11 Woolleys Bay

Description and geomorphology

Woolleys Bay is a located approximately 24 km north of Whangarei.

The site is a pocket beach embayment situated between two headlands of Kaone Point in the north and an unnamed headland in the south. The shoreline is approximately 800 m long.

The beach comprises medium to coarse sand with a portion of shell. The beach has a minimal berm along the shoreline. A stormwater outlet enters the site near the southern end of the site, which has caused a local retreat of the dune toe.

The site has a healthy dune system which is well vegetated with spinifex. The dune elevation is relatively high and ranges from RL 3 to 10 m.

A stream enters the shoreline at the northern end of the site. The stream flows behind the northern 300 m of the shoreline forming a relatively low lying barrier spit that is approximately 50 m wide.

The sand sediment is moving in a northerly direction and has blocked off the stream in the past. A groyne structure has been constructed on the southern side of the stream mouth.

Local considerations

There are no erosion protection structures located at this site.

The relatively narrow spit located at the northern end of the site is influenced by both coastal and fluvial processes. Therefore, this entire section of the site (cell 11A) is considered to be susceptible to erosion hazard and is not suitable for development.

Coastal Erosion Hazard Assessment

The site is split into four cells based on differences in geomorphology, dune height and shoreline movement trends.

Adopted component values are presented within Table 11-1. Short-term erosion values range from 5 to 20 m along the open beach. Long-term trends are variable at between -0.1 and +0.1 m/year along the beach and erosion of up to -0.15 m/year for the cliff at the east end.

Site Photograph A (northern end)

Site Photograph B (southern end)

Site Photograph C (spit)

Histograms of individual components and resultant CEHZ distances using a Monte Carlo technique are shown in Figure 11-1 to Figure 11-4.

Coastal Erosion Hazard Zone widths are presented within Table 11-2 to 11-4 and Figure 11-5 and range from 17 to 19 m for the CEHZ1, 35 to 42 m for the CEHZ2 and 37 to 49 m for the CEHZ3. CEHZ's have been mapped in agreement with the calculated values, except lines are dashed around the eastern stream mouth to account for the potential fluvial effects and are truncated along the western spit when they intersect the stream running behind the dune.

The CEHZ2 line for cell 11A at Woolleys Bay has been removed as requested by NRC and the CEHZ2 value in Table 11-2 has been deleted.

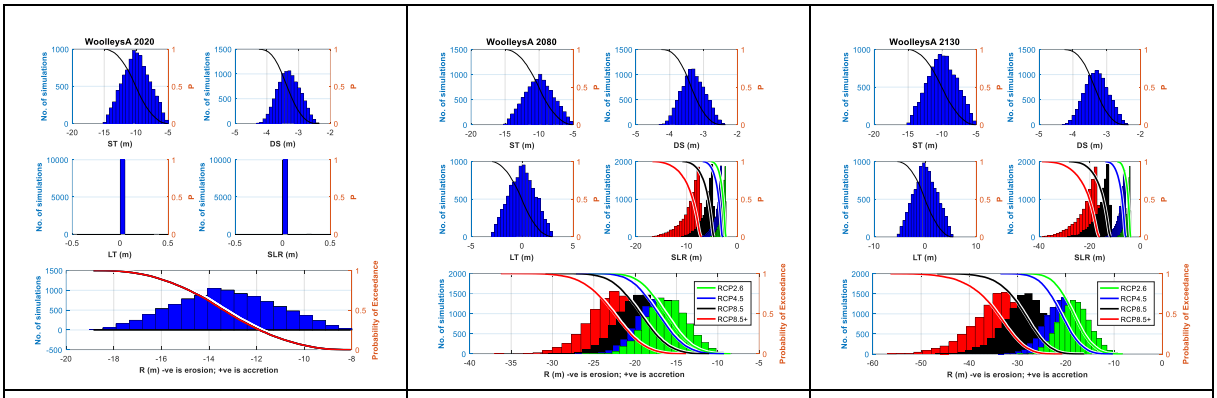
Figure 11-6 shows the available historic shorelines for Woolleys Bay.

