

# Appendix E Risk Assessment



Erosion Risk Register

Beach	Asset Type / Owner / Manager	Asset	Level of Risk				Comments <i>e.g. wrt consequence chosen, current management actions, owner/manager arrangements, future plans etc</i>	Consequence used in Risk Rating <i>(highest social, environmental, or economic adopted)</i>	Consequence of Erosion Impact			Erosion Probability of Exceedance			
			2020	2040	2070	2120			Social	Environmental	Economic	2020	2040	2070	2120
Minnamurra	Council Managed Crown Land	Minnamurra Beach and Dunes (including beach accessways) (Council managed Crown lands)	Medium	Medium	High	High	<i>Consequence will increase with time (as the area exposed increases spatially), so level of risk will also increase with time - see Table 7-1 and 7-2</i>	Minor	Minor	minor	minor	10%	10%	50%	50%
Jones	Council Land	Jones Beach and Beach Reserve (including beach accessways, picnic facilities) (Council owned and managed)	Medium	Medium	High	High	<i>Consequence will increase with time (as the area exposed increases spatially), so level of risk will also increase with time - see Table 7-1 and 7-2</i>	Minor	Minor	minor	minor	10%	10%	50%	50%
Jones	Biodiversity Asset	Shrubland/Heathland (LEP 2011), within beach reserve	N/A	N/A	N/A	High		Major	Moderate	Major	Minor	N/A	N/A	N/A	10%
Jones	Council Stormwater Asset	Pit/Outlet onto Beach (erosion = only 2 at S end, inundation is all 3 pits, plus pipes)	N/A	N/A	N/A	Medium		Moderate	Moderate	Insignificant	Moderate	N/A	N/A	N/A	1%
Bombo	Council Managed Crown Land	Bombo Beach and Dunes, Black Beach (Council managed crown lands, Crown Land)	High	High	Extreme	Extreme	<i>Consequence will increase with time (as the area exposed increases spatially) - see Table 7-1 and 7-2</i>	Moderate	Moderate	Moderate	Moderate	50%	50%	50%	50%
Bombo	Heritage, Council Managed Land	Northern end of beach within the Quarry Heritage LEP 2011 listing	High	High	High	High		Moderate	Moderate	Insignificant	minor	50%	50%	50%	50%
Bombo	Biodiversity	Shrubland/Heathland (LEP 2011) at back of dunes (50% to 1%)	N/A	High	High	High		Major	Moderate	Major	Minor	N/A	1%	1%	50%
Bombo	Transport NSW	South Coast Rail Line (Zone SP2) (note, inundation impacts are very minor in area)	N/A	N/A	N/A	High		Catastrophic	Major	Insignificant	Catastrophic	N/A	N/A	N/A	10%
Bombo	Transport NSW	Bombo Train Station (Heritage LEP 2011) and platform (Zone SP2)	N/A	N/A	N/A	High		Catastrophic	Major	Insignificant	Catastrophic	N/A	N/A	N/A	1%
Bombo	Transport NSW	Train Station Carpark (at edge of A1 Princes Highway) (Zone SP2)	N/A	N/A	N/A	High		Catastrophic	Major	Insignificant	Catastrophic	N/A	N/A	N/A	1%
Bombo	Sydney Water	Sewer main and pump station (south of train station, north of Spring Creek)	N/A	N/A	N/A	High	Sewer main and pump station for everything south and west of location e.g. Jamberoo, Kiama, Kiama. Consequence is catastrophic for pump station, lesser issue for pipes (see below assets)	Catastrophic	catastrophic	major	catastrophic	N/A	N/A	N/A	1%
Bombo	Sydney Water	Water pipe/main (south of train station, north of Spring Creek)	N/A	N/A	N/A	High		Catastrophic	catastrophic	minor	catastrophic	N/A	N/A	N/A	1%
Bombo	Sydney Water	Sewer main, maintenance hole (Spring Creek mouth/Black Beach)	N/A	High	High	High	Probability of impact ranges up to 50%.	Major	major	minor	major	N/A	1%	1%	50%
Surf	Council Managed Crown Land	Surf Beach	High	High	High	Extreme	<i>Based on Bombo consequence rating (consequence will increase with time, as area exposed increases spatially with time)</i>	Major	major	Moderate	major	50%	50%	50%	50%
Surf	Council or Crown Asset	Low brick wall along beach (not structural).	N/A	N/A	Low	Medium	<i>Based on previous consequence rating of similar asset (i.e. concrete lined pits)</i>	Minor	Minor	Insignificant	Minor	N/A	N/A	1%	10%
Surf	Council Managed Crown Land	Kiama SLSC building (Zone RE1)	N/A	Medium	Medium	High	Currently impacted by storms. No major economic impacts at present. Hasn't created structural damage as yet. Annoyance from time to time, happens reasonably regularly (NE corner). Over time, impact is exacerbated, becomes untenable. Relocation has adjoining impacts on land uses (vs defending structure). Asset is aging, already won't last 100 years (already constant repairs for concrete, wiring, etc structural longevity). Makes decision to defend unlikely. Demolish current building, and either move or raise. Hazard mapping influences long term plan. New CLM Act - more funding for Crown Assets under Council care and control falls to Council. Club is important, not the building. SLSC would be more than happy with a new building. No firm pathway on how Crown and Councils will interact on managing assets esp when needed.	Moderate	Moderate	Insignificant	Moderate	N/A	1%	1%	50%
Surf	Council Stormwater Asset	Stormwater Pits and Pipes (north and south ends of beach)	N/A	N/A	Low	Medium	<i>Limited impacts (i.e. really close to one pipe in north)</i>	Minor	minor	Insignificant	minor	N/A	N/A	1%	10%
Surf	Council or Crown Asset	Concrete lined creek/stormwater outlet	N/A	N/A	N/A	Medium	Would terminate outlet at new shoreline, not too expensive. Impact is very localised. Can use tidal and coastal inundation as tailwater conditions for flood study.	Minor	minor	Insignificant	minor	N/A	N/A	N/A	10%
Surf	Private Asset	Saint Peter and Paul Catholic Church and Primary School Lands (eastern end of grounds inc some Norfolk Pines, no buildings in erosion zone) (Heritage LEP 2011, Zone R3, private owner?)	N/A	N/A	N/A	High	<i>Based on previous consequence rating of similar asset</i>	Major	Major	Insignificant	Moderate	N/A	N/A	N/A	1%
Surf	Council Managed Crown Land	Coronation Park (Zone RE1)	N/A	N/A	N/A	Medium	<i>Based on previous consequence rating of similar asset (i.e. SLSC)</i>	Moderate	Moderate	Insignificant	Moderate	N/A	N/A	N/A	1%
Surf	Council Managed Crown Land	Surf Beach Holiday Park (northern most cabin - Council asset)	N/A	N/A	N/A	High	<i>Based on previous consequence rating of similar asset (i.e. Easts Beach cabins)</i>	Major	major	Insignificant	major	N/A	N/A	N/A	1%
Surf	Council Asset	Carpark southern end (partly on Crown Land managed by Council)	N/A	N/A	N/A	Low	<i>Based on previous consequence rating of similar asset</i>	Minor	Minor	Insignificant	Minor	N/A	N/A	N/A	1%
Surf	Council Asset	Walkway and reserve, southern end (partly on Crown Land managed by Council)	Low	Low	Low	Low	<i>Based on previous consequence rating of similar asset</i>	Insignificant	Insignificant	Insignificant	Insignificant	1%	1%	10%	10%
Surf	Sydney Water	Sewer main and other assets (pump station) along entire length of back of beach/promenade	N/A	N/A	High	Extreme	<i>Based on Bombo / Jones consequence rating. Probability of impact ranges up to 50%</i>	Catastrophic	catastrophic	major	catastrophic	N/A	N/A	1%	50%
Kendalls	Council Land, Crown Land	Kendalls Beach (Zone RE1) (including beach access, and any buried structures)	Medium	High	High	High	<i>Based on consequence rating for similar asset (i.e. Jones Beach; consequence will increase with time, as area exposed increases spatially with time)</i>	Moderate	moderate	minor	moderate	50%	50%	50%	50%
Kendalls	Sydney Water	Sewer main (along back of beach, northern end only).	N/A	N/A	N/A	High	<i>Based on consequence rating for similar asset (if bed rock not present) . Probability of impact ranges up to 10%</i>	Catastrophic	major	major	catastrophic	N/A	N/A	N/A	10%

