
COASTAL
CONVERSATIONS
Amberley Golf Course
5 November 2022

Agenda

Summary of the Coastal Conversations project

Summary of the science

Summary of the options for Golf Links Road

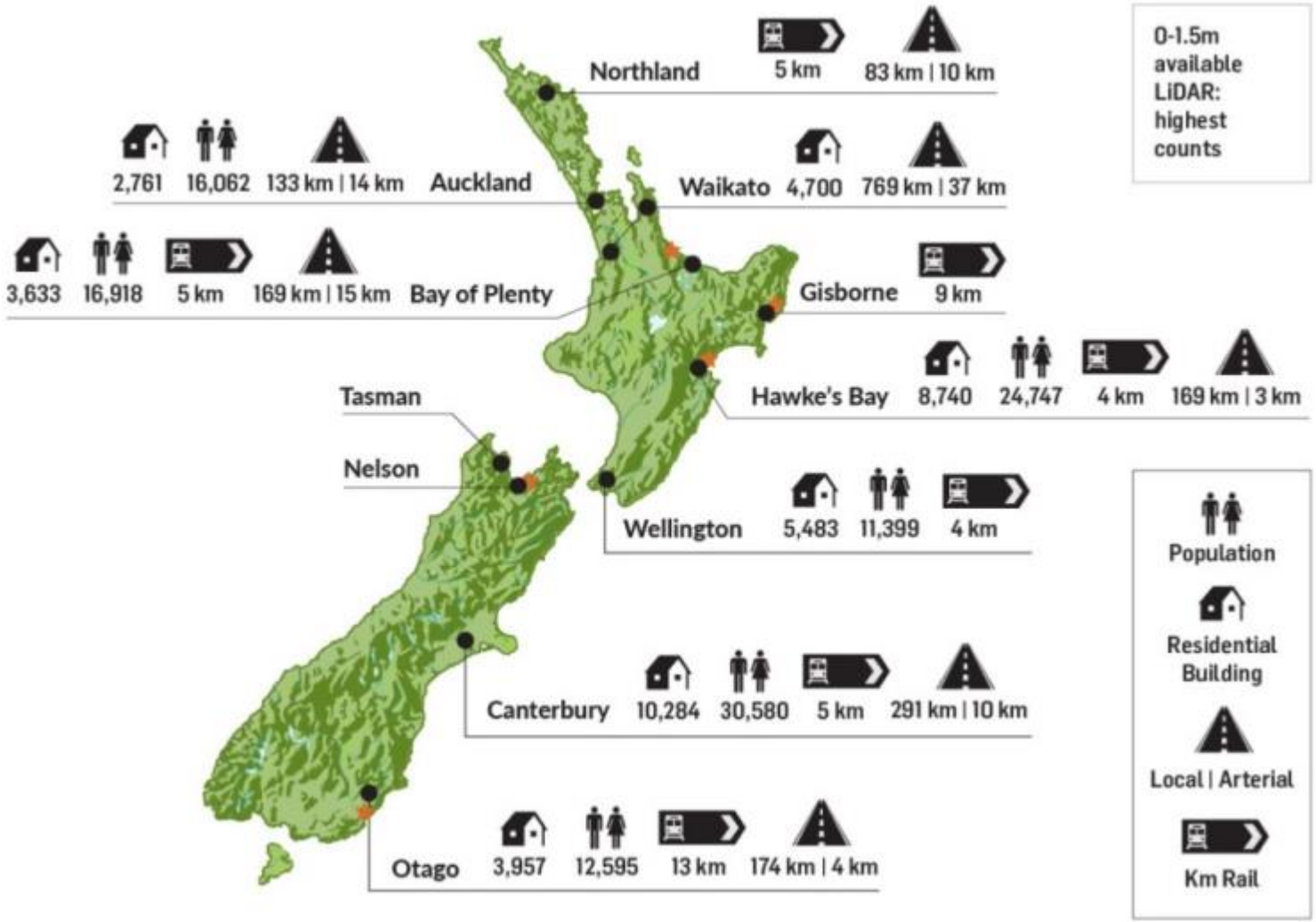
Phase one:
What is happening?

Sea level rise?

Coastal erosion?

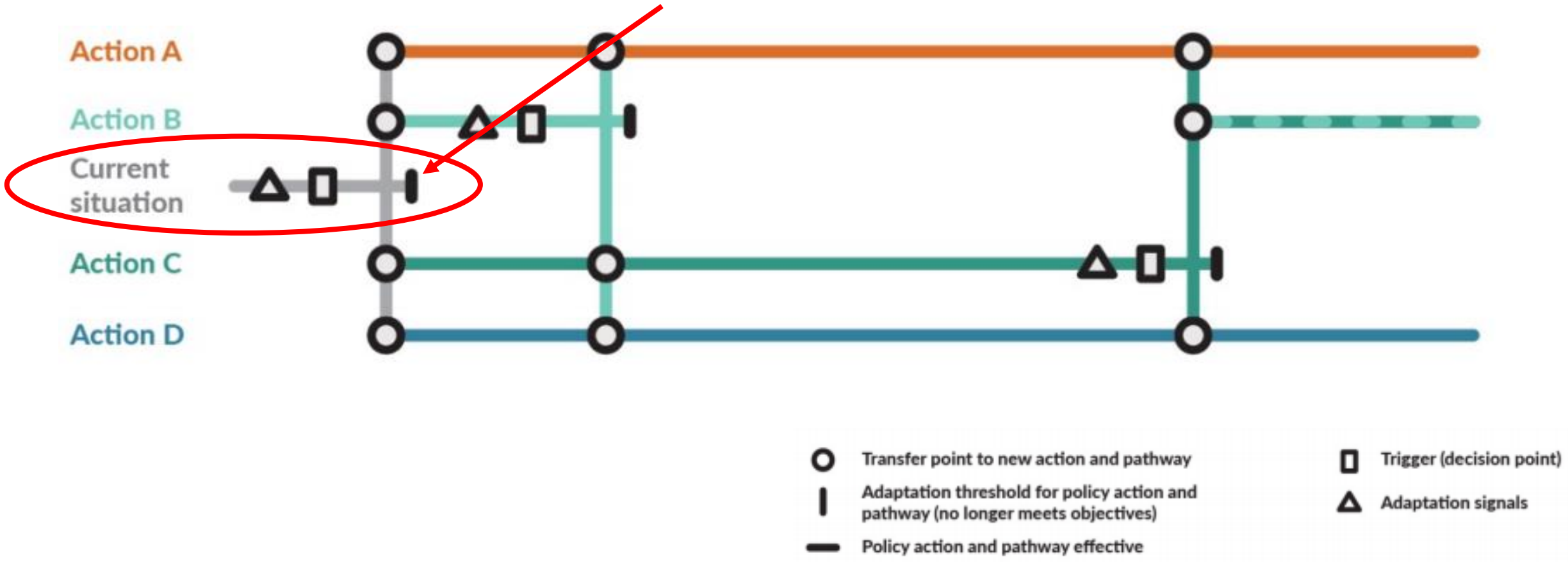
Coastal inundation?

Rising groundwater?

