Tunnel Layout of Kamaboko-shaped Electron BDS tunnel

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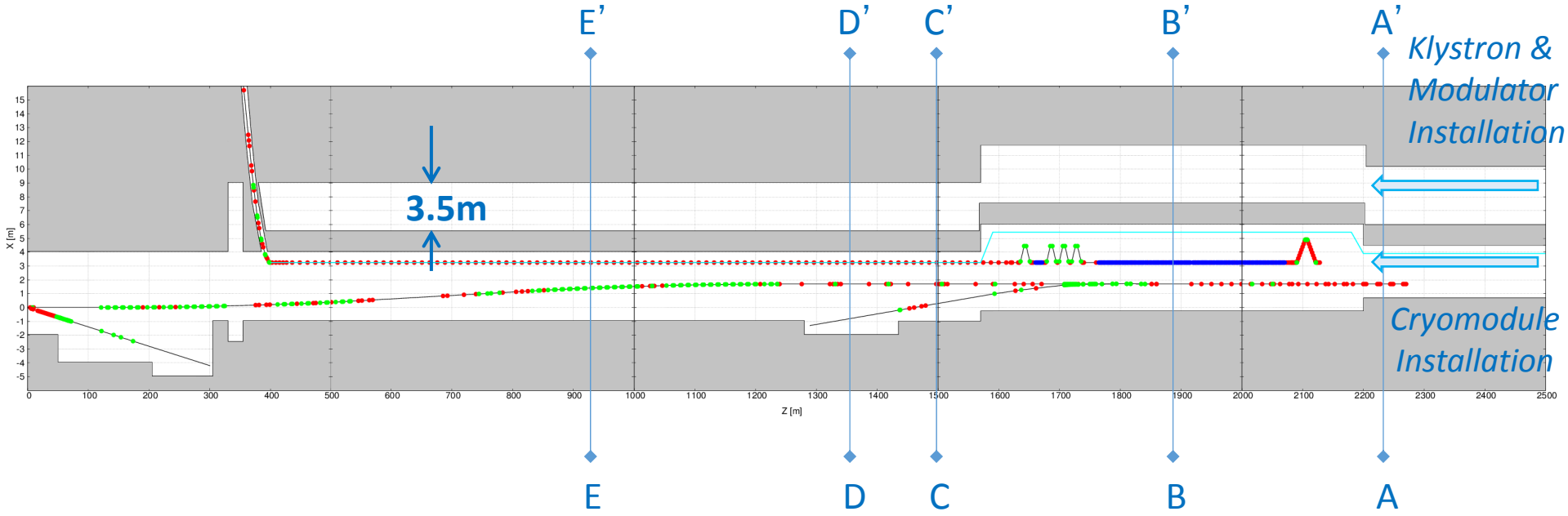
ILC Central Region Meeting

Downstream EBDS tunnel



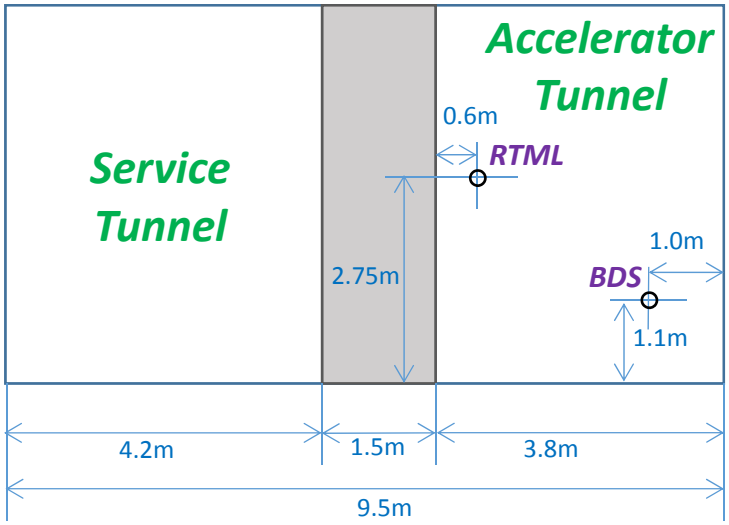
A – A' ; Z = 2280m ⇒ 2200m (ΔL=80m)

