WOOD & GRIEVE ENGINEERS

ENQUIRIES: IAN HARRIS
PROJECT NO: 38509-SYD-C

5 MARCH 2019

Northern Beaches Council
PO Box 82 Manly,
NSW 1655 Australia

FAO: Lashta Haidari

181 ALLAMBIE ROAD, ALLAMBIE HEIGHTS – OVERLAND FLOW FLOODING & STORMWATER

This letter has been prepared in response to council's Engineering Referral Response memo dated 25th February 2019 regarding a request for additional information on the upstream catchment overland flow conveyance across the site post development.

WGE have undertaken a review of the upstream catchment and local overland flow route passing directly to the west of the proposed development in order to assess whether the development will impact on this overland flow and whether the overland flow will impact on the development.

Modelling of the existing overland flow path was undertaken using DRAINS hydrology modelling software and the results of this investigation can be read in the accompanying design calculation sheet. The outcome of this assessment were as follows:

1. During both a 100 year and PMF storm event the existing swale has sufficient capacity to safely convey the overland flow from the upstream catchment without overtopping the swale. This assessment also include consideration into the existing culvert running under the road on site. This means that the upstream catchment overland flow will be conveyed across the site without impacting on the proposed development.
2. The overland flow depth in the swale during a 100 year storm event will be a maximum of 311mm meaning that 300mm freeboard will be provided to the bank of the swale during a 100 year storm event.
3. During a PMF storm event the water depth in the swale will be 521mm meaning 90mm freeboard will be provided to the swale bank.
4. The stormwater management system has been designed to attenuate the post development peak discharge back to the predevelopment discharge. This means that the discharge of stormwater into the existing swale will be as per the existing scenario and the proposed development will not adversely impact the ability of the swale to convey the upstream overland flow.

Direct responses to the items raised by council are provided below:

Overland Flow Flooding

- Catchment plan highlighting the full upstream catchment(s). – **Upstream catchment plan included in design calculation sheet.**
- A detailed analysis for any overland flow paths in both pre-development and post-development

conditions, considering the 1% AEP and PMF storm. – **Details of assessment is included in the design calculation sheet and DRAINS model provided. This assessment only shows one condition as the development will not impact on the existing swale.**

- Consideration is to be given to the capacity of the existing Council drainage infrastructure. **– Swale and culvert capacities have been assessment in the DRAINS model. The culvert can convey the 100 year flows but during a PMF event the water will overtop the culvert and discharge over the road.**
- Submission of plans clearly indicating pre-development and post-development flow path extents for both the 1% AEP and PMF storm. **– Flows will be maintained within the swale for both the 100 year and PMF storm events. As such this assessment is not required.**
- Any relevant supporting longitudinal and cross-sectional information at appropriate intervals. – **DRAINS model provided which looks at critical cross section of the swale.**
- Provision of any stormwater models (DRAINS, HEC-RAS) used in assessment, and relevant supporting input and output information. – **DRAINS model provided.**
- Demonstration of compliance with flood related development controls, in particular Warringah LEP 2011 Section 6.3 and DCP 2011 Section E11. – **As noted below the development should be classed as "Residential" and as such is not subject to flood planning restrictions given that assessment of the upstream overland flow suggest that the site should be classed as low flood risk.**
- The site is considered to be within both the Medium and Low Flood Risk Precincts with regard to Prescriptive Controls of WDCP E11 Section 1.2 (a). **– Assessment has indicates that upstream catchments will be safely conveyed around the proposed development. The steep topography across the site also means that there will be good conveyance of stormwater across the site and flooding will be highly unlikely. It is WGE's position that the development should be classed as Low Flood Risk and as such not subject to flood planning requirements.**
- The Land Use Group of the proposed is classified as "Vulnerable Uses" in accordance with WDCP E11 Table 1. As such, a Flood Risk Assessment Report shall be provided and the PMF storm considered. – **This is not correct. The proposed development is not an Aged Care or Seniors Living facility but a Residential Development and as such should be classed as a "Residential" use.**
- It is considered there may be conflicts with existing overland flow paths and the proposed development. As such, flood mitigation measures may be required. **– The assessment of the existing swale indicates that there will be no conflict between the upstream overland flow path and the proposed development as the overland flow will be contained within the existing swale for all storm events up to and including the PMF.**
- The submitted bulk earthworks plan does not address the area of the proposed Pool Building. – **Updated Bulk earthworks plan included.**
- The landscape plans propose works to be undertaken within the existing drainage channel running along the northern boundary and through the site. These works have not been considered with respect to impact on overland flows. **– No works will be undertaken in the swale.**

