

APA Transport Frame Working Group

Justin Freitag

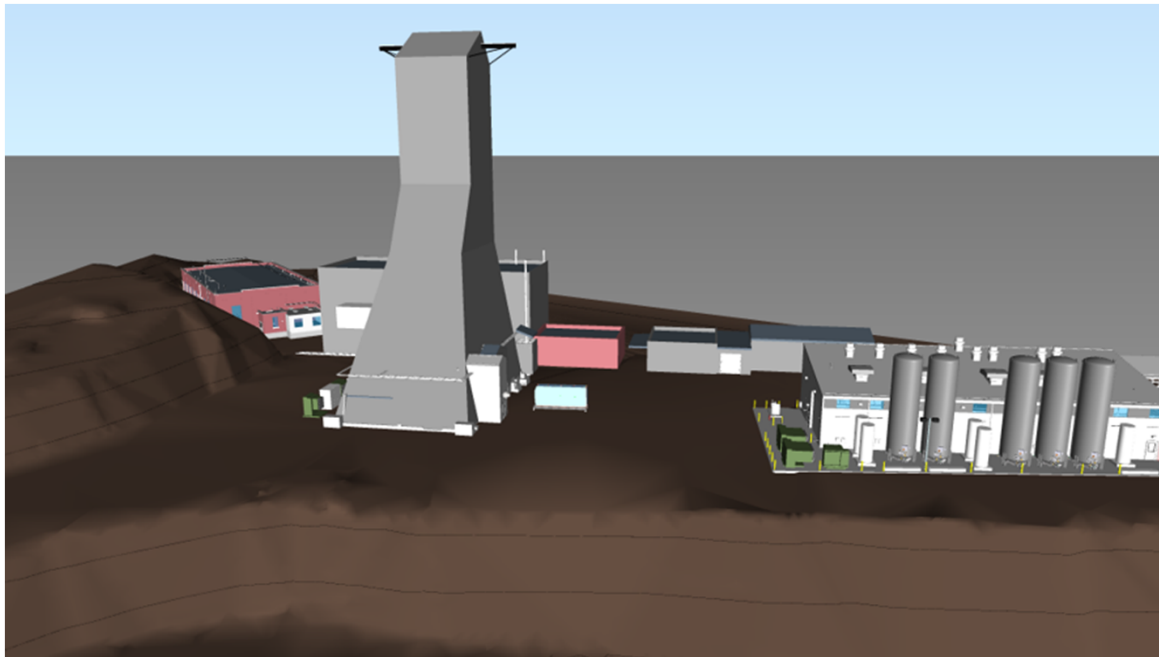
Conveyance from surface to clean room

Oct. 11, 2019

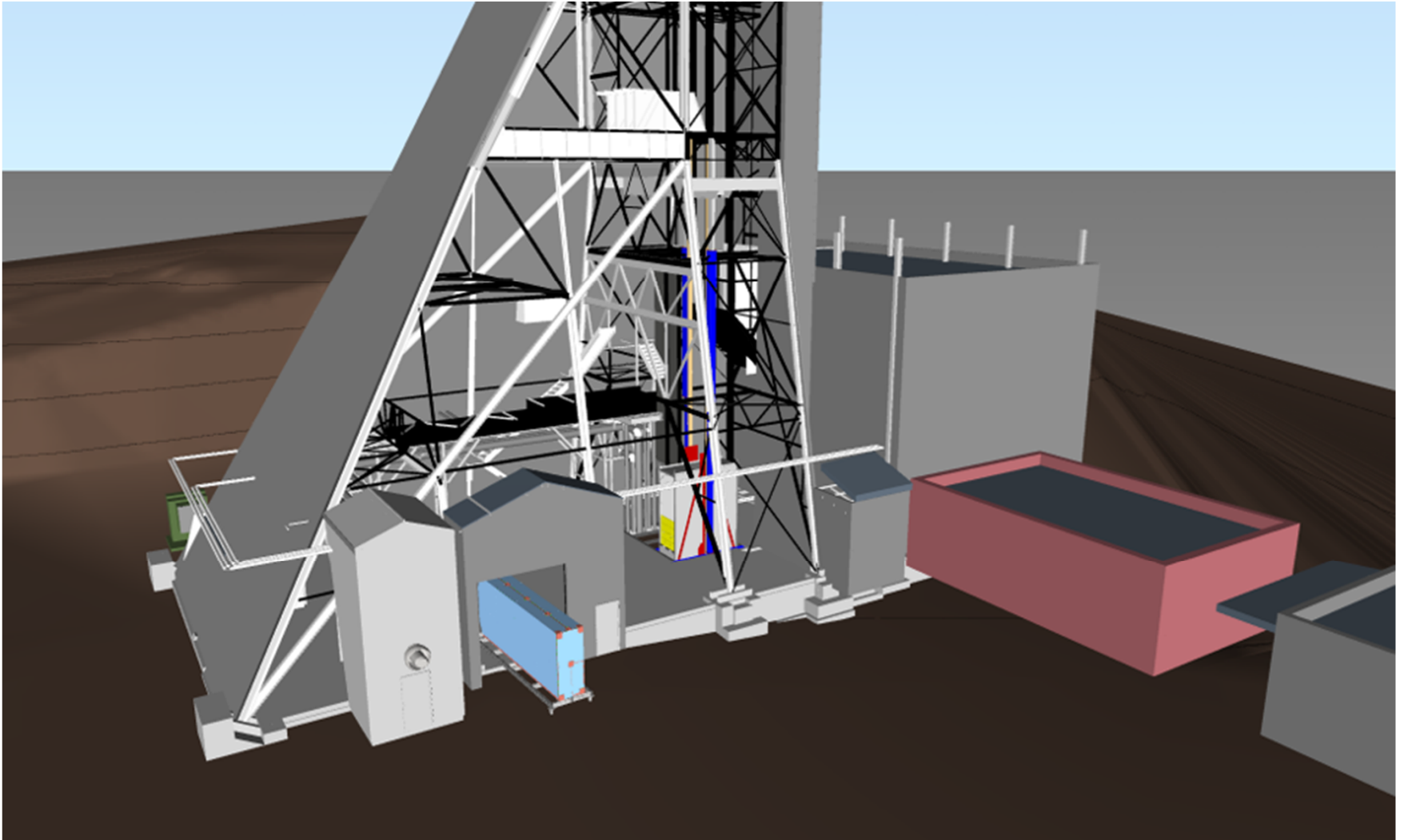


