TTW Structural Civil Traffic Façade

18 May 2020 191326 CAAA.

Hassell Pty Ltd
Level 2, Pier 8/9
23 Hickson Road
Sydney NSW 2000

Attention: Glenn Scott

Brookvale Oval Redevelopment Project

TTW response to Northern Beaches Council Stormwater Queries

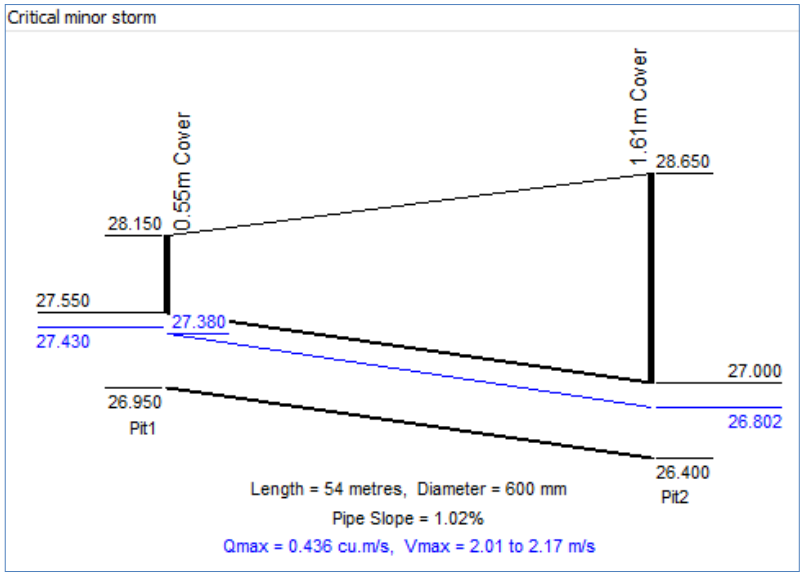
Dear Glenn,

Please find TTW's response to Council's stormwater queries itemised in the table below.

