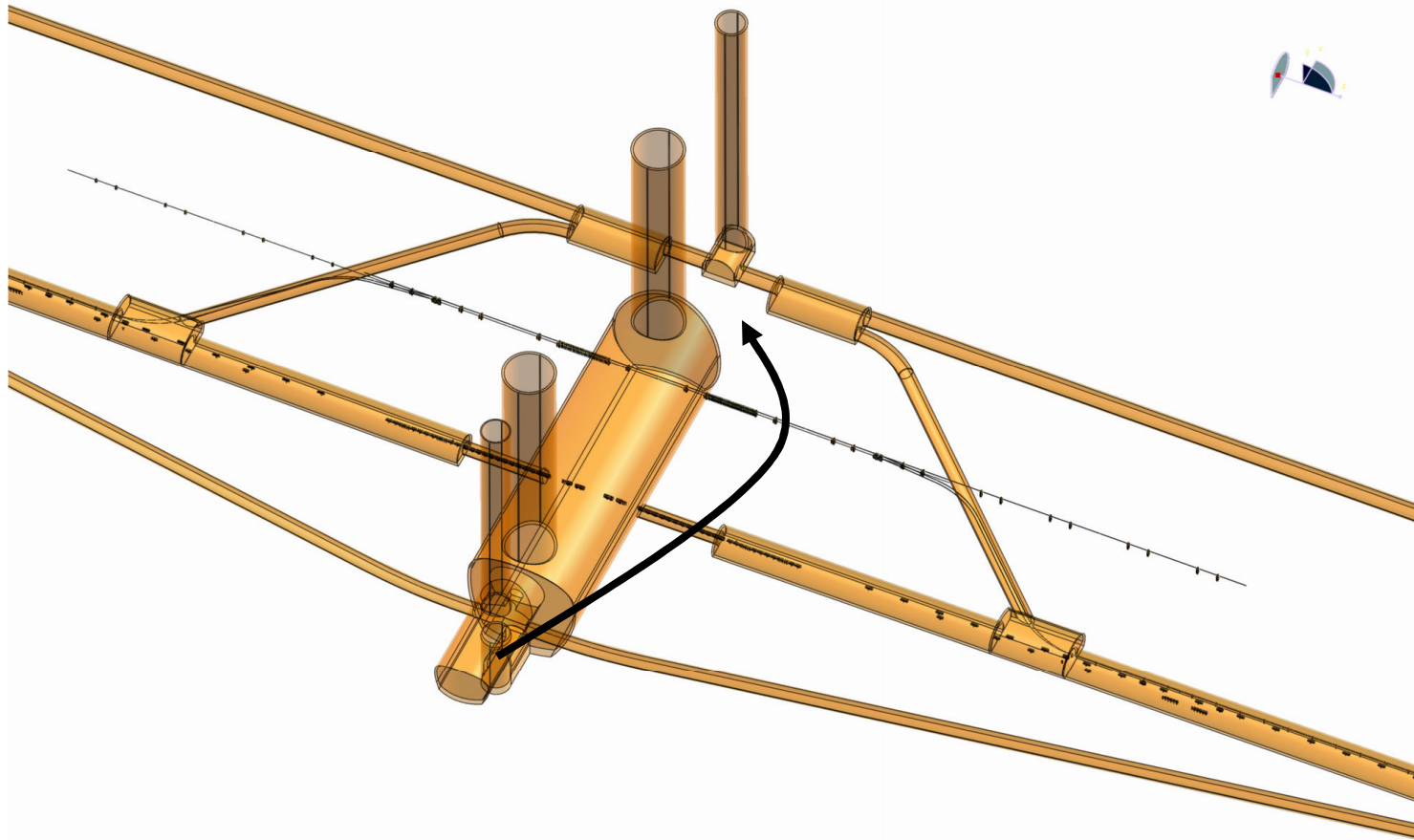


S  
h  
a  
f  
t  
  
S  
h  
a  
f  
t  
  
n  
o  
.  
3

Undulator  
section

