FIGURE 37
PEAK FLOOD VELOCITY
PMF EVENT

BOTANY BAY

BOTANY BAY
NATIONAL PARK

Prince Charles Pde

Prince Charles Pde

QUIBRAY
BAY

CALTEX
OIL REFINERY

N

Limit of Flood Mapping
Velocity (m/s)
0 - 0.025
0.025 - 0.05
0.05- 0.1
0.1 - 0.5
0.5 - 3

0 100 200 300 400 500 m

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NOTE: Hazard calculated in accordance with Figure L2 of the Floodplain Development Manual 2005

FIGURE 38
PROVISIONAL HYDRAULIC HAZARD CATEGORIES 1% AEP EVENT

BOTANY BAY

BOTANY BAY NATIONAL PARK

Prince Charles Pde

Prince Charles Pde

QUIBRAY BAY

CAL-TEX OIL REFINERY

N

Limit of Flood Mapping
Provisional Hydraulic Hazard
Low
High

0 100 200 300 400 500 m

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NOTE: Hazard calculated in accordance with Figure L2 of the Floodplain Development Manual 2005

FIGURE 39
PROVISIONAL HYDRAULIC HAZARD CATEGORIES PMF EVENT

BOTANY BAY

BOTANY BAY NATIONAL PARK

Prince Charles Pde

Prince Charles Pde

QUIBRAY BAY

CALTEX OIL REFINERY

N

Limit of Flood Mapping
Provisional Hydraulic Hazard
Low
High

0 100 200 300 400 500 m

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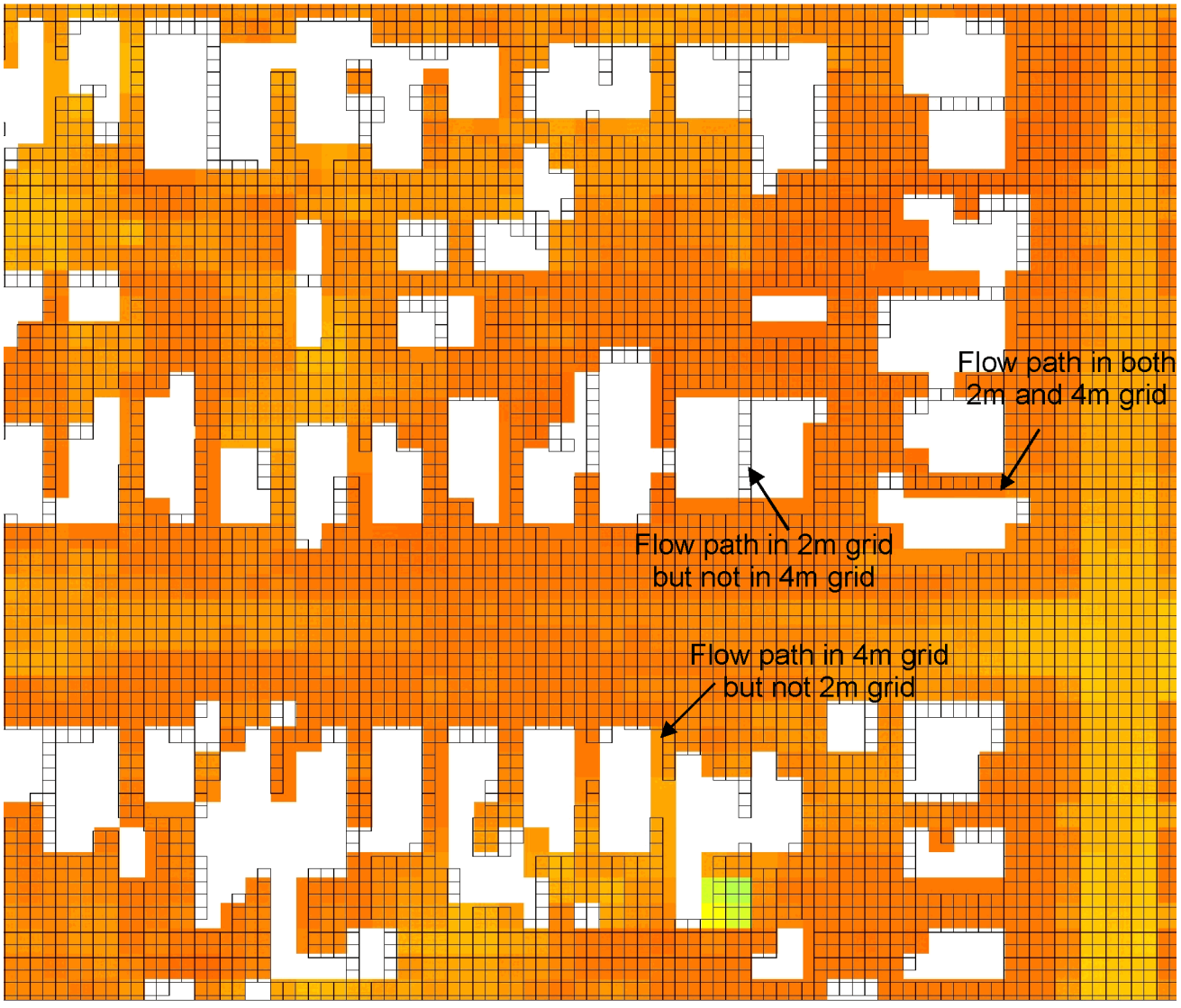
FIGURE 40

