

**Report on response to questions from the Greater Wellington Regional
Council regarding the application to conduct works associated with the
construction of a 4.4 km shared path along Marine Drive in Hutt City's Eastern
Bays**

Prepared for Hutt City Council, Lower Hutt

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1. Introduction

This report addresses the effects of the Shared Path Project (SPP) on Avifauna and Little Penguins and contains recommendations for the Hutt City Council (HCC) response to the letter from GWRC on 29 May 2019.

The recommended response is presented in sections 2 and 3. The recommended response relies heavily on biodiversity offset sites that are proposed for the southern breakwater at the Seaview marina and at Whiorau Reserve.

The recommended response to GWRC includes two activities that are not currently in the SPP. These activities are:

1. Creation of a breeding area for shoreline birds and little penguins on the southern breakwater at the Seaview marina
2. Creation of a fenced breeding area for little penguins at the Whiorau Reserve

The recommended response addresses concerns raised by the GWRC about the environmental impact of the SPP on shoreline foraging birds and on little penguins. The creation of breeding areas for penguins on the southern breakwater of the Seaview marina and at Whiorau Reserve will provide biodiversity offsets to offset the loss of habitat for shoreline foraging birds and to offset the adverse effects on little penguins that will arise from the SPP.

The offsets will address the following statements on page 4 of the letter from GWRC:

Dr Uys considers that the Shared Path Project will have a more than minor impact on the little penguin population and that the mitigation and offsetting measures provided are not appropriate. Dr Uys recommends that effects on penguins should be offset by providing equivalent, appropriate habitat along the seaward edges of the Eastern Bays coastline for little penguins to nest and roost safe from humans, dogs, cars, pest animals and sea level rise.

The recommended response addresses the request from GWRC to assess the effects of the project on little penguins in relation to the emerging DoC standard.

2. Response to GWRC questions

2.1 Avifauna

Text from the GWRC letter is shown in italics.

Avifauna

2. *Based on the species listed in the assessment, there are three broad feeding guilds of birds in the project area: (1) the offshore fishers (e.g. shearwaters and terns), (2) the inshore fishers (e.g. shags) and (3) the shoreline foragers (e.g. gulls and oystercatchers). Impacts on the first two groups are likely to be temporary, but the impacts on the shoreline foragers may result in a permanent reduction in habitat. While there appear to be few birds nesting in the project area, there are important shoreline foraging grounds that may be lost. The report details the numbers of birds, but this data is quite old in some cases, and does not provide a complete picture of the populations through the year. The current number of birds also does not reflect the potential of the habitat that may be lost. What is needed is an assessment of the current extent of shoreline foraging habitat and the amount of habitat that will be lost to the development. This loss may then be mitigated or offset by excluding dogs and pest animals to create the equivalent extent of suitable habitat further south.*
- (a) *Please map the current feeding/foraging habitat for shoreline foragers within the current project area and quantify what percentage of this habitat will be lost as a result of the Shared Path Project.*
 - (b) *Once the percentage of habitat loss has been confirmed please provide an appropriate effects management package to confirm how the applicant intends to avoid, remedy, mitigate and/or offset the effects of habitat loss on shoreline foragers in accordance with the full effects management hierarchy, as required by Policies P32 and P41 (and Schedule G) of the PNRP. In particular, please break down the effects management package for shoreline foragers into the relevant categories (avoid, remedy, mitigate) and describe which measures/actions have been taken to:*
 - i. *avoid significant coastal habitats for birds (Schedule F2 areas); then*
 - ii. *avoid more than minor adverse effects on shoreline foragers; then*
 - iii. *remedy any more than minor adverse effects on shoreline foragers; then*
 - iv. *mitigate any more than minor adverse effects on shoreline foragers; then*
 - v. *offset any residual effects on shoreline foragers*

Only once the effects management hierarchy has been followed and all other avenues exhausted is it appropriate to offer an offset to address the residual adverse effects on shoreline foragers.

Feeding and foraging habitat for shoreline foragers

The area of feeding/foraging habitat for shoreline foragers within the current project area has been mapped by Dr John Cockrem (refer to Appendix 1).

The foraging habitat for shoreline foragers was defined as:

- (a) the area from the low tide line to the edge of the road, the edge of concrete paths, or the edge of sand dune areas for coastline where there are no concrete or revetment walls, and
- (b) the area from the low tide line to the bottom of concrete seawalls, and
- (c) the area from the low tide line to the high tide line for coastline where there are revetment walls or rocky areas between the low tide line and the road.

The habitat was mapped on the 2017 aerial photographs in the Hutt City Council public map viewer system. The habitat was mapped for all of coastline from the Point Howard wharf to the boat ramp and carpark where Marine Drive meets Marine Parade. This is a continuous habitat for shoreline foraging birds. The habitat is all within Schedule F2 of the PNRP.

The calculated area of foraging habitat is 51 200 m² and the area of encroachment is 5 836 m². The percentage of foraging habitat that will be lost as a result of the Shared Path Project is 11.4%.

Effects management package for shoreline foragers

Policy P32 of the PNRP (Adverse effects on aquatic ecosystem health and mahinga kai) is not considered to be directly relevant to avifauna. Policy P41 (Managing adverse effects on ecosystems and habitats with significant indigenous biodiversity values) considers protection of the ecosystems and habitats with significant indigenous biodiversity values identified in Policy P40. Policy P40 in turn refers to habitats for indigenous birds identified in Schedule F2 (bird habitats). The coastline from Day's Bay to Point Howard is identified in this Schedule.

An effects management package for shoreline foragers is presented below.

Measures/actions taken to avoid significant coastal habitats for birds (Schedule F2 areas):

It is not possible to avoid significant coastal habitats for birds.

2. Measures/actions taken to avoid more than minor adverse effects on shoreline foragers:

It is not possible to avoid more than minor adverse effects on shoreline foragers.

3. Measures/actions taken to remedy any more than minor adverse effects on shoreline foragers:

The loss of foraging habitat will be a permanent effect of the project on shoreline foragers and it is not possible to remedy this effect.

4. Measures/actions taken to mitigate any more than minor adverse effects on shoreline foragers:

Areas of rock revetments that are under the water for much of the day will become potential feeding areas for shoreline foragers, so a small proportion of the lost habitat will be replaced during the project construction.

5. Measures/actions taken to offset any residual effects on shoreline foragers:

A biodiversity offset will be provided by the creation of a breeding area for shoreline birds and little penguins on the southern breakwater wall at the Seaview marina (see section 3.1).

The proposed biodiversity offset relates to the principles listed in Schedule G (biodiversity offsetting) as follows:

1. Adherence to the mitigation hierarchy:

The biodiversity offset will not have adverse effects on biodiversity.

2. Limits to what can be mitigated or offset:

The biodiversity offset will not have adverse effects on biodiversity.

3. Additional conservation outcomes:

The biodiversity offset will create new, safe breeding habitat for shoreline foraging birds, will also provide safe roosting opportunities, and will have positive effects on biodiversity that would not otherwise have occurred.

4. Landscape context:

The biodiversity offset will increase the availability of safe breeding habitat for shoreline foraging birds in the Wellington Harbour, thereby contributing to the protection of habitats of avifauna. The offset site is an existing artificial structure and the creation of breeding habitat for birds will complement the primary purpose of the breakwater which is to provide shelter for the marina.

