14 September 2012

Ben Lusher
Department of Planning and Infrastructure
22-33 Bridge Street
SYDNEY NSW 2000

Dear Ben

Subject: Allied Mills Concept Plan Application – Stormwater and Flooding Issues

Thank you for meeting with me last Tuesday morning to brief me on the Concept Plan application for the Allied Mills site at Summer Hill and provide me with copies of the relevant documentation.

I have reviewed the relevant sections of the Environmental Assessment and Preferred Project Report, submissions made by Sydney Water and Ashfield Council and the Proponent's commitments (set out in the Revised Statement of Commitments dated 18 June 2012 and outlined in the letter from SJB Planning dated 28 August 2012). I have also sought clarification/ confirmation of the position of the key parties as follows:

- Telephone discussion with Matthew Lewis (Sydney Water) on 6 September (approximately 30 minutes duration);
- Meeting at Evans & Peck's office on 7 September with Mark Syke (EG funds management), Scott Barwick (SJB Planning) and Mark Tooker (National Planning Consultants). This meeting lasted approximately 40 minutes.

1. Flooding Conditions - General

There is general agreement by the Proponent and Sydney Water that the site is significantly impacted by flooding and that there are a number of features of the site itself, the light rail corridor and the surrounding roads that lead to a complex pattern of stormwater flows through, and adjacent to, the Allied Mills site. The drainage infrastructure, principally the Hawthorne Canal (owned and managed by Sydney Water), was constructed many decades ago and does not appear to meet contemporary standards. In particular:

- The culvert under Longport Street is of inadequate capacity to convey the 100 year ARI flow and leads to water backing up behind the culvert onto the Allied Mills site and the light rail corridor;
- Similar backing up of floodwater occurs upstream of Old Canterbury Road;
- High hazard flood conditions occur at various locations within the site and the light rail corridor as a result of the depth and velocity of flow;
- Overland flow down Smith Street is trapped at a low point adjacent to the site and is conveyed by a branch of the Hawthorne Canal and by overland flow across the Allied Mills site before draining into the main canal.

2. Director General's Requirements

The fact that the site is affected by flooding has been recognised in the following items in the amended Director General's Requirements (22 August 2012) for the preparation of a Concept Plan for the site:

11. Drainage / Water Management / Flooding

- *The EA shall address drainage/flooding issues associated with the development site, including stormwater, overland flows, proximity to Hawthorne Canal, drainage infrastructure and incorporation of Water Sensitive Urban Design measures.*
- *The flood assessment and drainage design should consider the development of the site, in addition to any cumulative impacts of the proposed light rail station located in the floodplain and the development yield of the McGill Street Precinct Masterplan and the Concept Plan application for 78-90 Old Canterbury Road, Lewisham (MP08_0195).*
- *Evidence of consultation with the NSW Office of Water in relation to the potential impacts on Hawthorne Canal and possible rehabilitation/mitigation measures and the results of that consultation shall be provided in the EA.*

20. Statement of Commitments

- *The EA must include separate draft Statement of Commitments for the Concept Plan and the Stage 1 Project Application detailing measures for environmental management, mitigation measures and ongoing monitoring for the project.*

In addition, the amended Director General's Requirements for the preparation of the Stage 1 Project Application include detailed consideration to the following project-specific matters:

22. Public Domain/Open Space

- *The EA shall include details of measures to manage flood risk within the public domain.*

24. Drainage/Flooding

- *The EA shall identify any water management structures proposed to service the Stage 1 Project Application, including any dams, swales or detention basins. Information regarding the size, location, capacity and purpose of any water management structures.*

3. Flood Analysis

A number of studies have been undertaken, or are currently underway, to assess flood conditions along the Hawthorne Canal in general or the Allied Mills site in particular:

3.1 Flooding Report and Stormwater Concept Plan (Civil Certification, March 2011)

The *Flooding Report and Stormwater Concept Plan* prepared by Civil Certification formed Appendix B to the *Drainage / Water Management / Flooding / Utilities*' (APP, March 2011) that forms part of the EA documentation for the Concept Plan.

This study utilised RAFTS (an industry standard rainfall:runoff model) to estimate flows along the Hawthorne Canal from the south (Old Canterbury Road) and entering the canal from the west

(Smith Street) and a HEC-RAS one dimensional hydraulic model to assess flood levels within, and adjacent to the Allied Mills site. :

- Notwithstanding the fact that the proposed development of the Allied Mills site is estimated to increase the impervious surfaces from 65% to 75%, the RAFTS analysis indicates that, compared to existing conditions, the development would lead to a very minor (0.4%) increase in the 20 year ARI flood flow and no increase in the 100 year ARI flood flow in the Hawthorne Canal (see Table 11). This result is hardly surprising because any runoff from the site could be expected to have drained downstream by the time of the arrival of the peak of the flood from the catchment upstream of the site;
- The HEC-RAS hydraulic model was used to assess a number of scenarios, the most relevant of which were:
  - Scenario A = Existing conditions;
  - Scenario B = Existing conditions with 10% blockage in Longford St culvert;
  - Scenario C = Proposed conditions with 10% blockage in Longford St culvert;
  - Scenario D = Proposed conditions with 10% blockage in Longford St culvert and the construction of the proposed light rail platforms.