Surface Offloading

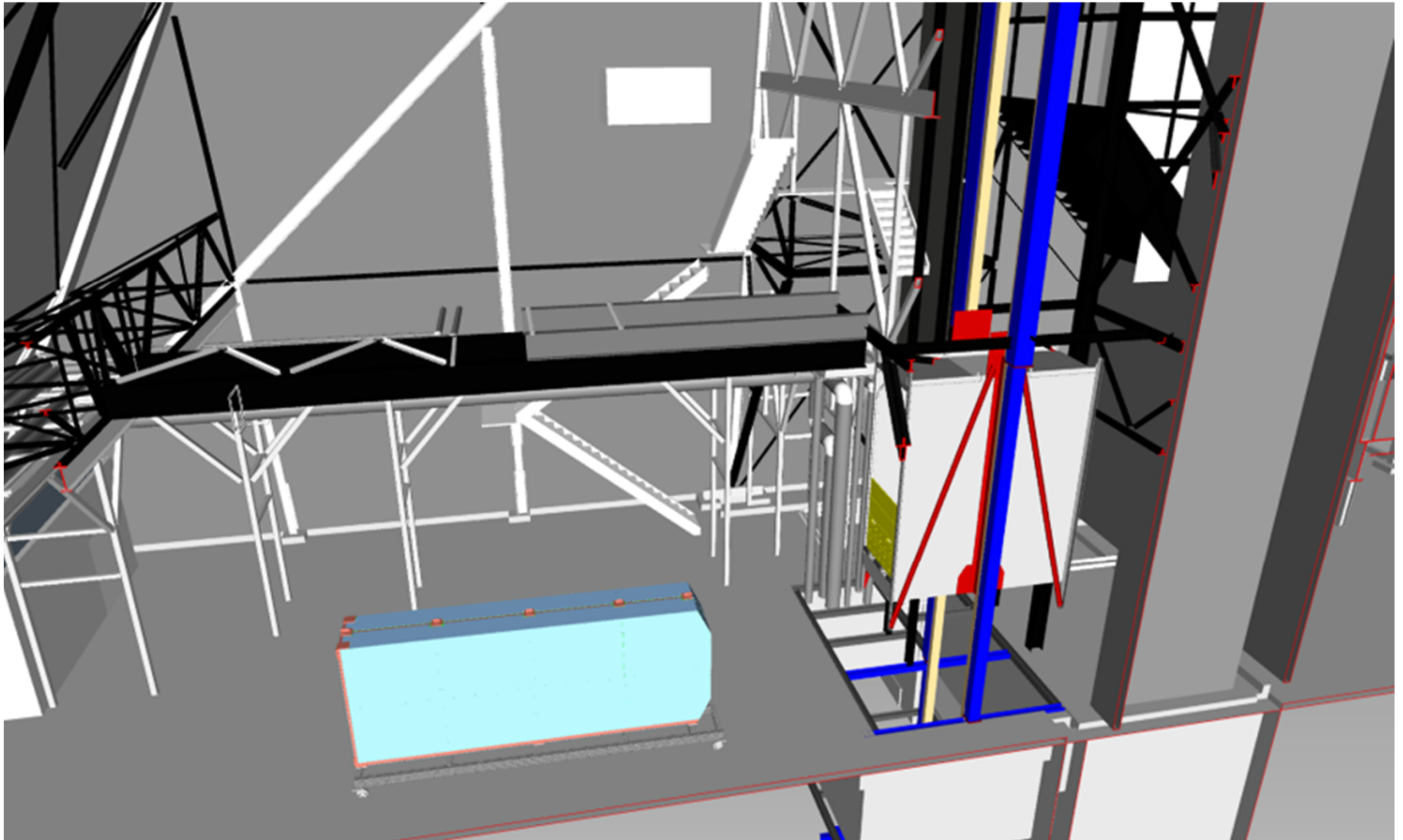
- Conveyance off truck at Ross headframe
 - Tele-handler
 - Mobile crane
 - Horizontal orientation onto cart (skates?)