5. Long term outcomes:

The breakwater is owned by the Hutt City Council (HCC) so the biodiversity offset will continue in perpetuity. Implementation of the offset by the HCC will be undertaken as a consent condition for the project.

6. No net biodiversity loss:

The biodiversity offset will provide new breeding habitat for birds. There will be no loss of biodiversity associated with creation of the breeding area and hence there will be a net gain of biodiversity. Measurable positive effects on biodiversity will be seen when shoreline foragers start to roost and then to breed at the new site. Shoreline foraging birds currently frequent the area, so the risk of failure in delivering the biodiversity offset is very low.

2.2 Little penguins

Text from the GWRC letter is shown in italics.

Little Penguins

4. *The application indicates that the works stand to impact more than 100 little penguins (based on the estimate of 50-60 penguin pairs in the project area, not accounting for the*

juveniles and singletons) which is a significant portion (12-14 percent) of the known population in the Wellington Harbour. The Vegetation and Avifauna Assessment claims that the 24 nesting sites within 50m of the project area is a small impact, however Dr Uys comments that the emerging standard (as advised by the Department of Conservation – e.g. in response to a development application on the Kaiwharawhara Spit) is to consider effects within 100m of nesting shorebirds. Taking into account the comments of Dr Uys I consider there is a need for the project to consider effects on penguins more holistically. Where the project is restricting or changing the location of access (or form of access) to known nesting sites this is an effect and needs to be considered and addressed. Conversely, design features which increase penguin accessibility are also associated with adverse effects as this increased access will result in additional human/penguin interaction and exacerbate the risk of harm to little penguins.

- Please provide an assessment of the actual and potential effects on little penguins in accordance with the emerging DoC standard.
5. The works are set to result in a net loss of 440m of accessible coastline (520m lost minus 80m gained). This translates into a 35 percent reduction in accessible coastline (from 34 percent to 22 percent) across the project area (interpreted from section 8.2.6 of the Assessment of Effects on Coastal Vegetation and Avifauna). It is not clear how much of this will be, or could be, mitigated by the addition of landing structures or other mechanisms to allow penguins to come ashore. It is also noted that landing structures (or other mechanisms) would only serve to maintain the human/wildlife conflict situation that exists around the eastern bays which has resulted in at least 20 little penguin mortalities between mid-2015 and mid-2018 (section 8.2.3). In addition, the continued use of stormwater infrastructure for access to nesting areas on residential properties is inappropriate and should not be maintained or encouraged by the Shared Path Project design. Based on the information presented in the application, Dr Uys considers that the Shared Path Project will have a more than minor impact on the little penguin population and that the mitigation and offsetting measures provided are not appropriate. Dr Uys recommends that effects on penguins should be offset by providing equivalent, appropriate habitat along the seaward edges of the Eastern Bays coastline for little penguins to nest and roost safe from humans, dogs, cars, pest animals and sea level rise.
- Please carry out an evaluation of the effects of the proposal on little penguins and how these effects are intended to be managed in accordance with the full effects management hierarchy, as required by Policies P32 and P41 (and Schedule G) of the PNRP. In particular, please break down the effects management package for little penguins into the relevant categories (avoid, remedy, mitigate) and describe which measures/actions have been taken to:
 - i. avoid significant coastal habitats for birds (Schedule F2 areas); then

- ii. *avoid more than minor adverse effects on little penguins; then*
- iii. *remedy any more than minor adverse effects on little penguins; then*
- iv. *mitigate any more than minor adverse effects on little penguins; then*
- v. *offset any residual effects on little penguins*

Only once the effects management hierarchy has been followed and all other avenues exhausted is it appropriate to offer an offset to address the residual adverse effects on little penguins.

Note: Dr Uys recommends opportunities to reduce the human/wildlife conflict within the eastern bays should be explored and built into the design wherever practicable. Dr Uys makes specific mention to rocky headlands and comments that if public access is excluded these areas could become penguin refugia that are safe from people and dogs. Wooden nest boxes or pre-cast (3D printing) penguin nests placed amongst rocks and vegetation are other options which would likely reduce the risks of penguins coming into contact with humans, dogs and traffic.

Assessment in accordance with the emerging DoC standard

The emerging DoC standard for little penguins was described in an email from Brent Tandy (DoC Kapiti Wellington office) on 30 May 2019. The email stated:

 The emerging standard for penguins is based on requirements that have been placed on similar applications over the last couple of years as penguins are being impacted via sea wall construction in response increasing coastal erosion.

The general little penguin annual lifecycle is as follows, and gives context to the requirements further below:

- April – June: Re-establishment of pair bonds and prospecting for nest sites. There is site fidelity so birds will return to the same areas and even the same nests as the previous season. Juvenile birds breeding for the first time will come back to the natal area looking for nests so recruitment is also a factor meaning nests can pop up in new locations.
- July – December: Egg laying, incubation, hatching, rearing and fledging. This is a critical time period for population health. Life is tough for penguins so successful breeding and fledging of chicks is critical to at least maintain population size. Adult birds are extremely active during this time, each parent swapping shifts almost daily to incubate eggs and rear chicks.
- January – March: Moulting occurs during this period. Adults head back to sea for a few weeks once the chicks have fledged. This is to build up significant fat reserves to trigger moulting. They come back to land - often the same breeding nest to moult over a 2-3 week period, during which time they cannot swim or feed.

For similar works around Wellington harbour we have specified following re: penguins:

- A penguin detection dog survey to be undertaken annually prior to works commencing to identify nests. It might be that several surveys are needed. If the works commence during April - June not all potential nests will be established and additional surveying would be required to ensure all nests are known. The ideal time for the dog survey is August to September when the breeding season is in full swing.
 - If nests are present it is our preference that work is avoided during the nesting period July to December, however if this is not possible we have required a 10 m buffer to be created around each the nest. This is a minimum distance and can increase depending on the nature of the works and associated disturbance. Breeding birds cannot be successfully moved and would cause a failed breeding attempt.
 - If moulting birds are present January to March and the works must proceed, the buffer still applies but these birds can be moved to a nearby suitable location if this is deemed appropriate on a case by case basis.
 - Revetments should be designed and constructed to enhance penguin habitat
 - Beach access points should be designed to minimise access for penguins onto the cycleway and road.
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In response to the emerging Doc standard outlined in the bullet points above, the following requirements will be included in the penguin management plan:

1. Surveys by penguin detection dog:

A penguin detection dog survey will be undertaken prior to works commencing to identify nests.

2. Timing of work during the nesting period of little penguins:

Work in areas where there are penguin nests will be undertaken from 1 March to 30 June, so there will not be any work in areas with penguin nests during the penguin breeding period.

3. Timing of work during the little penguin moulting period:

Work in areas where there are penguin nests will be undertaken from 1 March to 30 June, so there will not be any work in areas with penguin nests during the penguin moulting period.

4. Design of revetments:

Rocks will be placed at some of the new revetments in ways that will create potential nesting sites for penguins (see page 98 of Appendix C-1 (Vegetation and Fauna)).

