



Controlling Cumulative Floodplain Development Using Velocity-Depth Products

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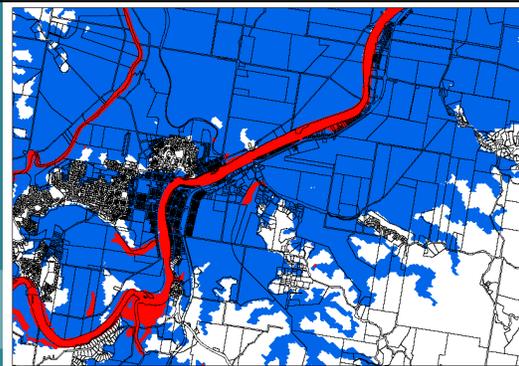
The Problem

- Individual development in isolation has negligible impact, but many similar developments may have significant "cumulative impacts"
- Must take into account cumulative impacts of floodplain development
- Manual provides limited guidance
- Impossible to predict all future scenarios and land uses - broad range of land use permissible in rural zone
- Tweed examples:
 - Aquaculture farm
 - Sugar mill bunding for co-gen plant
 - Tea tree oil processing plant
 - Sand extraction
 - Turf farm water storages
 - Waste Water Treatment Plant
 - Equestrian pad

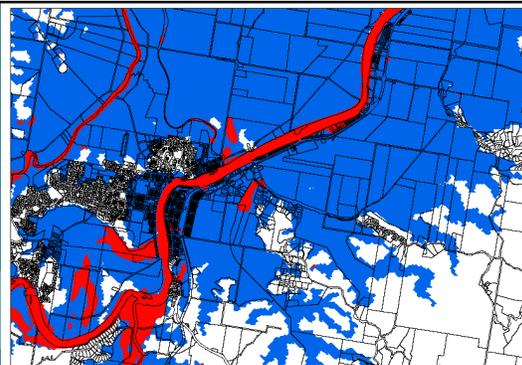


The Tweed Approach

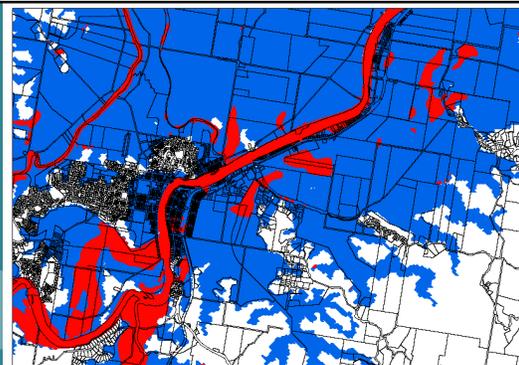
- Principle - Keep the majority of development outside of areas conveying the majority of flood water
- Velocity – Depth Products (vxd)
- m^2/s applied to unit width = flow
- 2D TUFLOW modelling by BMT WBM in Tweed Valley Flood Study
- Iterations of vxd mapping
- vxd = 0.3 provided connectivity of out of river flows
- Not a "floodway" definition
- Not a hazard category
- Conveyance function of land
- Floodplain classified as "high" and "low" flow



VxD = 1.0 (Floodway definition in 1986 Manual)

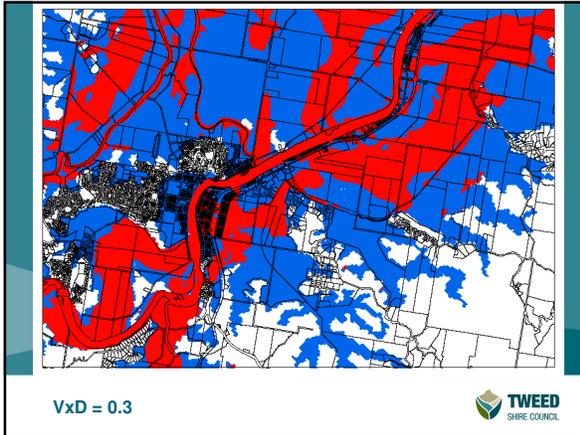


VxD = 0.7



VxD = 0.5





Cumulative Development Controls

- Floodplain Risk Management Study and Plan (adopted October 2007)
- Development Control Plan (adopted August 2008)
- Applied to land use zones
- High flow area controls
 - RURAL**
 - Depth of fill max 0.3m
 - Building footprint max 80m²
 - Separation for flow between structures
 - Open fencing
 - RESIDENTIAL**
 - Max 50m² enclosure below design flood level
 - COMMERCIAL / INDUSTRIAL**
 - Max fill height 5% AEP flood
 - Max 50% site coverage above 5% AEP flood level
- Advice on s149 certificates

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Has it been tested?

- Bolster v Tweed Shire Council [2007] NSWLEC 390, Brown C
 - Erection of two sheds for farm storage and tea tree processing and storage
 - 7760m² fill pad, 16,900m³ imported fill, two sheds 864m² and 36m²
 - Located in mapped high flow area
 - Alternate cumulative development scenarios modelled by applicant's engineer
 - Development standards – arbitrary and not convinced they should be blindly followed, but allowing significant departures would largely disregard the contents of the study. More rigorous development standards based on modelling would be desirable.
 - Precedent - the site has no special physical characteristics to distinguish itself from other sites in the floodplain, proper assessment of cumulative impacts could only be undertaken through modelling of the whole catchment, and could only practicably be undertaken by Council.
 - Appeal dismissed and DA refused

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