Ross Headframe Conveyance

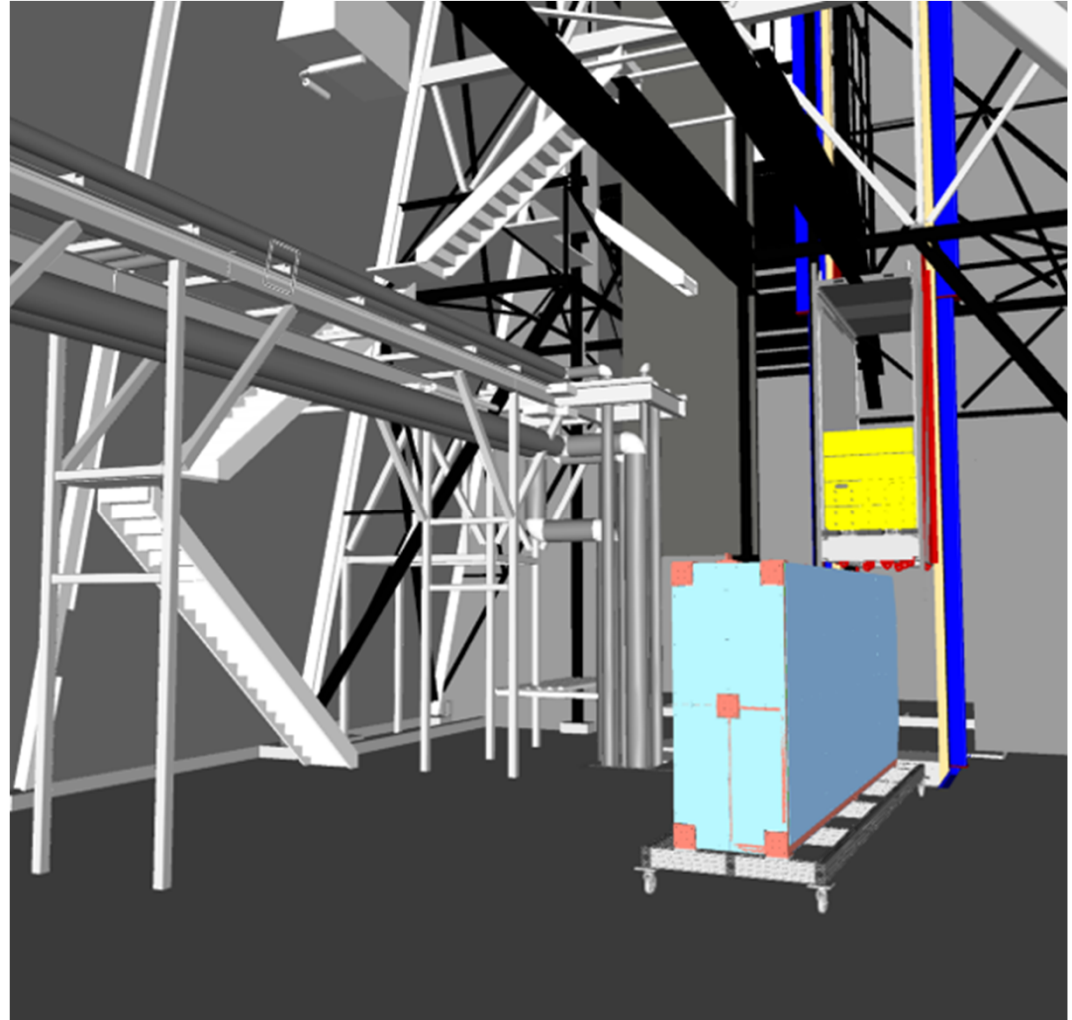


Ross Headframe Conveyance



Ross Headframe Conveyance

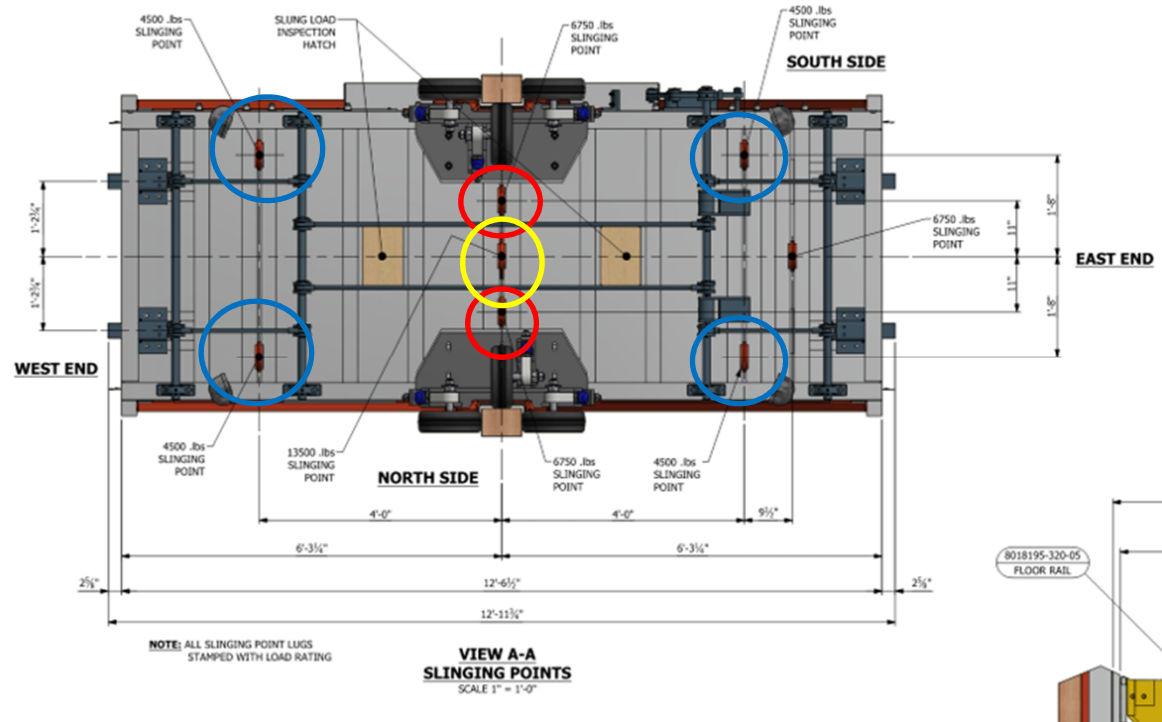
- Need to fully develop:
- Sling points to cage
- Transport frame attachment points
- Corner supports with skates for upending loads
- Guides for limiting rotation within shaft during lowering



Ross Headframe Conveyance

Sling Points to cage

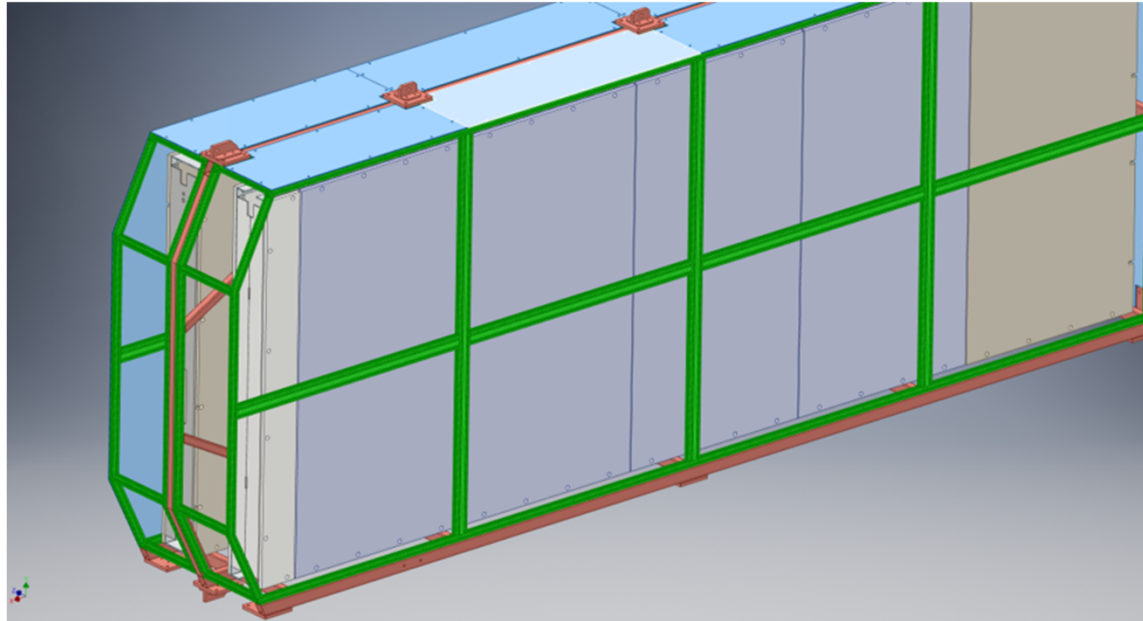
- Preferred connection to at least 2 points
- Low profile spreader bar attachment at top of APA frame may be feasible



