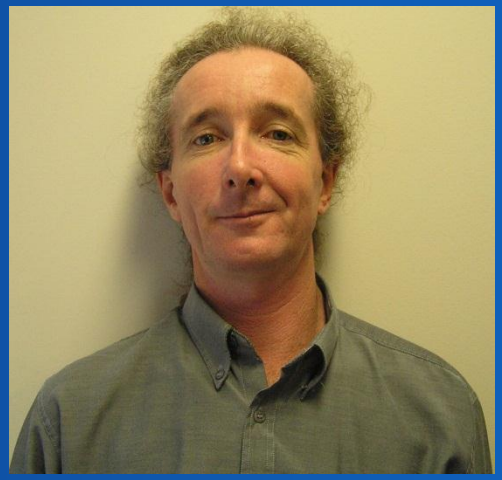
NSW GOVERNMENT Office of Environment & Heritage

Inundation Scenarios in Floodplain Risk Management

John Murtagh



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I am a Risk Manager

- I'm not a Scientist
  - I don't wait to know exactly how things work
- I use Engineering Principles
  - I will use empirical relationships that work, whether or not a scientist can explain how they work

What I try to achieve

Help a community avoid

- Death
- Injury
- Penury (bankruptcy)


Disaster Relief

How do I do it?

Help Councils & Communities to understand

- **What gets how wet how often for how long**
- **What the consequences (of inaction) are**
- **What (if anything) can be done**
- **What the consequences (of action) are**
- **What Floodplain Risk Management Plan to implement**

Risk Management Approach

- **Risk is a product of both**
  - **Chance (or probability) and**
  - **Consequence (or damage)**

Risk analysis for structural damage to residential development in floodplains
based on a traditional single storey, brick veneer, slab on ground house

Floor level range	Likelihood of above floor flooding	Chance of experiencing in a life time	Structural damage consequences				
			Insignificant < $1,000	Minor d < 0.1m $1,000 - $5,000	Moderate d > 0.1 & < 0.5m $5,000 - $25,000	Major d > 0.5 &< 1.0m $25,000 - $50,000	Catastrophic loss of house $150,000 plus
1:10,000 AEP to PMF	Improbable	0.7% - 0.07%	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
1:1,000 to 1:10,000 AEP	Rare	7% - 0.7%	Low Risk	Low Risk	Low Risk	Low Risk	Medium Risk
Flood of record to 1:1,000 AEP	Unlikely	30% - 7%	Low Risk	Low Risk	Low Risk	Medium Risk	High Risk
1:100 AEP to flood of record	Possible	50% - 30%	Low Risk	Low Risk	Medium Risk	High Risk	Extreme Risk
1:50 to 1:100 AEP	Likely	75% - 50%	Low Risk	Medium Risk	High Risk	Extreme Risk	Extreme Risk
Below 1:50 AEP	Almost Certain	100% - 75%	Medium Risk	High Risk	Extreme Risk	Extreme Risk	Extreme Risk

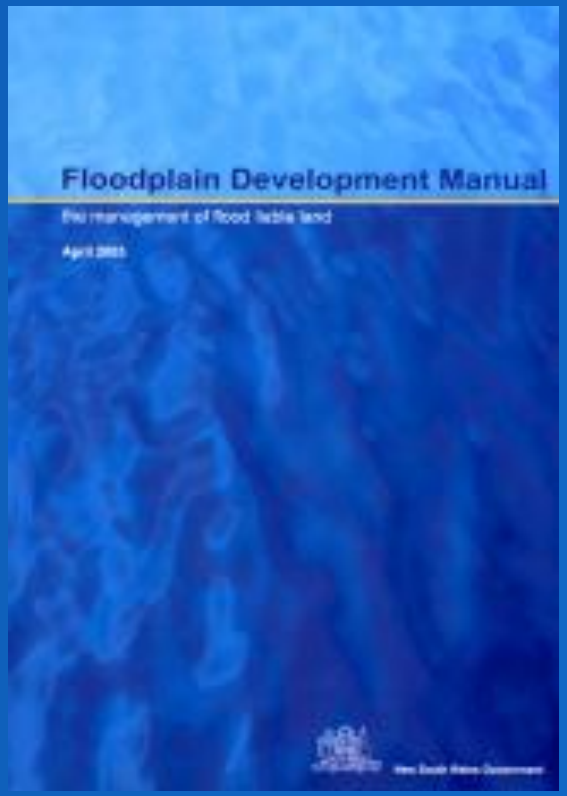
The Flood Prone Land Policy Statement

The primary objective of the policy is to reduce the impact of flooding and flood liability on individual owners and occupiers of flood prone property, and to reduce private and public losses from floods utilising ecologically positive methods, where possible.

