



ILC UPDATE

Vancouver to Valencia

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Personal Report
to SiD Collaboration
Oct 27, 2006

Date

Event

Global Design Effort

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What is in this talk

An overview of many of the system changes since Vancouver.

What changes are still undecided but being discussed?

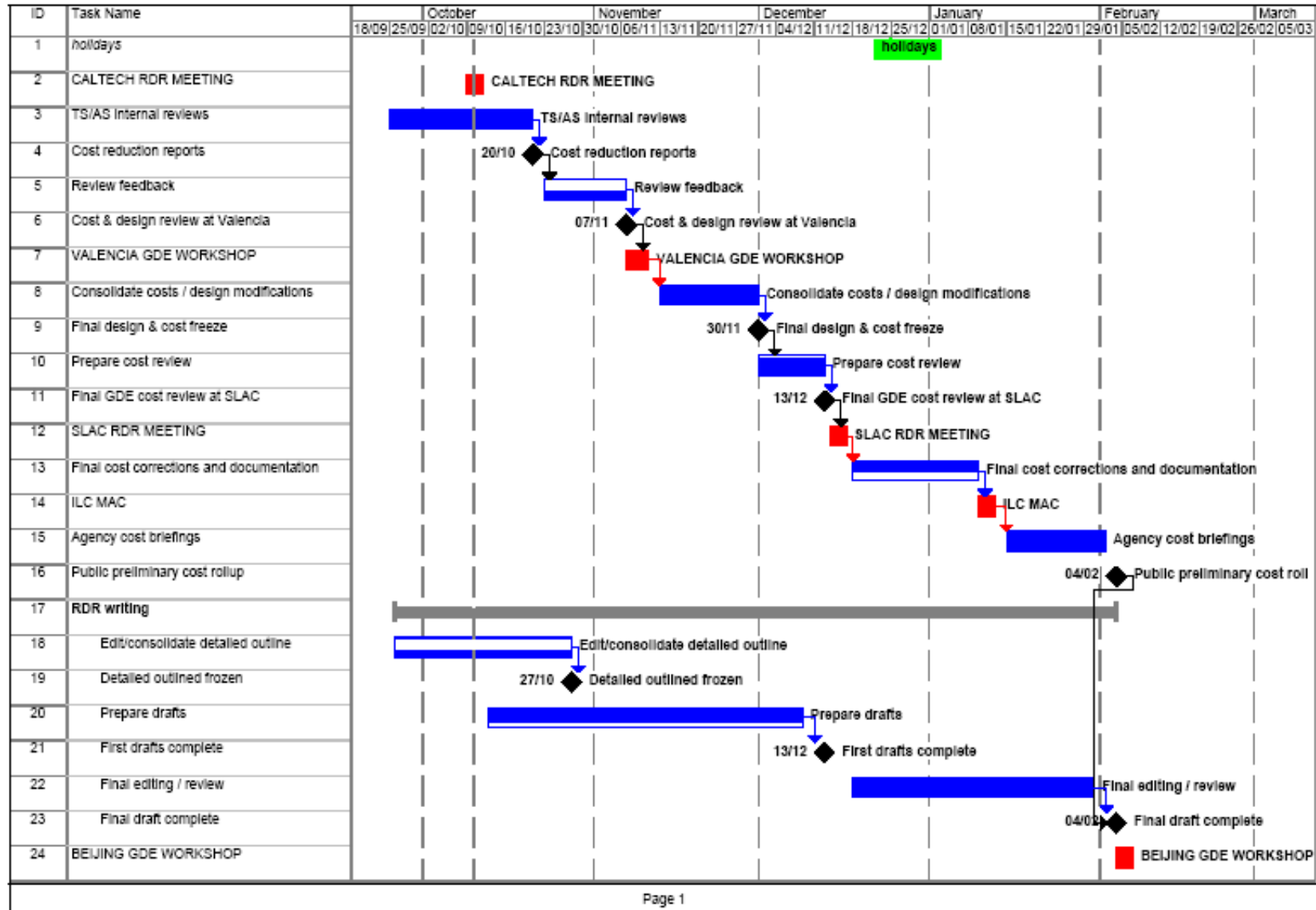
Schedule for the above between now, Valencia and Beijing.

This is NOT a talk about single beam delivery systems and push-pull detectors.

I will leave that in the capable hands of Phil Burrows in his talk tomorrow.