Ross Headframe Conveyance

Transport frame attachment points

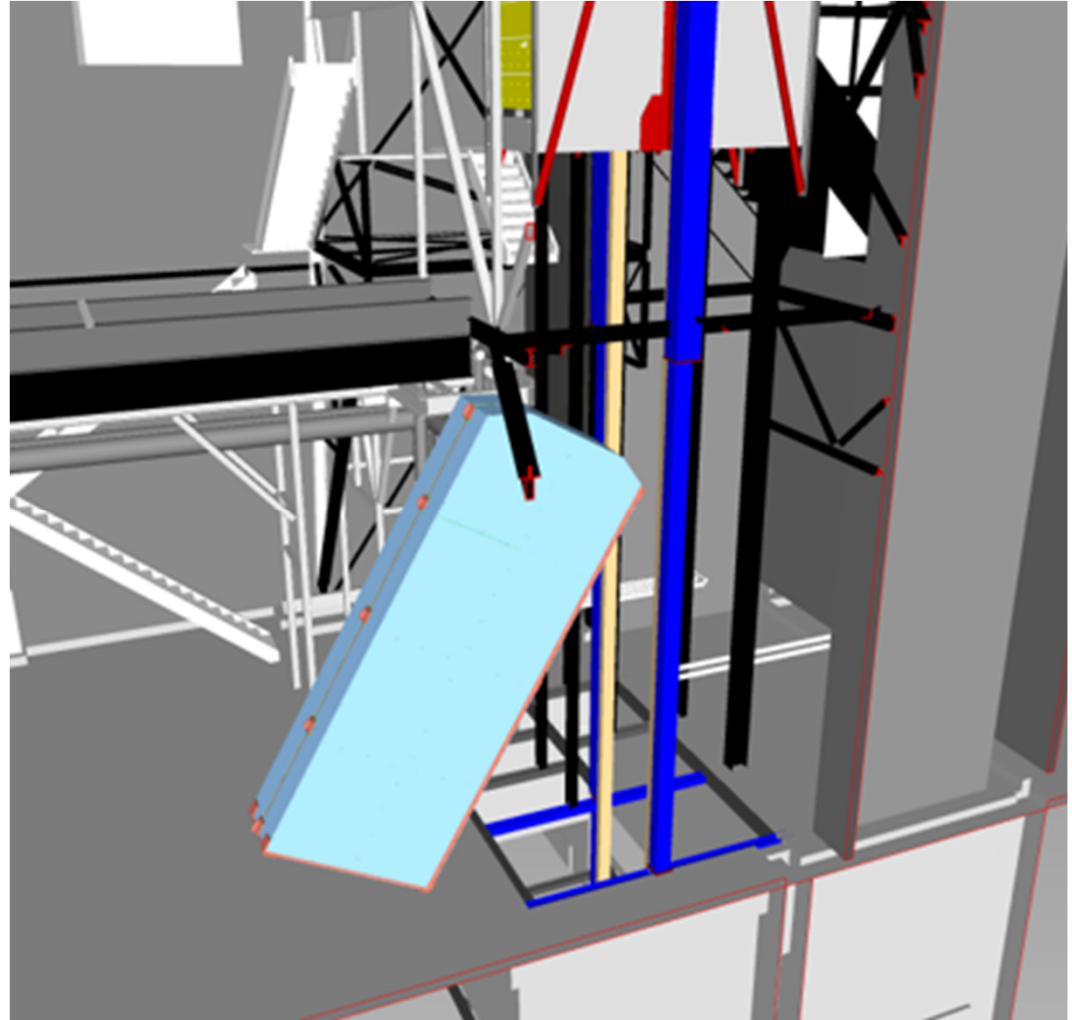
- All load orientation cases accounted for?
- Safety factor adequate?
- Will be looking at safety files from protodune APA approval as a template
- **Goal is to have University of Minnesota safety approval ASAP such that we can mfg and ship in time for Feb.**



Ross Headframe Conveyance

Corner supports with skates for upending loads

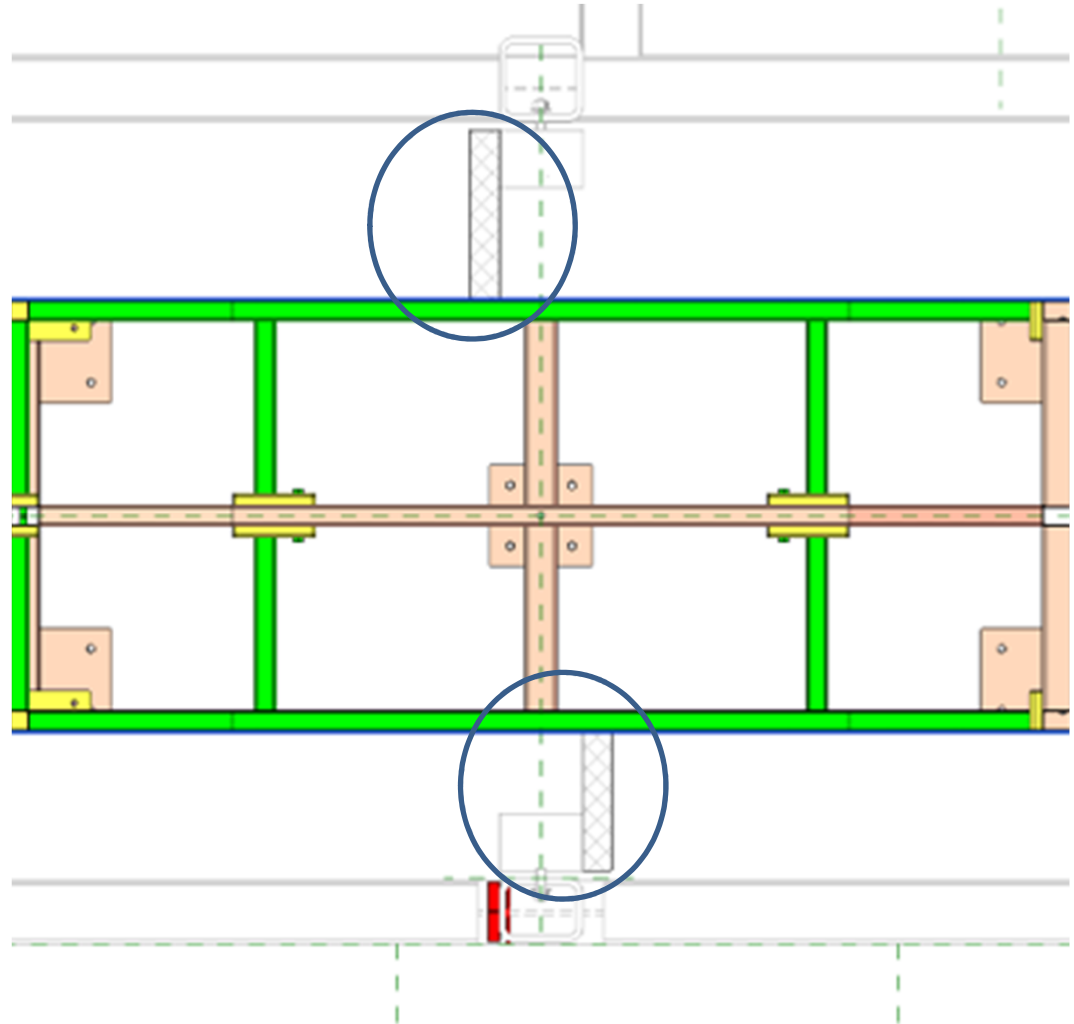
- Mounted on both sides to accommodate upending at headframe and unloading at brow?
- Low profile, heavy duty skates bolted directly to frame?
- Other hoisting method? (protodune)



