

11 August 2016

**Best Hooper Pty Ltd**

Level 9, 451 Little Bourke Street  
Melbourne Victoria 3008

Attention: Joel Snyder

Dear Joel,

## **MELBOURNE METRO RAIL PROJECT - WESTIN RESIDENTIAL APARTMENTS**

4D Workshop Pty Ltd has been engaged by Best Hooper Pty Ltd, on behalf of Owners Corporation 3 on Plan of Subdivision PS428405M (Owners Corporation 3) and the owners of the Westin Residential Apartments (WRA), to review relevant aspects of the Environmental Effects Statement (EES) for the Melbourne Metro Rail Project (MMRP), in relation to potential implications of the MMRP on the structure of the Westin building and the adjacent City Square Car Park.

The Westin is located in Precinct 6 of the MMRP and will be directly affected by construction of the CBD South Station, beneath the existing City Square. This report is ostensibly limited to commentary on potential implications of the construction of the CBD South Station on the existing structure of the Westin building, based upon relevant information presented in the EES.

### **4D WORKSHOP PTY LTD**

4D Workshop Pty Ltd is a consulting structural engineering practice located at Ground Floor, 164 Flinders Lane, Melbourne.

4D Workshop provides structural design, documentation, construction phase and advisory services on a broad range of commercial and institutional building projects.

This report has been prepared by:

Company:	4D Workshop Pty Ltd
Author:	David Doolan, director of 4D Workshop.
Position:	Director.
Qualifications:	Bachelor of Engineering (Civil); CPEng; Registered Building Practitioner.
Area of Expertise:	Structural engineering.

### **THE WESTIN BUILDING - OVERVIEW**

The Westin building is located on the site at 201 Collins St, Melbourne, which is bound by Collins Street to the north, Flinders Lane to the south, the Regent Theatre to the east and the City Square to the west.

The Westin comprises a twelve storey hotel and residential apartment building, above a common ground plane podium, integrated with the City Square, and a three-level basement carpark that extends beneath both the Westin and the City Square. WRA are located on levels 8 to 12 of the Westin building.

The basement carpark beneath the Westin and City Square comprises private car parking for the Westin Hotel and WRA in the area beneath the Westin ("eastern half"), and a public commercial carpark operated by the Melbourne City Council (MCC Carpark) in the area beneath the City Square ("western half"). The carpark areas are accessed by a common vehicle entry off Flinders Lane that also serves the hotel loading dock, and common circulation ramps.

## EXISTING CARPARK STRUCTURE

The existing carpark structure was constructed in the late nineties and is described by structural documentation prepared by Bonacci Winward consulting engineers. It comprises:

- A perimeter retaining wall system, along the Collins St, flinders Lane, Regent Theatre and Swanston St (western edge of the City Square) boundaries, of reinforced concrete piles and reinforced concrete infill walls.
- Foundations predominantly comprise reinforced concrete pad footings, founded in natural weathered Siltstone material, immediately below the lowest carpark level (Basement 3).
- Reinforced concrete columns and walls (lift and stair shafts).
- A reinforced concrete Basement 3 slab on ground.
- Suspended reinforced concrete Basement 1 & 2 slabs.
- A suspended reinforced concrete Ground Floor slab, with the Westin lobby on the eastern half and the landscaped City Square on the western half.

The reinforced concrete Westin building extends above the eastern half of the carpark / podium.

## MMRP EES – REVIEW OF RELEVANT DOCUMENTATION

The EES is a substantial document, of numerous volumes and appendices containing a broad range of information describing the proposed MMRP and associated processes and provisions.

The EES comprises predominantly descriptive narrative of a generic nature, but little in the way of specific technical detail in relation to proposed designs and construction methodology.

The CBD South Station appears to be located approximately 15-35m below the City Square. General reference is made throughout the EES to “cavern” construction for the station. We were unable to find any detailed information with respect to proposed designs or methodology for the station entrances, located immediately adjacent to the Westin building and carpark, only general reference to “soldier piles or similar retaining walls”.

## CBD SOUTH STATION - POTENTIAL IMPLICATIONS ON THE WESTIN BUILDING STRUCTURE

We understand from the EES that the development process for the CBD south Station includes temporary occupation of the City Square for the duration of the construction works and permanent acquisition of the MCC Carpark below the City Square, as the site for the new underground station.

It follows that construction of the CBD South Station is likely to involve demolition of the portion of the existing basement carpark beneath the City Square, with potentially significant implications on the structure of the Westin building, which is located immediately adjacent to the station site and, in the case of the ground plane and basement slabs, was constructed integrally with the structure to be demolished.

Primary concerns in relation to potential implications of the MMRP on the Westin building structure include:

### 1. Compromise of existing lateral restraint to basement retaining walls.

The perimeter site retention system for the existing basement relies upon the basement and ground plane slabs to provide permanent lateral restraint to the perimeter retaining walls. That is, the slabs act as compression elements to prop the retaining walls and transfer / strut lateral earth pressures across the excavation.