Table 11-1 Component values for Erosion Hazard Assessment

Site		**11. Woolleys Bay**			
Cell		11A [3,4]	11B	11C	11D
Cell centre (NZTM)	E	1734610	1734841	1735126	1735215
	N	6063966	6063786	6063682	6063659
Chainage, m (from N/W)		0-110	110-630	630-790	790-830
Morphology		Dune	Dune	Dune	Greywacke
Short-term (m)	Min	5	5	5	0
	Mode	10	10	10	0
	Max	15	15	20	0
Dune/Cliff elevation (m above toe or scarp)	Min	3.1	4.7	3.0	3.9
	Mode	4.2	6.9	4.6	4.7
	Max	5.1	9.5	6.3	5.0
Stable angle (deg)	Min	30	30	30	18.4
	Mode	32	32	32	22.5
	Max	34	34	34	26.6
Long-term (m) -ve erosion +ve accretion	Min	0.05	0.1	0.1	-0.05
	Mode	0	0.05	0	-0.1
	Max	-0.05	0	-0.1	-0.15
Closure slope (beaches)	Min	0.073	0.073	0.073	0.5
	Mode	0.067	0.067	0.067	0.25
	Max	0.03	0.03	0.03	0
SLR 2080 (m)	RCP 2.6	0.16	0.16	0.16	0.16
	RCP 4.5	0.21	0.21	0.21	0.21
	RCP 8.5M	0.33	0.33	0.33	0.33
	RCP 8.5H+	0.51	0.51	0.51	0.51
SLR 2130 (m)	RCP 2.6	0.28	0.28	0.28	0.28
	RCP 4.5	0.42	0.42	0.42	0.42
	RCP 8.5M	0.85	0.85	0.85	0.85
	RCP 8.5H+	1.17	1.17	1.17	1.17

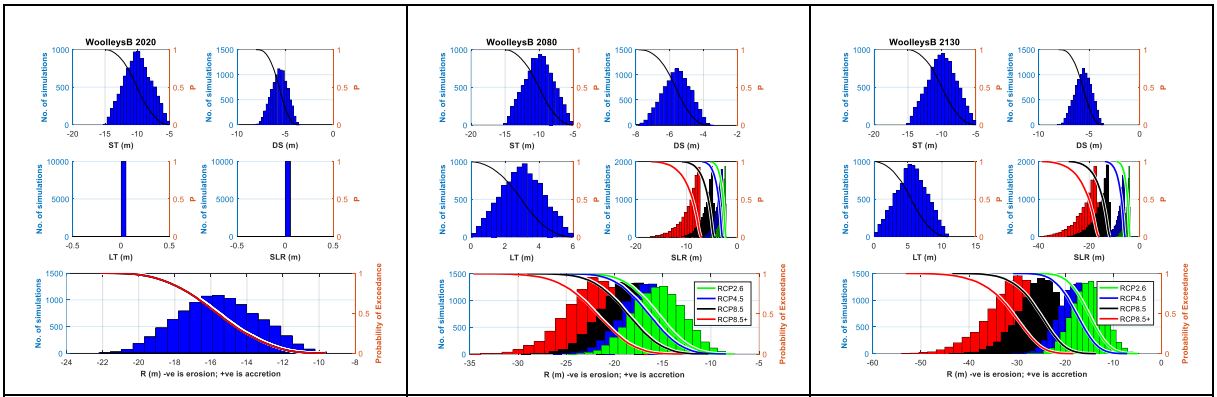
[3]Modified in consultation with NRC from original T+T (2014) assessment.

[4]Has been mapped in addition to T+T (2014)