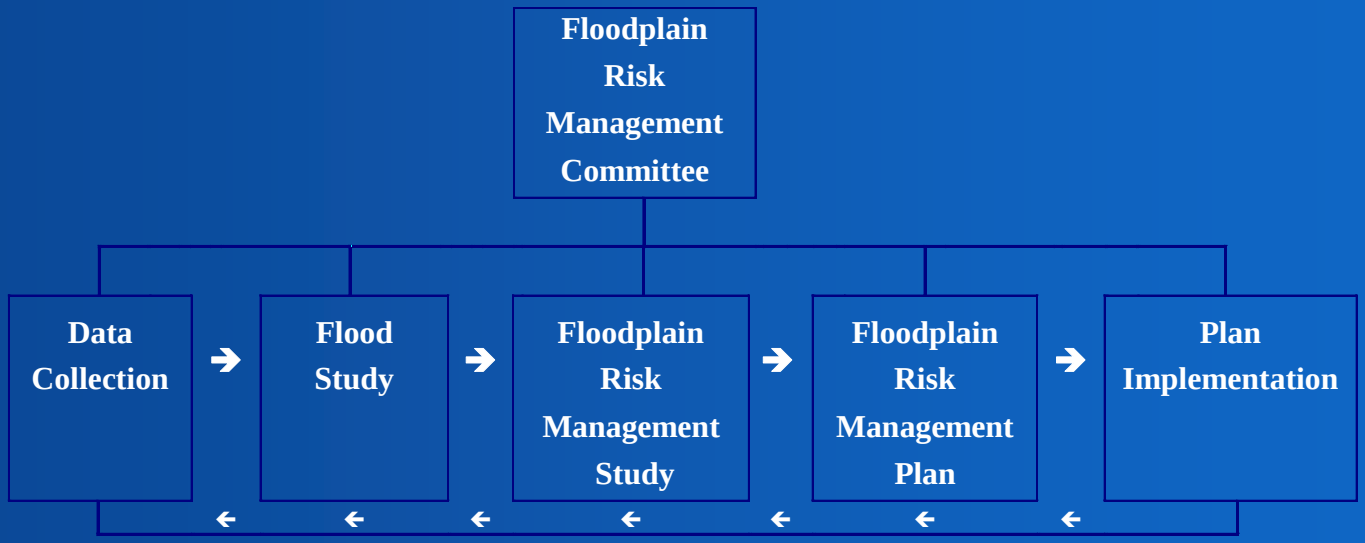
Risk Management Process

NSW Government Flood Prone Land Policy

Floodplain Development Manual



Floodplain Risk Management Process



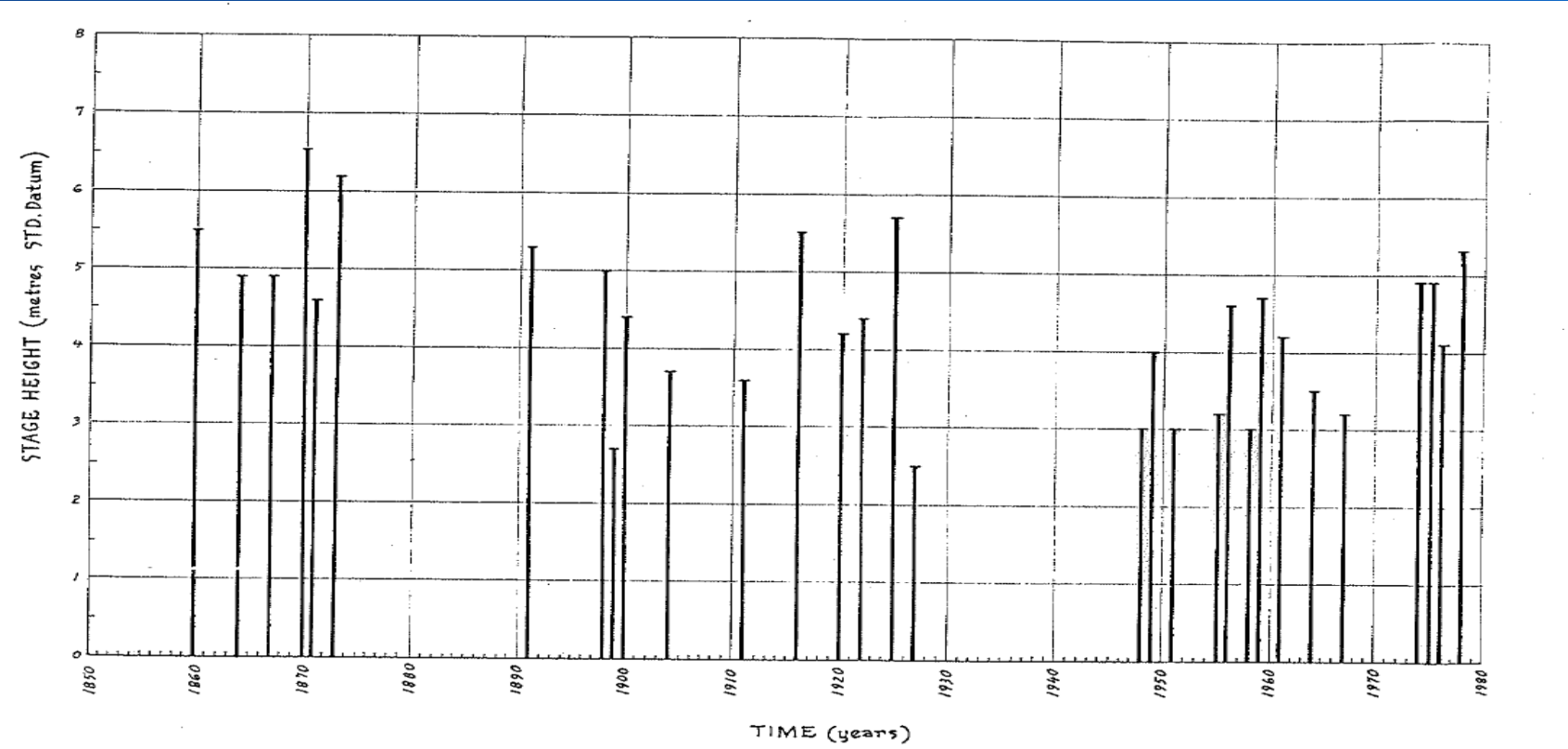
Data Collection & Flood Study

- **Documents**
  - Existing conditions across the catchment
  - Timing, depth, velocity, extent & duration of flooding across the floodplain & AEP range
  - High or Low Hazard areas across the floodplain & AEP range
  - Floodway, Storage & Fringe areas across the floodplain & AEP range

Inundation Scenarios

- Catchment and/or Local runoff
  - 1%AEP rainfall = 1%AEP Flood level
- Ocean storm surge
  - 1%AEP Ocean Level = 1%AEP Flood level
- Entrance state particularly for ICOLLs
  - How often, long & deep will areas flood behind an open, shoaled or closed entrance
- Tidal
  - How often, long & deep will tides like HHWSS flood areas now & into the future

Flood History at Nowra



Nowra Bridge Deck Level = 6.5 to 7mAHD
1%AEP Peak Flood Level = 6.3m AHD
Riverview Road Levee Crest Level = 6.4mAHD

