
Lincoln University and AgResearch Joint Facility

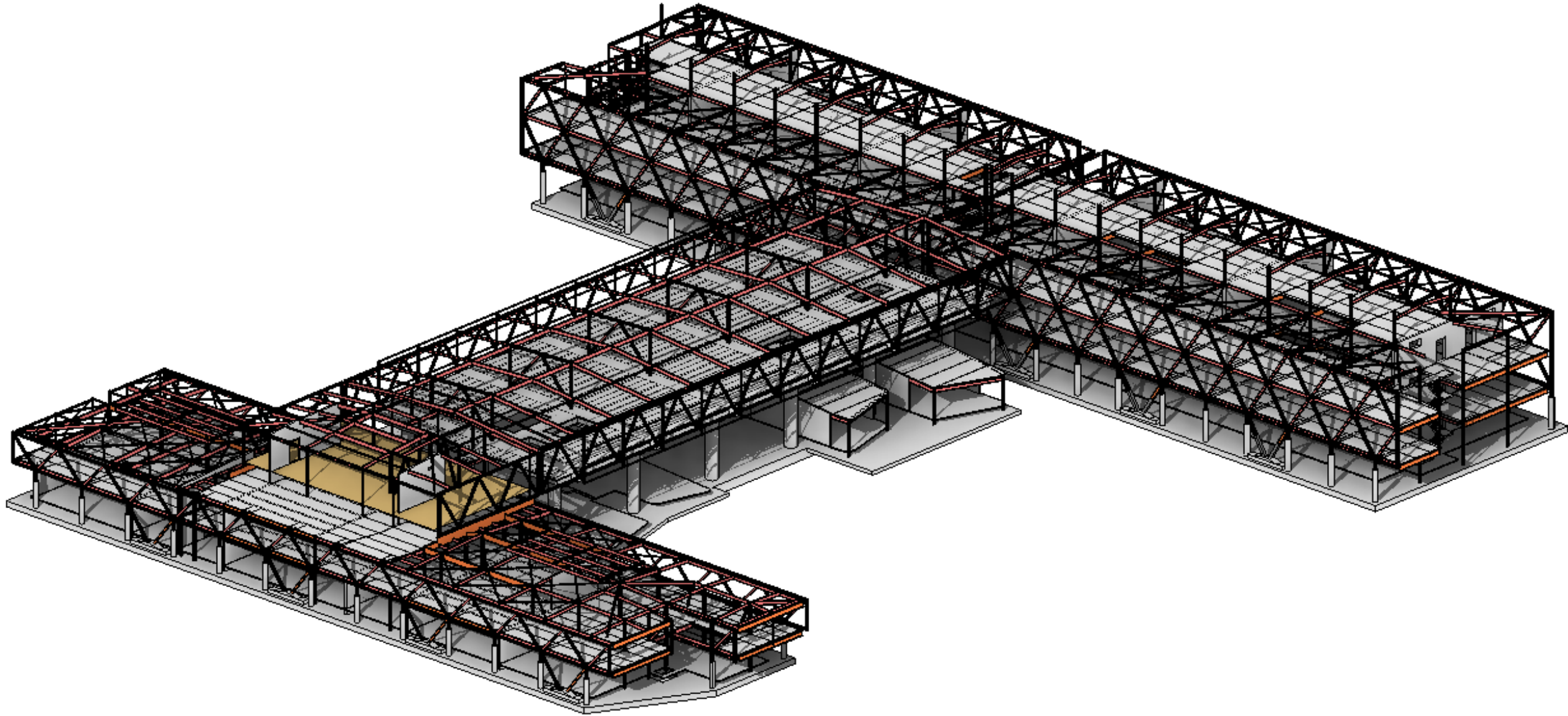
Friction Sliding Joints within a Diagrid