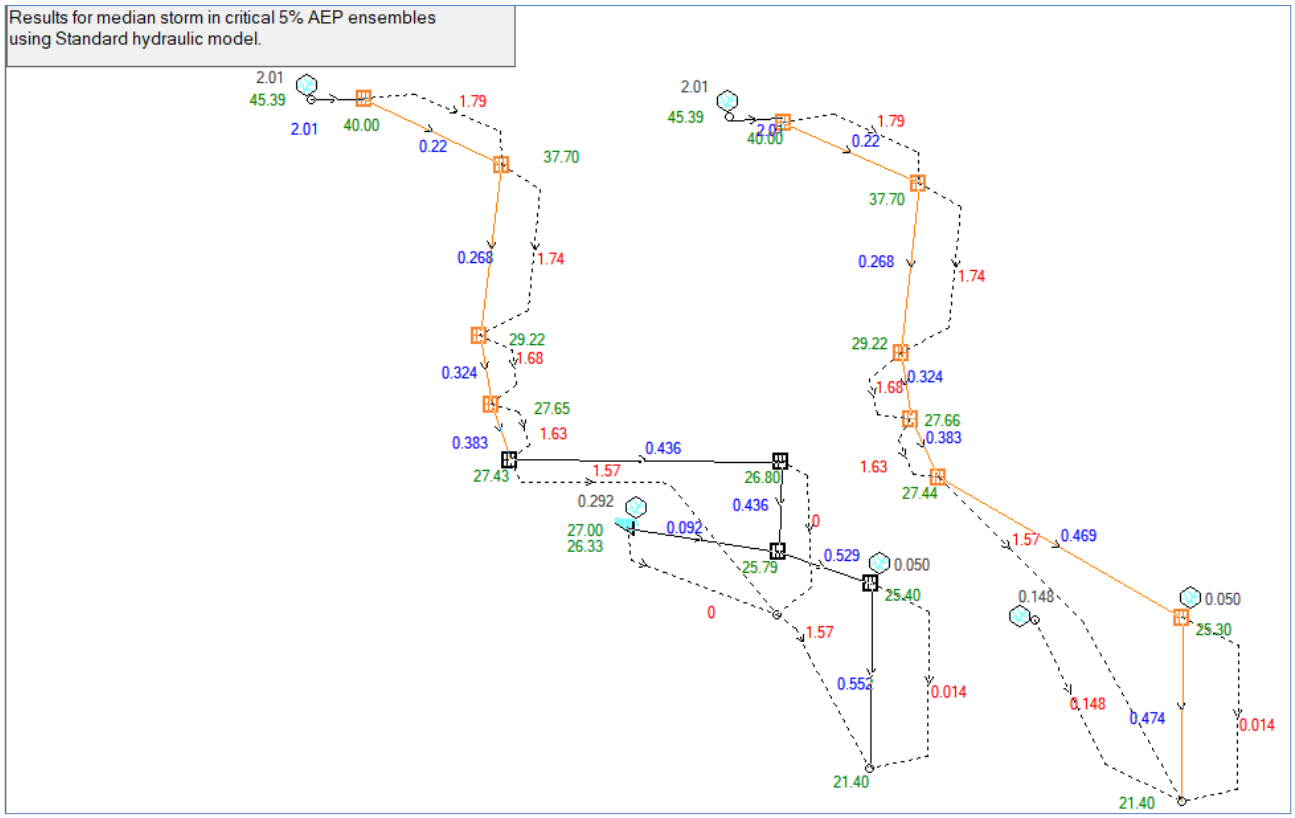
Query	TTW Response
1. The proposed stormwater re diversion does not propose any upgrade from the existing scenario. It is noted that PLM advice and in accordance with Councils Water Management Policy the existing council drainage line to be re diverted is to be upgraded to cater for the 20-year storm event.	We are not upgrading the pipe as the 600mm pipe caters for the 20-year storm event flow. We understand the pipe system should cater for the 20-year ARI storm event from Council's AUS-SPEC 1 – D5 Stormwater Drainage Design. Refer to the long section exported from the DRAINS model. As shown, the HGL is at 27.38m at the upstream end of the pipe, which is within the 600mm pipe and has a maximum pipe flow of 0.436 m^3/s.
2. The submitted information including DRAINS model is not sufficient. Additional information is recommended in order to determine catchment properties, including pipe flows and overland flow extents which may impact the proposed development.	The upstream catchment has been determined based on Google Earth data in conjunction with the Northern Beaches Council drainage map. Refer to the screenshots below. Also attached is the latest DRAINS model which has the upstream catchment modelled in both pre-development and post-development scenarios, which incorporates Council's existing drainage from Binba Place towards the development site. The upstream catchment is modelled to have a 60% impervious area. This drainage analysis illustrates that the proposed development does not negatively impact the downstream conditions in comparison with the pre-development conditions. The site includes effective overland flow paths incorporated around the site for the 100-year storm event to ensure overland flows do not impact the development.

3. Catchment maps, including sub-catchments for the existing council drainage infrastructure. The DRAINS model should be amended to accurately reflect catchment characteristics and is to include the pipe network.	The catchment area is shown in the Council's drainage map. The DRAINS model includes the upstream catchment and pipe network.
4. The DRAINS model is to include the capacity of existing and proposed Council drainage infrastructure with appropriate blockage factors as specified in Councils Auspec one design standard.	The DRAINS model complies with Council's AUS-SPEC 1 and applies the appropriate blockage factors.
5. Submission of plans clearly indicating pre-development and post-development flow path extents for the 1% AEP storm	The pre-development overland flow is 2.57 m^3/s. Refer to cross section below. The post-development overland flow is 2.42 m^3/s. Refer to cross section below.
6. The supporting longitudinal and cross-sectional information at appropriate intervals, including at the upstream and downstream property boundaries of the pre and post development water surface profiles to the 1% AEP.	Refer to the pre-development and post-development long-section of Council's pipe from upstream to downstream shown below.
7. Provision of any stormwater models (DRAINS, HEC-RAS) used in assessment, and relevant supporting input and output information.	The DRAINS model, stormwater plan, catchment area on Council's drainage map are attached.
8. Demonstration of compliance with Council's AUSPEC 1.	We are complying with the intent of Council's AUS-SPEC 1.

