1   Langs Beach

Description and geomorphology

Langs Beach is located south of Bream Bay, approximately 40 km south of Whangarei.

The site is approximately 1.8 km long and is situated between two headlands comprising weak sedimentary rock. The northern 350 m of the site is a cliff shoreline formed from Greywacke rock (cell 1A). The cliff elevations in this area range from RL 16 to 23 m.

The next 500 m section of shoreline is unconsolidated beach situated between two streams. Both streams have an effect on the shoreline position. The southern stream is often blocked by the beach berm forming a lagoon and meandering channel that causes some backshore erosion. A rock reef exists at the northern end of this cell which is located approximately 25 m offshore.

The central 300 m of shoreline comprises soft cliff (cell 1D). A medium to fine sandy beach exists along the site that has a berm width of approximately 5 to 10 m above the high tide line. Another stream mouth exists at the southern end of this cell where the topography transitions from the cliff shoreline to a low lying backshore area. This low lying area is approximately 450 m long and the stream channel flows between the edge of the shoreline bank and an intertidal spit.

The southern 150 m of the site is cliff shoreline comprising of graywacke rock (cell 1F). The cliff height in this area ranges from RL 25 to 31 m.

Local considerations

A grouted rock seawall exists along the southern edge of the middle stream. The structure is approximately 150 m long.

There are three streams that enter the site and influence the shoreline position. There is a greater level of uncertainty in these areas because fluvial processes also effect shoreline movement. The resulting hazard zones are dashed in these areas to reflect this uncertainty.

Site Photograph A (low lying southern backshore)
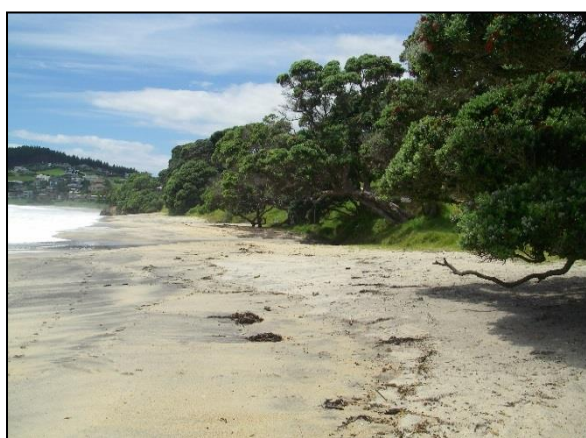
Site Photograph B (central cliff area)

Site Photograph C (northern beach)

Coastal Erosion Hazard Assessment

The site is split into six cells based on differences in geomorphology, exposure and dune height.

Adopted component values are presented within Table 1-1. Short-term erosion rates range from 5 to 15 m in the north and 4 to 10 m in the more sheltered south. The Greywacke cliffs at the

northern end have lower stable angles than the southern cliffs due to their more weathered nature. Long-term erosion rates range from -0.02 to -0.1m/year for the cliffed sections and from +0.2 to -0.1m/year along the beaches where some accretion has occurred since 1960, particularly around the northern stream mouth.

Histograms of individual components and resultant CEHZ distances using a Monte Carlo technique are shown in Figure 1-1 to Figure 1-6. Coastal Erosion Hazard Zone widths are presented within Table 1-2, Table 1-3 and Table 1-4 and mapped in Figure 1-7.

CEHZ1 lines range from 15 to 24 m for the beaches, CEHZ2 values range from 40 to 60 m and CEHZ3 values range from 50 to 74 m. The CEHZ1 value for cell 1E has been adjusted from 12 m to a minimum value of 15 m.

Hazard lines are generally based on these values, although uncertainties remain around the

stream mouths where fluvial processes occur. These lines have been dashed to reflect this.

Note that cell 1E has experienced accretion since about 1972 over approximately 150 m, with CEHZs offset from the accreted most recent shoreline.

For cell A, D and F the cliff projection method has been adopted with future shoreline distances shown in Figure 1-1, Figure 1-4 and Figure 1-6, Table 1-2, Table 1-3 and Table 1-4 instead of CEHZ distances.
Future shoreline (cliff toe) distances range from 3 to 8 m to 2080 and 15 to 34 m to 2130.