Stormwater

- A proposed finished level contour plan shall be provided clearly indicating the direction of stormwater runoff and any developed areas that bypass the OSD system. **– Updated finished surface contours are included in the updated GA plan.**
- The proposed below ground OSD tank beneath the Pool Building is not supported. Council's OSD Technical Specification Section 4.7 shall be addressed with respect to OSD access/location, floor levels and safe overflow routes. **– The OSD tank will be located in an undercroft below the deck outside the pol building. All hatches will be external to the building and the tank has been designed to surcharge over and internal weir rather than through the hatches.**

We trust that this information is sufficient for your purposes, however should you have any queries in regards to this report please feel free to contact me.

Yours faithfully

Ian Harris
for **Wood & Grieve Engineers**

Encl

cc

Project Name:	181 Allambie Road, Allambie Heights
Project Number:	38509
Design Engineer:	RT
Office:	Sydney
Date:	5/03/2019 1:38 PM
Design Section:	Flooding

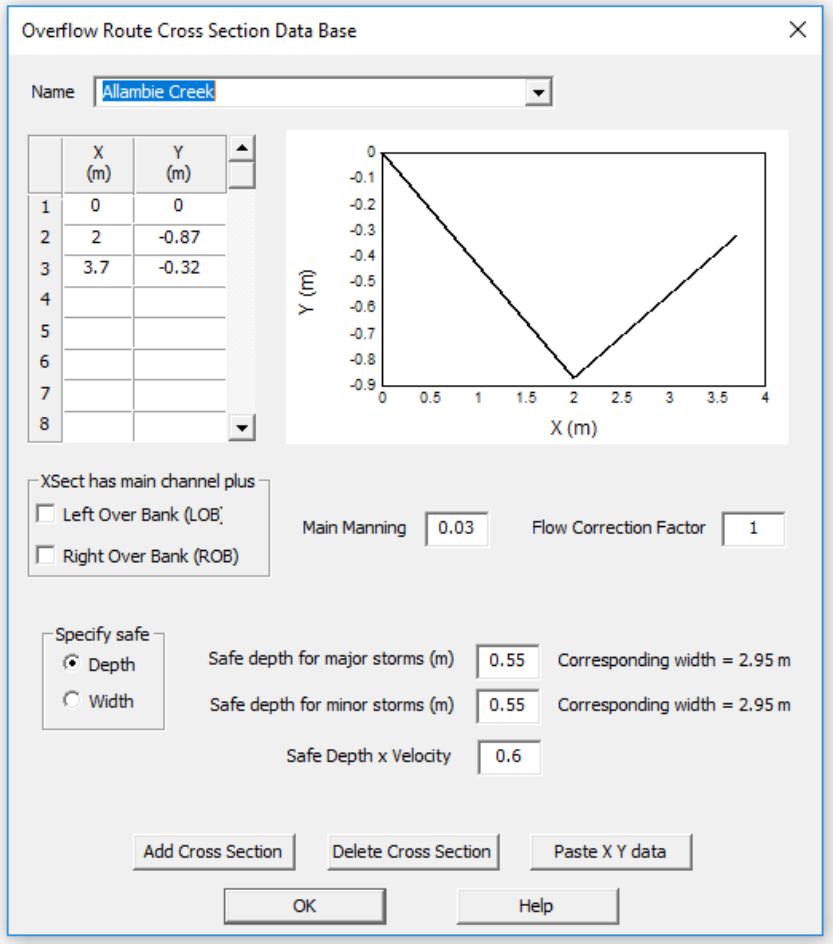
Adjacent Creek Analysis

Upstream Catchment

Project Name:	181 Allambie Road, Allambie Heights
Project Number:	38509
Design Engineer:	RT
Office:	Sydney
Date:	5/03/2019 1:38 PM
Design Section:	Flooding

