

SURF Infrastructure roundup

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DUNE DAQ Facilities and Integration Working Group

17 January 2025





[v1 – posted DD Month](#)

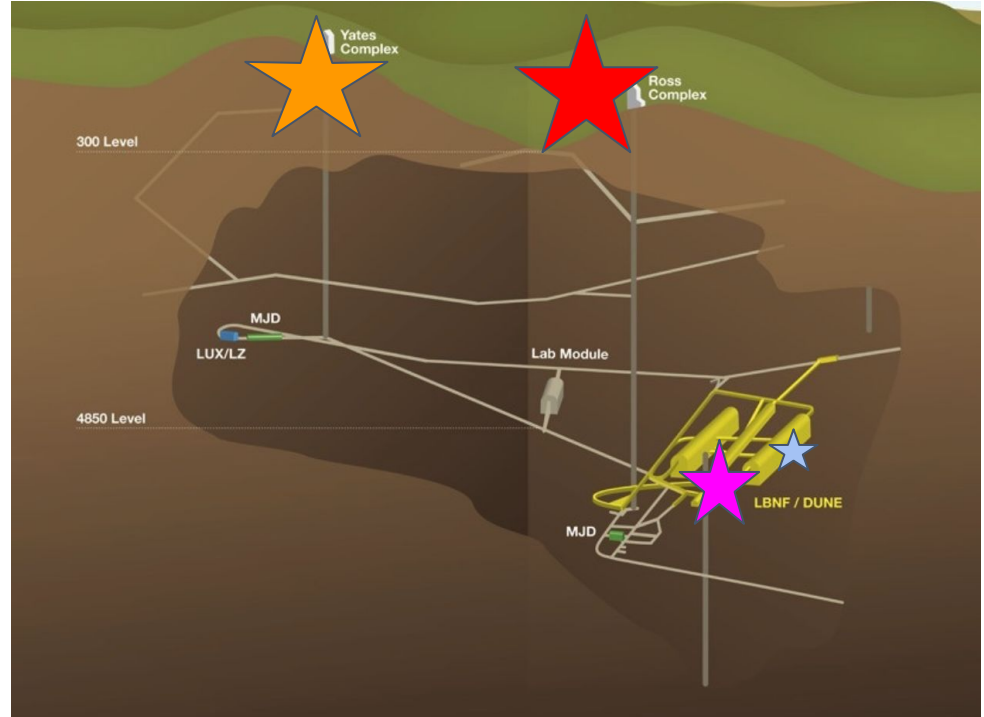


FD Infrastructure Review

1. Locations and DAQ point of presence
 - a. Ross Dry
 - b. Yates Admin
 - c. Central Utility Cavern (CUC)
 - d. South Cavern (VD)
 - i. DAQ Barrack (on Cryogenic Mezzanine)
 - ii. Detector Mezzanine
 - iii. Top of Detector
2. Schedule

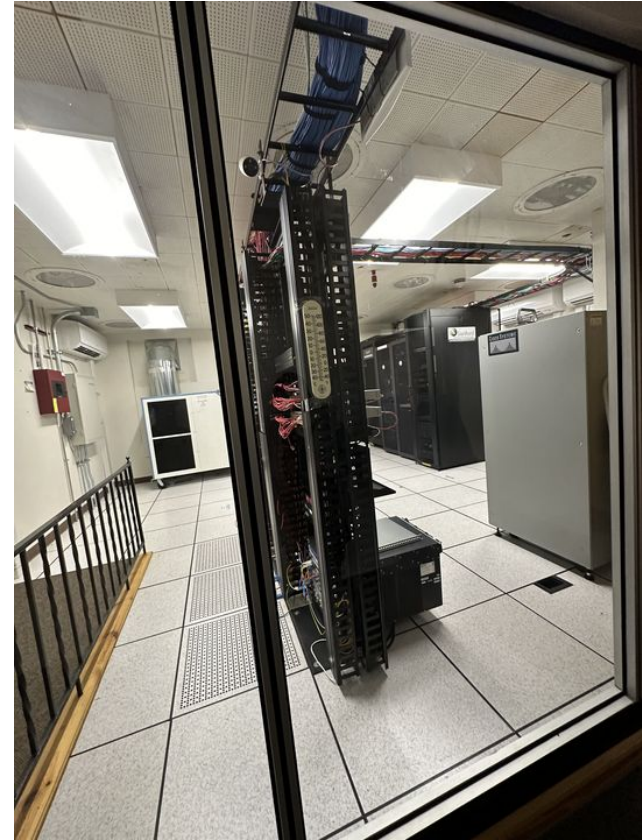
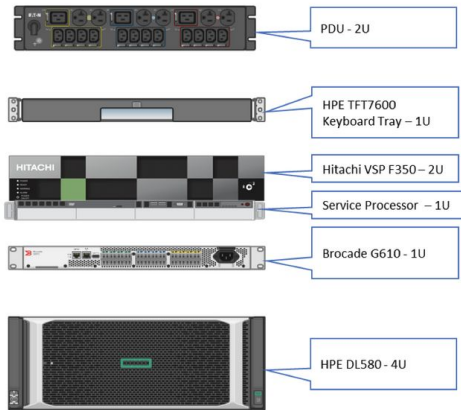
SURF Locations Overview

- **Surface:**
 -  Ross Dry
 -  Yates
- **Underground aka 4850**
 -  South Cavern
 - Detector Mezzanine
 - Detector Top
 - Cryo Mezzanine
 - DAQ Barrack
 -  CUC

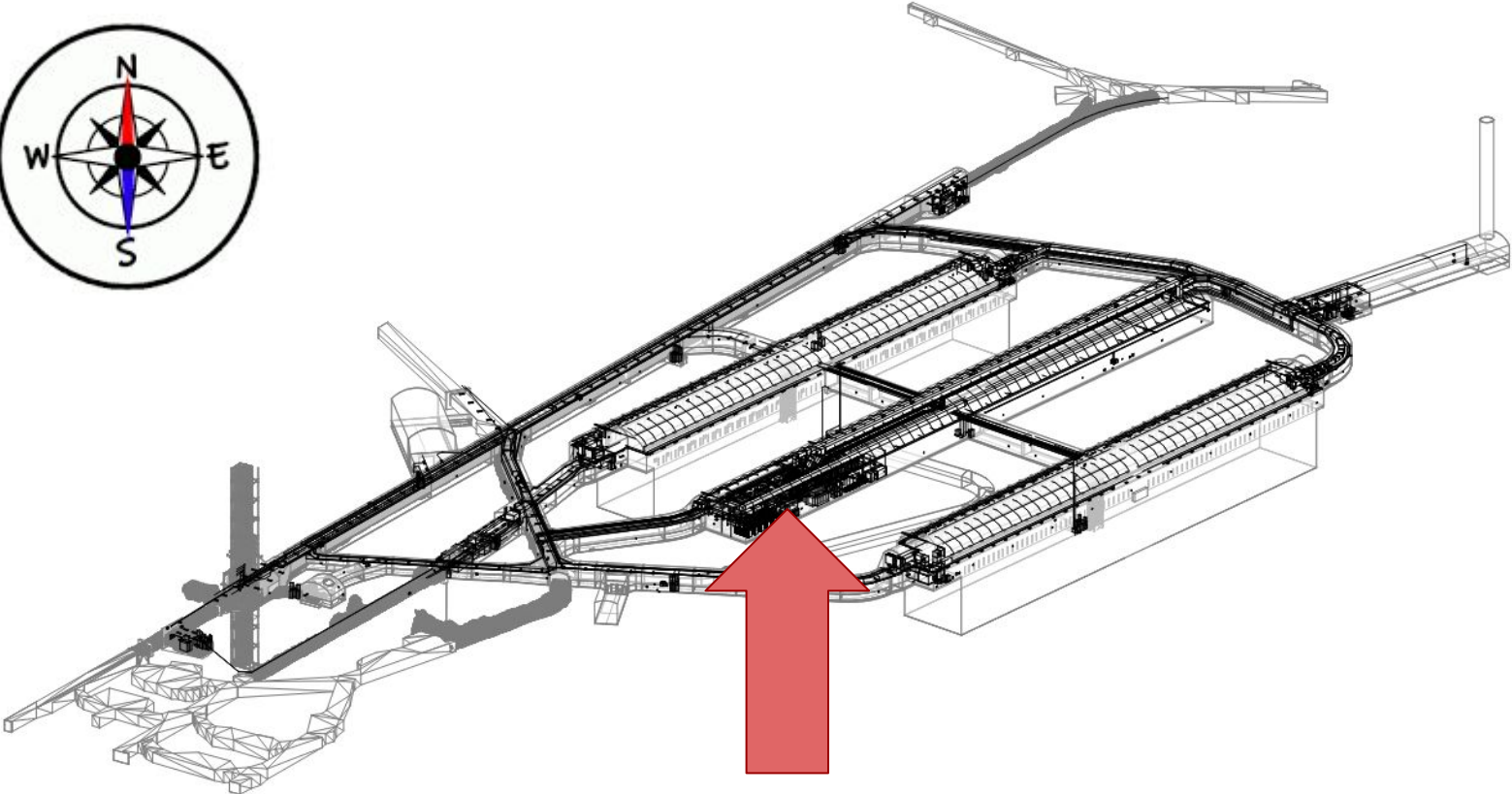
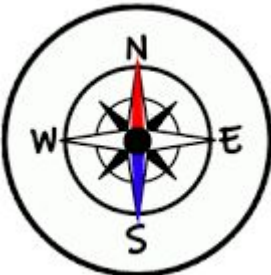