Figure 1-8 shows the available historic shorelines for Langs Beach.

Table 1-1 Component values for Erosion Hazard Assessment

Site		1. Langs Beach					
Cell		1A[1]	1B	1C[2]	1D[1]	1E	1F[1]
Cell centre (NZTM)	E	1737892	1738032	1738162	1738422	1738760	1739071
	N	6010317	6010119	6009946	6009782	6009590	6009692
Chainage, m (from N/W)		0-350	350-500	500-850	850-1150	1150-1600	1600-1750
Morphology		Highly weathered Greywacke	Dune	Dune	Soft Cliff	Dune	Greywacke
Short-term (m)	Min	0	5	5	0	4	0
	Mode	0	10	10	0	6	0
	Max	0	15	15	0	10	0
Dune/Cliff elevation (m above toe or scarp)	Min	16.0	5.9	3.1	7.1	3.1	25.2
	Mode	18.8	7.1	6.3	8.5	3.8	29.2
	Max	22.9	7.9	8.1	10.4	5.3	31.0
Stable angle (deg)	Min	18.4	30	30	26.6	30	26.6
	Mode	22.5	32	32	30.2	32	30.2
	Max	26.6	34	34	33.7	34	33.7
Long-term (m) -ve erosion +ve accretion	Min	-0.02	0.1	0	-0.02	0.2	-0.05
	Mode	-0.05	0.05	-0.05	-0.05	0.05	-0.1
	Max	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2
	Min	0.5	0.1	0.1	0.75	0.1	0.5

Site		1. Langs Beach					
Cell		1A[1]	1B	1C[2]	1D[1]	1E	1F[1]
Closure slope (beaches)	Mode	0.25	0.026	0.026	0.5	0.034	0.25
	Max	0	0.015	0.015	0.25	0.019	0
SLR 2080 (m)	RCP 2.6	0.16	0.16	0.16	0.16	0.16	0.16
	RCP 4.5	0.21	0.21	0.21	0.21	0.21	0.21
	RCP 8.5M	0.33	0.33	0.33	0.33	0.33	0.33
	RCP 8.5H+	0.51	0.51	0.51	0.51	0.51	0.51
SLR 2130 (m)	RCP 2.6	0.28	0.28	0.28	0.28	0.28	0.28
	RCP 4.5	0.42	0.42	0.42	0.42	0.42	0.42
	RCP 8.5M	0.85	0.85	0.85	0.85	0.85	0.85
	RCP 8.5H+	1.17	1.17	1.17	1.17	1.17	1.17

[1]Cliff projection method has been used, so distance to future cliff toe position has been tabulated. Actual CEHZ width will be greater depending on cliff height and stable slope angle.
[2]CEHZ0 included behind coastal protection structure.

2020	*2080*	*2130*

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

2020	*2080*	*2130*

Figure 1-2 Histograms of parameter samples and the resultant CEHZ distances for 2020, 2080 and 2130 timeframes for cell 1B