Erosion Risk Register

Beach	Asset Type / Owner / Manager	Asset	Level of Risk				Comments <i>e.g. wrt consequence chosen, current management actions, owner/manager arrangements, future plans etc</i>	Consequence of Erosion Impact			Erosion Probability of Exceedance				
			2020	2040	2070	2120		Social	Environmental	Economic	2020	2040	2070	2120	
Easts	Private Asset	Easts Beach Holiday Park: Beach front cabins	N/A	N/A	N/A	High	Zoning may permit eco tourism in future. No trigger for rezoning in LSPS (would only be triggered by owners). Access to beach already difficult. Options to negotiate future beach access through Easts HP? Council work has noted visitors to park are main users of the beach. Only other access is via coastal walkway. Easement over a bit of their land was negotiated in past. CVA mapped - will trigger SEPP, can change how/if. WRT to acquisition, Coastal Lands Protection scheme still available.	Major	major	Insignificant	major	N/A	N/A	N/A	1%
Easts	Council Managed Crown Land	Easts Beach (Zone RE1), including seawall under beach. Ownership of seawall unknown	High	High	Extreme	Extreme	If this is lost to erosion, it becomes private frontage to the beach / private beach for Easts HP. Also lose coastal walkway. If lose beach, public access is permanently impacted, and changes. There is no alternative access to this beach, if lose the beach. Economic impact is coastal walkway cut off. Then requires acquisition to return this. (Consequence will also increase with time, as area exposed increases spatially with time)	Moderate	Moderate	Insignificant	Moderate	50%	50%	50%	50%
Easts	Sydney Water	Sewer main (along back of northern end of beach / behind seawall, condition of seawall unknown)	N/A	N/A	High	Extreme	Based on consequence rating for similar assets at Bombo. Probability of impact ranges up to 10%	Major	major	minor	major	N/A	N/A	1%	10%
Werri	Council Land, Crown Land	Werri Beach and Dunes (noting berm to waterline is Crown Land, & area opposite Werri Beach HP) (Zone RE1)	High	High	High	High	Resilience of dunes is important, not only for an environmental value, but as a natural buffer for storms and inundation. The dune system will initially be impacted in the south and then progressively north overtime.	Major	major	Moderate	major	10%	50%	50%	50%
Werri	Biodiversity	Shrubland/Heathland (LEP 2011) at back of dunes (Northern end 10% to 1% erosion, southern end 50% to 1% erosion)	N/A	N/A	Medium	High	Small disconnected patches. Specific as they are beach, some environmental significance. Southern end - complete loss of habitat, not able to be offset or relocated landward. Need to consider this if opting for protection for the road.	Moderate	Moderate	Moderate	Minor	N/A	N/A	1%	50%
Werri	Council Stormwater Assets	Pits (at south end only) - stormwater	Low	Low	Medium	Medium	Based on consequence rating for similar assets at Surf beach.	Minor	minor	Insignificant	minor	1%	1%	50%	50%
Werri	Council Asset	Walkway/Cycleway (south of Moore St to southern end of beach)	N/A	N/A	N/A	Low		Minor	minor	Insignificant	minor	N/A	N/A	N/A	1%
Werri	Council Asset	Werri Beach Progress Hall (opp Sandy Wha Road)	N/A	N/A	N/A	Medium	Based on consequence rating for similar assets at Bombo.	Moderate	Moderate	Insignificant	minor	N/A	N/A	N/A	1%
Werri	Council Asset	Carparks (from south of Park Lane, down to SLSC and Pacific Ave carparks)	Low	Medium	Medium	Medium	Probability of impact ranges from 1% up to 50% at southern end.	Minor	Minor	Insignificant	Minor	1%	10%	50%	50%
Werri	Council Road	Pacific Ave (from S of Werri Beach HP)	High	High	Extreme	Extreme	Road is major access point to Werri. Surf and Bowling Club totally isolated. Where would road go. Community expectation of defending/retaining road in some way, managing future erosion. Alternative accesses for inundation (short periods), but community would want a long term solution. Probability of impact ranges from 1% up to 50% at southern end.	Catastrophic	Major	Insignificant	Catastrophic	1%	1%	50%	50%
Werri	Private Asset	Gerrigong Bowling & Recreation Club - Carpark only (Zone RE1)	N/A	N/A	N/A	Medium		Moderate	Moderate	Insignificant	minor	N/A	N/A	N/A	1%
Werri	Council Building	Gerrigong SLSC Building	N/A	N/A	N/A	Medium	Council owns this. Same as Kiama (surf beach), only concern with relocation is needing to keep building near beach.	Moderate	Moderate	Insignificant	Moderate	N/A	N/A	N/A	1%
Walkers	Council Land, Crown Land	Walkers Beach (Zone E2)	N/A	Medium	Medium	High	Secluded beach, hard to access	Moderate	Moderate	Moderate	Minor	N/A	1%	1%	50%
Walkers	Private Asset	Gerrigong Golf Course (very minor extents at eastern end) (Zone E3)	N/A	N/A	N/A	Low		Minor	minor	Insignificant	Insignificant	N/A	N/A	N/A	1%
Seven Mile	Council Stormwater Asset	Pits along Crooked River entrance (east of bridge). Only stormwater pipe & pit to boat ramp off Burke Pde at risk from erosion	N/A	N/A	N/A	Medium		Minor	minor	Insignificant	minor	N/A	N/A	N/A	10%
Seven Mile	Crown Land	Seven Mile Beach and dunes	N/A	High	High	High	A lot of beach is Nat. Park, and has room to transgress landwards	Major	major	Moderate	Moderate	N/A	1%	10%	50%
Seven Mile	Council / MIDO Asset	Boat ramp off Burke Pde	N/A	N/A	N/A	Medium	Based on consequence rating for similar asset	Minor	minor	Insignificant	minor	N/A	N/A	N/A	10%
Seven Mile	Council Land	Reserve at 52-54 Burke Pde (only small area subject to erosion)	N/A	N/A	N/A	Low		Minor	Minor	minor	minor	N/A	N/A	N/A	1%
Seven Mile	Private Asset	2 Residences on Burke Pde	N/A	High	High	Extreme	Based on consequence rating for similar asset	Catastrophic	catastrophic	Insignificant	Catastrophic	N/A	1%	1%	50%
Seven Mile	Council Road	Access Road to Boat Ramp	N/A	N/A	N/A	Medium	Based on consequence rating for similar assets at Bombo	Minor	minor	Insignificant	minor	N/A	N/A	N/A	10%
Seven Mile	Biodiversity	Natural Grassland (LEP Biodiversity)	N/A	N/A	N/A	High	Based on consequence rating for similar asset at Bombo	Major	Minor	Major	Minor	N/A	N/A	N/A	10%
Seven Mile	Biodiversity	Shrubland / Heathland (LEP Biodiversity)	N/A	N/A	High	High		Major	Minor	Major	Minor	N/A	N/A	1%	10%
Seven Mile	Biodiversity	Eucalypt Forest (LEP Biodiversity)	N/A	N/A	N/A	High		Major	Minor	Major	Minor	N/A	N/A	N/A	1%