Yates Admin

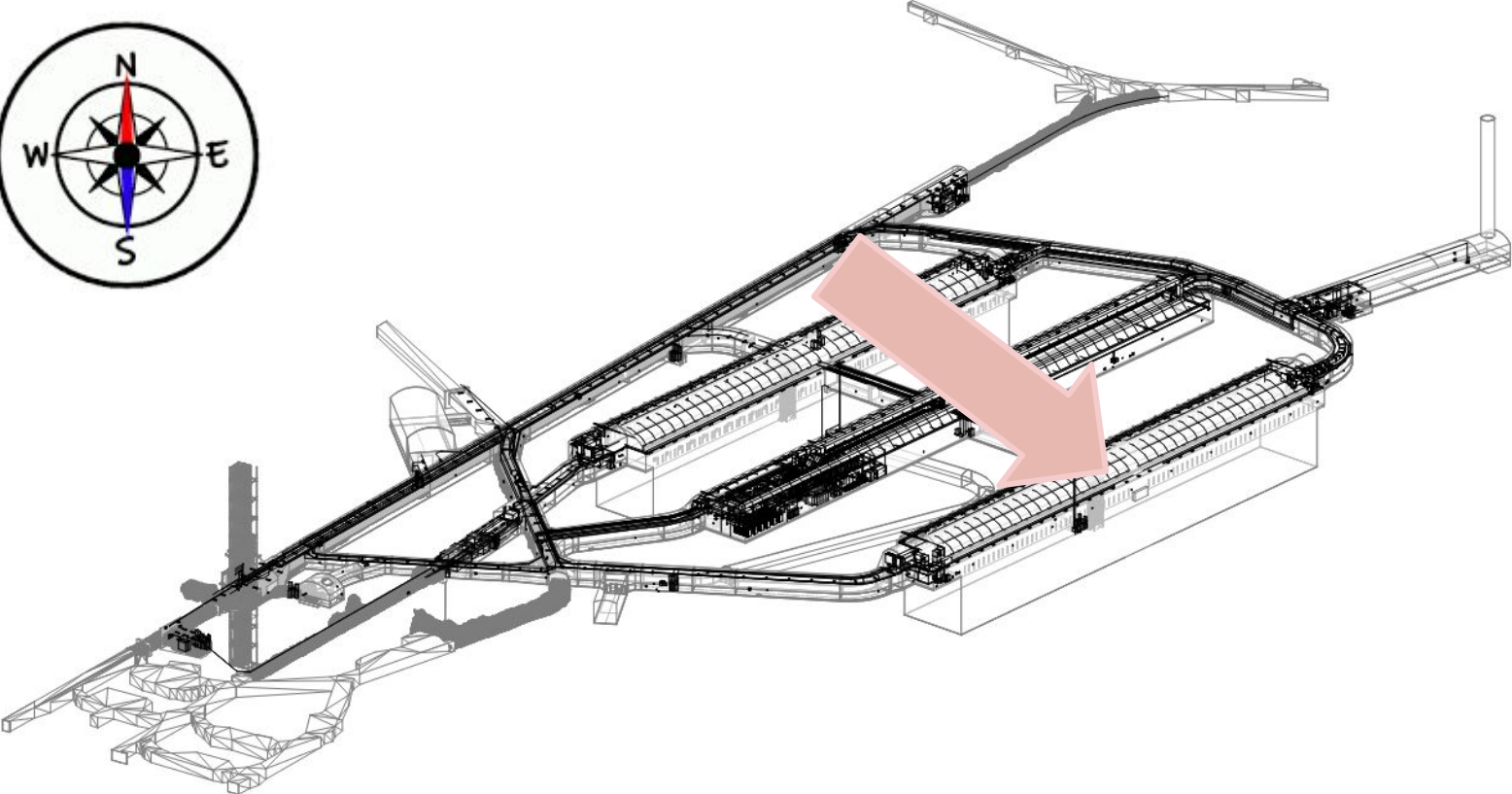
- 14U of equipment for ITD core services (VMWare)



Central Utility Cavern (CUC)



South Cavern (Vertical Drift)



South Cavern (Vertical Drift)

Detector Mezz
• Overall size in light blue

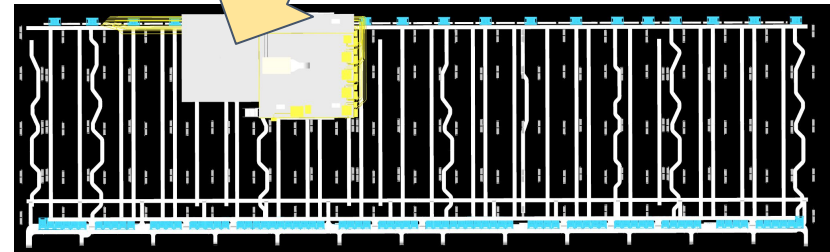
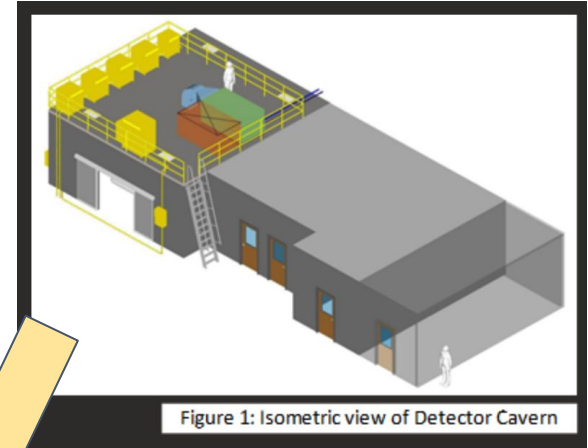
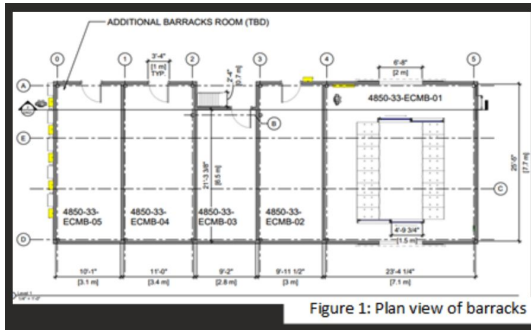
FD2 DAQ Barrack