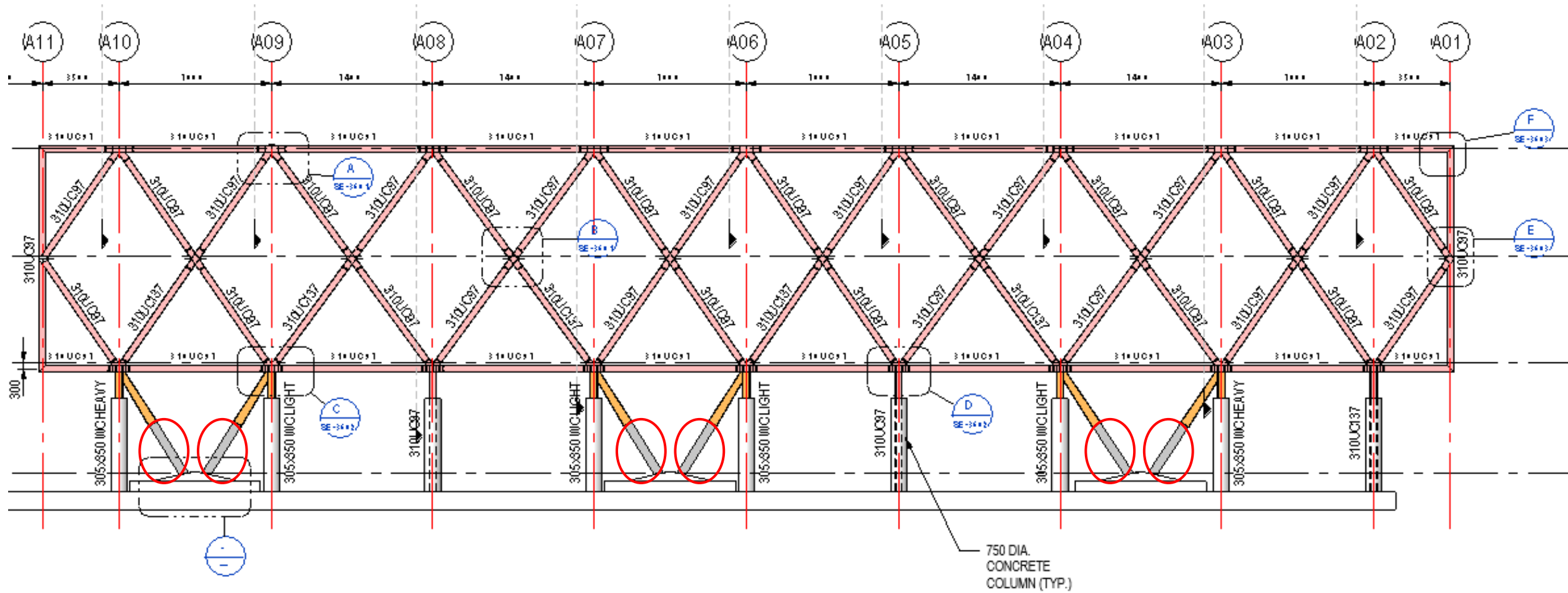
Wherever it can reasonably be expected to be achieved for minimal capital cost impact, we will design for Low Damage and/or Repairability.



Structural Arrangement



Diagrid Elevation



FSJ based on Torre Cuarzo arrangement



Design Drivers

- Diagrid key part of architectural concept
- No client budget for Low Damage Design
- Structural desire to insert ductility to lower bracing
- Additional benefit of localisation of damage