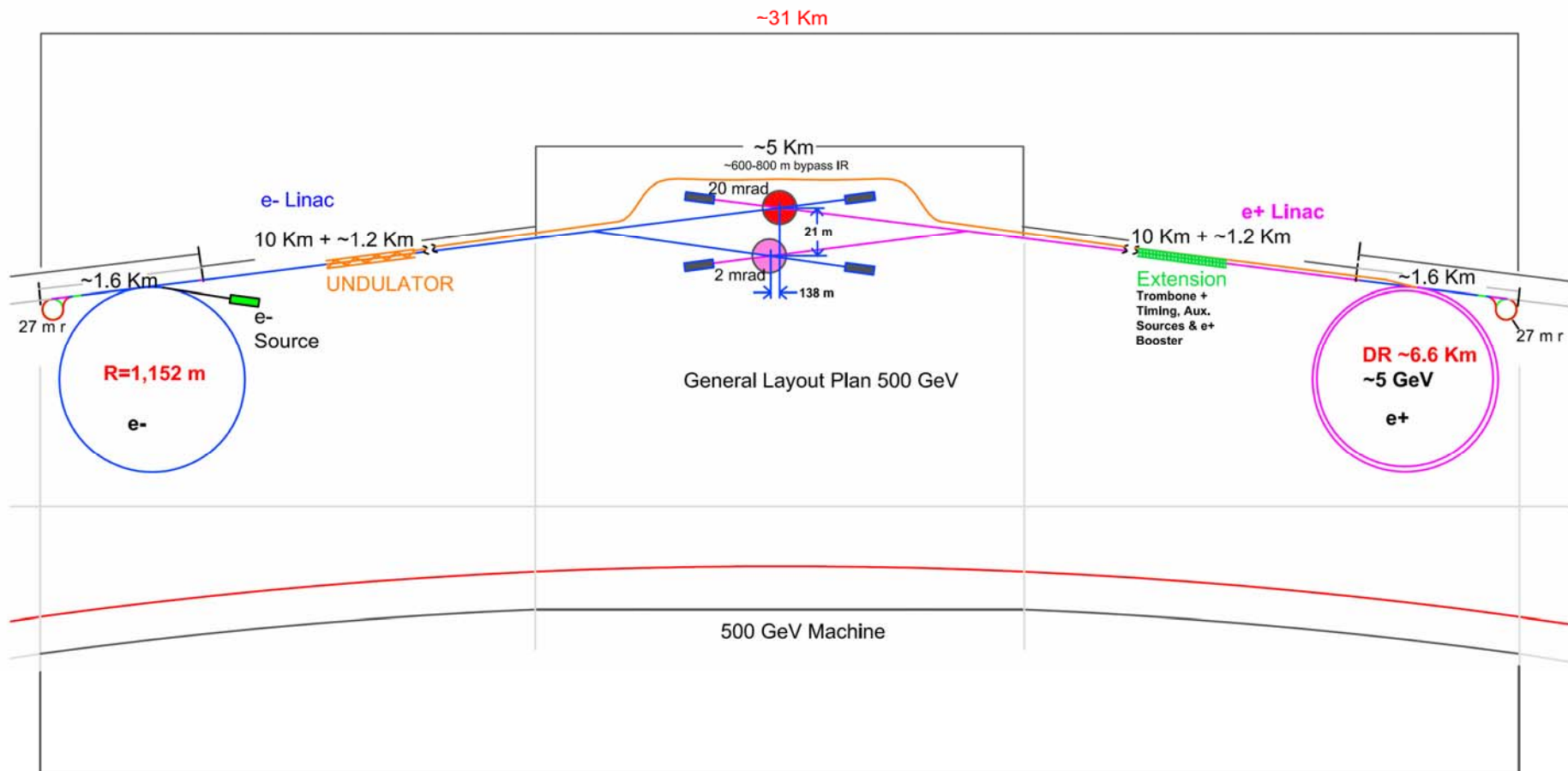


Where are we today





Status of the General Layout of 500GeV @ Vancouver

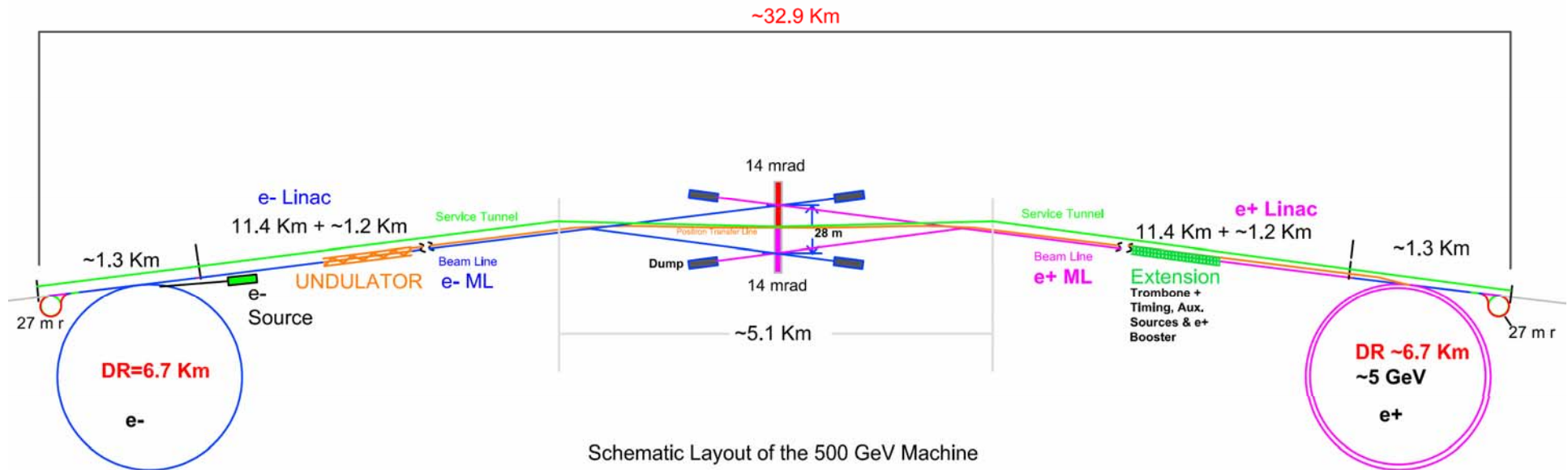


General Elevation View



Ongoing work for discussion – Post Vancouver

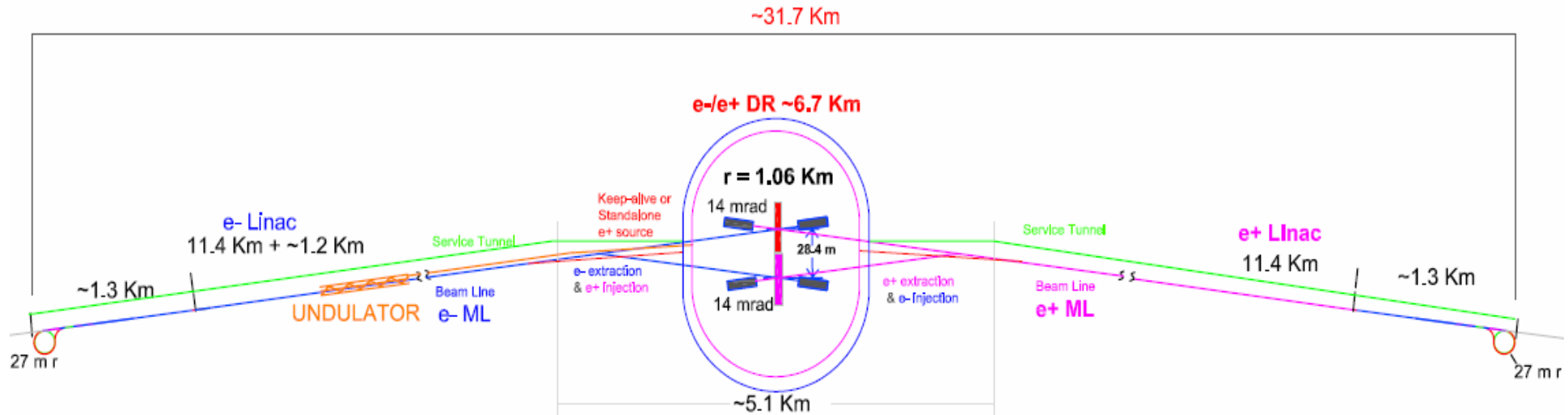
Approved September 2006





Proposed ILC Layout Approved ???