## Coastal Inundation Risk Register

Beach	Asset Type / Owner / Manager	Asset	Level of Risk				Comments e.g. wrt consequence chosen, current management actions, owner/manager arrangements, future plans etc	Consequence used in Risk Rating (highest social, environmental, or economic adopted)	Consequence: Coastal Inundation			Coastal Inundation Probability of Exceedance (using ARI100)			
			2020	2040	2070	2120			Social	Environmental	Economic	2020	2040	2070	2120
Minnamurra	Council Asset	Boat Ramp (river mouth south)	Medium	Medium	High	High	Consequence will increase with time (as the area exposed increases spatially), so level of risk will also increase - see Table 7-2	Moderate	minor	minor	moderate	95%	95%	95%	95%
Minnamurra	Council Land	Council owned reserve land (zoned RE1)	High	High	High	High		Moderate	minor	moderate	minor	95%	95%	95%	95%
Minnamurra	Council Asset	Access Road and Carpark (zoned RE1)	N/A	N/A	N/A	Medium	Probability of impact ranges from 5 to 95%	Minor	minor	Insignificant	minor	N/A	N/A	N/A	95%
Jones	Council Land	Jones Beach and Beach Reserve (including beach accessways, picnic facilities) (Council owned and managed)	Medium	Medium	High	High	Consequence will increase with time (as the area exposed increases spatially), so level of risk will also increase with time - see Table 7-1 and 7-2	Minor	minor	minor	minor	95%	95%	95%	95%
Jones	Biodiversity Asset	Shrubland/Heathland (LEP 2011), within beach reserve	Medium	Medium	High	High	Consequence will increase with time (as the area exposed increases spatially)	Minor	Insignificant	minor	Insignificant	95%	95%	95%	95%
Jones	Council Stormwater Asset	Pit/Outlet onto Beach (erosion = only 2 at S end, inundation is all 3 pits, plus pipes)	Medium	Medium	Medium	Medium		Minor	minor	Insignificant	minor	95%	95%	95%	95%
Jones	Council Building	Kiama Downs SLSC building and Amenities Block (95%)	N/A	N/A	N/A	High		Moderate	Moderate	Insignificant	Moderate	N/A	N/A	N/A	50%
Jones	Council Road	North Kiama Drive	N/A	N/A	N/A	High	No alternative access way available	Major	major	Insignificant	major	N/A	N/A	N/A	50%
Jones	Council Road	Merindah Avenue	N/A	N/A	N/A	Medium	Alternative access available	Minor	minor	Insignificant	minor	N/A	N/A	N/A	5%
Jones	Council Asset	Carpark and courts behind SLSC, southern Carpark and picnic area (50%) (zoned RE1)	N/A	N/A	N/A	Medium		Minor	minor	Insignificant	minor	N/A	N/A	N/A	5%
Jones	Private Asset	4 - 6 properties on N Kiama Drive	N/A	N/A	N/A	High		Major	major	Insignificant	major	N/A	N/A	N/A	5%
Jones	Sydney Water	Sewer pipe (and pump station)	N/A	N/A	N/A	High	Probability of impact ranges up to 5%	Major	major	minor	major	N/A	N/A	N/A	5%
Bombo	Council Managed Crown Land	Bombo Beach and Dunes (Council managed crown lands, Crown Land)	Medium	Medium	High	Extreme	Consequence will increase with time (as the area exposed increases spatially)	Catastrophic	Catastrophic	Catastrophic	Catastrophic	95%	95%	95%	95%
Bombo	Heritage, Council Managed Land	Northern end of beach within the Quarry Heritage LEP 2011 listing	High	High	High	High		Moderate	Moderate	Insignificant	minor	95%	95%	95%	95%
Bombo	Biodiversity	Shrubland/Heathland (LEP 2011) at back of dunes (50% to 1%)	Medium	Medium	High	High	Based on Jones consequence rating	Moderate	Insignificant	Moderate	Insignificant	95%	95%	95%	95%
Bombo	Transport NSW	South Coast Rail Line (Zone SP2) (note, inundation impacts are very minor in area)	High	High	High	High		Catastrophic	Major	Insignificant	Catastrophic	5%	5%	5%	5%
Bombo	Transport NSW	South Coast Rail Bridge/Culvert over Spring Creek (Zone SP2)	Extreme	Extreme	Extreme	Extreme	Combination of impacts at 2020, inc. inundation and catchment flows	Catastrophic	Major	Insignificant	Catastrophic	95%	95%	95%	95%
Bombo	Council Asset	Access Road and Carpark (zoned SP2) to northern end of beach`	N/A	N/A	Medium	Medium	Doesn't lead to any properties - alternate access available	Minor	minor	Insignificant	minor	N/A	N/A	50%	95%
Bombo	Council Asset	Stormwater Pit and pipe (at northern creek on beach)	High	High	High	High		Moderate	Moderate	Insignificant	Moderate	95%	95%	95%	95%
Bombo	Council Asset	Stormwater Pit into Spring Creek	High	High	High	High		Moderate	Moderate	Insignificant	Moderate	50%	50%	50%	50%
Bombo	Council Asset	Council reserve on Hothersal St (next to carpark, and Spring Creek) (Zone RE1)	Medium	Medium	Medium	Medium		Minor	Insignificant	Minor	Insignificant	95%	95%	95%	95%
Bombo	Private Asset / Council	Bombo Beach reserve adjacent to Black Beach / Spring Creek (Zone RE1, possibly in private ownership)	Medium	Medium	Medium	Medium		Minor	Insignificant	Minor	Insignificant	95%	95%	95%	95%
Bombo	Sydney Water	Sewer main, maintenance hole (Spring Creek mouth/Black Beach)	Extreme	Extreme	Extreme	Extreme	Triangle parcel of land in between the highway and rail	Major	major	minor	major	95%	95%	95%	95%
Bombo	Sydney Water	Water pipe/main (south of train station, north of Spring Creek)	N/A	N/A	Medium	High	Based on Erosion consequence rating. Likelihood of a breach of water pipe is low but if this were to happen the consequence is high.	Moderate	Moderate	Insignificant	moderate	N/A	N/A	5%	95%
Surf	Council Managed Crown Land	Surf Beach	High	High	Extreme	Extreme	Based on Jones consequence rating. Consequence will increase with time (as the area exposed increases spatially)	Major	major	moderate	minor	95%	95%	95%	95%
Surf	Council / Crown Asset	Along beach, low brick wall (not structural).	Medium	Medium	Medium	Medium		Minor	Minor	Insignificant	Minor	95%	95%	95%	95%
Surf	Council Managed Crown Land	Kiama SLSC building (Zone RE1)	High	High	High	High	Currently impacted by storms. No major economic impacts at present. Hasn't created structural damage as yet. Annoyance from time to time, happens reasonably regularly (NE corner). Over time, impact is exacerbated, becomes untenable. Relocation has adjoining impacts on landuses (vs defending structure). Asset is aging, already won't last 100 years (already constant repairs for concrete, wiring, etc structural longevity). Makes decision to defend unlikely. Demolish current building, and either move or raise. Hazard mapping influences long term plan. New CLM Act - more funding for Crown Assets under Council care and control falls to Council. Club is important, not the building. SLSC would be more than happy with a new building. No firm pathway on how Crown and Councils will interact on managing assets esp when needed.	Moderate	Moderate	Insignificant	Moderate	95%	95%	95%	95%
Surf	Council Stormwater Asset	Stormwater Pits and Pipes (north and south ends of beach)	Medium	Medium	Medium	Medium		Minor	minor	Insignificant	minor	95%	95%	95%	95%
Surf	Council / Crown Asset	Concrete lined creek/stormwater outlet	Medium	Medium	Medium	Medium	Would terminate outlet at new shoreline, not too expensive. Impact is very localised. Can use tidal and coastal inundation as tailwater conditions for flood study.	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Surf	Private Asset	Saint Peter and Paul Catholic Church and Primary School Lands (eastern end of grounds inc some Norfolk Pines, no buildings in erosion zone) (Heritage LEP 2011, Zone R3, private owner?)	High	High	High	High	Based on a slightly lower consequence rating than erosion	Moderate	Moderate	Insignificant	minor	95%	95%	95%	95%
Surf	Council Managed Crown Land	Coronation Park (Zone RE1)	High	High	High	High	Based on Erosion consequence rating	Moderate	Moderate	Insignificant	Moderate	95%	95%	95%	95%