  For each scenario a number of flow conditions were assessed including increased rainfall intensity by 10%, 15% and 30% as a result of climate change. The flow conditions selected for illustrative purposes in Table 1 were:
  - 100 year ARI flow under current climate conditions (labelled '100 Y' in Table 1);
  - 100 year ARI flow assuming 15% increase in rainfall intensity due to climate change (labelled '100 Y CC' in Table 1).

  Table 1 summarises the estimated flood levels for these scenarios at various chainages in the HEC-RAS model (see **Figure 1** for locations).

Table 1: Estimated Flood Levels for Various Scenarios

Chainage	Scenario A		Scenario B		Scenario C		Scenario D	
	100 Y	100 Y CC	100 Y	100 Y CC	100 Y	100 Y CC	100 Y	100 Y CC
280	9.58	10.27	10.03	10.66	10.00	10.62	10.03	10.66
300	9.60	10.31	10.05	10.73	10.03	10.70	10.05	10.73
380	9.73	10.46	10.17	10.83	10.17	10.83	10.17	10.83
400	9.72	10.43	10.15	10.81	10.15	10.82	10.15	10.81
420	11.02	11.06	11.02	11.06	11.02	11.06	11.17	11.25
480	11.69	11.78	11.69	11.78	11.69	11.78	11.69	11.78

The results from this analysis of flooding provide the basis for the overall assessment of flood impacts in the '*Drainage / Water Management / Flooding / Utilities*' report by APP. Importantly, in reference to flood conditions on the Allied Mills site, the APP report concludes, "*The proposed development would not change this flood behaviour and would maintain the existing peak flood flow rates so there would be no change on flood levels compared with existing conditions.*"