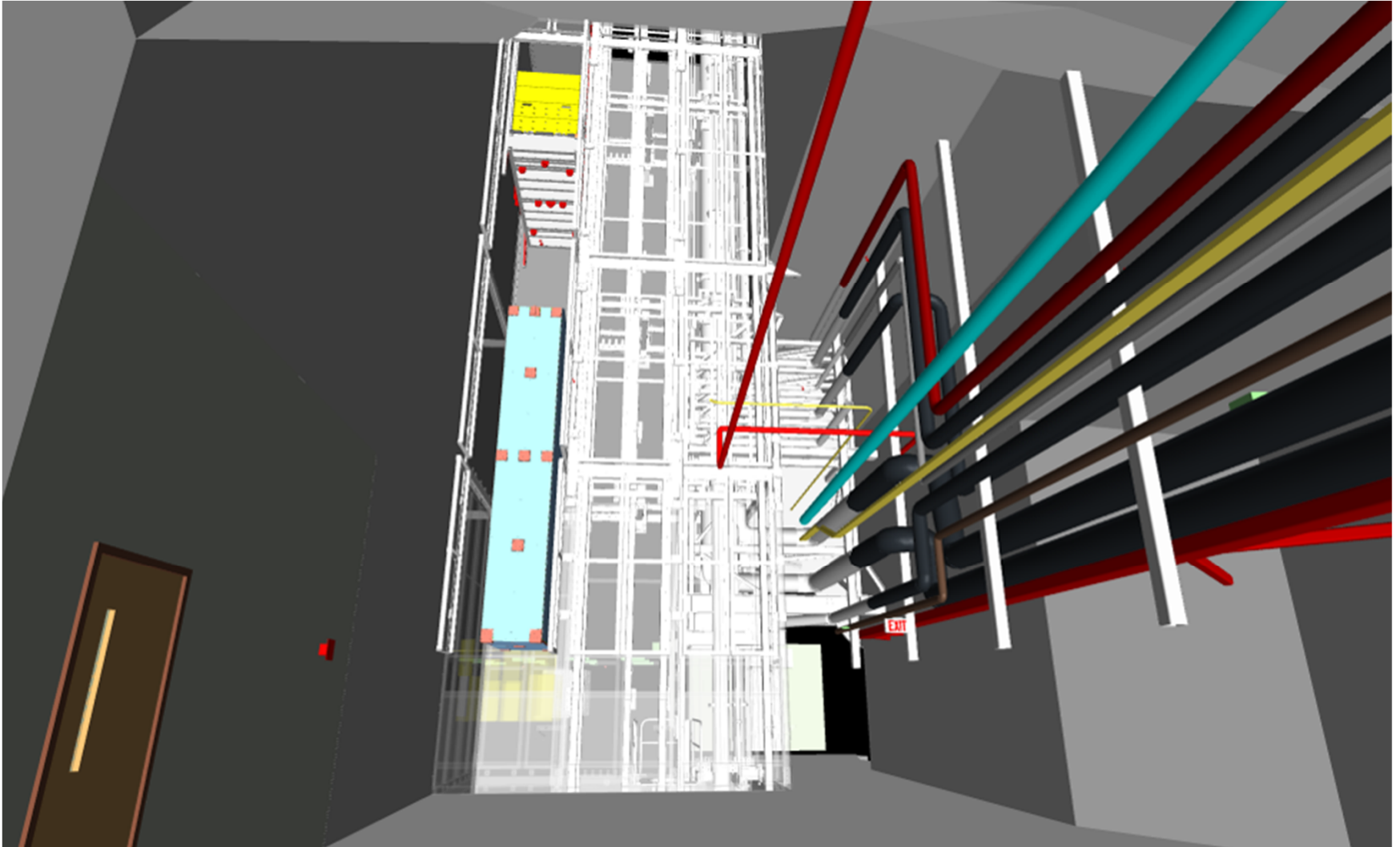
Ross Headframe Conveyance

Guides for limiting rotation within shaft during lowering

- Could be as simple as 2 plates attached to frame



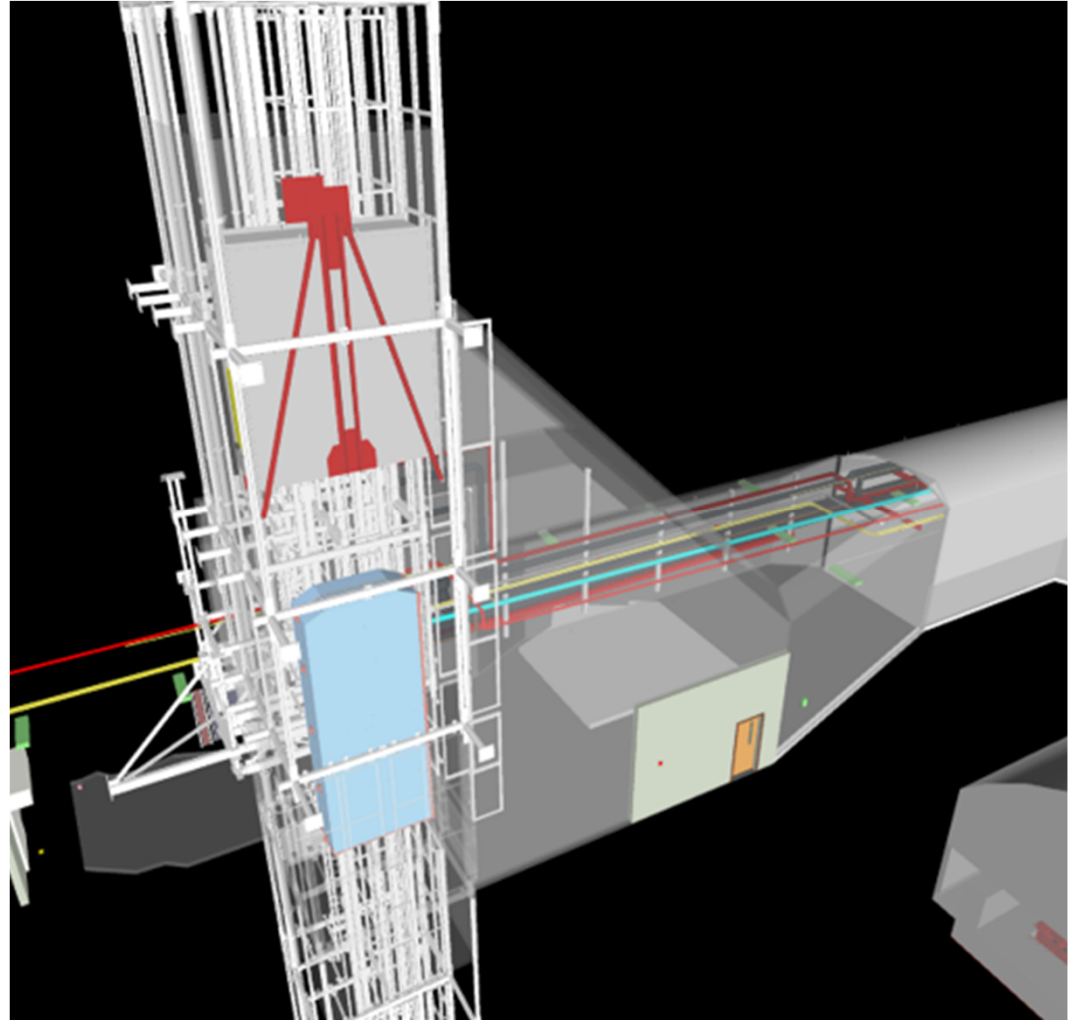
