

Attachment A12

Structural Design Description

Subject	Piccadilly Redevelopment - Structural Design Summary
Job No/Ref	295375
Date	28 August 2025
By	Andrew Johnson

Introduction

The document responds directly to the correspondence from City of Sydney dated 19th August 2025, with particular reference to the following section:

“Engineering Structural Record

To demonstrate future development for the site, which includes retention of the tower at 133-135 Castlereagh Street tower is feasible including elements to be retained or demolished, an integration with new structural components. A geotechnical study should also be included to demonstrate suitability of the proposed future development for the site.”

Structural description

The structural intent is to fully re-use the existing 133 Castlereagh St (133C) tower and extend via new structure to the west, resulting in a single monolithic structure composed of the existing and new. The entire substructure between Pitt St and Castlereagh is proposed to be retained, with localised reconfiguration and strengthening where required to facilitate the proposed functions.

The new completed structure will be designed and certified for a 50-year design life including the existing 133C.

Douglas Partners (DP) have completed both desktop and site specific physical geotechnical investigations based on a brief prepared by Arup that have included mapping of the existing sandstone excavation in the location of the new core, verification of foundation pressures for new and existing foundations, and rail corridor influence. Reference is made to the report prepared by DP.

The following descriptive notes shall be read in conjunction with Figure 1 to Figure 5 below.

- Existing 222 Pitt St building demolished including foundations. Existing retail podium structure demolished to the existing ground level slab. Extent to the building joint interfacing with the 133C tower columns;
- Existing basement excavation footprint and depth retained and utilised with no new bulk excavation. Detailed excavation required for new satellite core lift pits and pad footings. Geometrical relationship to the Sydney Metro Up and Down lines under Pitt and Castlereagh St's unchanged. All new foundation loading is outside the 1st reserve as defined by the Sydney Metro Corridor Protection Guidelines;
- Documentation review, structural calculation, and detailed materials testing of the existing 133C tower columns and foundations by a 3rd party specialist testing facility has verified the capacity to support the additional loads above the western side of the existing floorplate. This testing and verification has included strength, durability, and fire performance;
- The columns and floor framing for the new floors off 222 Pitt St and the extended 133C tower will be constructed from materials required to suit the functional planning, construction methodology, economical, and embodied carbon requirements at the time. Various structural

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grids and framing methodologies have been tested to demonstrate that the proposed function, ceiling height, and services-structure interaction can be achieved within the existing floor to floor heights;

- The lateral structure has been tested based on a banded post-tensioned slab arrangement for the new typical commercial floors and post-tensioned plates for the residential levels in the mixed-use configuration which provides an upper bound mass for seismic assessment;
- New tower columns are inserted through the existing basement structure to pad footings on sandstone. The columns immediately adjacent to the 133C tower columns are structural steel regardless of the material selected for the typical floor structure to alleviate differential long-term shortening issues between the new and existing;
- New western (satellite) core. This core sits within the new footprint and is ideally located to supplement the existing 133C core and the share the increased wind and seismic loads, and provide lateral and vertical support for the 222 Pitt St building component. Detailed structural analysis has been undertaken including staged construction of the existing and new buildings in combination with physical and dynamic testing of the existing building to tune our analytical models;
- The existing 133C is reconfigured within the outer primary core walls, utilising the existing shafts and protecting its structural performance. Modest localised strengthening is required only;
- The new typical commercial floors above 222 Pitt St are provided at the level of the existing floors to provide contiguous floor plates. These floors are connected to the existing as needed and provide continuous structural diaphragms that link the two cores and constrain the building to behave as one;
- The structural form can accommodate either the full commercial or mixed-use scenarios. For the mixed-use scenario, a transfer slab is proposed at the top of the existing building to allow transition to a suitable structural grid for residential use.

Conclusion

We have undertaken substantial site investigations along with detailed structural analysis and assessment to demonstrate that the proposed works are feasible including the retention of the 133-135 Castlereagh St tower elements to be retained. A geotechnical study including both desktop and site investigation has been undertaken to further demonstrate that the ground conditions are suitable for the proposed works.