Layout of beamline and tunnel wall

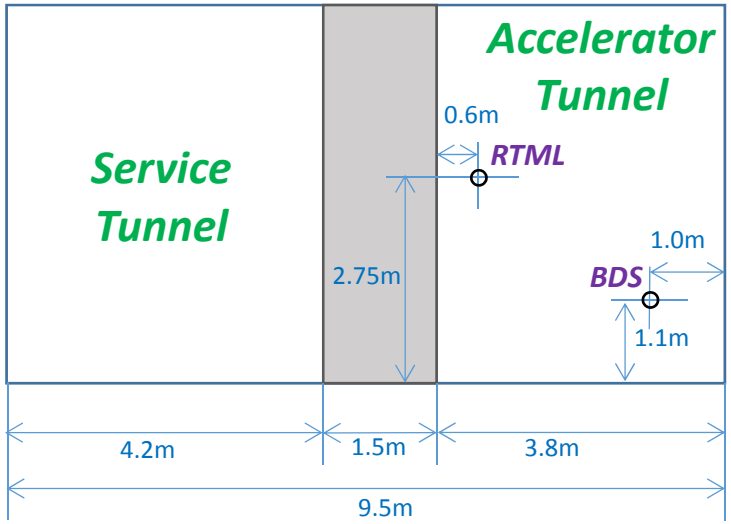
Tunnel width of service tunnel is 3.5m.
Is the width OK ?

M.Miyahra and J-power evaluated
by CFS point of view.

Same shape to ML tunnel (w=9.5m)



A – A' ; Z = 2280m ⇒ 2200m (ΔL=80m)

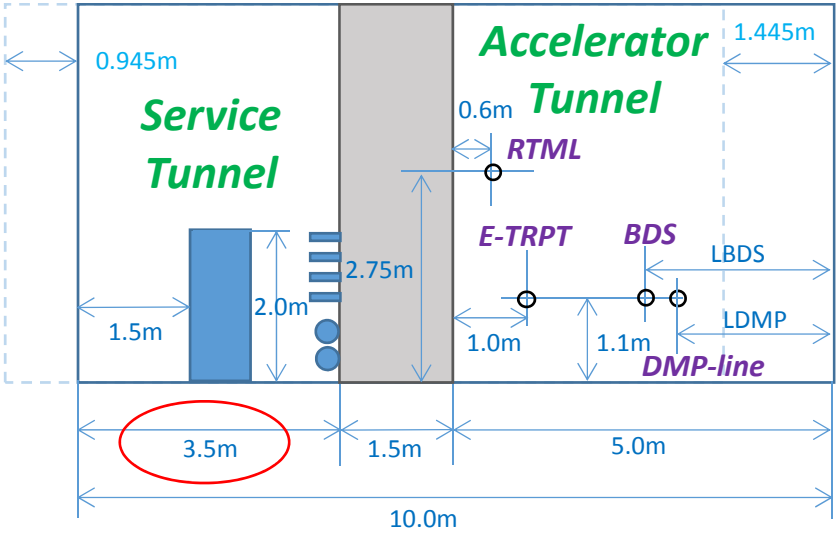


C – C' ; Z = 1570m ⇒ 1430m (ΔL=140m)

LBDS = 2.445m LDMP= 1.575 ⇒ 0.945m

E – E' ; Z = 1280m ⇒ 390m (ΔL=890m)