2m AND 4m GRID COMPARISON



4m grid

Nulled buildings in the 4m grid

2m grid

FIGURE 41
POTENTIAL STORM TIDE FLOOD EXTENTS

PRINCE CHARLES PD
CAPTAIN COOK LA
CAPTAIN COOK ST
GANNON ST
CAPTAIN COOK PWY
SILVER BEACH RD
CAPTAIN COOK DR
SHEPHERD ST
COOK ST
WARD 3.05VP.WY
BALBOA ST
TORRES ST
BRIDGES ST
TASMAN ST
HORNING ST
CAPTAIN COOK
SOLANDER ST
CAPTAIN COOK DRIVE
CHISHOLM ROAD

N

Storm Tide Levels (mAHD)
- <1.7
- 1.7 - 2
- 2 - 2.3
- 2.3 - 2.6

0 50 100 200 300 400 500 m

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FIGURE 42

INCREASE IN 1% AEP FLOOD LEVEL FOR HIGH CLIMATE CHANGE SCENARIO (PEAK ENVELOPE OF OCEAN AND CATCHMENT FLOOD EVENTS by 2100)

BOTANY BAY

BOTANY BAY NATIONAL PARK

Prince Charles Pde

Prince Charles Pde

Prince Charles Pde

Less than 0.2m Increase

0.2 to 0.4m Increase

0.4 to 0.6m Increase

0.6 to 0.8m Increase

QUIBRAY BAY

CAL-TEX OIL REFINERY

N

Potential Increase in Flood Level Due to Climate Change by 2100

- 0.2m Increase
- 0.4m Increase
- 0.6m Increase
- 0.8m Increase

0 100 200 300 400 500 m

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Appendix A

APPENDIX A: GLOSSARY OF FLOOD TERMS

Taken from the Floodplain Development Manual (April 2005 edition)

acid sulfate soils — Are sediments which contain sulfidic mineral pyrite which may become extremely acid following disturbance or drainage as sulfur compounds react when exposed to oxygen to form sulfuric acid. More detailed explanation and definition can be found in the NSW Government Acid Sulfate Soil Manual published by Acid Sulfate Soil Management Advisory Committee.

Annual Exceedance Probability (AEP) — The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. For example, if a peak flood discharge of 500 m^3/s has an AEP of 5%, it means that there is a 5% chance (that is one-in-20 chance) of a 500 m^3/s or larger event occurring in any one year (see ARI).