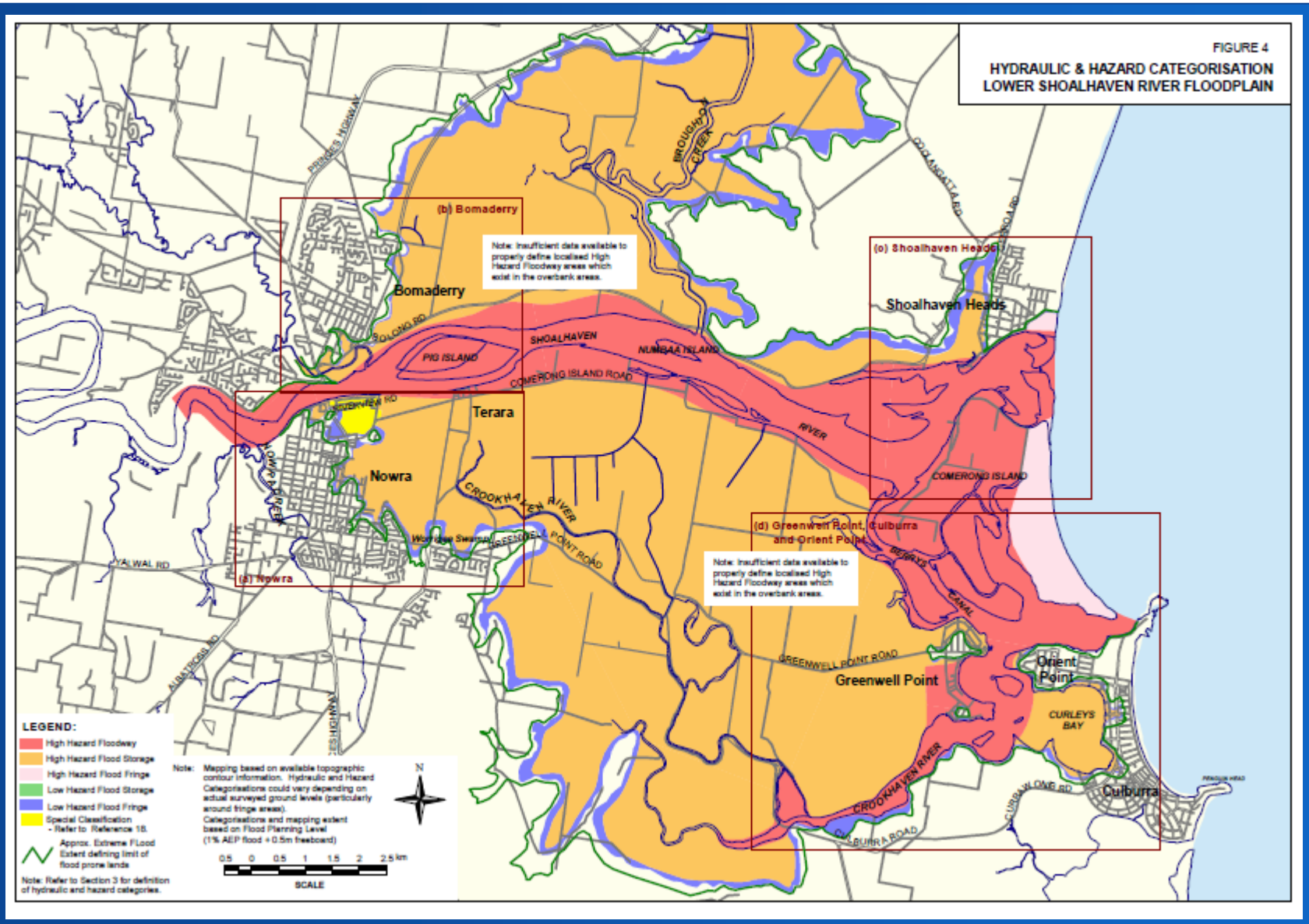


FIGURE 4
HYDRAULIC & HAZARD CATEGORISATION
LOWER SHOALHAVEN RIVER FLOODPLAIN
(b) Bomaderry
Note: Insufficient data available to properly define localised High Hazard Floodway areas which exist in the overbank areas.
(c) Shoalhaven Heads
(a) Nowra
(d) Greenwell Point, Culburra and Orient Point
Bomaderry
Shoalhaven Heads
Terara
Nowra
Greenwell Point
Orient Point
Culburra
PRINCES HIGHWAY
BROUGHTON CREEK
COLANGATTA RD
SOLONG RD
PIG ISLAND
SHOALHAVEN RIVER
NUMBAA ISLAND
COMERONG ISLAND ROAD
COMERONG ISLAND
CLEVEDON RD
LOWER CRANNEL
CROOKHAVEN RIVER
GREENWELL POINT ROAD
YALWAL RD
ALBATROSS RD
BERRYS CANAL
CURLEYS BAY
CULBURRA ROAD
LEGEND:
High Hazard Floodway
High Hazard Flood Storage
High Hazard Flood Fringe
Low Hazard Flood Storage
Low Hazard Flood Fringe
Special Classification - Refer to Reference 18.
Approx. Extreme Flood Extent defining limit of flood prone lands
Note: Refer to Section 3 for definition of hydraulic and hazard categories.
Note: Mapping based on available topographic contour information. Hydraulic and Hazard Categorisations could vary depending on actual surveyed ground levels (particularly around fringe areas).
Categorisations and mapping extent based on Flood Planning Level (1% AEP flood + 0.5m freeboard)
N
0.5 0 0.5 1 1.5 2 2.5 km
SCALE

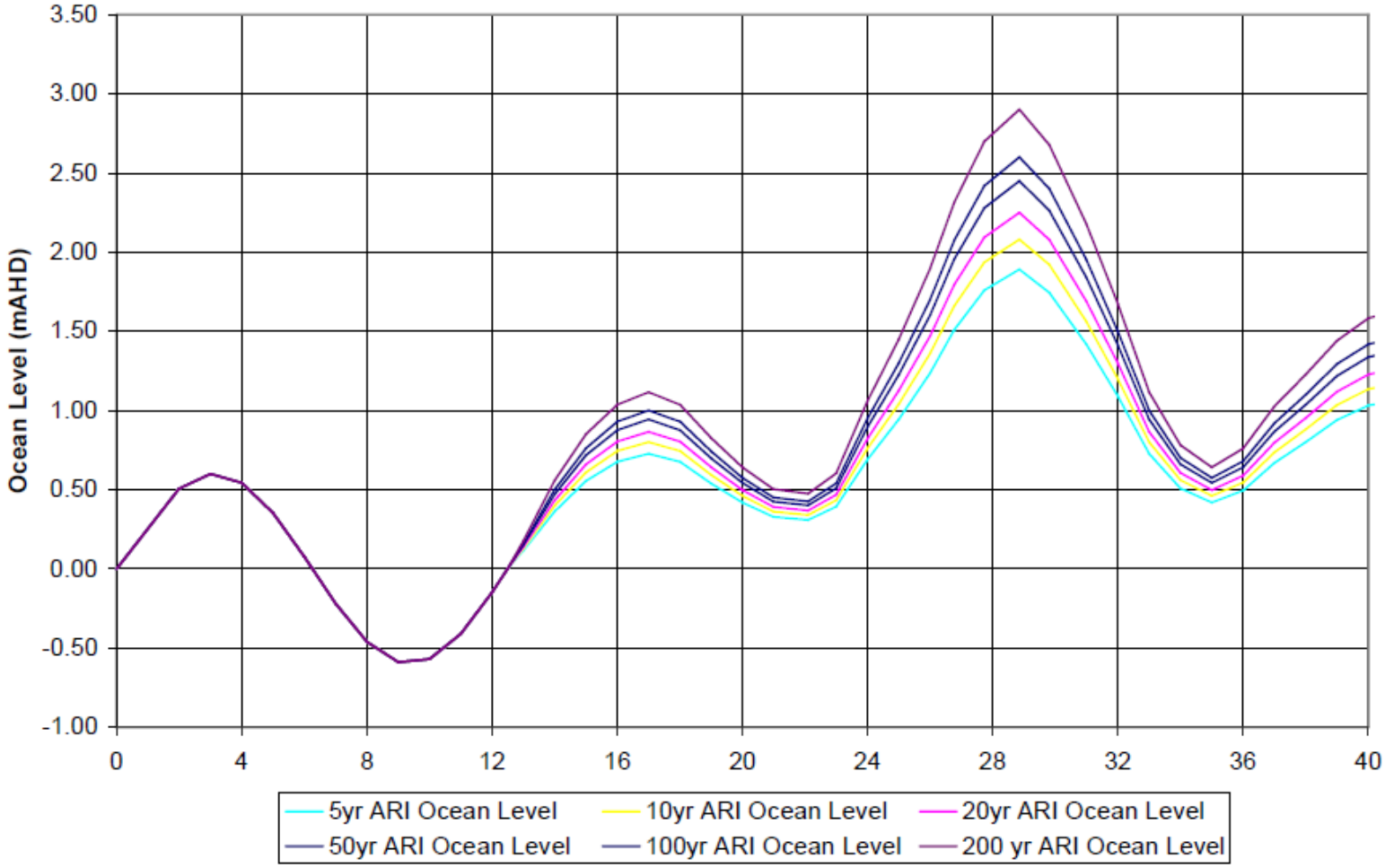
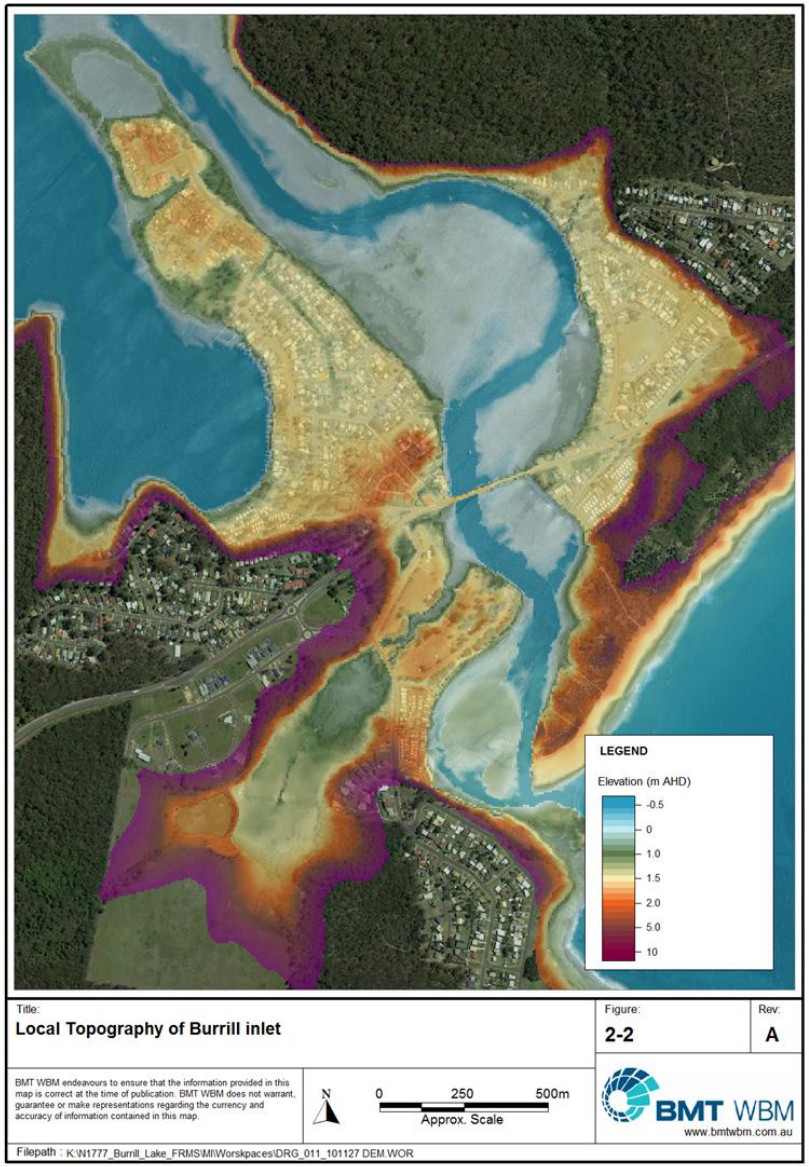


