

Tunnel Layout of Kamaboko-shaped Positron BDS tunnel

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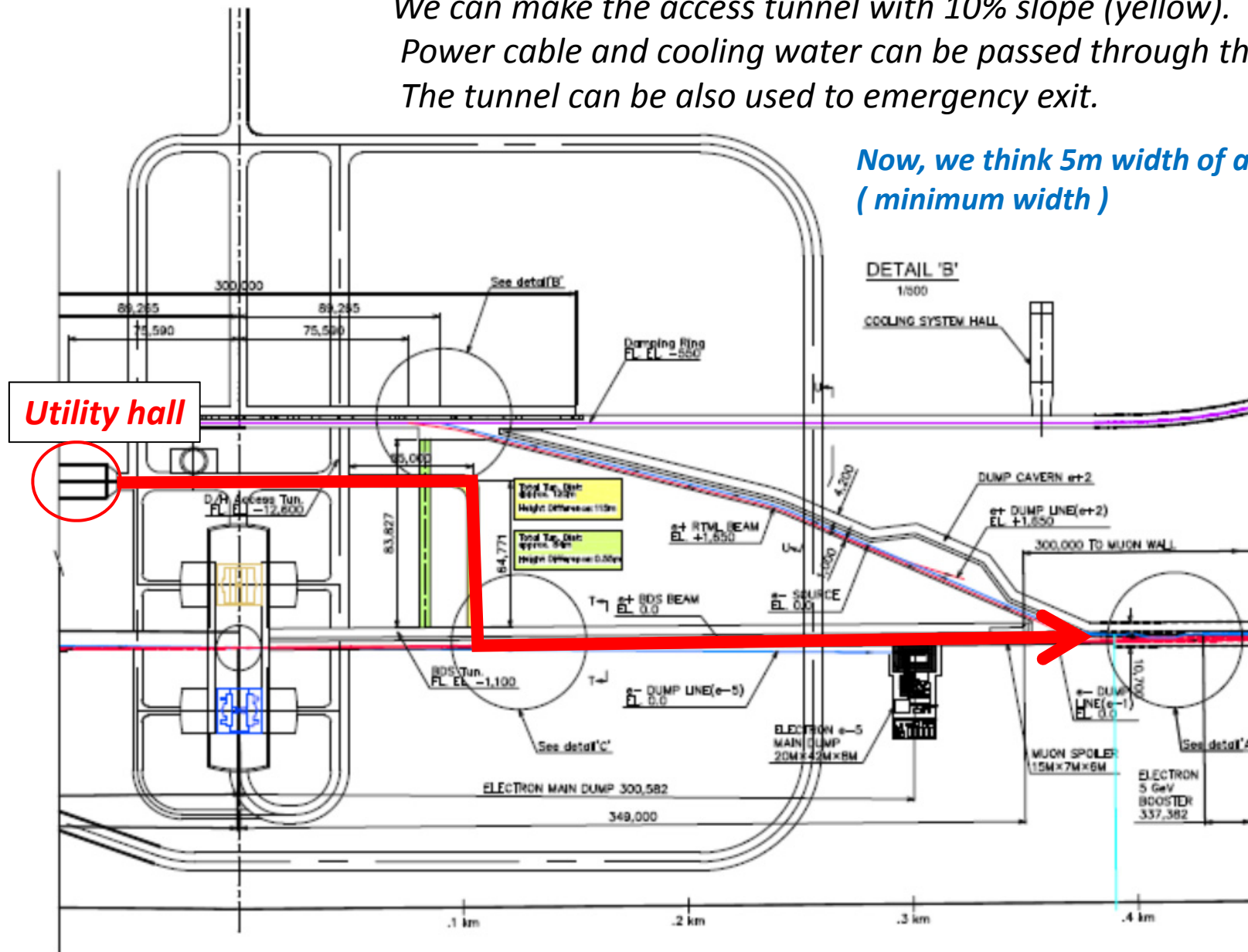
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ILC Central Region Meeting

Access tunnel from central region to BDS section

We can make the access tunnel with 10% slope (yellow).
Power cable and cooling water can be passed through the tunnel.
The tunnel can be also used to emergency exit.

