NORTHROP

HYDRAULIC REPORT

Beverly hills Town Centre – APA Gas Report

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Hydraulic Report

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1. General

Northrop Consulting Engineers Pty. Ltd. (Northrop) was engaged to provide a desktop investigation and summary of existing gas services relating to the proposed development at Beverly hills Town Centre – APA Gas Report . The proposed development will impact 52 continuous allotments covering area of 16,073m² and is located within the Georges River Local Government Area (LGA). This desktop review will be used to highlight potential impacts and considerations that are currently present.

The existing gas main is owned and operated by APA Pty Ltd. This pipe is part of the Moomba- Sydney pipeline. A bi-directional gas pipe which is used to transport both natural gas and ethane.

The pipework which is affected in this report travels to Botany Bay, NSW and is responsible for carrying ethane gas for industrial purposes.

Northrop has contracted APA Group for information that is present in this report. This high-level consultation has provided us with basic information regarding the size and depth of the gas main. Correspondence was provided through emails and telephone conversations.

Figure 1-1 Proposed development site with route of gas line

2. Proposed Development

The proposed concept design shows a full re-development to the exisitng Beverly Hills Town Center, into mixed development high rise. The subject site in question is the north-block is located at 407 King Georges rd, Beverly Hills is will be renovated and rebuilt with a 50m tall mixed use building. This building will be the closest and largest to be constructed adjacent to the main.

Due to the size of the proposed building, foundation and footing sizes will be required as part of the engineering works. While the current gas line easement adjacent to the proposed property is outside the construction zone. However, the zone of influence will be impacted due to the construction of basements, footings and piers.

Subsequently, large and extensive excavation works in close proximity to the gas main will be required during the construction phase for the proposed north block. These works may damage the pipework due to over excavation, or land slippage if shoring is not provided during excavation. Additionally, geotechnical and flood reports will also have impact on the size and type of structure. This also included proposed vibrations impacts of piling, vehicle and machinary movements.

Figure 2 Concept design of the redevelopment with gas main overlay.

2.1 Existing Gas Line and APA Requirements

The current gas line is located adjacent to the rail corridor in Beverly Hills, NSW. The ethane gas main is owned and operated by APA Group Pty Ltd and is currently installed with a 6-metre easement which runs parallel along the rail corridor. Preliminary desktop investigations show that this gas main is a DN200 steel main and can achieve pressures from 1050kPa to 10,000kPa. The main is on average approximately 0.9 – 1.2m deep. However, this may be up to 1.8m deep when installed along a rail corridor. Pipework installed along the rail corridor is generally installed with concrete protection slabs over the top.

Ethane is a flammable gas that has similar characteristics to that of Natural Gas, however it is predominately used in industrial processes, mainly in the production of plastics and detergents, as opposed to being used as a heating gas. Damage to this pipe during construction will cause significant ramifications to those on site and in surrounding areas.

All proposed works within the vinicity of this gas main and easement, require written concent and confirmation from APA Group Pty Ltd. This includes information such as:

- Details and specification of any earthworks proposed on the easement/pipeline area
- A professionally prepared landscape plan by a qualified landscape architect
- Planting plan and schedule showing species, quantities, size when installed, mature size, height, canopy, and root ball sizes
- Likely timing of works.

Any developments that could affect the access or maintenance of this pipeline. For development within 600m of the pipeline, APA requests that the NSW Dept Planning, Councils and Developers engage with APA in the early design stages particularly where there is an to be an increase in sensitive uses, ie schools, childcare, aged care, buildings with 5 or more stories.

The existing gas main must be located through non-destructive digging techniques such as electronical location technology and wet-vac truck digging. These works must be conducted under APA's guidance and approval. Current DBYD information is to be obtained from both designers and contractors. Exact locations of the main are to be confirmed by APA Group, these cannot be assumed or be measured from DBYD information.

This gas main has already had noticeable impact on other developments within the local area. The proposed Beverly Hills Commuter Car Park development was required to have a structural set back of at least 3m or more from the gas main. We note that the proposed works at 407 King Georges rd will require a similar or greater set back.
This construction set back was done in consultation to APA Group under their national construction guidelines. These guidelines show clear examples of exclusion zones from pipework and easements to ensure complaint and safe building design.