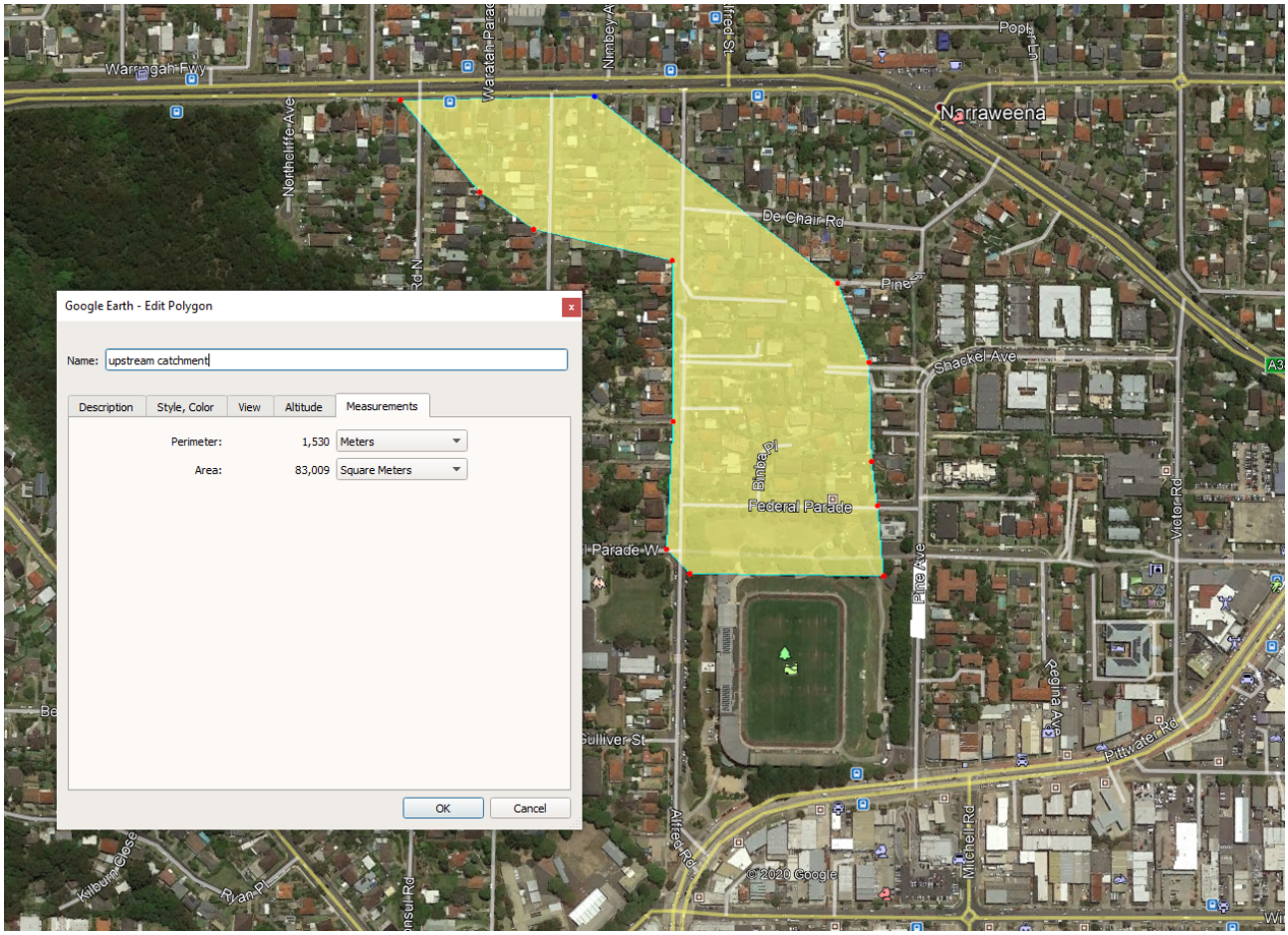
Long-section from DRAINS – 5% AEP storm event



