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29 August 2025

SY171708-18_B01

Stockland Corp. Ltd
Maud Garnier
Level 26, 133 Castlereagh Street
Sydney NSW 2000

Dear Maud,

Re: Macquarie Park Stage 2 – “Building E” SSDA (SSD – 63235720) – Response to Flooding Related Request for Information

Northrop Consulting Engineers have been engaged by Stockland Corp. Ltd. to prepare a Flood Impact and Risk Assessment (FIRA) for the proposed “Building H” Data Centre located at 1-5 Khartoum Road, Macquarie Park (REF: SSD - 63235720).

Following submission of the updated Flood Impact and Risk Assessment, dated the 23rd of June 2025 (Revision C), herein referred to as “*the FIRA (Northrop, 2025)*”, an additional flood related Request for Further Information (RFI) has been received from Ryde City Council (REF: COR2025/146/3) dated 22nd of July 2025, herein referred to as Council's RFI (CoR, July 2025).

Following receipt of Council's RFI (CoR, July 2025), a meeting was held on the 25th of August 2025, which included representatives from Ryde City Council and the applicant (i.e. Stockland and their flood consultant, Northrop). During the meeting Council requested the applicant provide further information including a sensitivity test with respect to pit blockage in Talavera Road.

The purpose of this correspondence is to summarise the flood related RFI, provide a response to each query and present the findings of the sensitivity test.

		Date
Prepared by	LG	29/08/2025

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Response to City of Ryde Request for Further Information

Presented in the below **Table 1** are the flood related Request for Further Information items presented in the City of Ryde Council RFI (COR, July 2025) along with a response to their query.

Table 1 – City of Ryde Council Request for Information and Response

Request for Further Information City of Ryde Council RFI (COR, July 2025)	Northop Response (29/08/2025)
Pre- and post-development flood maps have not been included in the updated report. Only the post-development scenario is shown. Without both sets of maps, a comparative assessment of changes to flood behaviour resulting from the proposed development cannot be undertaken.	As discussed in the meeting on the 25th of August 2025, under the approved existing case conditions (REF: SSD – 24299707-Mod-1), the subject site is generally flood free and as such, the proposed development is not expected re-direct or remove flood storage from the existing overland flow path. As the development is not expected to change existing case flood behaviour, the results presented in the FIRA (Northrop, 2025) represents both the existing and developed case scenarios. As no change to the existing flow regime are expected, the proposed development is not expected create a significant adverse flood impact in adjacent properties. Please refer to the Flood Effects section of the the FIRA (Northrop, 2025) for further information.
The afflux maps are not included in the updated flood study report. These are essential to evaluate changes in flood levels and potential adverse impacts to surrounding land and infrastructure.	With reference to the above, afflux maps have not been provided as existing flood behaviour is not expected to change as a result of the proposed development. Please refer to the Flood Effects section of the the FIRA (Northrop, 2025) for further information.
In the absence of pre-/post-development flood mapping, there is no evidence-based justification provided for Council to assess whether the proposed development results in adverse flood impacts or not.	Please refer to the above comments.

Electronic copy of modelling results for pre and post development scenario for velocity, depth, flood level, VxD and VxD afflux, flood level afflux for 1% AEP and PMF in .asc format were requested to be submitted to Council for further assessment. The currently submitted model results only include the existing scenario, which is insufficient.

Flood model files have been provided as part of a previous response to Council's RFI.

Only one scenario has been provided as the flood behaviour does not change between the existing and developed case scenarios.

Existing Flooding conditions:

Council notes that the existing flood depth along the Talavera Road frontage of the site reaches nearly 1.0 m in the 1 % AEP event and 2m for PMF event , as identified by Northrop in the first submission of flood study report dated 23 January 2025 and also per Council database...

...The below figures are from the June 2025 Flood study that shows the site is PMF free however demonstrates adverse increased flood on adjoining sites & possibly Talavera Road.

The flood modelling presented in the January version of the Flood Report (i.e. Revision B) was prepared prior to approval of the Modification for 17-23 Talavera Road (REF: SSD – 24299707-Mod-1). Since the preparation of Revision B of the report, the Modification for 17-23 Talavera Road (REF: SSD – 24299707-Mod-1) has been approved.