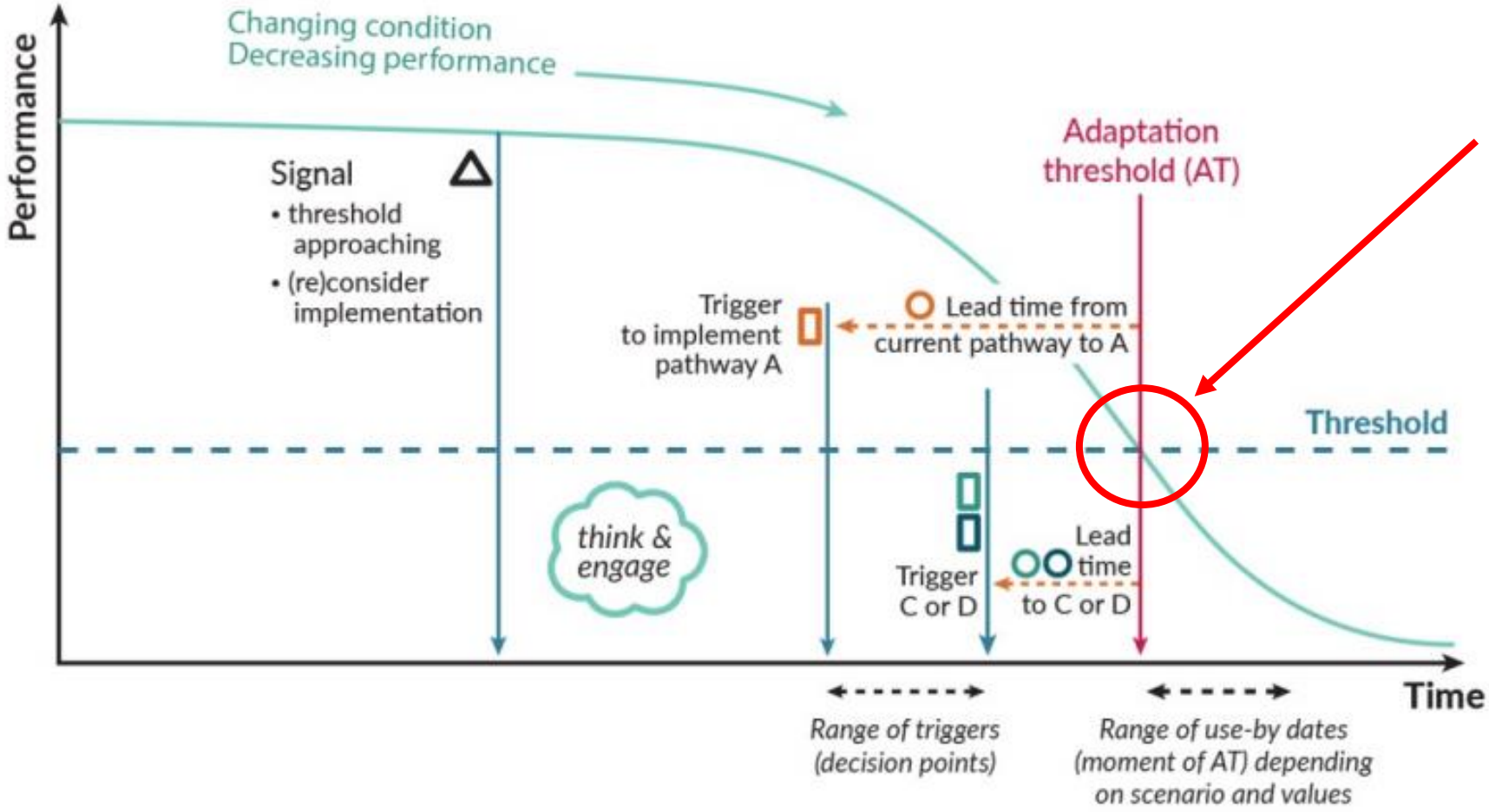


Phase two:
What matters most?

Phase three:
What can we do about it?



Phase four:
How can we implement the strategy?



Phase 1

- High level risk assessment
- Document community experiences and observations

Phase 2

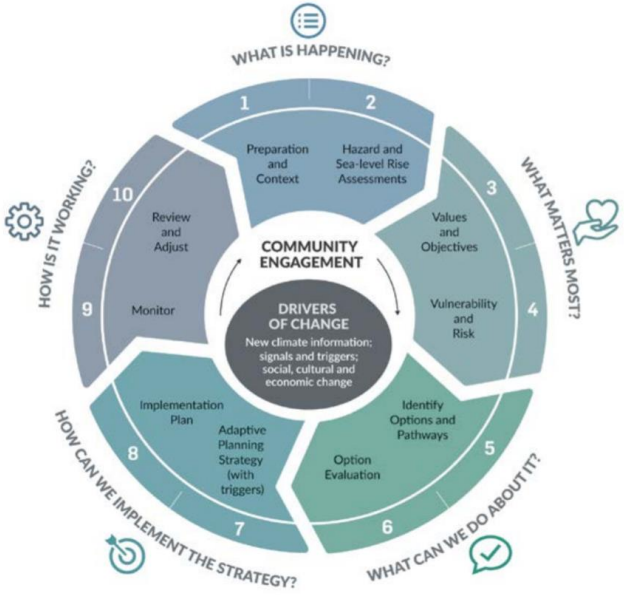
- Establish what needs to be protected
- Determine a criteria to make decisions against

Phase 3

- Identify a range of options to achieve the outcomes agreed in Phase 2 and feasibility of these options

Phase 4

- Implementation plan recording agreed approach enabling long term planning



HURUNUI District Council

COASTAL CONVERSATIONS

The environment is changing, how will you?

Jacobs Challenging today. Reinventing tomorrow.

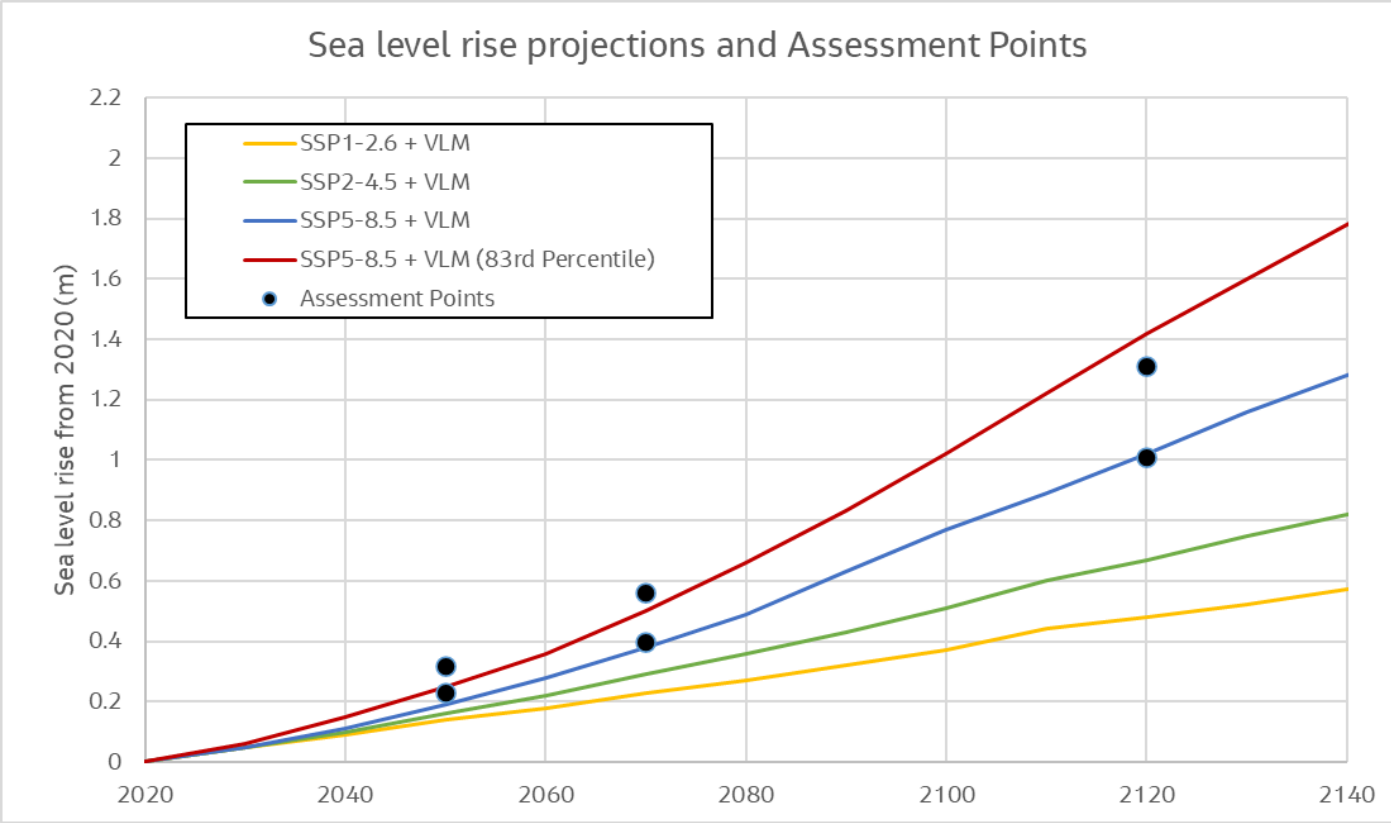
Overview of Coastal Hazards Amberley Golf Club

Derek Todd

Agenda

- **Overview of hazards**
  - Coastal/Fluvial Inundation
  - Coastal Groundwater
  - Coastal Erosion

Sea level rise projections from NZSeaRise Update



Vertical Land Movement at Amberley Beach = +0.074 mm/yr

Year	RCP8.5 SLR Scenario		RCP8.5+ SLR Scenario	
	SLR from 2020 Baseline	Rate of accelerated rise	SLR from 2020 Baseline	Rate of accelerated rise
2050 (30 Year)	+0.23 m	5.7 mm/yr	+0.32 m	8.7 mm/yr
2070 (50 Year)	+0.40 m	6.0 mm/yr	+0.56 m	9.2 mm/yr
2120 (100 Year)	+1.01 m	8.1 mm/yr	+1.31 m	11.1 mm/yr

Results

Coastal Inundation

Flood probabilities

- Average Recurrence Interval (ARI)
  - On average, how often will it happen – every 10 years?, every 100 years?
- Annual Exceedance Probability (AEP)
  - What's the chance it will happen in any one year – 10%?, 1%?