Figure 7-3 Floodplain Management Guideline No.5 - Design Ocean Water Levels at Burrill Lake


LEGEND
Elevation (m AHD)
-0.5
0
1.0
1.5
2.0
5.0
10
Title:
Local Topography of Burrill inlet
Figure:
2-2
Rev:
A
BMT WBM endeavours to ensure that the information provided in this map is correct at the time of publication. BMT WBM does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.
N
0
250
500m
Approx. Scale
BMT WBM
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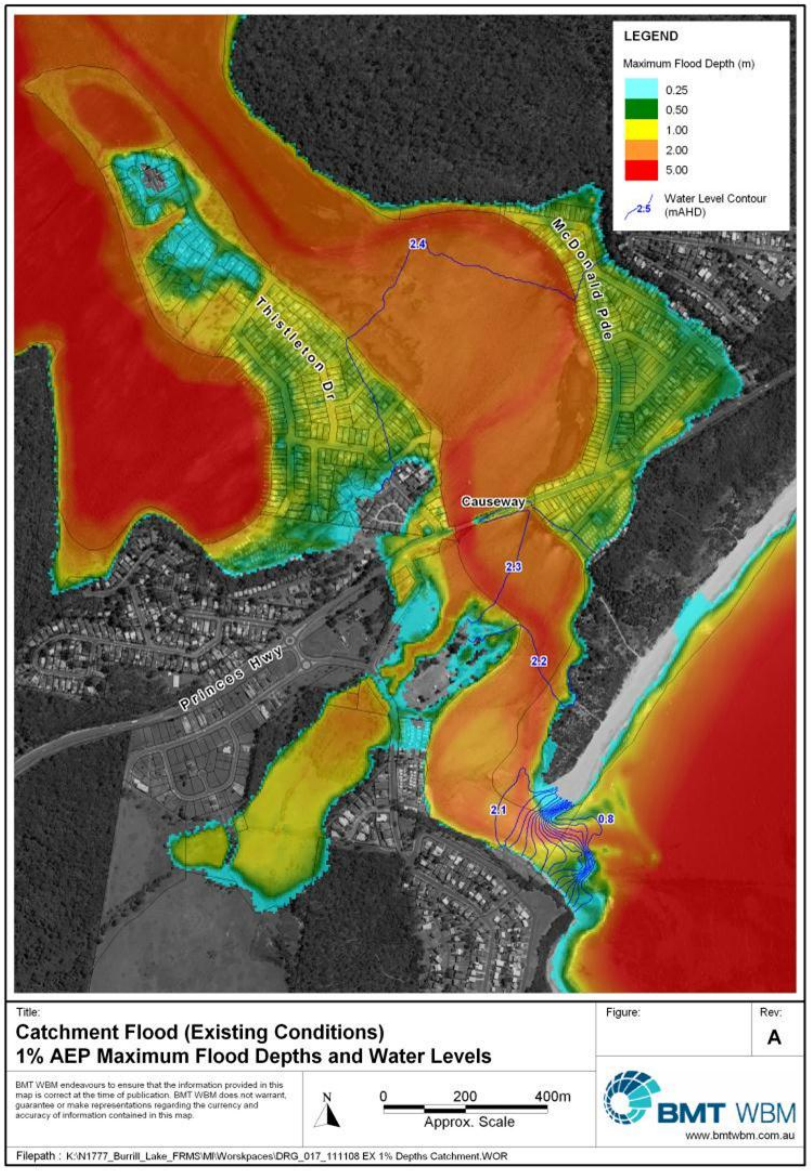
Filepath : K:\N1777_Burrill_Lake_FRMS\Mf\Worskpaces\DRG_011_101127 DEM.WOR


LEGEND
Maximum Flood Depth (m)
0.25
0.50
1.00
2.00
5.00
Water Level Contour (mAHD)
2.5
McDonald Pde
Thistleton Dr
Causeway
Princes Hwy
2.4
2.3
2.2
2.1
0.8
Title:
Catchment Flood (Existing Conditions)
1% AEP Maximum Flood Depths and Water Levels
Figure:
Rev:
A
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0
200
400m
Approx. Scale
BMT WBM
www.bmtwbm.com.au
Filepath : K:\N1777_Burrill_Lake_FRMS\Mf\Worskpaces\DRG_017_111108 EX 1% Depths Catchment.WOR