Existing Creek Cross Section

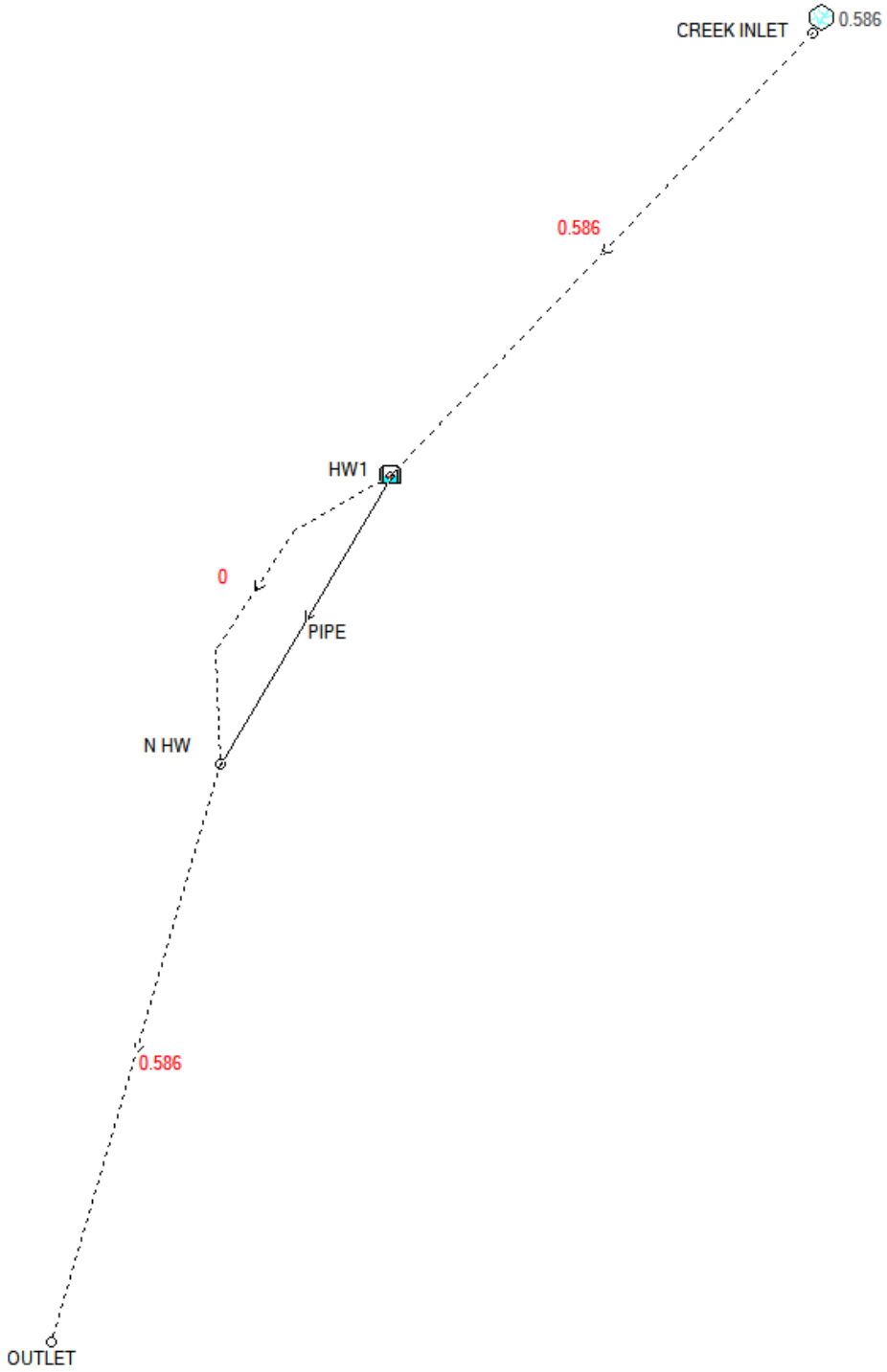
Taken from survey as most shallow point on adjacent creek. Approx. depth – 0.55m. Refer cross section modelled in DRAINS below.