Following approval of the development at 17-23 Talavera Road, the existing case flood behaviour for the subject site is based on the approved developed case scenario for 17-23 Talavera Road (REF: SSD – 24299707-Mod-1). This scenario renders the subject site generally flood free during both the 1% AEP and PMF design storm events.

As the site no longer experiences overland flow, the proposed development is not expected re-direct or remove flood storage and therefore is not expected to create a significant adverse flood impact.

Please refer to the latest version the FIRA (Northrop, 2025) for further information.

Figure 4 shows that In Northrop's Report dated January 2025, the site was affected by PMF, however when compared to their Report Dated June 2025 (Figure 6) the site is not longer affected. This flood water appears to have diverted (due to the built form) to adjoining site (17-23 Talavera Road) resulting in adverse flood behaviours. This is unacceptable increase of flood within neighbouring property.

Please refer to the above response.

The site no longer experiences overland flow and therefore the proposed development is not expected to re-direct or remove flood storage and or create a significant adverse flood impact.

Please refer to the latest version the FIRA (Northrop, 2025) for further information.

As result of the above concerns to effectively resolve Council flooding concerns, Council recommends that the upgrading of Council drainage system as previously advise is required. Further details below.

As noted in the FIRA (Northrop, 2025), during the Meeting on 25th of August 2025, and above, the proposed development is not expected to create a significant adverse flood impact within Talavera Road, or elsewhere.

As such, the requirement to upgrade Council's stormwater network is not expected to be required.

Requirement for Drainage Network Upgrade

The existing Council stormwater drainage system along Talavera Road does not have sufficient capacity to convey peak flows during the 1% AEP and PMF events, resulting in a high risk of surcharge at the site frontage.

Without appropriate downstream upgrades, this bottleneck poses a significant hazard in the form of overland flow entering the development, with the potential to disrupt or damage operationally critical infrastructure including generators, cooling towers, telecom/electrical utilities, etc. As such the upgrade of the Talavera Road pipe will ensure the protection of the data centre asset in a flood event, by reducing the bottleneck and reducing risk of the site being inundated with flood waters.

While the upstream drainage system within 17–23 Talavera Road has been upgraded, the absence of corresponding improvements downstream within Talavera Road has created a hydraulic bottleneck directly in front of the site. To reduce the risk of surcharge-related inundation and protect essential infrastructure, Council requires an upgrade to the stormwater drainage system at the site frontage.

Council has undertaken a catchment analysis, demonstrated in Figure 7. The catchment relevant to the pipe is approximately 55 ha. The combined pipe and overland flow at the frontage of the development site reaches approx. 20 m³/s during the 1% AEP event. Given the size of the building envelope and the fact that the PMF flood is diverted to the neighbouring property, the drainage upgrade at the frontage of the property is deemed required.

Accordingly, due to the development impact on flood behaviour outside of the development site drainage upgrade is considered necessary and justified to:

- Reduce the risk of localised surcharge and ponding at the development frontage,
- Improve conveyance and reduce flood depths adjacent to the site,
- Protect high-value and vulnerable infrastructure from inundation,

Following the meeting with Council on the 25th of August, we understand Council's intention for the requirements of the stormwater upgrades relate to:

1. The potential for flood impacts to be created by the development, causing flood levels in Talavera Road to increase; and also
2. The potential for blockage within Talavera Road, increasing flood levels in Talavera Road and raising flood levels around the proposed development.

A response to the potential for flood impacts to be created by the development has been already discussed in the above comments. Please refer to the above for a response to Item 1.

With respect to Item 2 above, a blockage sensitivity test has been performed using the modelling presented in the FIRA (Northrop, 2025).

For the purposes of the sensitivity test, the inlet blockage of the stormwater pits within Talavera Road at the site frontage, were increased to 90% to represent a severe blockage scenario. The results were then compared to the modelling that is already presented in the FIRA (Northrop, 2025). Both the 1% AEP and PMF design storm events were considered for the analysis.

The results of the sensitivity test are presented in Figures 1 and 2 of Attachment 1. During the 1% AEP, Figure 1 shows minor decreases are expected in Talavera Road, across the site frontage and downstream. Similarly, some minor increases are observed upstream of the subject site.