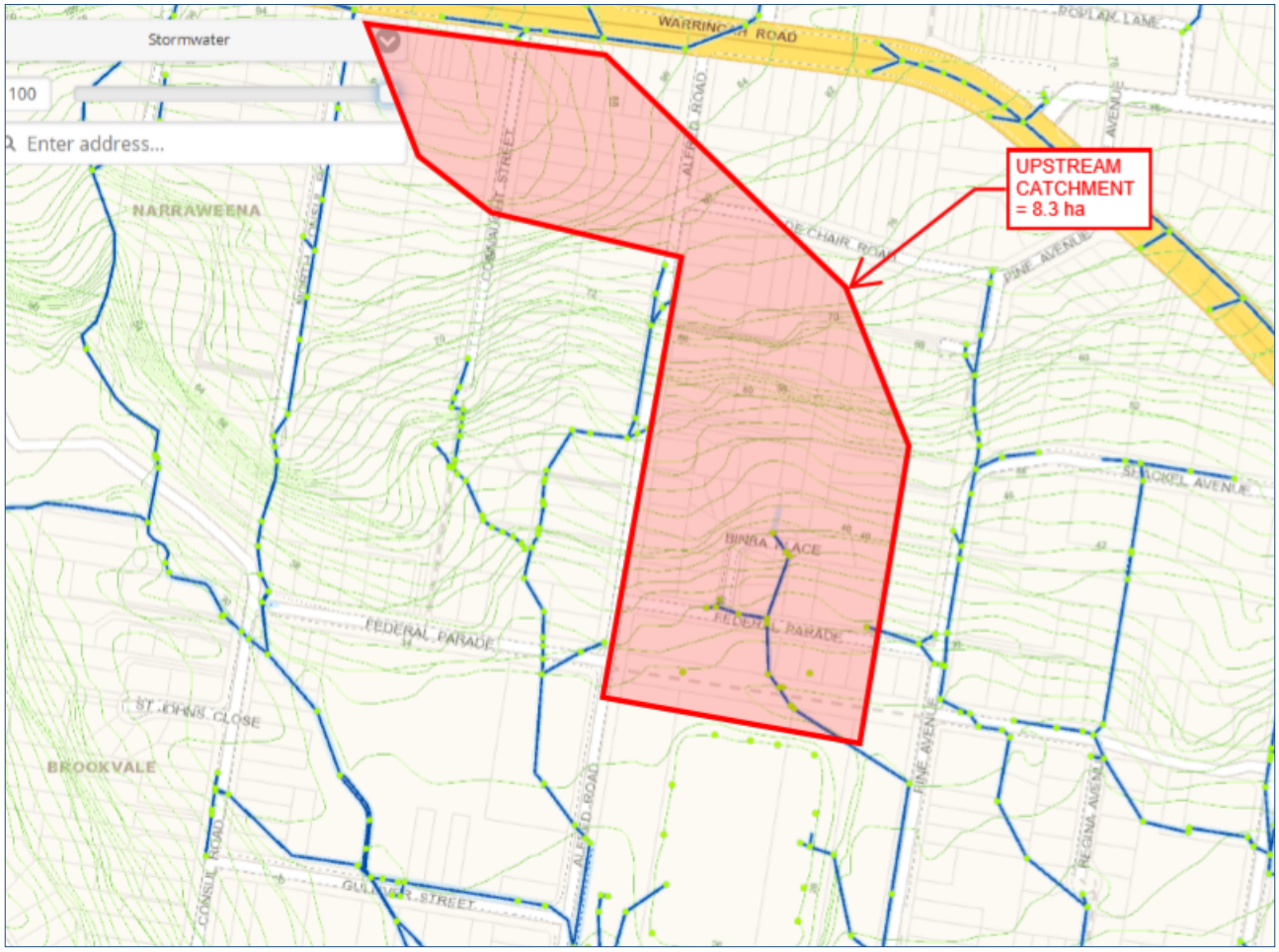
DRAINS Results- 5% AEP storm event



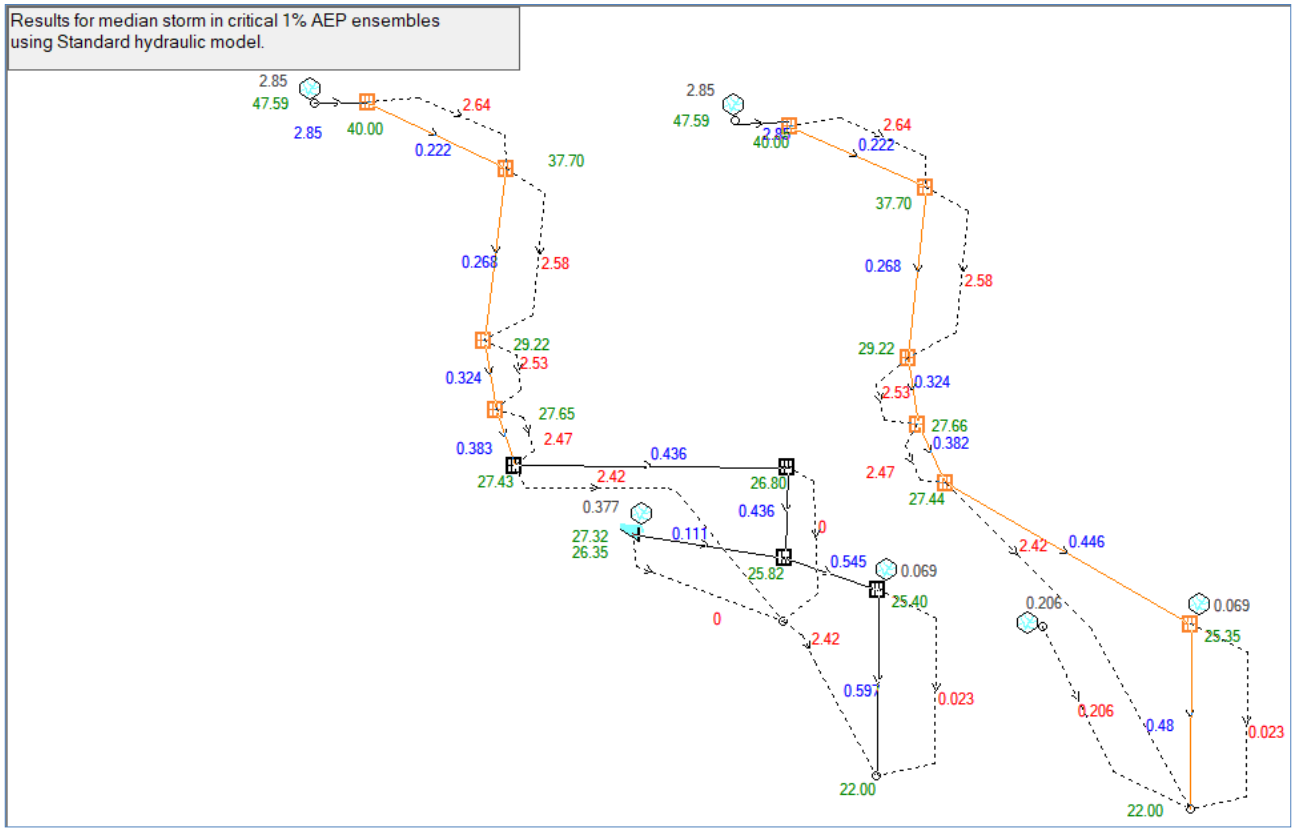