Effects management package for little penguins

Effects of the proposal on little penguins have been considered in detail in Appendix C-1 (Vegetation and Fauna) of the AEE lodgement. An effects management package for little penguins is presented below.

1. Measures/actions taken to avoid significant coastal habitats for birds (Schedule F2 areas);

It is not possible to avoid significant coastal habitats for birds.

2. Measures/actions taken to avoid more than minor adverse effects on little penguins

It is not possible to avoid some adverse effects of the project on penguins.

3. Measures/actions taken to remedy any more than minor adverse effects on little penguins

It is proposed that rocks are placed at some of the new revetments in ways that will create potential nesting sites for penguins.

4. Measures/actions taken to mitigate any more than minor adverse effects on little penguins

Timing of the project construction activities will be consistent with recommendations from DoC. Work in areas where there are penguin nests will be undertaken from 1 March to 30 June, so there will not be any work during the penguin breeding or moulting periods.

5. Measures/actions taken to offset any residual effects on little penguins

Biodiversity offsets will be provided by the creation of little penguin breeding areas on the southern breakwater at the Seaview marina (see section 3.1) and at Whiorau Reserve (see section 3.2).

Relationships between the proposed biodiversity offset and the principles listed in Schedule G (biodiversity offsetting) have already been described for the Seaview marina. These relationships are considered below for the Whiorau Reserve.

1. Adherence to the mitigation hierarchy

The biodiversity offset will not have adverse effects on biodiversity.

2. Limits to what can be mitigated or offset

The biodiversity offset will not have adverse effects on biodiversity.

3. Additional conservation outcomes

The biodiversity offset will create new, safe breeding habitat for little penguins and hence have positive effects on biodiversity that would not otherwise have occurred.

4. Landscape context

The biodiversity offset will increase the availability of safe breeding habitat for little penguins in the Wellington Harbour, thereby contributing to the protection of habitats of avifauna. The offset site is within an existing reserve where penguins currently nest. The creation of safe breeding habitat for penguins within the reserve will enhance the biological, social and cultural values of the reserve.

5. Long term outcomes

The Whiorau Reserve is owned by the Hutt City Council (HCC) so the biodiversity offset will continue in perpetuity.

6. No net biodiversity loss

The biodiversity offset will provide new breeding habitat for little penguins. There will be no loss of biodiversity associated with creation of the breeding area and hence there will be a net gain of biodiversity. Measurable positive effects on biodiversity will be seen when the number of little penguins breeding at the site exceeds the number of little penguins that currently breed at the Whiorau Reserve. Little penguins currently nest at the Reserve, so the risk of failure in delivering the biodiversity offset is very low.

Human/wildlife conflicts for little penguins

Little penguins that breed along the coastline where the shared path will be constructed, between Point Howard and Marine Parade, are currently exposed to risks at breeding sites on both sides of the road. Penguins at current breeding sites on the seaward side of road are vulnerable to disturbance by people, to disturbance and predation by dogs, and to loss of breeding sites as the sea level rises. Penguins at current breeding sites on the landward side of road are at risk of being killed by vehicles on the road and are vulnerable to predation by dogs and other mammalian predators.

The proposed creation of little penguin breeding areas on the southern breakwater at the Seaview marina and at Whiorau Reserve will provide penguins with safe breeding areas on the seaward side of the road. This provision of safe breeding habitat means that the Shared Path Project will be of net benefit to little penguins.

Stormwater pipes

Little penguins show strong site fidelity and return each year to the site they have occupied in previous years. If access to stormwater pipes used by penguins was blocked then penguins would probably go along the shore until they could climb up and cross the road to their breeding area. Blockage of penguin access to stormwater pipes would thus increase the risk of penguin mortality on the road, so access to these pipes will not be blocked.

Access of little penguins to the landward side of the road

It would be possible to reduce access of little penguins to the road by building fences between the road and the sea and placing gates across ramps down to beaches. However, fences and gates would be visually unattractive and would reduce access of people to the foreshore so might not be publicly acceptable. Approaches to reducing penguin mortality on the road could be considered by HCC in future as this problem exists independently of the Shared Path Project.

3. Offset proposals

3.1 Proposed breeding area for shoreline birds on the southern breakwater at the Seaview marina

It is proposed that new breeding habitat for shoreline foraging birds (white-fronted terns, variable oystercatchers, red-billed gulls and black-backed gulls) is created on the existing southern breakwater at the Seaview marina. The new habitat will also provide roosting opportunities for other harbour birds such as shags, kingfishers and herons. The proposed new breeding area for shoreline birds is shown in Fig. 1.



Fig. 1. Seaview marina breakwaters with the proposed new breeding area for shoreline birds on the southern breakwater shown in yellow.

There is currently no suitable nesting habitat for shoreline foraging birds on the southern or northern breakwaters at the Seaview marina.

The southern breakwater is approximately 180 m long. The breakwater is approximately 7 m wide at the high tide line at the start of the breakwater and approximately 5 m wide at the end. The top of the breakwater is approximately 1 m above the high tide line at the start of the breakwater. The height of the breakwater decreases along its length and the top of the breakwater is approximately 0.5 m above the high tide line at the end of the breakwater.

Breeding habitat for birds that is well above the high tide line will be created by increasing the height of the top of the breakwater by approximately 1 metre. This will be achieved by the placement of rocks on top of the existing breakwater. Restraining frameworks for rocks might be included for some or all of the increased breakwater height using concrete, wood or wire basket retaining materials. Rocks will only be placed above the MHWS level and there will not be any increase in the footprint of the breakwater in the water.

The sides of the addition to the breakwater are likely to be sloped so that the width of the addition at the start of the breakwater will decrease from approximately 7 m at the bottom to approximately 5 m at the top. The breakwater becomes narrower along its length, and the width of the top of the addition to the breakwater will decrease from approximately 5m at the start of the breakwater to approximately 3 m at the end of the breakwater.

Crushed rock will be placed to fill gaps between rocks and create a flat surface on the top of the breakwater. This flat surface is important for the creation of breeding habitat for birds.

Approximately half of the new bird breeding area, away from the road (see Fig. 1) will be left open as a nesting area for shoreline foraging birds. Nesting areas for these birds must be open areas with unobstructed views of the surroundings. Coarse sand will be placed on the top of the breakwater to create artificial beach nesting habitat for shoreline foraging birds. Small (<0.3 m diameter) rocks will be placed along the edges and at intervals across the nesting area to the limit movement of sand.

The provisional area for the breeding habitat is approximately 350 to 400 m² for shoreline foraging birds. The plan for the creation of the breeding areas is at the concept stage and is subject to change during the development of detailed plans.

3.2 Proposed breeding area for little penguins on the southern breakwater at the Seaview marina

It is proposed that new breeding habitat for little penguins is created on the existing southern breakwater at the Seaview marina. The proposed new breeding area for little penguins is shown in Fig. 2.

Little penguins were detected by a penguin dog at 11 sites on the southern breakwater and at six sites close to the end of the northern breakwater in a survey conducted in October 2017. Nests were found at four of the sites on the southern breakwater and at two of the sites on the northern breakwater. Little penguin nests on the southern breakwater are likely to fail due to

inundation when large storms occur when there are eggs or chicks in the nests. The northern breakwater is lower than the southern breakwater and little penguin nests on the northern breakwater are especially vulnerable to inundation.