	ARI	AEP	What's the chance it will happen during a period of….		
			30 years?	60 years?	100 years?
"small flood"	5 years	20%	100%	100%	100%
↓	10 years	10%	96%	100%	100%
↓	20 years	5%	79%	95%	99%
↓	50 years	2%	45%	70%	87%
"big flood"	200 years	0.5%	14%	26%	39%

Flood probabilities

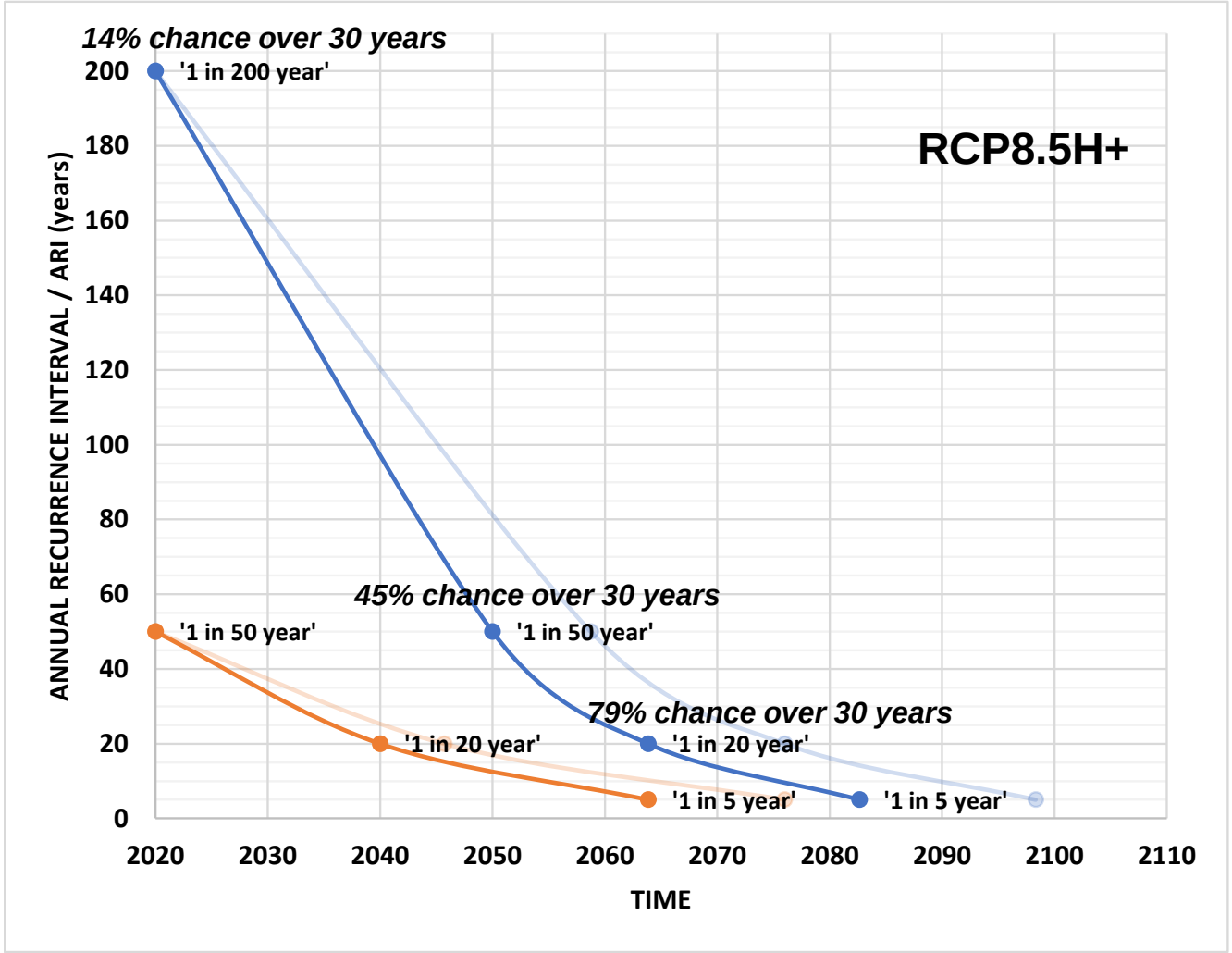
- For our assessment we have considered two overall probabilities of flooding:
  - 0.5% AEP (or 200 year ARI), a more extreme event – often considered for land use planning
  - 2% AEP (or 50 year ARI), a more frequent event – often considered for asset planning
- For each probability we have assessed the flooding for two combinations of storm tide and river flow + rainfall (the "1/10th rule"):

Flood probability (AEP)	Storm tide probability (AEP)	River flow and rainfall probability (AEP)
0.5%	0.5%	5%
	5%	0.5%
2%	2%	20%
	20%	2%

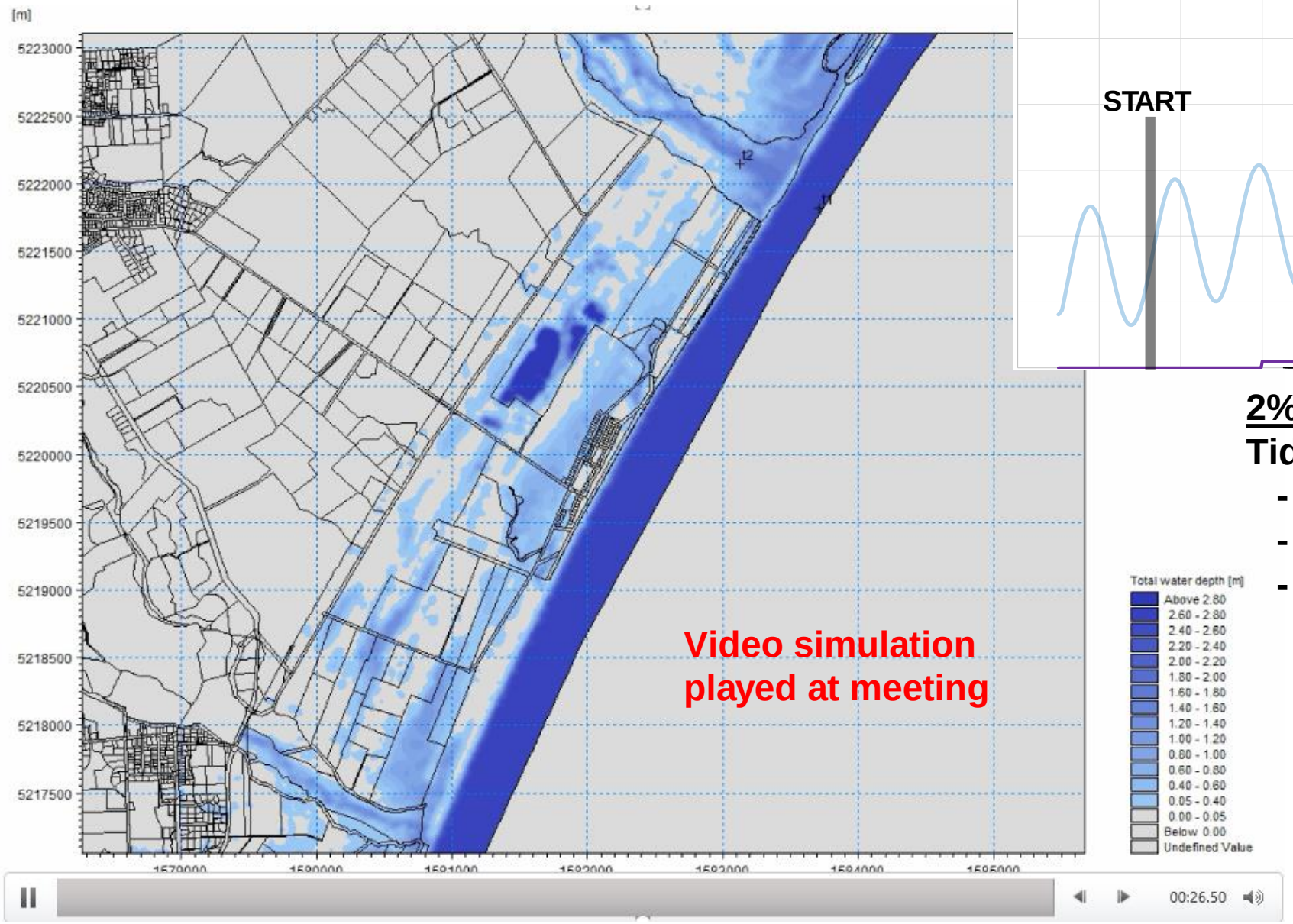
Climate change and sea level rise

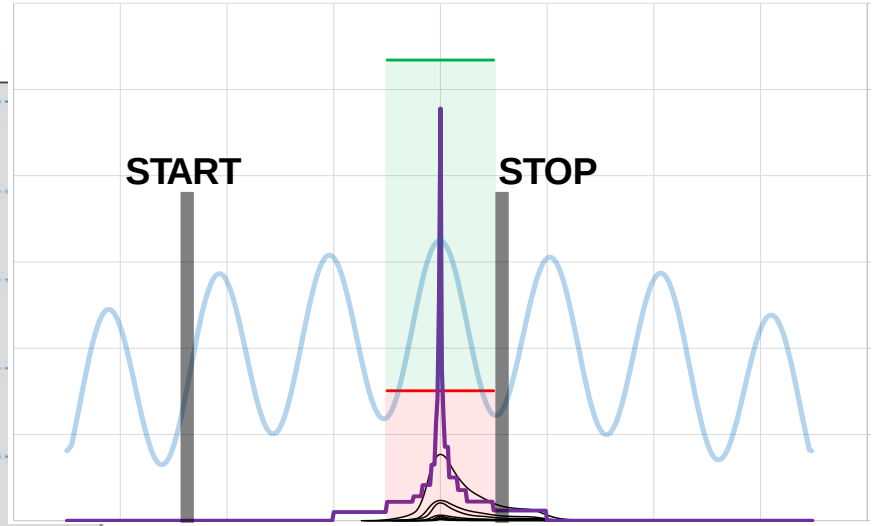
- Climate change affects the probability of flooding
  - Severe events will become more frequent:
  - 50 year ARI event will become
    - 20 year ARI by 2040;
    - 5 year ARI by 2065

