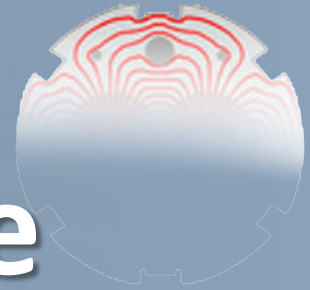




# PS East Area Update



Radiation 2 Electronics (R2E) LHC Activities

RadWG August 23<sup>rd</sup> 2012

*M. Brugger on behalf of the R2E Project*

Many thanks to everybody contributing to the PS-EA efforts:  
L. Gagnon, M. Moll, M. Lazzaroni, M. Glaser, J. Mekki, and  
many others...



- ⊙ **Long-term radiation tolerant developments** are essential for the **A&T sector**
- ⊙ **Bottleneck** for testing exists already, will become severe as from 2013/2014
- ⊙ There is a significant **difference between test areas** and a dedicated **test facility** – strong impact on the test and support teams
- ⊙ **Test campaigns can be significantly optimized** if performed partly ‘in-house’ and in mixed fields
- ⊙ **Synergy with proton facility** (also for A&T sector)
- ⊙ **LS1 the right moment to install**

# Present/Future Users

## Electronics:

### LHC existing:

- ⊗ QPS, Cryo, Power-Converters, Lights, etc.

### New (LHC related) developments:

- ⊗ Power-Converters (FGClite, 120A/600A/4-6-8kA)
- ⊗ QPS
- ⊗ Beam-Instrumentation
- ⊗ Collimation
- ⊗ nanoFIP (batch control)

### Injector chain:

- ⊗ SPS BPM, SPS/PS Interlock, BI electronics of transfer lines, PS-Ventilation/Access, RF upgrade of Booster

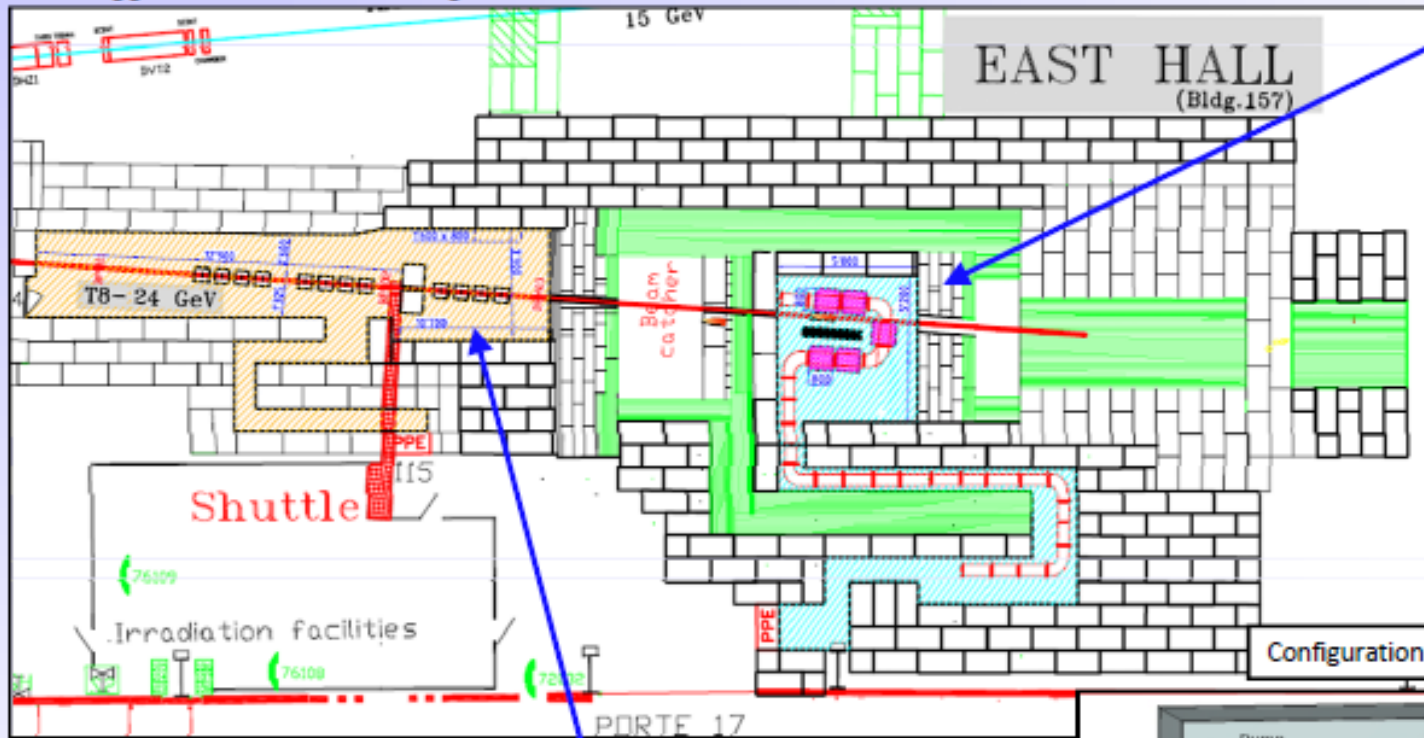
### Other:

- ⊗ LIU-SPS, CLIC (already at H4IRRAD), ISOLDE, LHC-Upgrade,....

## Material:

- ⊗ Cables & Fibers (impact on all machines)
- ⊗ Magnets (resins, but also possibly BLM related activities)
- ⊗ Collimators (and collimator like objects)

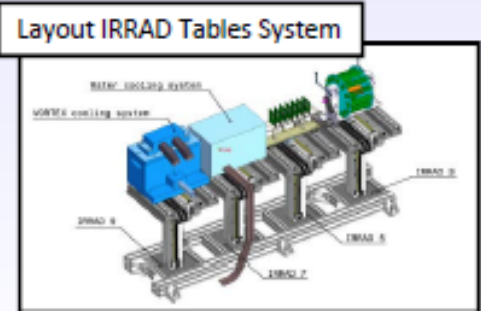
• Collaborative work: CERN EN & PH; AIDA & R2E  
 M. Brugger, M. Calviani, L. Gatignon, M. Glaser, E. Lebbos, M. Moll, F. Ravotti



**Mixed Field Facility**  
 multiple user communities:  
 LHC machine  
 LHC Experiments,  
 Dosimetry (RP),  
 MC benchmarking

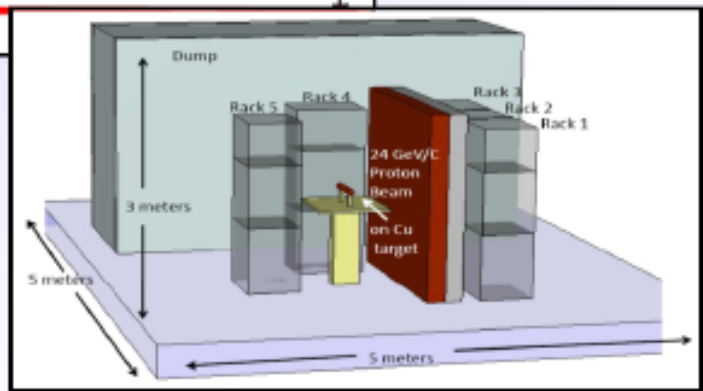
rail system on floor  
 for heavy material,  
 shuttle system  
 or small rail system  
 on ceiling (?)

Configuration of Mixed Field Area



**Proton Facility**

- main user community:  
 LHC Experiments
- Irradiation tables
- Cold boxes
- Shuttle system