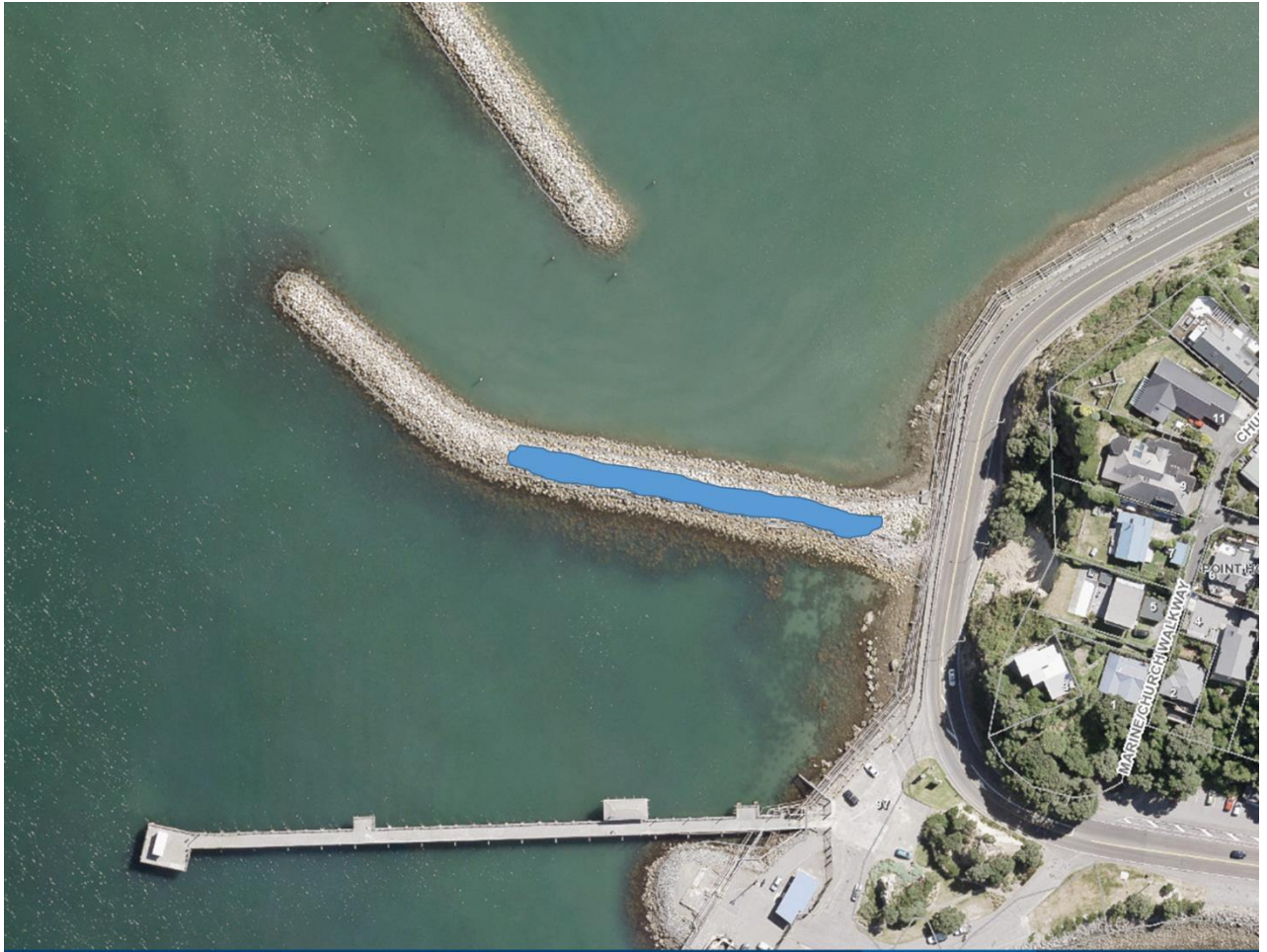


Fig. 2. Seaview marina breakwaters with the proposed new breeding area for little penguins on the southern breakwater shown in blue.

Breeding habitat for penguins that is well above the high tide line will be created by increasing the height of the top of the breakwater by approximately 1 metre. The concept plan for increasing the height of the breakwater to create the new bird breeding area was described in the preceding section.

Approximately half of new bird breeding area, starting from the road end, will have rocks placed along the sides of the top of the breakwater to provide some shelter from wind and from salt spray. Soil will be placed on the flat surface of the top of the breakwater so that taupata can be planted to create suitable habitat for penguins. Penguin nestboxes will be buried in the soil to create nest sites for penguins. Two ramps for penguins to walk from the water up to the breeding area will be built by pouring concrete over the rocks to create a

rough surface. This approach follows the design of the penguin landing ramp at the Oamaru Blue penguin Colony. The ramps will be approximately 1 m wide.

The provisional area for the breeding habitat is approximately 400 to 450 m² for little penguins. The plan for the creation of the breeding areas is at the concept stage and is subject to change during the development of detailed plans.

3.3 Proposed breeding area for little penguins at the Whiorau Reserve

A penguin nest was found in the southernmost garden bed at Whiorau Reserve in October 2017, three penguin nests were found in other garden beds, and two nests were found along the revetment wall on the western edge of the Reserve. Penguins that use these nests are vulnerable to disturbance by people and to predation by dogs and none of the nest sites are currently safe for penguins.

Construction of the new shared path is an opportunity to create a safe nesting area for little penguins at Whiorau Reserve. The nesting area is shown in Fig. 3. The area will be created by fencing the perimeter of the southernmost garden bed. The fence will also cross the revetment rocks and extend to below the low tide line. This will be necessary to keep people and dogs out of the penguin breeding area and to stop penguins that come ashore here from crossing the road.



Fig. 3. Whiorau Reserve with the proposed penguin breeding area shown in blue. The dashed lines represent fences.

Shrubs will be planted outside the fence to create a thick screen two metres high so that the fence will become hidden in the vegetation. The garden bed already has some trees and flax bushes. There will be additional planting of large shrubs and small trees in the penguin nesting area so that ideal penguin habitat with a canopy two to three metres above the ground can be established. Large rocks could be placed on the outer sides of the fences where they cross the revetment rocks so the fences are partially screened.

Penguin nestboxes will be buried in the soil within the nesting area to create nest sites for penguins.

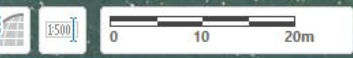
The new shared path will be beside the road from the southern end of the Whiorau Reserve for approximately 40 m and then turn westwards to pass on the northern side of the new penguin breeding area. The existing sealed path along the edge of the revetment within the new penguin breeding area will be removed and shrubs planted in the area from the edge of the revetment wall to the current garden bed. A ramp approximately 0.5 m wide for penguins to walk from the water up to the breeding area will be built in the middle of the fenced area of revetment wall by pouring concrete over the rocks to create a rough surface.

The area of the proposed breeding area will be 400 to 450 m². The plan for the creation of the breeding area is at the concept stage and is subject to change during the development of detailed plans.

Appendix 1

This appendix contains figures showing the estimation of the area of feeding/foraging habitat for shoreline foragers within the current project area.