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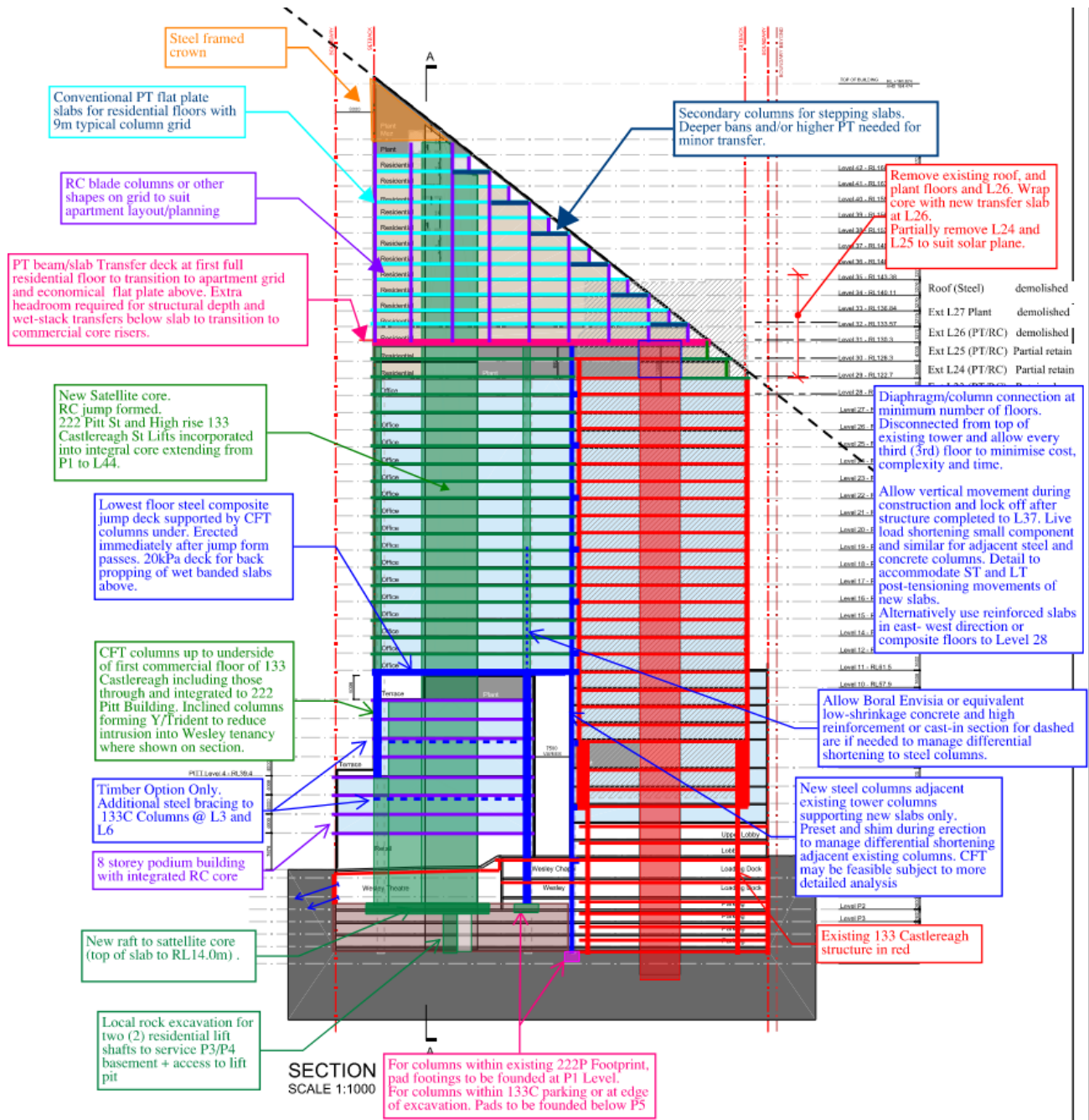
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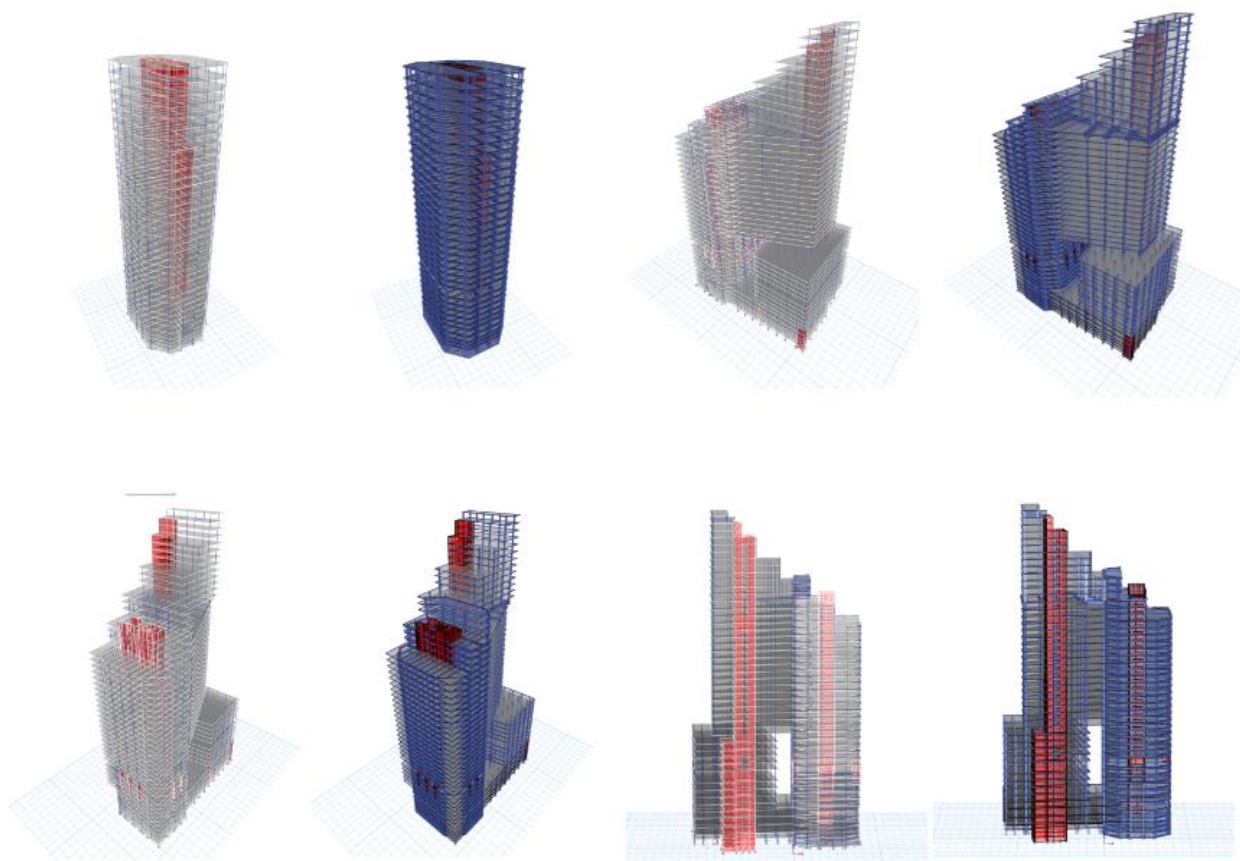