FD2 Cryo Mezz



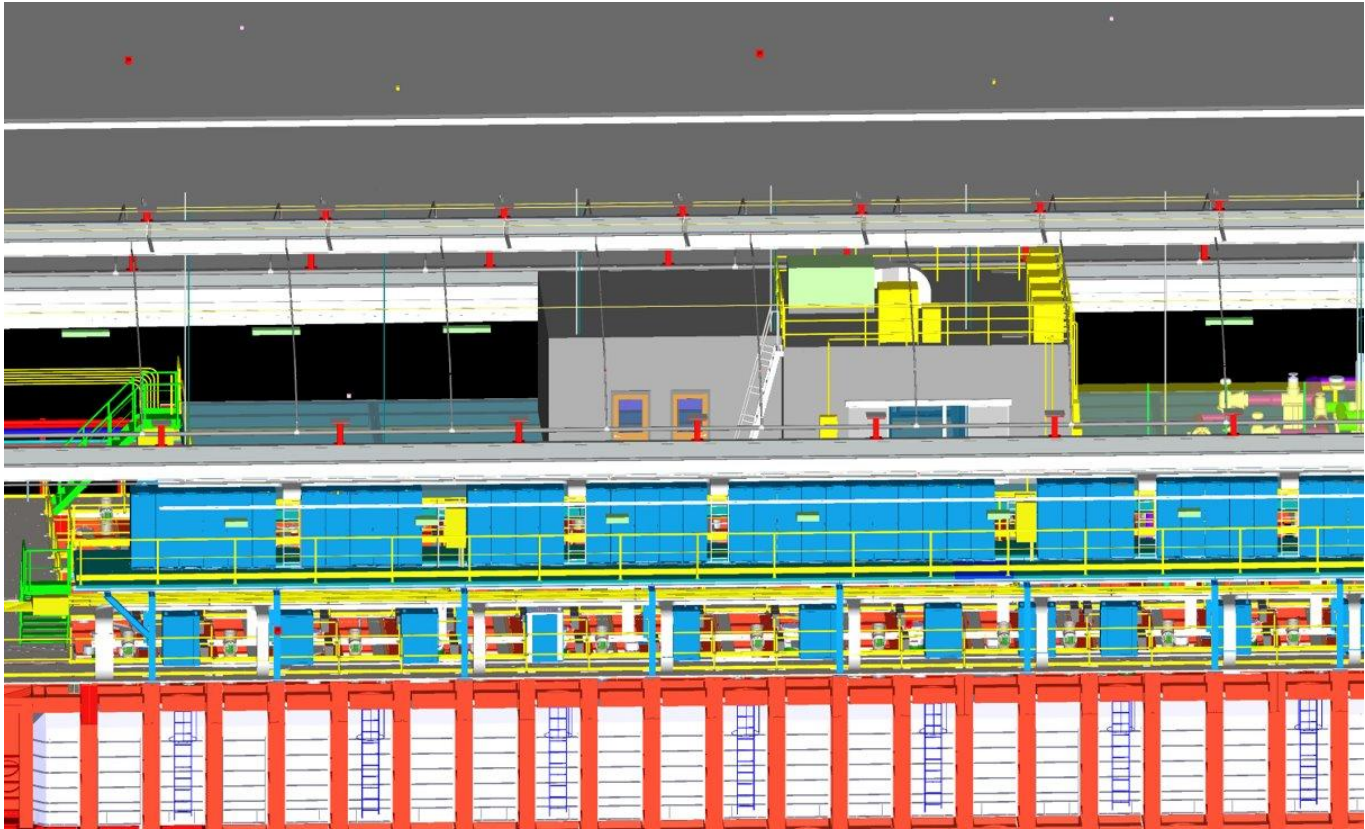
South Cavern (Vertical Drift DAQ Barrack)

- 150 KVA transformer
- 16 racks



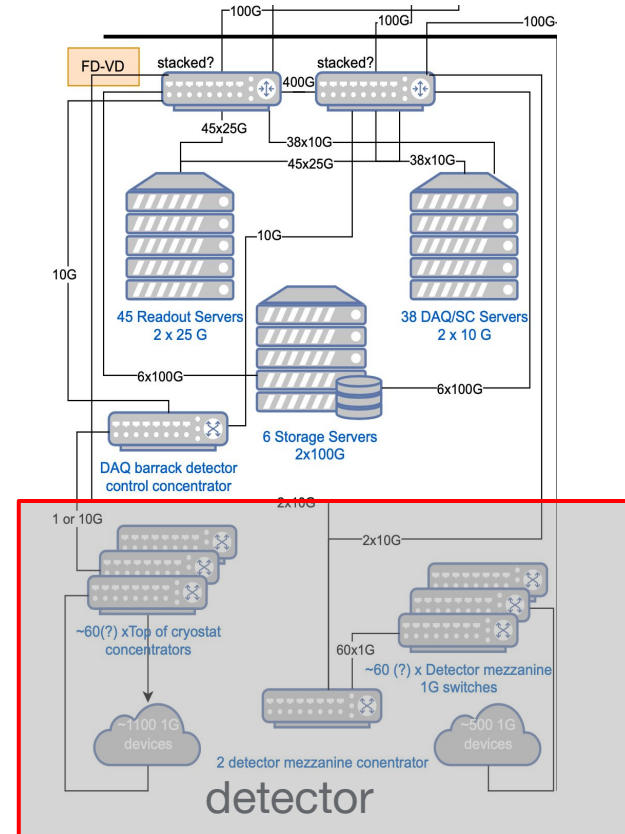
South Cavern (Vertical Drift DAQ Barrack)

Another view



South Cavern (Vertical Drift DAQ Barrack)

- Servers:
 - 45 readout
 - 38 DAQ/SC (this is the smaller count)
 - 6 storage servers potentially since server count decreases



South Cavern (VD Detector Mezzanine)

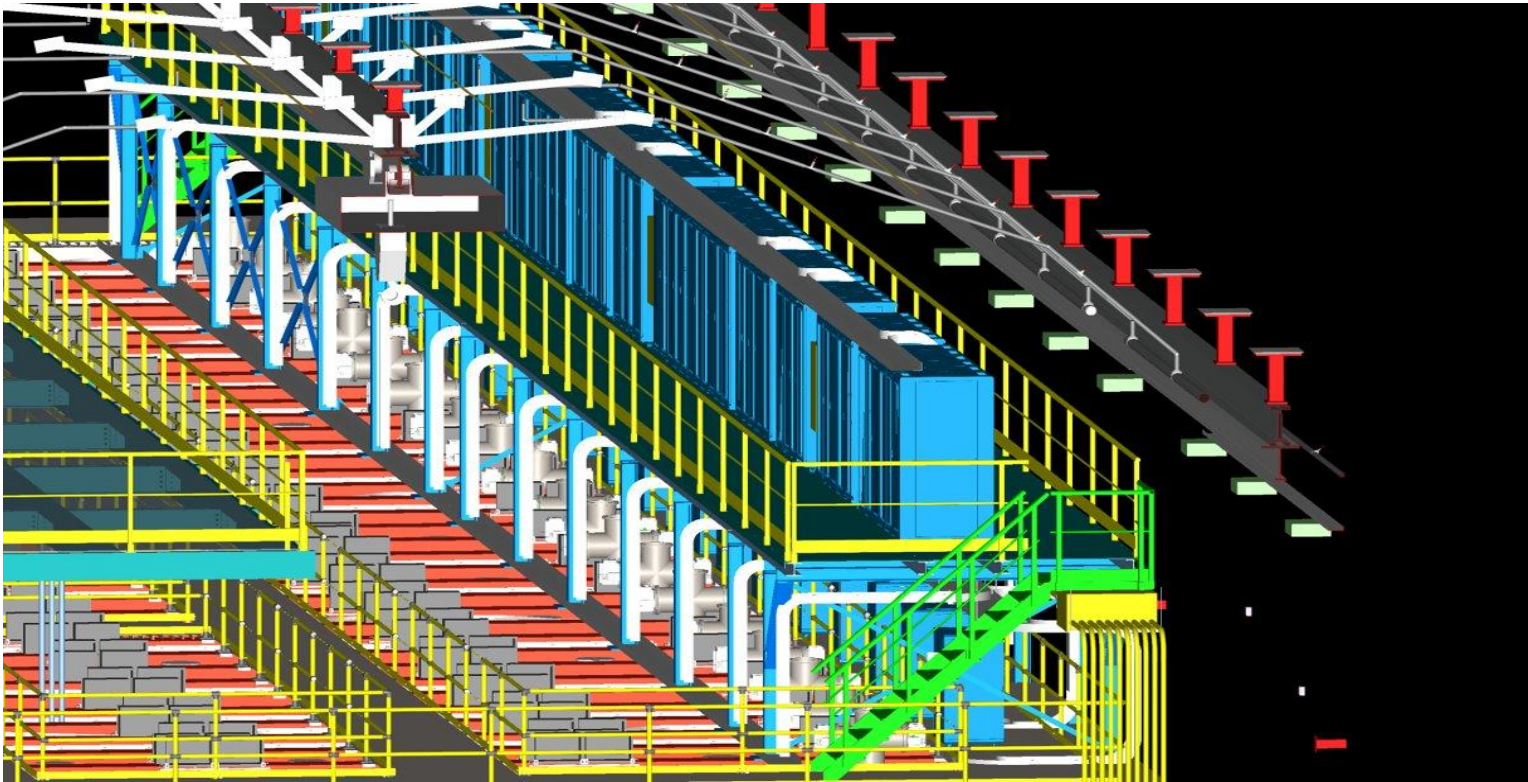
- 80 racks
 - Get confirmation that there will be 1 small concentrator per rack
 - Could we aggregate all to an aggregation switch with optical link to barracks
- 5 types (?)