- Change in probability of storm tides at Amberley Beach



Results



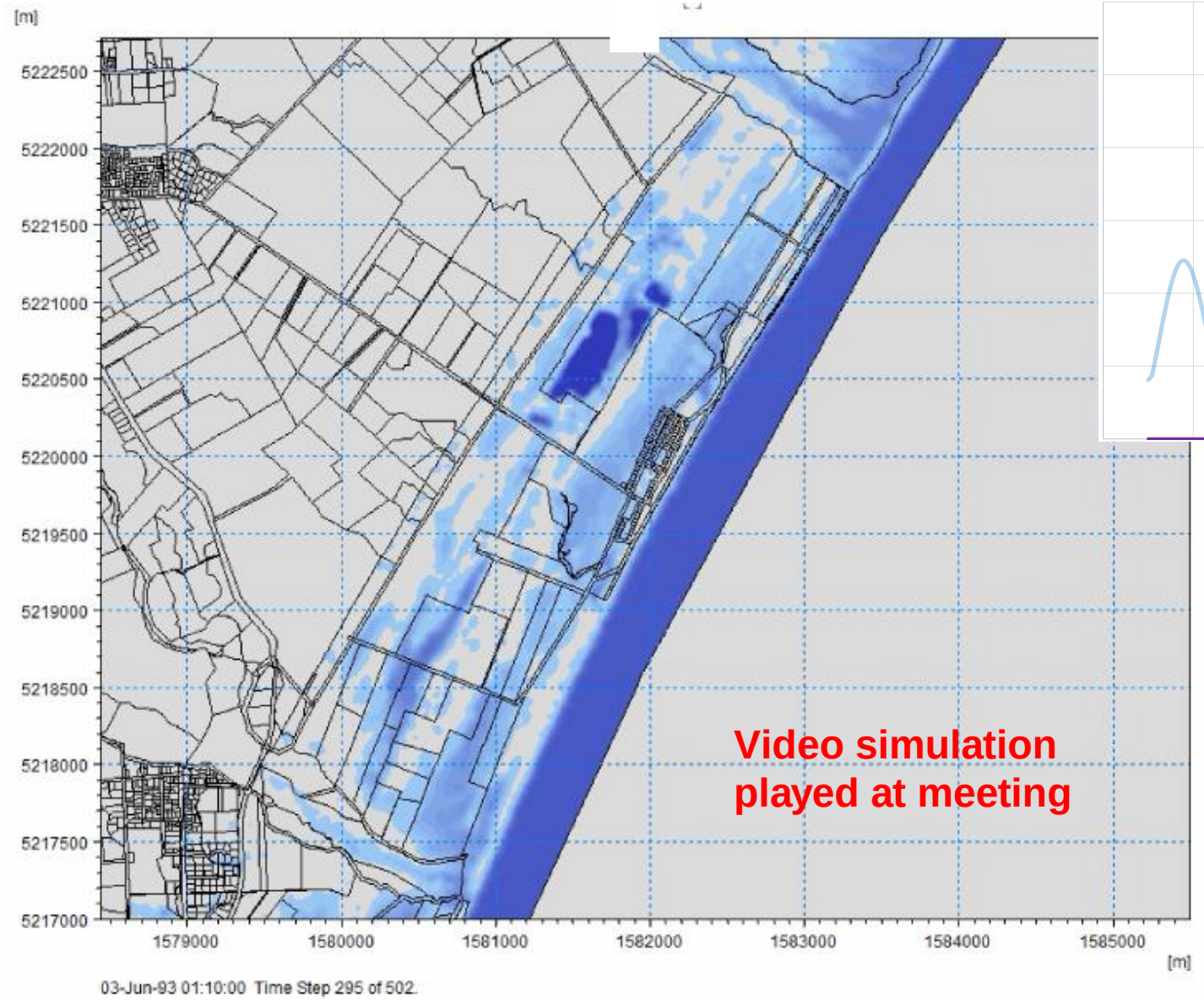


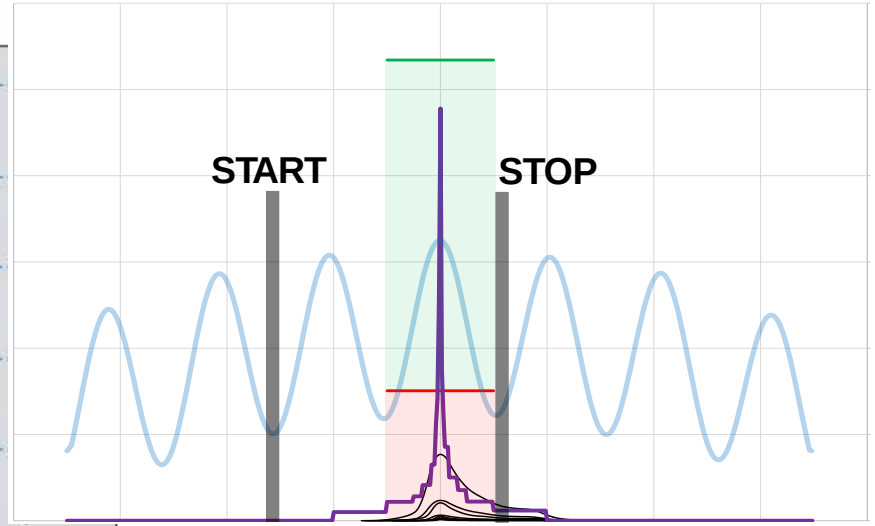
2% AEP (1 in 50-year)

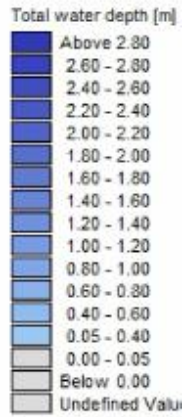
Tidally dominated

- **2% AEP tide**
- **20% AEP fluvial**
- **0.5 m SLR**

Results







0.5% AEP (1 in 200-year)

Tidally dominated

- **0.5% AEP tide**
- **5% AEP fluvial**
- **0 m SLR**

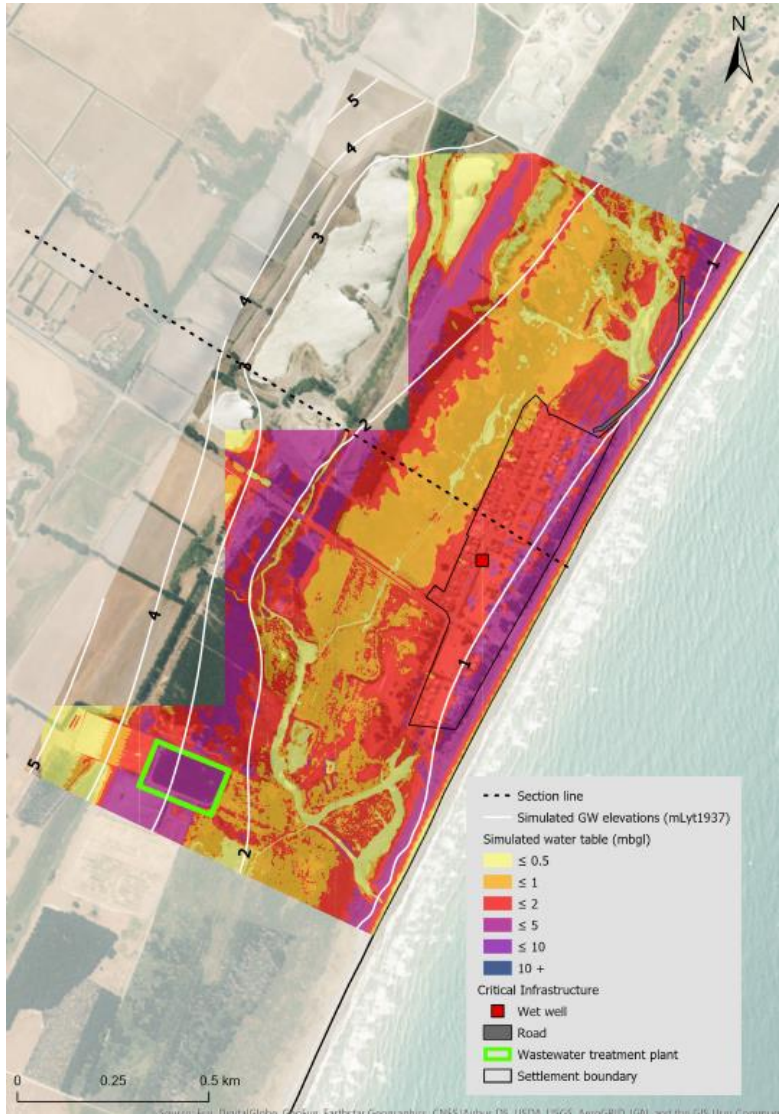
Summary of Multi Flood Hazard Assessment for Amberley Beach