Australian Height Datum (AHD) — A common national surface level datum approximately corresponding to mean sea level.

Average Annual Damage (AAD) — Depending on its size (or severity), each flood will cause a different amount of flood damage to a flood prone area. AAD is the average damage per year that would occur in a nominated development situation from flooding over a very long period of time.

Average Recurrence Interval (ARI) — The long term average number of years between the occurrence of a flood as big as, or larger than, the selected event. For example, floods with a discharge as great as, or greater than, the 20 year ARI flood event will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event.

caravan and moveable home parks — Caravans and moveable dwellings are being increasingly used for long-term and permanent accommodation purposes. Standards relating to their siting, design, construction and management can be found in the Regulations under the LG Act.

catchment — The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.

consent authority — The Council, government agency or person having the function to determine a development application for land use under the EP&A Act. The consent authority is most often the Council, however legislation or an EPI may specify a Minister or public authority (other than a Council), or the Director General of DIPNR, as having the function to determine an application.

development — Is defined in Part 4 of the Environmental Planning and Assessment Act (EP&A Act).

infill development: refers to the development of vacant blocks of land that are generally surrounded by developed properties and is permissible under the current zoning of the land. Conditions such as minimum floor levels may be imposed on infill development.

new development: refers to development of a completely different nature to that associated with the former land use. For example, the urban subdivision of an area previously used for rural purposes. New developments involve rezoning and typically require major extensions of existing urban services, such as roads, water supply, sewerage and electric power.

redevelopment: refers to rebuilding in an area. For example, as urban areas age, it may become necessary to demolish and reconstruct buildings on a relatively large scale. Redevelopment generally does not require either rezoning or major extensions to urban services.

disaster plan (DISPLAN) — A step by step sequence of previously agreed roles, responsibilities, functions, actions and management arrangements for the conduct of a single or series of connected emergency operations, with the object of ensuring the coordinated response by all agencies having responsibilities and functions in emergencies.

discharge — The rate of flow of water measured in terms of volume per unit time, for example, cubic metres per second (m^3/s). Discharge is different from the speed or velocity of flow, which is

	a measure of how fast the water is moving for example, metres per second (m/s).
ecologically sustainable development (ESD)	Using, conserving and enhancing natural resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be maintained or increased. A more detailed definition is included in the Local Government Act 1993. The use of sustainability and sustainable in this manual relate to ESD.
effective warning time	The time available after receiving advice of an impending flood and before the floodwaters prevent appropriate flood response actions being undertaken. The effective warning time is typically used to move farm equipment, move stock, raise furniture, evacuate people and transport their possessions.
emergency management	A range of measures to manage risks to communities and the environment. In the flood context it may include measures to prevent, prepare for, respond to and recover from flooding.
flash flooding	Flooding which is sudden and unexpected. It is often caused by sudden local or nearby heavy rainfall. Often defined as flooding which peaks within six hours of the causative rain.
flood	Relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with major drainage before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences excluding tsunami.
flood awareness	Flood awareness is an appreciation of the likely effects of flooding and a knowledge of the relevant flood warning, response and evacuation procedures.
flood education	Flood education seeks to provide information to raise awareness of the flood problem so as to enable individuals to understand how to manage themselves an their property in response to flood warnings and in a flood event. It invokes a state of flood readiness.
flood fringe areas	The remaining area of flood prone land after floodway and flood storage areas have been defined.
flood liable land	Is synonymous with flood prone land (i.e. land susceptible to flooding by the probable maximum flood (PMF) event). Note that the term flood liable land covers the whole of the floodplain, not just that part below the flood planning level (see flood planning area).
flood mitigation standard	The average recurrence interval of the flood, selected as part of the floodplain risk management process that forms the basis for physical works to modify the impacts of flooding.
floodplain	Area of land which is subject to inundation by floods up to and including the probable maximum flood event, that is, flood prone land.
floodplain risk management options	The measures that might be feasible for the management of a particular area of the floodplain. Preparation of a floodplain risk management plan requires a detailed evaluation of floodplain risk management options.
floodplain risk management plan	A management plan developed in accordance with the principles and guidelines in this manual. Usually includes both written and diagrammetic information describing how particular areas of flood prone land are to be used and managed to achieve defined objectives.
flood plan (local)	A sub-plan of a disaster plan that deals specifically with flooding. They can exist at State, Division and local levels. Local flood plans are prepared under the leadership of the State Emergency Service.
flood planning area	The area of land below the flood planning level and thus subject to flood related development controls. The concept of flood planning area generally supersedes the “flood liable land” concept in the 1986 Manual.
Flood Planning Levels (FPLs)	FPL’s are the combinations of flood levels (derived from significant historical flood events or floods of specific AEPs) and freeboards selected for floodplain risk management purposes, as determined in management studies and incorporated in management plans. FPLs supersede the “standard flood event” in the 1986 manual.
flood proofing	A combination of measures incorporated in the design, construction and alteration of individual buildings or structures subject to flooding, to reduce or eliminate flood damages.
flood prone land	Is land susceptible to flooding by the Probable Maximum Flood (PMF) event. Flood prone land is synonymous with flood liable land.