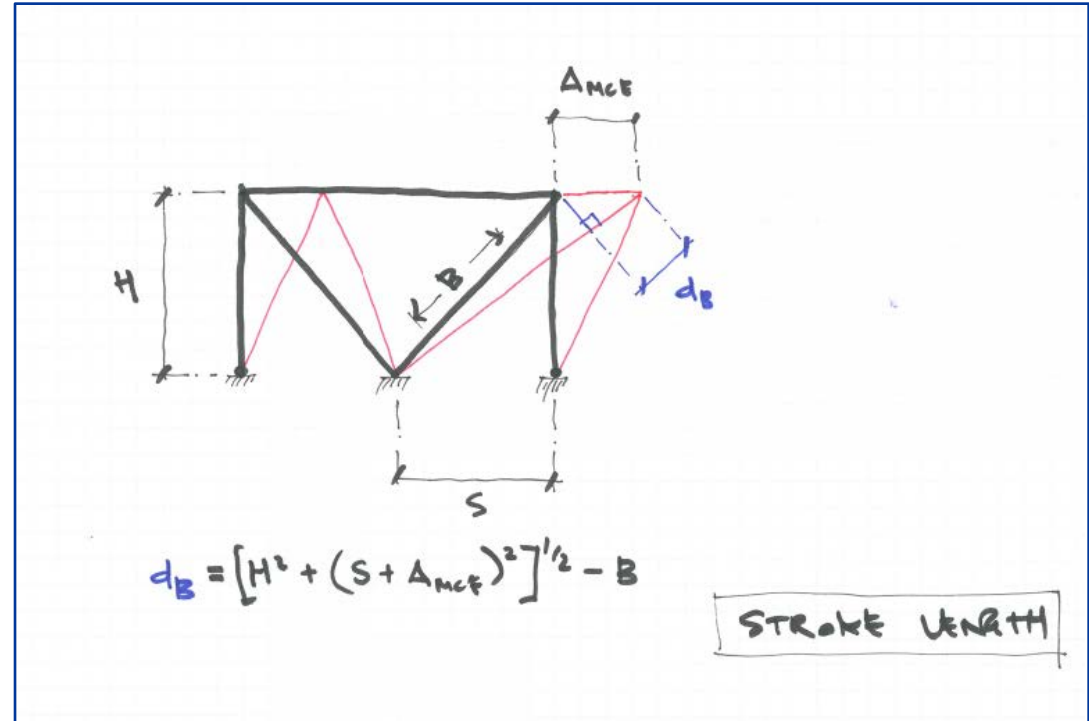
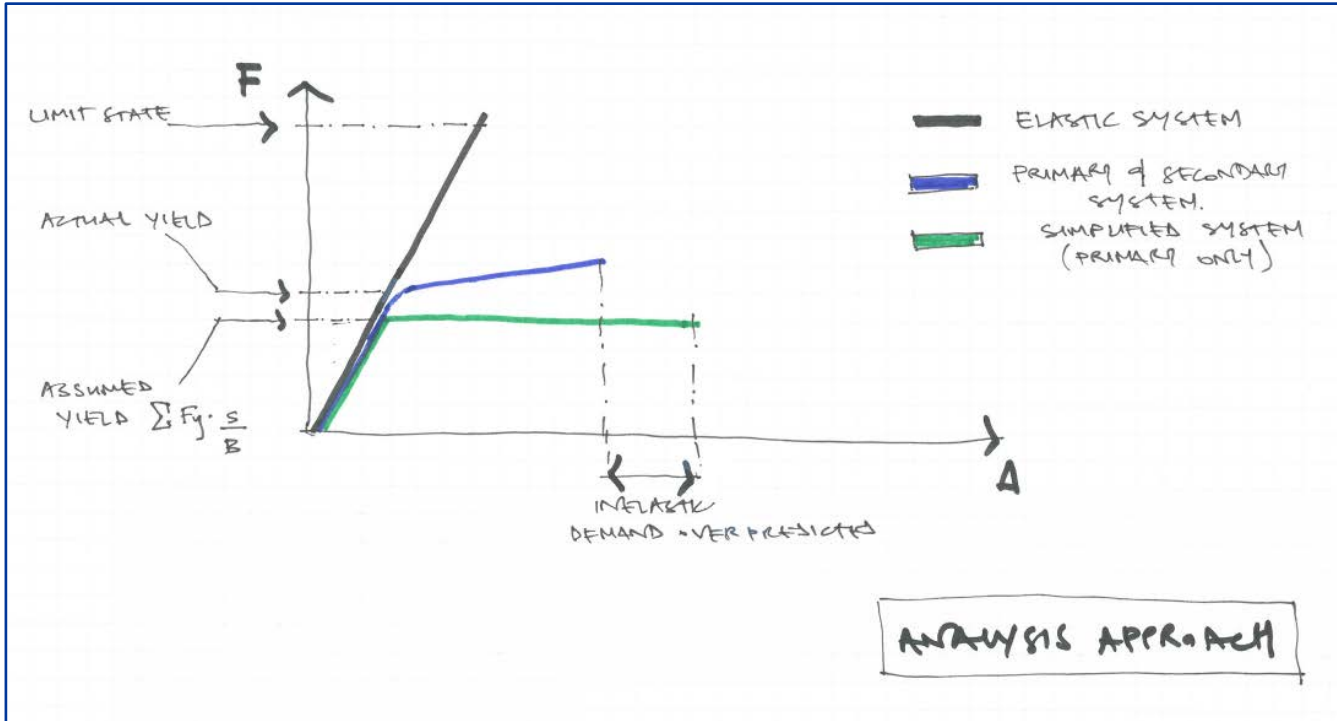
Key design aspects