- Main sources of flood hazard are high river flow and storm tide
- Runoff from local catchments important in smaller events
- Probability of flooding is high
  - Widespread flooding for events more frequent than 1 in 50 year at present
  - Deepest flooding is in the lower land between Amberley Beach and Hursley Terrace – including the only access route via Amberley Beach Road
  - Flooding will become more frequent with climate change and sea level rise
- At present, flooding during large events is worse for high river flow events than for high storm tide events
- With rising mean sea level, flooding will be worse for storm tide events than for high river flow events after around 0.5 m SLR
- Less certainty in hazard from groundwater - modelling indicates this is mainly in the seep area below Hursley Terrace Road rather than in Amberley Beach itself and is less affected by sea level rise than tidal and fluvial flooding

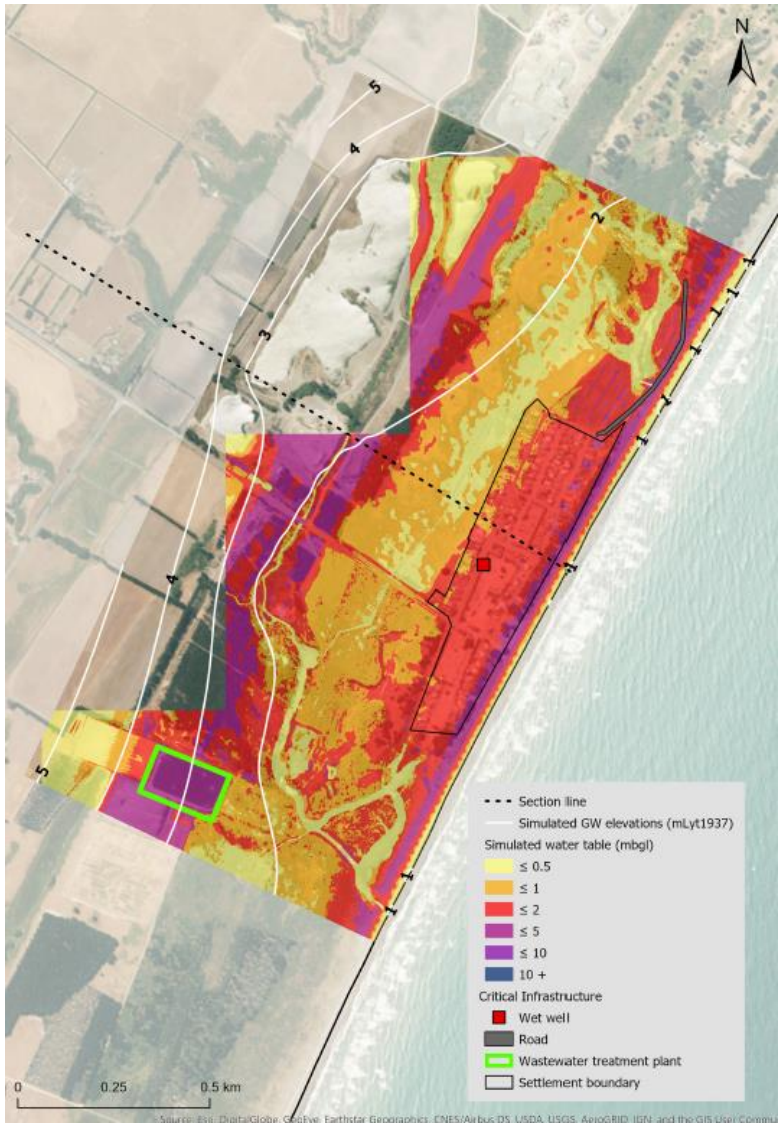
Results

Rising Groundwater

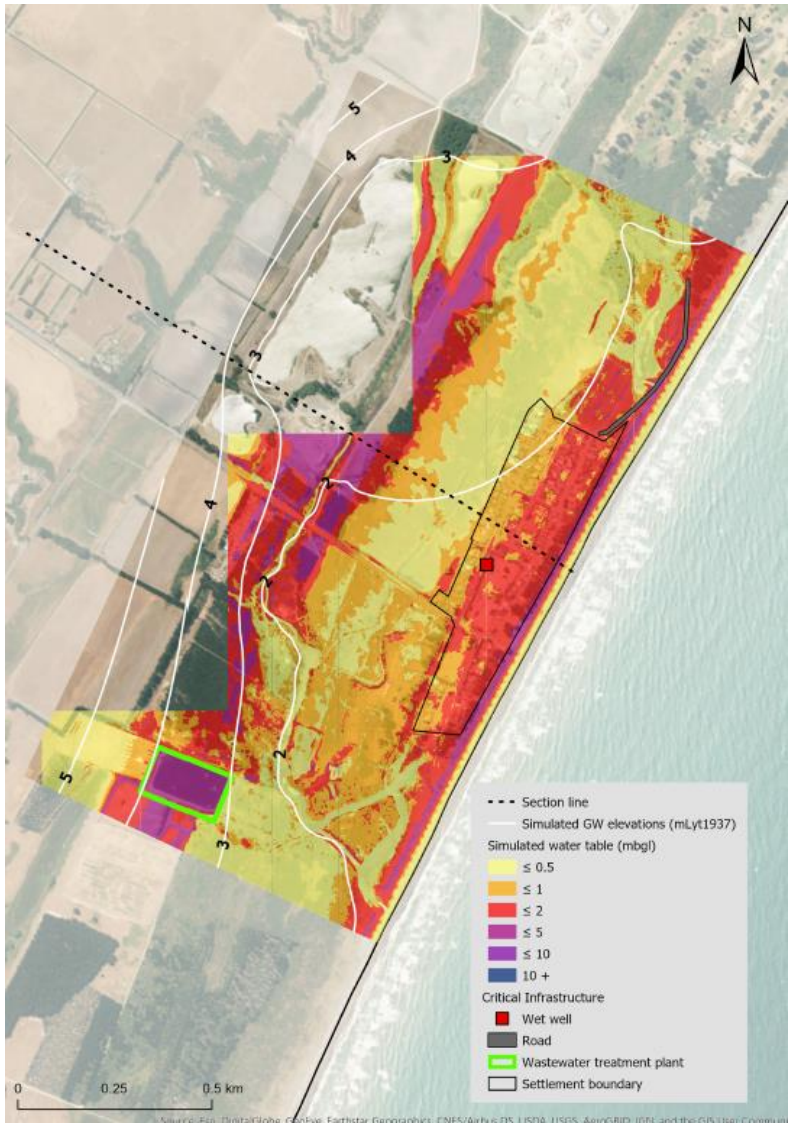
Present Day:



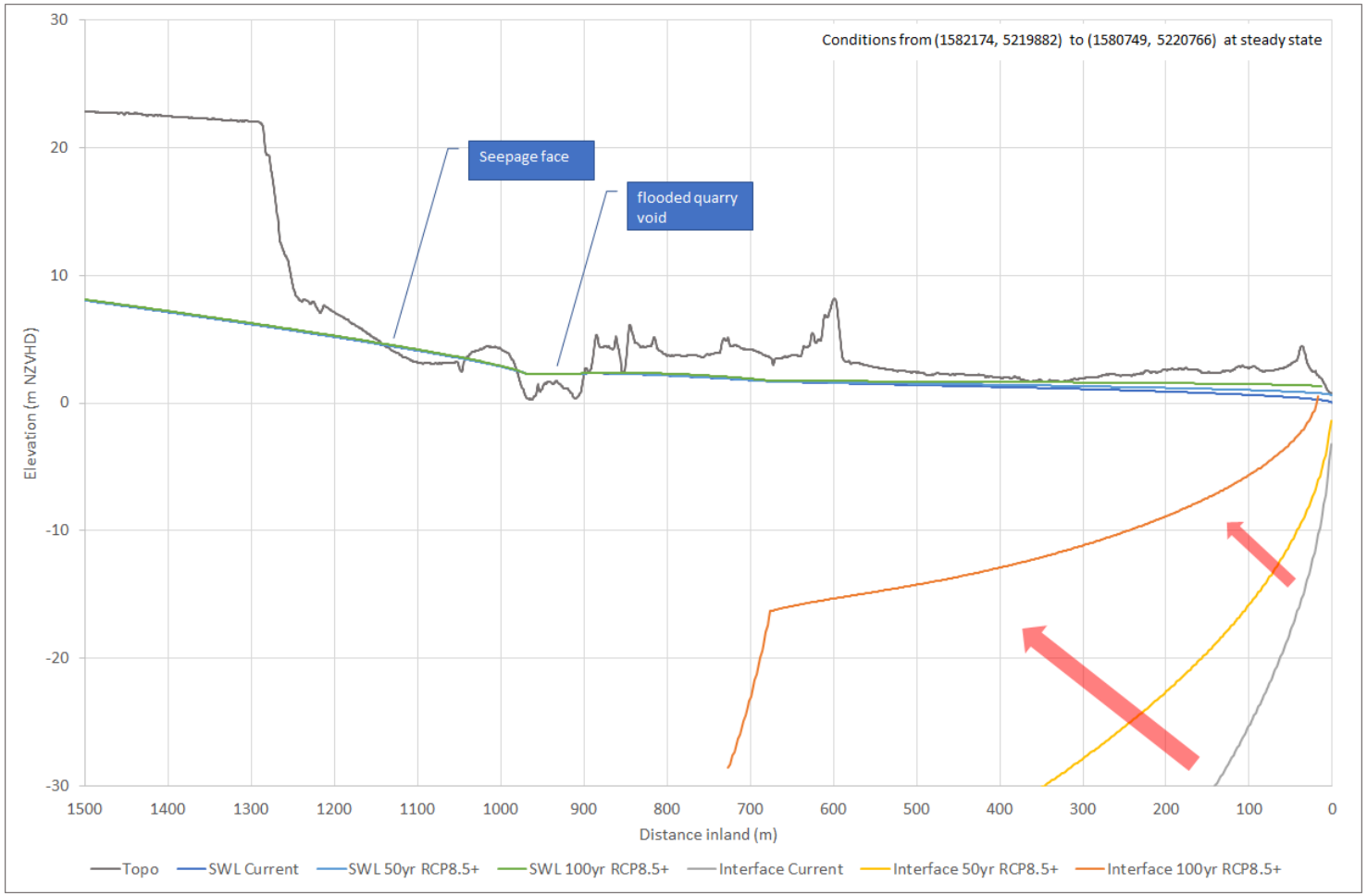
50 Year (RCP8.5+):



100 Year (RCP8.5+):



Change in the Saline Interface



Results

Coastal Erosion

Methodology – *Coastal Erosion*

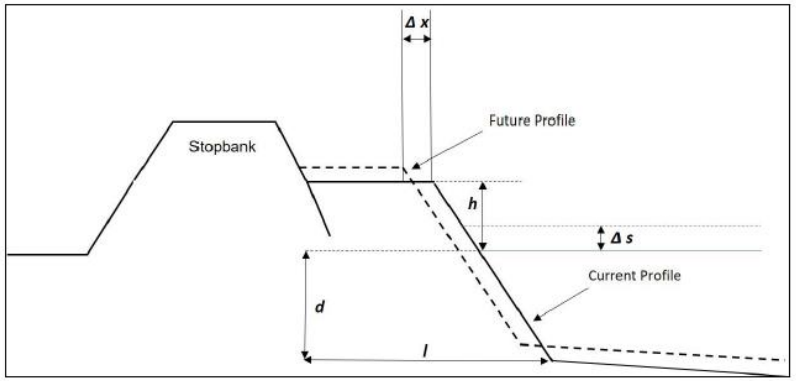
Projected Future Shoreline Position (PFSP) = (LT x T) + SL + ST

Where:

- ***T** = Timeframe considered (30, 50, 100 years);*
- ***LT** = Extrapolation of the rate of historical shoreline movement (m/yr);*
- ***SL** = Estimated erosion due to accelerated sea level rise over the timeframe (T); and*
- ***ST** = Short-term storm erosion*

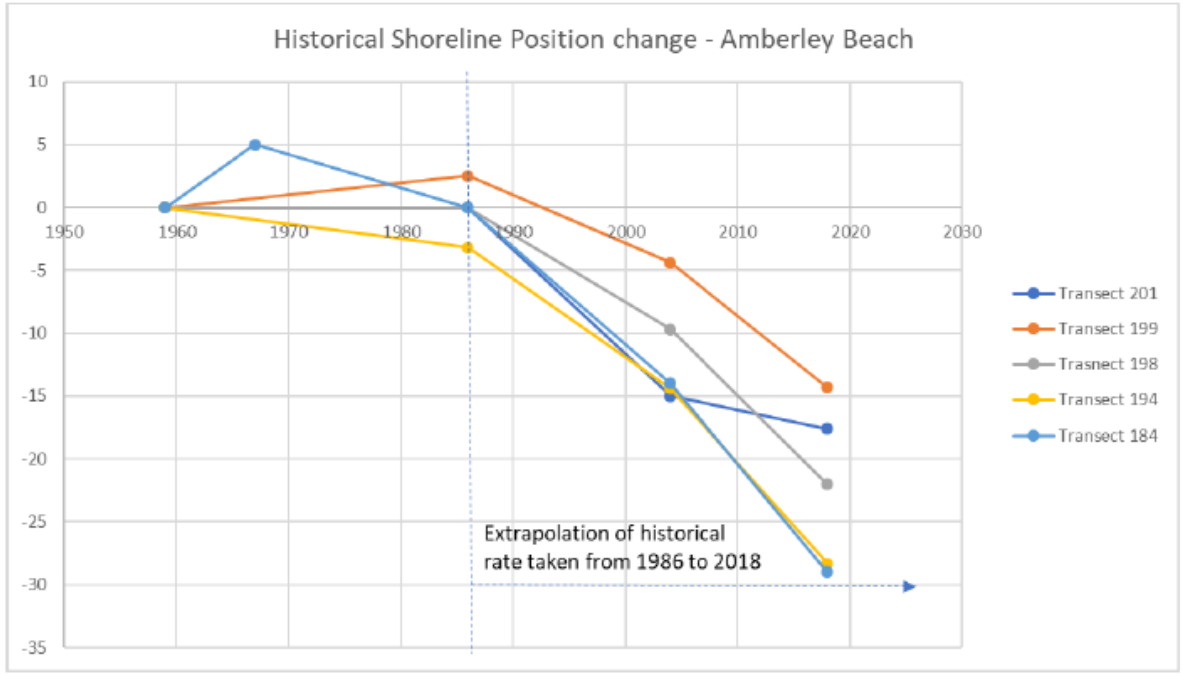
1. Long Term

2. SLR Effect



3. Short Term Storm Erosion

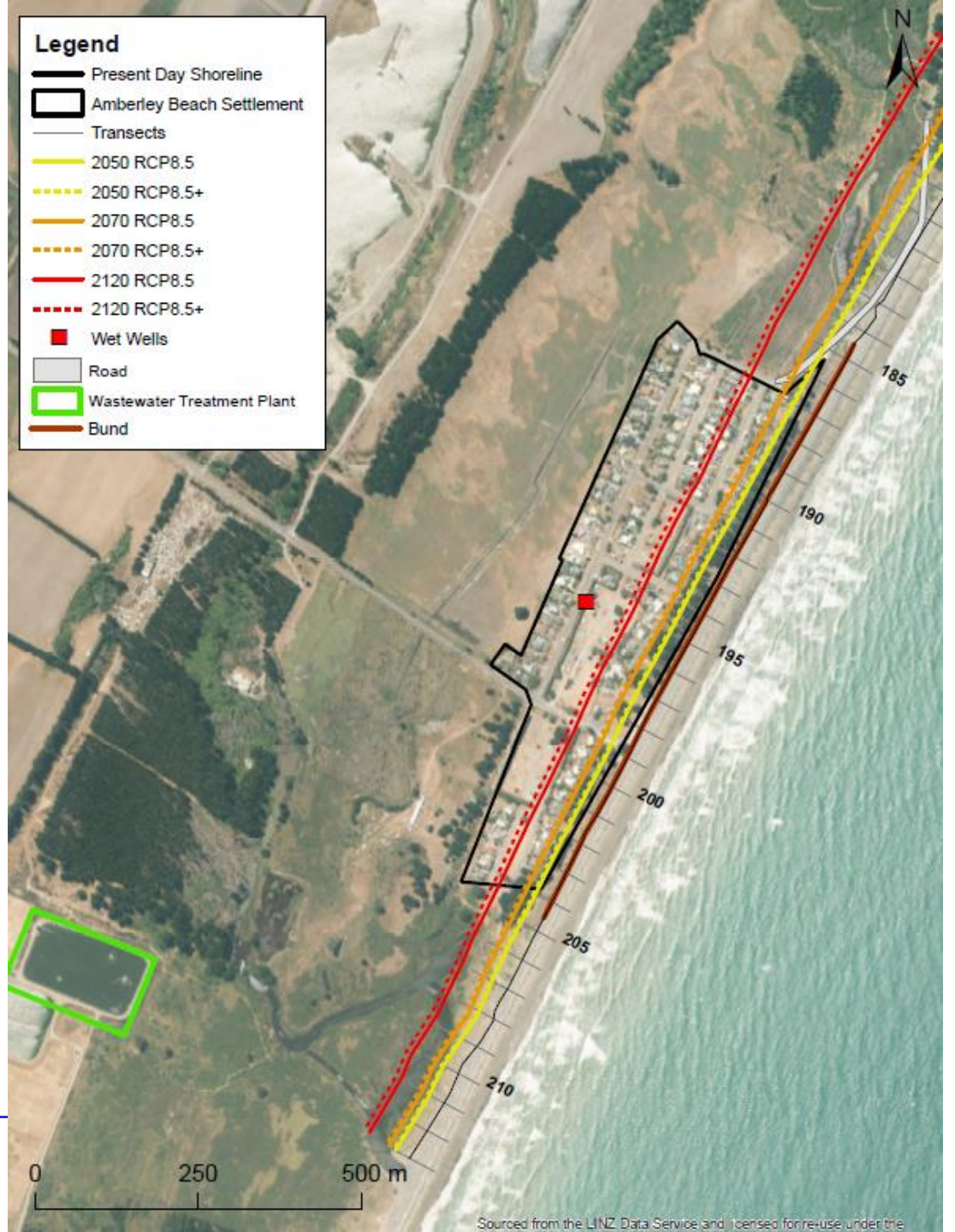
1. Historical Shoreline Position Change:



2. Effect of Accelerated SLR:

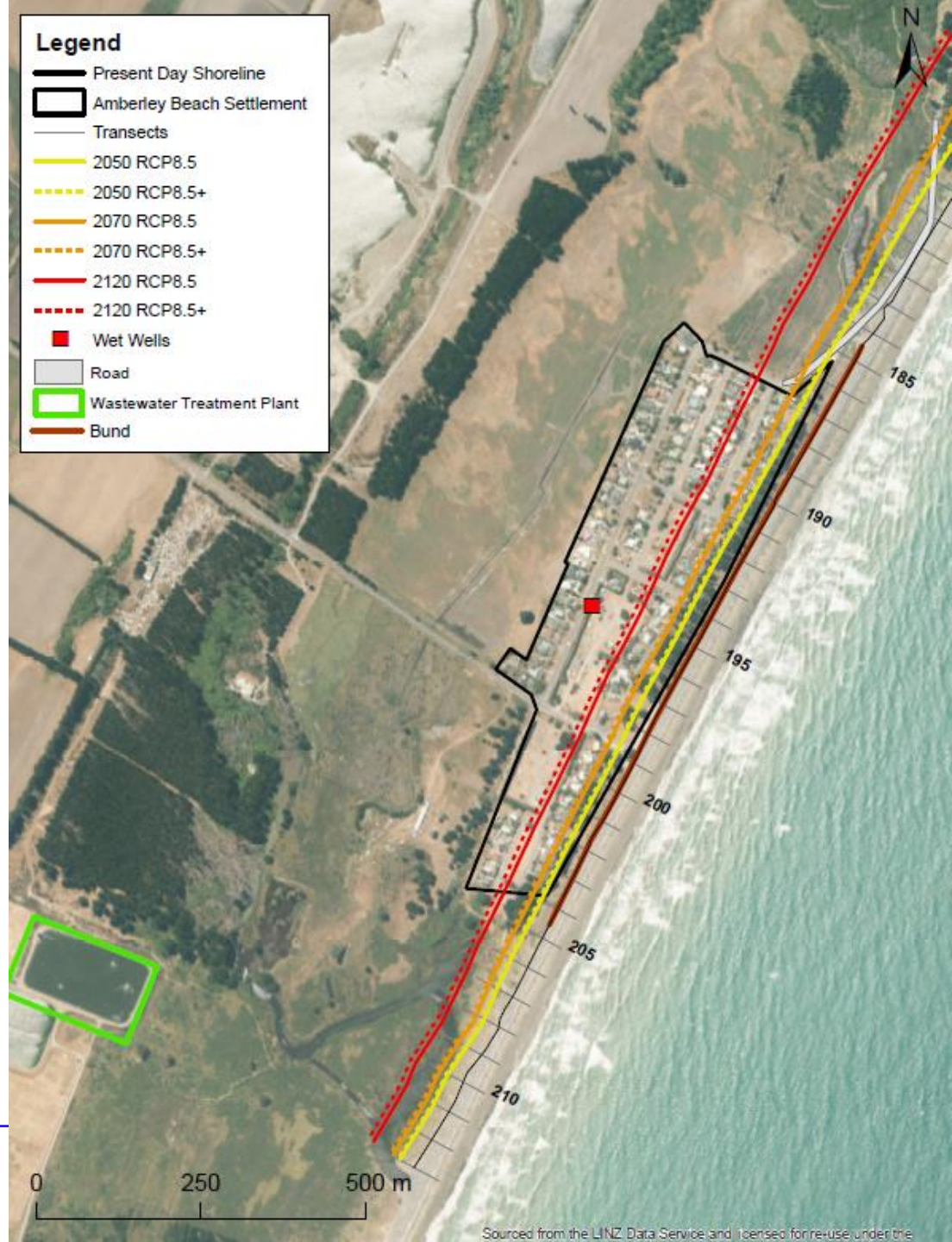
- 30 Years = -5 to -8m
- 50 Years =-8 to -14m
- 100 Years = -23 to -33m

3. Short Term Erosion: Estimated to be up to -7m



Distances from Current Shoreline to Projected Future Shoreline Position:

Timeframe	30-years (2050)		50-years (2070)		100-years (2120)	
Scenario	RCP 8.5	RCP 8.5+	RCP 8.5	RCP 8.5+	RCP 8.5	RCP 8.5+
Transect 201 (South Crescent)	-30	-32	-45	-50	-89	-98
Transect 199 (Amberley Beach Rd)	-30	-33	-46	-51	-92	-101
Transect 194 (Chamberlain Ave)	-33	-36	-51	-56	-101	-110
Transect 184 (Golf Links Rd)	**-40**	**-43**	**-63**	**-68**	**-126**	**-135**



What can we do about it?

1. New road following the boundary following the property boundary (yellow)

2. New road following the existing bund haul road (red)

3. New road following the Ready Mix site boundary (blue)

Estimated width of wetland approximately 40 m

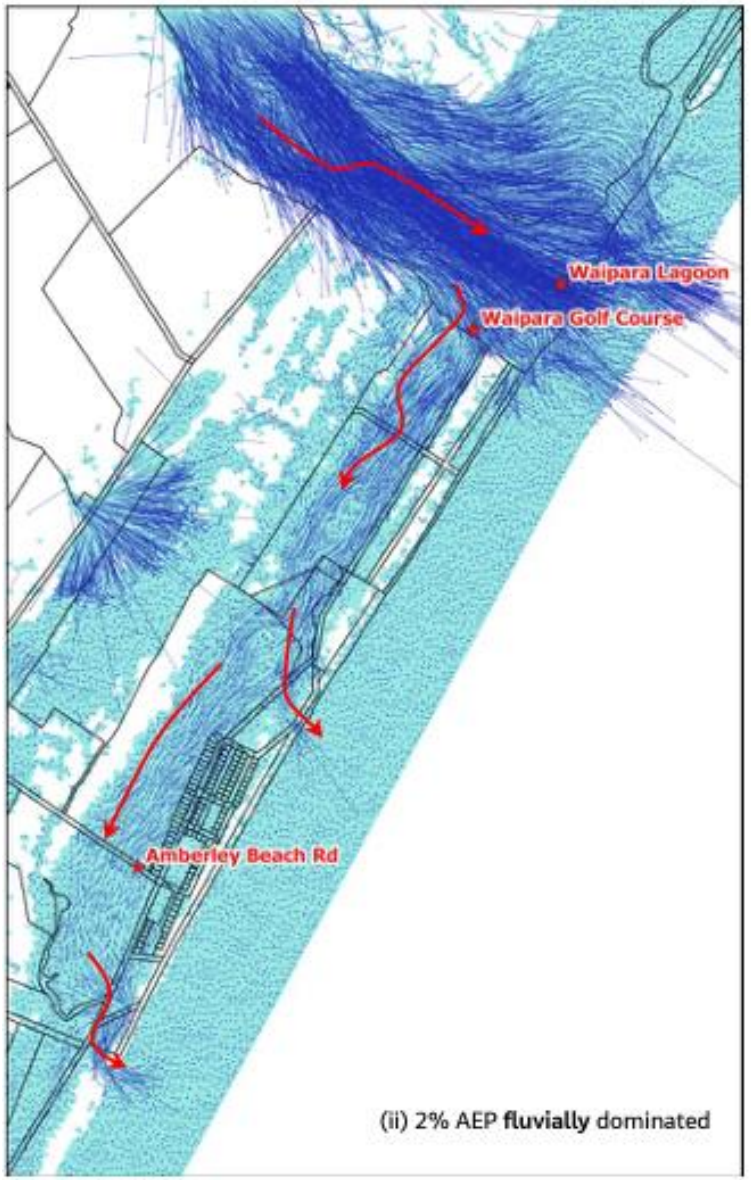
Works need to be clear of the wetland by 10 m either side

