

Aperture for ALICE (LHC)

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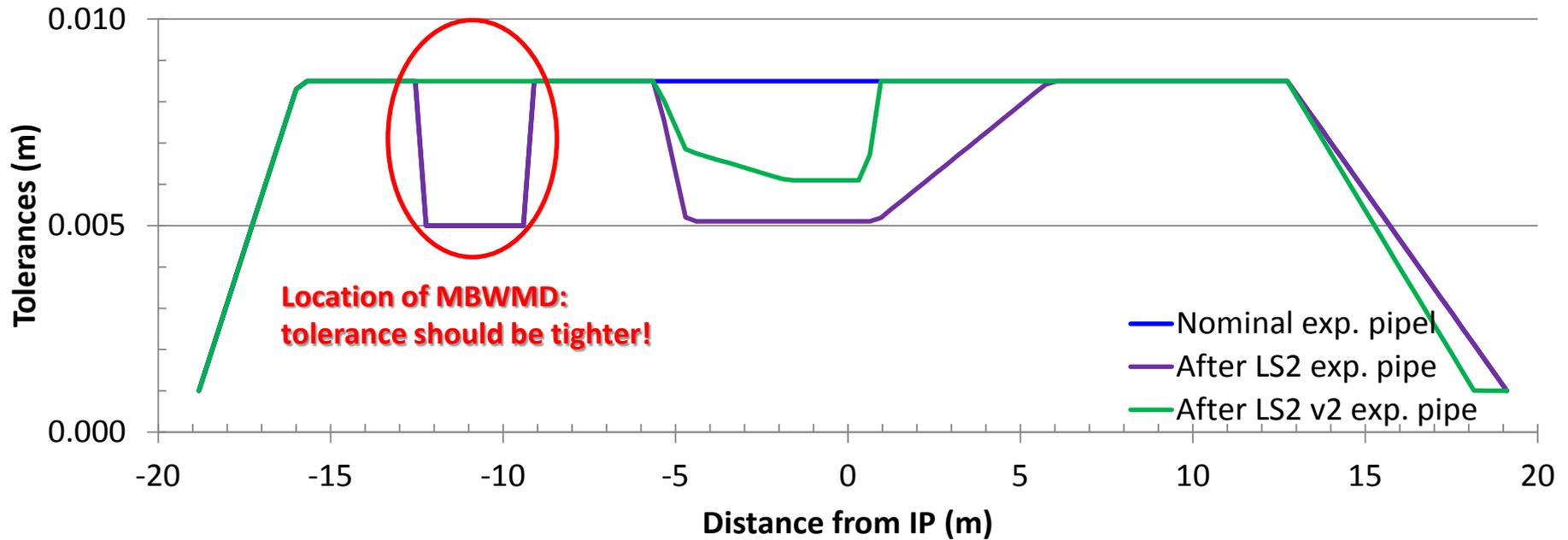
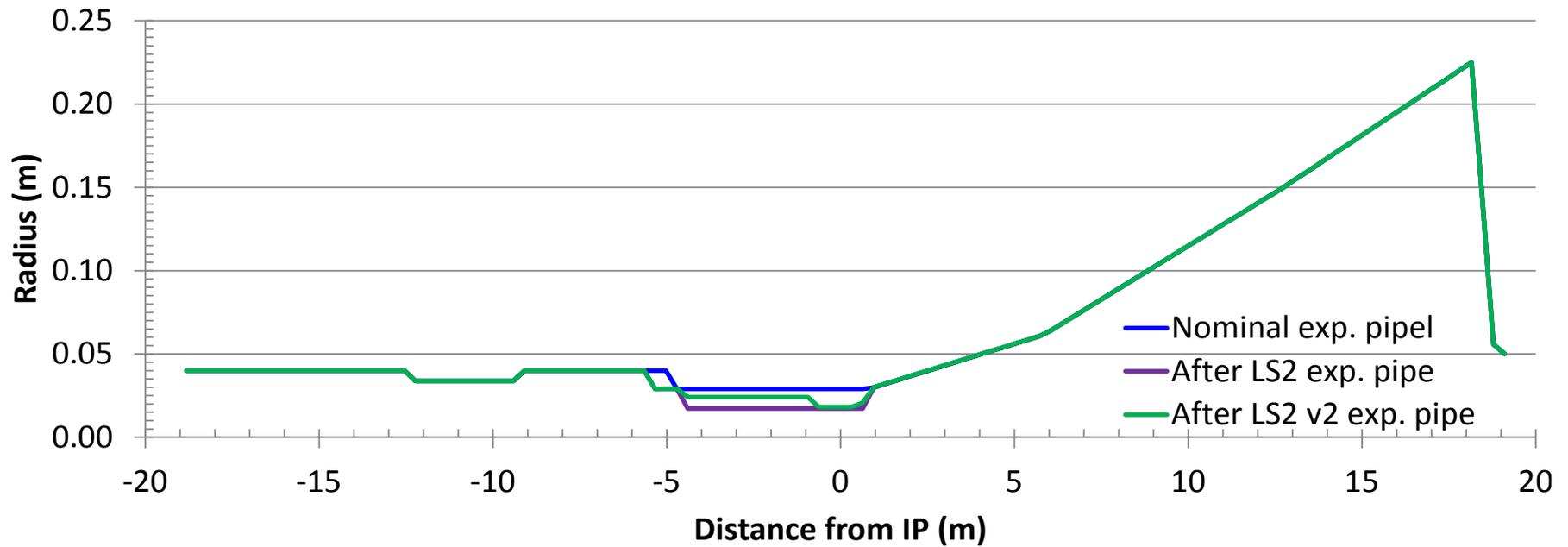
Acknowledgements: A. Tauro, W. Riegler