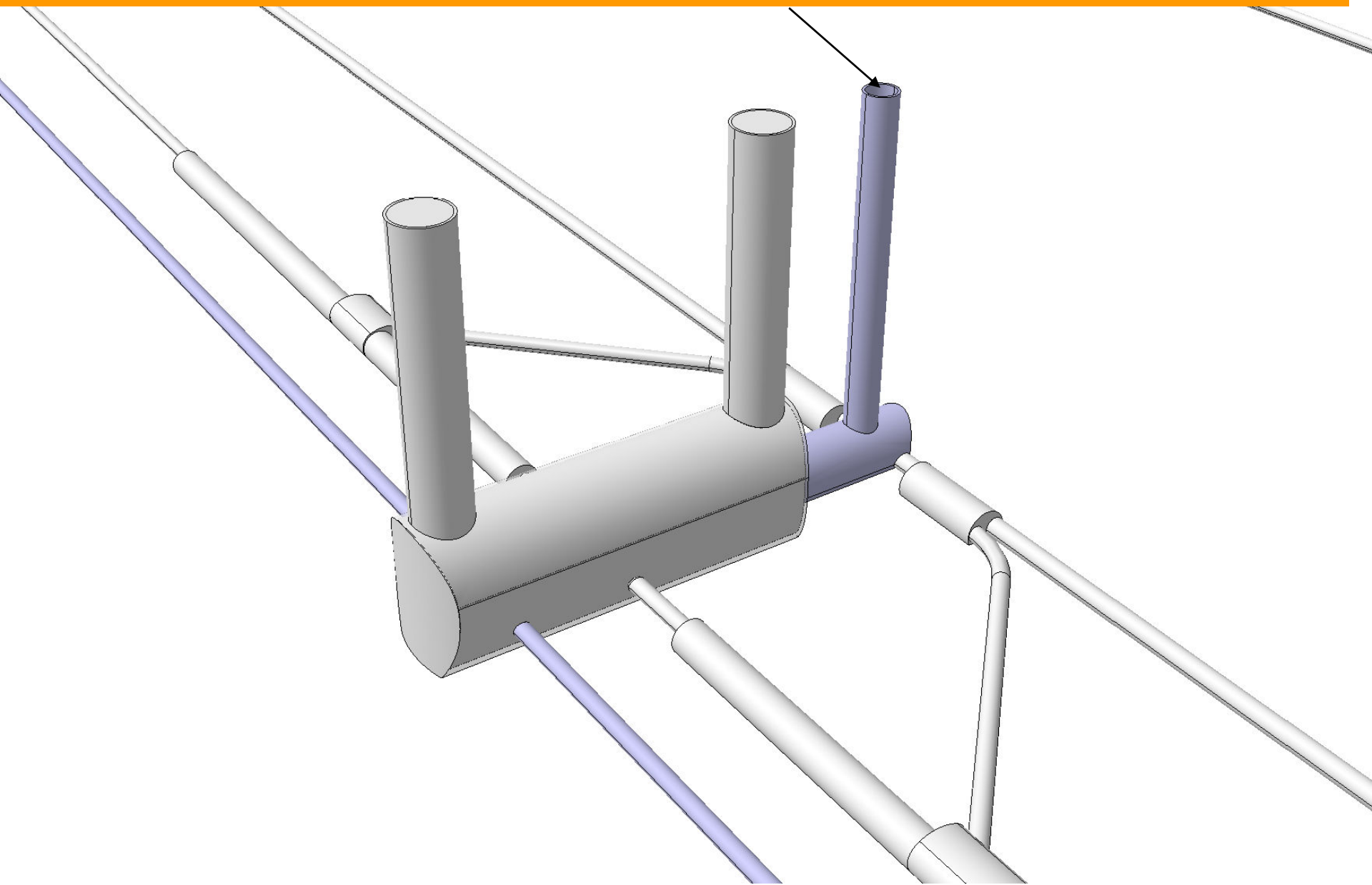


In SB2009 central region there are now 4 shafts in close proximity due to DR new position