- System Design
- Detail Design
- Construction and reliability (Specification Design)

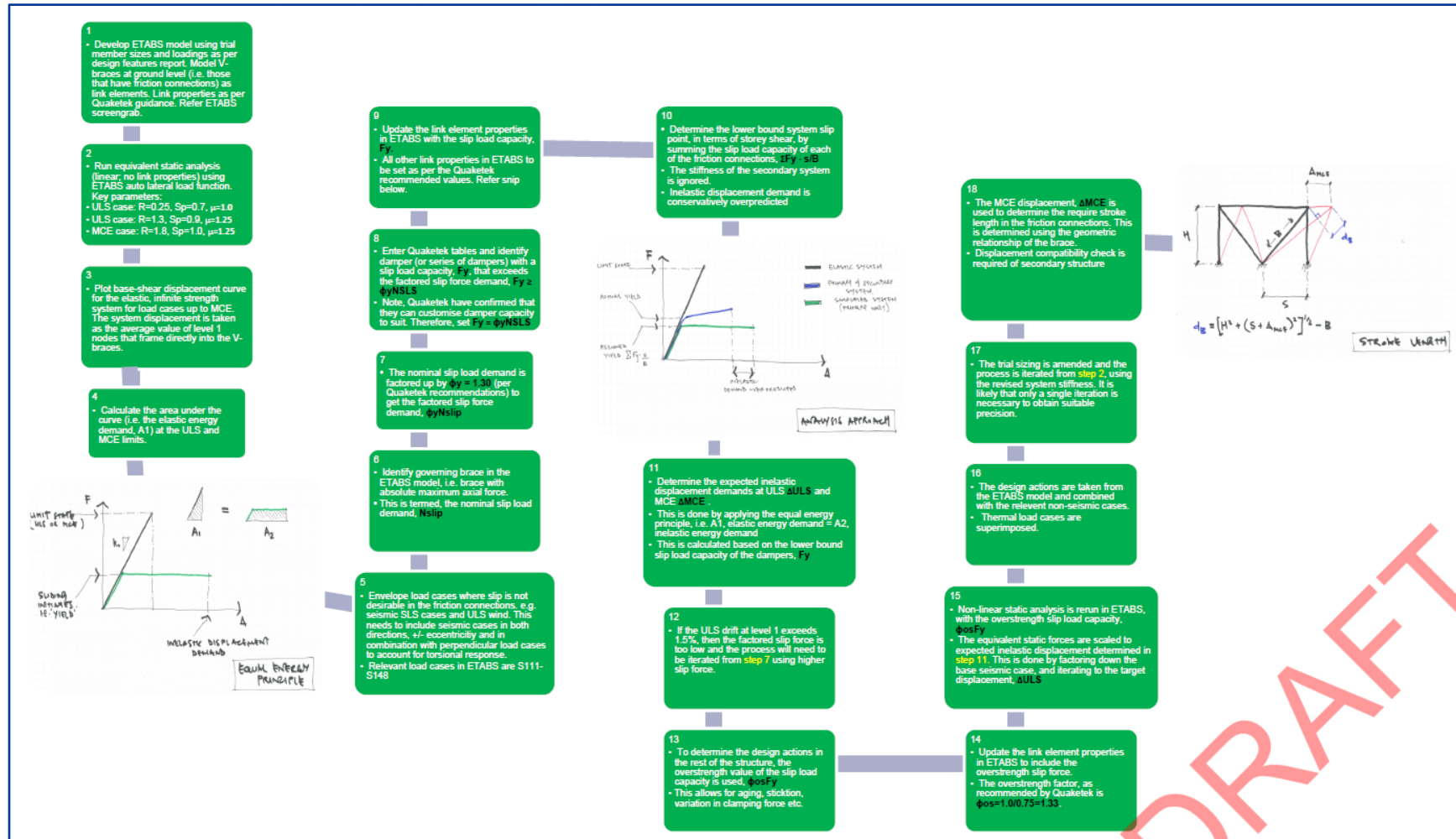
System Design

- Design Process
 - Adaption of “standard” BRB and Seismic Isolation processes
 - Including learnings from industry papers (Gledhill, McRae, Clifton)