Figure 2: Images of global structural FE model (ETABS) undertaken including staged construction

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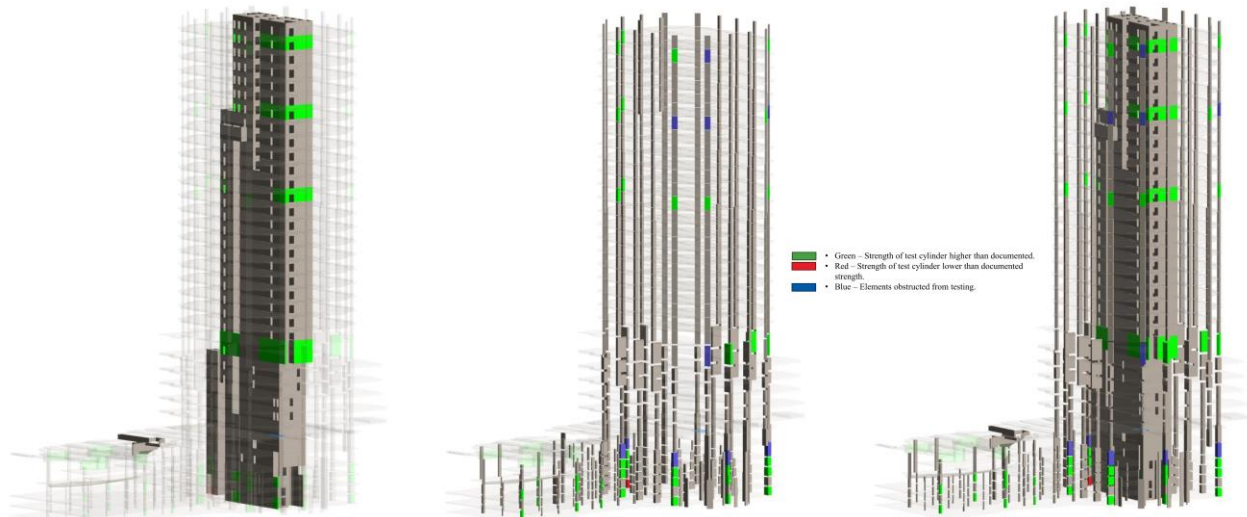