Figure 1-3 Histograms of parameter samples and the resultant CEHZ distances for 2020, 2080 and 2130 timeframes for cell 1C
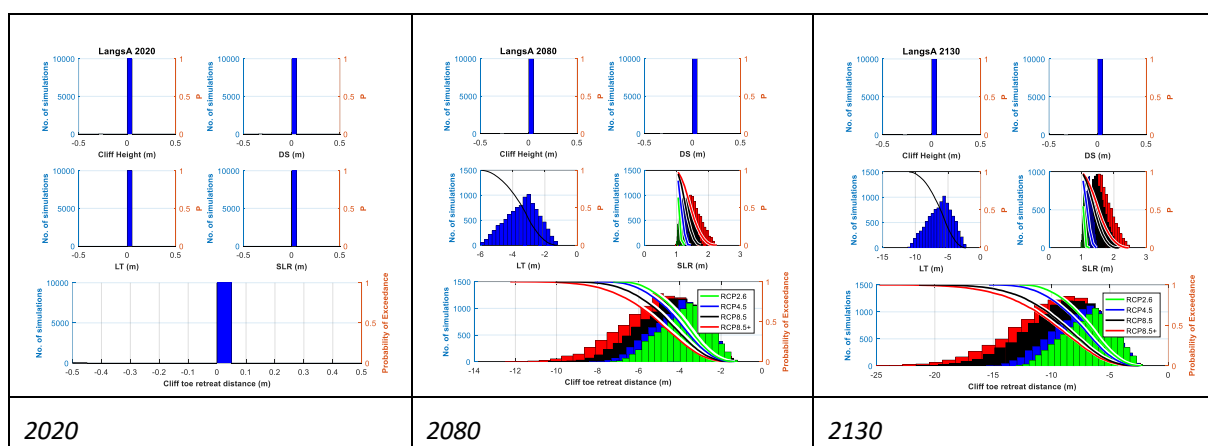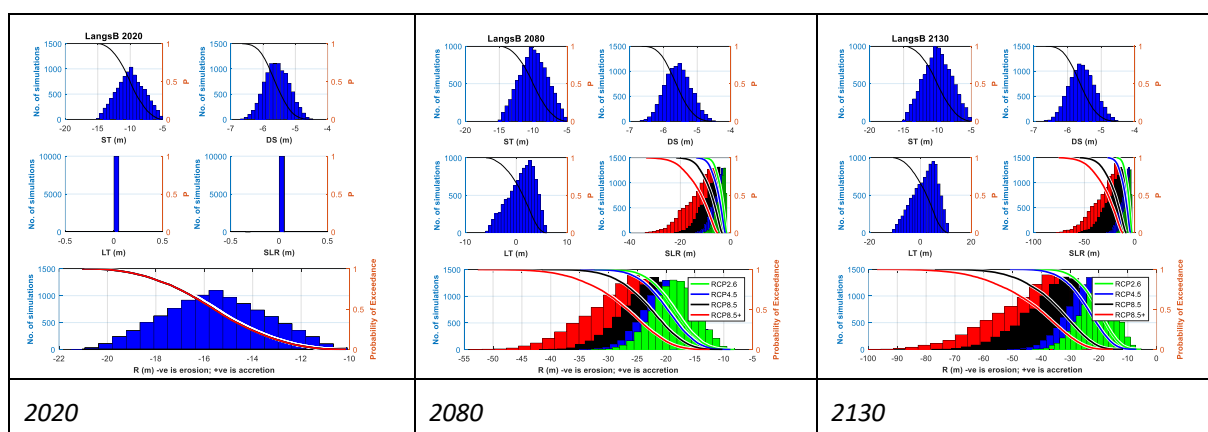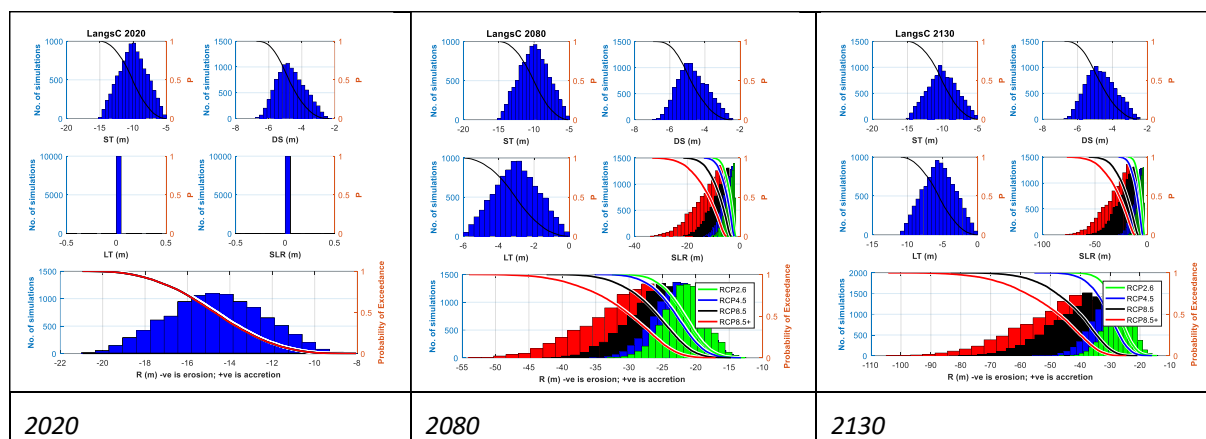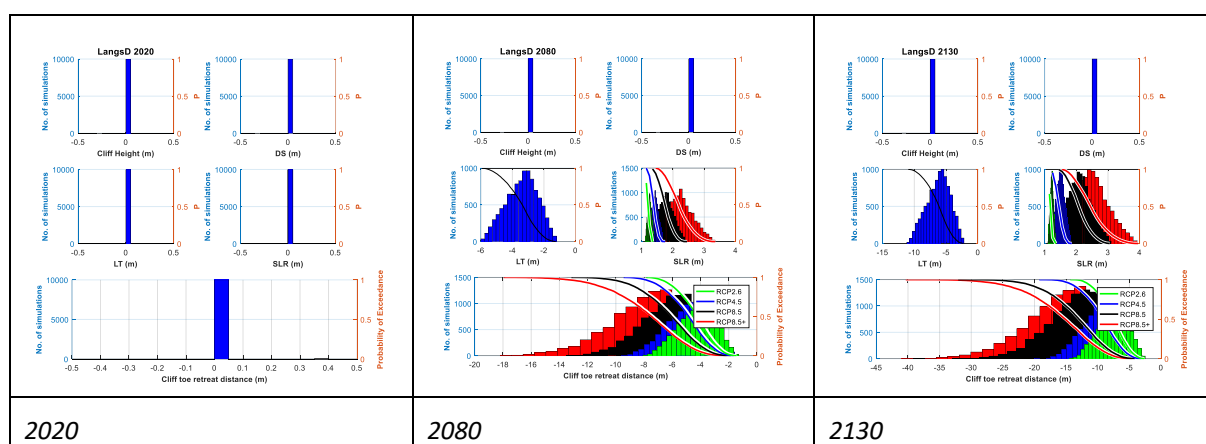