 - Consolidate into formal design processes
- Design Cases
 - SLS
 - ULS
 - Displacement compatibility (robustness)
- Translation from an idealised system to a real system

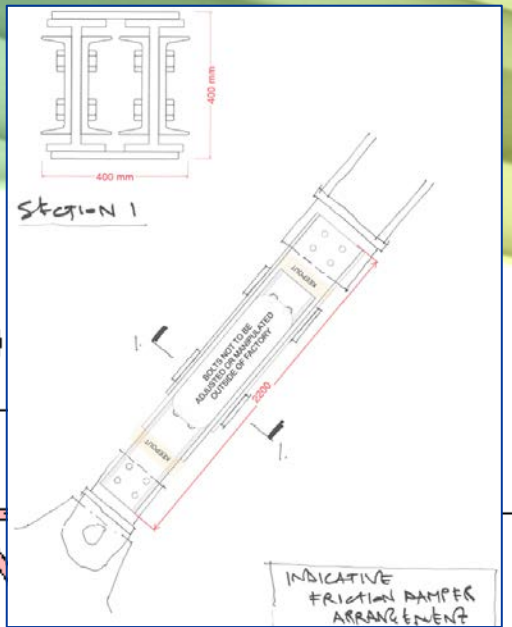
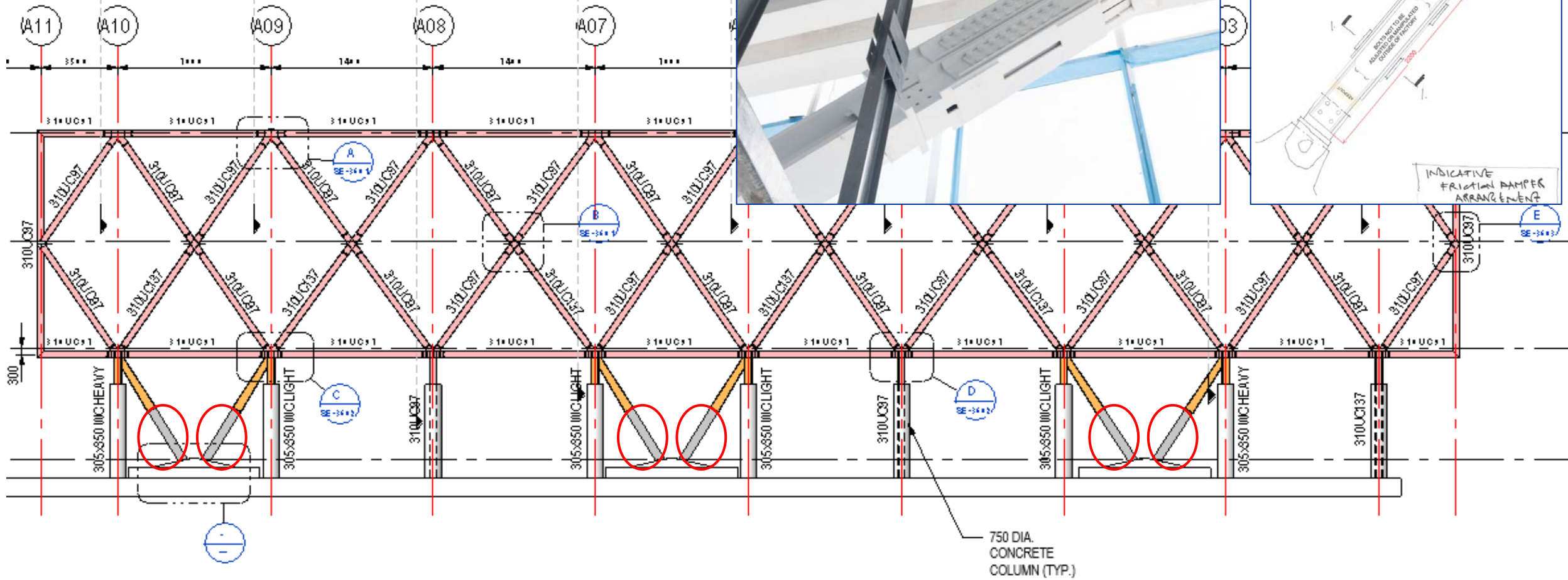
System Design – From an idealised system