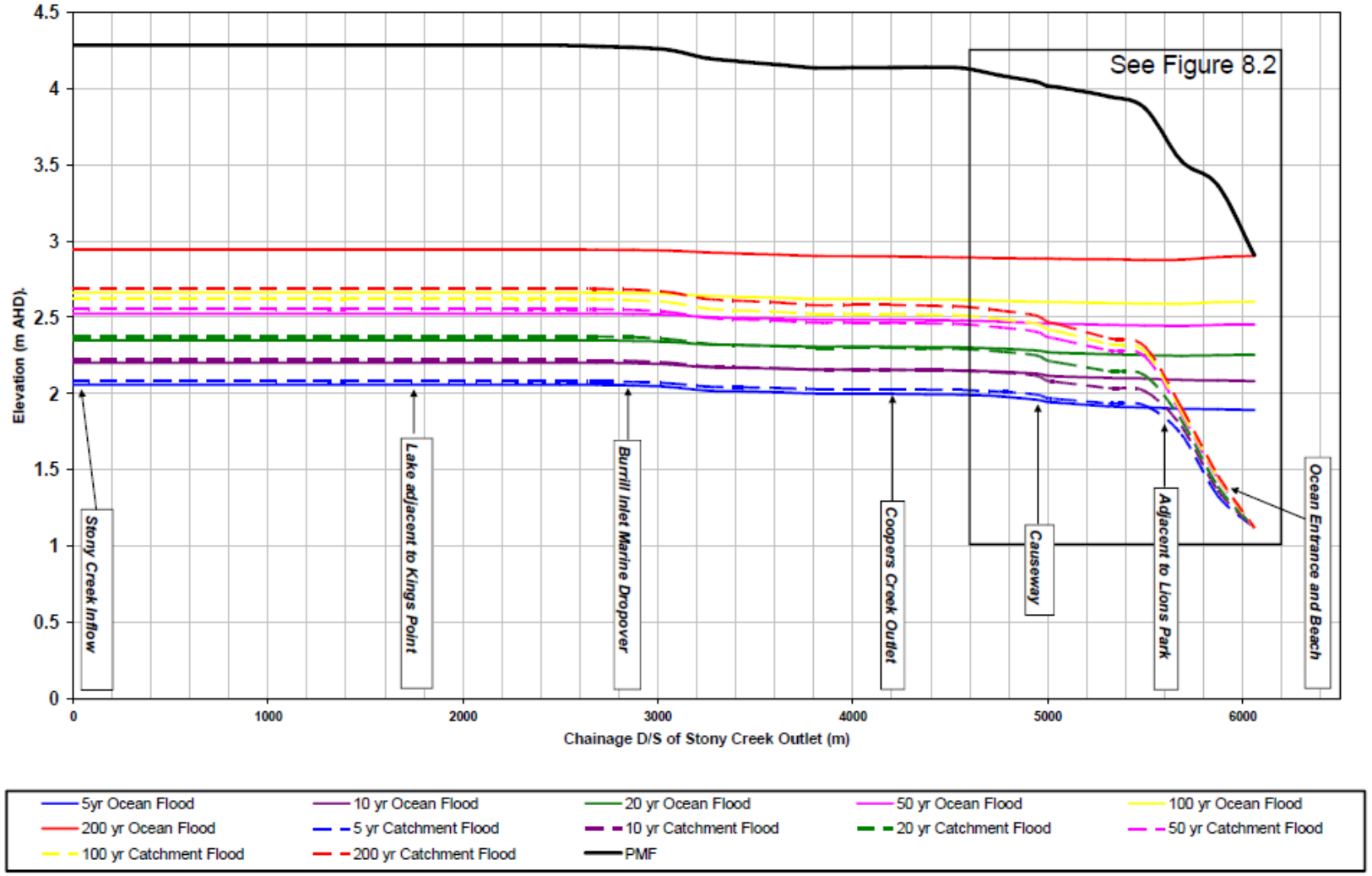


Figure 8-1 Burrill Lake Longitudinal Profile of Design Flood Water Levels

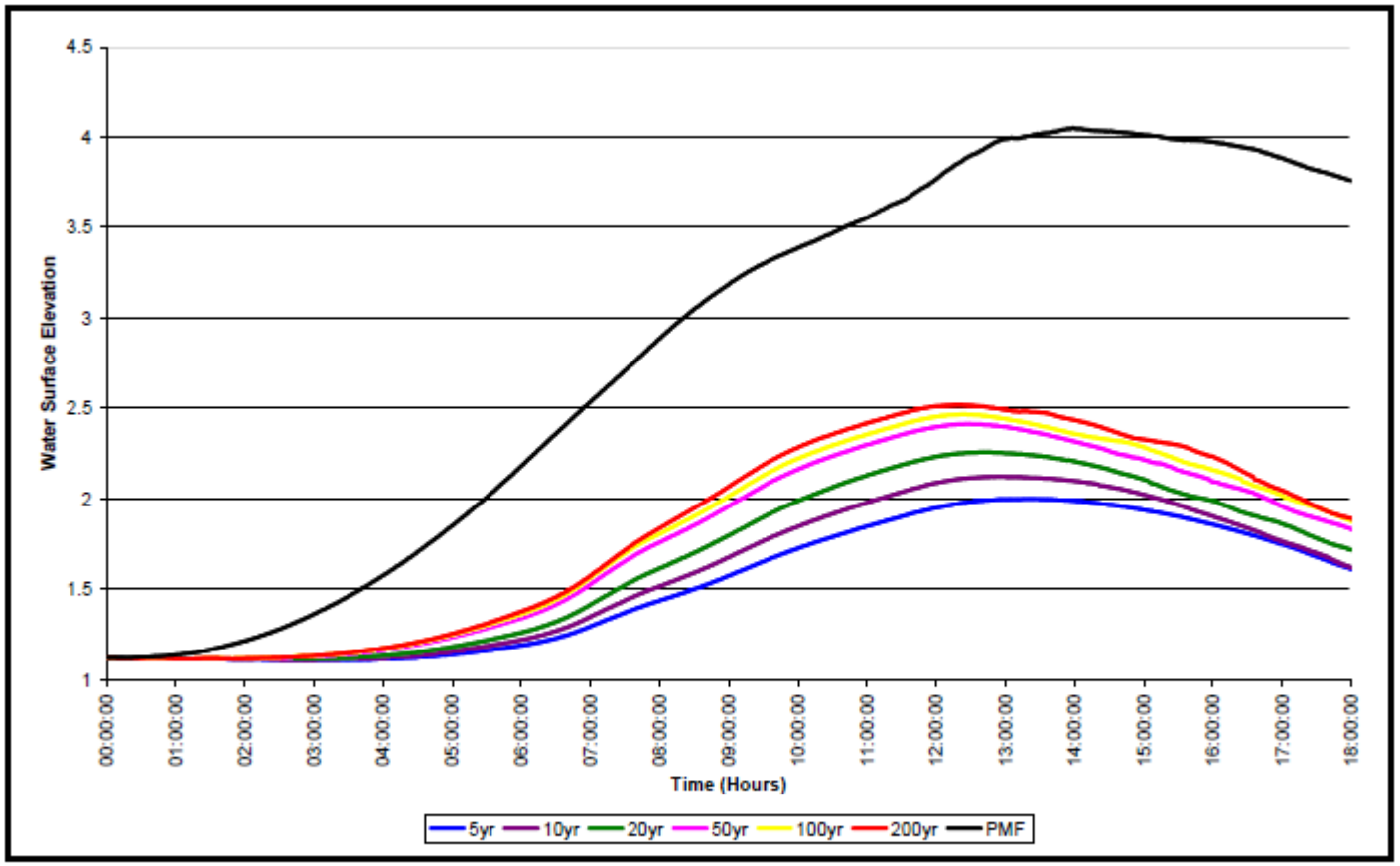


Figure 8-4 Predicted Catchment Design Flood Water Level Hydrographs at the Causeway

