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Dear Sir

RE: 100 Mount Street, North Sydney - Assessment of impact of proposed commercial development on CBD Rail Link

1. Introduction

This letter report presents an interim assessment of potential geotechnical and tunnelling related constraints associated with construction of the proposed 100 Mount Street development in close proximity to the future CBD Rail Link Mount Street station. This letter report is updated from an earlier study undertaken in 2009 by Parsons Brinckerhoff in relation to the same matter.

This revised assessment is based on details of proposed CBDRL tunnel alignment and Mount Street station arrangement as provided by RailCorp in 2009. Parsons Brinckerhoff, on behalf of Laing O'Rourke, is presently seeking updated design details for the CBDRL development from RailCorp. We are presently not aware of any changes to the proposed CBDRL arrangement nor of any changes to proposed project corridor protection zones since 2009. Parsons Brinckerhoff is also seeking information from RailCorp in relation to expected construction and operational vibration limits associated with CBDRL, in order to support design of mitigation measures to address this issue.

2. Development details

Proposed foundation details of the 100 Mount Street development have changed since this initial study with key changes including:

- Presently proposed B5 basement excavation down to finished floor level of approximately RL 36.75m with a half-basement down to FFL33.75m on the northern side of the development site. The preliminary assessment of potential impacts conducted by PB in 2009 was based on a basement finished elevation of approximately RL38m.
- A two-way ramp proposed at the south-eastern corner of the development site to connect between B5 and B6 basements.

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- Changes in column loads and positions with southern-most columns now set back approximately 6.5 metres from the southern (Mount Street) boundary of the site.
- Lift core located on the western boundary of the development site.

With respect to the 100 Mount Street development, key relevant aspects of the 2009 CBDRL design drawings and associated project exclusion zones include:

- Proposed mined cavern station under Mount Street with design track elevation at RL17.75m.
- Nominal station cavern length of 210m aligned approximately E-W under and parallel to Mount St.
- Nominal station cavern width of 20 metres and height of 7.2m above track level (station cavern design crown elevation = RL24.95m) as shown in Fig 1.
- 70m long "Paid Concourse Area" located above the eastern end of the station cavern and having a design width of 22 metres and crown height of 12.2 metres above design track elevation (Concourse cavern design crown elevation = RL29.95m) (Ref Fig 1)
- A 12m long transition zone (escalator access) between the paid concourse and station cavern areas over which the roof grades from RL29.95m to RL24.95m. This transition is located immediately west of the Mount Street/Walker Street intersection.
- An approximately 30m long pedestrian concourse (6m wide by 5m high) extending north from the station under Walker Street with crown level at approximately RL24.95m.