Figure 1-4 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 1D
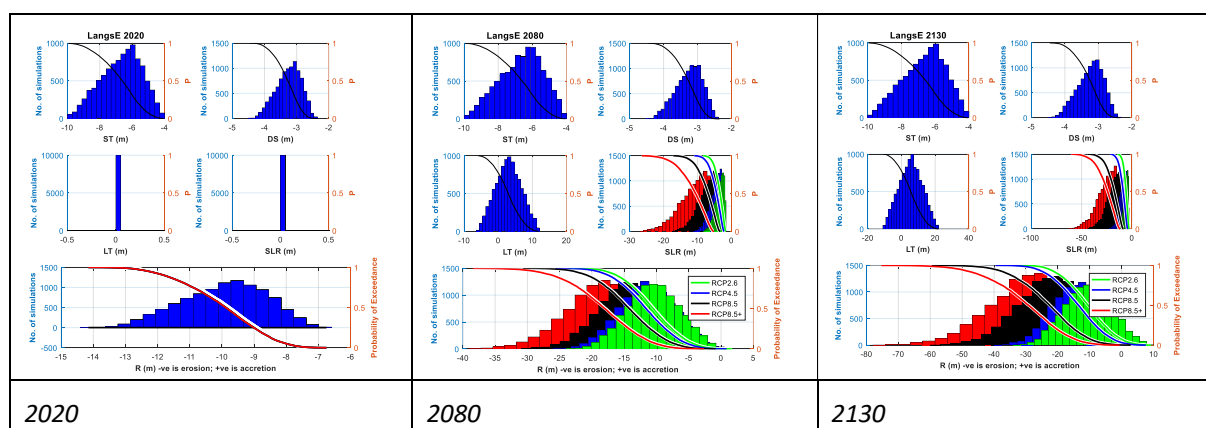