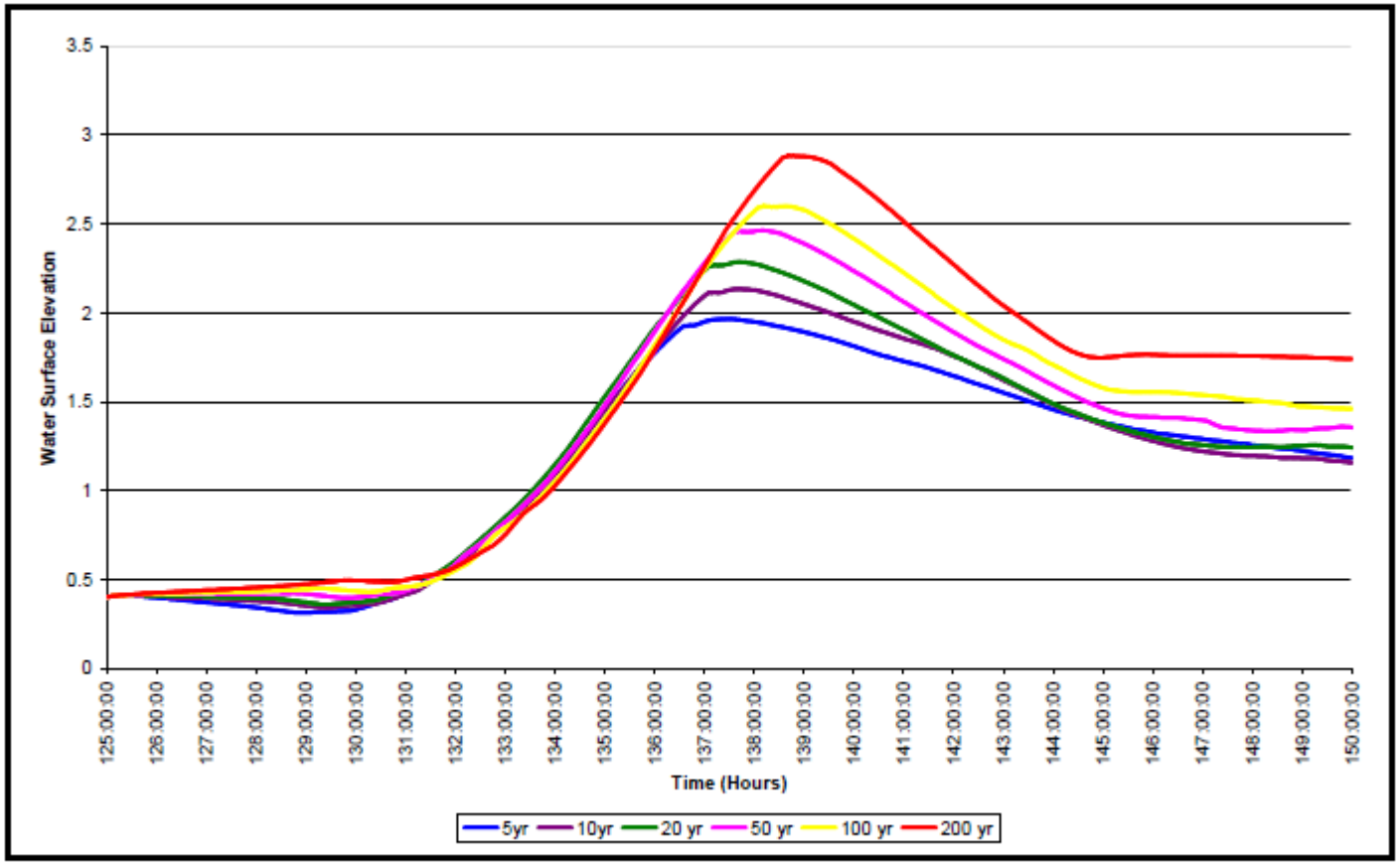
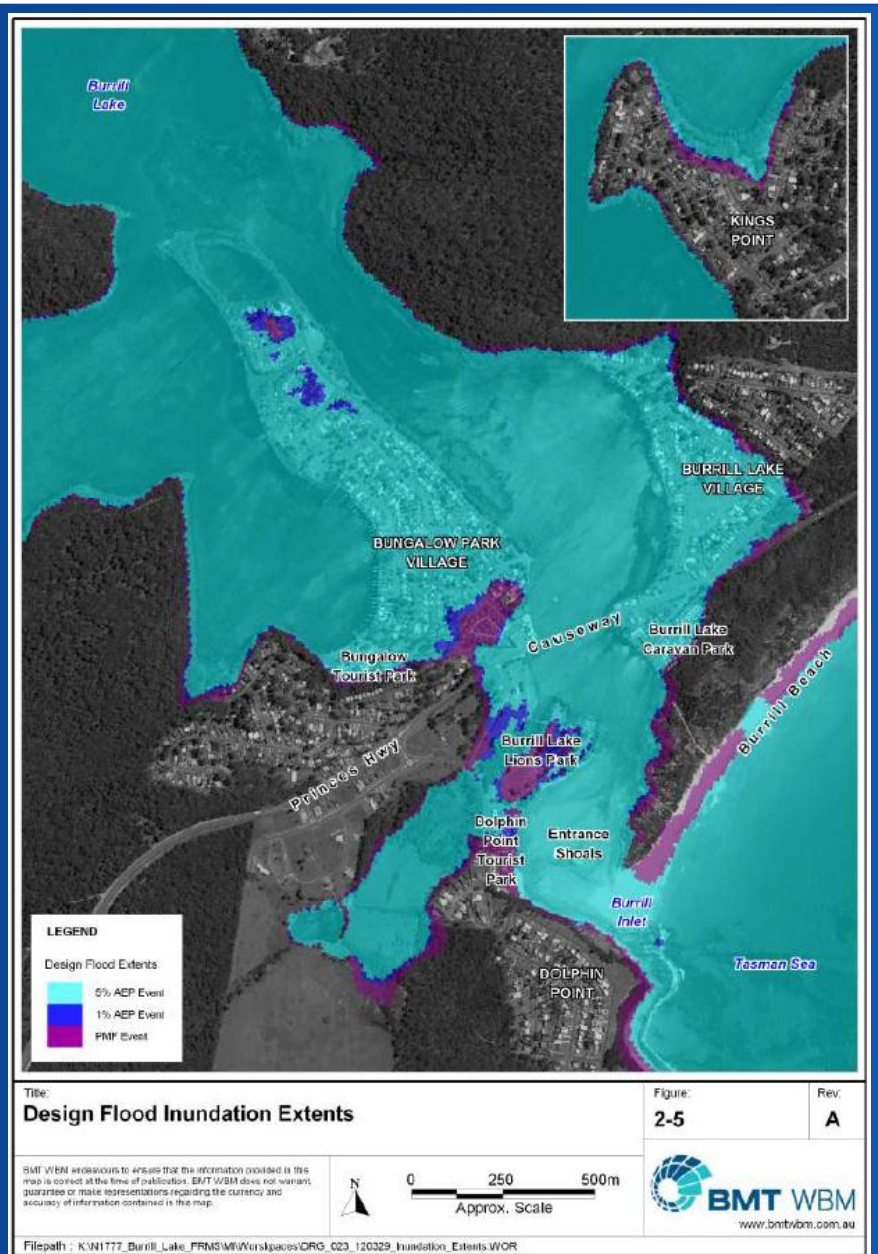


Figure 8-6 Predicted Oceanic Design Flood Water Level Hydrographs at the Causeway