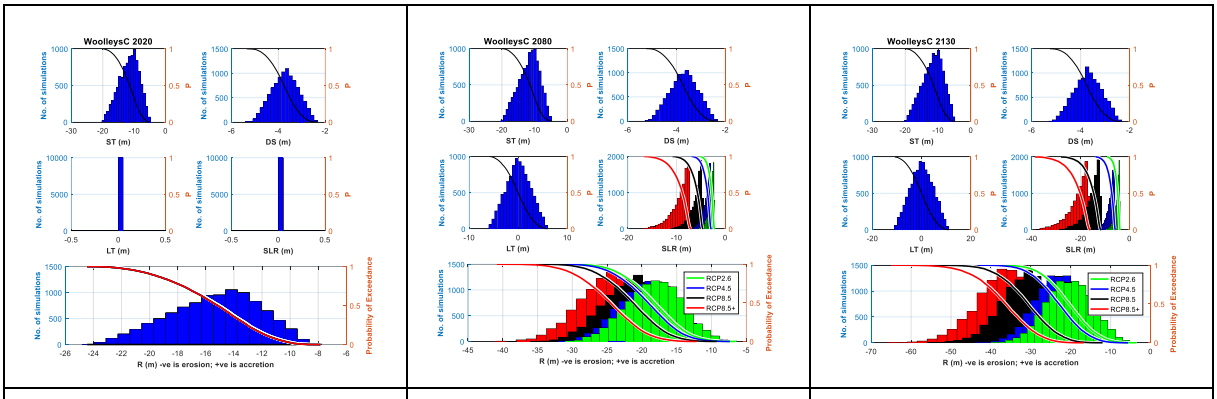
2020	2080	2130

Figure 11-1 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 11A



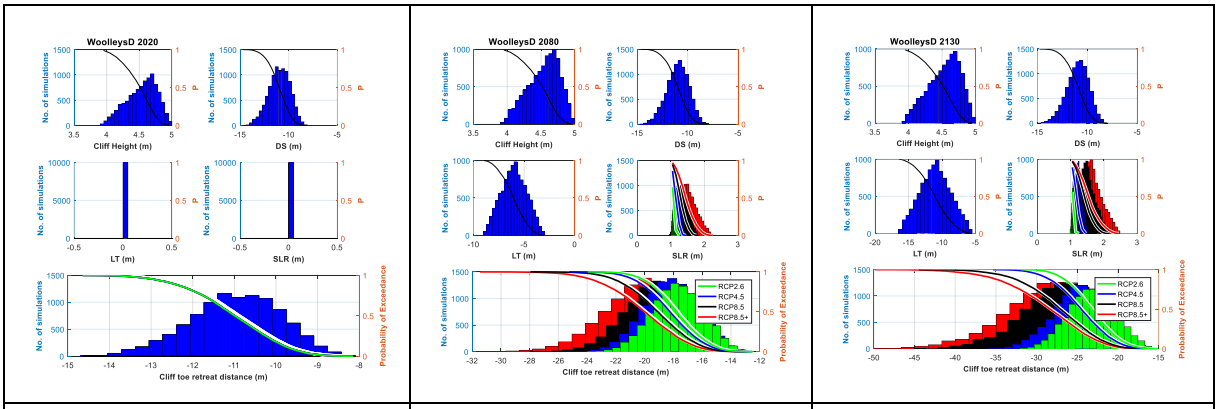
2020	2080	2130

Figure 11-2 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 11B



2020	2080	2130

Figure 11-3 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 11C



2020	2080	2130

Figure 11-4 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 11D

Table 11-2 Coastal Erosion Hazard Zone Widths for 2020

Site		11. Woolleys			
		A	B	C	D
Probability of CEHZ (m) Exceedance	Min	-8	-10	-8	-8
	99%	-9	-11	-9	-9
	95%	-10	-12	-11	-9
	90%	-11	-13	-11	-10
	80%	-11	-14	-13	-10
	70%	-12	-14	-13	-10
	66%	-12	-15	-14	-10
	60%	-13	-15	-14	-11
	50%	-13	-16	-15	-11
	40%	-14	-16	-16	-11
	33%	-14	-17	-17	-11
	30%	-14	-17	-17	-12
	20%	-15	-18	-18	-12
	10%	-16	-18	-20	-12
	5%	-17	-19	-21	-13
	1%	-18	-20	-23	-14
	Max	-19	-22	-25	-15

Table 11-3 Coastal Erosion Hazard Zone Widths Projected for 2080

Site		11. Woolleys															
Cell		11A				11B				11C				11D			
RCP scenario		2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	Min	-8	-9	-11	-14	-8	-8	-10	-13	-7	-7	-9	-12	-12	-13	-13	-13
	99%	-11	-11	-13	-16	-10	-11	-12	-15	-10	-10	-12	-15	-14	-14	-15	-15
	95%	-12	-13	-15	-18	-11	-12	-14	-17	-12	-13	-15	-18	-15	-15	-16	-16
	90%	-13	-14	-16	-19	-12	-13	-15	-18	-13	-14	-16	-19	-15	-16	-16	-17
	80%	-14	-15	-17	-20	-13	-14	-16	-19	-15	-16	-18	-21	-16	-17	-17	-18
	70%	-15	-16	-18	-21	-14	-15	-17	-20	-16	-17	-19	-22	-17	-17	-18	-19
	66%	-15	-16	-18	-21	-14	-15	-17	-21	-16	-17	-20	-23	-17	-17	-18	-19
	60%	-16	-16	-19	-22	-15	-16	-18	-21	-17	-18	-20	-23	-17	-18	-18	-19
	50%	-16	-17	-19	-22	-16	-16	-19	-22	-18	-19	-21	-24	-18	-18	-19	-20
	40%	-17	-18	-20	-23	-16	-17	-19	-23	-19	-20	-22	-26	-18	-19	-20	-21
	33%	-17	-18	-21	-24	-17	-18	-20	-23	-20	-21	-23	-26	-18	-19	-20	-21
	30%	-18	-19	-21	-24	-17	-18	-20	-23	-20	-21	-23	-27	-19	-19	-20	-21
	20%	-18	-19	-22	-25	-18	-19	-21	-24	-22	-23	-25	-28	-19	-20	-21	-22
	10%	-19	-20	-23	-27	-19	-20	-22	-26	-24	-25	-27	-30	-20	-21	-22	-24
	5%	-20	-21	-24	-28	-20	-21	-23	-27	-25	-26	-28	-32	-21	-21	-23	-25
	1%	-22	-23	-26	-30	-21	-23	-25	-30	-28	-29	-31	-35	-22	-23	-25	-27
	Max	-26	-27	-31	-36	-24	-26	-29	-35	-31	-32	-35	-41	-24	-25	-28	-31
	CEHZ1	-18				-17				-20				-18			