Now, we think 5m width of access tunnel.
(minimum width)

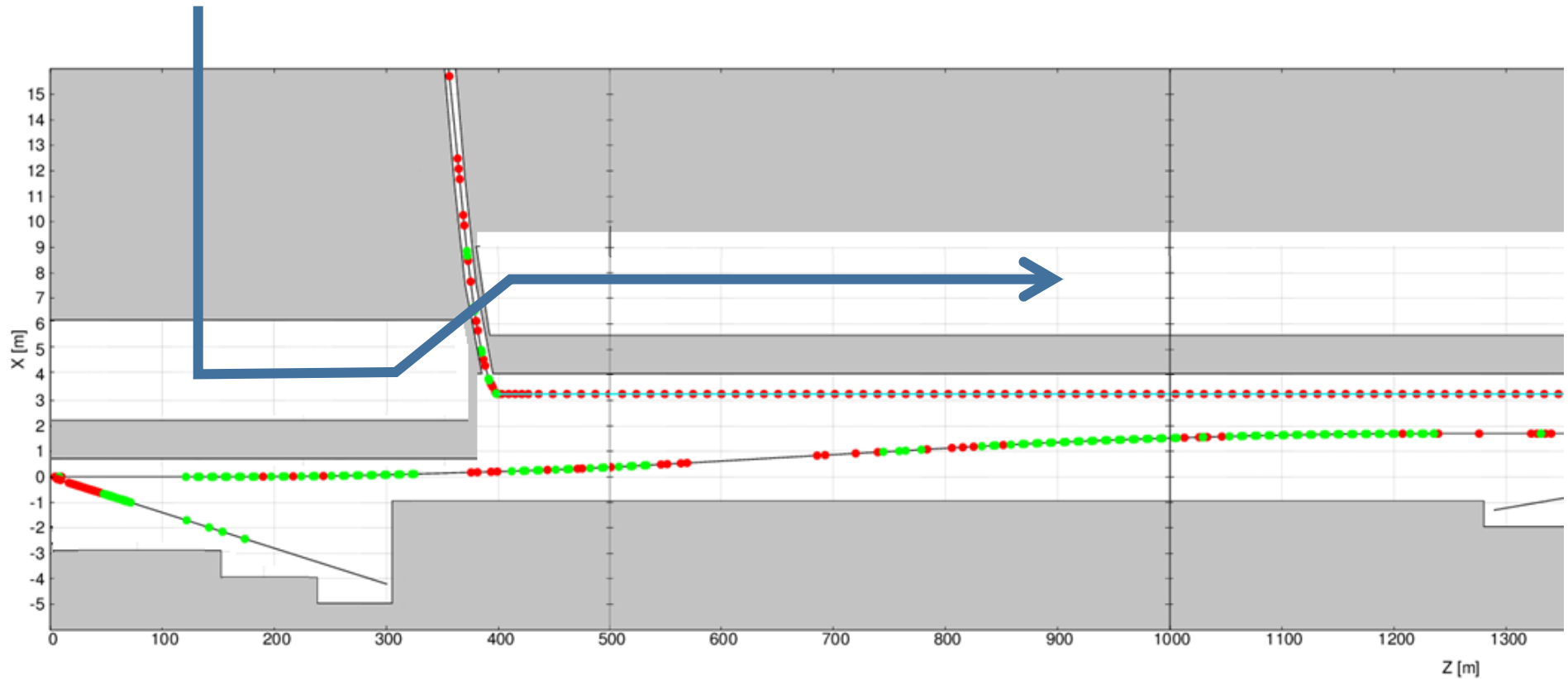


Main power line will be distributed from central region

Main power line (66kV power line ; All of ML)

BDS power line (6.6kV power line)