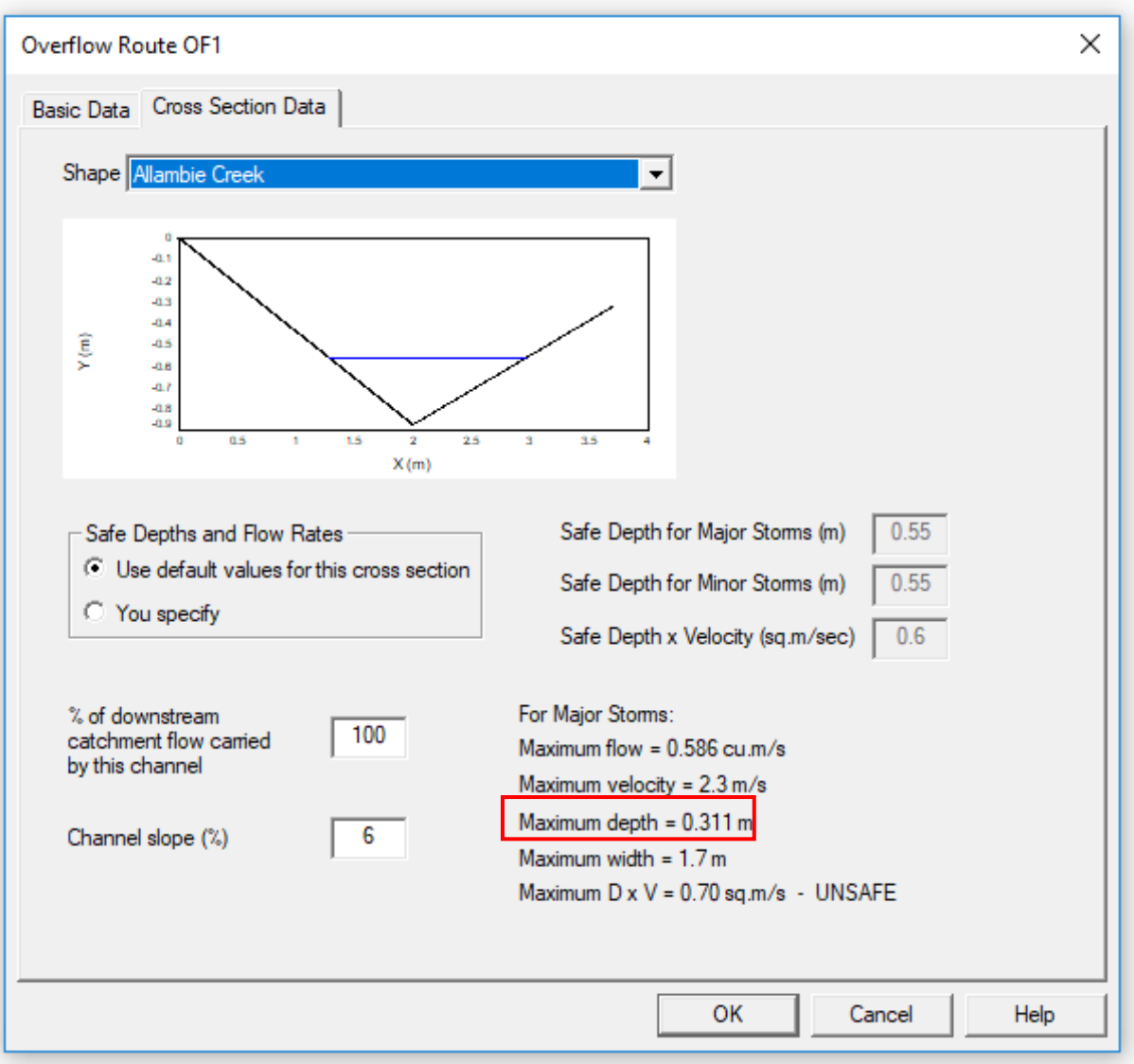
- Upstream Catchment = 1.04Ha
    - Effective Impervious Area = 30%
- Design storm :
    - 100yr ARI taken from ARR 2016
    - PMF ARI using BOM 2013 – Bulletins

Project Name:	181 Allambie Road, Allambie Heights
Project Number:	38509
Design Engineer:	RT
Office:	Sydney
Date:	5/03/2019 1:38 PM
Design Section:	Flooding