Figure 1-5 Histograms of parameter samples and the resultant CEHZ distances for 2020, 2080 and 2130 timeframes for cell 1E
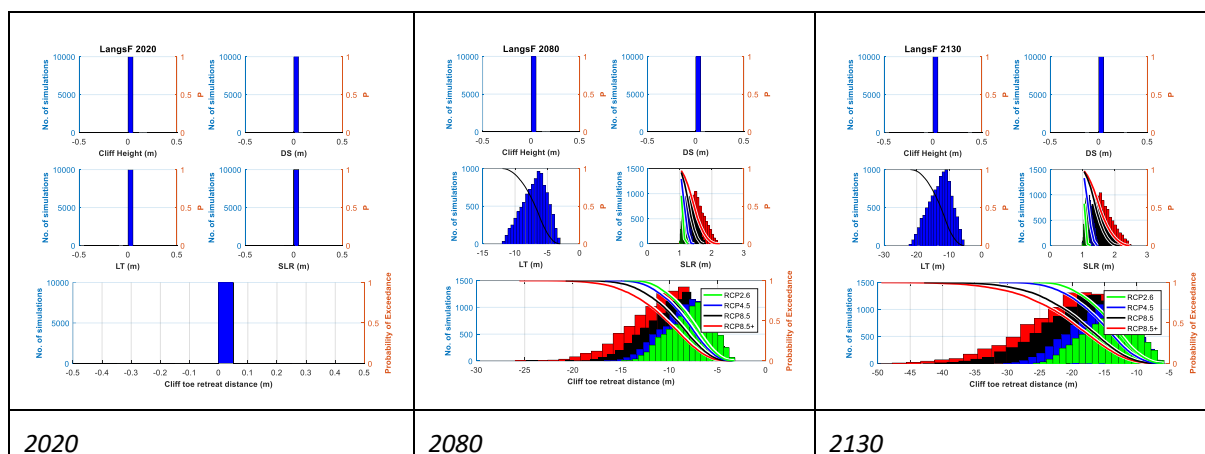
2020	*2080*	*2130*

Figure 1-6 Histograms of parameter samples and the resultant shoreline distances for 2020, 2080 and 2130 timeframes for cell 1F

Table 1-2 Coastal Erosion Hazard Zone Widths for 2020

Site		1. Langs Beach					
		A*	B	C	D*	E	F*
Probability of CEHZ (m) Exceedance	Min	0	-10	-8	0	-7	0
	99%	0	-11	-10	0	-7	0
	95%	0	-12	-11	0	-8	0
	90%	0	-13	-12	0	-8	0
	80%	0	-14	-13	0	-9	0
	70%	0	-14	-13	0	-9	0
	66%	0	-15	-14	0	-9	0
	60%	0	-15	-14	0	-9	0
	50%	0	-16	-15	0	-10	0
	40%	0	-16	-15	0	-10	0
	33%	0	-17	-16	0	-10	0
	30%	0	-17	-16	0	-11	0
	20%	0	-17	-17	0	-11	0
	10%	0	-18	-18	0	-12	0
	5%	0	-19	-18	0	-12	0
	1%	0	-20	-19	0	-13	0
	Max	0	-21	-21	0	-14	0

*Cliff projection method has been used, so cliff toe position has been tabulated, which has been assumed to be unchanged from the adopted 2019 baseline. Actual CEHZ width will be greater depending on cliff height and stable slope angle.