Coastal Inundation Risk Register

Beach	Asset Type / Owner / Manager	Asset	Level of Risk				Comments e.g. wrt consequence chosen, current management actions, owner/manager arrangements, future plans etc	Consequence: Coastal Inundation			Coastal Inundation Probability of Exceedance (using ARI100)				
			2020	2040	2070	2120		Social	Environmental	Economic	2020	2040	2070	2120	
Surf	Council Asset	Carpark southern end (partly on Crown Land managed by Council)	Medium	Medium	Medium	Medium	Based on Erosion consequence rating	Minor	Minor	Insignificant	Minor	95%	95%	95%	95%
Surf	Council Asset	Walkway and reserve, southern end (partly on Crown Land managed by Council)	Medium	Medium	Medium	Medium		Minor	Minor	Insignificant	Minor	95%	95%	95%	95%
Surf	Council Road	Barney Street	Medium	Medium	Medium	Medium	Alternative access available	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Surf	Private Asset	4 - 6 Residences on Barney St (Zone R3)	N/A	N/A	High	Extreme	Based on Erosion consequence rating Probability of impact is 95% for 2 properties, 50% for 2 properties and 5% for 2 properties	Catastrophic	catastrophic	Insignificant	Catastrophic	N/A	N/A	5%	50%
Surf	Sydney Water	Sewer main (inc. pump station) and other assets along entire length of back of beach/promenade	Extreme	Extreme	Extreme	Extreme	Based on Bombo / Jones consequence rating. Cluster of Storm water points is where pump station/ ERS is	Major	major	minor	major	95%	95%	95%	95%
Kendalls	Council Land, Crown Land	Kendalls Beach (Zone RE1) including seawall (and access)	High	High	Extreme	Extreme	Based on similar beach consequence rating. Consequence will increase with time (as the area exposed increases spatially)	Moderate	Moderate	moderate	Moderate	95%	95%	95%	95%
Kendalls	Council Asset	Kendalls on the Beach Holiday Park (includes cabins, access roads etc)	High	High	Extreme	Extreme	Based on similar beach consequence rating - combination of overland and catchment run off - Consequence will also increase with time (as the area exposed increases spatially)	Moderate	Moderate	insignificant	Moderate	95%	95%	95%	95%
Kendalls	Council Stormwater Asset	Stormwater Pipes to small beach creek	Medium	Medium	Medium	Medium	Based on previous consequence rating of similar asset	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Kendalls	Sydney Water	Sewer main (along back of beach, northern end only).	Medium	Medium	Medium	Medium	Based on consequence rating for similar asset. Sewer main appears to be set in bed rock	Minor	minor	minor	minor	95%	95%	95%	95%
Kiama Boat Harbour	Various (see individual assets below)	Kiama Harbour as a whole (ie, considering harbour as a whole, integrated asset, not just its individual parts)	High	High	Extreme	Extreme	Kiama Harbour is considered the "Jewel in the Crown" for Kiama tourism and business. Realistically, everything in Robertsons Harbour is an integrated piece, fits together, so should be considered as a single entity. Whole area is very highly used by community as well as tourists. Space as a whole is integral part of community. Ongoing long term access is vital. Whole area highly connected (improvements to one part affect all, and also support businesses). Ongoing/regular inundation means much more difficult to get investment in business in the area if there is uncertainty about viability of the harbour. The need for certainty should drive need for upgrades to assets. Harbour Revitalisation - MIDO project, not just for boaters, collaboration with all parties. Strategic approach for planning. TfNSW (MIDO) has day to day management and asset management for the harbour, partnering with TfNSW (Maritime) on water issues. Action from Revitalisation - governance of harbour and adjoining harbour precinct. Working group is intended to be continued beyond project. Need for greater involvement from the broader Crown Lands department, who own/manage non-waterway assets and land in the Harbour. Social and Economic consequence increases to major/catastrophic in the future, as the area impacted increases spatially with time.	Moderate	Moderate	Insignificant	moderate	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands	Harbour Breakwaters / Robertson Basin (Heritage LEP 2011) (Zone IN4)	High	High	High	High	TfNSW (MIDO) now in charge of upgrades to this. Anecdotal from divers - tip of western breakwater is already undermined. MHL didn't dive onsite. Breakwater structure north of helipad said to be in good condition by MHL (report with MIDO, not yet available). Further work required to understand condition of breakwater below water. Probability ranges from 5 to 95%.	Moderate	minor	Insignificant	Moderate	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Council (manages)	Lighthouse/Blowhole access roads	N/A	Medium	Medium	High	Formerly as sand spit, then backfilled with unknown fill. Consequence rating similar to Bombo, but higher social & economic value / issue to fix / upgrade	Moderate	Moderate	Insignificant	Moderate	N/A	5%	5%	95%
Kiama Boat Harbour	Crown Lands / Council (manages)	Helipad	Medium	Medium	High	High	Emergency Services and Defence use this. Access is also important consideration for viability of this asset (which would change with future scenarios).	Moderate	Moderate	Insignificant	moderate	95%	95%	95%	95%
Kiama Boat Harbour	Transport NSW	South coast train line/ railway bridge (note. bridge only partially impacted)	N/A	N/A	High	Extreme	Hard to relocate, and important for broader (local, regional, state) community	Catastrophic	major	Insignificant	catastrophic	N/A	N/A	5%	95%
Kiama Boat Harbour	Crown Lands / Council (manages)	Ocean Pools (north and south, both Heritage LEP 2011)	Medium	Medium	Medium	Medium	Difficult to consider at what point the pools actually become unusable (e.g. frequency of the "high tide"). Highest value is social.	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Private lease of building	Fish and Chips/Restaurant (part of Robertson Basin Heritage listing) (Zone IN4)	High	High	High	High	Regular tidal inundation - much greater impact, because of frequency	Moderate	moderate	Insignificant	moderate	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Council (manages)	Kiama boat ramp	High	High	High	High	Council does all upgrades and maintenance, inc pontoons. Recent licence renewal with Crown Lands. Difficult structure to modify as have to shift further inland to get the appropriate slope. Therefore dependant on availability of land to shift into. Based on Minnamurra consequence rating, but with slightly higher values because of location	Moderate	Moderate	Insignificant	Moderate	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Council	Black Beach, and Black Beach Reserve	Medium	Medium	High	Extreme	Valuable event space. Beach based on Jones consequence rating. Consequence will increase with time (as the area exposed increases spatially)	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Council	Storm Bay Reserve	N/A	N/A	Medium	Medium	Amenities are Council managed, Park is Crown managed Consequence considered similar to above Reserve	Minor	minor	Insignificant	minor	N/A	N/A	5%	95%
Kiama Boat Harbour	Council Road	Shoalhaven Street	Medium	Medium	High	Extreme	If all roads affected at once, would be catastrophic - Consequence will increase with time (as the area exposed increases spatially)	Moderate	moderate	Insignificant	moderate	95%	95%	95%	95%