Rack Type #1 HV Drift				Rack Type #2 TPC Electronics LV				Rack Type #3 TPC Electronics Aux				Rack Type #4 TPC Bias Voltage			
U#	Description	Space Required	Power (W)	U#	Description	Space Required	Power (W)	U#	Description	Space Required	Power (W)	U#	Description	Space Required	Power (W)
42	Full size 3U Rack		3000	42	Rack Protection	1	50	42	Rack Protection	1	50	42	Rack Protection	1	50
41	Space			41	Space			41	Space			41	Space		
40	Network Switch	1	150	40	Network Switch	1	150	40	Network Switch	1	150	40	Network Switch	1	150
39	Space			39	Space			39	Space			39	Space		
38	3U DC Power Supply	3	2050	38	Interface with between Wiener PLS06/Equip	3	2050	38	Interface with between PLC and Wiener PLS06 and interface between	12	700	38	Interface between PLC and GEG modules in New Wiener MPOD	12	700
37	Space			37	Space			37	Space			37	Space		
36	Space			36	Space			36	Space			36	Space		
35	Rain Tray	1	90	35	Rain Tray	1	90	35	PLC and WIECU			35	PLC and WIECU		
34	Space			34	Interface with Network PLC and fans			34	Interface with Network PLC and fans			34	Interface with Network PLC and fans		
33	Space			33	Space			33	Space			33	Space		
32	Space			32	Space			32	Space			32	Space		
31	Space			31	Space			31	Space			31	Space		
30	Space			30	Space			30	Space			30	Space		
29	Space			29	Space			29	Space			29	Space		
28	Space			28	Space			28	Space			28	Space		
27	Space			27	Space			27	Space			27	Space		
26	Space			26	Space			26	Space			26	Space		
25	Space			25	Space			25	Space			25	Space		
24	Space			24	Space			24	Space			24	Space		
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22	Space			22	Space			22	Space			22	Space		
21	Space			21	Space			21	Space			21	Space		
20	Space			20	Space			20	Space			20	Space		
19	Space			19	Space			19	Space			19	Space		
18	Space			18	Space			18	Space			18	Space		
17	Space			17	Space			17	Space			17	Space		
16	Space			16	Space			16	Space			16	Space		
15	Space			15	Space			15	Space			15	Space		
14	Space			14	Space			14	Space			14	Space		
13	Space			13	Space			13	Space			13	Space		
12	Space			12	Space			12	Space			12	Space		
11	Space			11	Space			11	Space			11	Space		
10	Space			10	Space			10	Space			10	Space		
9	Space			9	Space			9	Space			9	Space		
8	Space			8	Space			8	Space			8	Space		
7	Space			7	Space			7	Space			7	Space		
6	Space			6	Space			6	Space			6	Space		
5	Space			5	Space			5	Space			5	Space		
4	Space			4	Space			4	Space			4	Space		
3	Space			3	Space			3	Space			3	Space		
2	Space			2	Space			2	Space			2	Space		
1	Space			1	Space			1	Space			1	Space		
Total:		0	3300	Total:		8	2980	Total:		16	900	Total:		36	3480

Not DAQ scope



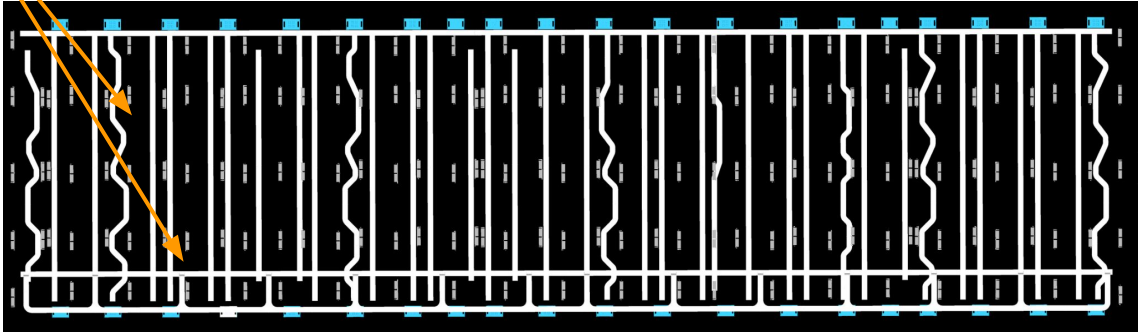
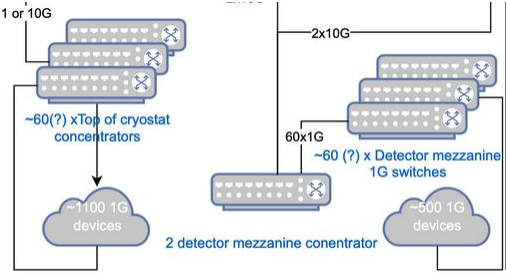
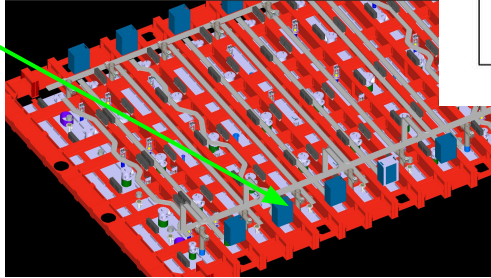
South Cavern (Detector Mezzanine)



South Cavern (VD Detector Top)