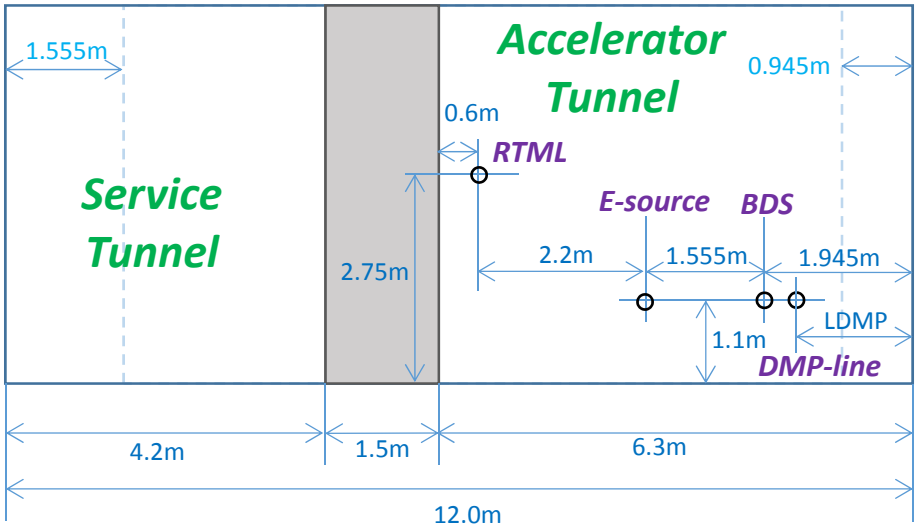
LBDS = 2.445 ⇒ 0.945 m No DMP-line



Dashed Line for other pictures; ML tunnel

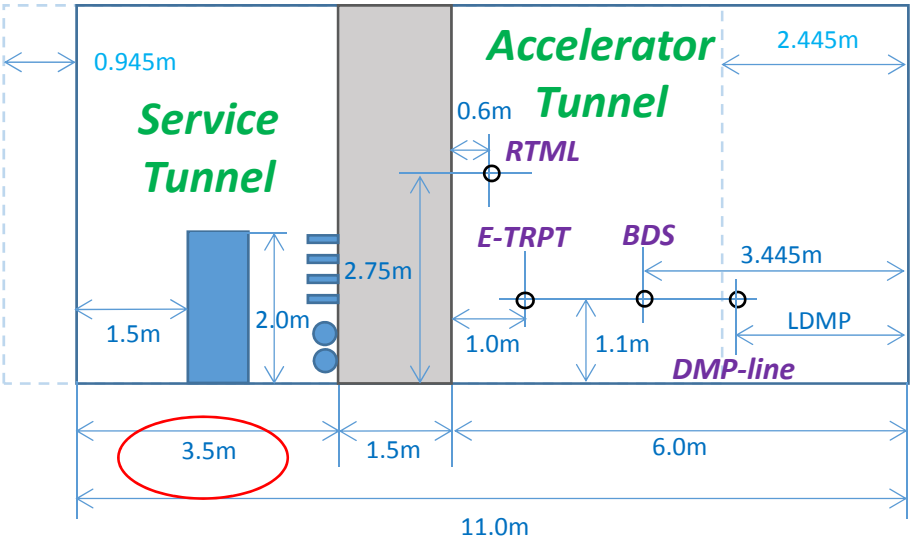
B – B' ; Z = 2200m ⇒ 1570m (ΔL=630m)