Beach	Asset Type / Owner / Manager	Asset	Level of Risk				Comments e.g. wrt consequence chosen, current management actions, owner/manager arrangements, future plans etc	Consequence used in Risk Rating (highest social, environmental, or economic adopted)	Consequence: Coastal Inundation			Coastal Inundation Probability of Exceedance (using ARI100)			
			2020	2040	2070	2120			Social	Environmental	Economic	2020	2040	2070	2120
Kiama Boat Harbour	Council Road	Blowhole Point Access Roads	Medium	Medium	High	Extreme	Consequence is higher because of cutting off access to Helipad during storms (esp. in 2120) (although usability of the helipad during a storm is questionable). Alternative helicopter landing sites include Minnamurra Headland, open paddocks, showground. - Consequence will increase with time (as the area exposed increases spatially)	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Kiama Boat Harbour	Council Road	Terralong Street (Manning St corner)	N/A	N/A	High	Extreme	If inundated, results in cutting off access to harbour	Major	major	Insignificant	major	N/A	N/A	5%	95%
Kiama Boat Harbour	Private Asset	Belle Vue Holiday Accommodation (Zone B2), Kiama Harbourside Apartments, Yves	Medium	High	High	High		Moderate	moderate	Insignificant	moderate	5%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Council (manages)	Scout Hall	High	High	High	High		Moderate	moderate	Insignificant	moderate	95%	95%	95%	95%
Kiama Boat Harbour	Council Stormwater Asset	Stormwater pits and pipes (numerous)	High	High	High	High	Lots of these assets are below walkways, safety aspects of pipe failure. Affected by high tides. Individually replacing assets is small cost, the social aspects bigger consideration. Other impacts from stormwater pipes where water from the ocean enters the pipes, causing them to "back up" in the opposite direction of typical flow. Based on consequence rating for similar assets, increased Social / economic consequence to moderate because of their location	Moderate	Moderate	Insignificant	Moderate	95%	95%	95%	95%
Kiama Boat Harbour	Sydney Water	Sewer pipe (section at back of Black Beach Reserve)	Extreme	Extreme	Extreme	Extreme	Based on consequence rating for similar asset	Major	major	minor	major	95%	95%	95%	95%
Kiama Boat Harbour	Sydney Water	Sewer Main (section along northern edge of harbour/promenade)	Extreme	Extreme	Extreme	Extreme	Based on consequence rating for similar asset	Major	major	minor	major	95%	95%	95%	95%
Kiama Boat Harbour	Sydney Water	Sewer pipe (section at Terralong/Manning St corner)	N/A	N/A	High	Extreme	Based on consequence rating for similar asset	Major	major	minor	major	N/A	N/A	5%	95%
Kiama Boat Harbour	Sydney Water	Water pipe (section at Terralong/Manning St corner)	N/A	N/A	Medium	High	Based on consequence rating for similar asset	Moderate	Moderate	Insignificant	moderate	N/A	N/A	5%	95%
Kiama Boat Harbour	Sydney Water	Water pipe (and sewer?) (section along Blowhole Point Road)	N/A	N/A	N/A	High	Based on consequence rating for similar asset	Moderate	Moderate	Insignificant	moderate	N/A	N/A	N/A	95%
Kiama Boat Harbour		Storm Bay	Medium	Medium	Medium	Medium	Based on consequence rating for similar asset (Storm Bay Reserve)	Minor	minor	minor	minor	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Boat owners association Leasehold (managed by Transport NSW)	Boat moorings	Medium	Medium	Medium	Medium	Based on consequence rating for similar assets in other LGAs	Minor	Insignificant	Insignificant	minor	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Boat owners association Leasehold (managed by Transport NSW)	Slipway SE corner Robertsons Basin	Medium	Medium	Medium	Medium	Much harder to modify. Have to shift further inland to get the appropriate slope. May not have sufficient space. Only self serving facility in several hundred kms	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands	Fishermans Shed (N of slipway), Heritage listed	High	High	High	High	Could be lifted, but is of clapboard (ad hoc) construction.	Moderate	Moderate	Insignificant	Moderate	95%	95%	95%	95%
Kiama Boat Harbour	Council Road	Carpark associated with Basin	High	High	High	High	Commercial element as well as recreational. Enables economic functioning of fishing fleet (loading/offloading supplies).	Moderate	Moderate	Insignificant	Moderate	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands with private leaseholder	Fishermans market	High	High	High	High	Commercial interest - Enables economic functioning of fishing fleet (sales). Is next to sheds but not Heritage listed. Based on consequence rating for similar assets	Moderate	Moderate	Insignificant	Moderate	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands with private leaseholder	Game fishing club weighing station (gantry)	Medium	Medium	Medium	Medium	Councillor interest. Consequence rating is based on assumption that asset is intended to withstand water.	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Easts	Private Asset	Easts Beach Holiday Park (beach front cabins, campsites, recreational facilities, access roads, onsite stormwater, and Munna Munnora Ck) (Zone E3), and 1 lot (north of this) separately privately owned.	Extreme	Extreme	Extreme	Extreme	Zoning may permit eco tourism in future. No trigger for rezoning in LSPS (would only be triggered by owners). Access to beach already difficult. Option to negotiate future beach access through Easts HP? Council work has noted visitors to park are main users of the beach. Only other access is via coastal walkway. Easement over a bit of their land was negotiated in past. CVA mapped - will trigger SEPP, can change how/if. WRT to acquisition, Coastal Lands Protection scheme still available.	Catastrophic	major	insignificant	catastrophic	95%	95%	95%	95%
Easts	Council Managed Crown Land	Easts Beach (Zone RE1), including seawall under beach. Ownership of seawall unknown	High	High	Extreme	Extreme	If this is lost to erosion / inundation, it becomes private frontage to the beach / private beach for Easts HP. Also lose coastal walkway. If lose beach, public access is permanently impacted, and changes. There is no alternative access to this beach, if lose the beach. Economic impact is coastal walkway is cut off. Then requires acquisition to return this. Inundation (tidal) may block access across the beach, but not entire beach.	Moderate	moderate	insignificant	moderate	95%	95%	95%	95%
Easts	Sydney Water	Sewer main and pump station (along back of beach, northern end only). Behind "seawall" (unsure of its condition).	Extreme	Extreme	Extreme	Extreme	Based on consequence rating for similar assets at Bombo	Major	major	minor	major	95%	95%	95%	95%
Easts	Sydney Water	Water main (centre) servicing HP	High	High	High	High	Based on consequence rating for similar assets at Bombo	Moderate	Moderate	Insignificant	moderate	95%	95%	95%	95%