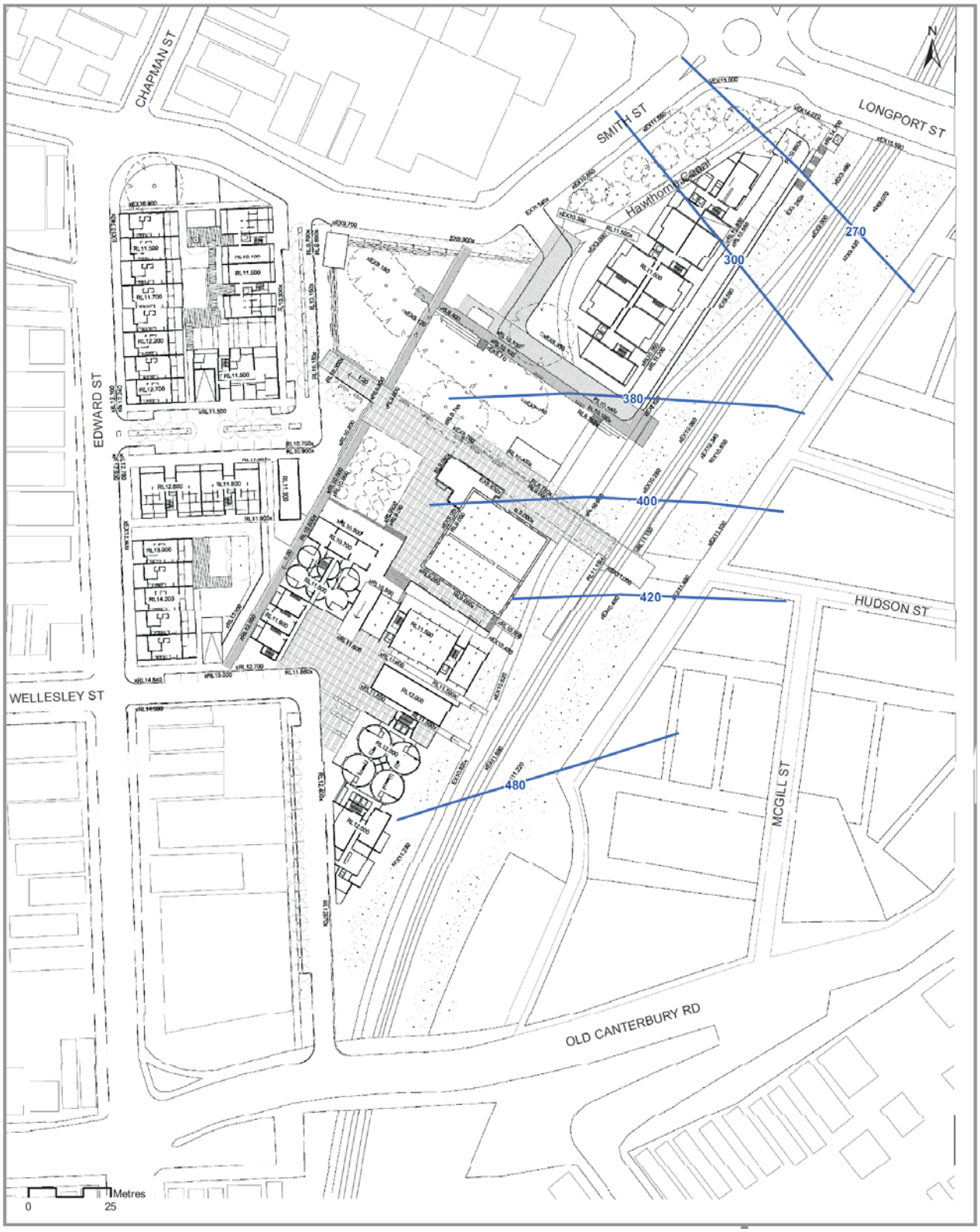

Figure 1: HES-RAS Flood Model Cross Section Locations

3.2 Hawthorne Canal Flood Study (WMAwater)

Based on the information in the Sydney Water letter dated 24 August 2012, it is understood that Sydney Water has commissioned WMAwater to prepare the Hawthorne Canal Flood Study. No details of the scope of the study have been provided, but the following salient features of this study have been deduced from the letter from Sydney Water, the attached flood level/depth plans and the proposal prepared by WMAwater (appended to the Sydney Water letter):

- Basis for flood flow estimation is not defined;
- Flood flow characteristics along Hawthorne Canal have been determined using a two dimensional hydraulic model (TUFLOW). The land surface for this modelling appears to be derived from ALS survey.

Results from this study, by way of preliminary 5 year and 100 year ARI flood levels for the site and the associated flood hazard, accompany Sydney Water's letter of 24 August 2012.

The two dimensional analysis used in the study by WMAwater provides a much more detailed representation of the flow regime than the one dimensional HEC-RAS modelling adopted for the *Flooding Report and Stormwater Concept Plan*. Although the HEC-RAS modelling took account of the flow entering the canal from Smith Street, the focus of the analysis was the flood levels along the alignment of the main canal. In the case of the modelling undertaken by WMAwater, the flood levels along Smith Street and the overland flow between the street and the canal are accounted for separately as shown in Figure 2 '*Peak Flood Depth and Flood Level Contours*' attached to the Sydney Water letter of 24 August 2012.

Although the HEC-RAS modelling is significantly more simple that the two dimensional modelling adopted by WMAwater, **Table 2** shows that both models provide similar general flood levels (WMAwater flood levels taken from Figure 2 attached to the Sydney Water letter of 24 August).

Table 2: Comparison of 100 Year ARI Flood Levels from HEC-RAS and Modelling by WMAwater

Location	HEC-RAS	100 Year ARI Flood Level (m AHD)	
	Chainage	HEC-RAS	WMAwater
Upstream Longport Street	270	9.23	9.5
Mungo Scott Building	400	9.72	9.5
Near south end of Allied Mills site	480	11.69	11.5

A major difference between the TUFLOW modelling undertaken by WMAwater and the HEC-RAS modelling presented in the *Flood Report and Stormwater Drainage Concept Plan* is that the TUFLOW modelling clearly identifies areas of high flood hazard within the site. The flood hazard conditions are not apparent from the HEC-RAS modelling and are not specifically discussed in the *Drainage / Water Management / Flooding / Utilities* report.

3.3 Allied Mills Flood Study (WMAwater)

In the course of an interview with the Proponent's representatives, I was informed that EG Funds Management has separately commissioned WMAwater to prepare a flood study of the Allied Mills site.

I was also informed that, on the basis of more detailed site topography provided to WMAwater for this study, some of the details of the flood pattern shown in the Figure 2 (1% AEP flood levels) attached to the Sydney Water letter of 24 August are incorrect. In particular:

- Near the north-west corner of the Allied Mills site Figure 2 shows flood water flowing down Smith Street and a small separate flow path through the site. Flow down this small separate flow-path is not possible because it is blocked by a building.
- Along the site boundary with the light rain corridor to the south of the Mungo Scott building, Figure 2 does not accurately account for structures on the site boundary.

3.4 Flood Conditions and Flood Risk Management at the Allied Mills Site

As of 10 September 2012, full details of flood conditions affecting the Allied Mills site have not yet been determined. Notwithstanding, key aspects of the existing flood conditions have been taken into account in developing the Concept Plan for the site:

- The site is affected by flooding from the Hawthorne Canal and from overland flow across the site from Smith Street;
- The limited capacity of the Longport Street culvert largely dictates flood levels in the vicinity of the Mungo Scott building and the northern section of the site. Once flood levels reach about 9.6 m AHD, the proponent asserts that the water would be able to flow under Longport Street via the railway corridor;
- Overland flow flooding from Smith Street is caused by inadequate capacity of the stormwater drainage systems in the street and in the branch of the canal which drains from Smith Street;
- The preliminary analysis by WMAwater indicates that, during a 100 year ARI flood, 'high hazard' flood conditions would occur at a number of locations within the site. Whilst the currently available information does not define the specific depth and velocity conditions that lead to 'high hazard' classification, it is likely that:
  - Both depth and velocity contribute to the 'high hazard' classification along the alignment of the canal including the covered section of the canal that runs under the light rail corridor;
  - The depth of water (and velocity?) between Smith Street and the canal is likely to be the main cause of the 'high hazard' classification in that area;
  - The depth of water to the west and south of the Mungo Scott building is likely to be the main cause of the 'high hazard' classification in that area;
- Whilst Sydney Water's aspiration to 'eliminate' high hazard conditions from the site is laudable, such an aspiration is unlikely to be achievable in practice because it would either require extensive flood detention works upstream (unlikely in a highly urbanised catchment) or, by increasing the downstream conveyance capacity, would lead to the transfer of the flooding problem downstream (which is unlikely to be acceptable to the downstream community).