Figure 3: Graphic representation on materials testing regime undertaken on the existing 133 Castlereagh St concrete structure to investigate material properties - strength and durability assessment

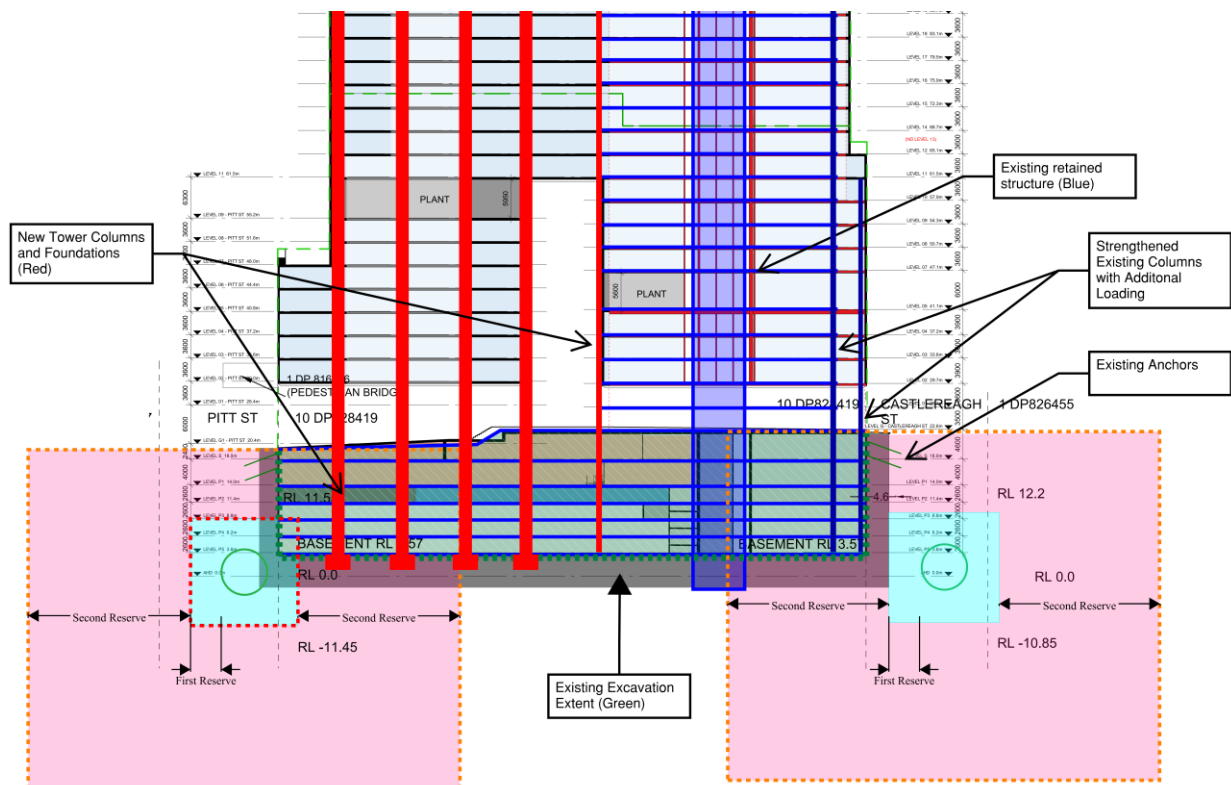


Figure 4: Existing basement extent and Metro Interaction – no increase in existing basement footprint or depth