BDS cooling water



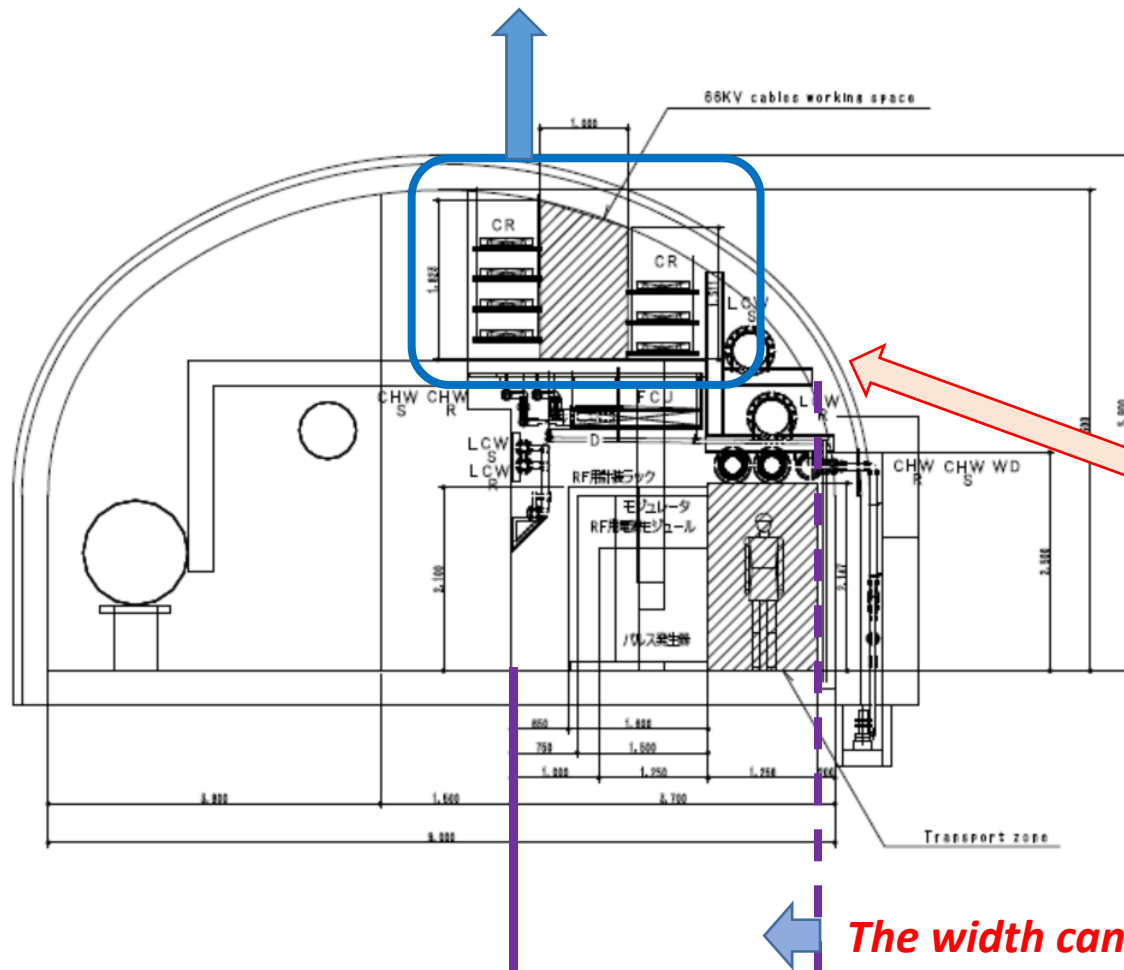
We can make the power transfer line to ML
by making Kamaboko tunnel in between detector to LTR.

**Maintenance
Space**

**66kV power line
(~100MW)**



**6.6kV power line
(For BDS tunnel)**



**Must be separated
from normal
access area.**

Cooling waters

The width can shorten only less than 1m.

Evaluation of BDS power and cooling water

ECM		Power[kW]				Cooling Water [l/min]			
		500GeV		1TeV		500GeV		1TeV	
Temp. Rise		10°C	30°C	10°C	30°C	10°C	30°C	10°C	30°C
BDS	BEND	46.80	50.00	122.60	130.40	51.40	18.80	127.00	47.00
	QUAD	874.50	913.60	1418.50	1481.00	1009.60	420.60	1622.60	681.40
DUMP	BEND	23.20	24.80	48.40	49.60	33.68	12.04	32.20	24.08
	QUAD	107.00	115.10	227.10	236.60	153.74	55.62	208.40	113.65
E-source	BEND	60.80	65.60	60.80	65.60	71.52	31.68	71.52	31.68
	QUAD	52.67	56.67	52.67	56.67	75.33	27.33	75.33	27.33
RTML	QUAD	105.33	113.33	105.33	113.33	150.67	54.67	150.67	54.67
TOTAL		1270.30	1339.10	2035.40	2133.20	1545.94	620.74	2287.72	979.81

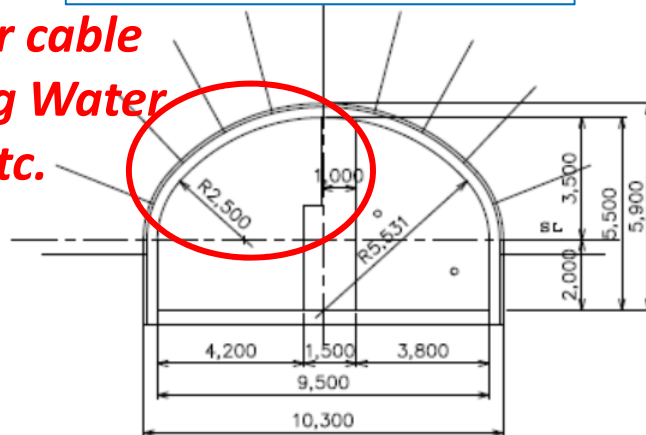
Electric power for positron BDS is about 2MW even for 1TeV operation.