- The heritage aspects of the site, particularly the Mungo Scott building and the trees that form an avenue leading south-east from Smith Street impose limitations on what could be done to eliminate high hazard areas within the site. The proposed elevated access ways which allow pedestrian movement during major floods provide an appropriate site specific response to this issue.
- For purposes of setting floor and access levels across the site, a 100 year ARI flood level of 9.73 m AHD has been adopted (see Table 3 of the APP report). This level corresponds to the 100 year ARI flood level in the vicinity of the Mungo Scott building as determined by the HEC-RAS modelling assuming no blockage of the Longport Street culvert and without any provision for increased rainfall intensity as a result of climate change. There does not appear to be adequate justification for adopting this flood level rather than a more conservative level which would account for the possible future impact of climate change and blockage of the culvert.
- The Proponent has asserted that flood levels at the site would be limited by the fact that, above about 9.6 m AHD, floodwater could flow along the light rail corridor under Longport Street and the width of the rail corridor would provide a large increase in flow conveyance for a small increase in flood level. However, this assertion is not supported by the data in Tables 13 and 14 of the *Flood Report and Stormwater Drainage Concept Plan*, which indicate the 100 year ARI flood levels at Chainage 280 (immediately upstream of Longport Street) for different future climate change scenarios as set out in **Table 3**. These flood levels do not appear to show a significant effect of flow along the light rail corridor under Longport Street which would be expected to lead to minimal increase in flood level for increased rainfall intensity.

Table 3: Impacts of Climate Change Scenarios on Estimated Flood Levels

Scenario	Flood Level (m AHD)	
	Current Site	Developed Site
Current climate conditions with 10% culvert blockage	10.03	10.00
10% increase in rainfall intensity with 10% culvert blockage	10.44	10.41
15% increase in rainfall intensity with 10% culvert blockage	10.66	10.62
30% increase in rainfall intensity with 10% culvert blockage	10.93	10.89

- For the portion of the site to the south of the Mungo Scott building, the proposed flood level for setting building floor levels (9.73 m AHD) is significantly less than the estimated flood level in the adjacent rail corridor (11.69 m AHD). The adoption of 9.73 m AHD as the basis for setting floor levels in the southern portion of the site appears to be based on the proposed exclusion from the site of floodwater flowing along the light rail corridor to the south of the Mungo Scott building. Accordingly, flooding in the vicinity of Buildings 3A – 3D and 5A – 5B is taken to be caused by backwater flooding from the vicinity of the Mungo Scott building (9.73 m AHD). The ability to exclude floodwaters from the light rail corridor in this section of the site without causing adverse impacts elsewhere has not yet been demonstrated by way of flood modelling.

4. Sydney Water

4.1 Flood Hazard Concerns

The letter from Sydney Water to SJB Planning dated 12 March 2012 raises a number of concerns relating to flooding conditions on the site as determined from preliminary results from modelling undertaken by WMAwater. (Copies of some of the relevant results were subsequently provided as attachments to the letter from Sydney Water dated 24 August.) In essence, Sydney Water's concerns relate to:

- Severe local flooding upstream of Longport Street, including the Allied Mills site, is likely to occur as a result of the limited capacity of the culverts under the main railway line and Longport Street;
- Intensification of development without appropriate provisions for management of local flood risk, particularly the potential for 'break out' of flood flows overland across the light rail line and the potential risk for people to be swept into the open channel where the overland flow crosses the alignment of the pedestrian link between Smith Street and the light rail station;
- Major flooding would occur in an uncontrolled manner in areas proposed for high intensity land use and Sydney Water would prefer that hazardous flows be separated from high intensity land use areas and be conveyed in a controlled manner around these areas;
- In the event of future flood incidents following the development, particularly if an incident was life threatening, Sydney Water's standing in the community could be damaged and the organisation could be under public pressure to undertake remedial works;
- The broad footprint of Building 1A could compromise future options for flood mitigation works to reduce the level of flood hazard in major floods.

4.2 Sydney Water Requirements

In its letter of 24 August 2012, Sydney Water notes that the Allied Mills site is subject to local flooding which is likely to present a significant hazard to future residents and the local community, including users of the future light rail. Sydney Water considers that:

- A plan to address this flood risk is yet to be developed;
- There no agreement nor commitment on implementation; and
- No party is able to commit undertaking flood mitigation works to reduce flood risk at the development site.

In previous correspondence, Sydney Water has also noted other concerns in relation to the proposed development of the Allied Mills site:

- Elements of the current Masterplan (in particular the broad footprint of Building 1A) could compromise future flood mitigation works (letter of 12 March 2012);
- Structural flood mitigation works such as the proposed wall along the eastern boundary of the southern portion of the site (to exclude floodwater from the light rail corridor) need to be tested in an appropriate flood modelling exercise to ensure no unacceptable adverse impacts are caused to others (Attachment to letter dated 13 June 2012).