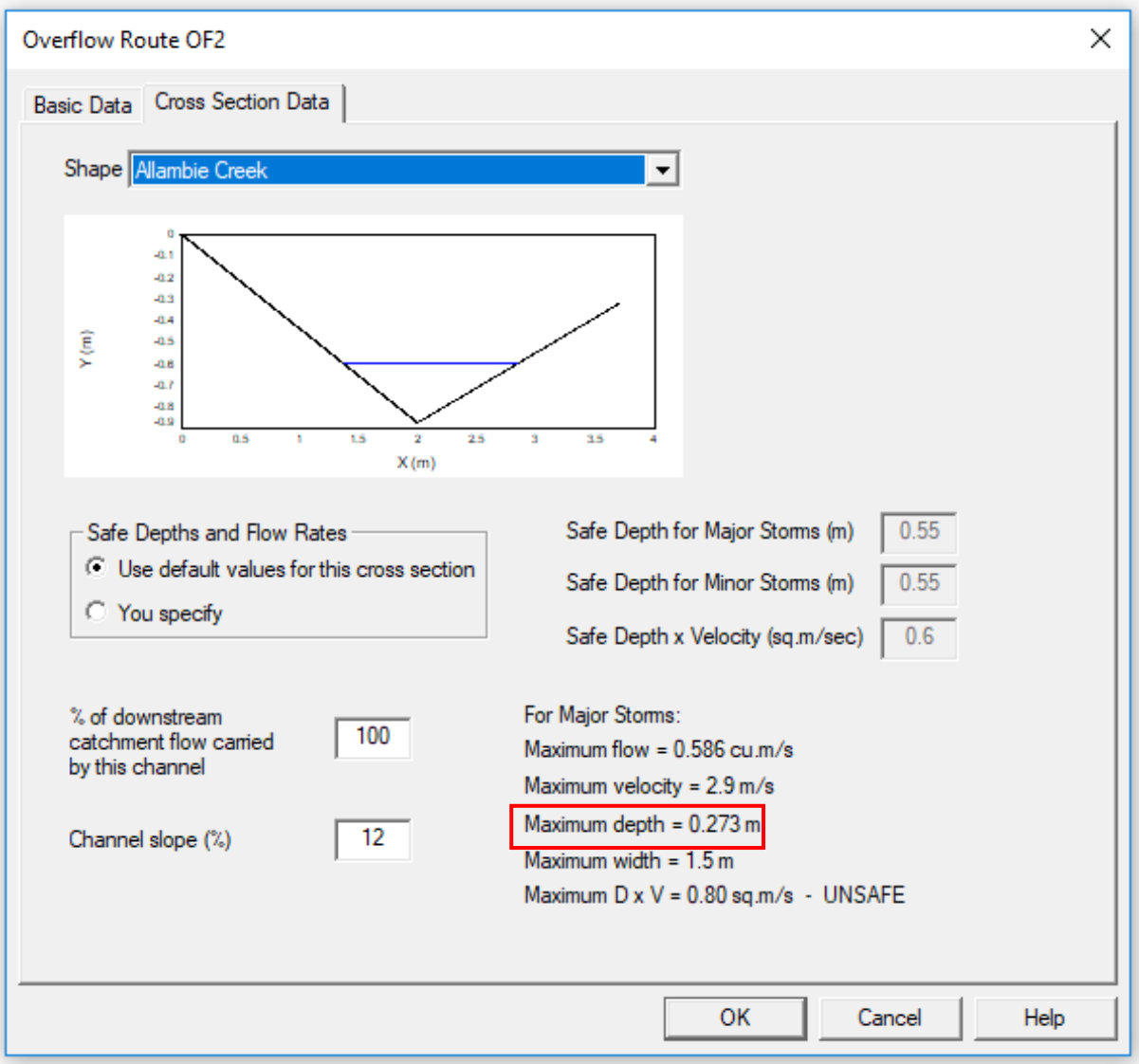
100 Year Rainfall Event - DRAINS Results



Project Name:	181 Allambie Road, Allambie Heights
Project Number:	38509
Design Engineer:	RT
Office:	Sydney
Date:	5/03/2019 1:38 PM
Design Section:	Flooding