*Amount of the cooling water is 2300 l/min (10 temperature rise) for 1TeV operation.
(200A main pipe ??)*

Power cable
Cooling Water
etc.

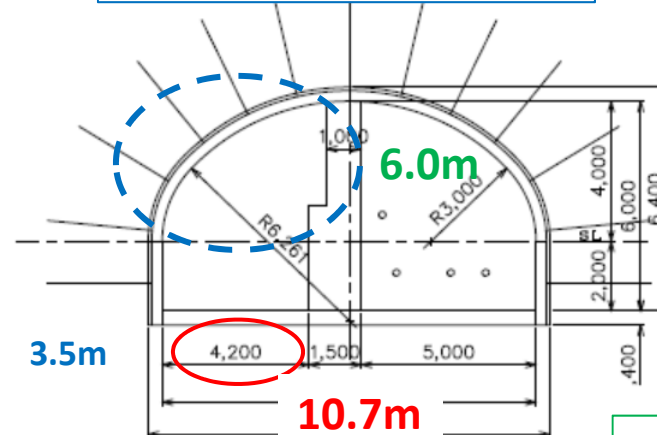
内空縦横比 : 0.58

ML tunnel



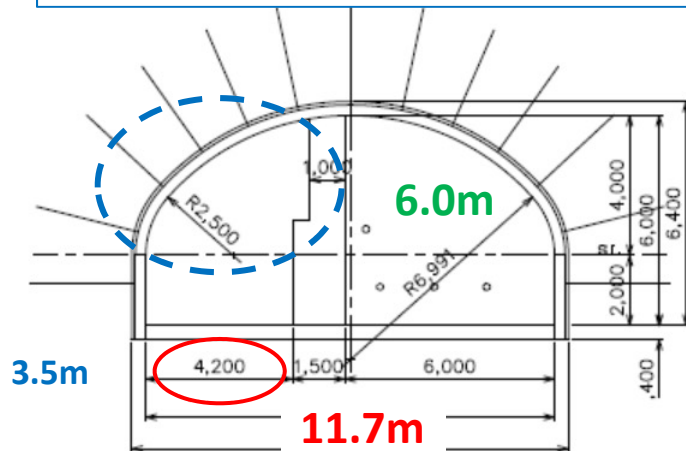
内空縦横比 : 0.56

BDS Beamline



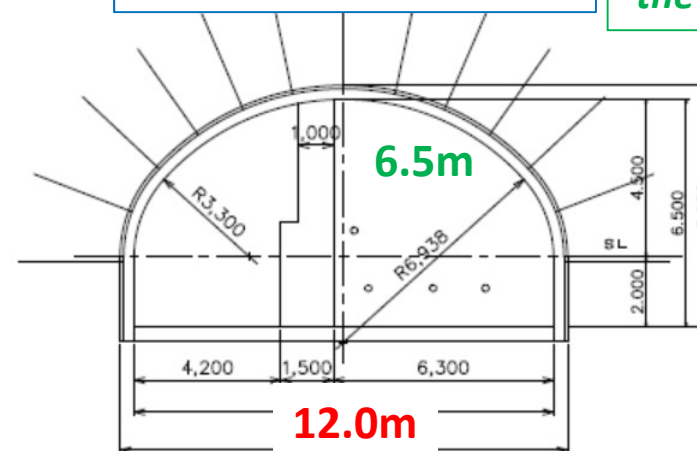
内空縦横比 : 0.51

BDS (around tuning dump)



内空縦横比 : 0.54

Electron Source



The tunnel height was optimized to the tunnel width.

Cost Issues

The tunnel cost of positron BDS is now evaluating by Miyahara-san and J-power.

*Preliminary evaluation is a little bit expensive to TDR BDS tunnel, which did not include the penetration cost.
(The difference is a couple Million US\$).*

When we counts the penetration cost too, the tunnel cost of Kamaboko positron BDS is cheaper than that of TDR BDS tunnel.