In its letter of 24 August, Sydney Water recommended that any Masterplan approval be conditional upon the development and implementation of an appropriate Floodplain Risk Management Study & Plan (FRMS&P) for the local catchment which included, but was not limited to:

- 'non-structural' elements including locating public areas and access points to minimise exposure to high risk areas, flood warning signs and emergency response plans;
- 'structural' elements in the design of the development including floor level controls and fencing; and
- 'flood mitigation works' that eliminate high hazard flood conditions in the 100 year Annual Recurrence Interval (ARI) design event for 'active' areas of the development site and limit 100 year ARI high hazard flood conditions generally to the northern portion of the site,

Sydney Water seeks to be required to approve the plan, and also seeks to manage the development of the plan with 50% funding from the Proponent.

In the course of a telephone consultation with Matt Lewis (A/Manager - Stormwater) made the point that there was a significant variation (up to 2.5 m) in flood level between the 5 year ARI and 100 year ARI floods. (However, from inspection of the flood depth figures that were attached to the Sydney Water letter of 24 August, it would appear that this flood level difference relates primarily to the Hawthorne Canal itself, rather than the public domain.) Specific concerns expressed in the course of the consultation reflected those set out in the Sydney Water letter of 24 August, specifically:

- Ideas for flood mitigation works such as the wall between the site and the light rail corridor to the south of the Mungo Scott building) have not been tested.
- The Proponent has not committed to any specific actions in relation to flood mitigation.

4.3 Comments in Relation to Sydney Water Concerns and Requirements

As the owner and manager of the Hawthorne Canal, Sydney Water has a legitimate interest in developments that may adversely impact on:

- The functioning or maintenance of the asset; or
- Its ability to upgrade the asset in the future;
- Exposure of the public to areas of flood hazard associated with its asset in an area which is not currently accessible to the public.

Sydney Water acknowledges that the Department and relevant Councils are the determining authorities at various stages in the development process whose responsibilities include, amongst other things, balancing the objectives of urban consolidation, heritage conservation and public safety.

The current site plans and commitments by the Proponent currently address, or are capable of addressing, Sydney Water's key concerns:

- **Plans to address the flood risk:**
  - With the exception of the corridor containing the heritage avenue, the Concept Plan locates public areas and access points in a way that minimises exposure to high risk areas. I

understand that the key elements of these proposals involve elevated pedestrian access between the Mungo Scott Building and the proposed light rail station which would allow high hazard overland flow from the light rail corridor to flow beneath the pedestrian access and then re-enter the canal. Elevated pedestrian access is also proposed between Building 1A and Smith Street. I have not had the opportunity to verify details of the levels of these pedestrian access ways, but understand the intent is that they would be at a level which would allow the 100 year ARI flood to flow beneath the pedestrian access. I also understand that the proposed development would include permanent safety fencing along all exposed sections of the canal. The conditions of approval for the Concept Plan could specify the relevant freeboard relative to the adopted design flood (100 year ARI) for residential floor and walkway levels in order to separate the public from high hazard conditions.

  - The provision of flood warning signs and emergency response plans are matters that can be addressed in the conditions of approval;

- **Commitment on implementation of measures to address flood risk:**
  - Structural elements in the design including floor level controls and fencing have already been considered and incorporated into the Concept Plan. Whilst some adopted levels may require amendment as a result of the further flood study commissioned by the Proponent, the principles to be applied in setting levels for residential floors and pedestrian access ways are capable of being specified in the conditions of approval.
- **Future flood mitigation works**
  - Sydney Water is concerned that once the Concept Plan is approved there would be insufficient safeguards against elements of the development being constructed without sufficient opportunity for the inclusion of works that might reduce the flood hazard on the site or within the light rail corridor.
  - None of the correspondence between the parties indicates that there has been any suggestion of works that would involve alternative drainage arrangements to take water from the light rail corridor into the Allied Mills site anywhere south of the Mungo Scott building.
  - The various options put forward by Sydney Water and the correspondence indicates that the main concern relates to the section of the site in which Building 1A is proposed. The Proponent's amended Statement of Commitments provides a commitment to provide space for a 3 m x 1.5 m culvert under Building 1A if required. The subsequent letter from SJB Planning (28 August) provides a more general commitment for:

    Provision of an allowance within the foundation space of building 1A for a box culvert or equivalent to accommodate a connection from the light rail corridor to the Hawthorne Canal if required.

  - The key issue appears to be one of providing Sydney Water with sufficient certainty that, if required, the Proponent will make provision for a culvert to carry a proportion of the flow from the light rail corridor to the canal in the general vicinity of Building 1A.

Notwithstanding Sydney Water's concerns about flood hazards on the Allied Mills site, and the desirability of 'eliminating' flood hazards, in practice, it is unlikely that significant reduction in flood

hazard could be achieved without compromising other aspects of the site or adversely impacting on flood conditions downstream of the site:

- During a 100 year ARI flood, the high hazard flood conditions between Smith Street and the canal are caused by overflow from the stormwater drainage in Smith Street along an avenue of trees that are to be retained for heritage purposes. The heritage status of these trees precludes any earthworks that might redirect flow away from the public domain. In view of this the Concept Plan provides for pedestrian flood free access across the site from Smith Street to the light rail station, to/from the Mungo Scott building and to/from proposed buildings at the northern end of the site. I also understand that, in consultation with Sydney Water, the Proponent has committed to construction of a stormwater inlet along a section of the Smith Street boundary and the construction of a culvert to convey some of the overflow from the street that is currently carried by overland flow. The objective of these works is to reduce the flow rate of the overland flow along the heritage avenue and thereby reduce flood hazard in this area.
- It is highly unlikely that significant works would be able to 'eliminate' high hazard flood conditions from the public domain without adverse consequences elsewhere. Sydney Water has previously (12 March and 13 June) put forward various concepts for flood mitigation or improved conveyance. While some of these schemes could reduce the flood hazard on the Allied Mills site, the current Concept Plan provides an appropriate response to the existing flood hazards on the site. If implemented, the schemes envisaged by Sydney Water might reduce the flood hazard on the site, but I do not consider such a reduction to be a pre-requisite for approval of the Concept Plan.

Sydney Water's other concerns are legitimate, but can be addressed by means of conditions or commitments and do not preclude granting Concept Plan approval:

- Sydney Water contends that the development should not cause unacceptable impacts to others. This is a fundamental principle of any flood mitigation works. In this case, the Proponent's wish to ensure that floodwaters do not enter the southern side of the site from the light rail corridor has the potential to change flood conditions within the light rail corridor. I understand that the Proponent's position is that there are only very narrow openings that would allow floodwater to drain from the light rail corridor and that blocking them would have minimal impact on flooding in the light rail corridor. The site flood study being undertaken by WMAwater will, presumably, examine this issue. The results of the study will show either:
  - That the proposed blockages have minimal impact on flooding in the light rail corridor – and could therefore be approved at a subsequent stage; or
  - That the proposed blockages do have an unacceptable impact on flooding in the light rail corridor – and therefore the entry of floodwater via this route needs to be taken into account in assessing flood levels and hazards within the site and setting appropriate floor levels.
- The development could compromise future flood mitigation works such as various schemes set out in Sydney Water' s letters of 12 March and 13 June. I understand that Sydney Water's main concern relates to Building 1A. The Proponent has indicated a willingness to make provision for a culvert under the basement. This has been notionally sized as 3m wide and 1.5 m deep. However, in my discussions with the Proponent's representatives they indicated willingness to consider other alternatives at the time that Development Approval is being sought for Building 1A (which is the final stage of the proposed development and will not occur for a number of years). This is reflected in the letter from SJB planning dated 28 August 2012.

In the normal course of events, an overall Floodplain Risk Management Study and Plan would have been prepared for a catchment prior to the preparation of plans for a proposed development. A developer would then use the information from the Floodplain Risk Management Study and Plan as the basis for developing site specific measures to accommodate and/or manage the flood risks. In this instance, the preparation of an overall catchment wide Floodplain Risk Management Study and Plan has been commenced by Sydney Water, but the timing for completion of the study, particularly the assessment of flood mitigation options, has not been defined. Under these circumstances, I consider it reasonable for the Proponent to carry out its own study to determine flood conditions on the site (for current and assumed climate change scenarios) and to prepare a Concept Plan that seeks to accommodate the flood risks and demonstrate that the project will have no unacceptable flood related impact on others. If, subsequently, Sydney Water and the relevant Councils prepare a Floodplain Risk Management Study and Plan that includes measures that reduce the flood risk at the site, then this reduced flood risk can be taken into account in Development Applications for subsequent stages of the project.

Under these circumstances, it is in the interests of the Proponent and Sydney Water to share information that would assist each party to undertake their own analysis. However there is no compelling reason why:

- The Proponent should be required to contribute to the cost of the catchment wide study being undertaken on behalf of Sydney Water; or
- Any flood study for the site should be approved by Sydney Water.

5. Ashfield Council

For purposes of my review I was provided with a copy of a comprehensive planning report prepared for consideration at a meeting of Ashfield Council on 9 August 2011. I understand this report represents Council's submission in response to the public exhibition of the Concept Plan. The report includes the following comments in relation to stormwater and flooding:

> *The applicant's consultant's report explains that the site is subject to severe flooding from Hawthorne Canal, with flood levels approx 1.5 m deep within the site adjacent and around the stormwater canal. This will have an affect (sic) on the ground level use of the historic Mungo Scott building and on the public access ways to the future light rail station and GreenWay trail. This needs to be resolved so that these areas are safe to use. The DOPI will need to ensure the Concept Plan adequately addresses the potential flooding impacts through appropriate flood mitigation measures. The capacity of existing stormwater network external and internal to the site, and whether it needs upgrading also needs to be resolved.*

I consider that the issues raised by Council have either been resolved in the Preferred Project Report or the Amended Statement of Commitments; or are capable of being resolved through appropriate conditions of approval for the Concept Plan:

- The proposals for the ground floor of the Mungo Scott include providing a waterproof barrier up to an elevation which provides freeboard above the 100 year ARI flood level. All access to the building will be at this higher level, although the floor will remain at the current level;
- Safe public access to the future light rail station appears to be by means of elevated walkway above flood level (level of the walkway to be confirmed);

- The Concept Plan and the Proponent's commitments address potential flood impacts by setting building entrances and residential floor levels above the 100 year ARI flood level plus a freeboard allowance and providing pedestrian access across the site above the 100 year ARI flood level;
- The Proponent has committed to amplifying the stormwater conveyance between Smith Street and the Hawthorne Canal, and thereby reducing the flood hazard in that area of the site.