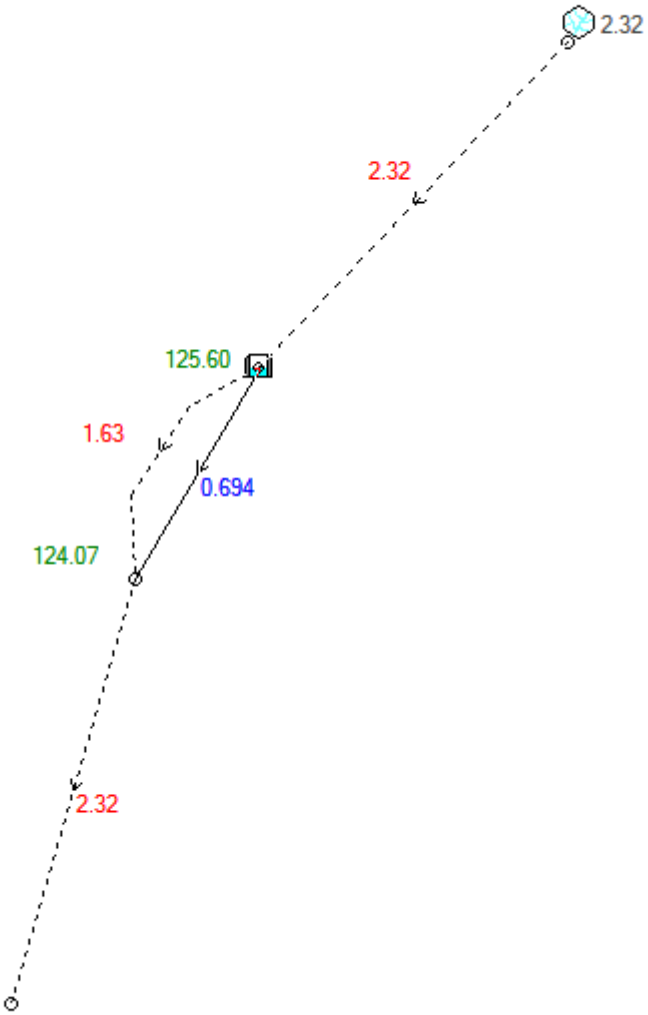
Project Name:	181 Allambie Road, Allambie Heights
Project Number:	38509
Design Engineer:	RT
Office:	Sydney
Date:	5/03/2019 1:38 PM
Design Section:	Flooding



From the above 100yr rainfall event DRAINS results, the creek does not overtop in the 100yr event, with a maximum depth of flow of 0.311m.

Project Name:	181 Allambie Road, Allambie Heights
Project Number:	38509
Design Engineer:	RT
Office:	Sydney
Date:	5/03/2019 1:38 PM
Design Section:	Flooding

PMF Event – DRAINS Results

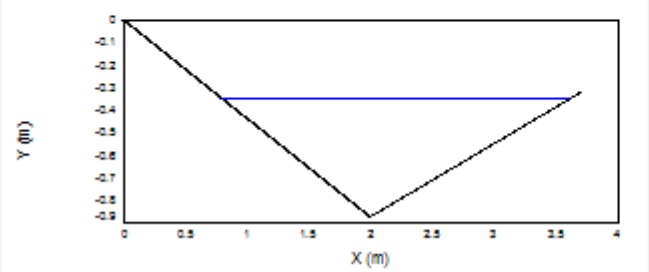


Project Name:	181 Allambie Road, Allambie Heights
Project Number:	38509
Design Engineer:	RT
Office:	Sydney
Date:	5/03/2019 1:38 PM
Design Section:	Flooding

Overflow Route OF1

Basic Data | Cross Section Data

Shape: Allambie Creek



Safe Depths and Flow Rates
- (•) Use default values for this cross section
- ( ) You specify