Maybe today??



Schematic Layout of the 500 GeV Machine



A sampling of changes in the various systems

Most changes are a result of iterations between systems, area and technical systems, to optimize designs and reduce costs.

For completeness many basic issues were (and continue to be) revisited. E.g. One versus two tunnels.

Many changes being considered depend on the results of R&D efforts that will not be known on the time scale of slide 4. There best judgment of the outcome of the R&D programs is the only guideline. E.g. The achievable accelerating gradient.

One cannot be too conservative or the cost goes up up up!



The Electron and Positron Sources

E-Source.....Changes in layout to minimize civil construction and lower costs

E+ Sources Undulator based vs Conventional revisited

Do we really need polarized E+.....Maybe!

What is the impact on ILC design....not small.

Could we start with a conventional source and later upgrade to a polarized source....difficult without large upfront investment.

Are the radiation problems with a conventional approach soluble.....a definite maybe.

Should the source be at 150 GeV or at 250 GeV i.e. end of the linac.....low energy running?

Present plan is to stay with undulator e+ source (unpolarized at the start) with 10% “keep alive source” at the DR.



The LINACS

They are still the most challenging and they dominate

Technical issues requiring R&D ... **Gradient and yield**
Technical system costs.... **Cryomodules, design and cost**
Conventional Construction costs.... **60km of tunnels**

Many options under consideration from choice of
Klystron Modulators etc
to
Tunnel Diameter and single or twin



Tunnel Issues

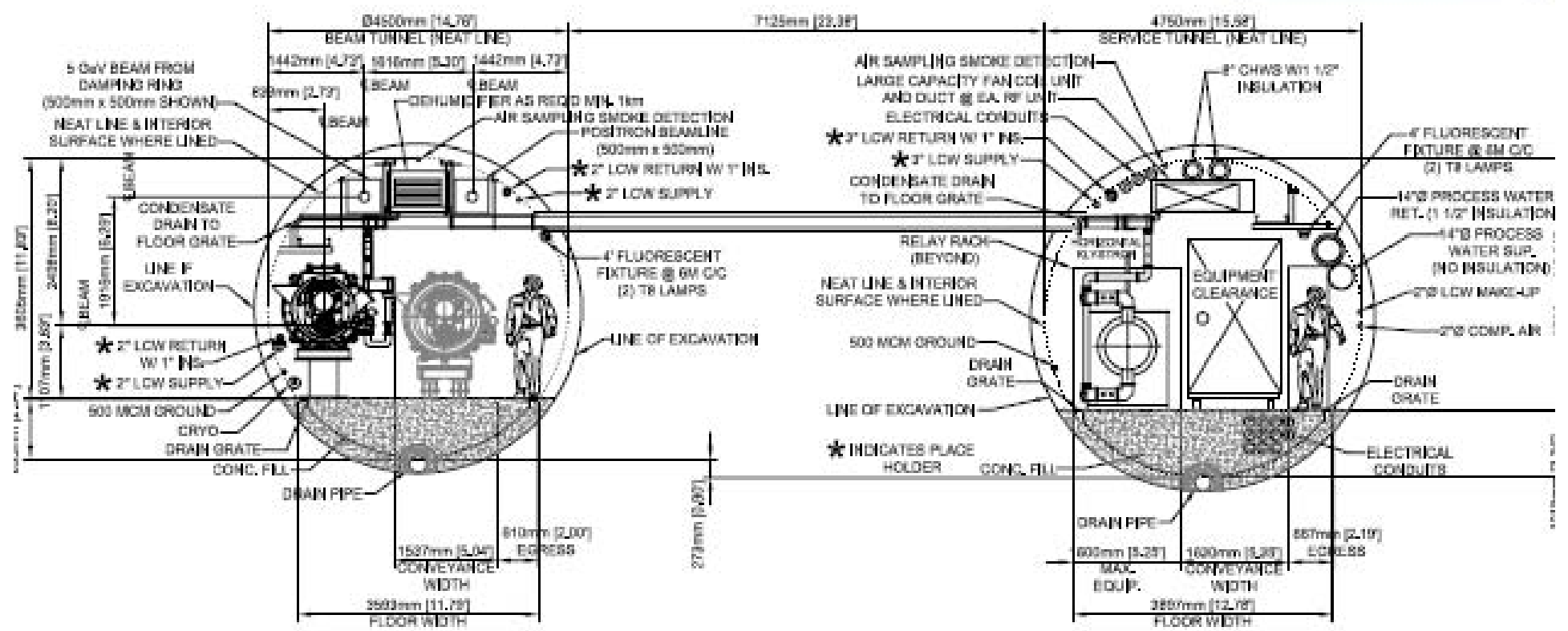
- If one tunnel.....what size?
- If one tunnel..... safe exit?
- If one tunnel.....machine availability?

- If two tunnels..... What size?
- If two tunnels..... Safe exit?
- If two tunnels.....Machine availability?

COST DIFFERENCE

We still have two tunnels...the service and the accelerator tunnels!

DRAFT



DRAFT 10/2/06



The LINACS (cont)

Unpopular questions that must be asked.....and very personal answers as of 10/25/06, @ 3pm

A) What if we install half the RF and have half the luminosity?

Yes it is a major cost savings or delay in expenditures but the upgrade is NOT as adiabatic as one might think.

Much of the hardware can be installed adiabatically but cannot increase the current and luminosity until most of the linac is done.

B) Similar question with energy overhead. You run at 500 GeV on good days!

Yes it can save cost but in practice with time taken to tune the accelerator and BDS for luminosity and backgrounds, you will run at lower energy to regain redundancy and average luminosity, all the time.