flood readiness	Flood readiness is an ability to react within the effective warning time.
flood risk	Potential danger to personal safety and potential damage to property resulting from flooding. The degree of risk varies with circumstances across the full range of floods. Flood risk in this manual is divided into 3 types, existing, future and continuing risks. They are described below. **existing flood risk:** the risk a community is exposed to as a result of its location on the floodplain. **future flood risk:** the risk a community may be exposed to as a result of new development on the floodplain. **continuing flood risk:** the risk a community is exposed to after floodplain risk management measures have been implemented. For a town protected by levees, the continuing flood risk is the consequences of the levees being overtopped. For an area without any floodplain risk management measures, the continuing flood risk is simply the existence of its flood exposure.
flood storage areas	Those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation. Hence, it is necessary to investigate a range of flood sizes before defining flood storage areas.
floodway areas	Those areas of the floodplain where a significant discharge of water occurs during floods. They are often aligned with naturally defined channels. Floodways are areas that, even if only partially blocked, would cause a significant redistribution of flood flows, or a significant increase in flood levels.
freeboard	Freeboard provides reasonable certainty that the risk exposure selected in deciding on a particular flood chosen as the basis for the FPL is actually provided. It is a factor of safety typically used in relation to the setting of floor levels, levee crest levels, etc. Freeboard is included in the flood planning level.
habitable room	**in a residential situation:** a living or working area, such as a lounge room, dining room, rumpus room, kitchen, bedroom or workroom. **in an industrial or commercial situation:** an area used for offices or to store valuable possessions susceptible to flood damage in the event of a flood.
hazard	A source of potential harm or a situation with a potential to cause loss. In relation to this manual the hazard is flooding which has the potential to cause damage to the community. Definitions of high and low hazard categories are provided in the Manual.
hydraulics	Term given to the study of water flow in waterways; in particular, the evaluation of flow parameters such as water level and velocity.
hydrograph	A graph which shows how the discharge or stage/flood level at any particular location varies with time during a flood.
hydrology	Term given to the study of the rainfall and runoff process; in particular, the evaluation of peak flows, flow volumes and the derivation of hydrographs for a range of floods.
local overland flooding	Inundation by local runoff rather than overbank discharge from a stream, river, estuary, lake or dam.
local drainage	Are smaller scale problems in urban areas. They are outside the definition of major drainage in this glossary.
mainstream flooding	Inundation of normally dry land occurring when water overflows the natural or artificial banks of a stream, river, estuary, lake or dam.
major drainage	Council's have discretion in determining whether urban drainage problems are associated with major or local drainage. For the purpose of this manual major drainage involves: • the floodplains of original watercourses (which may now be piped, channelised or diverted), or sloping areas where overland flows develop along alternative paths once

system capacity is exceeded; and/or
- water depths generally in excess of 0.3 m (in the major system design storm as defined in the current version of Australian Rainfall and Runoff). These conditions may result in danger to personal safety and property damage to both premises and vehicles; and/or
- major overland flow paths through developed areas outside of defined drainage reserves; and/or
- the potential to affect a number of buildings along the major flow path.