I want to...







I want to...

POINT HOWARD

MARINE DR

LOT 26 BLOCK III
DP 2041

LOT 4
DP 24900

LOT 2
DP 47086

LOT 1
DP 6676

LOT 2
DP 6676

LOT 1
DP 47086

LOT 5
DP 24900

LOT 1
DP 60944

Area: 1,515.90 m²
Perimeter: 446.72 m

SORRENTO BAY

LOT 1
DP 40891

LOT 29 BLOCK III
DP 2041

WESTHILL PAPER RD

0 10 20m

1:500



I want to...



24 m
8.32 m

MARINE DR

SORRENTO BAY

141

143

LOT 1
DP 14451

201

LOT 2
DP 14451

202

LOT 1
DP 73735

SEC 2
SO 506552

203
SEC 1
SO 506552

LOT 5
DP 43140

LOT 6
DP 43140

WILM CREEK WAY

LOWRY BAY

LOT
DP 43

Area: 2,627.54 m²
Perimeter: 606.14 m

9.89 m

9.11 m

8.62 m

8.10 m

11.06 m

22.76 m

10.96 m

11.51 m

13.53 m

7.21 m

12.42 m

12.93 m

9.03 m

ant to...



Area: 181.79 m²
Perimeter: 169.76 m

9.03 m

7.21 m

9.08 m

10

15.75 m

17.25 m

LOT 1
DP 52732

LOT 2
DP 490144

LOT 5
DP 9588

LOT 2
DP 402304

LOT 6
DP 9588

LOT 1
DP 402304

PT LOT 6
DP 1714

LOT 1
DP 17366

LOT 2
DP 17366

RESERVE RD

MARINE DR

LOWRY BAY



Area: 902.34 m²
Perimeter: 289.12 m

MARINE DR

LOWRY BAY

CHEVOT

10 20m

LIS HCC | USGS.GWRC

DP 17366

LOT 2
DP 312933

LOT 2
DP 27056

LOT 1
DP 27056

LOT 2
DP 17366

PT LOT 22
DP 1714

LOT 1
DP 312933

PT LOT 3
DP 27056

LOT 3
DP 17366

LOT 4
DP 27056

PT LOT 3
DP 27056

LOT 2
DP 85635

LOT 1
DP 46850

LOT 1
DP 397111

LOT 2
DP 8439

Area: 902.34 m²
Perimeter: 289.12 m

LOT 1
DP 8439
FLAT 1
DP 73133

LOT 1
DP 46850

LOT 3
DP 11428

LOT 2
DP 397111

LOT 1
DP 11428

LOT 2
DP 11428

FLATS 1 & 2
DP 64243

FLATS 1 & 2
DP 59417

LOT 30
DP 11205



Area: 1,841.55 m²
Perimeter: 336.80 m

MARINE DR
19.64 m
18.95 m

27.92 m
17.31 m

11.11 m

16.73 m

20.02 m

11.88.94 m

48.42 m

15.68 m

KAIKOURA PATH RD

LOWRY BAY

231

232

234

235

236

230

229

238

36

34

32

45

30

16

41

10

14

28

39

10

2/16

14

12

8

6

2

2

7A

want to...