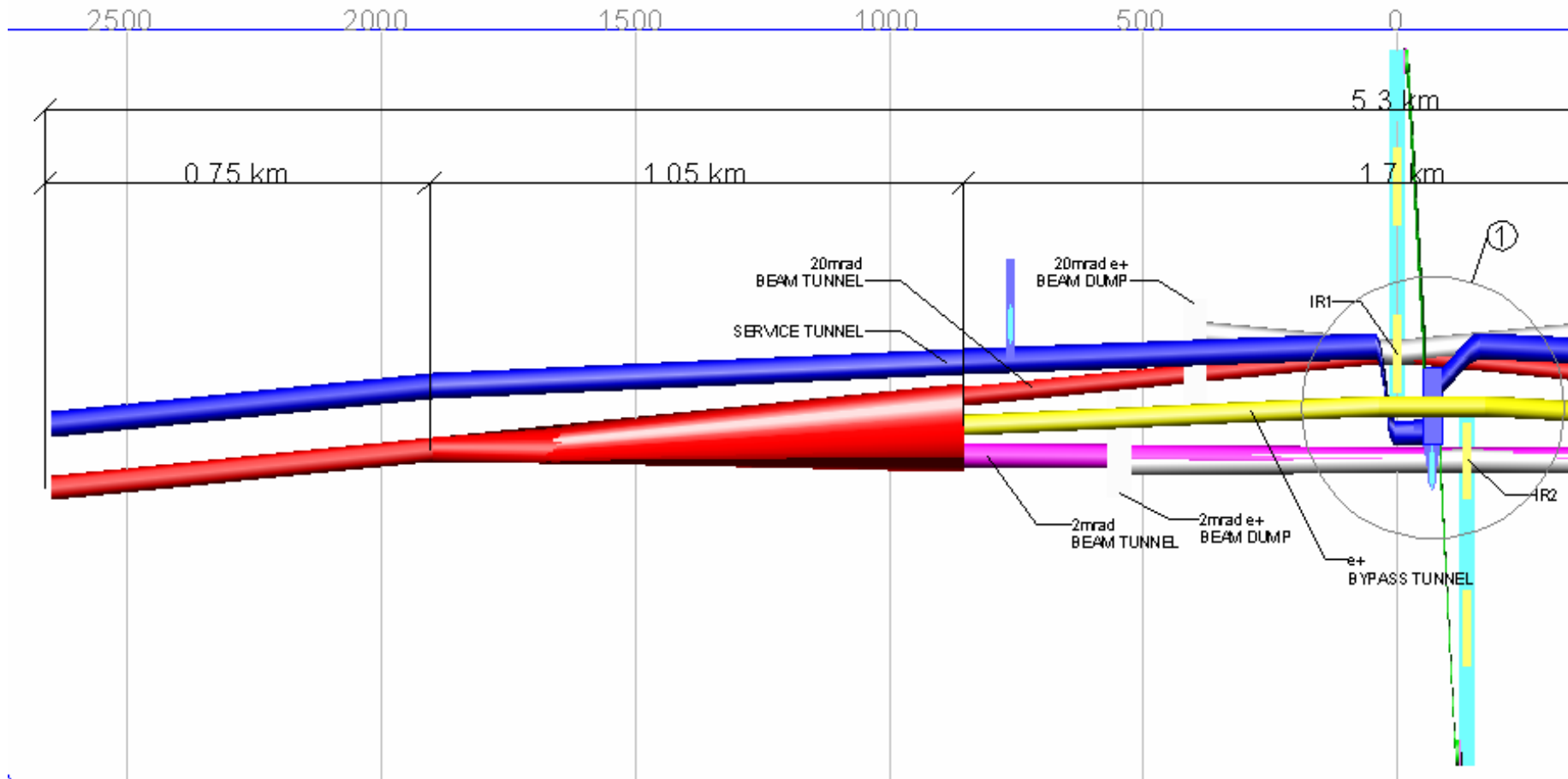


The Beam Delivery System

- Since Vancouver the BDS has gone on a continuous change or improvement program.
- 20 and 2mrad >>> 14 and 14 mrad >>>?
- IR's at different Z positions (100+m) to the same Z position.
- "Improved" muon spoilers
- Total length 5.5km >> 5.1 >> 4.1km?
- Service tunnel >> alcoves >> service tunnel?
- Not to mention smaller halls, and maybe one beamline?
- And now it has to be integrated with DR's, Injectors and the Linac..... and Detectors



Ongoing work for discussion - Vancouver



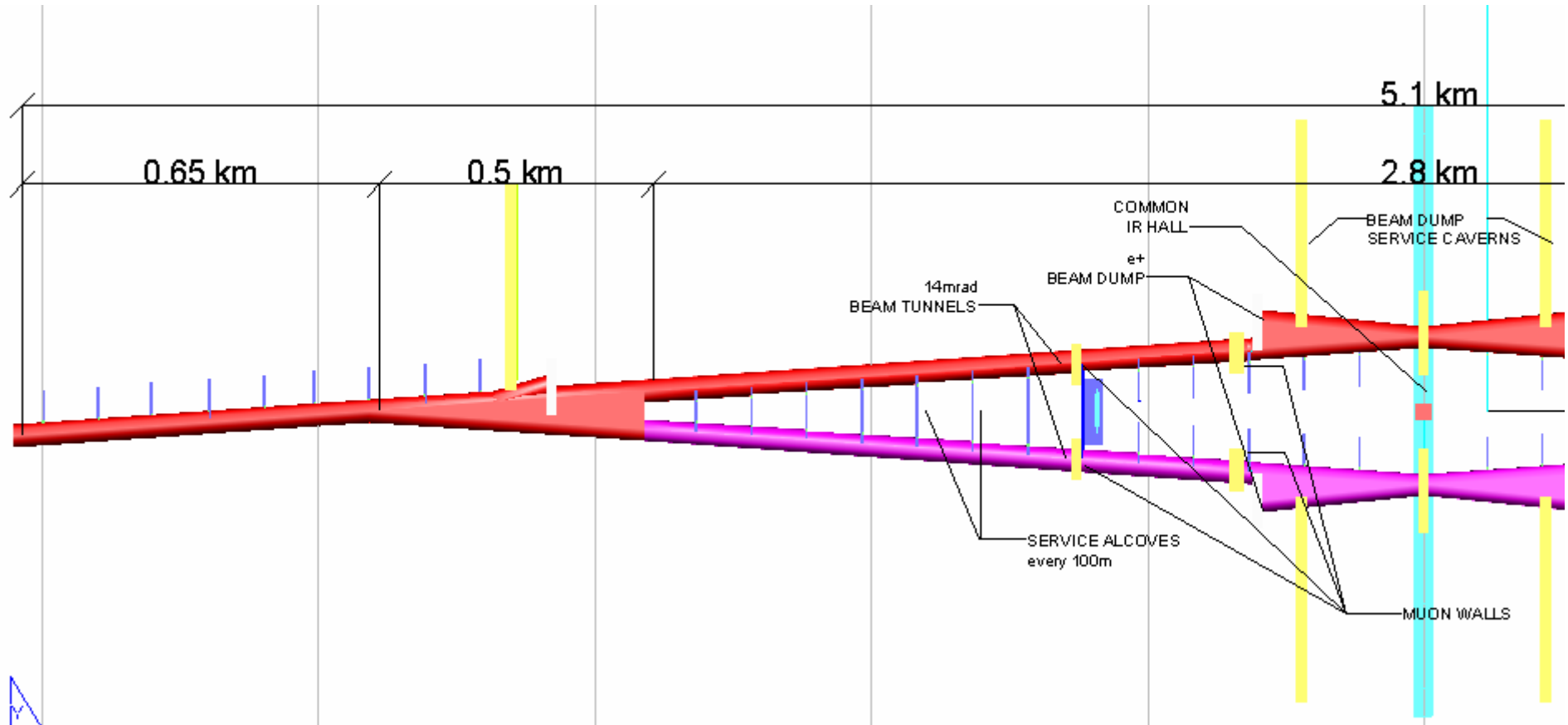
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Ongoing work for discussion-Post Vancouver