Google Earth Screenshot



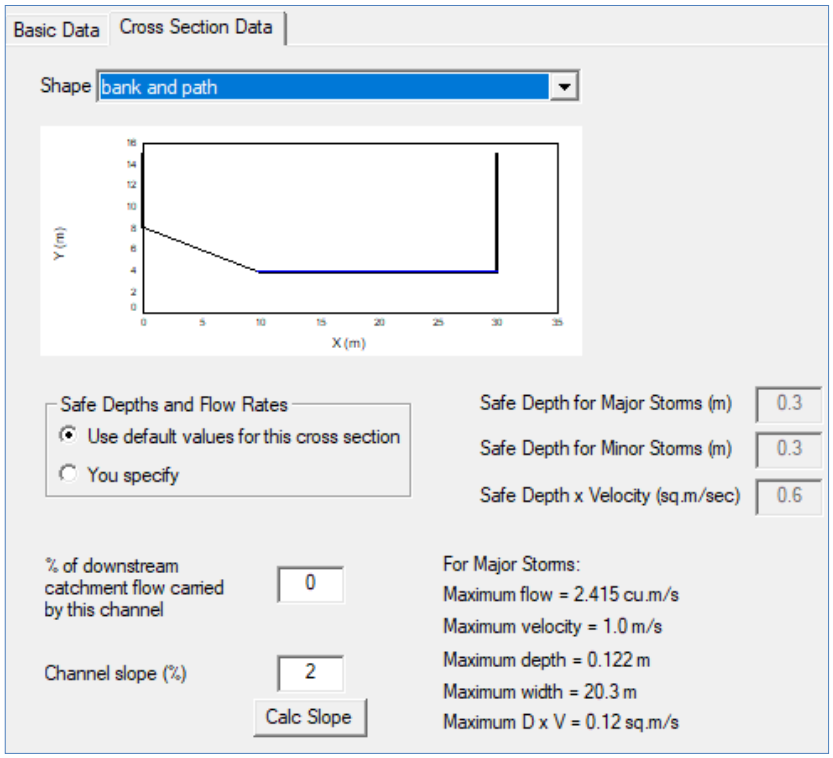