Area: 563.12 m²
Perimeter: 447.69 m

SEC 1
SO 32758

YORK BAY

250

15.17 m

12.43 m

10.02 m

21.02 m

10.06 m

8.45 m

15.47 m

18.09 m

9.21 m

12.90 m

8.12 m

7.24 m

11.29 m

11.17 m

7.34 m

8.57 m

14.03 m

58.96 m

7.14 m

9.02 m

26.32 m

46.78 m



Area: 1,426.48 m²
Perimeter: 319.57 m

250

LOT 49
DP 1538

LOT 1
DP 28755

LOT 48
DP 1538

LOT 1
DP 48668

LOT 2
DP 48668

LOT 3
DP 48668

LOT 46
DP 1538

YORK BAY

PT LOT 45
DP 1538

WAITOHU RD

LOT 1
DP 40770

LOT 2
DP 40770



Area: 885.42 m²
Perimeter: 392.03 m

7.41

LOT 1
DP 1538

11.76 m

14.22 m

20.3

8.63 m

28.04 m

9.42 m

8.74 m

LOT 2
DP 40770

LOT 43
DP 1538

LOT 42
DP 1538

LOT 1
DP 83011

LOT 77
DP 1574

LOT 2
DP 83011

SEC 139
SO 31147

LOT 1
DP 21848

LOT 1
DP 10907

LOT 34
DP 1538

LOT 3
DP 10907

LOT 2
DP 465896

LOT 1
DP 465896

LOT 3
DP 20014

LOT 2
DP 20014

LOT 1
DP 20014

LOT 2
DP 76317

MARINE DR

MARINE/WAITOHU WALKWAY

YORK BAY

25

23

21

23R

301

303

305

19

38

32

LOT 1
DP 1538



4 m

16.06 m

22.58 m

8.26 m

7.68 m

16.88 m

14.42 m

12.50 m

12.50 m

13.11 m

16.89 m

12.65 m

Area: 922.83 m²
Perimeter: 281.63 m

305

LOT 4
DP 21848

LOT 4
DP 72409

LOT 1
DP 465896

TAUNGATA RD

YORK BAY

TAUNGATA RD EXTN

LOT 1
DP 11018

LOT 2
DP 11018

LOT 5
DP 1538

LOT 6
DP 1538

LOT 7
DP 1538

LOT 8
DP 1538

LOT 1
DP 418844

LOT 2
DP 418844

20

15

14

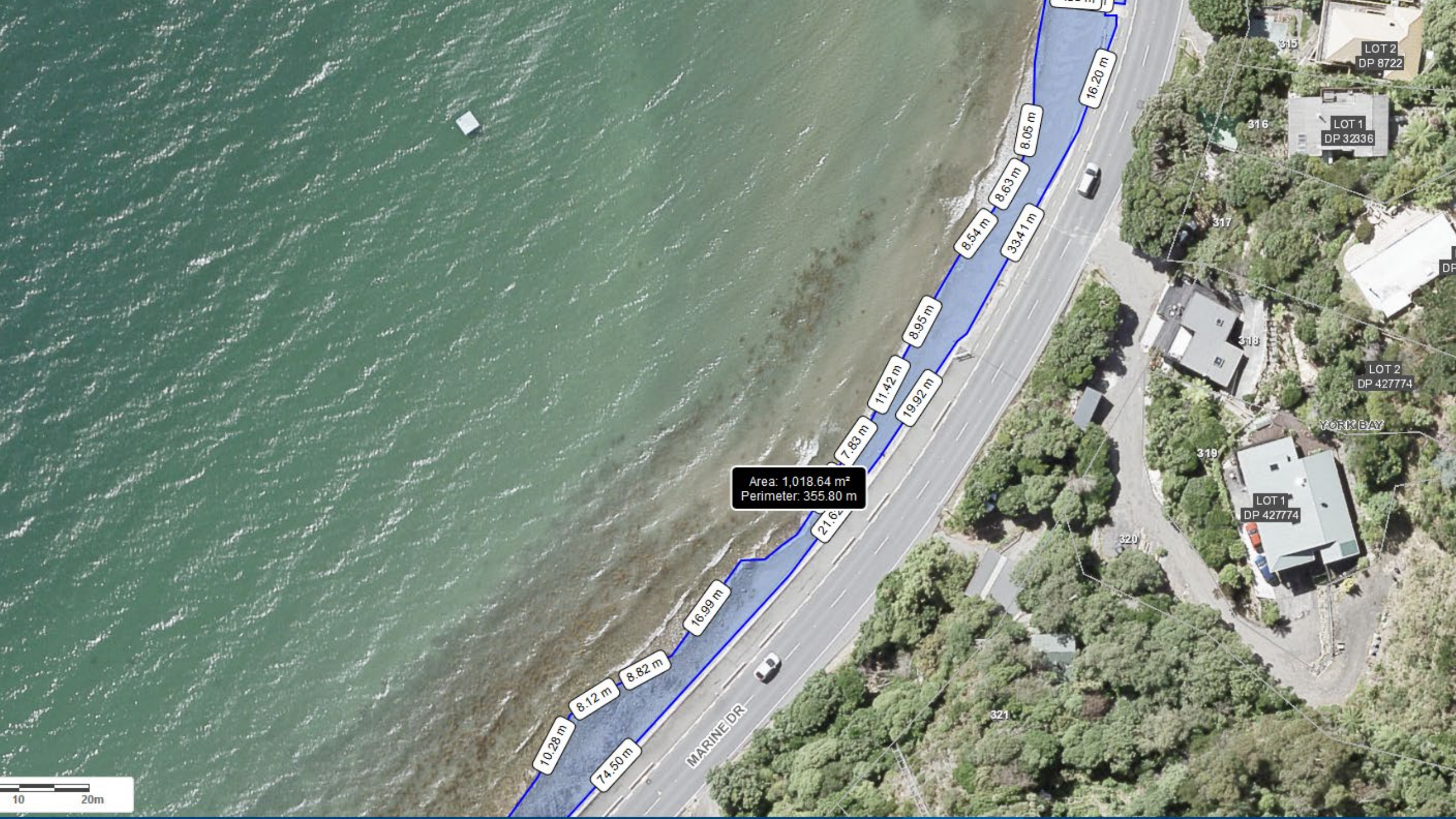
10

13

18A

12

307



Area: 1,018.64 m²
Perimeter: 355.80 m

10.28 m

8.12 m

74.50 m

8.82 m

16.99 m

21.62 m

7.83 m

11.42 m

19.92 m

8.95 m

8.54 m

8.63 m

33.41 m

8.05 m

16.20 m

LOT 2
DP 8722

LOT 1
DP 32336

LOT 2
DP 427774

LOT 1
DP 427774

YORK BAY

MARINE DR

10 20m



Area: 1,658.01 m²
Perimeter: 367.50 m

9.82 m

34.84 m

8.12 m

7.75 m

10.92 m

7.60 m

10.33 m

8.74 m

7.73 m

22.18 m

14.78 m

10.56 m

8.99 m

7.40 m

5.83 m

12.67 m

LOT 5
DP 6203

LOT 6
DP 6203

LOT 7
DP 6203

LOT 8
DP 6203

LOT 9
DP 6203

LOT 2
MAHINA BAY
DP 6050

YORK BAY

MARINA



Area: 1,738.06 m²
Perimeter: 562.85 m

8.28 m

8.87 m

12.70 m

13.41 m

9.29 m

7.41 m

7.92 m

27.27 m

8.75 m

13.53 m

12.70 m

11.97 m

LOT 1
DP 29753

LOT 4
DP 8096

LOT 5
DP 8096

LOT 6
DP 8096

LOT 3
DP 414590

LOT 2
DP 414590

LOT 6
DP 8668

10 20m

Click or tap to draw a multi-sided shape and find area. Double-click/tap to finish.

I want to...



I want to...



Area: 721.23 m²
Perimeter: 195.09 m

- 13.22 m
- 7.32 m
- 7.98 m
- 9.31 m
- 7.35 m
- 7.77 m
- 7.62 m
- 7.59 m
- 8.03 m
- 11.30 m