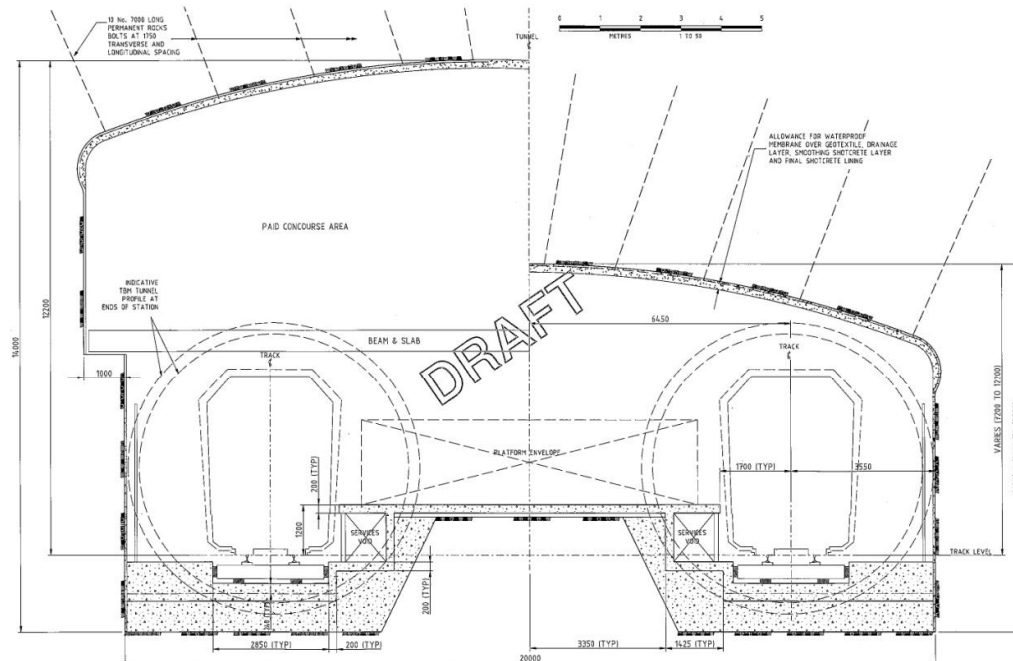


Figure 1: Proposed CBDRL Mount Street Station cross section (per Halcrow drwg TTSRCP-602, Vers 3)

Halcrow drawing TTSRCP-603 (Vers 2) presents the proposed protection reserves around the Mount Street station cavern. A modified extract of this drawing is included in Figure 2.

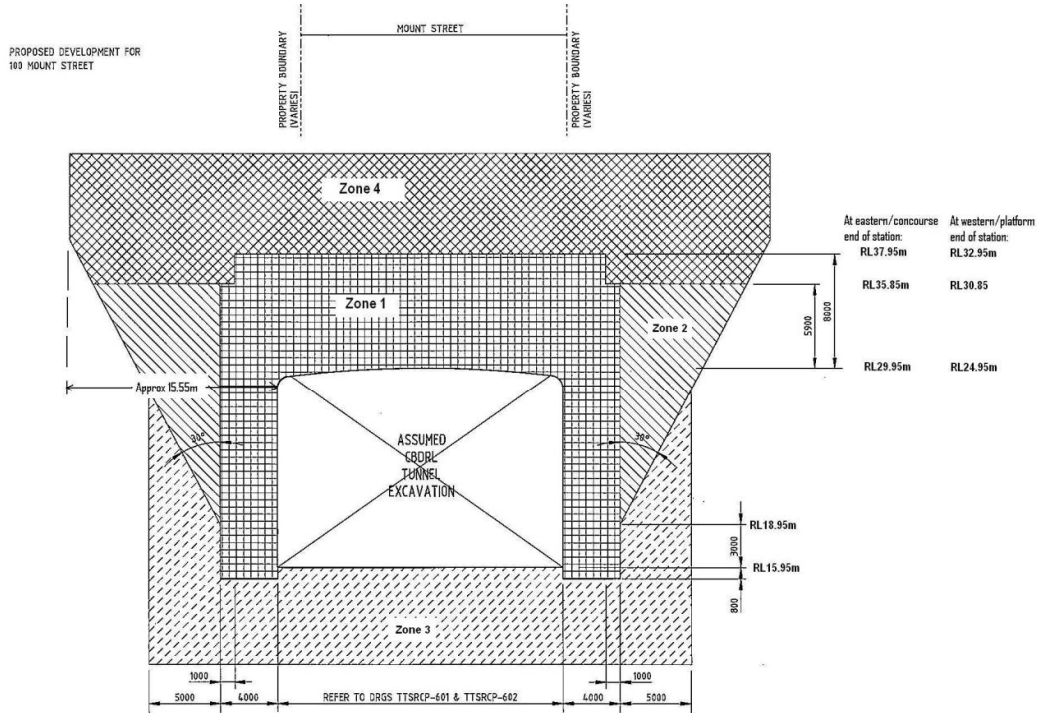


Figure 2: Proposed protection zones for CBDRL Mount Street station cavern (modified from Halcrow Drawing TTSRCP-603, Vers 2)

The general loading requirements specified in RailCorp documentation for Zones 1 to 4 are as follows:

- Zone 1 – Excavation, structures or loading directly applied to rock mass not permitted in this zone. Horizontal loading effects from structures outside Zone 1 shall be modelled and designed so as not to have a significant negative impact on the assumed CBDRL tunnel excavation such as overstressing or instability of rock between basement excavation and CBDRL excavation.
- Zone 2 – Foundations applying vertical load directly to rock mass are not permitted in this zone. Excavation and construction of structures permitted but must avoid deterioration of rock structure in adjacent rock mass.
- Zone 3 – Vertical downwards load from structures permitted. Vertical upwards loads (and components thereof) to be designed to allow for removal of rock mass in assumed CBDRL tunnel excavation zone.
- Zone 4 – Loading to be modelled and designed so as not to cause a significant negative impact on the assumed CBDRL tunnel excavation such as overstressing of the rock or instability between the basement and assumed tunnel.