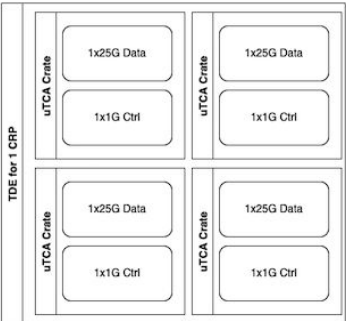
- There are 40 **BDE/PDS mini-racks**

- 80 **TDE containers (uTCA crates)**

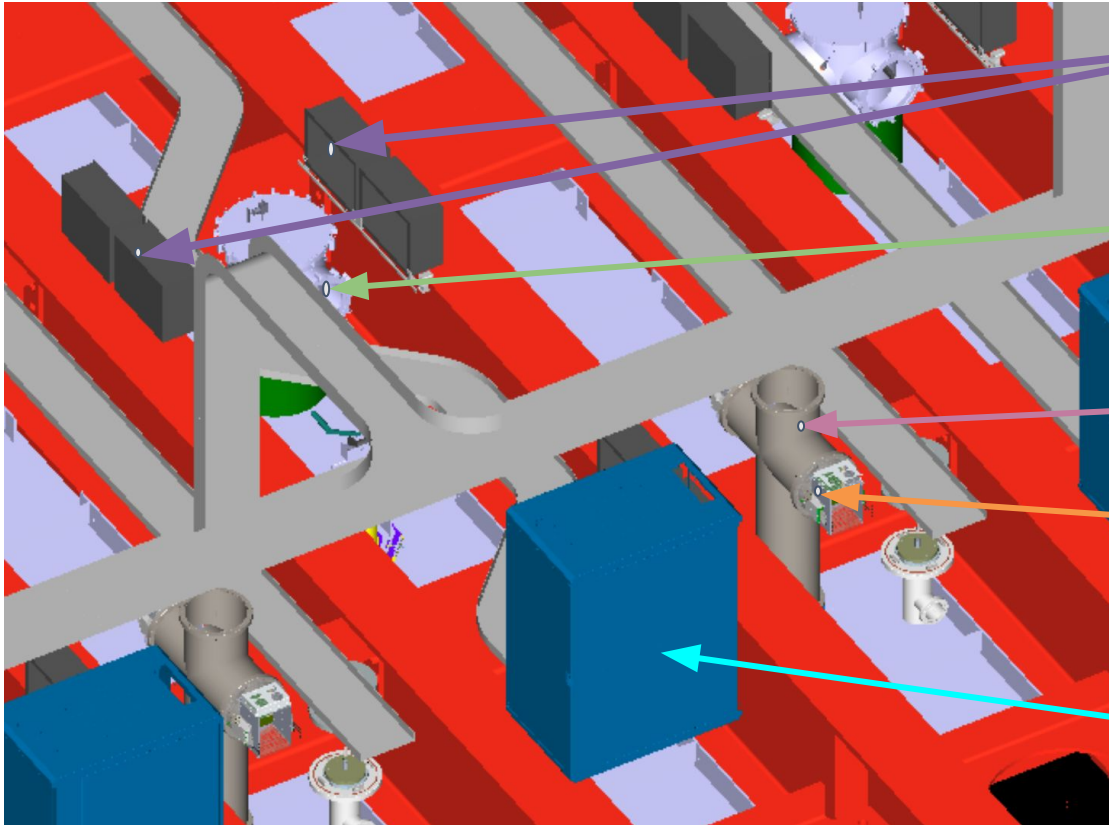


Total of 80 x 4 = 160 Dual LC fibers for data;
Any plans of adding concentrating patch panels and trunks?

Total of 80 x 4 = 160 RJ45 for control (correct?);
Any plans of adding concentrating control switches?



South Cavern (VD Detector Top)



uTCA crates
2 or 4 per feedthrough
depending on location

TDE Feedthrough

BDE feedthrough

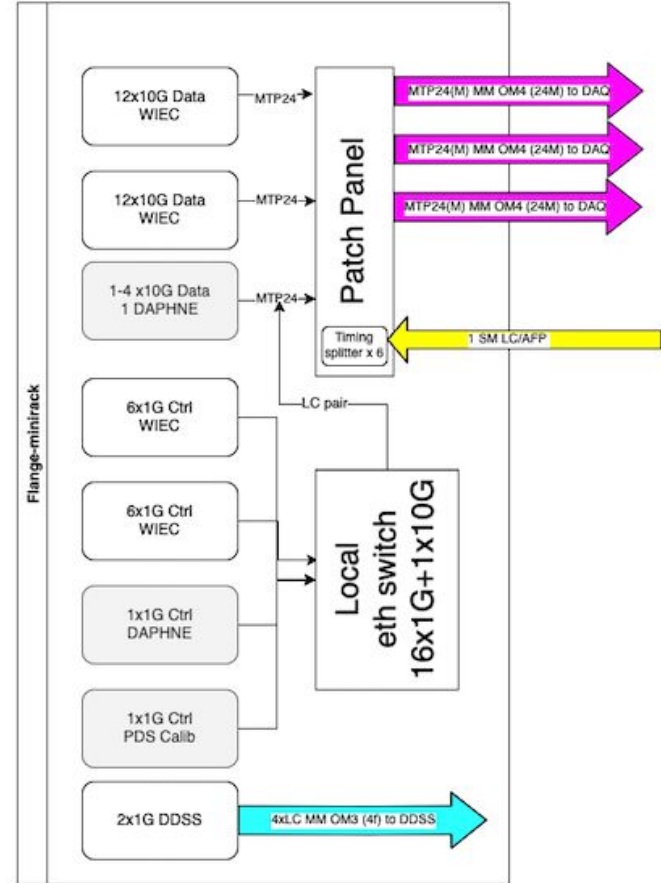
BDE WIBs

BDE/PDS racks
Contain DAPHNE

South Cavern (VD Detector Top)

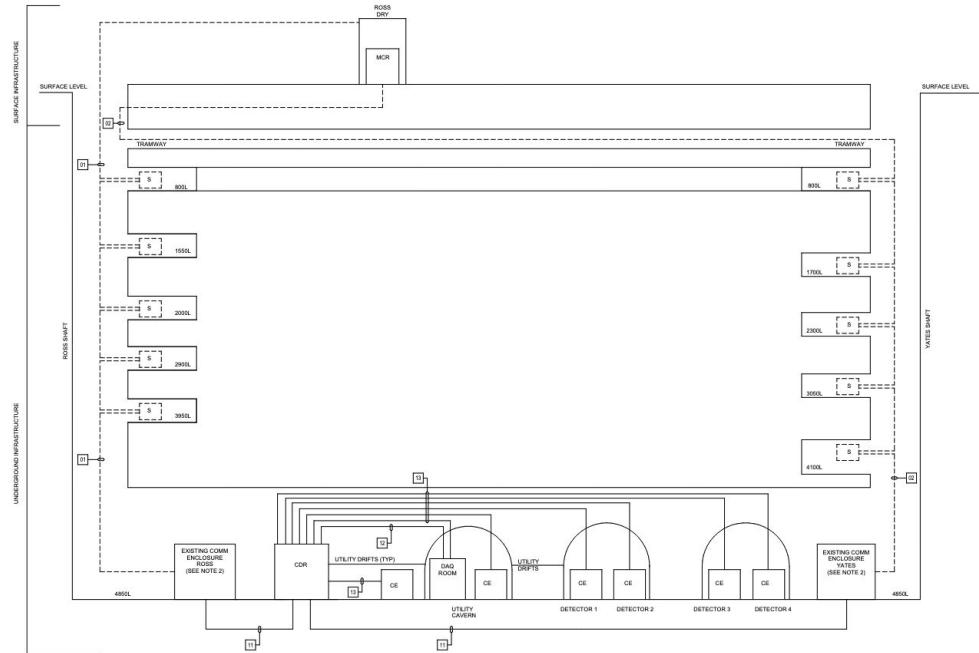
- Readout fibers to Barracks through patch panels
 - BDE/PDS patch panels in miniracks
 - TBD for TDE?
 - Plan in EDMS
- Control:
 - “Industrial” AC copper switches for 1G connections