Table 1-3 Coastal Erosion Hazard Zone Widths Projected for 2080

Site		1. Langs Beach																						
Cell		**1A**				**1B**				**1C**				**1D**				**1E**				**1F**			
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+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+
Probability of CEHZ (m) Exceedance	**Min**	-1	-1	-2	-2	-8	-9	-10	-12	-12	-13	-14	-17	-1	-2	-2	-2	2	1	0	-3	-3	-4	-4	-4
	99%	-2	-2	-2	-2	-11	-12	-13	-16	-15	-16	-18	-20	-2	-2	-2	-3	-1	-2	-4	-7	-4	-4	-5	-6
	95%	-2	-2	-3	-3	-13	-14	-16	-18	-17	-18	-20	-22	-2	-2	-3	-4	-4	-5	-7	-10	-5	-5	-6	-7
	90%	-2	-3	-3	-3	-14	-15	-17	-20	-18	-19	-21	-24	-3	-3	-3	-4	-5	-6	-8	-11	-5	-6	-7	-8
	80%	-3	-3	-4	-4	-15	-16	-19	-22	-19	-20	-22	-25	-3	-3	-4	-5	-7	-8	-10	-13	-6	-7	-8	-9
	70%	-3	-3	-4	-5	-17	-18	-20	-24	-20	-21	-23	-27	-3	-4	-4	-5	-8	-9	-12	-15	-7	-7	-8	-9
	66%	-3	-4	-4	-5	-17	-18	-21	-24	-20	-21	-24	-27	-3	-4	-5	-6	-9	-10	-12	-16	-7	-7	-9	-10
	60%	-3	-4	-4	-5	-18	-19	-21	-25	-21	-22	-24	-28	-4	-4	-5	-6	-9	-10	-13	-17	-7	-8	-9	-10
	50%	-4	-4	-5	-5	-18	-20	-23	-27	-22	-23	-26	-30	-4	-4	-5	-6	-10	-12	-14	-18	-8	-8	-10	-11
	40%	-4	-4	-5	-6	-19	-21	-24	-28	-22	-24	-27	-31	-4	-5	-6	-7	-12	-13	-15	-19	-8	-9	-10	-12
	33%	-4	-5	-5	-6	-20	-22	-25	-30	-23	-24	-28	-32	-5	-5	-6	-7	-12	-14	-16	-21	-9	-10	-11	-13
	30%	-4	-5	-6	-6	-20	-22	-25	-30	-23	-25	-28	-33	-5	-5	-6	-8	-13	-14	-17	-21	-9	-10	-11	-13
	20%	-5	-5	-6	-7	-22	-23	-27	-33	-24	-26	-30	-36	-5	-6	-7	-8	-14	-15	-18	-23	-10	-11	-12	-14
	10%	-5	-6	-7	-8	-24	-25	-29	-36	-26	-27	-32	-39	-6	-6	-8	-9	-16	-17	-21	-26	-11	-12	-14	-16
	5%	-6	-6	-7	-8	-25	-27	-31	-39	-27	-29	-34	-42	-6	-7	-8	-10	-17	-19	-22	-28	-12	-13	-15	-17
	1%	-6	-7	-8	-9	-28	-30	-35	-45	-29	-31	-37	-47	-7	-8	-9	-11	-20	-21	-25	-33	-13	-14	-16	-19
	Max	-7	-8	-9	-11	-32	-35	-41	-53	-34	-37	-43	-54	-7	-8	-10	-13	-24	-27	-33	-41	-14	-16	-18	-22
	CEHZ1	-4*				-21				-24				-5*				-12				-9*			

*Cliff projection method has been used, so distance to future cliff toe position has been tabulated. Actual CEHZ width will be greater depending on cliff height and stable slope angle.