MARINE DR

LOT 4
DP 32748

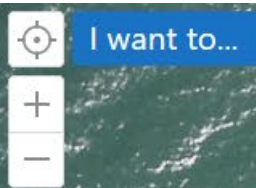
LOT 3
DP 32748

LOT 1
DP 88910

LOT 2
DP 88910

MAHINA BAY





Area: 1,235.27 m²
Perimeter: 294.16 m

PT SEC (ROAD) 28
SO 10753

MARINE DR

LOT 1
DP 87686

LOT 2
DP 10614

LOT 2
DP 87686

MAHINA BAY

LOT 2
DP 71606

PT LOT 2
DP 7014

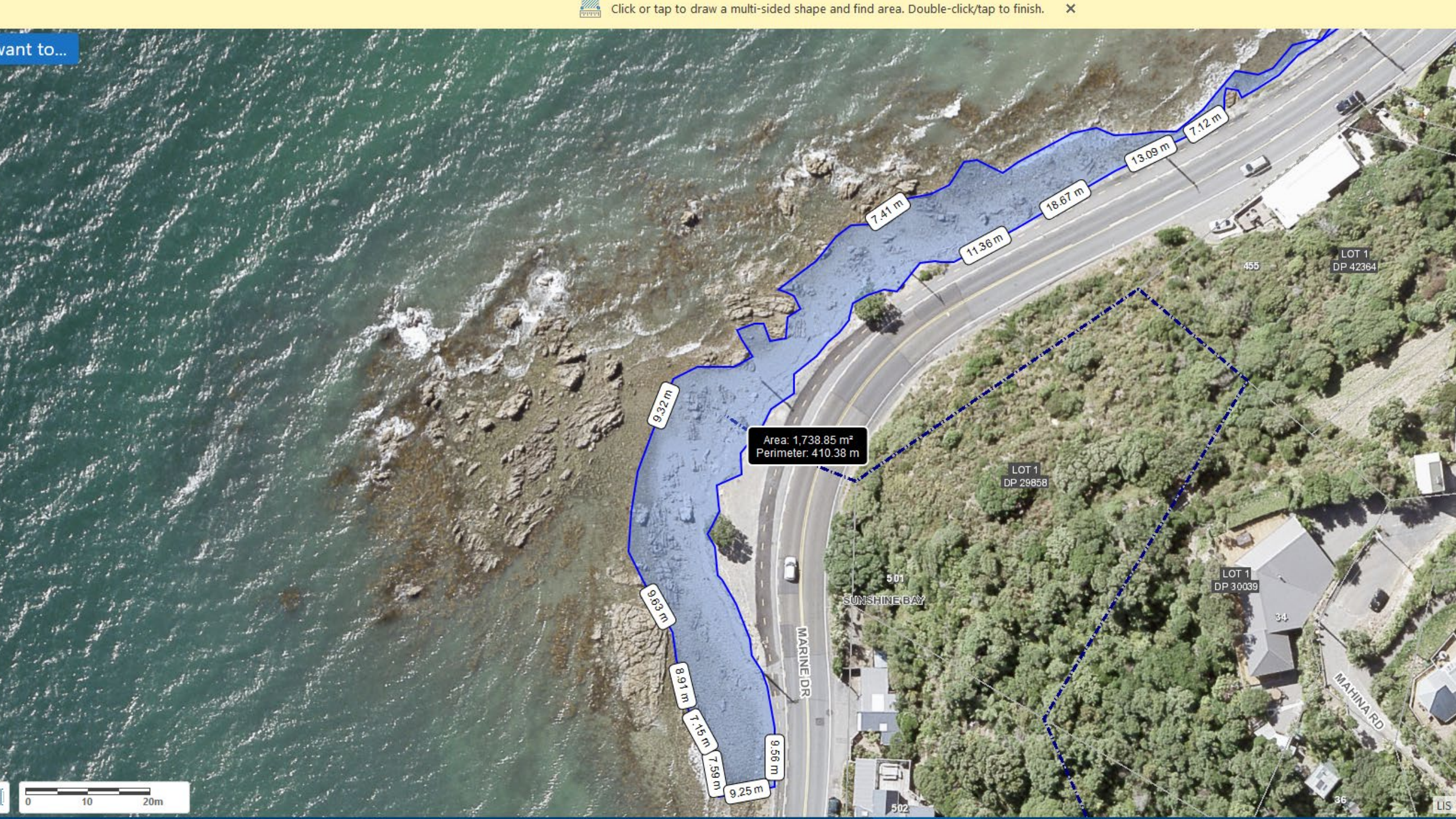
LOT 1
DP 7143

LOT 2
DP 7143

LOT 1
DP 71606

LOT 5
DP 7143

want to...