mathematical/ computer models The mathematical representation of the physical processes involved in runoff generation and stream flow. These models are often run on computers due to the complexity of the mathematical relationships between runoff, stream flow and the distribution of flows across the floodplain.

merit approach The merit approach weighs social, economic, ecological and cultural impacts of land use options for different flood prone areas together with flood damage, hazard and behaviour implications, and environmental protection and well being of the State's rivers and floodplains.

The merit approach operates at two levels. At the strategic level it allows for the consideration of social, economic, ecological, cultural and flooding issues to determine strategies for the management of future flood risk which are formulated into Council plans, policy and EPIs. At a site specific level, it involves consideration of the best way of conditioning development allowable under the floodplain risk management plan, local floodplain risk management policy and EPIs.

minor, moderate and major flooding Both the State Emergency Service and the Bureau of Meteorology use the following definitions in flood warnings to give a general indication of the types of problems expected with a flood:

minor flooding: causes inconvenience such as closing of minor roads and the submergence of low level bridges. The lower limit of this class of flooding on the reference gauge is the initial flood level at which landholders and townspeople begin to be flooded.

moderate flooding: low-lying areas are inundated requiring removal of stock and/or evacuation of some houses. Main traffic routes may be covered.

major flooding: appreciable urban areas are flooded and/or extensive rural areas are flooded. Properties, villages and towns can be isolated.

modification measures Measures that modify either the flood, the property or the response to flooding. Examples are indicated in Table 2.1 of the Manual together with further discussion.

peak discharge The maximum discharge occurring during a flood event.

Probable Maximum Flood (PMF) The PMF is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation, and where applicable, snow melt, coupled with the worst flood producing catchment conditions. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood prone land, that is, the floodplain. The extent, nature and potential consequences of flooding associated with a range of events rarer than the flood used for designing mitigation works and controlling development, up to and including the PMF event should be addressed in a floodplain risk management study.

Probable Maximum Precipitation (PMP) The PMP is the greatest depth of precipitation for a given duration meteorologically possible over a given size storm area at a particular location at a particular time of the year, with no allowance made for long-term climatic trends (World Meteorological Organisation, 1986). It is the primary input to PMF estimation.

probability A statistical measure of the expected chance of flooding (see AEP).

risk Chance of something happening that will have an impact. It is measured in terms of consequences and likelihood. In the context of the manual it is the likelihood of consequences arising from the interaction of floods, communities and the environment.

runoff	The amount of rainfall which actually ends up as streamflow, also known as rainfall excess.
stage	Equivalent to "water level". Both are measured with reference to a specified datum.
stage hydrograph	A graph that shows how the water level at a particular location changes with time during a flood. It must be referenced to a particular datum.
survey plan	A plan prepared by a registered surveyor.
water surface profile	A graph showing the flood stage at any given location along a watercourse at a particular time.
wind fetch	The horizontal distance in the direction of wind over which wind waves are generated.