6. Project Commitments

Amended Project Commitments were provided by the Proponent on 18 June 2012 and some additional matters were canvassed in a letter from SJB Planning to the department dated 28 August.

Table 4 quotes from these two sources and seeks to align those that are common, or have slightly different wording to reflect the same general intent. The table also contains our comments in relation to matters that should be documented in any conditions of approval for the Concept Plan.

Table 4: Proponent's Commitments - Reconciliation and Comments

Amended Statement of Commitments (18 June 2012)	Letter from SJB Planning (28 August 2012)	Comments
Flood management measures will be documented within each Development Application for each stage of the proposal.		Appropriate commitment. Concept Plan approval to reflect this commitment.
The flood management measures will be based upon reviews of, and where necessary, updates of flood study results that account for works approved or undertaken in the adjoining light rail corridor, on the McGill street Masterplan site and within the subject site.		Appropriate commitment. Concept Plan approval should reflect this commitment to base detailed flood management measures in any DA on the most up-to-date flood modelling including any proposed works in the light rail corridor and the McGill Street Masterplan
All residential buildings will be provided with floor levels above the 100 year ARI level with appropriate allowances for climate change, blockages and freeboard, identified in the required flood study/ies.	Provision of all residential floor levels above the 100 year ARI plus freeboard allowance.	Concept Plan approval should include: ▪ Requirement for at least 500 mm freeboard above the adopted 100 year ARI design flood level for residential floors ▪ Requirement to justify an appropriate allowance for climate change in the analysis of the 'design flood' level (Note: the Sydney Metropolitan CMA has adopted 15% increase in rainfall intensity for purposes of assessing flood conditions on the Parramatta River). ▪ Flood study should clearly identify the flood levels control(s) and the sensitivity of flood level estimates to assumptions regarding blockage of the Longport Street culvert and land levels along the light rail alignment under Longport Street.
	The design of the basement entry crests of building 1A to be above the 100 year ARI level.	Concept Plan approval should include a requirement to provide entry crest freeboard of at least 500 mm above the relevant 100 year ARI design flood level.
Any non-residential buildings and open spaces that include floor levels or ground levels below the 100 year ARI level will be subject to an emergency response plan to appropriately manage the risk to personal safety during severe flood events.	Preparation of an emergency response plan to manage risk for the non-residential buildings and open space areas with levels below the 100 year ARI level.	

Amended Statement of Commitments (18 June 2012)	Letter from SJB Planning (28 August 2012)	Comments
Any non-residential building with floor levels below the 100 year ARI level will be flood proofed up to the 100 year ARI level plus 0.5m freeboard to minimise potential flood damage and be provided with appropriate evacuation connections.	Flood proofing of non-residential buildings up to the 100 year ARI level plus 500mm freeboard where the floor levels are below the 100 year ARI level.	
	Incorporation of vertical evacuation to higher floor levels above the flood levels.	A draft Flood Emergency Response Plan should be required as part of each Development Application. The draft Flood Emergency Response Plan should justify the adopted alarm level (10.8 m AHD proposed) and demonstrate that all necessary facilities are available within each building to allow the proposed response. For example: ▪ Provision of stairs that allow access from the basement car parks to floors above the PMF level. ▪ Provision of stairs that allow access from the retail floors to floors above the PMF level. ▪ Demonstration of precisely how access for emergency services will be achieved within the site and along relevant access routes in the immediate vicinity of the site and at what flood frequency emergency vehicle access would not be possible.
	An emergency flood response plan that includes alarms when floodwaters on the site reach RL 10.8m AHD requiring residents and workers to move to higher floors above the PMF level.	
	A requirement for each body corporate to be responsible for the emergency flood response plan, including nomination of people to be wardens in the building, training of all residents/workers and instigating annual drills to practice the plan requirements.	
	The provision of signs and lighting to inform people of evacuation routes	
	The provision of access for emergency services if required during a flood.	
The objective of all proposed measures and strategies will be to manage and where possible minimise the potential flood hazard posed by flood waters from the Sydney Water culvert that traverses beneath the adjoining light rail corridor.		Commitment specifies an appropriate commitment.
The detailed design of Building 1A foundation space will incorporate allowance for the inclusion of a 3.0m wide x 1.5m high box culvert or equivalent to be concrete encased (no maintenance or replacement required) from the southern boundary of the site to the Sydney Water Corporation channel at the eastern end of the building.	Provision of an allowance within the foundation space of building 1A for a box culvert or equivalent to accommodate a connection from the light rail corridor to the Hawthorne Canal if required.	The commitment in the letter of 28 August is less specific than that in the Amended Statement of Commitments and, therefore, provides flexibility for Sydney Water to determine its preferred option, if any. The key issue is the degree of certainty that can be provided to Sydney Water that any reasonable requirement for a drainage corridor under Building 1A will be accommodated at the time of the preparation of a Development Application for that stage.