Disclaimer: unless otherwise stated, nominal parameters are used.

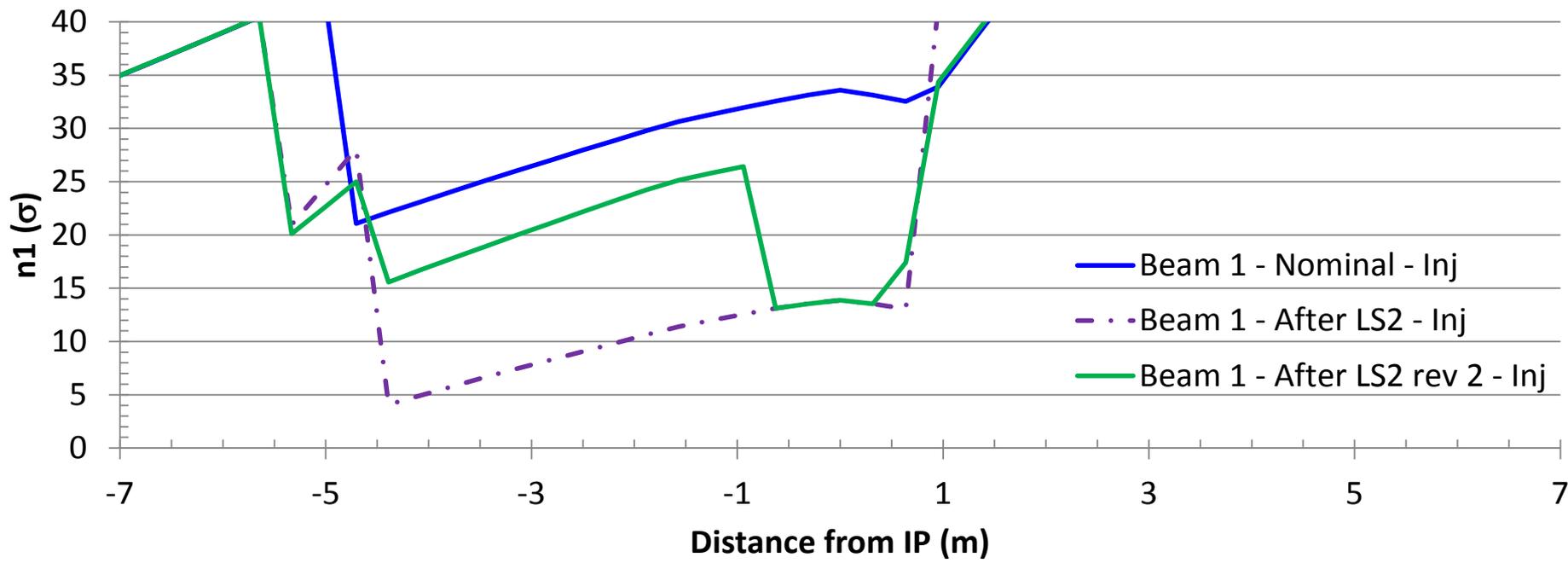
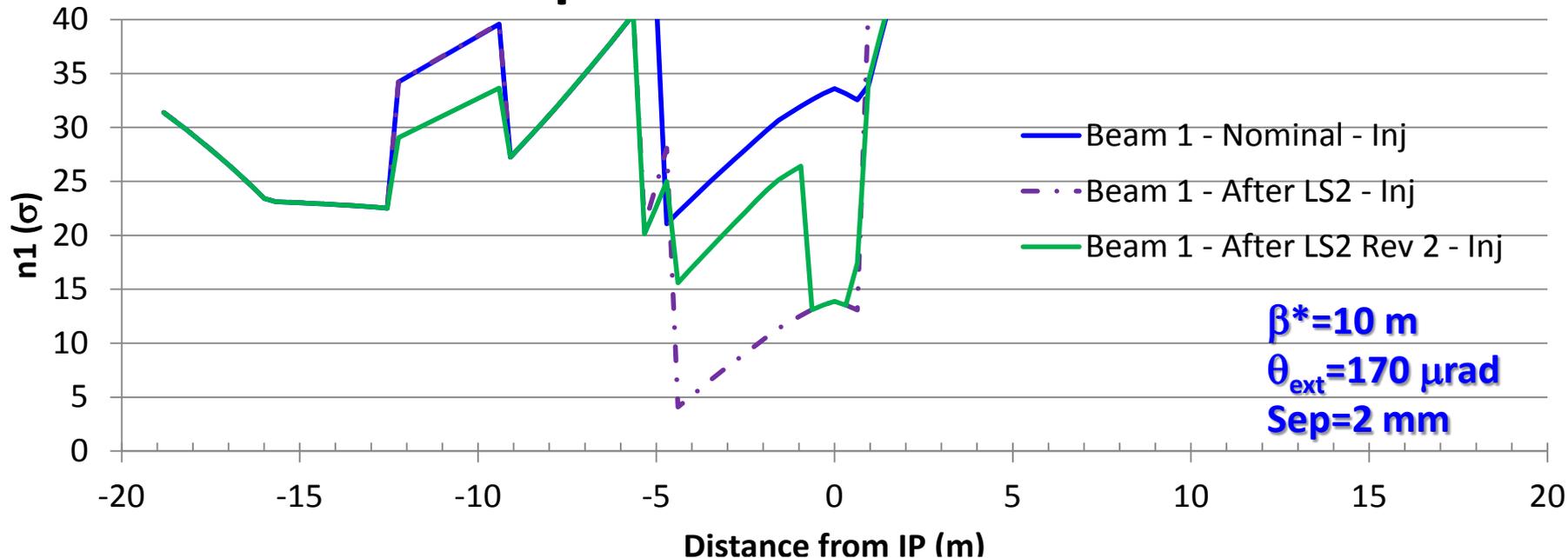
Alice beam pipe - I