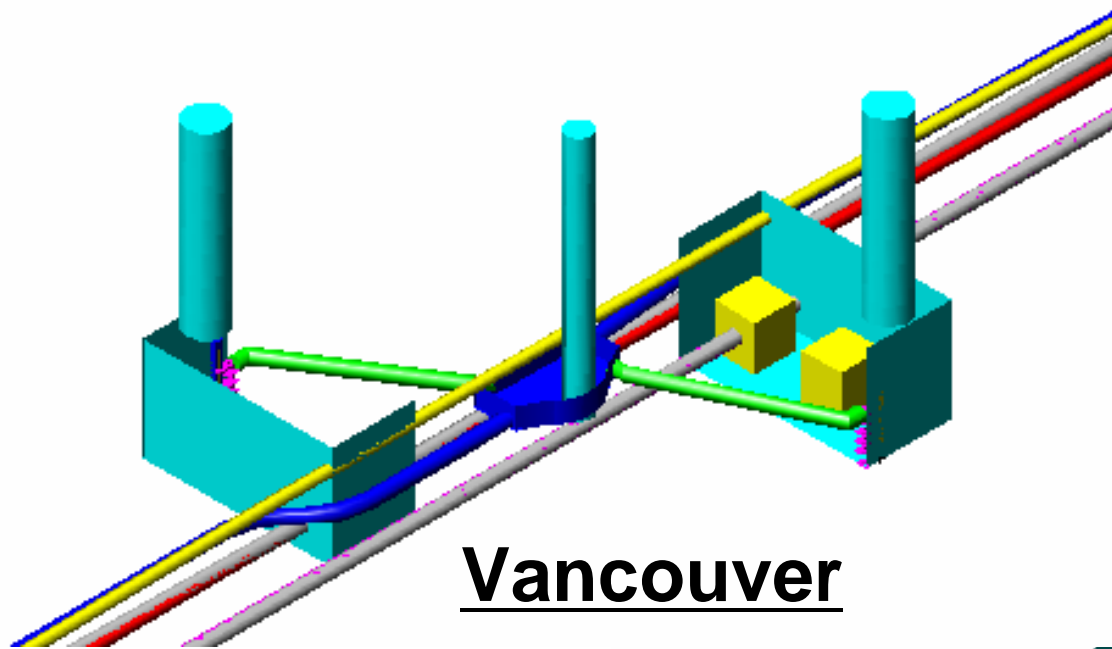
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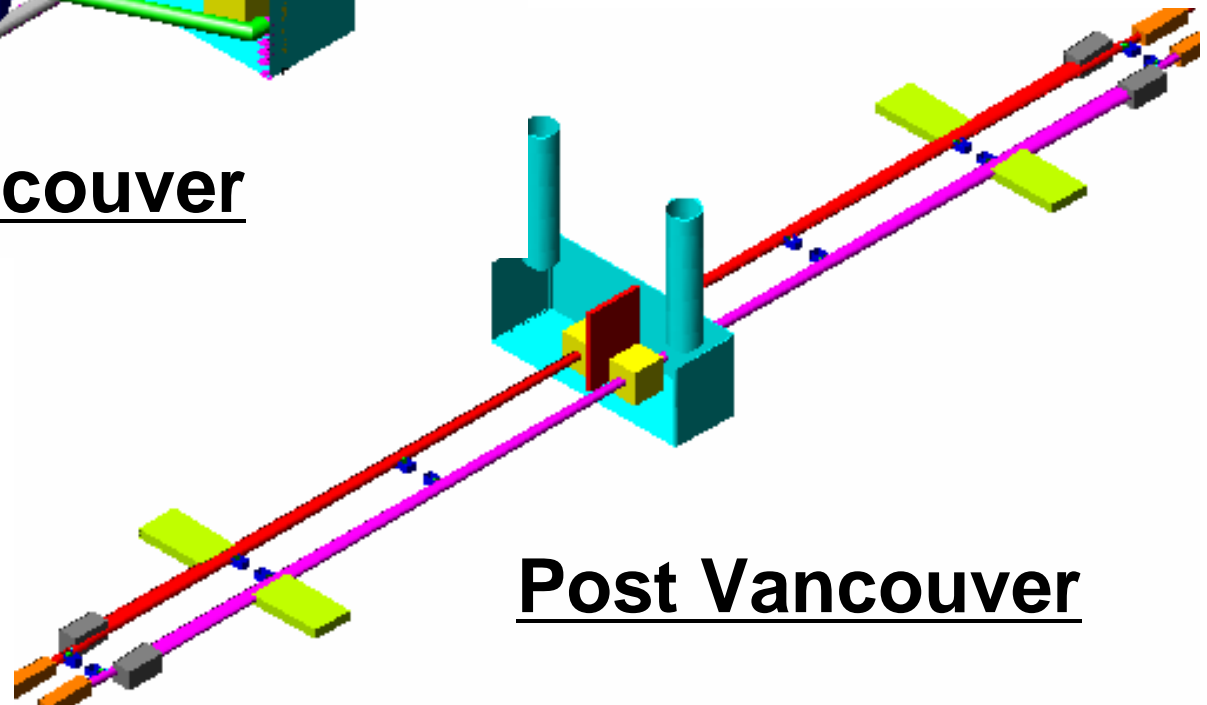
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Snapshots at Interaction Regions