40x

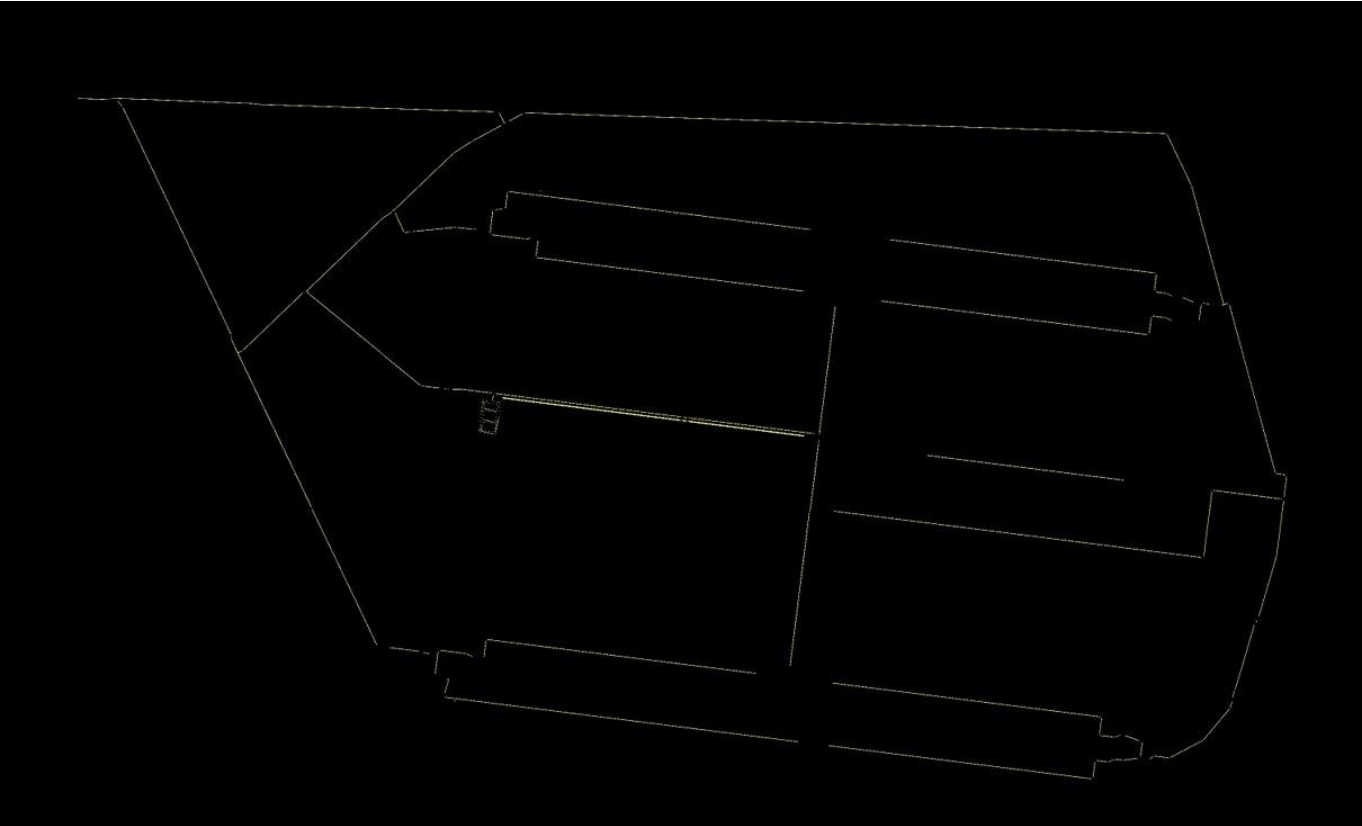


SURF Fibers

- Shaft fibers
 - Some changes from this diagram from the 100% design



SURF Fibers

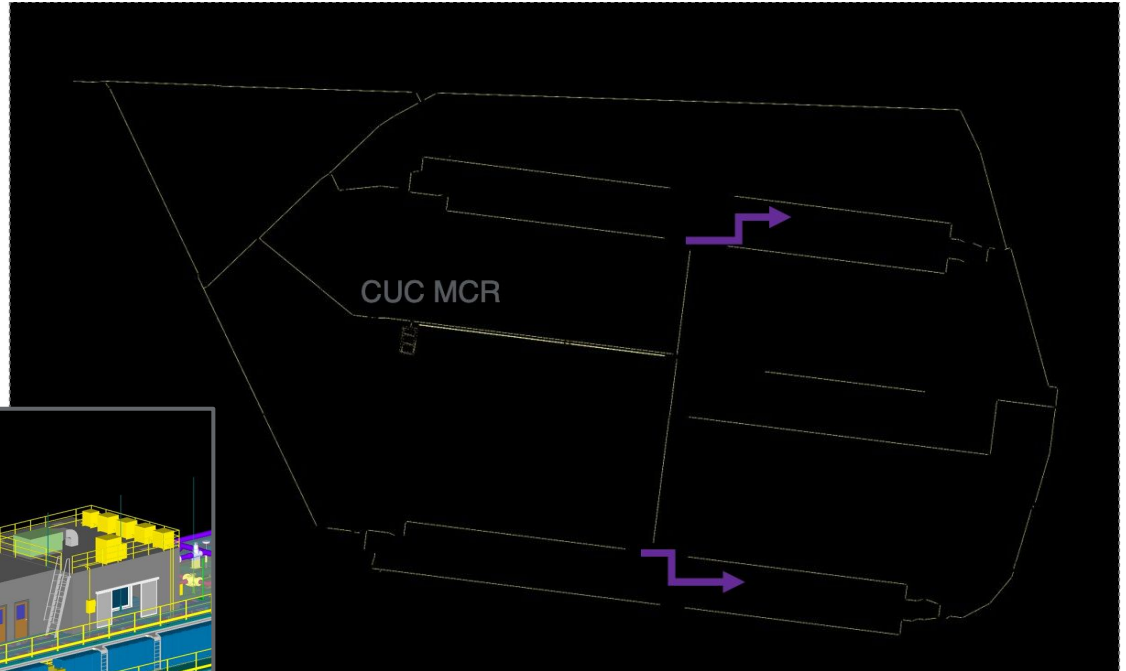
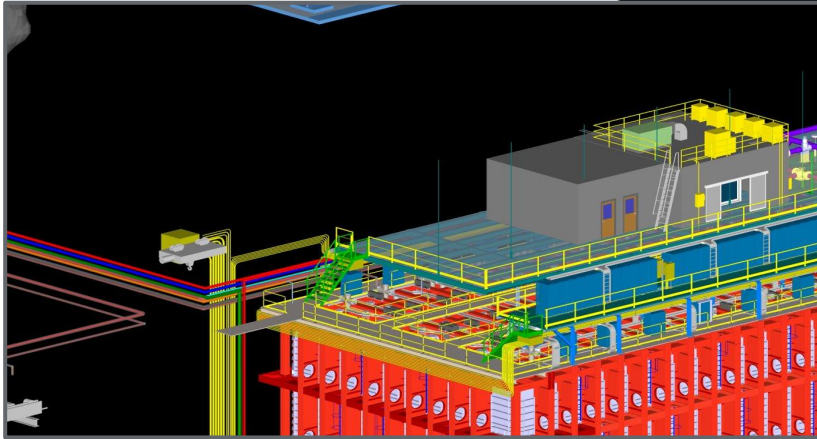


Cable Trays (all underground)