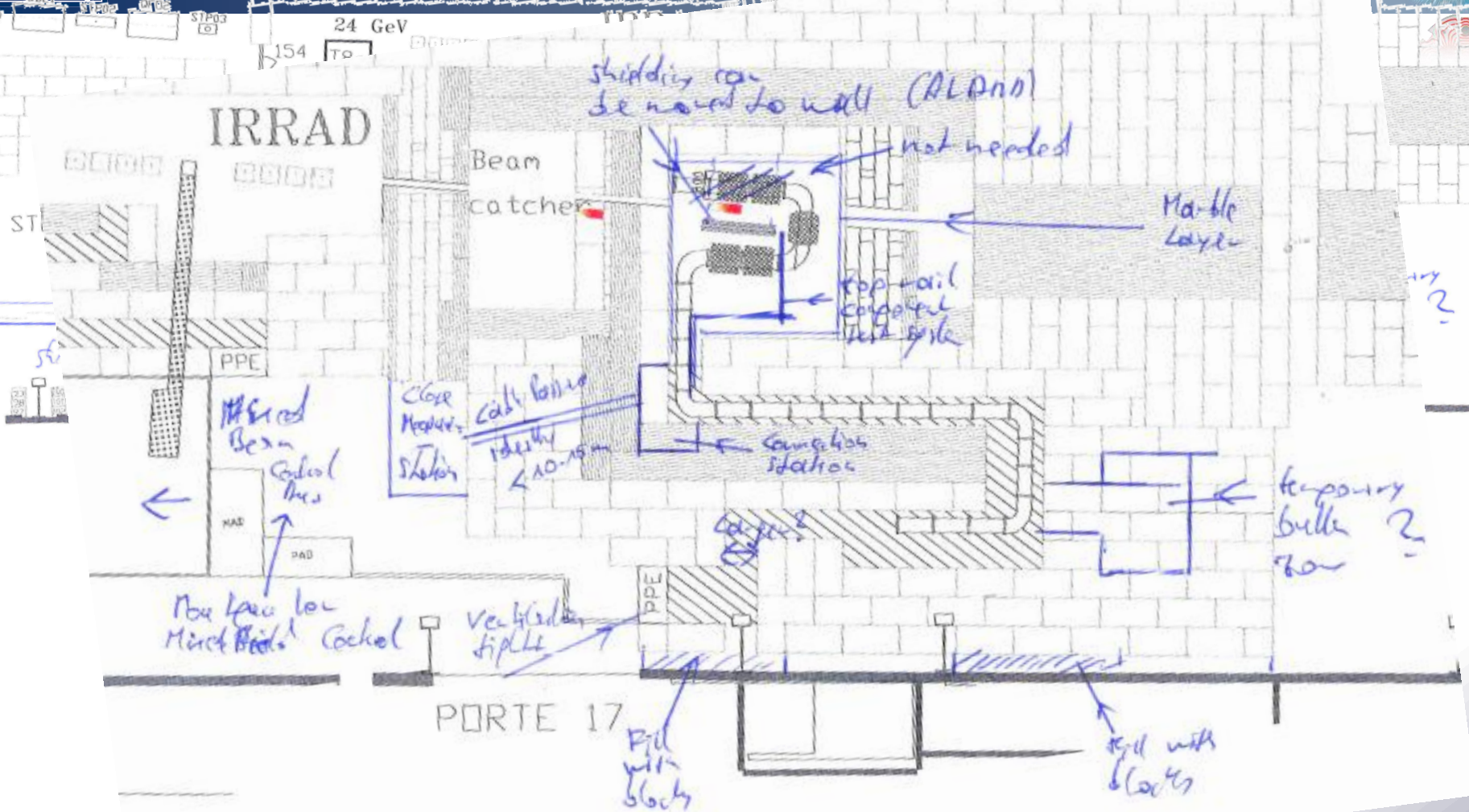


# Seeking Simplification

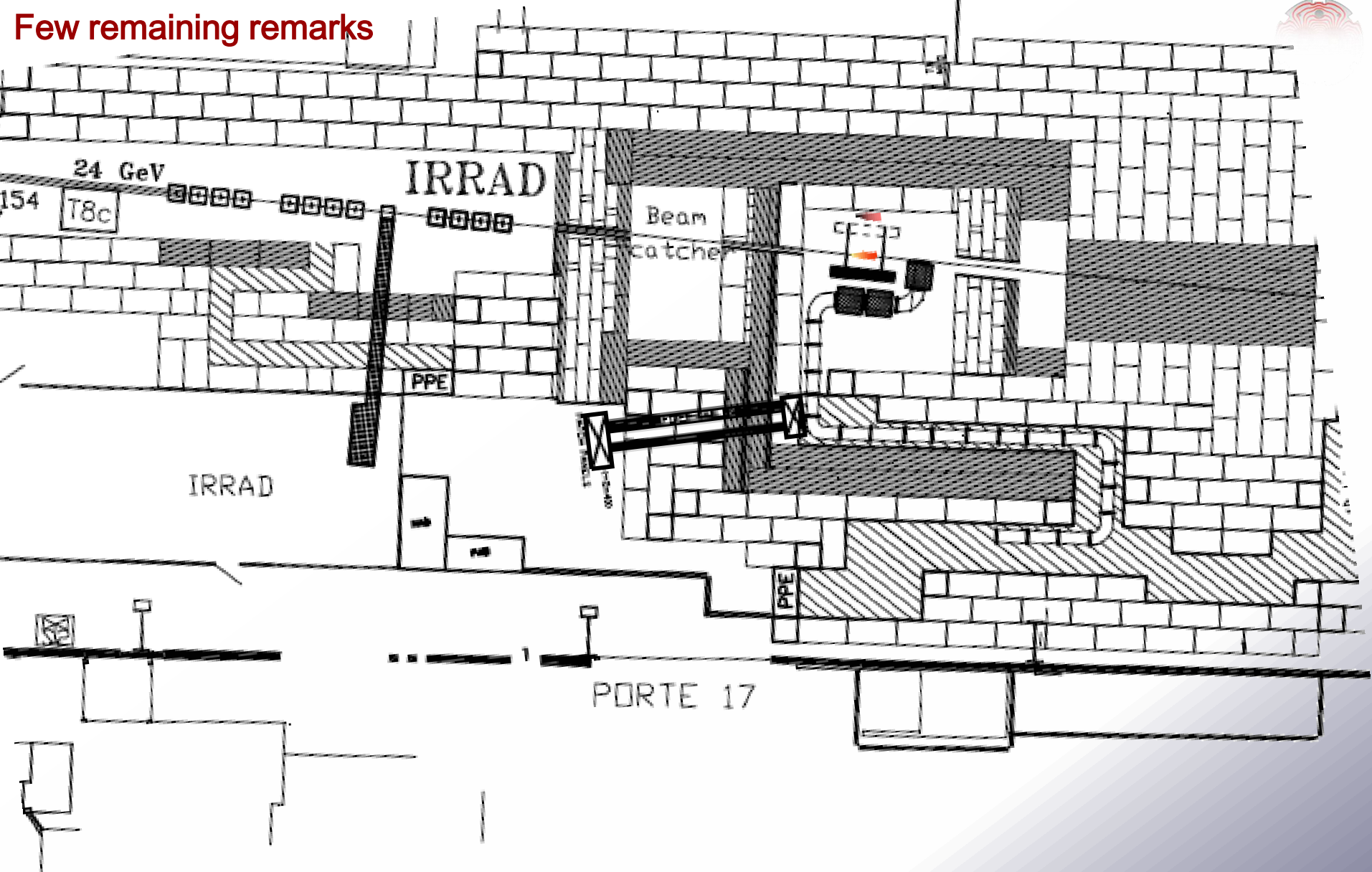
- ④ **One cable/connection station** at the entry of the mixed-beam facility (more space required)
- ④ Measurement cables directly guided outside to the shielding to a **first ‘analysis station’**
- ④ 1st Measurement station **as close as possible** (cable length not longer than 10-15m)
- ④ **Could be combined with** mixed-field ‘control room’ (should become a bit larger)
- ④ **Equipment is connected/tested in the preparation room**, rack is rolled to the connection station (temp shielding?) -> last check, then automatically placed at measurement positions