Vancouver



Post Vancouver



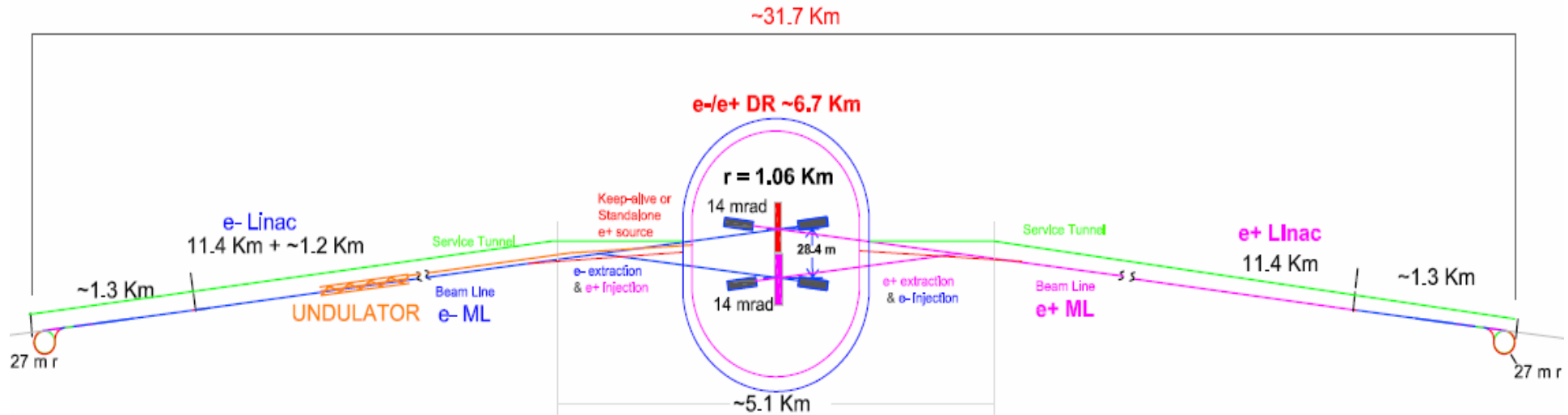
What is this Central Complex?

- Put e- and e+ DR's in a single tunnel
- Place this tunnel between the linacs.
- Move the e- injector and the e+ KAS to central complex.
- RTML takes beams from central complex to beginning of the linacs.
- ETC. and re-optimize systems to share facilities where possible.



Proposed ILC Layout Approved ???

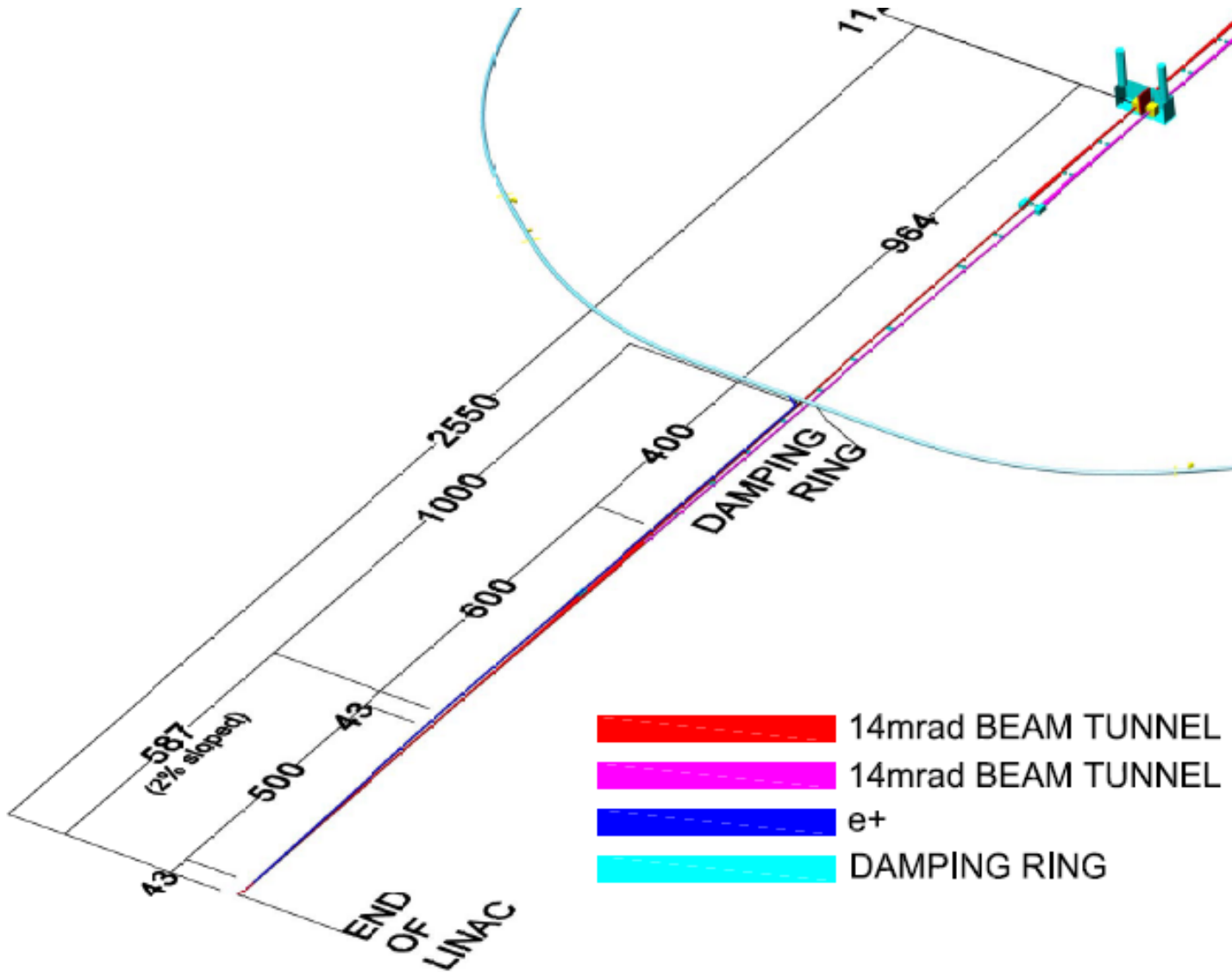
Maybe today??