LDMP= 1.945m ⇒ 1.075m



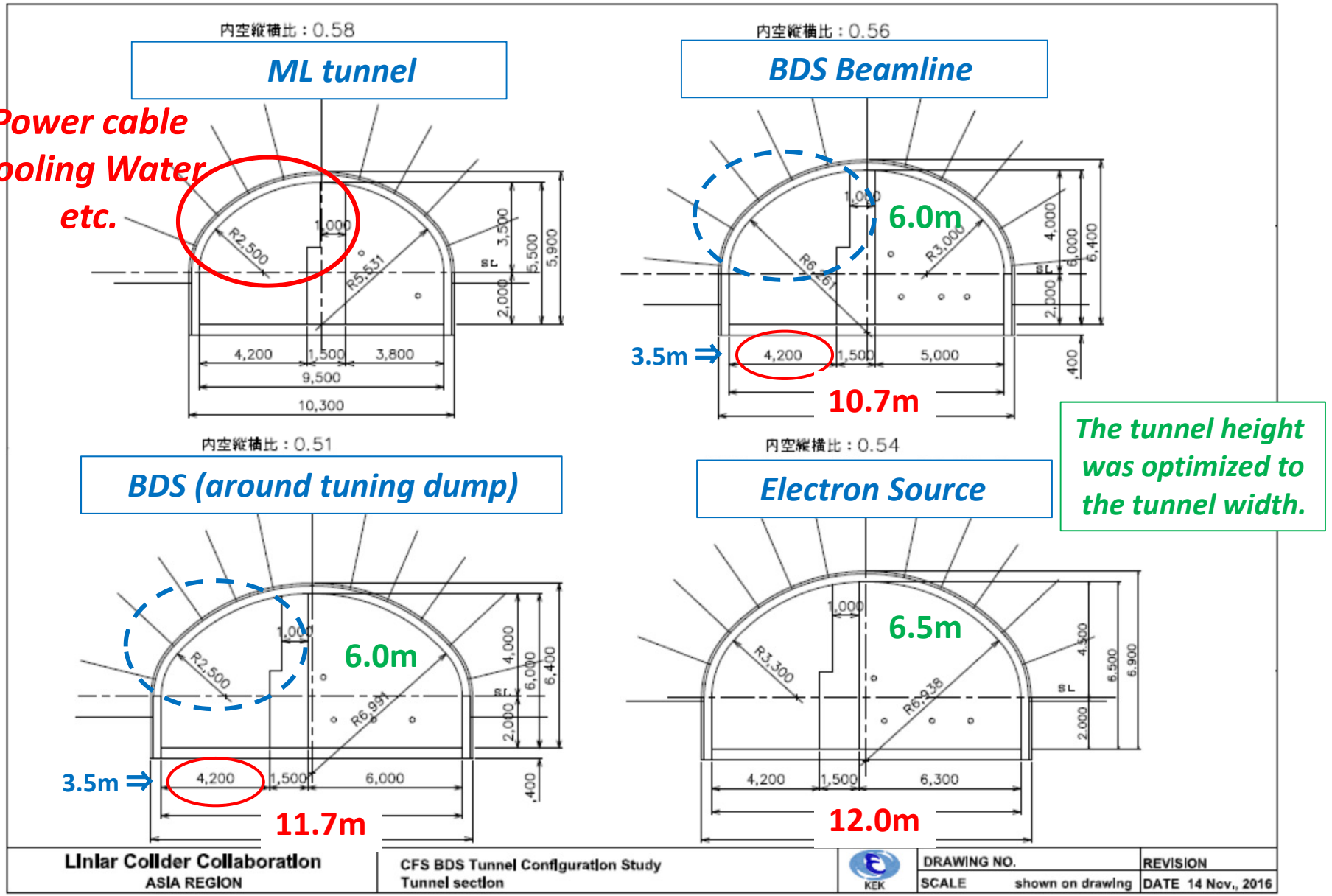
D – D' ; Z = 1430m ⇒ 1280m (ΔL=150m)

LDMP= 1.945 ⇒ 0.445m



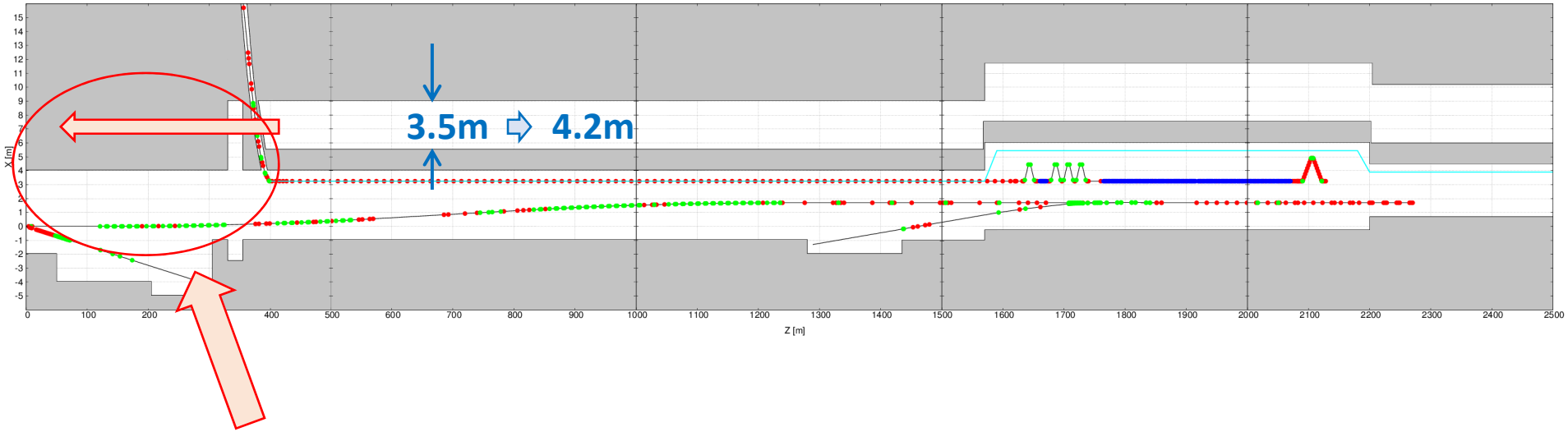
The same service tunnel width is necessary to keep the capacity of infrastructure !