We assume that construction of the station entry will involve demolition of the western half of the existing basement structure. This may potentially result in out of balance lateral earth pressure actions and, unless supplementary structure is provided to resist forces currently carried by the (entire) basement floor structures that are to be demolished, may result in significant changes to loads imposed on the existing lateral stability structure.

It should also be noted that the existing eastern retaining wall, on the boundary shared with the Regent Theatre, was designed to resist significant lateral loads due to surcharge from the immediately adjacent

Regent Theatre structure, and that changes to the structure providing permanent lateral restraint to this wall could lead to increased lateral movements and potential for cracking to the relatively brittle Regent structure and (masonry) facade.

The potential “imbalance” in lateral forces due to demolition of the western half of the basement is unlikely to have been contemplated in the original structural design and warrants careful consideration with respect to potential adverse impacts on existing structure, in the context of the proposed design solutions and construction methodology for the station entrance.

## 2. Undermining of existing foundations.

Existing foundations supporting the eastern edge of the Westin building are located immediately adjacent to the proposed CBD South Station entry structure. Given that the proposed base level of the station is significantly lower than the existing (lowest) Basement 3 and the Westin building is supported on relatively shallow foundations, there is potential for undermining of the existing foundations by construction works for the proposed station entry structure. Careful consideration should be given to implementation of appropriate site retention solutions, to ensure that existing foundations are not undermined or subject to unacceptable settlement.

## 3. Ground movement – general.

Chapter 19 and Appendix P of the EES refer to potential risks to adjacent buildings due to ground movement associated with the MMRP works. Such references are generic and focus primarily on assessment methodology and criteria, rather than providing definitive advice in relation to anticipated ground movements in the context of proposed construction details and methodology.

There are numerous references to estimations of “minor” impacts to building structures in the vicinity of the MMRP works, however such references seem to generally relate to tunnelling / boring works, rather than to more conventional excavation methodology anticipated for the station entrance structures, which are likely to be more relevant to the Westin. We were unable to find any specific or definitive reference to anticipated ground movements relevant to the Westin and it is difficult to make such assessment in the absence of relevant detailed design and construction methodology information.

## Other potential implications

The primary focus of this report is potential structural impacts of the proposed MMRP works on the existing Westin building structure, however we briefly highlight other relevant criteria that should, in our view, also be the subject of careful consideration.

- Functionality of the existing carpark: Occupation of the City Square and partial acquisition of the basement carpark will have a significant impact on the functionality of the existing carpark. It is not clear from the EES how operation of the existing Hotel and WRA car parking facilities will be addressed, during and after construction, in the context of removal of access to common circulation ramps and aisles located within the de-commissioned western half of the carpark. It is anticipated that proposals to re-configure the eastern half of the carpark to reinstate this access will significantly reduce useable area and may not be viable.
- Noise and vibration.
- Detrimental impacts on amenity of occupants.

## **SUMMARY**

Based upon our review of selected sections of the EES, it would appear that, at this stage, information on the proposed design and construction methodology for the CBD south Station, of primary relevance to the existing Westin building, is of a generic nature and does not extend to detailed resolution.

Therefore, in our opinion, the EES is insufficient to facilitate a meaningful assessment of potential implications of the proposed works on the structure of the Westin Building and integrated City Square carpark and podium.

We recommend that further detailed information, suitable to facilitate such an assessment, should be requested from Melbourne Metro, and that additional information provided should include, as a minimum, specific and detailed technical information on how the following key issues are to be adequately addressed:

1. Lateral restraint to existing Westin / MCC Carpark basement retaining walls.
2. Undermining of existing Westin foundations.
3. Anticipated ground movements and associated risk assessments.

It is not clear from the EES as to whether provisions for adjoining asset holders to undertake independent technical review of the proposed works, through Protection Works Notice processes provided under the Building Act, are applicable for the MMRP.

In our view, information provided by Melbourne Metro to should include, without being limited to:

- Detailed engineering drawings and technical specifications for proposed demolition of the existing City Square carpark and ground plane structure.
- Detailed engineering drawings and technical specifications for the proposed MMRP works, specifically construction of the CBD South Station entry structures.
- Associated construction methodology and sequencing / staging information.
- A detailed Construction Management Plan.
- Detailed architectural and engineering drawings for proposed modifications to reinstate functionality of the retained existing basement carpark.

The information provided should be sufficient to facilitate a meaningful independent review of aspects of the proposed MMRP relevant to the Westin building and assessment of associated implications on the building structure in both temporary (construction) and final conditions.

We hope that this information is of assistance. Please do not hesitate to contact the undersigned if further clarification is required.

#### **DECLARATION**

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'David Doolan', is written over a light blue rectangular background.

David Doolan \_Director

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