Table 1-4 Coastal Erosion Hazard Zone Widths Projected for 2130

Site		1. Langs Beach																							
Cell		**1A**				**1B**				**1C**				**1D**				**1E**				**1F**			
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+	2.6	4.6	8.5	8.5+	2.6	4.6	8.5	8.5+
	Min	-2	-3	-3	-4	-6	-7	-12	-15	-14	-16	-21	-25	-3	-3	-4	-4	9	8	3	-1	-6	-7	-8	-9
	99%	-3	-3	-4	-5	-9	-11	-17	-21	-18	-20	-26	-30	-3	-4	-5	-6	5	3	-3	-7	-7	-8	-10	-11
	95%	-4	-4	-5	-6	-12	-14	-21	-25	-21	-23	-29	-33	-4	-5	-6	-7	1	-1	-8	-13	-9	-10	-12	-13
	90%	-4	-5	-6	-7	-13	-16	-23	-28	-22	-24	-31	-35	-5	-5	-7	-8	-1	-4	-11	-16	-10	-11	-13	-15
	80%	-5	-6	-7	-8	-16	-18	-26	-31	-24	-26	-33	-38	-5	-6	-8	-9	-4	-7	-15	-20	-11	-12	-15	-17
Probability of CEHZ (m) Exceedance	**70%**	-6	-7	-8	-9	-17	-20	-29	-35	-25	-28	-36	-41	-6	-7	-9	-11	-7	-9	-18	-23	-12	-14	-17	-19
	66%	-6	-7	-8	-9	-18	-21	-30	-36	-25	-28	-36	-42	-6	-7	-10	-11	-7	-10	-19	-25	-13	-14	-17	-19
	60%	-6	-7	-9	-10	-19	-22	-31	-38	-26	-29	-38	-44	-7	-8	-10	-12	-9	-11	-20	-26	-13	-15	-18	-20
	50%	-7	-8	-10	-11	-20	-24	-34	-41	-27	-30	-40	-47	-7	-8	-11	-13	-10	-14	-23	-29	-14	-16	-20	-22
	40%	-8	-8	-10	-12	-22	-26	-36	-44	-28	-32	-43	-51	-8	-9	-12	-14	-12	-16	-25	-32	-15	-17	-21	-23
	33%	-8	-9	-11	-12	-23	-27	-39	-48	-29	-33	-45	-54	-8	-10	-13	-15	-14	-17	-27	-34	-16	-18	-22	-25
	30%	-8	-9	-11	-13	-24	-28	-40	-49	-29	-33	-46	-55	-8	-10	-13	-15	-15	-18	-28	-36	-16	-19	-23	-25
	20%	-9	-10	-13	-14	-26	-30	-44	-55	-31	-35	-50	-61	-9	-11	-14	-16	-17	-20	-31	-40	-18	-20	-25	-28
	10%	-10	-11	-14	-15	-29	-33	-50	-62	-33	-38	-55	-68	-10	-12	-16	-18	-20	-24	-36	-46	-20	-23	-28	-31
	5%	-11	-12	-15	-17	-31	-36	-55	-68	-35	-41	-60	-74	-11	-13	-17	-20	-23	-26	-40	-50	-22	-24	-30	-34
	1%	-12	-13	-17	-19	-36	-42	-63	-80	-38	-46	-68	-86	-12	-14	-19	-22	-27	-31	-48	-60	-23	-27	-34	-38
	Max	-13	-15	-19	-22	-42	-51	-77	-97	-46	-55	-83	-104	-13	-16	-22	-26	-33	-40	-60	-75	-25	-30	-39	-43
	CEHZ2	-15*				-55				-60				-17*				-40				-30*			
	CEHZ3	-17*				-68				-74				-20*				-50				-34*			

*Cliff projection method has been used, so distance to future cliff toe position has been tabulated. Actual CEHZ width will be greater depending on cliff height and stable slope angle.

LEGEND

- – – – 2019 Shoreline
- ——— Erosion Protection Structures
- ◄——► Cell Extent
- ——— CEHZ0
- ——— CEHZ1
- ——— CEHZ2
- ——— CEHZ3

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

A4 SCALE 1:7,500

| 0 | 0.1 | 0.2 | 0.3 | 0.4 | (km) |

DRAWN	JJOU	May.20
CHECKED		
APPROVED		
ARCFILE	1012360_CEHZ001_v2.mxd	
SCALE (AT A4 SIZE)	1:7,500	
PROJECT No.	1012360	

NORTHLAND REGIONAL COUNCIL
Coastal Erosion Hazard Assessment
Langs Beach
Site: 1

FIGURE No. Figure 1-7   Rev. 1

LEGEND

→ Cell Extent

--- 2019 Shoreline

Historic Shorelines
— 2014/01/14
— 2014/01/10
— 2013/12/06
— 2005/12/12
— 1998/03/04
— 1985/12/13
— 1972/02/15
— 1963/05/20

1A 1B 1C 1D 1E 1F
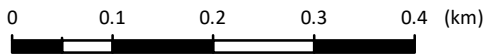
Notes: Dashed CEHZ indicates greater uncertainty around stream mouths and backshore topography.
Northland 0.4m Rural Aerial Photos (2014-2016).

A4 SCALE 1:7,500

0   0.1   0.2   0.3   0.4   (km)

Tonkin+Taylor
105 Carlton Gore Rd, Newmarket, Auckland
www.tonkintaylor.co.nz

DRAWN	JJOU	Jun.20
CHECKED		
APPROVED		

ARCFILE
1012360_Historicv2.mxd

SCALE (AT A4 SIZE)
1:7,500

PROJECT No.
1012360

NORTHLAND REGIONAL COUNCIL
Historic Shorelines
Langs Beach
Site: 1

FIGURE No.
Figure 1-8

Rev.
1