SURF Fibers

I&I cable tray needs
to be extended to
DAQ Barracks

- Purple arrows



Schedule

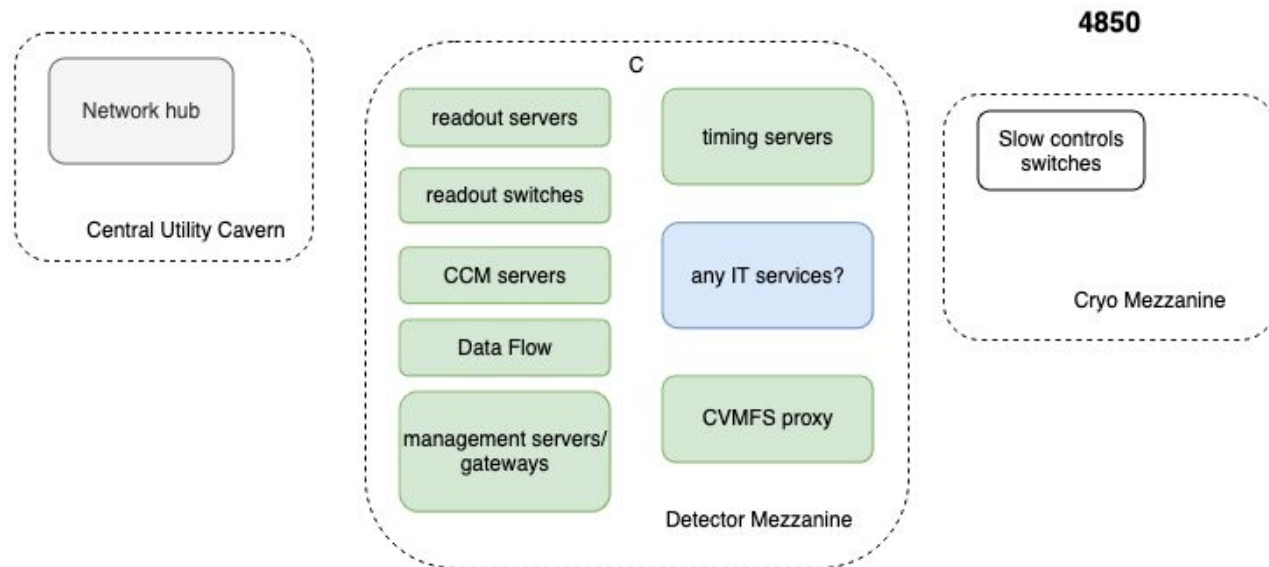
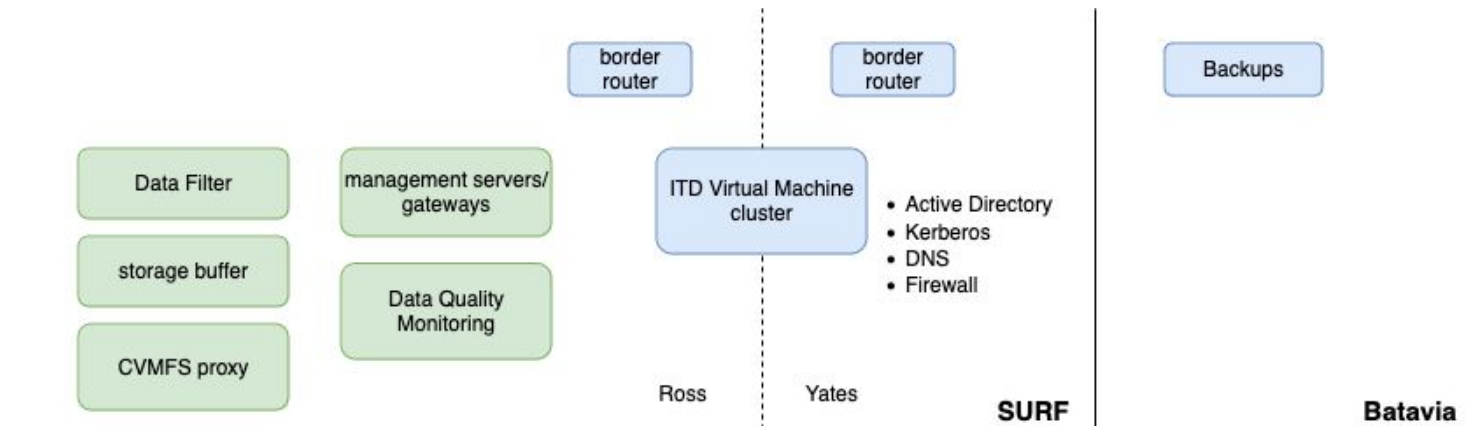
1. Ross Dry: DAQ installation planned to begin June 2026
 - Expect room to be available for networking installation in FY26Q3 (May at latest?)
2. VD DAQ Barracks (underground): DAQ planning for initial installation Nov 2026
 - Current schedule has early Dec 2026, but opportunities for advancing
 - (expect cables to DAQ room ready by end of Oct?)
 - Installation of racks on cryostat top expected to begin in parallel with DAQ installation
3. HD DAQ Barracks (underground): DAQ planning for Nov 2027
 - Expect DAQ barracks to be available from Aug 2027(?), but would be large float in that
4. Yates: ??