Ross Brow Conveyance



Ross Brow Conveyance

Need to fully develop:

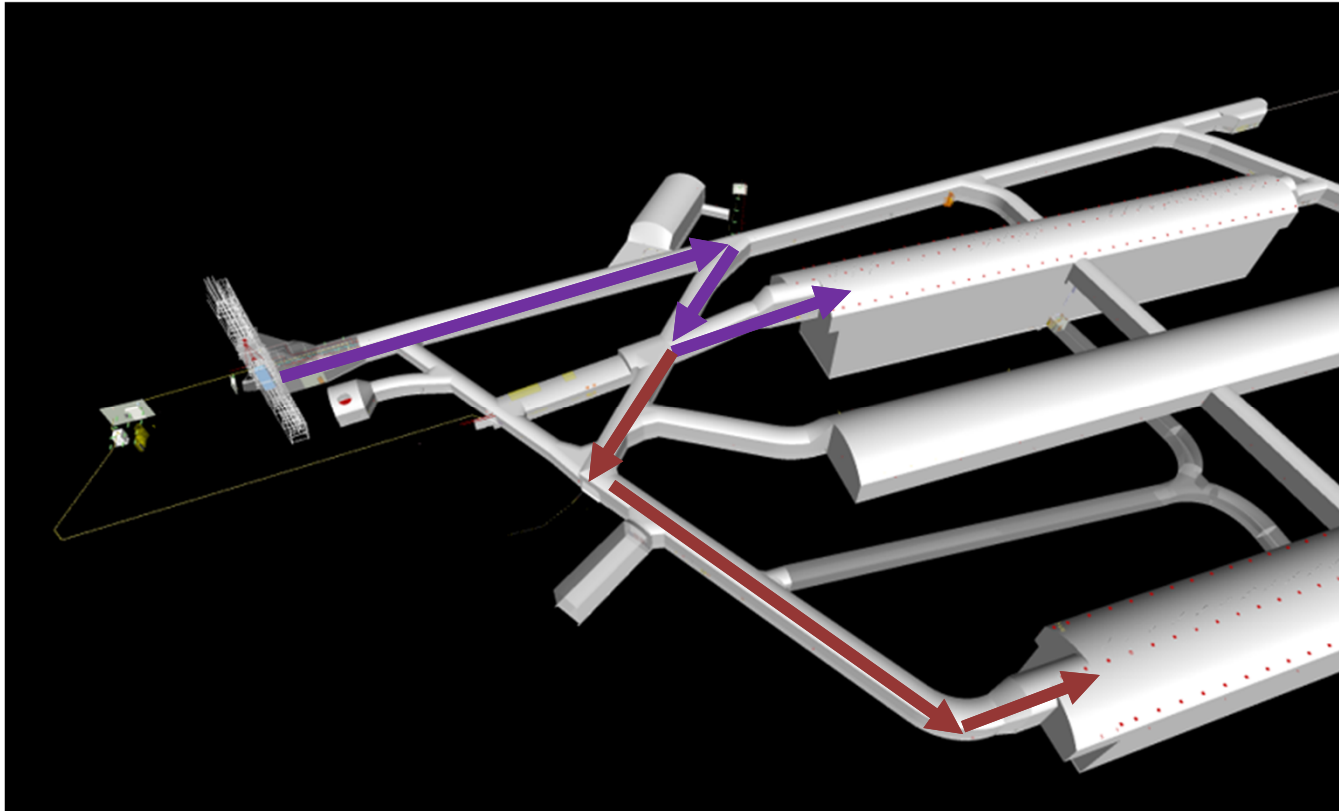
- Offloading conditions
 - Hoist requirements to pull APA out of shaft and shift horizontally
- Rolling on side without spine ok?