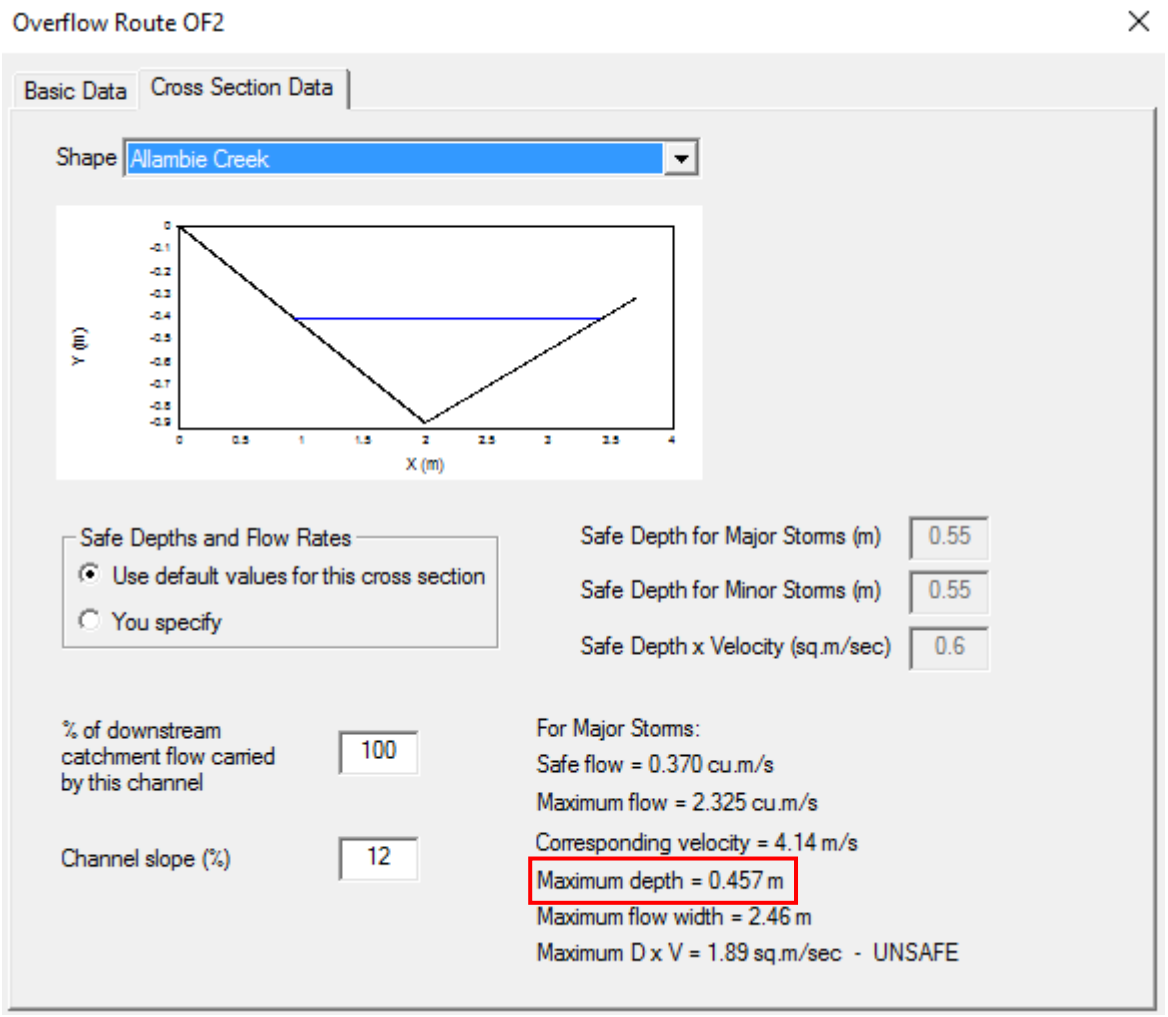
Safe Depth for Major Storms (m): 0.55
Safe Depth for Minor Storms (m): 0.55
Safe Depth x Velocity (sq.m/sec): 0.6

% of downstream catchment flow carried by this channel: 100

Channel slope (%): 6

For Major Storms:
Safe flow = 0.458 cu.m/s
Maximum flow = 2.325 cu.m/s
Corresponding velocity = 3.18 m/s
Maximum depth = 0.521 m
Maximum flow width = 2.81 m
Maximum D x V = 1.66 sq.m/sec - UNSAFE

Project Name:	181 Allambie Road, Allambie Heights
Project Number:	38509
Design Engineer:	RT
Office:	Sydney
Date:	5/03/2019 1:38 PM
Design Section:	Flooding



From the above PMF rainfall event DRAINS results, the creek does not overtop in the PMF event, with a maximum depth of flow of 0.521m.

It is noted that the existing creek is quite steep which generates a high velocity of flow however, the proposed development does not contribute additional flow to the creek.