Figure 3 - Proposed development of Beverly Hills Community Car Park

The zone of influence of the pipework must also be adhered to, an example of this is provided in the screenshot below.

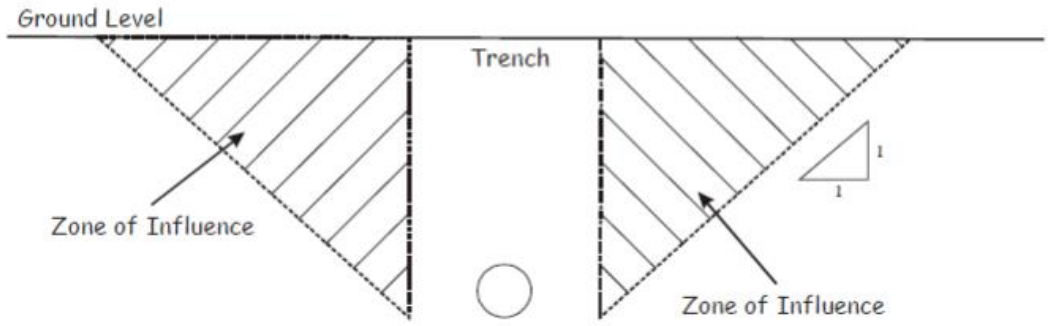

Figure 4 - Zone of influence

Figure 5 – 6m Easement adjacent to railway corridor

2.2 Considerations and further works

APA Group Pty Ltd is to be considered and available to provide consultation at each key design phase. This collaboration will ensure that the proposed building is designed and constructed safely adjacent to the gas main. Approval shall also be sort from the Georges River Local Government Area.

Additional construction and site investigation costs may also be reduced if the building set back of the mixed residential building is moved away from the gas main. This change will remove foundations away from the zone of influence. Building elements such as a central courtyard / extension of public domain would be seen as favorable and would reduce the likely hood of causing impact to the main and ensure adequate access is available for maintenance.

Design documentation from structural engineers and landscape architects that is within this range is to be passed onto APA. Any buildings that include sensitive areas like schools, childcare facilities, aged care facilities, or buildings with five or more stories should also be passed on to APA Group for review and assessment.

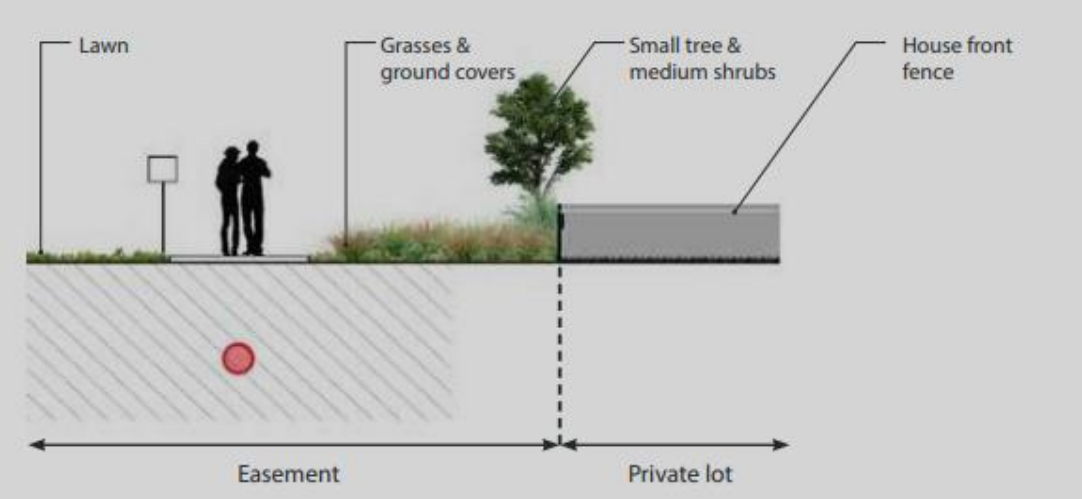

Figure 6 - Typical sections provided by APA Group


Beverly Hills Station
King Georges Rd
Moomba - Sydney Ethane Pipeline - Active
Morgan St
A3
GEORGES RIVER COUNCIL
423
King Georges Rd
423
Edgbaston Rd
2