Northern Beaches Council Drainage Map



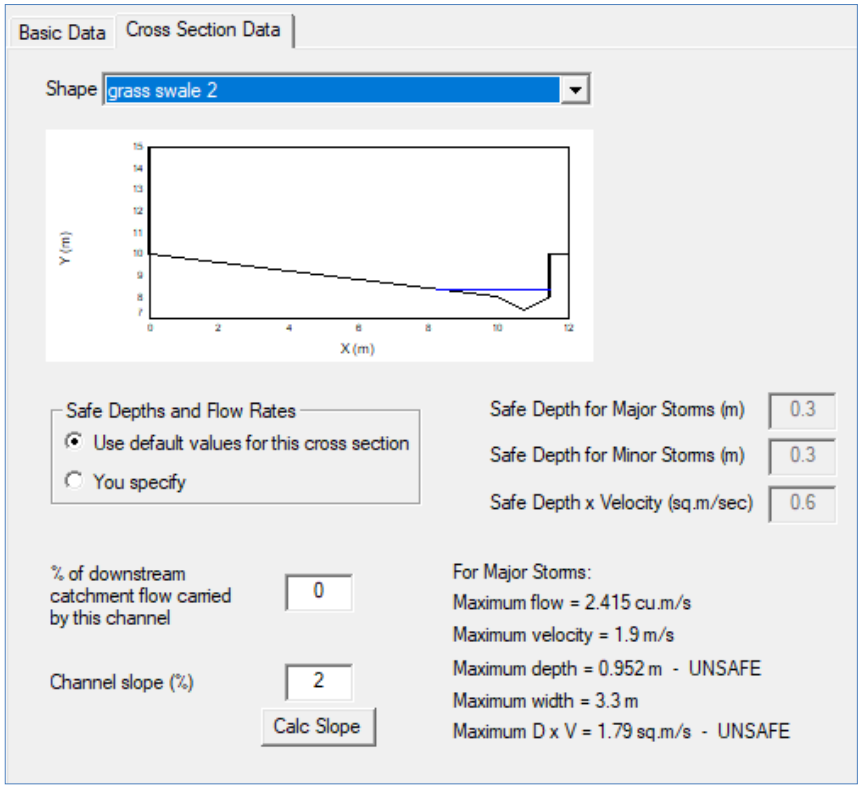
DRAINS Results- 1%AEP storm event