System Design – to a real system



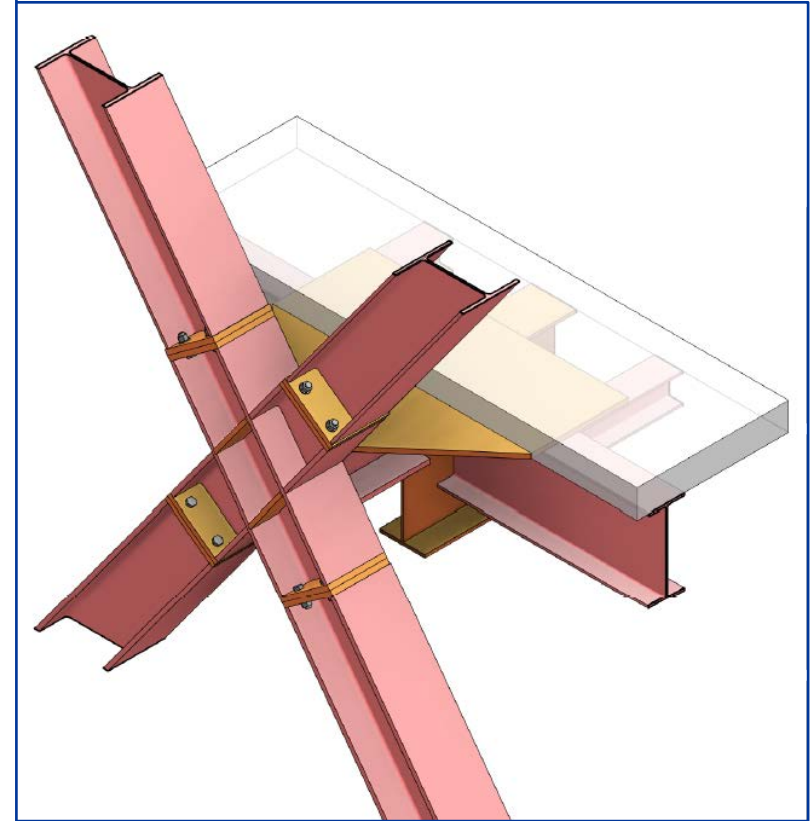