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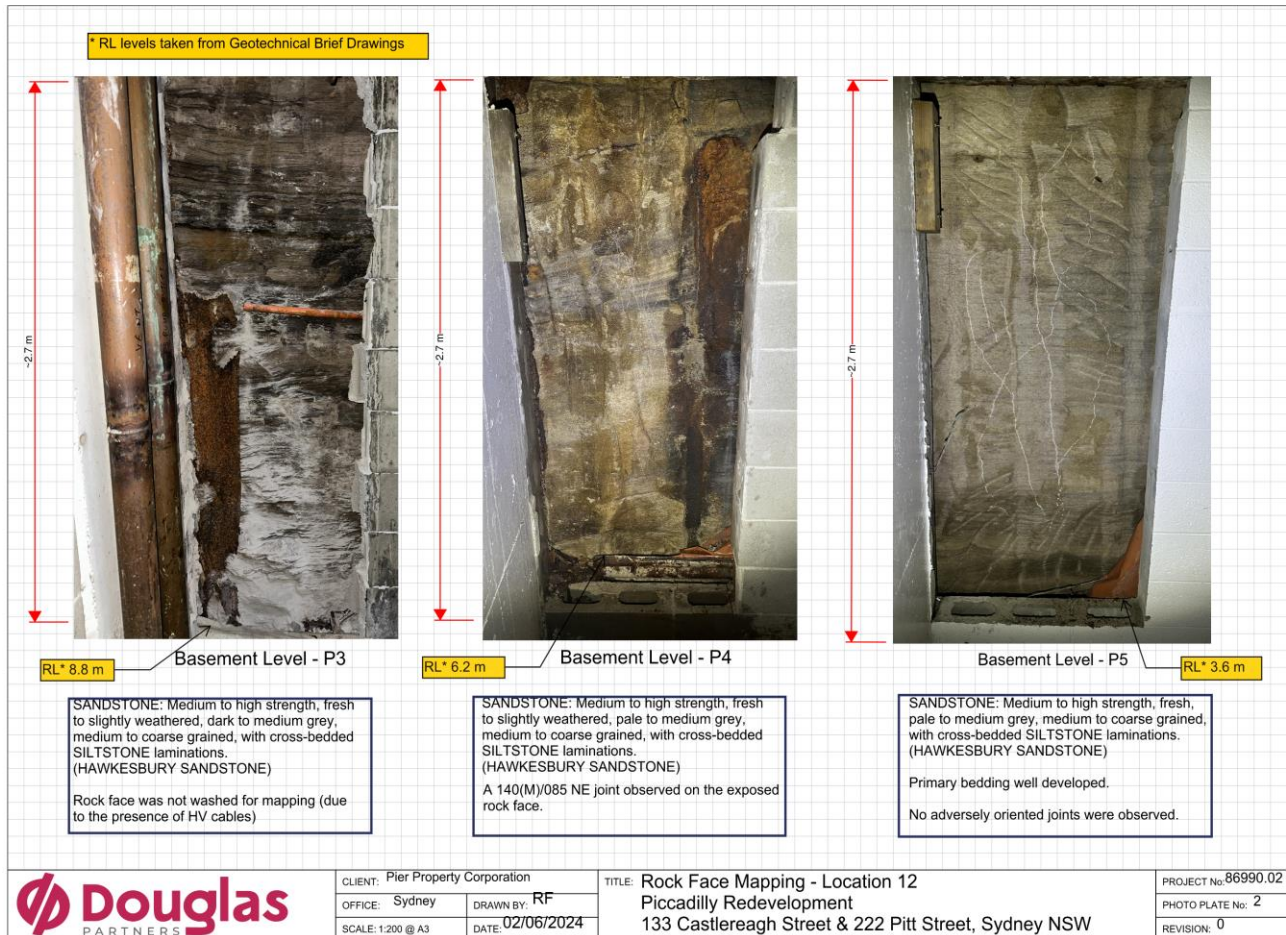


Figure 5: Mapping of rock excavation on site (DP)