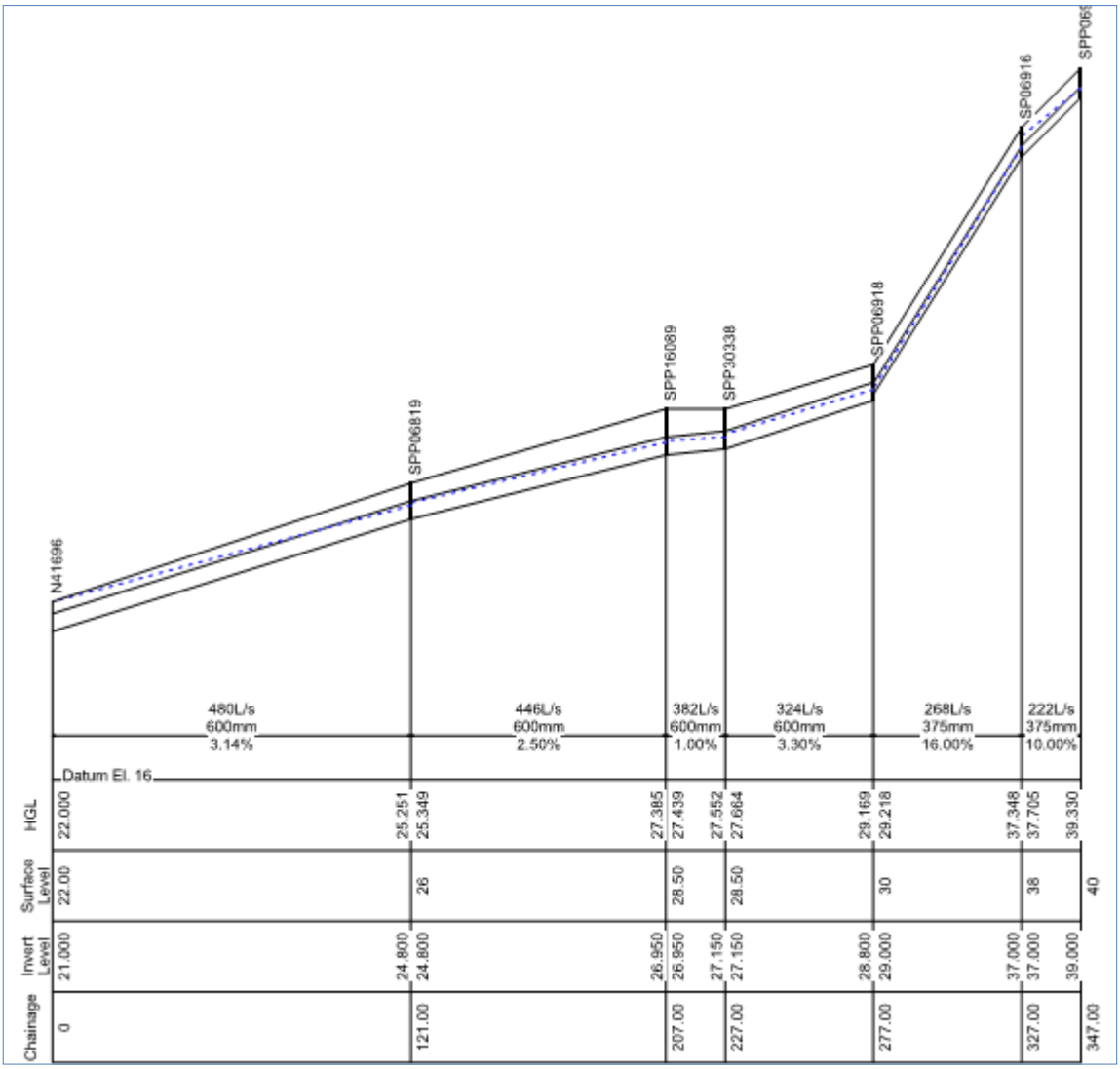
Pre-development 1% AEP Overland Flow Cross section