Appendix B

APPENDIX B: HISTORICAL FLOOD INFORMATION

Table B1: Summary of the 1980 Community Interview Responses

Address	Years in Area	Property affected by flooding	Date of flooding	Flood Level	Ponding Time	Comment
11 Bridges Street	2.5	No				some ponding, but is not seen as a problem
112 Bridges Street	<1	No				ponding at E.O.B
115 Bridges Street	20	No				tidal inundation on Torres St and near property but no stormwater issues
119 Bridges Street	8	Yes				tidal inundation
121 Bridges Street	8	Yes				tidal inundation
125 Bridges Street	8	Yes				some problem with tidal inundation, no stormwater problems
13 Bridges Street	20	No				no problems observed
15 Bridges Street	20	No				used to have drainage problems, but none in the last 10 years. Water soaks away quickly
19 Bridges Street	10	Yes	1975	300mm		ponding, since then area has been filled 3-400mm to Council's levels, some ponding may still occur but soaks away quickly
20 Bridges Street	1	No				no problems since moved there
21 Bridges Street	8	Yes				some ponding, near and under house
23 Bridges Street	8	Yes				some ponding
24 Balboa Street	12	Yes				some ponding
24 Bridges Street	8	Yes	1975			water generally soaks away okay, high water table
26 Balboa Street	12	Yes				some tidal inundation into garage, no stormwater problem
26 Bridges Street	8	Yes	1975			some ponding
28 Balboa Street	12	Yes				some ponding
28 Bridges Street	10	No				no drainage problems and water soaks away quickly
30 Bridges Street	30	No				
32 Bridges Street	30	No				have not had any flooding problems, any ponding has gone within 1/2 hr
82 Bridges Street	18	No				road water ponds at E.O.B
86 Bridges Street	18	Yes				thinks there are some drainage problems
87 Bridges Street	11	Yes				ponding, since then area has been filled
89 Bridges Street	11	Yes			days	some ponding
93 Bridges Street	11	Yes	1975			ponding, since then area has been filled
97 Bridges Street	8	No				ponding at E.O.B
16 Captain Cook Drive	10	No				Was better off than most in 1975 storm
32 Captain Cook Drive	30	Yes	1975			Also flooded in years prior to 1975, although none since then
34 Captain Cook Drive	42	No				block filled before the 1975 flood, and has had no flooding problems although some surrounding properties do
40 Captain Cook Drive	4	Yes		300mm		Cook St drainage thought to have reduced flooding, have done some filling of yard
49 Captain Cook Drive	5	Yes	1975			Flowed across Capt. Cook Drive and through block. Not been a problem other than in 1975.
51 Captain Cook Drive	8	Yes	1975			Water from Cook St Swamp and National Park, across Capt. Cook Dr and into Gannon St. Been filled and no problems since.
75 Captain Cook Drive	5	Yes	1975			Was there for 1975 storm, hasn't been as bad since but may be potential drainage issues

77 Captain Cook Drive	1	No				
81 Captain Cook Drive	8	No				some water at back but soaks away
97 Captain Cook Drive	1	No				
99 Captain Cook Drive	3	No				no problems since moved there
101 Captain Cook Drive		Yes	1975			some ponding, water came into house in 1975, water from road runs into properties
105 Captain Cook Drive	1	No				no problems since moved there
4 Dampier Street	6	Yes	1975		less than 1 hr	some ponding
6 Dampier Street	6	No				
14 Dampier Street	14	No				
16 Dampier Street	30	No				
18 Dampier Street	25	No				Ponding at EOB
26 Dampier Street	15	No				
28 Dampier Street	15	No				Water soaks away quickly
42 Dampier Street	24	No				No problem with block, but suggests roadwork in Dampier St to alleviate street drainage problems.
2 Gannon Street	8	Yes	1975	50-150mm		
3 Gannon Street	1	No				
8 Gannon Street	15	Yes				Some flooding from back fence in heavy storms
80 Prince Charles Parade	16	No				
86 Prince Charles Parade	18	No				
90 Prince Charles Parade	25	No				
94 Prince Charles Parade	3	No				
146 Prince Charles Parade	3	No				
152 Prince Charles Parade	3	No				
154 Prince Charles Parade	13	No				
162 Prince Charles Parade	<1	No				
164 Prince Charles Parade	25	No				
1 Silver Beach Road	15	No				
9 Silver Beach Road	3	Yes				Water comes into garage from road, ponding at EOB for days. Remainder of block has no problems.
17 Silver Beach Road	9	Yes	1975	400-500mm		
18 Silver Beach Road	8	No				Water ponding at EOB
26 Silver Beach Road	25	No				
30 Silver Beach Road	20	No				Water ponding at EOB
13 Tasman Street	18	No				Some ponding in 1975 but soaked away quickly
15 Tasman Street		Yes		<100mm		