Most consentable option would be a single span bridge but will still be difficult to consent

Estimated cost approximately $2.2 million

4. Form the unformed section of Hursley Terrace Road (yellow)

5. Access via Webbs Road and adjacent to the riverbed (red)



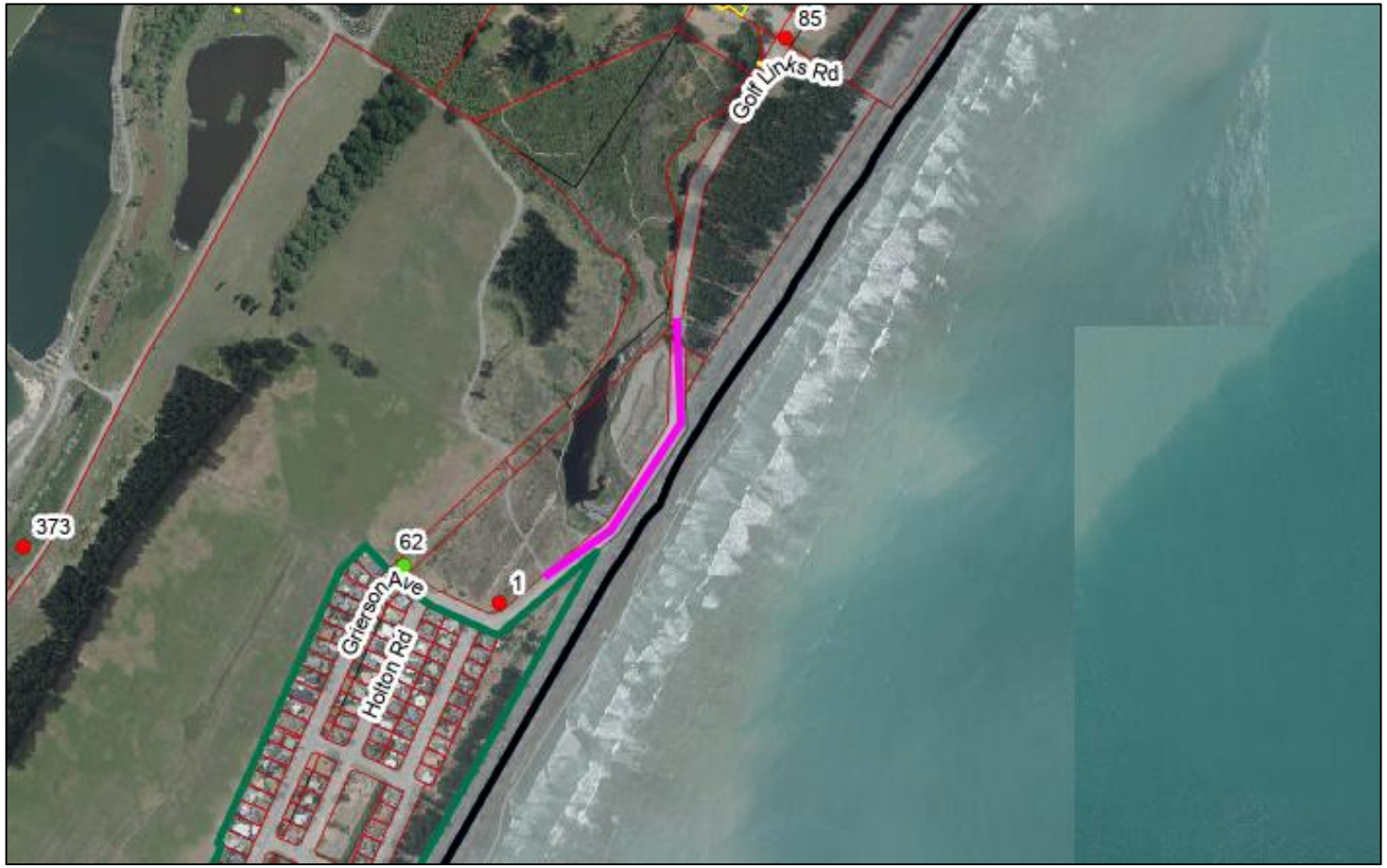
New road would likely be within the Waipara River flood plain

Would need to acquire land

Access would be a long way from clubrooms

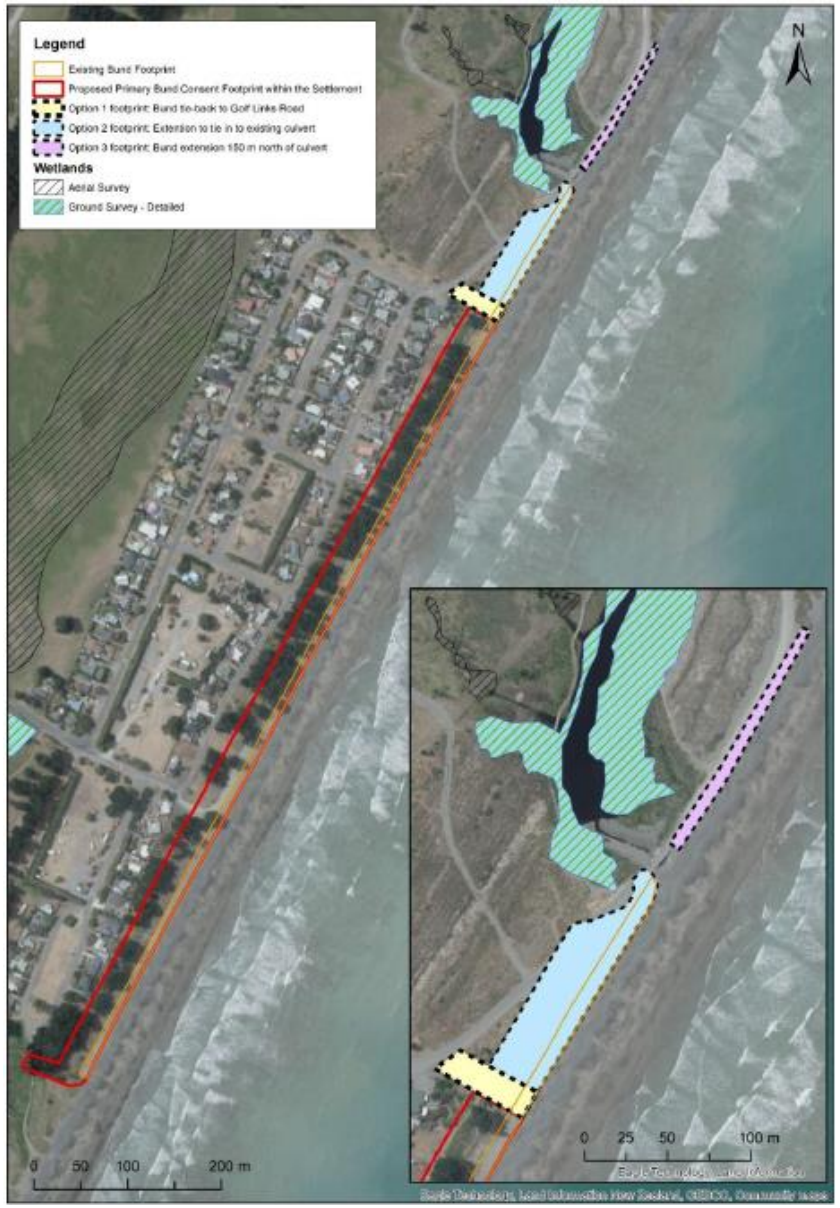
Have not completed ecological assessment for this route

Estimated cost excluding acquisition of land (and any ecological issues) approximately $570,000



6. Continuing to maintain Golf Links Road

Bund consent application



Consenting issues with NZCPS and RCEP

In the short term will require hard protection to maintain the road in that position

Starting price of around $1.7 million

7a. Walking access only via existing Golf Links Road

7b. Walking access only via existing Lagoon Walkway (with improvements)

Only vehicle access would be 4WD access via beach or Waipara River bed

Maintaining walking access along Golf Links Road would be easier than maintaining vehicle access

Could look at improving the walkway as part of the wetland restoration

Your future – your call

Questions?

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Reinventing tomorrow.