Service tunnel was widen by 0.7m, by keeping the width of accelerator tunnel.



Tunnel width was widen for infrastructure space.

Tunnel height was optimized for each tunnel width.

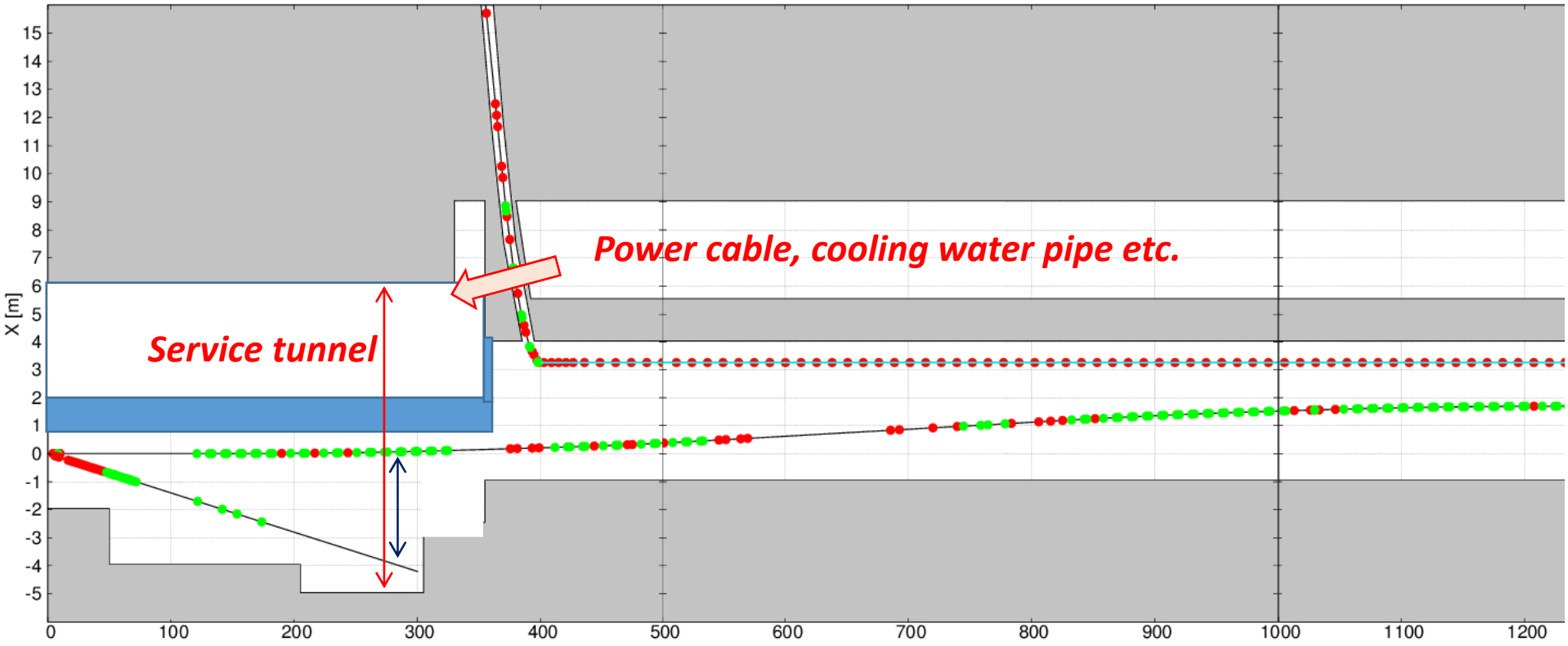


How to transport a lot of power cables etc. ?

Single tunnel ⇒ *Kamaboko tunnel*

to prepare the service tunnel for infrastructure ??