Drifts Conveyance

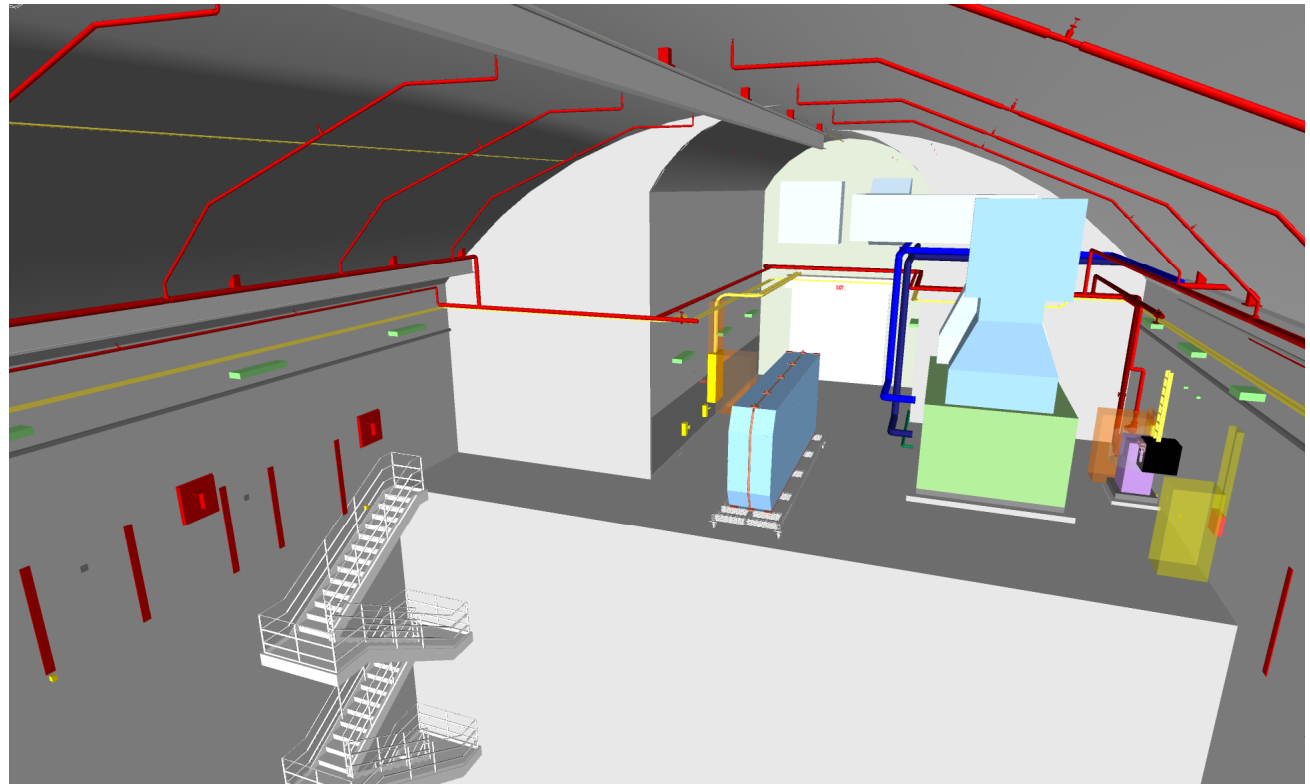
~180m from Ross brow to North detector Cavern

~300m to South detector cavern

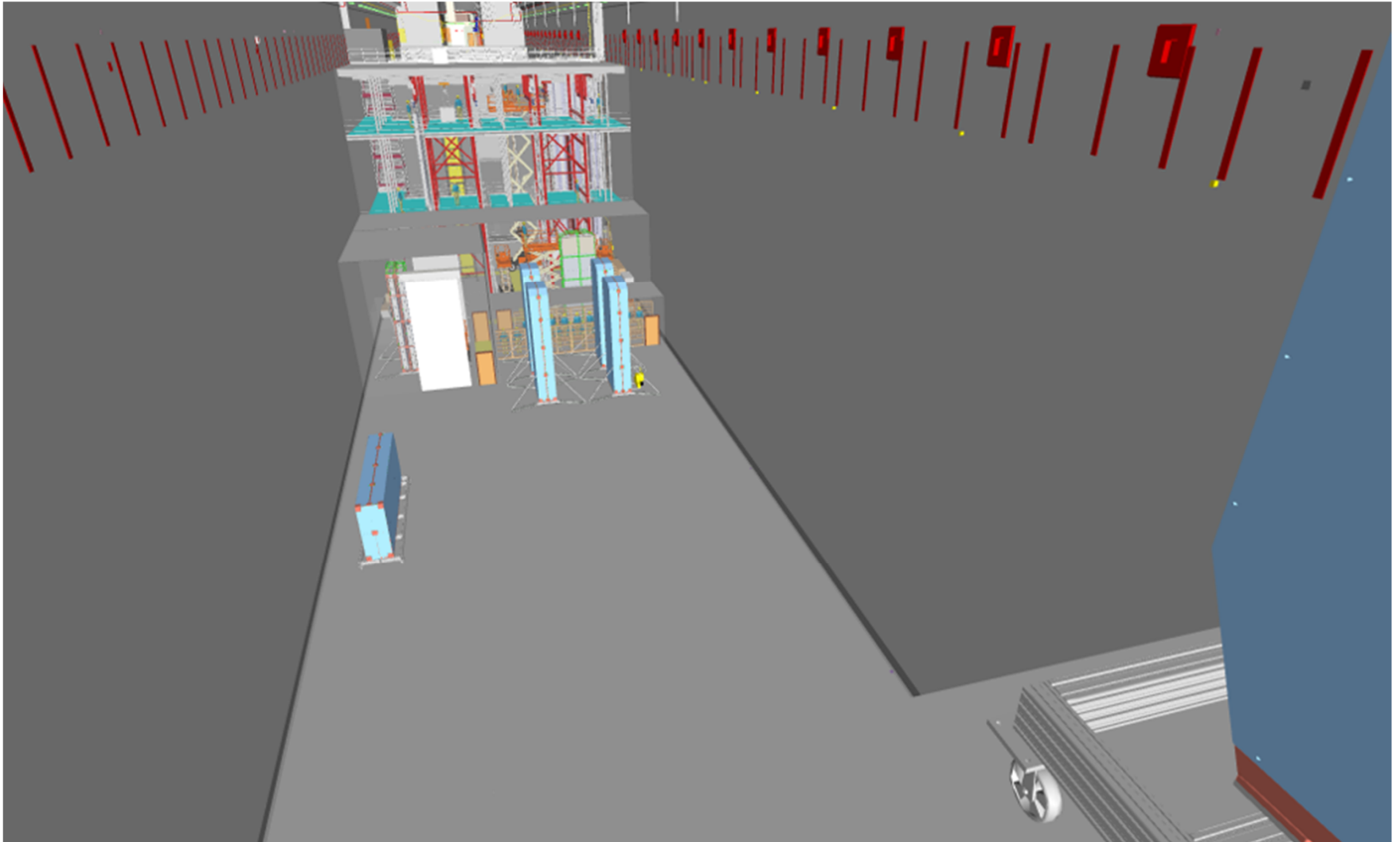


4850L to 4910L conveyance

- Double hoist on central monorail
- Can store at 4910L horizontally or vertically