These changes are expected to be the result of upwelling that occurs in Talavera Road during the design blockage scenario for the 1% AEP design storm event. The increased blockage factor applied to the stormwater network in Talavera Road, reduces the quantity of flows that upwell into the street. This reduces the hydraulic capacity of the 2.1m RCP line that runs through 17-23 Talavera Road, forcing additional flows to continue overland, rather than through the pipe.

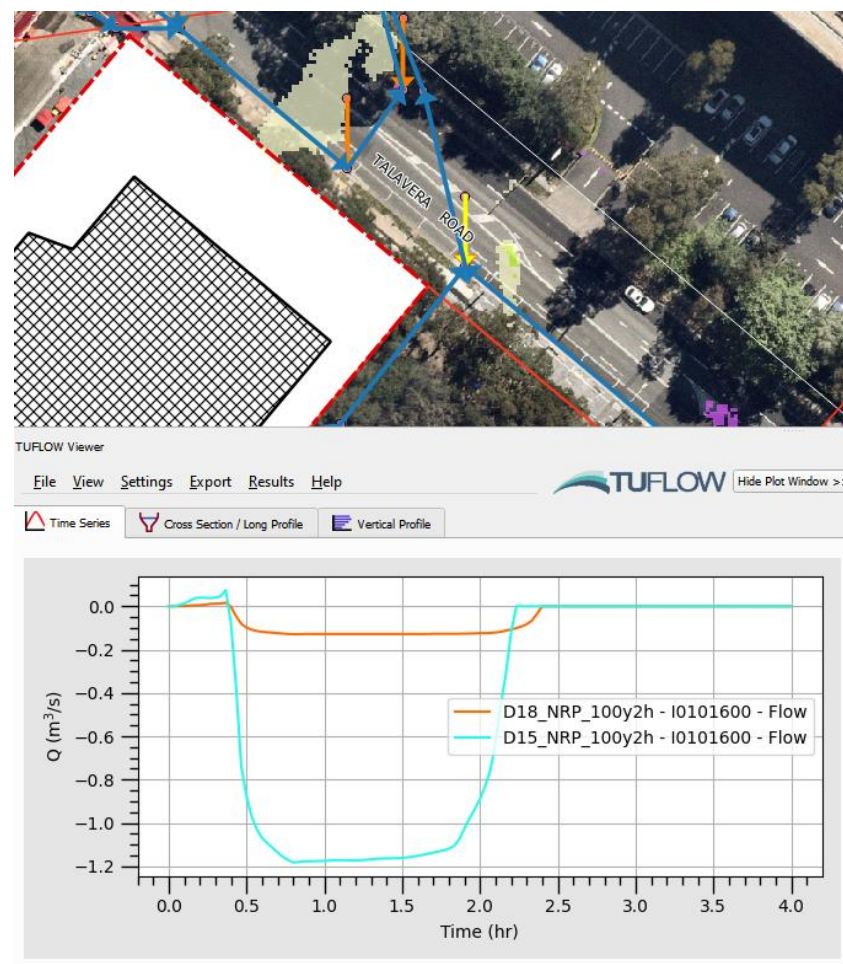
This relationship is demonstrated by the below graph which shows flows discharging from a pit in Talavera Road (i.e. the line highlighted yellow).

- Ensure consistency with the NSW Floodplain Development Manual's flood risk management hierarchy, particularly in protecting critical land uses.

Council notes that Clause 5.21 of the RLEP 2014 applies to the development. Council reiterates that Special Flood Considerations apply to sensitive and hazardous development in areas between the FPA and the PMF and to land that may cause a particular risk to life and other safety considerations that require additional controls. These controls relate to the management of risk to life and the risk of hazardous industry/hazardous storage establishments to the community and the environment in the event of a flood.

Council requests that DPHI seek the applicant prepare civil plans for the upgrade of the Assets previously advised in Council's EIS Submission. Should this not be done, Council will be providing its recommended condition of consent, that requires the upgrade works to be undertaken.

Note that, negative values indicate flows are upwelling and spilling onto the road carriageway, positive values would indicate flows are entering into the below ground stormwater network.