# New (latest) General Layout

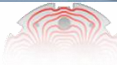


Few remaining remarks

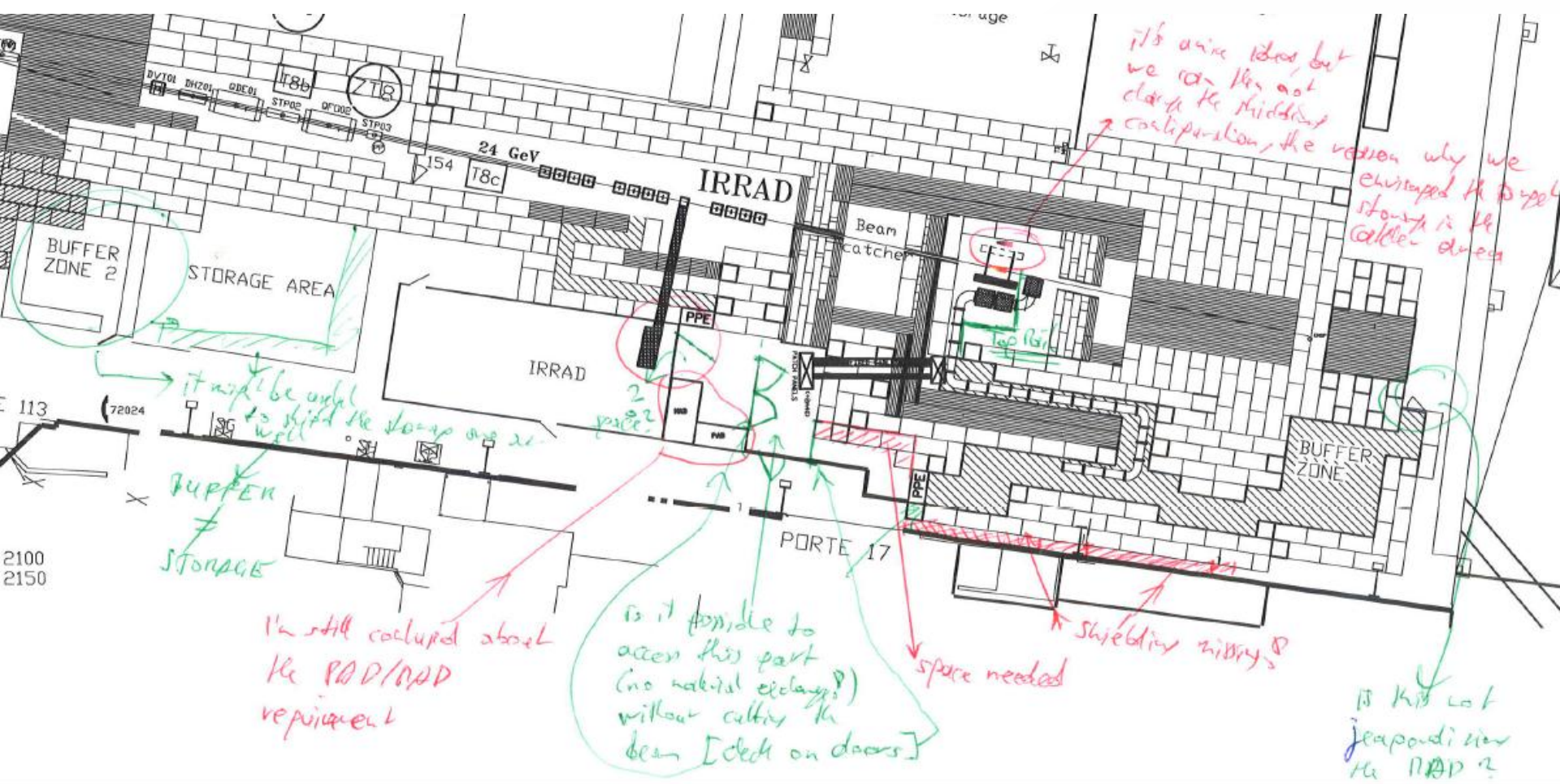




# New (latest) General Layout



Few remaining remarks → Finalization of layout (3D Catia) as from September





## @ Final Layout

### @ Design of cable station:

- @ input on cable requirements essential
- @ cable feed-through and connection logic
- @ care to be taken to optimize the amount