Kamaboko tunnel for BDS tunnel from LTR to IP



Maximum accelerator tunnel width

W = 0.5m + 4.2m + 0.5m = 5.2m

(Total tunnel width)

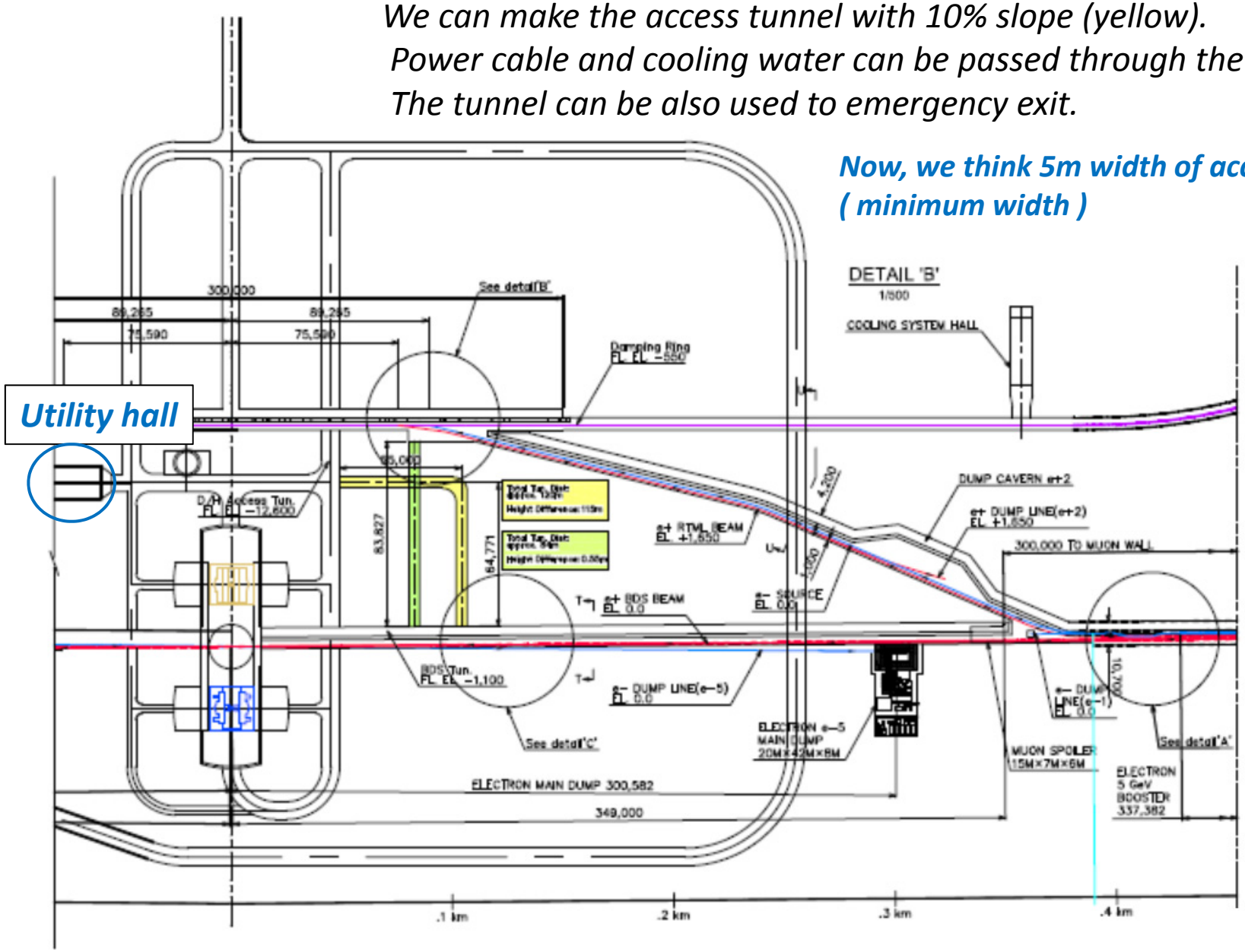
= 4.2m (service) + 1.5m (Shield) + 5.2m (accelerator)

= 10.9m (comparable to BDS tunnel of 10.7m)

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)



Summary

The tunnel width and height of BDS tunnel (ML to LTR)
were optimized by CFS point of view by Miyahara-san and J-power.

We need the service tunnel for BDS tunnel (LTR to Detector).
When we change to the Kamaboko tunnel this region too,
the maximum width is 10.9m (comparable to upstream BDS tunnel).

We can make the access tunnel from central region utility hall to BDS tunnel.
The power cable and cooling water can be transported
through the new access tunnel.