Schematic Layout of the 500 GeV Machine



3D Full Scale Layout



Date

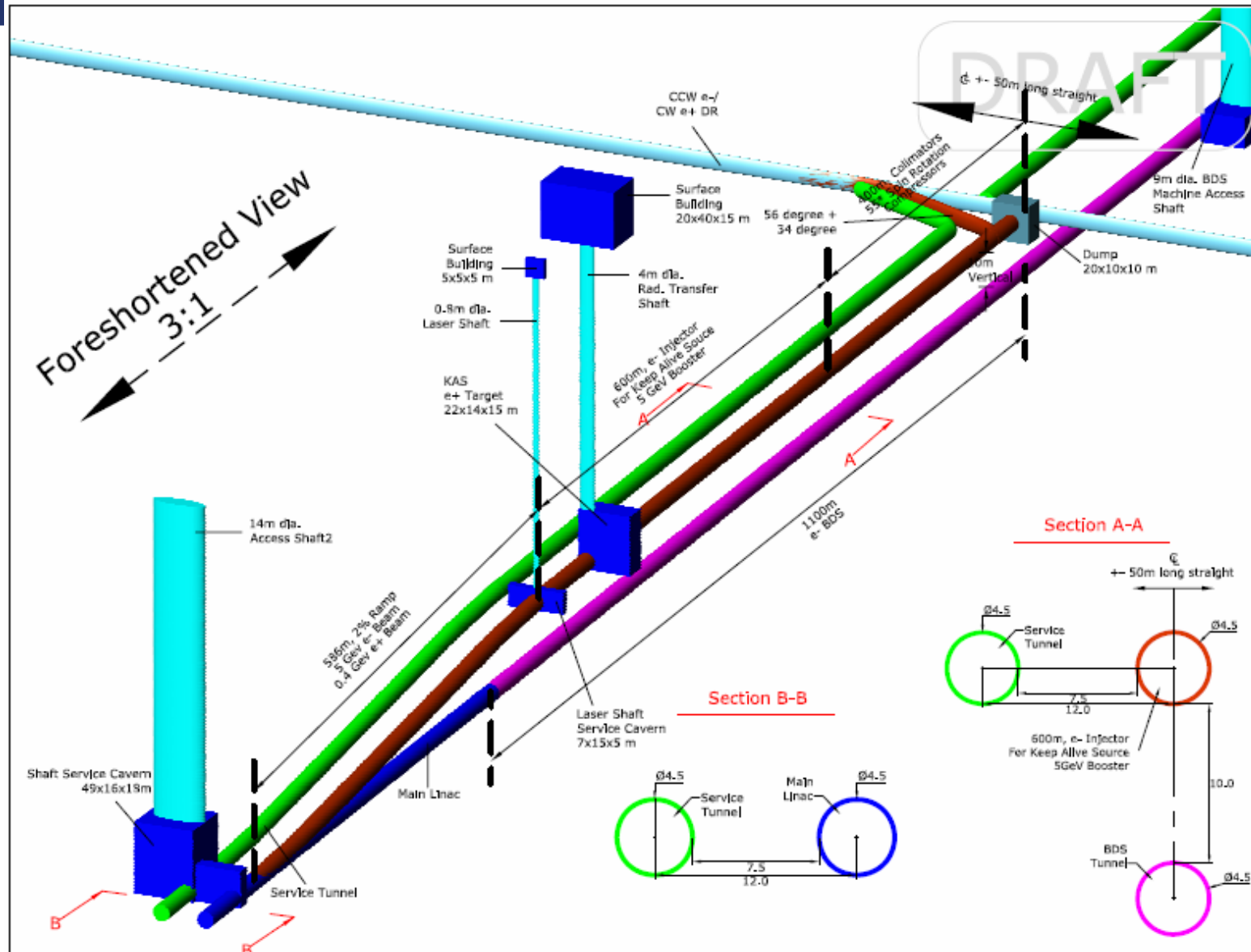
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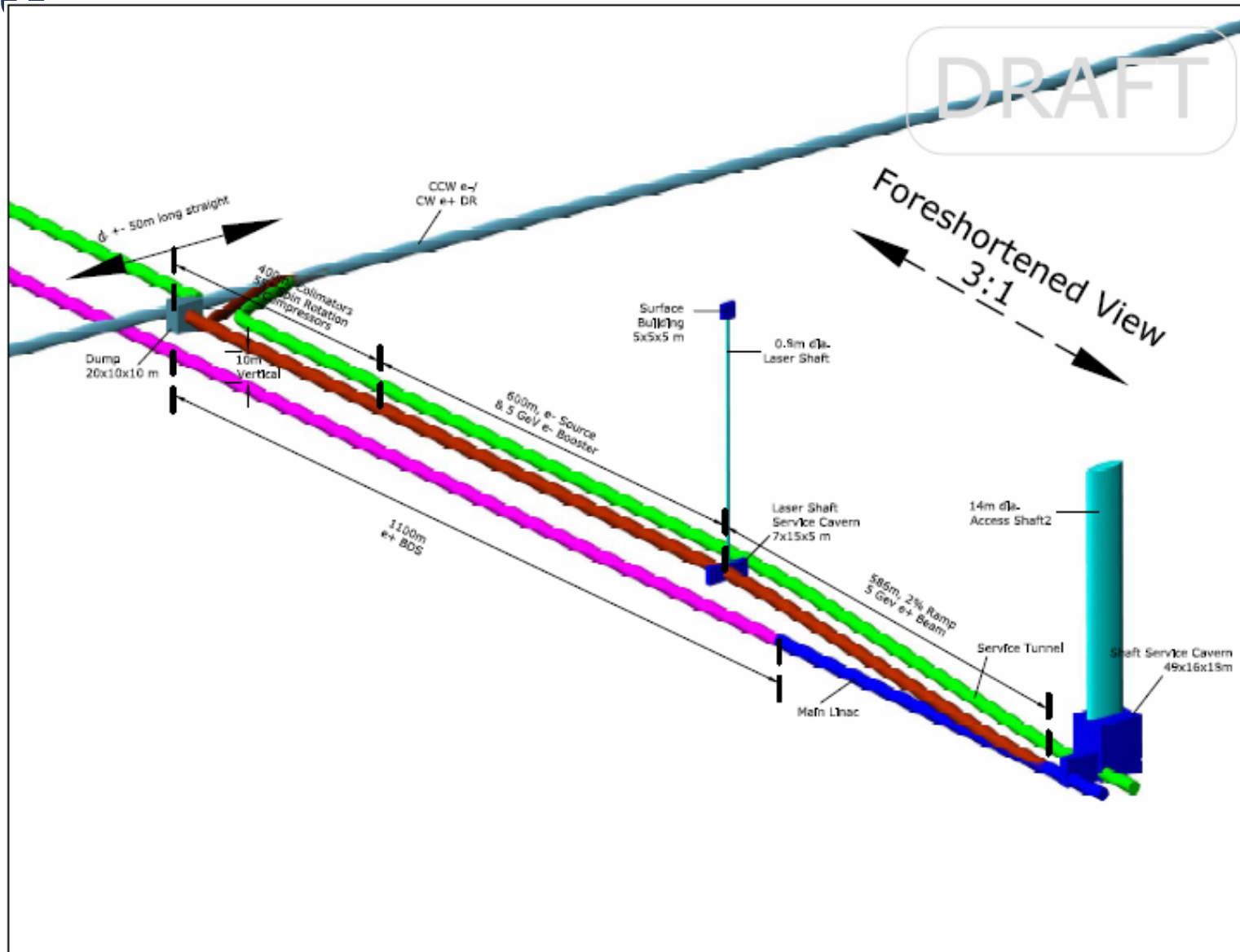


