

JAS:PC
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Ecove Group
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43 Brisbane Street
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**RE: STRUCTURAL ENGINEERING COMMENTARY ON DEVELOPMENT APPLICATION
FOR: SITE 9, SYDNEY OLYMPIC PARK**

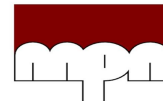
The proposed development at Site 9, Sydney Olympic Park consists of a podium structure that is approximately 104m long by 30m wide with a 32 storey residential tower sitting on top of a portion of the podium. The northern end of the podium is 7 storeys tall and consists of retail on the Ground Floor, parking in the upper floors and offices on the top two floors. The southern end of the podium is 6 storeys tall and consists of retail on the Ground Floor and parking on the upper floors. This is topped by a 32 story residential tower that occupies approximately 60% of the footprint of the southern podium.

The site was used for landfill in the past and is underlain by a moderately deep layer of fill varying in depth from 2 to 9m in places. The fill contains refuse and other contaminants associated with landfill usage. The structure has no basement in order to minimise excavation and avoid having to remove and remediate the contaminated soils.

The foundations for the structure will consist of piles founded on the bedrock underlying the fill and soil layers. The proposed pile solution will be either driven precast piles or continuous flight auger (CFA) piles. The advantage of the driven precast piles will be that removal of the contaminated fill is not required. The disadvantage of this pile type will be their limited capacity. The pile capacity is limited to the strength of the precast concrete section and the fact that only end bearing on rock is used. This will be an issue under the tower columns and walls. Pile groups of up to 16 precast piles may be required to support the tower loads.

The increased capacity of CFA piles comes from the ability to use larger diameter piles and the ability to socket the piles into the rock which means side friction can be used as well as end bearing. Pile groups of up to 6 x 900mm diameter piles would be required under the heavily loaded walls and columns. The disadvantage of CFA piles is that contaminated soil will be removed by the auger which needs to be dealt with and that it may be difficult to install the CFA piles. The auger may be fouled by items buried in the landfill or it may become entangled and lost within the fill layer. Another concern is the potential loss of grout during the CFA operation due to grout escaping into pockets within the fill materials. The specialist piling contractor will need to check and control this issue.

The Ground floor slab will be a suspended reinforced concrete slab consisting of 1600mm wide band beams running predominately in an east – west (EW) direction with one way slabs spanning onto the band beams in the north – south (NS) direction. The slab will be supported by the piles founded on the bedrock below. The level of the Ground Floor slab has been raised to sit slightly above natural ground level along Olympic Boulevard. The Ground Floor slab levels match the current natural ground levels on the eastern frontage (rear of the site). These levels have been selected in order to minimise the required removal of the contaminated fill.



The structure of the northern podium consists of one way post tension 1600mm wide band beams running predominately in an EW direction with one way slabs spanning onto the band beams in the NS direction. The depth of the beams is typically 380mm in carpark levels, 400mm deep in the office levels and 500-600mm deep for the roof level. This level supports landscaping including deep soil planting. A number of transfers are required at Level 8 in order to accommodate the change in the roof floor plate outline. These transfer beams pick up loads from one floor only, namely the landscaped roof.

The structural system used to resist lateral loads acting on the northern podium consists of ordinary moment resisting frames in the EW direction and shear walls around the stair core on the southern side. The moment resisting frames comprise the band beams acting in combination with the concrete columns. Given the height and plan dimensions of the northern podium the critical lateral load will be earthquake.

The structure of the southern podium consists of one way post tension 1600mm wide band beams running in an EW direction to the west of the core and in a NS direction to the east of the core. One way post tensioned slabs run perpendicular to the band beams and are supported by the band beams. The depth of the beams is typically 380mm in carpark levels, and 500-600mm deep for the roof level. This level supports landscaping including deep soil planting.

The residential tower structure sits on top of the southern podium. A number of large transfer beams are required at Level 7 in order to change the residential column layout into a column layout that is suitable for the carpark levels. These transfer beams pick up loads from approximately 32 residential floors. The transfer beam depths are 1300mm to 1400mm deep.

The tower floors are designed as post tensioned concrete flat plates, with set downs to wet areas and balconies. They are generally 220mm thick.

The structural system used to resist lateral loads acting on the southern podium and tower consists of shear walls around the stair core and lift core with additional shear walls in the podium levels. Given the height of the tower the critical lateral load will be wind. A wind tunnel test will be undertaken and the results will be used to design the core walls and shear walls in this portion of the building.

The preliminary structural system described in this report has been sized using statutory loadings as set out in AS/NZS1170.0:2002, AS/NZS1170.1:2002, AS/NZS1170.2:2011 and AS/NZS1170.4:2007. From the information we have received to date we believe that there is no impediment to the structure complying with the relevant structural clauses of the National Construction Code (NCC) 2015 Volume One, Part B.

The above report describes the structural system for the proposed development at Site 9, Sydney Olympic Park. Please contact the undersigned if further information is required.

Yours sincerely

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