

APPENDIX N ADDENDUM STRUCTURAL ENGINEERING STATEMENT

Arup



Hannah Slater
Infrastructure New South Wales
Level 12
MLC Centre
12 Martin Place
Sydney
NSW 2000

ARUP

Dear Madam

Powerhouse Precinct, Parramatta
Structural Design Statement No 2_Flood Events

We (Arup) are providing structural engineering services to Infrastructure New South Wales in relation to the Powerhouse Precinct in Parramatta.

Notwithstanding anything to the contrary contained in this statement we are obliged to exercise reasonable skill and care in the performance of our Services under the Appointment and we shall not be liable except to the extent that we have failed to exercise reasonable skill and care and this statement shall be read and construed accordingly, and in particular shall be subject to the terms and conditions of the Appointment.

We advise that the design being prepared by this office has been undertaken in accordance with the relevant Australian Standards, The Building Code of Australia and accepted engineering principles to withstand the flood loadings on the structure due to the 1% AEP +0.5m freeboard and to a PMF at RL=11.000.

The flow velocity from the PMF water flow described in the flood modelling and corresponding forces determined in accordance with the requirements of AS5100.2.

The structural elements adopted to satisfy the forces from the flood waters up to the PMF level include: -

- Within the under-croft zone reinforced concrete columns have been provided with embedded structural steel sections. These sections provide enhanced lateral load resisting capacity due to the enhanced stiffness provided by incorporating a large welded steel profile confined within a reinforced concrete column acting compositely. These sections are embedded within the foundation piles.
- Within the under-croft zone at the northern perimeter of the western building reinforced concrete filled structural steel exo-skeleton lattice elements have been adopted. These sections consist of structural steel closed sections (boxes) filled with reinforcement and concrete. These sections provide enhanced lateral load resisting capacity due to the enhanced stiffness provided by incorporating a reinforcement and concrete within a steel box profile which acts compositely.
- Within the ground level zone up to PMF, the lattice exoskeleton structure has been designed for appropriate flood loads.

The exoskeleton design also incorporates redundancy in load paths due to its lattice nature which will allow redistribution of loads due to any damage from floodwater debris (or other like vehicle impacts). An element replacement strategy has been developed to manage this risk.

- Within the ground level zone up to PMF, the structural steel columns supporting the ground mezzanine slabs acting as the level of indoor refuge have been sized to satisfy the forces from floodwaters. These columns too are embedded and in addition to floodwater forces have also been sized to satisfy the security related requirements.
- Reinforced concrete core structures that provide global building stability. Reinforced concrete core structures used to provide pedestrian fire escape routes and building services reticulation represent large concrete cores that resist lateral forces in compression and tension by acting as large cantilever structures.

The following Australian standards are referenced in particular:

- AS 1170.0-2002
- AS 1170.1-2002
- AS 1170.2-2002
- AS 1170.4-2007
- AS 2601-2001
- AS 3600-2009
- AS5100 - 2017
- AS3700-2001
- AS4100-1998

The information contained in this letter is true and accurate to the best of my knowledge.

Yours faithfully



George Cunha
Associate Principal
BSc (Eng)
NER 3411585