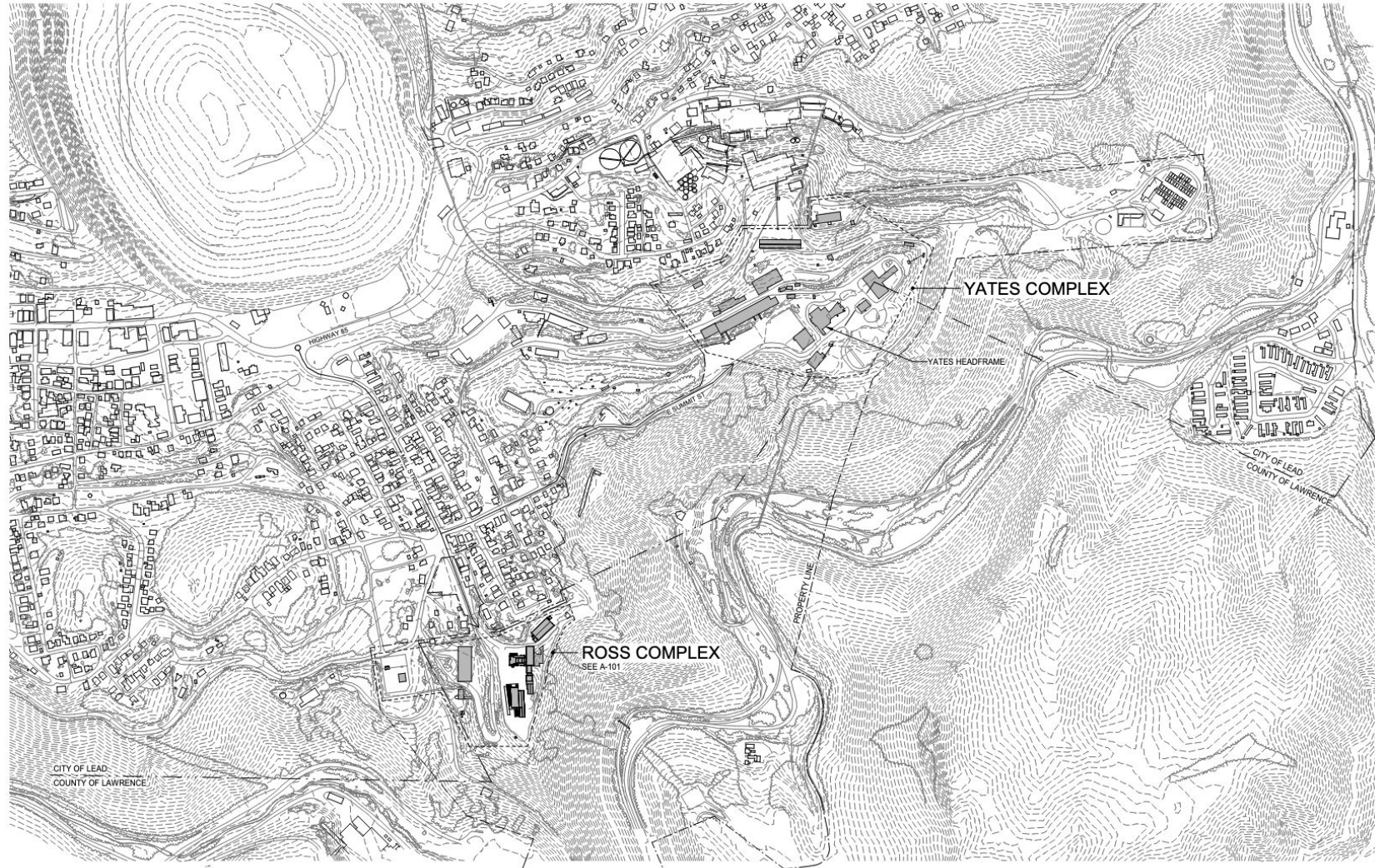
Appendix

Thanks Tom Wieber for additional images

Schedule

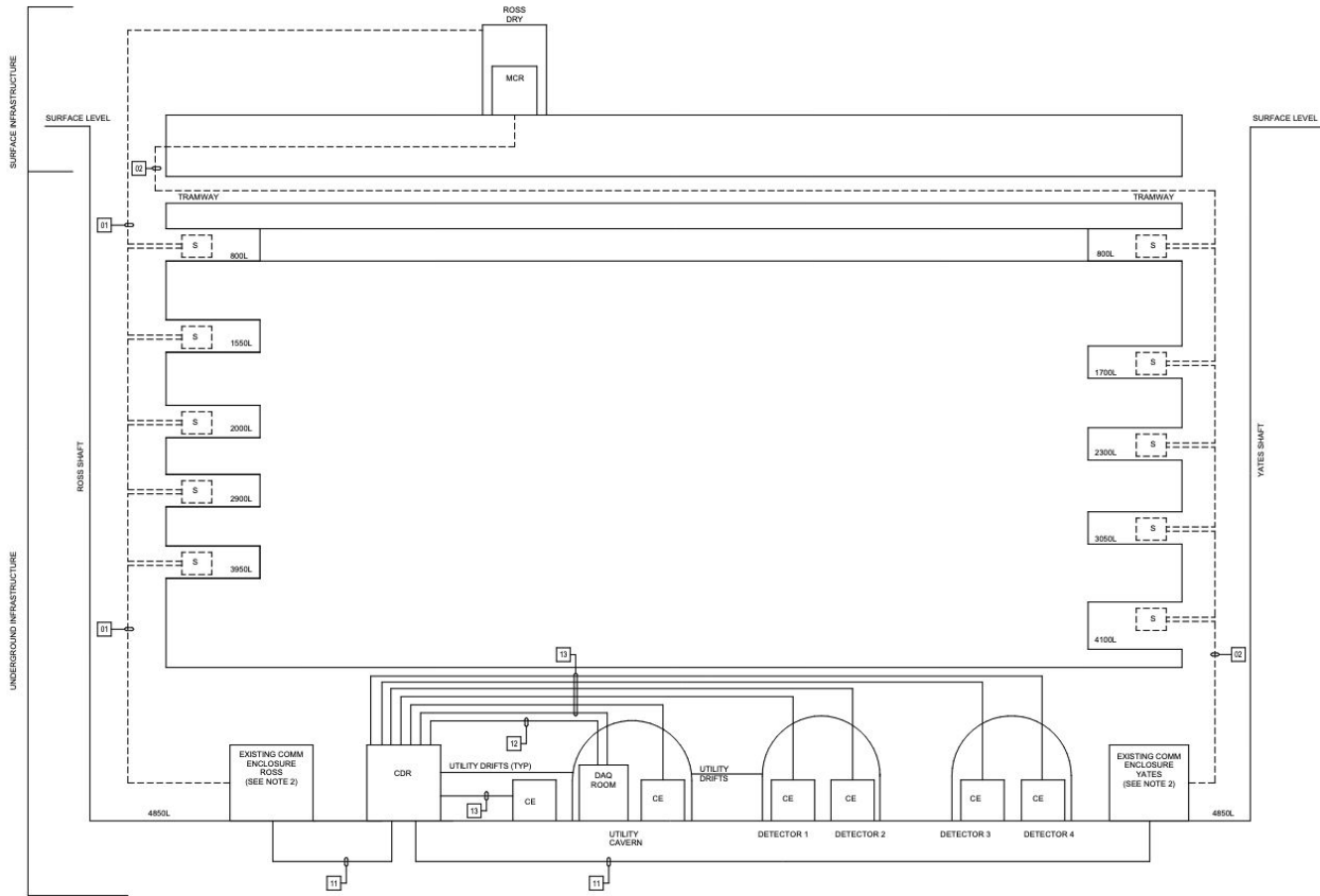
1. FSCF 100% Final Design BSI Documents
<https://edms.cern.ch/ui/#!/master/navigator/project?P:100373538:100373538:subDocs>
2. Network Specs Document
https://fermicloud-my.sharepoint.com/:w:/r/personal/wketchum_services_fnal_gov/Documents/DUNE%20DAQ%20Project%20Documents/NetworkSpecifications_shared.docx?d=wa5bae8f57cb34e68beb20d1ee919f7ec&csf=1&web=1&e=VROpt5
3. SURF current Rack Diagrams
https://fermicloud-my.sharepoint.com/:x:/r/personal/trwieber_services_fnal_gov/layouts/15/Doc.aspx?sourcedoc=%7B7CBB75F3-7970-4C17-A904-1AFBA6EDF15F%7D&file=DUNE_Rack_Diagrams.xlsx&fromShare=true&action=default&mobileredirect=true
4. Rack Layouts (DocDB) <https://docs.dunescience.org/cgi-bin/sso/ShowDocument?docid=32577>
5. Detector Mezzanine rack layout
<https://edms.cern.ch/ui/#!/master/navigator/document?D:100703012:100703012:subDocs>
- 6.





SITE PLAN - OVERALL

SCALE: 1" = 300'-0"



- NOTES:**
1. REFER TO CABLING SCHEDULE ON T-002 FOR TAG DESIGNATIONS AND DESCRIPTIONS
 2. COMMUNICATIONS ENCLOSURES AND BACKBONE CABLING IN YATES AND ROSS SIDES AT 4850 LEVEL (DASHED LINES) SHOWN FOR REFERENCE AND PROVIDED AS PART OF PRE-EXCAVATION
 3. STRAIN RELIEF OF CABLE SHOWN FOR REFERENCE AND PROVIDED AT IDENTIFIED LEVELS AS PART OF PRE-EXCAVATION
 4. FIBER PATHWAYS TO ROSS AND YATES ENCLOSURES SHOULD BE PHYSICALLY DIVERSE.

Responsibility Matrix: Specifications

DRAFT / PRELIMINARY

	Ross Dry	Yates	CUC	DAQ Barrack	Cryo Mezzanine	Detector Mezzanine	Detector Top
“DAQ” Servers	DAQ+ITD	ITD		DAQ			
Experiment Network	DAQ+ Networking	DAQ+ Networking	Networking	DAQ+ Networking			
Readout Switches				DAQ			
Detector Mezzanine Switches						I&I/SC + Networking	
Cryostat Top Switches							I&I/SC+DAQ+ Networking
Detector/DAQ Fibers/patch panels				DAQ		I&I/SC	DAQ+I&I/SC

(OK, and we’re all working together and communicating on this, but just trying to identify the main drivers.)

Responsibility Matrix: Procurement

DRAFT / PRELIMINARY

	Ross Dry	Yates	CUC	DAQ Barrack	Cryo Mezzanine	Detector Mezzanine	Detector Top
"DAQ" Servers	DAQ (+ops?)	(ops?)		DAQ			
Experiment Network	I&I	I&I	I&I	I&I			
Readout Switches				DAQ			
Detector Mezzanine Switches						I&I (?)	
Cryostat Top Switches							I&I
Detector/DAQ Fibers/patch panels				DAQ		I&I/SC	DAQ+I&I/SC

Responsibility Matrix: Installation

	Ross Dry	Yates	CUC	DAQ Barrack	Cryo Mezzanine	Detector Mezzanine	Detector Top
"DAQ" Servers	DAQ	??		DAQ			
Experiment Network	I&I+DAQ+ Networking?	I&I?	I&I+Networking?(+DAQ?)	I&I+DAQ+ Networking?			
Readout Switches				DAQ			
Detector Mezzanine Switches						I&I?	
Cryostat Top Switches							I&I
Detector/DAQ Fibers/patch panels				DAQ		I&I/SC	I&I/SC (tiny bit DAQ)

Responsibility Matrix: Operations

	Ross Dry	Yates	CUC	DAQ Barrack	Cryo Mezzanine	Detector Mezzanine	Detector Top
"DAQ" Servers	DAQ			DAQ			
Experiment Network	Networking	Networking	Networking	Networking			
Readout Switches				DAQ			
Detector Mezzanine Switches						Networking	
Cryostat Top Switches							Networking
Detector/DAQ Fibers/patch panels				DAQ		I&I/Ops	I&I/Ops

SURF Fibers

1. Who: procures, installs, “supports”
I think we should have 4 such slides, one for each of specification, procurement, hardware installation/connection, configuration/operation