



**ATKINS**

Member of the SNC-Lavalin Group

# How to do maintenance on STEP?

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# Summary



# What is STEP?

## Compact

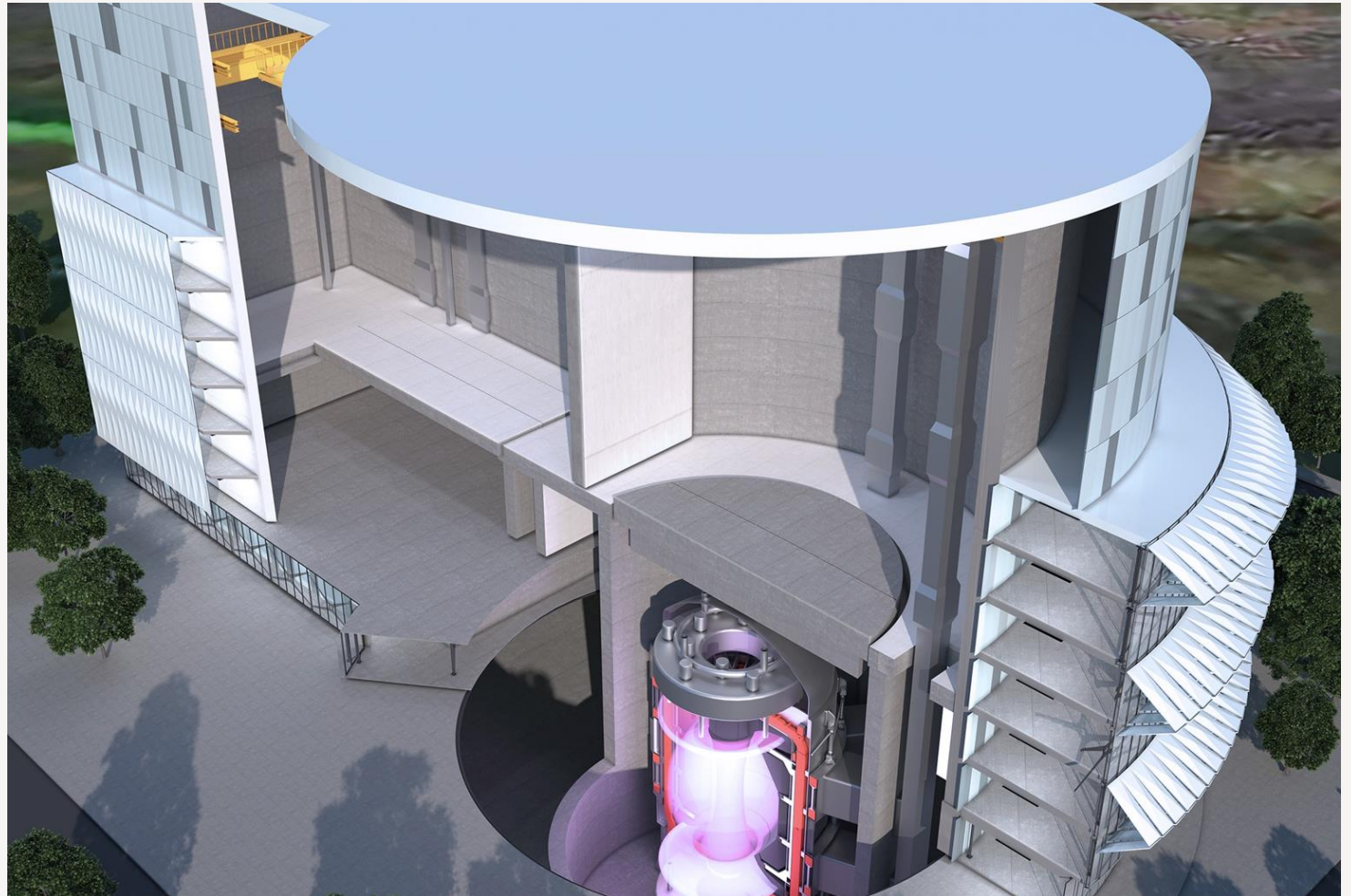
Smaller than ITER  
Reduced footprint and costs

