Appendix D Stormwater Management Response

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Penrith City Council
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164 Station Street, Penrith – Stormwater Management Response

Dear Sir / Madam,

This letter has been prepared by Mott MacDonald to clarify stormwater management issues raised by the Department of Planning and Infrastructure (DPI) in a letter dated 26 August 2013 regarding the proposed mixed-use development at 164 Station Street, Penrith.

The following stormwater management components have been addressed:

1) Flooding
2) On-Site Stormwater Detention
3) Tailwater Conditions
4) Water Quality

This letter is also supported by the following relevant technical studies and modelling files:

- *Nepean Green, 164 Station Street Penrith - Civil Engineering, Infrastructure and Stormwater Report,* June 2013 (see Appendix A);
- *Masters Home Improvement Store, Nepean Green - Stormwater Management Report, Stage 1 Project Application,* June 2013 (see Appendix B);
- DRAINS Model - *310574 130607 Proposed DRAINS Model – (Premium Hydraulic);* and
- MUSIC Model - *310574 131107 MUSIC Model*

1.0 Flooding

A meeting was held between Mott MacDonald and Penrith City Council on 21 February 2013 to discuss flooding issues in relation to the subject site. Council advised during the meeting that they were currently undertaking an overland flow study of the local catchment and they were unable to provide any information at this time due to the draft nature of the study. Following this meeting, regular liaison was undertaken with Council via email correspondence to confirm when information would be available. Council advised via email correspondence on

27 May 2013 that "*the study confirms that there is very minimal overland flow affectation on the subject site externally other than the internal surface runoff from within."* As such, **it is our understanding that the subject site is not affected by external overland flows**. It is also noted that no flood levels in the adjoining street network were provided by Council.

2.0 On-Site Stormwater Detention (OSD)

Details of the design and analysis of the proposed OSD systems for the site were included in *Nepean Green 164 Station Street, Penrith – Civil Engineering, Infrastructure and Stormwater Report* and *Masters Home Improvement Store – Nepean Green, Stormwater Management Report – Stage 1 Project Application* as prepared by Mott MacDonald in June 2013.

Details of the proposed OSD facilities are summarised below:

Station Street Catchment

OSD is proposed as an above ground system in the customer carpark area to the north of the new home improvement centre building to restrict post-developed flows generated from the Masters site. Consideration has also been given to piped / overland flows conveyed to Station Street from the proposed Stage 2-6 road network / residential buildings (it is noted that these flows will bypass the OSD system). **Modelling results indicate that pre-post conditions for all storm events from the 5yr to 100yr ARI are satisfied for discharge from the development to Station Street.**

Woodriff Street Catchment

OSD is proposed as a below ground system beneath the hardstand area to the south of the new home improvement centre building to restrict post-developed flows generated from the Masters site. Consideration has also been given to piped / overland flows conveyed to Woodriff Street from the proposed Stage 2-6 road network / building works, including those flows conveyed overland from Jamison Road (it is noted that these flows will bypass the OSD system). **Modelling results indicate that pre-post conditions for all storm events from the 5yr to 100yr ARI are satisfied for discharge from the development to Woodriff Street.**

Jamison Road Catchment

Stormwater flows draining to Jamison Road are proposed to discharge to an existing 1050mm dia. stormwater line. Email correspondence received from Council on 12 July 2012 indicated the following:

1) OSD is not required for the subject area. However, post development flows are not to adversely impact on existing drainage systems in the area;

2) If the existing pit and pipe network in the adjoining street network has sufficient capacity to accept minor system stormwater flows from the site, than no OSD is required; and

3) If the existing pit and pipe network in the adjoining street network has insufficient capacity to accept minor system stormwater flows from the site, then either OSD / upgrade of the street network is required.

Preliminary assessment based on a review of existing catchment areas indicates that the existing 1050mm dia. stormwater line has sufficient capacity to accept post-developed minor system flows from the site. As such, no OSD has been provided for discharge to Jamison Road in accordance with the advice received from Penrith City Council.

For major system flows, it is noted that the post-developed catchment area discharging piped flows to the Jamison Road outlet is approximately 3.932Ha, which is considerably less than the existing calculated catchment area of approximately 4.377Ha (refer to drawings 0105 and 0110 in Appendix A for details). Similarly, based on the proposed grading of the internal road network, a portion of overland runoff from this catchment for stormwater flows in excess of the piped network capacity will bypass Jamison Road and instead be conveyed to Station Street / Woodriff Street (which has been considered in the OSD calculations for these catchments as detailed above). As such, modelling indicates that the post-developed flow rate discharging to Jamison Road for the 100 year storm event is approximately 1.13m3/s, which is less than the pre-developed flow rate of 1.33m^3/s. Similarly, modelling results using the premium hydraulic function in DRAINS indicate that approximately 0.227m^3/s of this flow rate is overland flow, which is eventually to be conveyed to the south to Woodriff Street via an internal overland flowpath (it should be noted that these flows have been considered in the OSD assessment as detailed above).

Based on the above, it is anticipated that the proposed development will have a negligible effect on the overall flooding of the local catchment / area. Similarly, we note that all internal overland flowpaths satisfy the minimum safety requirements as specified in the NSW Floodplain Development Manual.

3.0 Tailwater Conditions

Woodriff Street / Station Street

Tailwater conditions were assumed at 150mm below and above (i.e. top of kerb) the downstream pit grate level for the minor and major storms respectively. It is noted that Council advised that there is minimal overland flow affectation on the site from external flows (i.e. contained within adjoining street network). As such, in lieu of more detailed data from Council, the assumed downstream tailwater level for the major system event is considered appropriate.

Jamison Road

In lieu of more detailed data, tailwater conditions at the connection to the existing open concrete channel were conservatively assumed at 50% channel capacity for the minor storm event and 100% channel capacity for the major storm event. This can be updated as necessary based on any stormwater / flood data received from Council, however to date no additional data has been provided.

4.0 Water Quality

An updated MUSIC model detailing the proposed water quality treatment measures for Stage 1 has been included for review. Based on the results of the MUSIC model, we note the following:

- Rainfall data was modified to Station 67113 Penrith Lakes AWS as per advice from Council;

- 95% of the non-potable water demand for the site is satisfied through the proposed rainwater harvesting tank storage; and
- The proposed treatment train will satisfy Council's target pollutant removal rates for total suspended solids, total phosphorus and gross pollutants. It is noted that the pollutant removal rate for nitrogen is slightly less than the target level required by Council. However, given the nature of the subject site (large commercial development with sealed pavements) we consider the target pollutants to be suspended solids, gross pollutants and hydrocarbons. As such, based on these assumptions and the relatively close value obtained, this level is considered adequate to satisfying Penrith City Council's statutory requirements.

We trust that this information is sufficient for your review. If you require any further information, please do not hesitate to contact the undersigned on 9891 5044.

Yours faithfully,

Chris Avis
Civil Engineer
Mott MacDonald