Burrill Lake
KINGS POINT
BURRILL LAKE VILLAGE
BUNGALOW PARK VILLAGE
Causeway
Burrill Lake Caravan Park
Bungalow Tourist Park
Princes Hwy
Burrill Lake Lions Park
Burrill Beach
Dolphin Point Tourist Park
Entrance Shoals
Burrill Inlet
Tasman Sea
DOLPHIN POINT
LEGEND
Design Flood Extents
5% AEP Event
1% AEP Event
PMF Event
Title:
Design Flood Inundation Extents
Figure:
2-5
Rev:
A
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Approx. Scale
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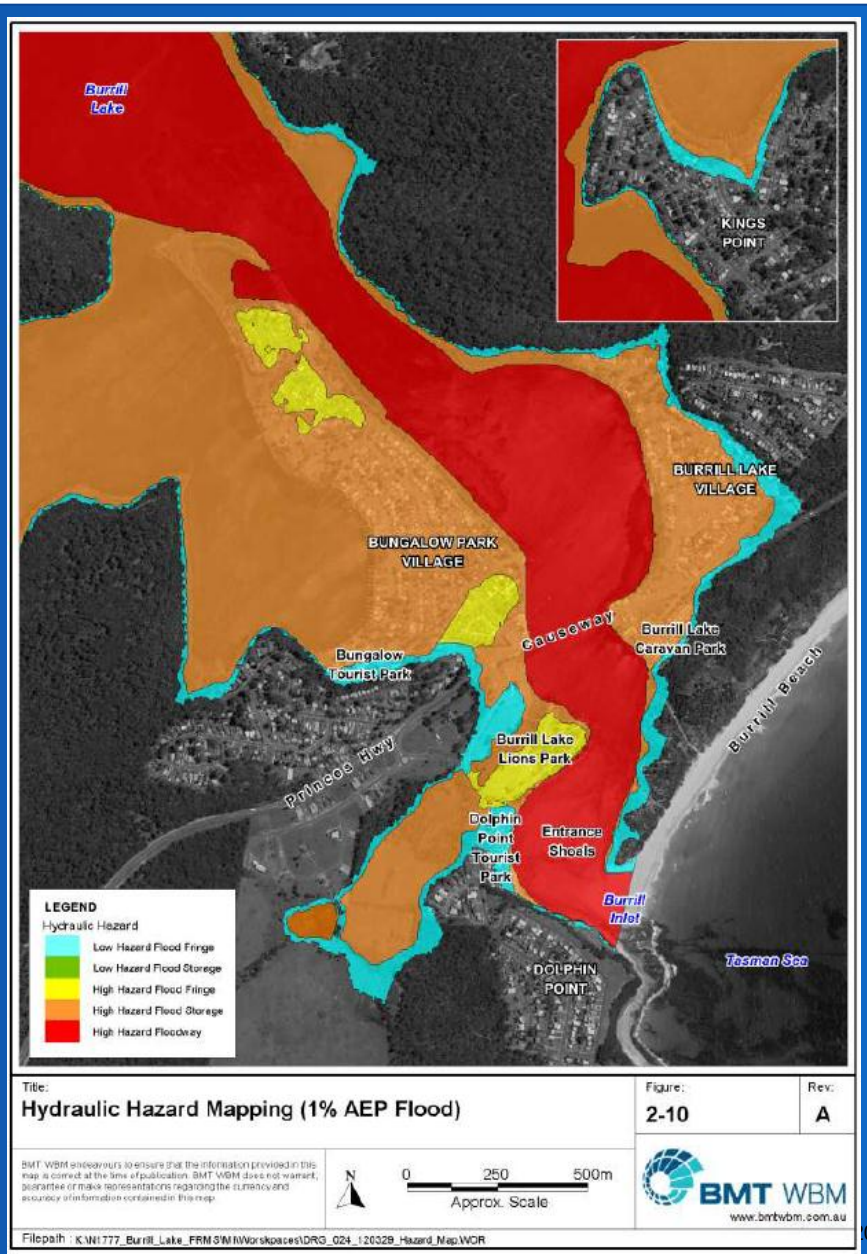
Burrill Lake
KINGS POINT
BURRILL LAKE VILLAGE
BUNGALOW PARK VILLAGE
Causeway
Burrill Lake Caravan Park
Bungalow Tourist Park
Princes Hwy
Burrill Lake Lions Park
Burrill Beach
Dolphin Point Tourist Park
Entrance Shoals
Burrill Inlet
Tasman Sea
DOLPHIN POINT
LEGEND
Hydraulic Hazard
Low Hazard Flood Fringe
Low Hazard Flood Storage
High Hazard Flood Fringe
High Hazard Flood Storage
High Hazard Floodway
Title:
Hydraulic Hazard Mapping (1% AEP Flood)
Figure:
2-10
Rev:
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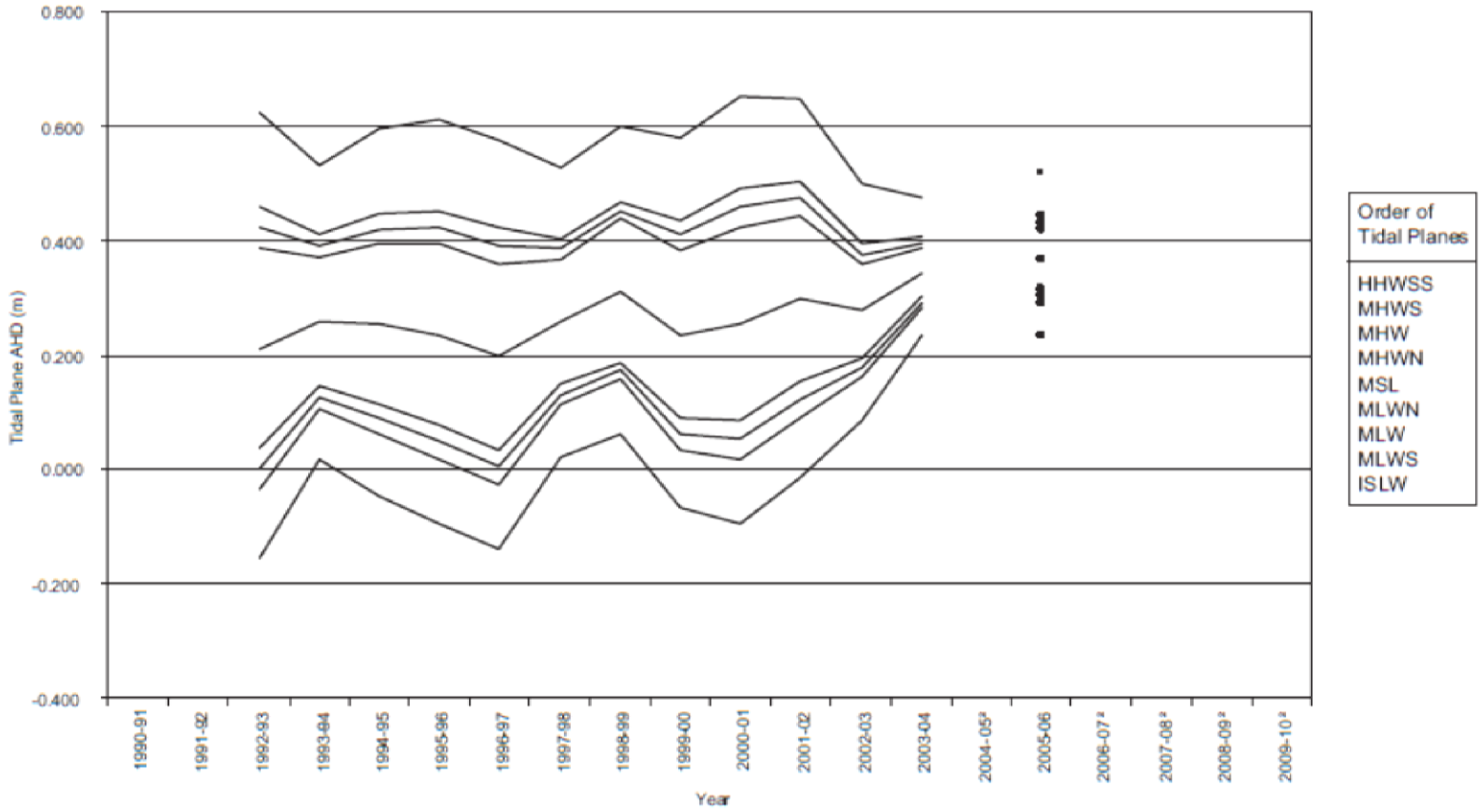
Public Works
Manly Hydraulics Laboratory