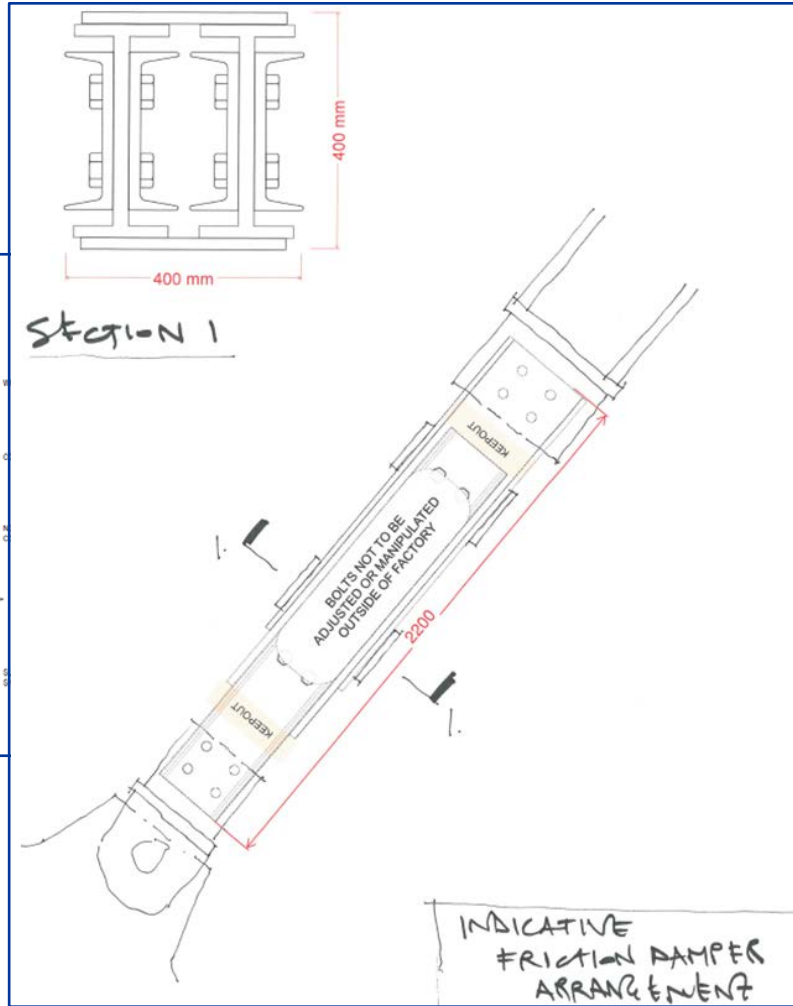
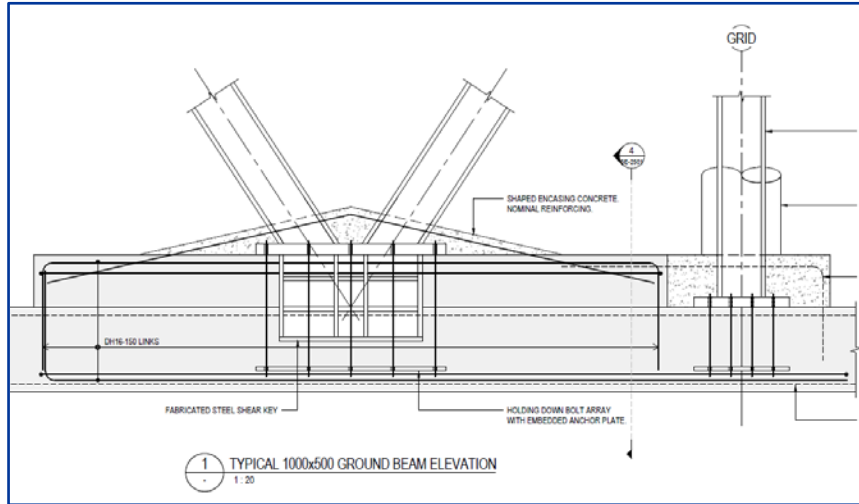
Detail Design



