

25 Te Puna Estuary

25.1 Site description

The Te Puna Estuary shoreline is located on the western side of Te Puna. The site consists of approximately 0.3 km of consolidated shoreline and 1 km of low-lying estuarine area. The site is split into 3 cells based on differences in morphology, exposure and shoreline elevation (Figure 25-1).

The Te Puna Estuary is a very low energy environment with limited fetch and shallow intertidal flats. The shoreline is exposed to winds from the west, with the average fetch of 0.5 km.



Figure 25-1 Location and cell extent of the Te Puna Estuary shoreline within Tauranga Harbour

The northern and southern extents of the shoreline consists low-lying estuarine area with mangroves and salt marsh vegetation (Cell 25A and Cell 25C). In the middle there is a small section of well-vegetated, west-facing cliff (Cell 25B).



Figure 25-2 Site photos for the Te Puna Estuary shoreline. (A) Low-lying estuarine shoreline at the northern end (Cell 25A), (B) low-lying estuarine shoreline at the southern end (Cell 25B).

25.2 Geology

The geological map of the area²⁶ indicates that the site comprises:

- Matua Subgroup: Poorly to moderately sorted gravel with minor sand and silt underlying terraces; includes minor fan deposits and loess.
- Holocene river deposits: Alluvial gravel, sand, silt, mud and clay, with local peat.

Field observations were in line with the published geology.

Existing slope angles for the consolidated cliffs range from 35° to 45°. The range of stable slope angles for Te Puna Estuary are shown in Table 25-1 below.

The failure types observed around Te Puna Estuary were typically shallow surface failures. The likelihood of deep seated movement is low to moderate.

25.3 Coastal processes

The presence of mangroves and salt marsh vegetation within the Te Puna Estuary indicates that it is a low energy environment. Due to the limited fetch exposure and shallow intertidal flats the tidal current and wave energy at the shoreline is likely to be minimal. Due to vegetation cover it is difficult to determine long term cliff erosion rates within Cell 25B, however based on the sheltered environment, erosion rates are estimated to range from -0.02 to -0.08 m/yr.

The SLR response factor for the cliffs in Cell 25B is estimated to range from 0.1 to 0.3.

25.4 Adopted component values

Adopted component values are presented within Table 25-1. The short term values are equal to zero for the consolidated cells as short term erosion is not applicable for consolidated shorelines (see section 4.6.2 in main report).

²⁶ Leonard, G.S.; Begg, J.G.; Wilson, C.J.N. (compilers) 2010: *Geology of the Rotorua area*. Institute of Geological & Nuclear Sciences 1:250,000 geological map 5. 1 sheet + 102 p. Lower Hutt, New Zealand. GNS Science.

Table 25-1 Component values for the cells along the Te Puna Estuary shoreline.

Site		25. Te Puna Estuary		
Cell		25A	25B	25C
Cell centre (NZTM)	E	1870431	1870347	1870524
	N	5827403	5826917	5826651
Morphology		Low-lying estuarine	Consolidated	Low-lying estuarine
Geology		Holocene river deposits	Matua Subgroup	Matua Subgroup
Exposure (average fetch/direction)		0.5 km (SW)	0.5 km (NW)	0.1 km (SW)
State		Natural	Natural	Natural
Short-term (m)	Min	<i>No CEIHA (Refer to future MHWS layer in Stephens, 2019)</i>	0	<i>No CEIHA (Refer to future MHWS layer in Stephens, 2019)</i>
	Mode		0	
	Max		0	
Dune/Cliff elevation (m above toe or scarp)	Min		5	
	Mode		6	
	Max		7	
Stable angle (deg)	Min		24	
	Mode		26	
	Max		40	
Long-term (m)	Min		-0.08	
	Mode		-0.05	
	Max		-0.02	
Closure slope (beaches)/SLR response factor (cliffs)	Min	0.1		
	Mode	0.2		
	Max	0.3		

25.5 Coastal erosion hazard assessment

Coastal erosion hazard distances for Te Puna Estuary are presented within Table 25-2 and an overview map in Figure 25-4. Histograms of individual components and resultant erosion hazard distances using a Monte Carlo technique are shown in Appendix B. For the purpose of this assessment all coastal erosion protection structures have been ignored (refer to main report Section 4.6.4).

The erosion hazard for the consolidated shoreline within Cell 25B ranges from -10 m for the current P_{66%} scenario to -24 m for the 2130 1.6 m SLR P_{5%} scenario.

Due to the presence of mangroves and salt marsh, there is no current erosion hazard within Cells 25A and 25C. Inundation as a consequence of SLR is likely to be a greater hazard for the low-lying shoreline in the future.

Table 25-2 Coastal erosion hazard widths (m) for current, 2080 and 2130 timeframes.

Site	Cell	Timeframe	SLR (m)	Probability of Exceedance					
				Min	P _{66%}	P _{50%}	P _{5%}	P _{1%}	Max
Te Puna Estuary	25A	Current	0.03	<i>No CEIHA (Refer to future MHWS layer in Stephens, 2019)</i>					
		50yr (2080)	0.12						
			0.2						
			0.4						
			0.6						
		100yr (2130)	0.22						
			0.6						
			0.8						
			1.25						
			1.6						
	25B	Current	0.03	-7	-10	-11	-14	-15	-16
		50yr (2080)	0.12	-8	-13	-14	-17	-18	-20
			0.2	-8	-13	-14	-17	-18	-20
			0.4	-9	-14	-14	-18	-19	-21
			0.6	-9	-14	-15	-18	-19	-22
		100yr (2130)	0.22	-9	-15	-16	-20	-21	-23
			0.6	-10	-16	-17	-21	-23	-25
			0.8	-10	-17	-18	-22	-24	-26
			1.25	-10	-17	-19	-23	-25	-28
			1.6	-10	-18	-19	-24	-25	-29
	25C	Current	0.03	<i>No CEIHA (Refer to future MHWS layer in Stephens, 2019)</i>					
		50yr (2080)	0.12						
0.2									
0.4									
0.6									
		0.22							

Site	Cell	Timeframe	SLR (m)	Probability of Exceedance					
				Min	P _{66%}	P _{50%}	P _{5%}	P _{1%}	Max
		100yr (2130)	0.6						
			0.8						
			1.25						
			1.6						

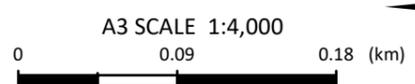
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LEGEND

- ↔ Cell Extent
- Baseline (2014-2017)
- - - No current erosion (refer to future MHWS)
- Critical structures
- 2030 (current) - P66%
- 2030 (current) - P5%
- 2080 - 0.4m SLR - P66%
- 2080 - 0.6m SLR - P66%
- 2080 - 0.6m SLR - P5%
- 2130 - 0.8m SLR - P66%
- 2130 - 1.25m SLR - P66%
- 2130 - 1.25m SLR - P5%
- 2130 - 1.6m SLR - P5%
- Future MHWS7 - 1.6m SLR

Notes: Aerial photograph sourced from the LINZ Data Service (dated 2015)



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ARCFILE	CEHA Overview2.mxd	
SCALE (AT A3 SIZE)	1:4,000	
PROJECT No.	1001628.1000	

Tauranga Harbour Coastal Erosion Assessment
 Erosion Hazard Overview
 Site 25: Te Puna Estuary

FIGURE No. Figure 25-4

Rev. 0

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