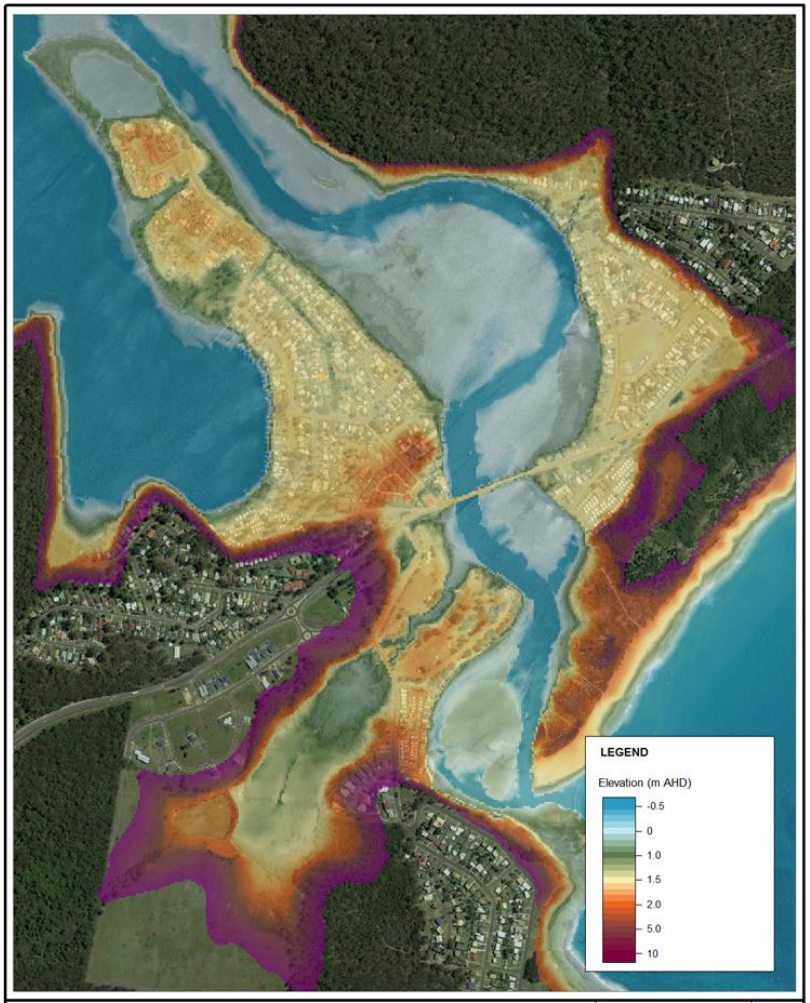
NSW TIDAL PLANE ANALYSIS
BURRILL LAKE AT BURRILL LAKE BRIDGE

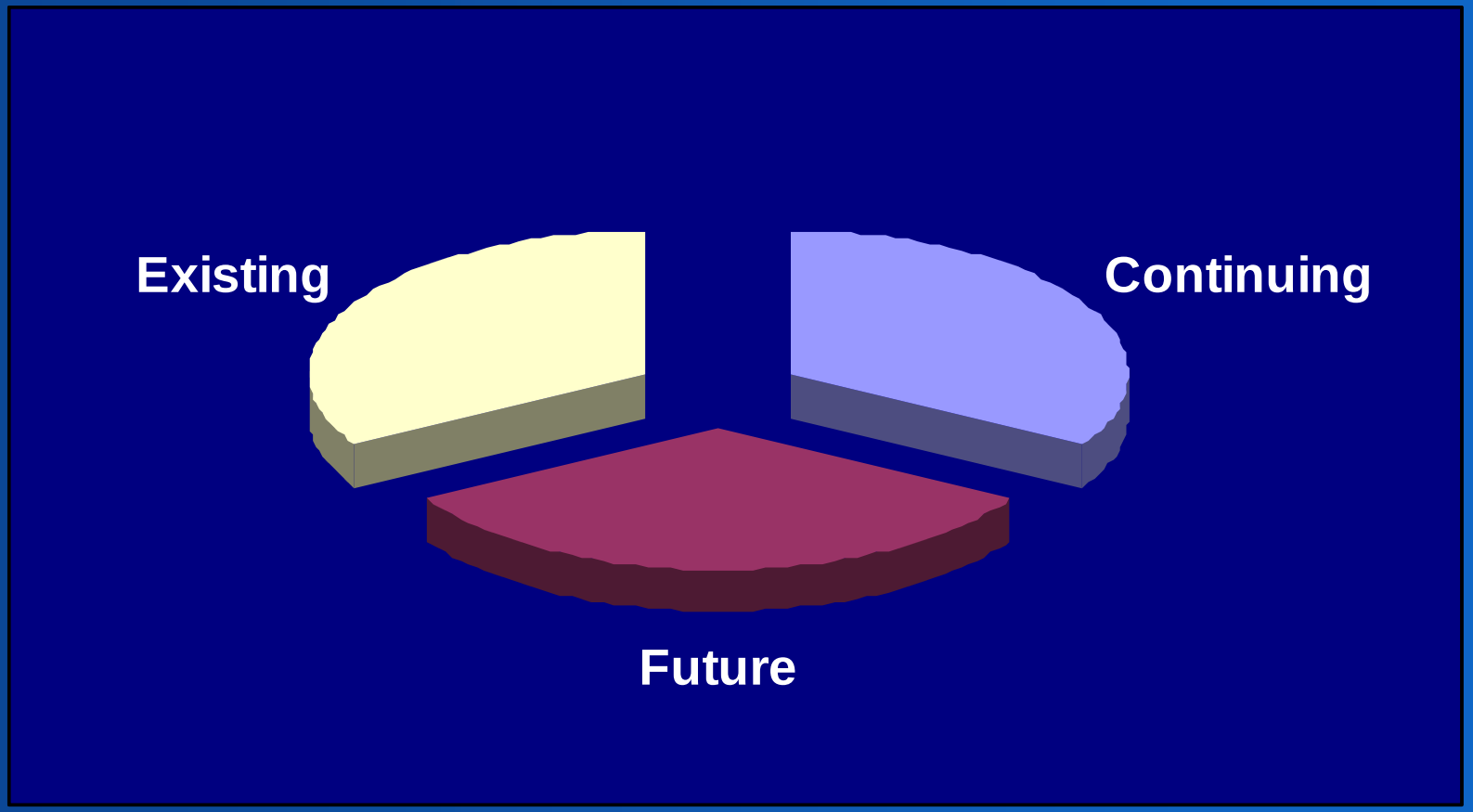
MHL Report 2053
Figure A201



Tidal inundation over time

Now: (1992 to 2006 Average	2000-01)
MSL = 0.269m AHD	0.255m AHD
MHWS = 0.441m AHD	0.492m AHD
HHWSS = 0.572m AHD	0.651m AHD
0.5m SLR	
MSL = 0.769m AHD	0.755m AHD
MHWS = 0.941m AHD	0.992m AHD
HHWSS = 1.072m AHD	1.151m AHD
1.0m SLR	
MSL = 1.269m AHD	1.255m AHD
MHWS = 1.441m AHD	1.492m AHD
HHWSS = 1.572m AHD	1.651m AHD
1.5m SLR	
MSL = 1.769m AHD	1.755m AHD
MHWS = 1.941m AHD	1.992m AHD
HHWSS = 2.072m AHD	2.151m AHD




Existing
Continuing
Future

Office of Environment & Heritage

Thank you

Any Questions?

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