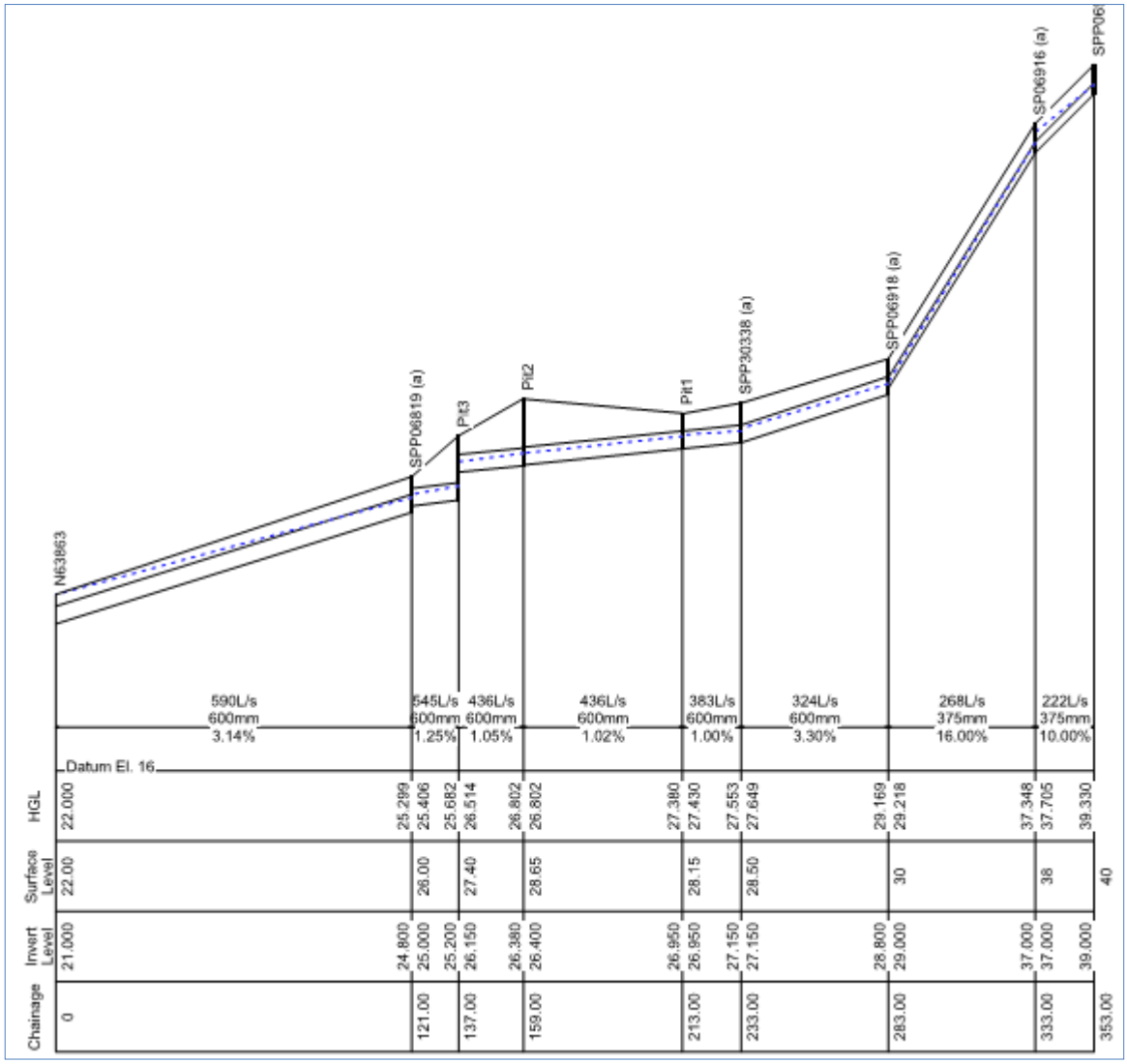
Post development 1% AEP Overland Flow Cross section



Pre-development Council Pipe Long-section



Post-development Council Pipe Long-section



Should you require anything further please contact the undersigned.

Yours faithfully,
TAYLOR THOMSON WHITTING (NSW) PTY LTD
in its capacity as trustee for the
TAYLOR THOMSON WHITTING NSW TRUST

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