Coastal Inundation Risk Register

Beach	Asset Type / Owner / Manager	Asset	Level of Risk				Comments e.g. wrt consequence chosen, current management actions, owner/manager arrangements, future plans etc	Consequence used in Risk Rating (highest social, environmental, or economic adopted)	Consequence: Coastal Inundation			Coastal Inundation Probability of Exceedance (using ARI100)			
			2020	2040	2070	2120			Social	Environmental	Economic	2020	2040	2070	2120
Werri	Council Land, Crown Land	Werri Beach and Dunes (noting berm to waterline is Crown Land, plus area opp Werri Beach HP) (Zone RE1)	High	High	Extreme	Extreme	Resilience of dunes is important. More so than even pure environmental value Based on consequence rating for similar assets - Social consequence increases to major in the future, as the area impacted increases spatially with time.	Moderate	Moderate	moderate	Minor	95%	95%	95%	95%
Werri	Biodiversity	Shrubland/Heathland (LEP 2011) at back of dunes (Northern end 10% to 1% erosion, southern end 50% to 1% erosion)	High	High	Extreme	Extreme	Small disconnected patches. Specific as they are beach, some environmental significance. Southern end - complete loss of habitat, not able to be offset or relocated landward. Need to consider this if opting for protection for the road. Social consequence increases to major / environmental increases to Catastrophic in the future, as the area impacted increases spatially with time.	Moderate	Moderate	moderate	Minor	95%	95%	95%	95%
Werri	Council Stormwater Assets	Stormwater Pits (at south end only)	Medium	Medium	Medium	Medium	Based on consequence rating for similar asset	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Werri	Council Asset	Carparks (from south of Park Lane, down to SLSC and Pacific Ave - esp. lower beachside carpark)	Medium	Medium	Medium	Medium	Probability of impact is 5% to 95% at S end.	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Werri	Council Road	Pacific Ave (from S of Werri Beach HP)	Extreme	Extreme	Extreme	Extreme	Road is major access point to Werri. Surf and Bowling Club totally isolated. Where would road go. Community expectation of defending/retaining road in some way, managing future erosion. Alternative accesses for inundation (short periods), but community would want a long term solution. Probability of impact is 5% to 95% at S end.	Major	Moderate	Insignificant	Major	95%	95%	95%	95%
Werri	Private Asset	Gerringong Bowling & Recreation Club - Carpark only (Zone RE1)	N/A	N/A	N/A	Medium	Consequence rating is based on only car park being impacted	Minor	minor	Insignificant	minor	N/A	N/A	N/A	50%
Werri	Council Building	Gerringong SLSC Building	N/A	N/A	N/A	Medium	Council owns this. Same as Kiama (surf beach), only concern with relocation is needing to keep building near beach. Based on consequence rating for Surf Beach - but reduced, considering the areas impacted	Minor	minor	Insignificant	minor	N/A	N/A	N/A	5%
Werri	Council Managed Crown Land	Werri Beach Holiday Park (Council cabins etc)	N/A	N/A	N/A	High	Council run this as a business unit. Very similar to Easts Beach. Reduced consequence rating compared with Easts Beach because much less impacted	Major	Moderate	insignificant	major	N/A	N/A	N/A	5%
Walkers	Council Land, Crown Land	Walkers Beach (Zone E2)	Medium	Medium	Medium	High	Secluded beach, hard to access	Insignificant	Insignificant	Insignificant	Insignificant	95%	95%	95%	95%
Walkers	Private Asset	Gerringong Golf Course (very minor extents at eastern end) (Zone E3)	N/A	N/A	N/A	Low	Very little impacted	Insignificant	Insignificant	Insignificant	Insignificant	N/A	N/A	N/A	5%
Gerringong Boat Harbour	Council Managed Crown Land	Boat Harbour and Rock Pool (Heritage LEP 2011)	Medium	Medium	Medium	Medium	Based on consequence rating for Kiama Harbour and pools - similar assets	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Gerringong Boat Harbour	?Council / MIDO	Gerringong Boat ramp	Medium	Medium	Medium	Medium	Based on consequence rating for similar assets at Minnamurra	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Gerringong Boat Harbour	Council Stormwater Asset	Stormwater Pits (2) and pipes (2)	Medium	Medium	Medium	Medium	Based on consequence rating for similar asset	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Gerringong Boat Harbour	Council Managed Crown Land	Cooke Park (including walkway and "seawall)	Medium	Medium	Medium	Medium	Based on consequence rating for similar asset	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Gerringong Boat Harbour	Council Asset	Amenities building (in Cooke Park)	N/A	N/A	Medium	Medium	Limited impacts	Minor	minor	Insignificant	minor	N/A	N/A	5%	95%
Gerringong Boat Harbour	Council Asset	Car Park (next to Boat ramp / Park)	Medium	Medium	Medium	Medium	Based on consequence rating for similar asset	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Seven Mile	Council Stormwater Asset	Pits along Crooked River entrance (east of bridge). Only stormwater pipe & pit to boat ramp off Burke Pde at risk from erosion	Medium	Medium	Medium	Medium	Based on consequence rating for similar asset	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Seven Mile	Council Asset	Walkway bridge over creek	High	High	High	High		Moderate	Moderate	Insignificant	Moderate	95%	95%	95%	95%
Seven Mile	Crown Land	Seven Mile Beach and dunes	High	High	High	High		Moderate	Moderate	moderate	Minor	95%	95%	95%	95%
Seven Mile	Council / MIDO Asset	Boat ramp off Burke Pde	Medium	Medium	Medium	Medium	Based on consequence rating for similar asset	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Seven Mile	Council Land	Reserve at 52-45 Burke Pde (only small area subject to inundation)	Medium	Medium	Medium	Medium		Minor	minor	Insignificant	minor	95%	95%	95%	95%
Seven Mile	Council Road	Park Rd (and Properties 2 -11 in 2120)	N/A	N/A	Medium	High	No alternate route	Moderate	Moderate	Insignificant	Moderate	N/A	N/A	5%	95%
Seven Mile	Council Road	Burke Pde	N/A	N/A	N/A	Medium	Limited impacts	Minor	minor	Insignificant	minor	N/A	N/A	N/A	50%
Seven Mile	Private Asset	2 Residences on Burke Pde	N/A	High	High	Extreme	Based on consequence rating for erosion, but lower	Major	major	Insignificant	major	N/A	5%	5%	95%
Seven Mile	Council Road	Access Road to Boat Ramp	N/A	N/A	N/A	Medium	Limited impacts	Minor	minor	Insignificant	minor	N/A	N/A	N/A	5%
Seven Mile	Biodiversity	Natural Grassland (LEP Biodiversity)	High	High	High	High	Based on consequence rating for similar asset	Moderate	Minor	moderate	Minor	95%	95%	95%	95%
Seven Mile	Biodiversity	Shrubland / Heathland (LEP Biodiversity)	High	High	High	High		Moderate	Minor	moderate	Minor	95%	95%	95%	95%
Seven Mile	Biodiversity	Eucalypt Forest (LEP Biodiversity)	N/A	High	High	High		Moderate	Minor	moderate	Minor	N/A	95%	95%	95%
Seven Mile	Biodiversity	Floodplain Forest (LEP Biodiversity)	High	High	High	High		Moderate	Minor	moderate	Minor	95%	95%	95%	95%