3. Interaction with CDRL development and exclusion zones

Based on the proposed development details and corridor protection zones described above, the following comments are offered in relation to expected interaction between these two developments:

- Zone 1:
 - Protection zones around the Paid Concourse are such that the easternmost approximately 5-10 metres of the basement excavation (for basement level B5 and the ramp to B6) along the Mount Street boundary may encroach upon Zone 1. This is based on a tunnel centreline presently positioned approximately 10 metres south of the Mount Street property boundary which needs to be confirmed in further consultation with RailCorp.
 - Protection zones around the Platform Concourse are such that the basement excavation along the remainder of the Mount Street boundary is not expected to encroach upon Zone 1.
- Zone 2:
 - Ramp excavation between basements B5 and B6 may encroach on Zone 2 based on a tunnel centreline approximately 10m south of the Mount Street property boundary.
 - A proposed footing in the south-eastern corner of basement B6 is likely to encroach on Zone 2, based on a tunnel centreline approximately 10m south of the Mount Street property boundary.
- Zone 3:
 - No proposed basement excavations are expected to encroach on Zone 3.
 - Further examination of anchors and foundations subject to uplift will be required at later stages of design development in order to demonstrate compliance with Zone 3 requirements.
- Zone 4:
 - Basement excavation on the southern boundary of the site is expected to encroach into Zone 4 from ground surface down to top of Zone 4 (typically at RL37.95m over most of the Mount St boundary). This vertical encroachment extends approximately 15 metres in from the Mount St property boundary.

4. Further work

Further studies would be required to confirm aspects of this interim assessment including:

- Discussions with RailCorp to confirm latest proposed CBDRL layout and alignment and in particular the horizontal alignment of the proposed station centreline and required exclusion zones.
- Intrusive geotechnical investigations to confirm assumed geotechnical conditions at basement founding level and tunnel crown level.
- Numerical modelling of excavations to assess likely stress and displacement effects associated with the basement excavation and potential implications for future station cavern excavation.
- Groundwater studies and potential changes to groundwater regime associated with both excavations.

- Studies of proposed foundation and anchor loads (including uplift) in 100 Mount Street basement to assess potential interaction between the two developments.
- Vibration studies to assess peak accelerations at basement level and potential mitigation measures that may be needed to address this issue.

5. Closing

Based on available information, the following conclusions and recommendations are made:

- The proposed CBDRL is in concept design phase. Basement excavation at 100 Mount Street can be expected to result in minor changes to existing ground stress, groundwater regime and deformation in the ground around the proposed cavern. Further analysis of these likely impacts is required.
- The proposed basement excavation likely extends into proposed protection Zones 1, 2 and 4 around the Paid Concourse area of CBDRL at Mount Street station, and into Zone 4 along the southern boundary of the site adjacent to the station cavern area.
- The assumed setout details and separation distances between the developments are based on available information and latest CBDRL setout should be confirmed by RailCorp.
- Detailed analysis of the effects of uniform and non-uniform foundation loads (including any anchor or uplift loads) would be recommended for elements within the defined protection zones.
- Intrusive site investigations and numerical modelling are recommended to assess likely ground deformation and settlement interaction between the proposed CBDRL station cavern and the basement excavation for 100 Mount Street development.

This report provides initial comments in relation to potential interaction between the CBDRL and 100 Mount Street developments. There is recognition of the need for further analysis and liaison with RailCorp to more accurately assess interaction, and ultimately provide a basis for obtaining RailCorp's non-objection to the proposed development.

6. Limitations

This report has been prepared on behalf of Laing O'Rourke to address specific project requirements. By necessity, this report has been limited to a conceptual assessment of the geotechnical constraints associated with development in close proximity to the proposed Mount Street CBDRL station. Further assessment of these issues would be required at later stages of project development.

Yours faithfully



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