183 Macquarie St Parramatta : Joint Statement from M+G Structural Engineers and EI Australia Geo-tech Engineer prepared for submission to TfNSW June 11 2024

	TfNSW Comments	M+G Response	EIA Response
1	This report is based on architectural concept level drawings only, with no input or verification by the project structural engineers.	M+G was involved in June 2023 to assist with the geotechnical modelling by EIA, and provided the initial structural input for the purposes of modelling (first attachment). Based on our experience with the basements in Parramatta, and based on the geotechnical report (indicating firm-to-stiff clays over shale), and considering a single-level basement with excavation of 3m approximately, 400dia soldier piles were recommended at 1.5m c/c, to be verified by the analysis.	As per M+G response
2	Details of allowance for accidental over excavation or reduction in passive resistance at the base of the excavation.	We are able to control such issues with appropriate hold points in our documentation. However, we would concur that it would be prudent to consider some over-excavation regardless.	EI has conducted a sensitivity analysis due to an over excavation. EI has allowed up to 0.5m below the BEL for over excavation.
3	Ground water levels assumed are (RL 2.0m ADH) inconsistent with the geotechnical report (Geotechnical Investigation 183 Macquarie Street, Paramatta NSW, dated 7 October 2022) which recommends a ground water level (RL 3.0m AHD) to account for seasonal variation. Furthermore, a more rigorous assessment of groundwater levels will be required for detailed design of the retention. This should be based on long term groundwater level monitoring to assess fluctuations in groundwater level with climatic conditions and consideration of accidental groundwater levels for other reasons due for example a failed service should also be assessed in line with WaterNSW requirements/guidance.	Measurements of ground water indicate seepage rather than permanent ground water (an aquifer). Any measurements are well below the BEL. Even if GW was to rise temporarily (and significantly), while the wall is unsupported along the top there would be no hydrostatic pressure on it (the water would simply enter the excavation). Therefore, in our view the ground water levels are not pertinent to this modelling and assessment.	The additional groundwater monitoring report, with reference no. E2770.G11.01 (Dated 12 October 2023), has been attached as Appendix B of new revision FEA report (Ref. No.E25770.G06_Rev1). Further response can be found in section 2.1.3 of the new revision FEA report. Based on the groundwater monitoring, we believe the assuemd groundwater level RL 2.0 AHD is appropriate.
4	The impacts of in situ stress relief have not been considered or commented on.	[geotechnical]	Referred to section 2.1.2 (Horizontal In-Situ Stress Release) of E25770.G06_Rev1.
5	Structural inputs will need to be verified by the project structural engineer and match those on the structural drawings. There is no consideration of the structural adequacy of the shoring. The Structural engineer will need to confirm / comment on the permanent propping arrangement and assumptions.	We have reviewed the results of the geotechnical modelling and confirm that the initially assumed shoring wall (400dia piles at 1.5m c/c) does work structurally, without anchors or propping, and based on the conservative 2D analysis.	Structural inputs have been checked by M+G
6	The modelled displacements are likely to be acceptable in terms of impact on track geometry. This would need to be confirmed by a dilapidation survey and rail alignment survey prior to and post construction to determine acceptable and resultant deviation from top, alignment and twist. Future modelling reports should present predicted differential vertical and horizontal displacements both longitudinally and between tracks for comparison to relevant track geometry limits.	If the design displacement are acceptable, than the modelling and assessment have fulfilled their purpose. Further appropriate actions would be monitoring during construction.	The predicted differential settlement of the asset can be seen in table 3-2 of the new revision of the FEA report.
7	As per Section 14.3.2 of T HR CI 12090 ST, a structural assessment of likely effects of displacements and stresses on the existing rail track slab needs to be provided. Certification that the proposed development will produce no adverse effects on the existing rail track slab needs to be provided.	In our view the estimated lateral and vertical displacements are very modest and will have negligible impact on the rail track slab.	As per M+G response
8	Justification of adopted vertical loading is to be provided.	We have reviewed the vertical surcharge load applied in the model, being 10kPa for the footpath area and 36.5kPa for the Light Rail traffic, and in our opinion the allowed surcharge loads are suitable.	As per M+G response
9	There is discrepancy between the shoring system recommended in the geotechnical report (Geotechnical Investigation 183 Macquarie Street, Paramatta NSW, dated 7 October 2022), which suggested an anchored or propped wall as compared to a temporary cantilevered wall which has been adopted in the analysis. Cantilevered walls are generally associated with larger movements This needs to be justified by the developer to justify their decision to move away from a propped system.	The geotechnical investigation report does mention anchored or propped shoring walls, however, it also states that a suitable retention system would be a soldier pile wall, and that anchors/props may be required refer second attachment). As mentioned above, our structural recommendation was to adopt cantilevered piles for the initial assessment, which should verify its feasibility. This has now been confirmed by the modelling.	The geotechnical investigation report states that anchors/props MAY be required for additioanl lateral restraint if necessary. The analysis shows that the cantilevered system with a deep socket length below BEL is feasible. Hence, from a geotechncial engineering perspective EI is of the opinion that the cantilevered wall is feasible. We also note that the revised model has reduced the total deflections of the shoring wall, further proving the feasibility of the cantilevered wall design. The reduction in deflection is due to optimization of the adopted parameters of the subsurface and shoring wall from the original parameters, which were too conservative. We considered the following aspects: 1. EI categorized the quality of the bedrock in more details as class V, IV, and III/II shales, rather than as very low to high strength shales. 2. EI optimized the parameters of the bedrock according to Bertuzzi (2014), following the new classification system mentioned in point 1 above. 3. EI increased the adopted compressive strength of concrete (f'c) to be 50 MPa (previously was 40MPa), this modification increased the EI/L and EA/L of the adopted parameters for PLAXIS modelling.

and Zlatko Gashi for M+G

prepared by Stephen Kim for EI Australia