Tidal Inundation Risk Register

Beach	Asset Type / Owner / Manager	Asset	Level of Risk				Comments e.g. wrt consequence chosen, current management actions, owner/manager arrangements, future plans etc	Consequence: Tidal Inundation			Tidal Inundation Probability of Exceedance (HAT)				
			2020	2040	2070	2120		Social	Environmental	Economic	2020	2040	2070	2120	
Minnamurra	Council Asset	Boat Ramp (river mouth south)	Medium	Medium	Medium	Medium		Minor	minor	Insignificant	minor	95%	95%	95%	95%
Minnamurra	Council Land	Council owned reserve land (zoned RE1)	High	High	High	High		Moderate	minor	moderate	minor	95%	95%	95%	95%
Minnamurra	Council Asset	Access Road and Carpark (zoned RE1)	N/A	N/A	N/A	Medium	Limited impacts. Probability of impact ranges from 5 to 95%	Minor	minor	Insignificant	minor	N/A	N/A	N/A	95%
Jones	Council Asset	Jones Beach accessways (x 3)	N/A	N/A	N/A	Medium	Limited impacts	Minor	Minor	Insignificant	Insignificant	N/A	N/A	N/A	95%
Bombo	Council Asset	Council reserve on Hothersal St (next to carpark, and Spring Creek) (Zone RE1)	N/A	N/A	N/A	Medium	Limited impacts	Minor	Insignificant	Minor	Insignificant	N/A	N/A	N/A	50%
Bombo	Sydney Water	Sewer main, maintenance hole (Spring Creek mouth/Black Beach)	N/A	N/A	N/A	High	Based on Coastal inundation consequence rating	Major	major	minor	major	N/A	N/A	N/A	5%
Bombo	Sydney Water	Water pipe/main (south of train station, north of Spring Creek)	N/A	N/A	N/A	Medium	Based on previous consequence rating of similar asset	Moderate	moderate	Insignificant	moderate	N/A	N/A	N/A	5%
Surf	Council / Crown Asset	Concrete lined creek/stormwater outlet	N/A	N/A	N/A	Medium	Would terminate outlet at new shoreline, not too expensive. Impact is very localised. Can use tidal and coastal inundation as tailwater conditions for flood study.	Minor	minor	Insignificant	minor	N/A	N/A	N/A	5%
Surf	Sydney Water	Sewer main, and other assets (pump station?) along entire length of back of beach/promenade	N/A	N/A	N/A	High	Based on Coastal inundation consequence rating	Major	major	minor	major	N/A	N/A	N/A	5%
Kendalls	Council Stormwater Asset	Pipes to small beach creek	N/A	N/A	N/A	Medium	Based on previous consequence rating of similar asset	Minor	minor	Insignificant	minor	N/A	N/A	N/A	50%
Kendalls	Sydney Water	Sewer main (along back of beach, northern end only).	N/A	N/A	N/A	High	Based on previous consequence rating of similar asset	Major	major	minor	major	N/A	N/A	N/A	5%
Kiama Boat Harbour	Various (see individual assets below)	Kiama Harbour as a whole (ie, considering harbour as a whole, integrated asset, not just its individual parts)	Medium	Medium	High	Extreme	Kiama Harbour is considered the "Jewel in the Crown" for Kiama tourism and business. Realistically, everything in Robertsons Harbour is an integrated piece, fits together, so should be considered as a single entity. Whole area is very highly used by community as well as tourists. Space as a whole is integral part of community. Ongoing long term access is vital. Whole area highly connected (improvements to one part affect all, and also support businesses). Ongoing/regular inundation means much more difficult to get investment in business in the area if there is uncertainty about viability of the harbour. The need for certainty should drive need for upgrades to assets. Harbour Revitalisation - MIDO project, not just for boaters, collaboration with all parties. Strategic approach for planning. TfNSW (MIDO) has day to day management and asset management for the harbour, partnering with TfNSW (Maritime) on water issues. Action from Revitalisation - governance of harbour and adjoining harbour precinct. Working group is intended to be continued beyond project. Need for greater involvement from the broader Crown Lands department, who own/manage non-waterway assets and land in the Harbour. Tidal inundation believed to have a much greater impact because the frequency makes assets unusable (unlike storm inundation that occurs rarely and assets remain usable between events). <b>Consequence will increase with time (as the area exposed increases spatially), thus risk level will also increase.</b>	Insignificant	Insignificant	Insignificant	Insignificant	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands	Harbour Breakwaters / Robertson Basin (Heritage LEP 2011) (Zone IN4)	High	High	High	High	TfNSW (MIDO) now in charge of upgrades to this. Anecdotal from divers - tip of western breakwater is already undermined. MHL didn't dive onsite. Breakwater structure north of helipad said to be in good condition by MHL (report with MIDO, not yet available). Probability of impact ranges from 5 to 95%	Moderate	minor	Insignificant	Moderate	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Council (manages)	Lighthouse/Blowhole access roads	Medium	Medium	Medium	Medium	Formerly as sand spit, then backfilled with ? - Alternative access available	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Council (manages)	Ocean Pools (north and south, both Heritage LEP 2011)	Medium	Medium	High	Extreme	Difficult to consider at what point the pools actually become unusable (e.g. frequency of the "high tide"). Highest value is social. Consequence will increase with time (as the area exposed increases spatially).	Insignificant	Insignificant	Insignificant	Insignificant	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Private lease of building	Fish and Chips/Restaurant (part of Robertson Basin Heritage listing) (Zone IN4)	Medium	Medium	High	Extreme	Regular tidal inundation - much greater impact, because of frequency Consequence will increase with time (as the area exposed increases spatially).	Insignificant	Insignificant	Insignificant	Insignificant	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Council (manages)	Kiama boat ramp	Medium	Medium	High	High	Council does all upgrades and maintenance, inc pontoons. Recent licence renewal with Crown Lands. Difficult structure to modify as have to shift further inland to get the appropriate slope. Therefore dependant on availability of land to shift into. This includes other fishing related assets (e.g. Game fishing weigh station). Consequence will increase with time (as the area exposed increases spatially).	Insignificant	Insignificant	Insignificant	Insignificant	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Council	Black Beach, and Black Beach Reserve	Medium	Medium	High	High	Valuable event space Based on Coastal inundation consequence rating - but have rated higher, as this is more frequent inundation Consequence will increase with time (as the area exposed increases spatially). Amenities are Council managed, Park is Crown managed	Major	major	Insignificant	Moderate	5%	5%	5%	50%
Kiama Boat Harbour	Crown Lands / Council	Storm Bay Reserve	Medium	Medium	High	High	Based on previous consequence rating of similar asset (Boat ramp) Amenities are Council managed, Park is Crown managed	Moderate	moderate	Insignificant	moderate	95%	95%	95%	95%