17 Tasman Street		Yes		100mm		
27 Tasman Street	3	No				some ponding for couple hours in back yard but is not a problem
33 Tasman Street	2	No				
35 Tasman Street	20	Yes				some ponding on driveway from road water
65 Tasman Street	8	Yes		50mm		
69 Tasman Street	10	Yes	1975	250-300mm		
71 Tasman Street	2	Yes				some ponding
115 Tasman Street	23	No				Block been filled so no problem from high tides, stormwater runs away into swamp.
7 Torres Street	20	No				
9 Torres Street	18	No				
13 Torres Street	21	No				
20 Torres Street	2.5	No				
41 Torres Street	3.5	No				
43 Torres Street	9	No				
44 Torres Street	7	No				
46 Torres Street	12	No				
51 Torres Street	<1	No				
53 Torres Street	1	No				
54 Torres Street		Yes	1975			some ponding
57 Torres Street	2.5	No				
58 Torres Street	44	No				
64 Torres Street	2.5	No				
67 Torres Street	10	No				
96 Torres Street	19	No				Back part of block has been filled
102 Torres Street	<1	No				
108 Torres Street	10	No				some ponding in backyard but soaks away quickly
118 Torres Street	2.5	No				
122 Torres Street	6	No				yard has been filled, no problems since
132 Torres Street	13	Yes	1975			some ponding
144 Torres Street	35	Yes	1975			tidal water flooded house

Table B2: Sutherland Shire Council Complaints Register

Location	Request Description	Incident Category	Action	CRMS Date
(south of unmade Shepherd St) Cook Street Kurnell	Council easement is higher than the ground. The water from the reserve is flooding customers property. The water is currently flooding customers property. It is approx 1 foot deep. It is flooding back yard and is approx 6 inches fr	General Flooding		
Marton Park	Flooding of Marton Park, Kurnell	General Flooding		22/05/2003
13 Reserve Road KURNELL	caller has reported every time it rains her drive is being washed away it is due to no kerb and gutter. caller has no drains on her property and water runs down the hill at great speed taking all in the way please go out and check what Council can do to	General Flooding	: Action - Finalised - Action - Operationally Finalised	2/06/2003
2 Cook Street	I can't find a category for this request. Customer is requesting more drainage to be place in his street, at Kurnell. He believe that one which is currently in the street is not enough to carry all the water from all the homes in the area.	General Flooding	: these properties low lying and suffer from inundation regularly, additional drainage lines not the answer	15/05/2003
20 Dampier Street KURNELL	MKerr MP for Mr S Hiskins, 20 Dampier Street, Kurnell - Concerns with flooding at Kurnell and Council maintenance of drains. LETTER SCANNED AND ON FILE	General Flooding	: there are no drains in vicinity of 20 dampier st, kerb and gutter exists and is clear and operational, this propably is a request on localised flooding on private land. response outlining the kurnell flood mapping is required.	2/06/2003
87 Torres Street	General flooding in torres st, Kurnell	General Flooding		24/05/2003
91 Bridges Street KURNELL	Resident claims damage to his property during the recent severe flooding necessitating his hiring of pumps on at least 2 occasions. He is concerned because of lack of storm water drain at rear of property, the construction of a dish drain, etc.	General Flooding	: Action - Finalised - Action - Operationally Finalised - Met and spoke to owner and advised the situation. The natural slope is low-lying and we can not do an	29/05/2003
248 Prince Charles Parade KURNELL	Refer CRMS 760603876 - customer has complained about this blocked drain before. All Council have every done in the past is shovel out debris, customer is suggesting that there need to be a proper clearing of the pipes. Every time it rains, the road is	Maintenance	: Action - Finalised - Action - Operationally Finalised - incorrect assumption by customer, if pit does block then the resultant flows run down to next pit along prince charles parade, prince charles parade	21/05/2003
90 Torres Street KURNELL	The stormwater drain is blocked between No 90-100 possibly around No 96 where it is obstructed by tree roots, as Council has made repaired previously. It it causing flooding to private properties land.	Maintenance	: Action - Finalised - Action - Operationally Finalised - ses and Council onsite now, waterjet also programmed	16/05/2003
Captain Cook Drive KURNELL	The open drain is blocked due to the Swamp Oaks have fallen in approx 3 places and therefore blocking the water from getting away. This is now causes	Maintenance	: Action - Finalised - Action - Operationally Finalised - Instruction issued 2 trees fallen into creek, to be removed.	19/05/2003