*Modified in consultation with NRC from the original T+T (2014) assessment, so width varies.

Table 11-4 Coastal Erosion Hazard Zone Widths Projected for 2130

Site		11. Woolleys															
Cell		11A				11B				11C				11D			
RCP scenario		2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	Min	-8	-10	-16	-21	-5	-7	-14	-18	-4	-6	-12	-17	-15	-16	-17	-17
	99%	-11	-13	-20	-25	-8	-10	-17	-22	-8	-10	-17	-22	-17	-18	-19	-19
	95%	-13	-15	-22	-27	-10	-12	-19	-24	-11	-14	-21	-26	-19	-19	-21	-21
	90%	-14	-17	-24	-29	-11	-13	-20	-25	-13	-15	-23	-28	-19	-20	-22	-22
	80%	-16	-18	-25	-30	-12	-15	-22	-27	-16	-18	-25	-31	-21	-22	-23	-24
	70%	-17	-19	-26	-32	-13	-16	-23	-28	-17	-20	-27	-33	-22	-23	-25	-26
	66%	-17	-20	-27	-32	-14	-16	-24	-29	-18	-20	-28	-33	-22	-23	-25	-26
	60%	-18	-20	-27	-33	-14	-17	-24	-30	-19	-21	-29	-35	-22	-24	-26	-27
	50%	-18	-21	-29	-34	-15	-18	-25	-31	-20	-23	-31	-36	-23	-24	-27	-28
	40%	-19	-22	-30	-35	-16	-19	-26	-32	-22	-24	-32	-38	-24	-25	-28	-30
	33%	-20	-22	-30	-36	-17	-19	-27	-33	-23	-26	-33	-39	-24	-26	-29	-31
	30%	-20	-23	-31	-37	-17	-20	-28	-34	-23	-26	-34	-40	-25	-26	-29	-31
	20%	-21	-24	-32	-39	-18	-21	-29	-36	-25	-28	-36	-42	-26	-27	-31	-33
	10%	-23	-25	-34	-42	-19	-22	-31	-39	-28	-31	-39	-46	-27	-29	-33	-36
	5%	-24	-27	-36	-44	-21	-24	-33	-41	-30	-32	-41	-49	-28	-30	-35	-38
	1%	-26	-29	-40	-49	-23	-26	-37	-46	-34	-37	-46	-54	-30	-32	-39	-43
	Max	-29	-34	-47	-56	-27	-31	-43	-53	-39	-43	-56	-65	-32	-35	-44	-50
	CEHZ2	-36				-35				-41				-35			
	CEHZ3	-44				-41				-49				-38			

Notes: Dashed CEHZ indicates greater uncertainty around stream mouths and backshore topography.
Northland 0.4m Rural Aerial Photos (2014-2016).

A4 SCALE 1:4,000

0 0.1 0.2 (km)

Tonkin+Taylor
105 Carlton Gore Rd, Newmarket, Auckland
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SCALE (AT A4 SIZE)	1:4,000	
PROJECT No.	1012360	

NORTHLAND REGIONAL COUNCIL

Coastal Erosion Hazard Assessment
Woolleys Bay
Site: 11

FIGURE No. Figure 11-5

Rev. 1

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Notes: Dashed CEHZ indicates greater uncertainty around stream mouths and backshore topography.
Northland 0.4m Rural Aerial Photos (2014-2016).

A4 SCALE 1:4,000

0 0.1 0.2 (km)

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ARCFILE	1012360_Historicv2.mxd	
SCALE (AT A4 SIZE)	1:4,000	
PROJECT No.	1012360	

NORTHLAND REGIONAL COUNCIL

Historic Shorelines
Woolleys Bay
Site: 11

FIGURE No. Figure 11-6

Rev. 1

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