The above figure presents both model Scenarios D15, (i.e. the original model submitted to Council, and presented in the FIRA (Northrop, 2015)) and D18 (i.e. D15 with 90% blockage factor applied). The results show a significant decrease in flows exiting the pit and passing onto Talavera Road for D18 (i.e. severe blockage scenario), thus confirming the hypothesis that less upwelling occurs. This reduction in upwelling results in the minor decrease in flood levels that are observed in Talavera Road.

During the PMF, Figure 2 shows largely no change to the flood levels in Talavera Road and elsewhere. This is expected to be due to the magnitude of flows that occur during the PMF.

During the PMF, the conveyance capacity of the below ground network is largely negligible, and the majority of flows are running overland. The reduction of the inlet capacity within the pits in Talavera Road do not create a significant change to flood levels as the below ground network is already compromised / at capacity.

Based on the above, and the results presented in Figures 1 and 2 of Attachment 1, the flood levels in Talavera Road are not expected to be sensitive to blockage during both the 1% AEP and PMF design storm events.

With a freeboard of approximately 2.22m and 1.60m above the 1% AEP and PMF flood levels in Talavera Road, and negligible change observed by the sensitivity test performed herein, blockage in Talavera Road is not expected to significantly impact the proposed development.

Conclusion

Northrop Consulting Engineers have been engaged by Stockland Corp. Ltd. to prepare a Flood Impact and Risk Assessment (FIRA) for the proposed “Building H” Data Centre located at 1-5 Khartoum Road, Macquarie Park (REF: SSD - 63235720).

Following submission of the FIRA (Northrop, 2025) a Request for Further Information was received from Ryde City Council (i.e. Council’s RFI; CoR, July 2025). A response to this Request for Further Information is presented herein.

The advice presented herein shows that with the proposed development has been rendered largely “Flood Free” following approval of the adjacent Modification for 17-23 Talavera Road (REF: SSD – 24299707-Mod-1). As a result, the proposed development is not expected to re-direct flood water in a way that would create a significant adverse flood impacts in adjacent properties.

A sensitivity test has also been performed with respect to the potential for blockage in Talavera Road. The results show, the flood levels in Talavera Road are not sensitive to blockage.

Furthermore, a freeboard of approximately 2.22m and 1.60m above the 1% AEP and PMF flood has been achieved for the development when compared to the flood levels in Talavera Road.

We commend our findings to the Department for their review.

Yours sincerely,



Laurence Gitzel

Associate | Group Manager | Senior Flood Engineer
BEng (Env) MProfEng (Env) MIEAust CPEng NER (Civil) RPEQ

Limitation Statement

Northrop Consulting Engineers Pty Ltd (Northrop) has been retained to prepare this report based on specific instructions, scope of work and purpose pursuant to a contract with its client. It has been prepared in accordance with the usual care and thoroughness of the consulting profession for the use by Stockland Corp. Ltd.

The report is based on generally accepted practices and standards applicable to the scope of work at the time it was prepared. No other warranty, express or implied, is made as to the professional advice included in this report except where expressly permitted in writing or required by law, no third party may use or rely on this report unless otherwise agreed in writing by Northrop.

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Attachment 1 – Flood Figures