## Spherical

Cored apple shaped  
Improved efficiency in the magnetic field

## Tokamak

Use of the torus to confine and control  
the hot plasma



# What are some of the key engineering challenges?

Component sizes

Multi-disciplinary work

Waste management

Remote handling

Plant availability

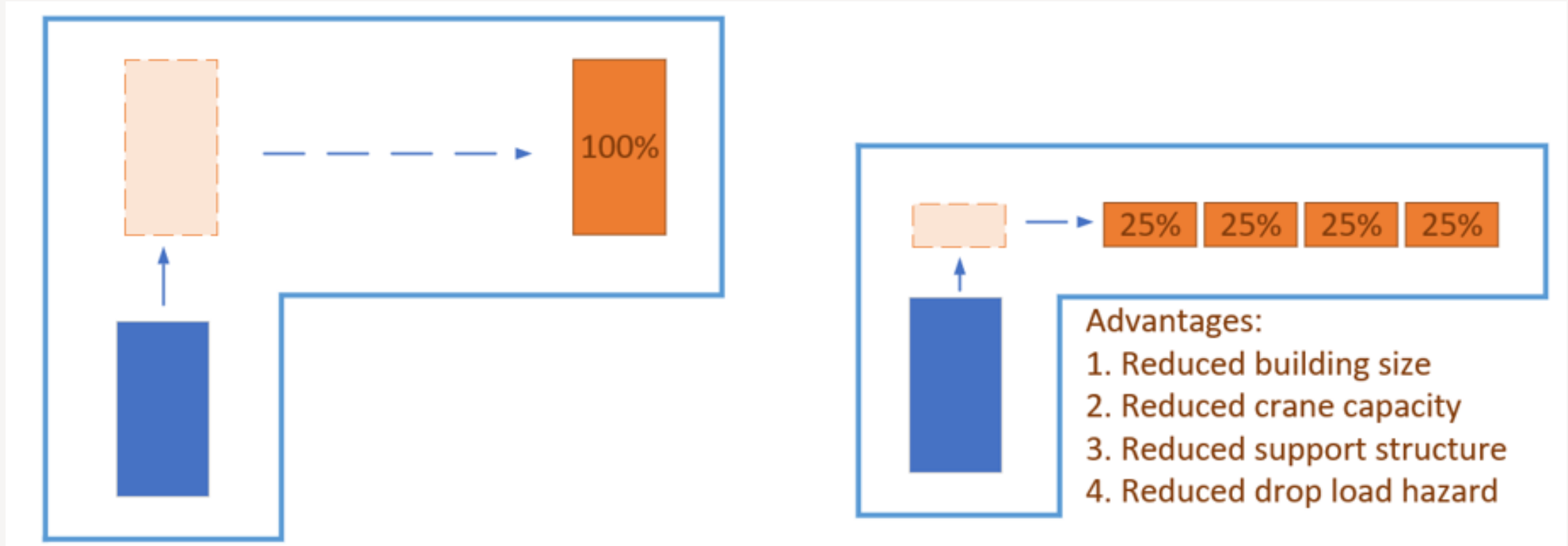
Material durability

Building volumes

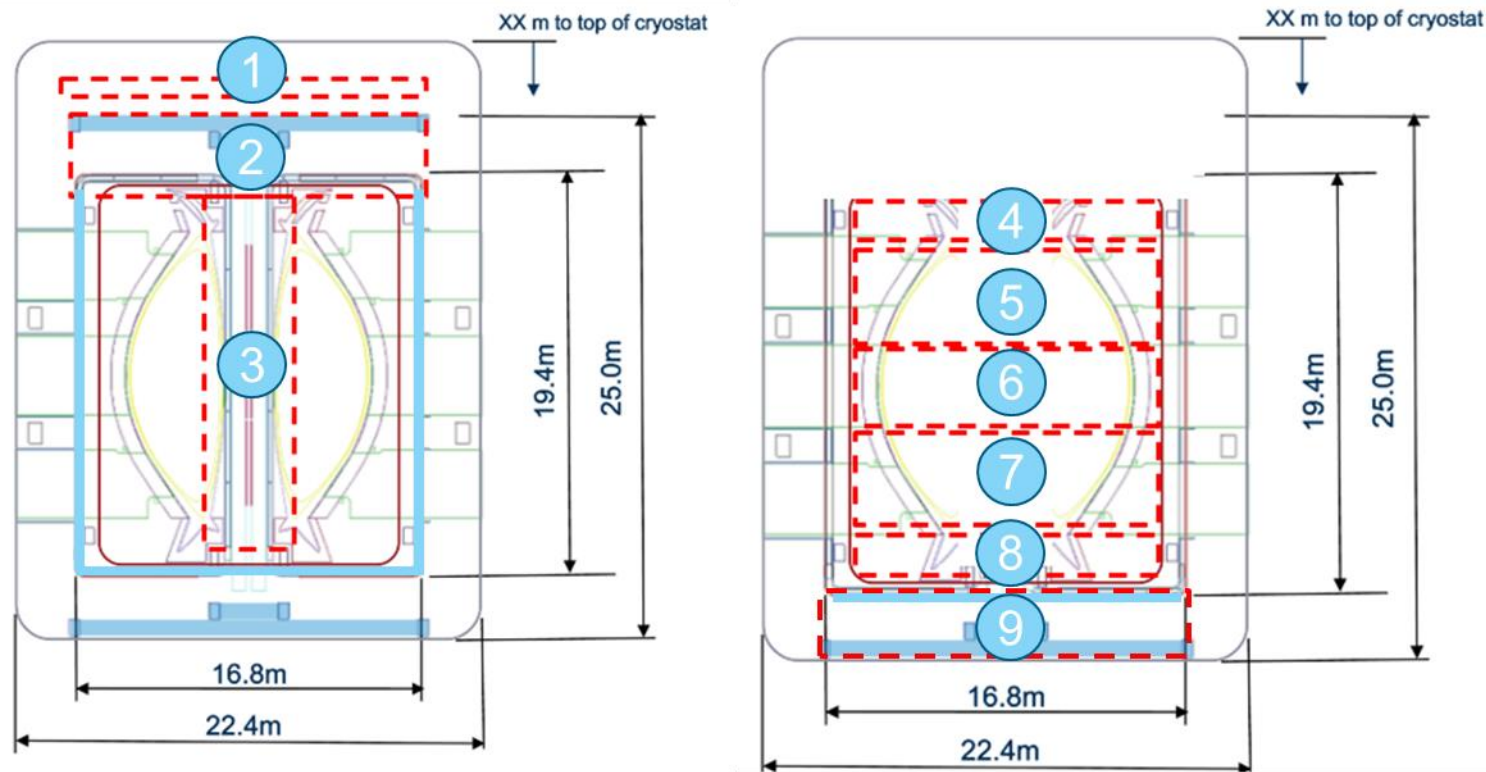
Recoverability



# Transporting large components



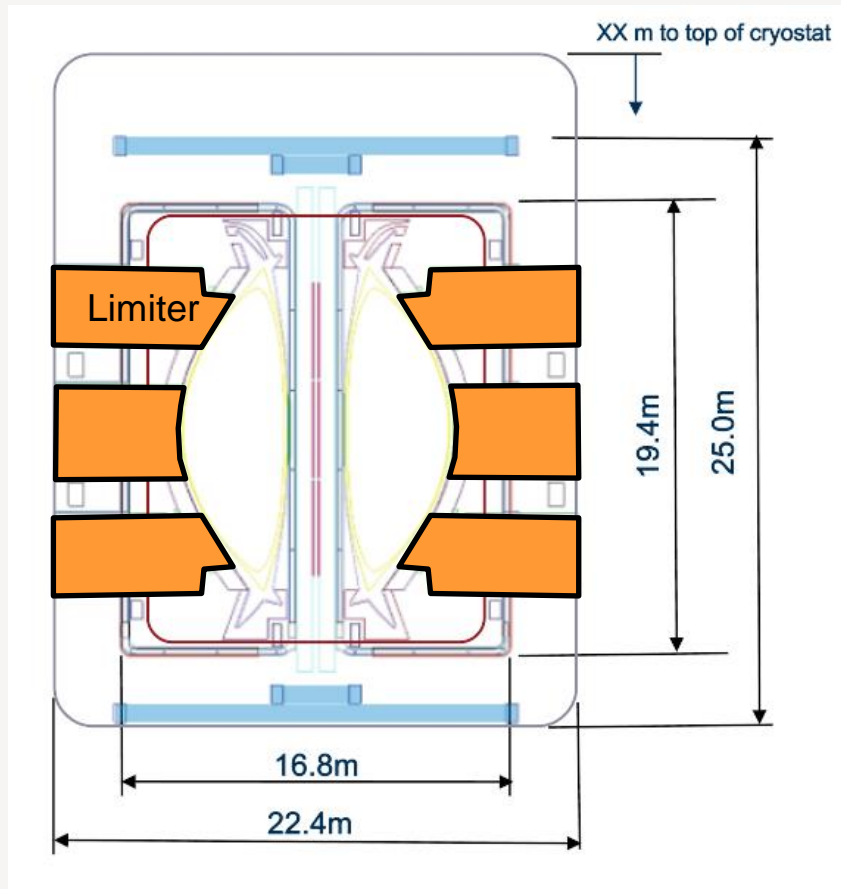
# Long Term Maintenance: Tokamak Assemblies



Tokamak Assembly	Mass (tonne)
1 – Cryostat Lid	200
2 – Upper Magnets Assembly	200
3 – Central Column	1200
4 – Upper Divertor	2400
5 – Upper BB Section	410 – Drained 1440 – Undrained
6 – Equatorial BB Section	265 – Drained 870 – Undrained
7 – Lower BB Section	410 – Drained 1440 – Undrained
8 – Lower Divertor	2488
9 – Lower Magnets Assembly	400



# Short Term Maintenance: In-Vessel, Ex-Vessel, Machine Hall



## In-Vessel

- 18 limiters inside radial ports. (3 levels, 6 per level)

## Ex-Vessel

- Tokamak systems in close proximity of the Cryostat e.g. ECRH Modules.

## Machine Hall

- Access to plant systems outside the Bio-shield.

# Multi-disciplinary Team

Atkins Core mechanical team

Multi-disciplinary SME team:

Mechanical handling

Safety case and hazards

HVAC

Transportation & Radioactive Waste Management

Civil & Structural

Creative Design

Fire hazard

BIM

Human Factors

Suppliers:

Mammoet – Heavy lifting



UKAEA counterparts:

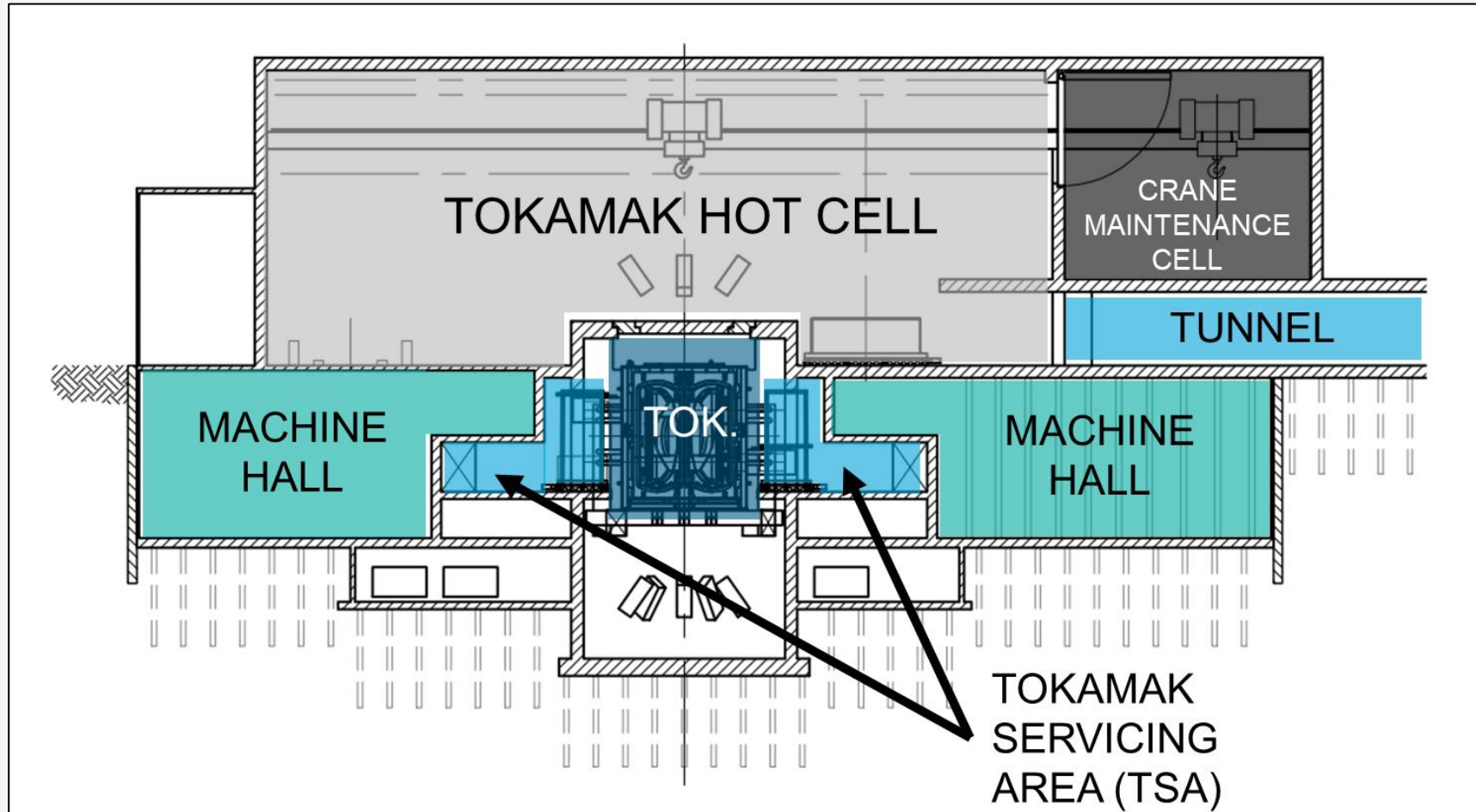
Core mechanical team

Interaction with internal UKAEA teams SMEs

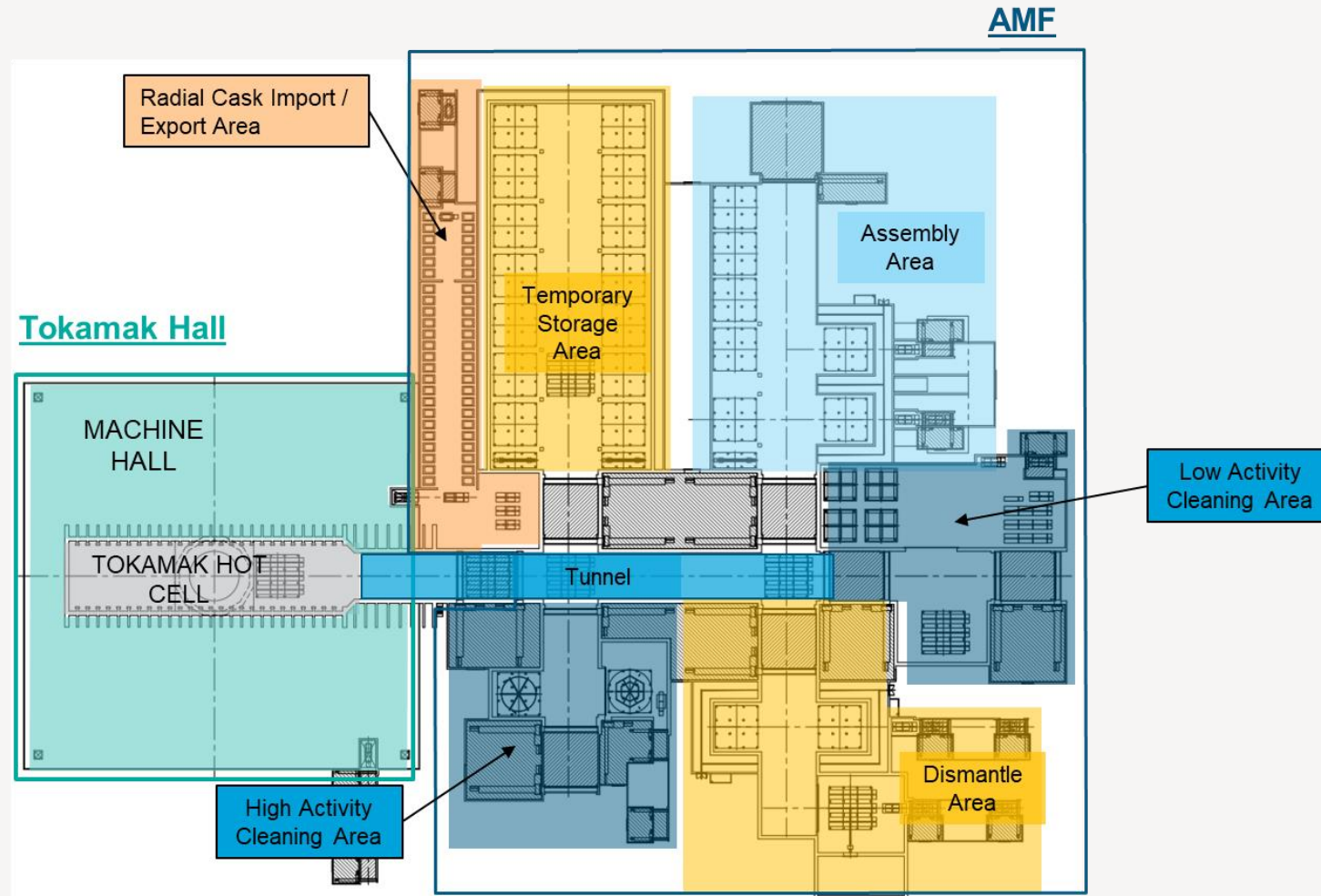




# Early concept design proposals: Tokamak Building



# Ground Level Plan View Layout



*Our values are the essence of our company's identity.  
They represent how we act, speak and behave together,  
and how we engage with our clients and stakeholders.*

## *S*~~A~~*F*~~E~~*T*~~Y~~

*We put safety at the heart of everything we do, to safeguard people, assets and the environment.*

## *I*~~N~~T~~E~~G~~R~~I~~T~~Y~~~~~~~~~~~~~~~~

*We do the right thing, no matter what, and are accountable for our actions.*

## *C*~~O~~*L*~~L~~*A*B*~~O~~*R*~~A~~*T*~~I~~*O*N***

*We work together and embrace each other's unique contribution to deliver amazing results for all.*

## *I*~~N~~N~~O~~*V*~~A~~*T*~~I~~*O*~~*N*~~

*We redefine engineering by thinking boldly, proudly and differently.*

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