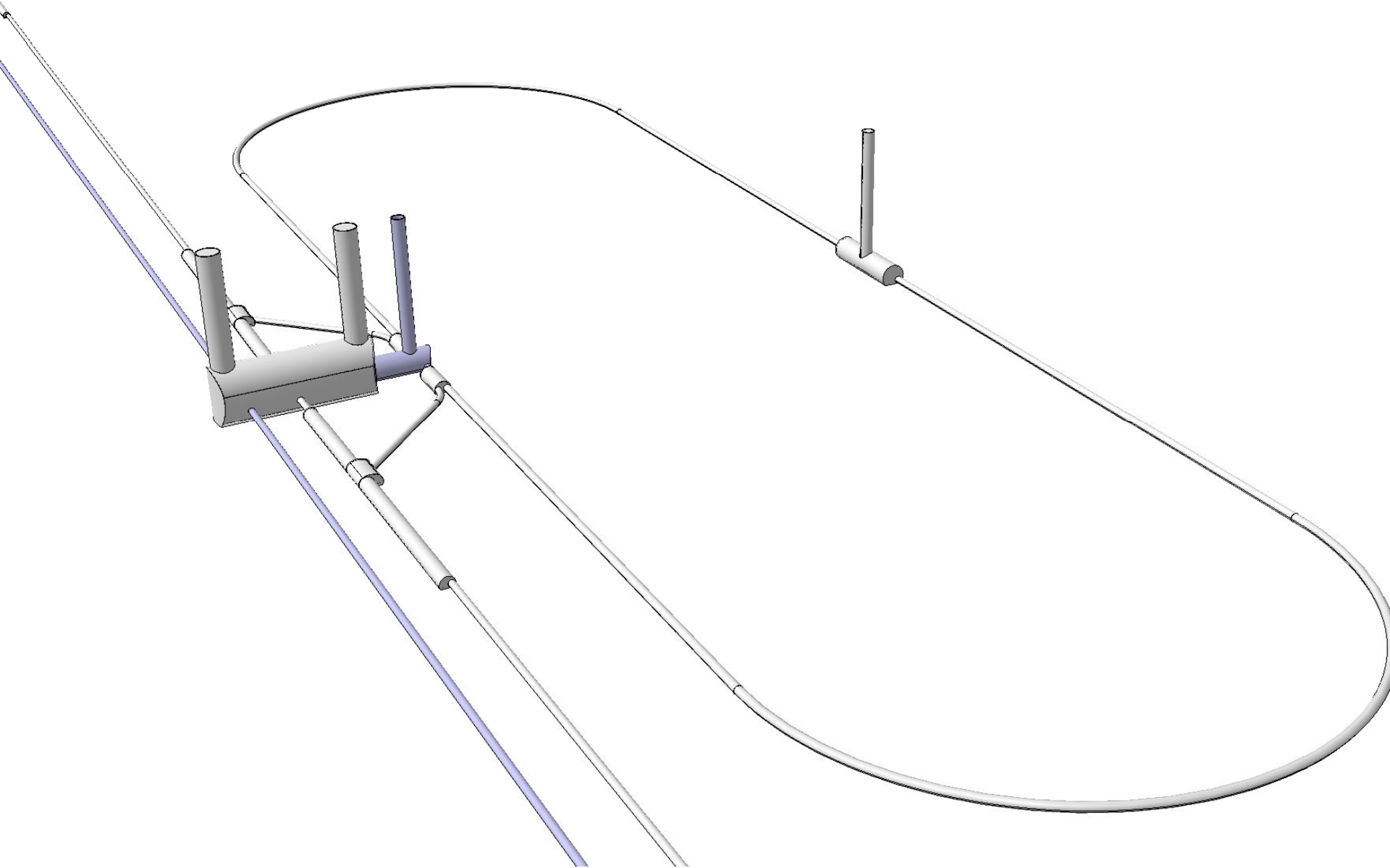


Proposal : Move service cavern to DR side and delete shaft ?

DR and IR service cavern share the same shaft....



DR and IR service cavern share the same shaft....



# Next steps.....

- 2d drawings / cross sections need to 'stabilise' first, hopefully immediately following Albuquerque, before 3d work can progress
- CERN are able to continue with CATIA 3d models for civil engineering
- CERN would preferably continue with Positron Source / IR region