E+ Injection and E- Extraction Side



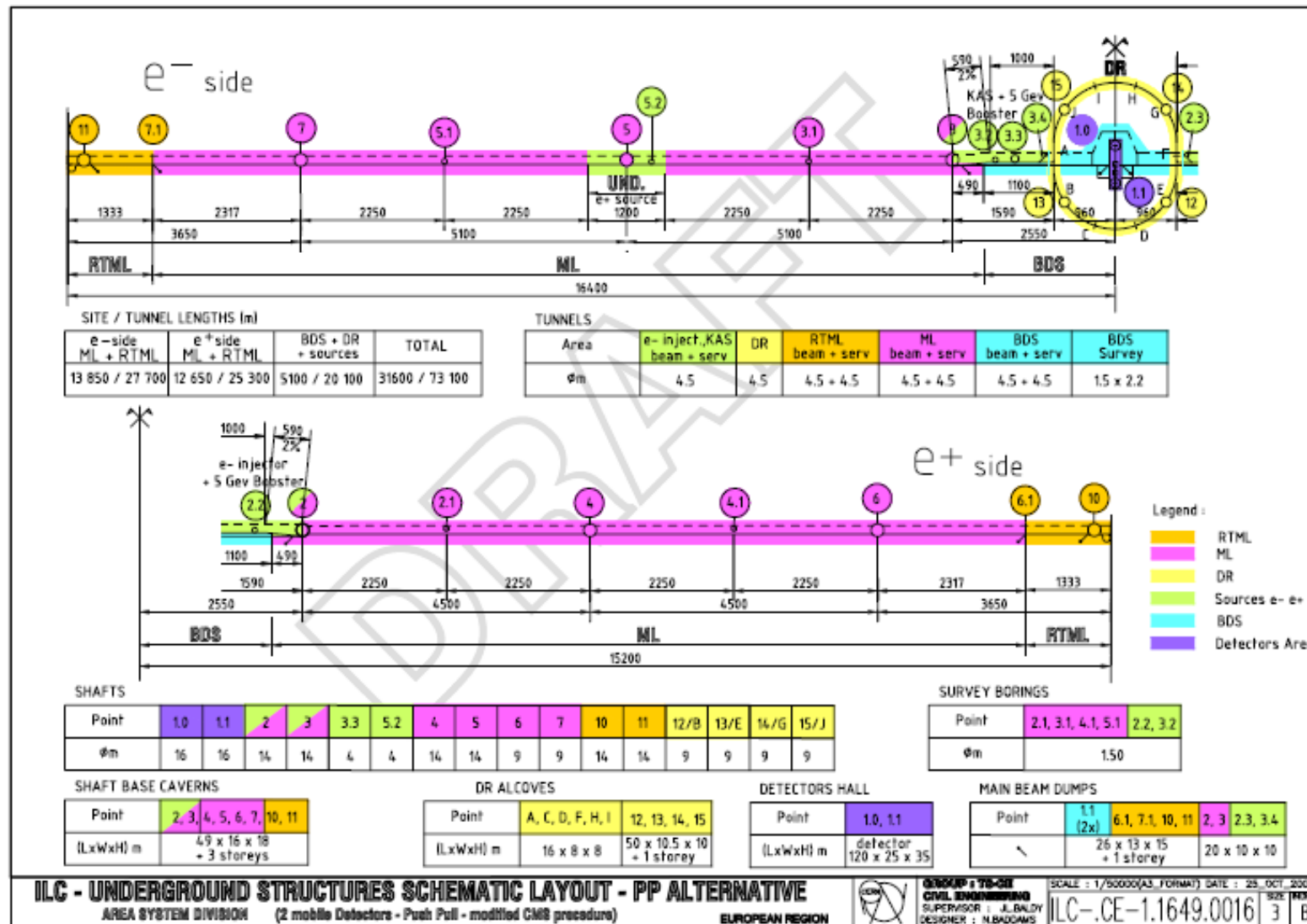


E- Injection and E+ Extraction





Composite layout of CF&S





Summary

Can we make our schedule? MAC in Jan and RDR in Feb?

It is going to be tight but we have to make it!
No choice?

Can we make more cost significant cost reductions?

With help from SiD collaboration pushing and pulling, yes we can!

Questions?.....that I can answer!