- New layout before LS2: certified (by M. A. Gallilee) nominal layout (LEB meeting 12/06/2012).
- New layout after LS2: certified (by M. A. Gallilee) proposed layout (LEB meeting 12/06/2012).
- S-dependent tolerances have been introduced for both layouts.
 - Main issue found: aperture at injection, well below **$n1=7 \sigma$** .
- New layout after LS2 – rev 2 from A. Tauro (**presented at first TREX meeting**).
 - Revision of the central part of the beam pipe (shortened section with small diameter)
 - Revision of mechanical tolerances with respect to previous version
- Several configurations considered:
 - Nominal injection
 - Nominal collision – proton physics
 - Nominal squeezed - ion physics

Alice beam pipe - II



Alice aperture: results - I



Alice aperture: results - II

$\beta^*=0.6$ m

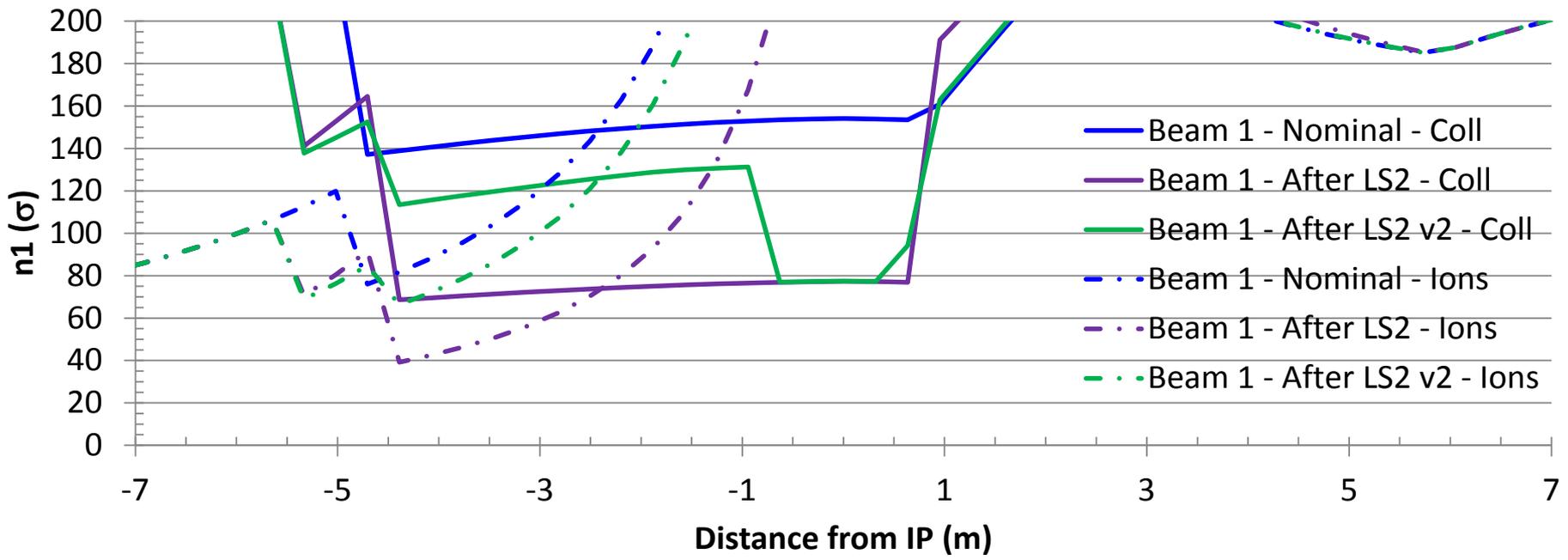
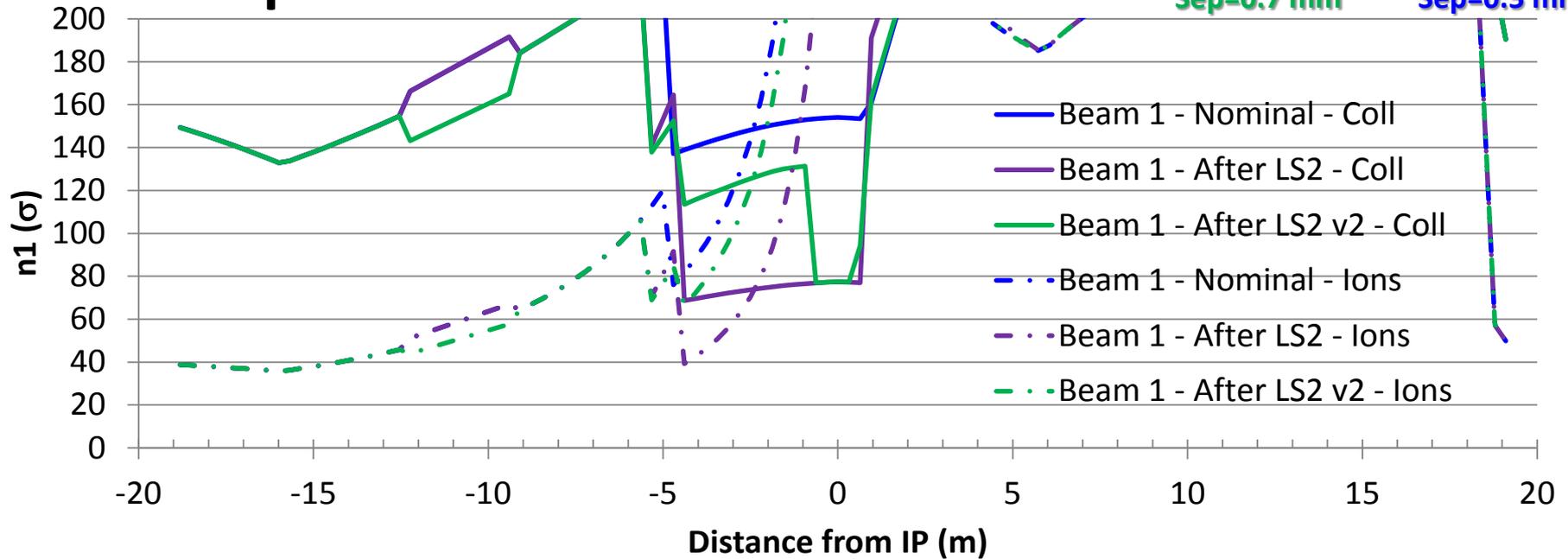
$\theta_{\text{total}}=150$ μrad

Sep=0.7 mm

$\beta^*=10$ m

$\theta_{\text{total}}=88$ μrad

Sep=0.5 mm



Conclusions for **nominal** LHC

- Injection energy situation is now fine as far as aperture is concerned.
- Top energy configurations are fine.
- Mechanical tolerances in the region of MBWMD are too loose, but this is not a problem for our model: the aperture and its tolerances are taken from the magnet data (not the experimental beam pipe).
- All the files for Alice will be available under

</afs/cern.ch/eng/lhc/optics/V6.503/aperture/as-built: upgraded beam pipe>

- Other points to be considered:
 - **Impedance**
 - **Vacuum**
 - **Machine protection**
 - **Injection failures**