Amended Statement of Commitments (18 June 2012)	Letter from SJB Planning (28 August 2012)	Comments
The wall height on the rail corridor boundary to the west of Building 2A will be adjusted at the detailed design stage to prevent the potential inflow of floodwaters from the rail corridor into the site.	If required, raising of the perimeter wall to the light rail corridor to reduce inflows to the site from the rail corridor.	Concept Plan approval should include a condition that specifies that any wall height on the rail corridor boundary to the west of Building 2A would not be approved at the Development Application stage unless the flood study demonstrated that the wall did not have any unacceptable impact in terms of flood levels and flow velocities within the light rail corridor or neighbouring property.
During detailed design stage of the proposed development, liaison with Transport NSW will be undertaken to ensure that the proposed site design complements the design aspects of the light rail project which will address and manage flooding issues form within the light rail corridor.		Concept Plan approval should include specific condition to provide documentary evidence at DA stage demonstrating the degree of liaison with Transport for NSW and any specific amendments to the project design to accommodate the requirements for the light rail and address any flood impacts resulting from the design of the light rail station (Scenario D – Table 15 - in the *Flood Report and Stormwater Drainage Concept Plan* indicates that the station platforms could give rise to a localised increase in flood levels of about 200 mm.)
	Reduction in the covered extent of the Hawthorne Canal and elevating pedestrian access to the proposed light rail stop.	This commitment reflects the removal of this aspect of the original Concept Plan. The Preferred Project leaves the canal in its current state.
	Piping of the existing Smith Street flows through the development site to the canal in order to reduce flood hazards.	It is understood that this commitment reflects discussions and an agreement with Sydney Water. Full details of the scheme and documentary evidence of the agreement from Sydney Water should be provided with the DA for Stage 1

7. Advice and Recommendations

1. As the owner and manager of the Hawthorne Canal, Sydney Water has a legitimate interest in ensuring that it is consulted about any development that might increase flow into the canal, reduce the hydraulic capacity of the canal or provide an impediment to any specific proposed flood mitigation works. It is also appropriate for Sydney Water to draw the Department's attention to the existing flood hazards on the site.

2. However, it is not reasonable for Sydney Water to require that a flood study and any flood risk management measures for the Allied Mills site be subject to approval by Sydney Water. If Sydney Water, as an interested party, considered that the subsequent flood analysis and any resulting proposed works on the site would have an unacceptable impact on its assets, it would be able to object at the DA stage.

3. Similarly, it is appropriate for Sydney Water to seek to preserve opportunities to undertake flood mitigation works in the future. In this instance, however, the Proponent has given an undertaking to provide access to allow Sydney Water to construct drainage works under Building 1A, which is the only location that Sydney Water has identified as potentially compromising future opportunities.

4. Subject to some further clarification by way of a further Amended Statement of Commitments, or by conditions of approval for the Concept Plan (as set out in the last column of **Table 4**), the Proponent's commitments address the underlying issues of concern to Sydney Water, namely:

   - Sydney Water would prefer that the increased risks associated with an increase of public access to areas of high flood hazard be eliminated from the site by means of flood mitigation works. The Proponent proposes various measures to exclude the public from high risk areas (elevated walkways to allow egress from buildings and access to the light rail station, and fencing of the canal) as well as hazard reduction by means of piping some of the flow from Smith Street.;
   - Sydney Water is concerned that the development could compromise options to reduce the flood hazard within the light rail corridor and the Allied Mills site. The stated concern particularly relates to Building 1A. The proponent has provided a commitment to make an allowance within the foundation space of building 1A for a box culvert or equivalent to accommodate a connection from the light rail corridor to the Hawthorne Canal if required.
   - Sydney Water is concerned that in the event of a significant life threatening flood event following completion of the development, Sydney Water's standing in the community could be damaged and the organisation would be under public pressure to undertake flood mitigation works. The proponent's proposals for flood protection of buildings and the measures to exclude the public from areas of high flood hazard address these concerns.

5. The Proponent advises that it has commissioned WMAwater to undertake a site specific flood study for the Allied Mills site. I also understand that the Proponent has given an undertaking to collaborate with Sydney Water in the conduct of the site specific study as well as the catchment wide study being undertaken by WMAwater for Sydney Water.

Accordingly, both studies can be expected to utilise the same base data and assumptions in order to characterise the existing flood conditions on the Allied Mills site. The Proponent is committed to utilising the results of the site specific flood study to determine final floor levels and pedestrian access levels for purposes of the various DAs for staged development of the site.

6. To address Sydney Water's concern that the development might compromise options for flood mitigation works affecting the light rail corridor, the Proponent has committed to provide a pathway for drainage under Building 1A. Whilst this commitment may not be not legally binding, Sydney Water has not yet determined its preferred option, if any, for flood mitigation works in the light rail corridor which would allow a formal easement to be granted.

7. The various flood studies indicate that there is a significant flood risk at the Allied Mills site. However, the site is also strategically located close to public transport and warrants serious consideration as a location to accommodate a residential and commercial development. Eliminating flood hazard on the site (as advocated by Sydney Water) is unlikely to be feasible. The current Concept Plan provides a suite of measures that seek to manage the flood risk in an appropriate manner.

I trust this letter provides adequate advice to allow the Department to determine the Concept Plan application for the Allied Mills site.

Please call if you require further clarification of any matters set out in this letter.

Yours faithfully
EVANS & PECK PTY LTD

Dr Steve Perrens
Principal