Specification Design

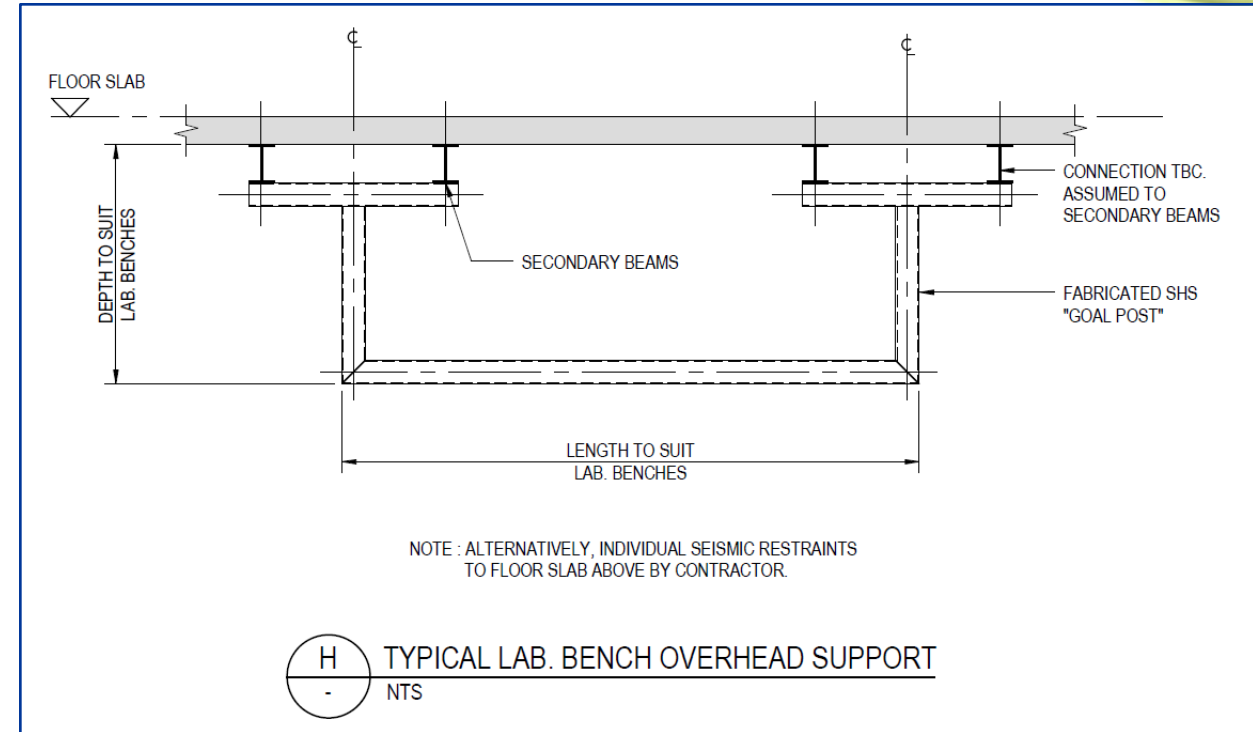
- Adopting a preferred supplier
- Performance Variability Criteria
 - Specified to meeting supplier criteria (Quaketek)
- Testing Requirements
 - Quaketek: Supplier testing of all units with independent monitoring

Key Details



Non Structural Elements

- <1.5% ULS drifts at ground level
- Significantly lower drifts at upper levels
- Challenges with engagement of non-structural element designers



Items for Discussion

- Do FSJ's warrant a design approach significantly different to that for a traditional ductile system (EBFs).
- How do we convey the repairability though low damage spectrum?
- Are ductility and LDD mutual opposing?
- What is an appropriate testing regime (for NZ). How can the Uni's help?
- Risk and reliability will lead to preference for established proprietary providers. This creates challenges for local supply
- Lack of guidelines (or acceptable solutions) is a significant barrier to adoption. Are our priorities aligned to promote low damage design?
- Do associated industries promote or hinder adoption of LDD (particularly the impact of the insurance industry).