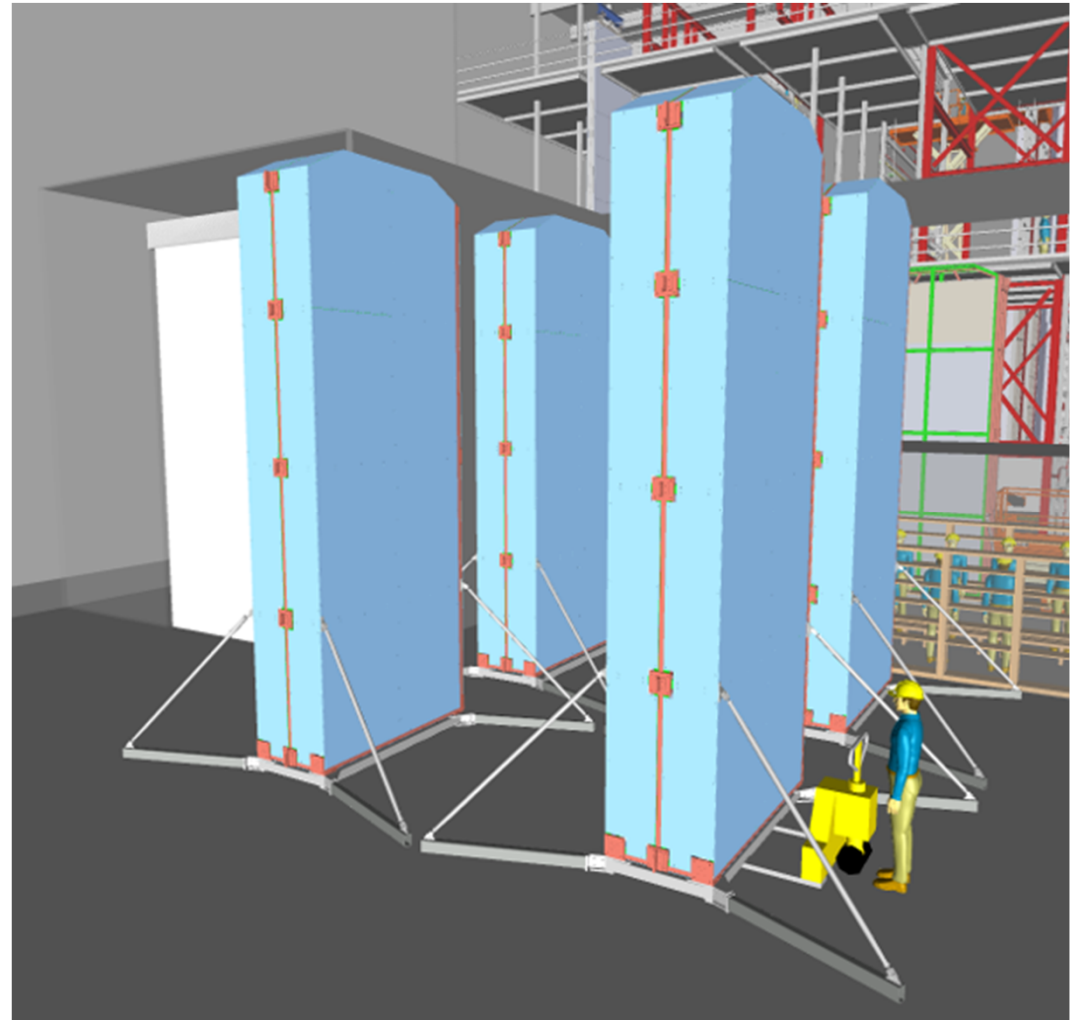


4850L to 4910L conveyance



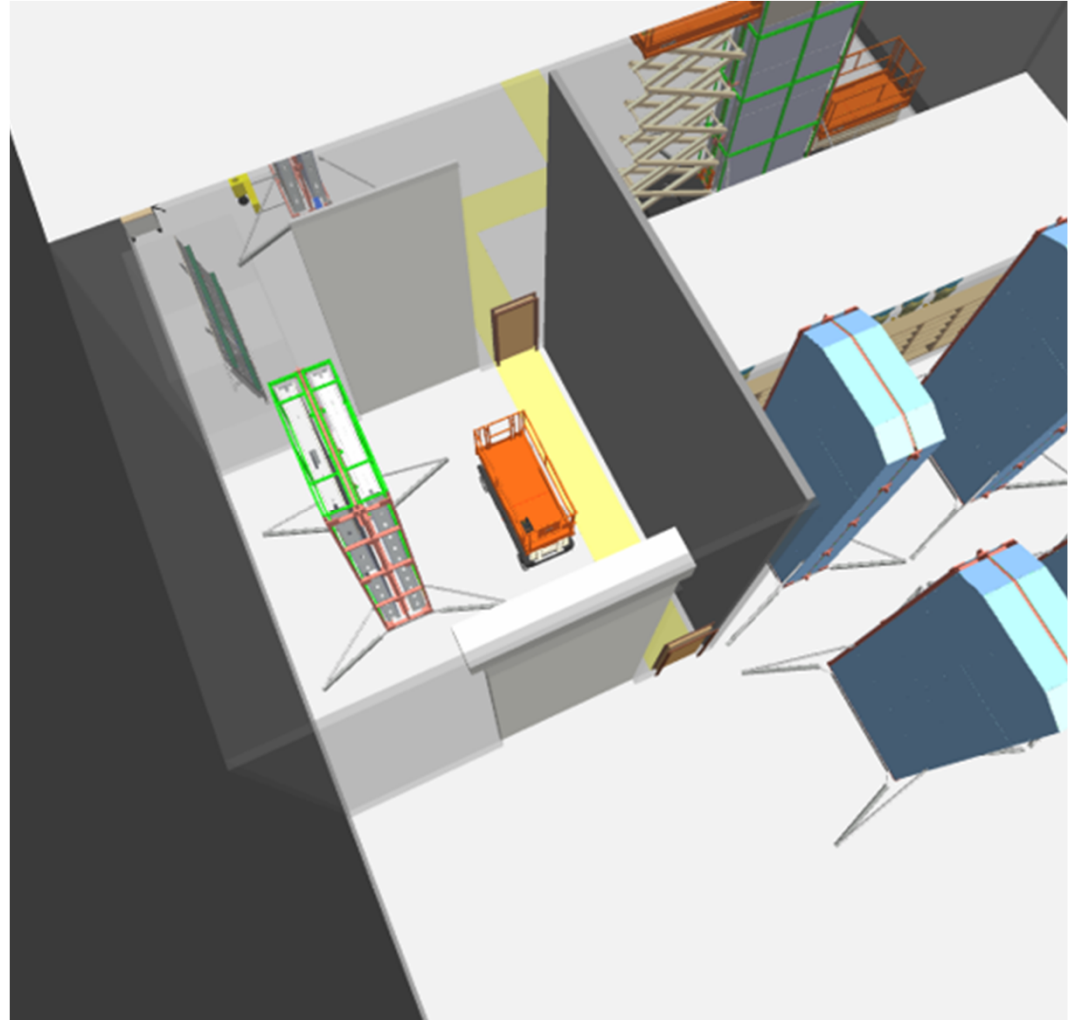
Clean room conveyance

- Ideally move vertically with electric pallet jack
- Add fork slots at bottom of vertical cart with pin connections for stability during movement?



Clean room conveyance

- Remove covers in material sas
- Minimum clean room door width needed for transport?



Clean room conveyance

- Move to PD install station (right)
- Move to APA lifting position (left)



Clean room conveyance

- Move to PD install station (right)
- Move to APA lifting position (left)