Legend

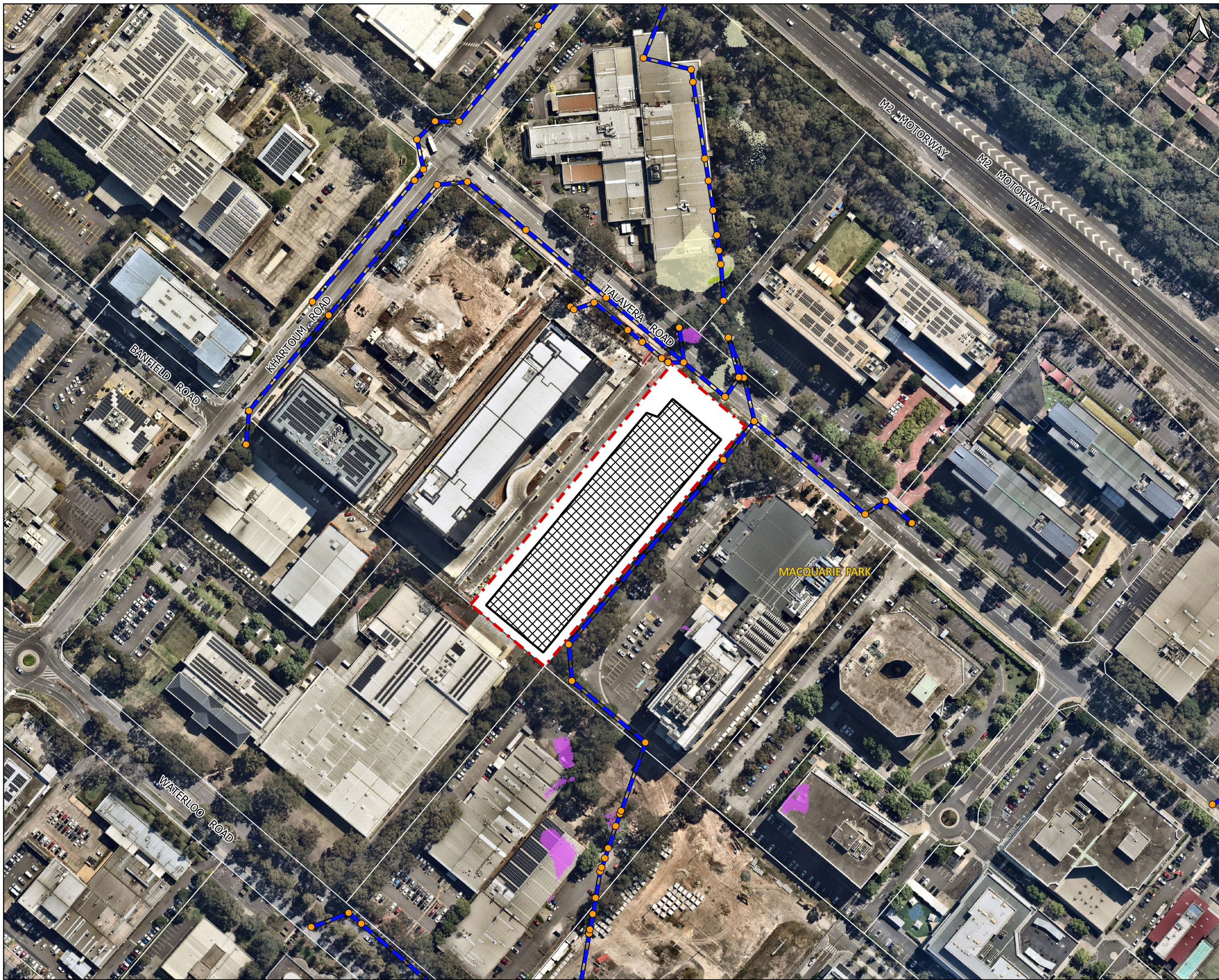
- Subject Site
- Building
- Pipes
- Pits
- Difference (m)**
 - <= -0.50
 - 0.50 - -0.10
 - 0.10 - -0.05
 - 0.05 - -0.03
 - 0.03 - -0.02
 - 0.02 - -0.01
 - 0.01 - 0.01
 - 0.01 - 0.02
 - 0.02 - 0.03
 - 0.03 - 0.5
 - 0.05 - 0.10
 - 0.10 - 0.50
 - >0.50

0 30 60 Metres
1:2,000

Figure 1
Blockage Sensitivity
Elevation Difference
1% AEP Flood Event

Khartoum Road
Macquarie Park, NSW





Legend

- Subject Site
 - Building
 - Pipes
 - Pits
- Difference (m)**
- ≤ -0.50
 - $-0.50 - -0.10$
 - $-0.10 - -0.05$
 - $-0.05 - -0.03$
 - $-0.03 - -0.02$
 - $-0.02 - -0.01$
 - $-0.01 - 0.01$
 - $0.01 - 0.02$
 - $0.02 - 0.03$
 - $0.03 - 0.5$
 - $0.05 - 0.10$
 - $0.10 - 0.50$
 - >0.50

0 30 60 Metres
1:2,000

Figure 2
Blockage Sensitivity
Elevation Difference
PMF Flood Event