Tidal Inundation Risk Register

Beach	Asset Type / Owner / Manager	Asset	Level of Risk				Comments <i>e.g. wrt consequence chosen, current management actions, owner/manager arrangements, future plans etc</i>	Consequence used in Risk Rating <i>(highest social, environmental, or economic adopted)</i>	Consequence: Tidal Inundation			Tidal Inundation Probability of Exceedance (HAT)			
			2020	2040	2070	2120			Social	Environmental	Economic	2020	2040	2070	2120
Kiama Boat Harbour	Council Road	Robertson Basin access road (inc. carpark)	Medium	Medium	High	Extreme	Consequence is higher because of cutting off access to the fishing industry infrastructure (boats etc). Commercial element as well as recreational. Enables economic functioning of fishing fleet (loading/offloading supplies). Consequence will increase with time (as the area exposed increases spatially).	Major	major	Insignificant	major	95%	95%	95%	95%
Kiama Boat Harbour	Council Stormwater Asset	Stormwater pits and pipes (numerous)	High	High	High	High	Lots of these assets are below walkways, safety aspects of pipe failure. Affected by high tides. Individually replacing assets is small cost, the social aspects bigger consideration. Other impacts from stormwater pipes where water from the ocean enters the pipes, causing them to "back up" in the opposite direction of typical flow.	Moderate	Moderate	Insignificant	Moderate	95%	95%	95%	95%
Kiama Boat Harbour	Sydney Water	Sewer Main (section along northern edge of harbour/promenade)	N/A	N/A	High	High	Based on previous consequence rating of similar asset	Major	major	moderate	major	N/A	N/A	5%	5%
Kiama Boat Harbour		Storm Bay	Medium	Medium	Medium	Medium	Based on Coastal inundation consequence rating	Minor	minor	Minor	minor	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Leased	Boat moorings	Medium	Medium	High	Extreme	Based on Coastal inundation consequence rating - but have rated higher, as this is more frequent inundation Consequence will increase with time (as the area exposed increases spatially). Boat owners association Leasehold (managed by Transport NSW) Much harder to modify. Have to shift further inland to get the appropriate slope. May not have sufficient space. Only self serving facility in several hundred kms Based on previous consequence rating of similar asset (i.e. boat ramp and moorings) Boat owners association Leasehold (managed by Transport NSW)	Catastrophic	major	Insignificant	catastrophic	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands / Leased	Slipway SE corner Robertsons Basin	Medium	Medium	High	Extreme	Based on previous consequence rating of similar asset (i.e. boat ramp and moorings) Boat owners association Leasehold (managed by Transport NSW)	Catastrophic	major	Insignificant	catastrophic	95%	95%	95%	95%
Kiama Boat Harbour	Crown Lands	Fishermans Shed (N of slipway), Heritage listed	N/A	N/A	N/A	High	Could be lifted, but is of clapboard (ad hoc) construction.	Major	major	Insignificant	moderate	N/A	N/A	N/A	50%
Kiama Boat Harbour	Crown Lands with private leaseholder	Fishermans market	N/A	N/A	N/A	High	Commercial interest - Enables economic functioning of fishing fleet (sales). Is next to sheds but not Heritage listed. Based on previous consequence rating of similar asset (i.e. Fishermans Shed ) Zoning may permit eco tourism in future. No trigger for rezoning in LSPS (would only be triggered by owners). Access to beach already difficult. Options to negotiate future beach access through Easts HP? Council work has noted visitors to park are main users of the beach. Only other access is via coastal walkway. Easement over a bit of their land was negotiated in past. CVA mapped - will trigger SEPP, can change how/if . WRT to acquisition, Coastal Lands Protection scheme still available. Consequence will increase with time (as the area exposed increases spatially) - exacerbated with combined impacts	Major	major	Insignificant	moderate	N/A	N/A	N/A	5%
Easts	Private Asset	East's Beach Holiday Park (beach front cabins, campsites, recreational facilities, access roads, onsite stormwater, and Munna Munnora Ck) (Zone E3), and 1 lot (north of this) separately privately owned.	Medium	Medium	High	Extreme	Zoning may permit eco tourism in future. No trigger for rezoning in LSPS (would only be triggered by owners). Access to beach already difficult. Options to negotiate future beach access through Easts HP? Council work has noted visitors to park are main users of the beach. Only other access is via coastal walkway. Easement over a bit of their land was negotiated in past. CVA mapped - will trigger SEPP, can change how/if . WRT to acquisition, Coastal Lands Protection scheme still available. Consequence will increase with time (as the area exposed increases spatially) - exacerbated with combined impacts	Insignificant	insignificant	insignificant	insignificant	95%	95%	95%	95%
Easts	Sydney Water	Sewer main and pump station (along back of beach, northern end only). Behind "seawall" (unsure of its condition).	N/A	N/A	N/A	High	Based on previous consequence rating of similar asset Key area impacted is the far north section of beach and sewer pipes	Major	major	minor	major	N/A	N/A	N/A	5%
Easts	Sydney Water	Water main (centre) servicing CP	N/A	N/A	N/A	High	Based on consequence rating for similar assets	Moderate	moderate	Insignificant	moderate	N/A	N/A	N/A	50%
Werri	Council Stormwater Assets	Pits (at south end only)	N/A	N/A	N/A	Medium	Based on previous consequence rating of similar asset	Minor	minor	Insignificant	minor	N/A	N/A	N/A	50%
Gerringong Boat Harbour	Council Managed Crown Land	Boat Harbour and Rock Pool (Heritage LEP 2011)	Medium	Medium	Medium	Medium	Based on previous consequence rating of similar asset (i.e. Kiama Harbour and pool)	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Gerringong Boat Harbour	Council / MIDO	Gerringong Boat ramp	Medium	Medium	Medium	Medium	Based on previous consequence rating of similar asset	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Gerringong Boat Harbour	Council Stormwater Asset	Pits (2)	N/A	Medium	Medium	Medium	Based on previous consequence rating of similar asset	Minor	minor	Insignificant	minor	N/A	50%	95%	95%
Gerringong Boat Harbour	Council Managed Crown Land	Cooke Park (including walkway and "seawall")	N/A	N/A	Medium	Medium	Based on previous consequence rating of similar asset	Minor	minor	Insignificant	minor	N/A	N/A	5%	50%
Seven Mile	Council Stormwater Asset	Pits along Crooked River entrance (east of bridge). Only stormwater pipe & pit to boat ramp off Burke Pde at risk from erosion	Medium	Medium	Medium	Medium	Based on previous consequence rating of similar asset	Minor	minor	Insignificant	minor	95%	95%	95%	95%
Seven Mile	? Council / MIDO Asset	Boat ramp off Burke Pde	N/A	Medium	Medium	Medium	Based on previous consequence rating of similar asset	Minor	minor	Insignificant	minor	N/A	5%	50%	95%
Seven Mile	Council Land	Reserve at 52-45 Burke Pde (only small area subject to inundation)	N/A	N/A	N/A	High	Based on previous consequence rating of similar asset	Major	major	Insignificant	major	N/A	N/A	N/A	5%
Seven Mile	Council Road	Park Rd (Properties 2 -11)	N/A	N/A	High	Extreme	No alternate route	Major	major	Insignificant	major	N/A	N/A	5%	95%
Seven Mile	Council Road	Bourke Pde	N/A	N/A	N/A	High	Limited impacts	Moderate	moderate	Insignificant	moderate	N/A	N/A	N/A	50%
Seven Mile	Biodiversity	Eucalypt Forest (LEP Biodiversity)	Medium	Medium	High	High	Consequence will increase with time (as the area exposed increases spatially)	Insignificant	Insignificant	Insignificant	Insignificant	95%	95%	95%	95%
Seven Mile	Biodiversity	Floodplain Forest (LEP Biodiversity)	Medium	Medium	High	High	Consequence will increase with time (as the area exposed increases spatially)	Minor	Minor	Minor	Minor	95%	95%	95%	95%