	flooding.			
62 Bridges Street KURNELL	Due to heavy rains of last week residents neighbouring property has decided to pump out all the flooding of property out onto the road - i.e. running off into other properties etc - cars driving through it etc.- Health Dept in morning meeting have phoned t	Private Drainage	: advised that the property was pumped out by the SES. The family will clean up the sandy deposit on the weekend.	21/05/2003
62 Bridges Street KURNELL	Customer claims a neighbouring property's yard was flooded in the rain last week. The owner pumped the water from his yard to the street, however there was also a lot of sand and rubbish as well which has made its way two houses down to in front of comp	Private Drainage	: Action - Finalised - Action - Operationally Finalised - Inspected property and observed sandy material in gutter outside of No	21/05/2003
142 Torres St KURNELL			Reported flooding by SES	10/05/2001
107 Torres St KURNELL			Reported flooding by SES	11/05/2001
26 Balboa St KURNELL			Reported flooding by SES	13/05/2001
28 Balboa St KURNELL			Reported flooding by SES	12/05/2001
81 Torres St KURNELL			Reported flooding by SES	11/05/2001

* Owners/residents also participated in the community questionnaire issued as part of the current study.

Table B3: Summary of Current Questionnaire Responses

Address	Years in Area	Property affected by flooding	Date of flooding	Flood Level	Ponding Time	Comment	Blocked Drains Mentioned	Effect of Regrading Road
4 Balboa Street		Yes	1984; 2001					
6 Balboa Street	23	Yes	1984 Nov; 2001 May		72hrs	4,8 and vacant Council block next to 8 also become inundated. Drain becomes blocked in Prince Charles Pde		
8 Balboa Street		Yes	1984; 2001					
18 Balboa Street	43	Yes	since Council raised road by 4 feet	up to back door		Road raised by 4 feet, made flooding worse		Worse
26 Balboa Street		Yes						
28 Balboa Street	26	Yes		50cm inside house	3 days to 1.5 weeks	Ponding occurred at 28 Balboa and to a lesser extent at 26. Drain trap installed in 1990's which has reduced flooding. A combination of rain and a king tide can still cause runoff and ponding.		
1 Bridges Street	44	No	none since 1963					
2 Bridges Street	44	No	none since 1963					
3 Bridges Street	44	No	none since 1963					
9 Bridges Street								
28 Bridges Street		Yes	May 2001; May 2003					
42 Bridges Street	11	No				When house purchased, were informed it was subject to flooding. During heavy rain any ponding has drained into soil within minutes. May 2001 and May 2003, flooding was observed in vicinity of #28 and the end of Bridges St.		
44 Bridges Street	3	Yes	2004	40mm	<24hrs	Rear 10% of property		
65 Bridges Street	11	No	none since 1996					
66 Bridges Street		Yes	1996/1998??	thigh level	2-4 days	Grates and drains to the beach installed in street in 2004		
70 Bridges Street	28	Yes	1988, 1990, 1992		few days	Back room and all around house has been inundated. Flood waters were observed to move swiftly from the main road and next door.		
73 Bridges Street	16	No	none since 1991					