## @ Future organisation of tests:

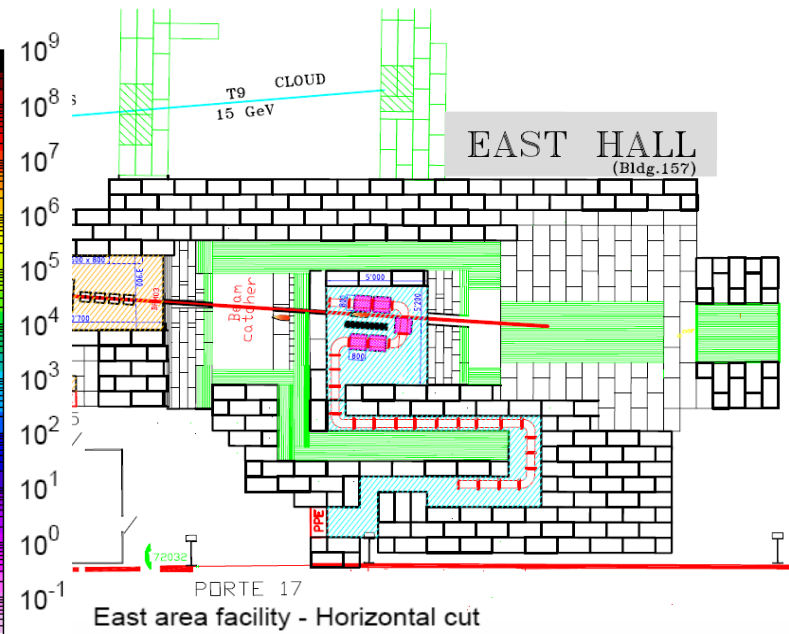
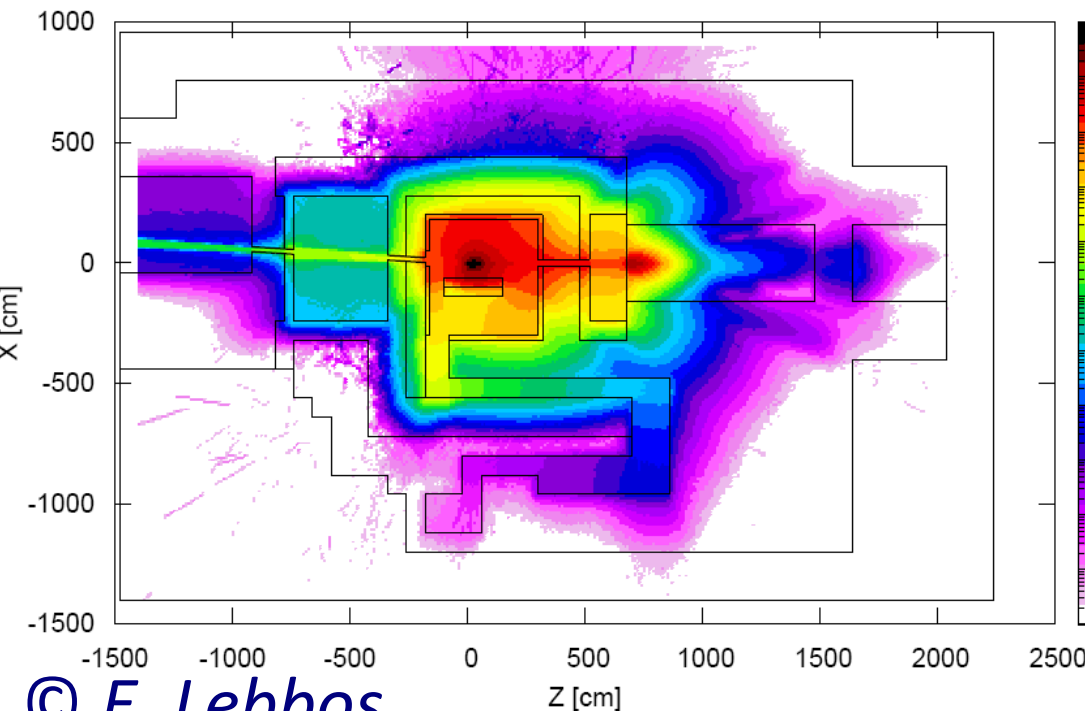
- @ Layout of control/preparation area
- @ Test-rack requirement

## @ Implementation:

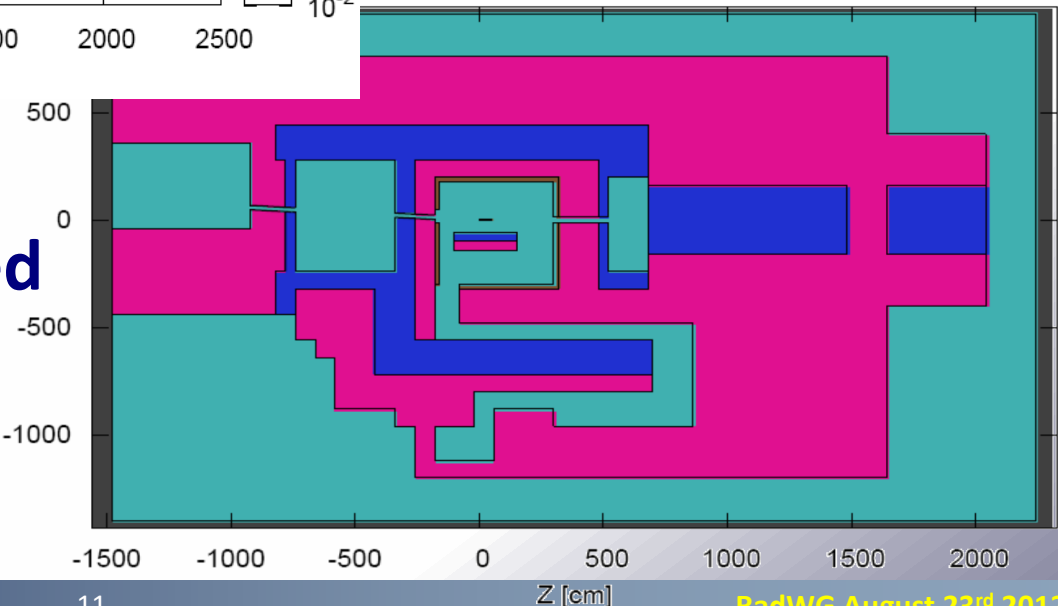
- @ Shielding layout and CATIA implementation as from September (input above partly required)
- @ **Critical actions: ventilation system and cabling**

# BACKUP

Prompt dose - Micro Sv /h - Horizontal cut [-25:25]



East area facility - Horizontal cut



© E. Lebbos

- Ⓢ detailed FLUKA studies
- Ⓢ radiation field optimized (and flexible)
- Ⓢ fitting intensity range

**ATS-Note-2011-082 TECH**

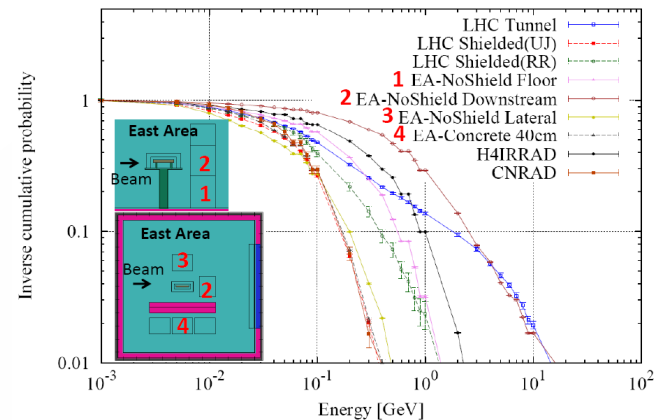
## Advantages:

- ⊗ **Flexible Particle/Energy spectrum and intensity reach** (inside: up to  $10^{11}\text{cm}^{-2}/\text{h}$ )
- ⊗ Strong **synergy** with proton facility with high beam availability
- ⊗ Component and complete **system tests**
- ⊗ **Combined effects** (TID/DD/SEE)
- ⊗ Dedicated design (**ALARA and optimized**)
- ⊗ **On-site (CERN)**, “easy” access with all required **services pre-installed**

## Constraints:

- ⊗ **New Installation** (integration, implementation, commissioning)
- ⊗ R2E requirement (**2014**)

High Energy Hadrons (>20 MeV)



Ambient residual dose rate [MicroSv/h] after 1 day