Area: 1,738.85 m²
Perimeter: 410.38 m

9.32 m

7.41 m

11.36 m

18.67 m

13.09 m

7.12 m

9.63 m

8.91 m

7.15 m

7.59 m

9.25 m

9.58 m

LOT 1
DP 29858

LOT 1
DP 30039

LOT 1
DP 42364

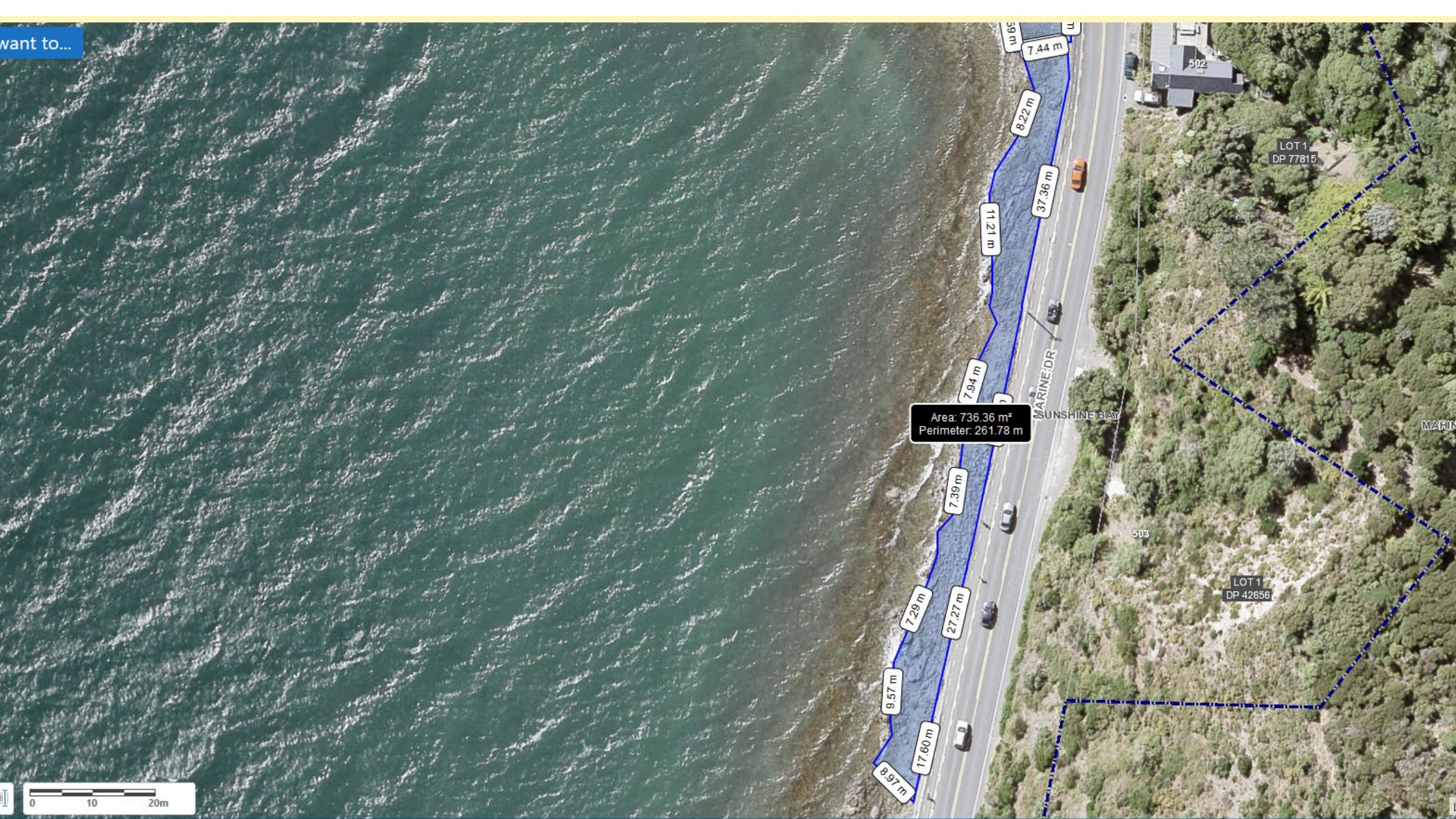
501
SUNSHINE BAY

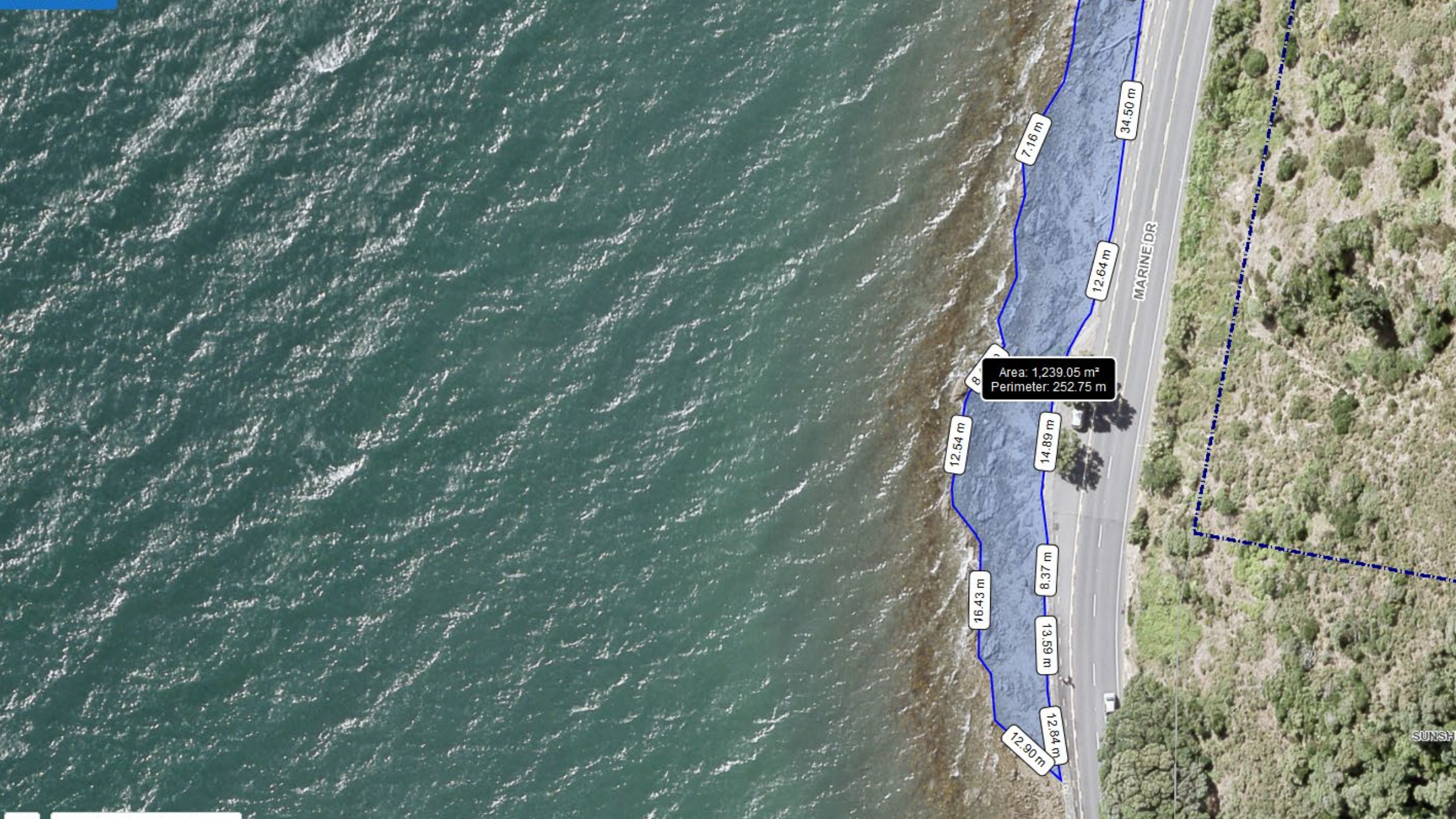
MARINE DR

MAHINA RD

0 10 20m

want to...





Area: 1,239.05 m²
Perimeter: 252.75 m

7.16 m

34.50 m

12.64 m

MARINE DR

14.89 m

12.54 m

8.37 m

16.43 m

13.59 m

12.84 m

12.90 m



Area: 1,160.74 m²
Perimeter: 301.17 m

MARINE DR

507

509 LOT 1
DP 69880

511

1:500

0 10 20m

9.43 m

13.59 m

8.09 m

8.88 m

35.91 m

8.57 m

12.04 m

8.08 m

8.35 m

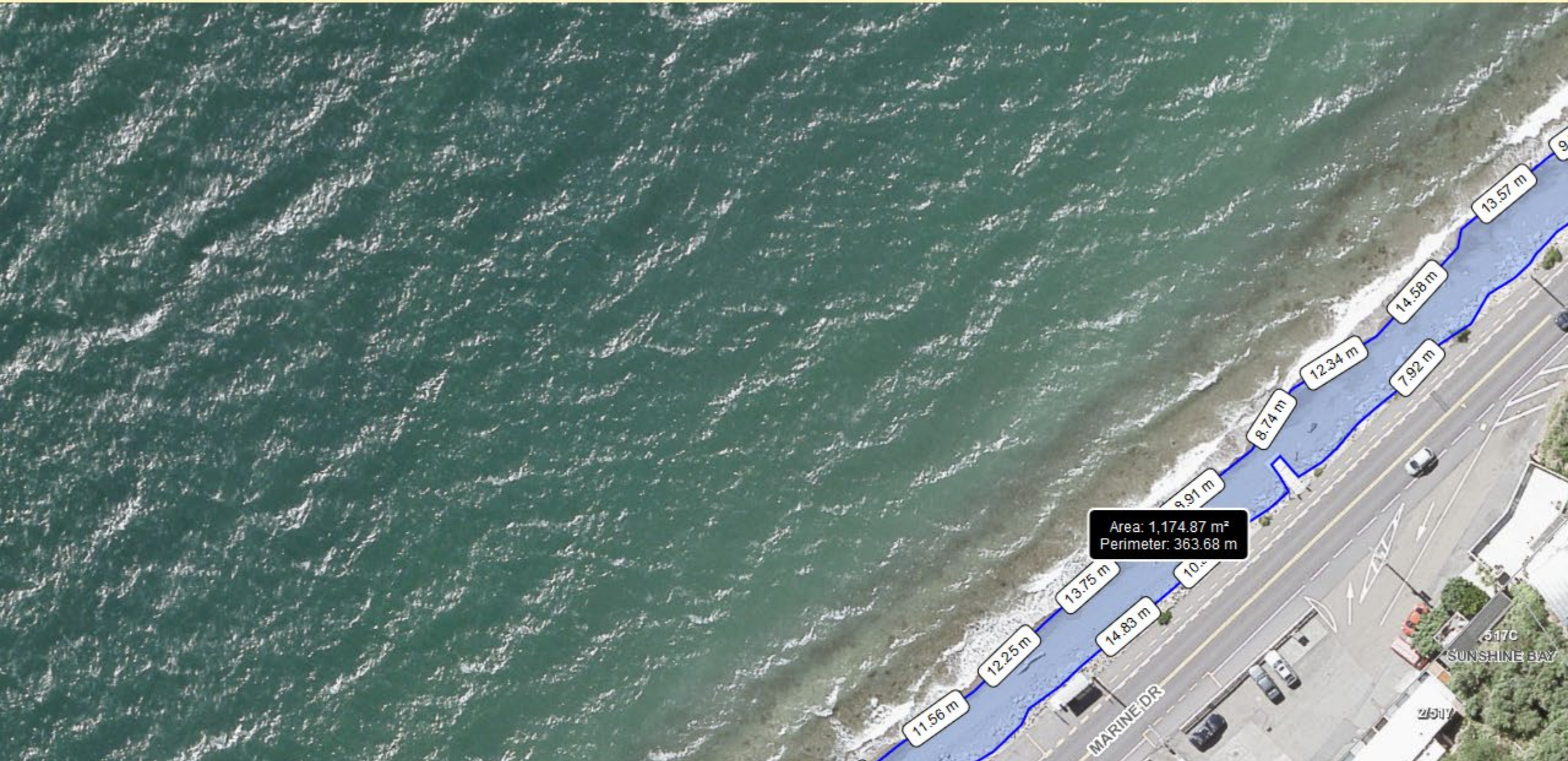
8.12 m

16.33 m

12.42 m

9.04 m

9.91 m



11.56 m

12.25 m

13.75 m

14.83 m

10.5 m

8.91 m

8.74 m

12.34 m

7.92 m

14.58 m

13.57 m

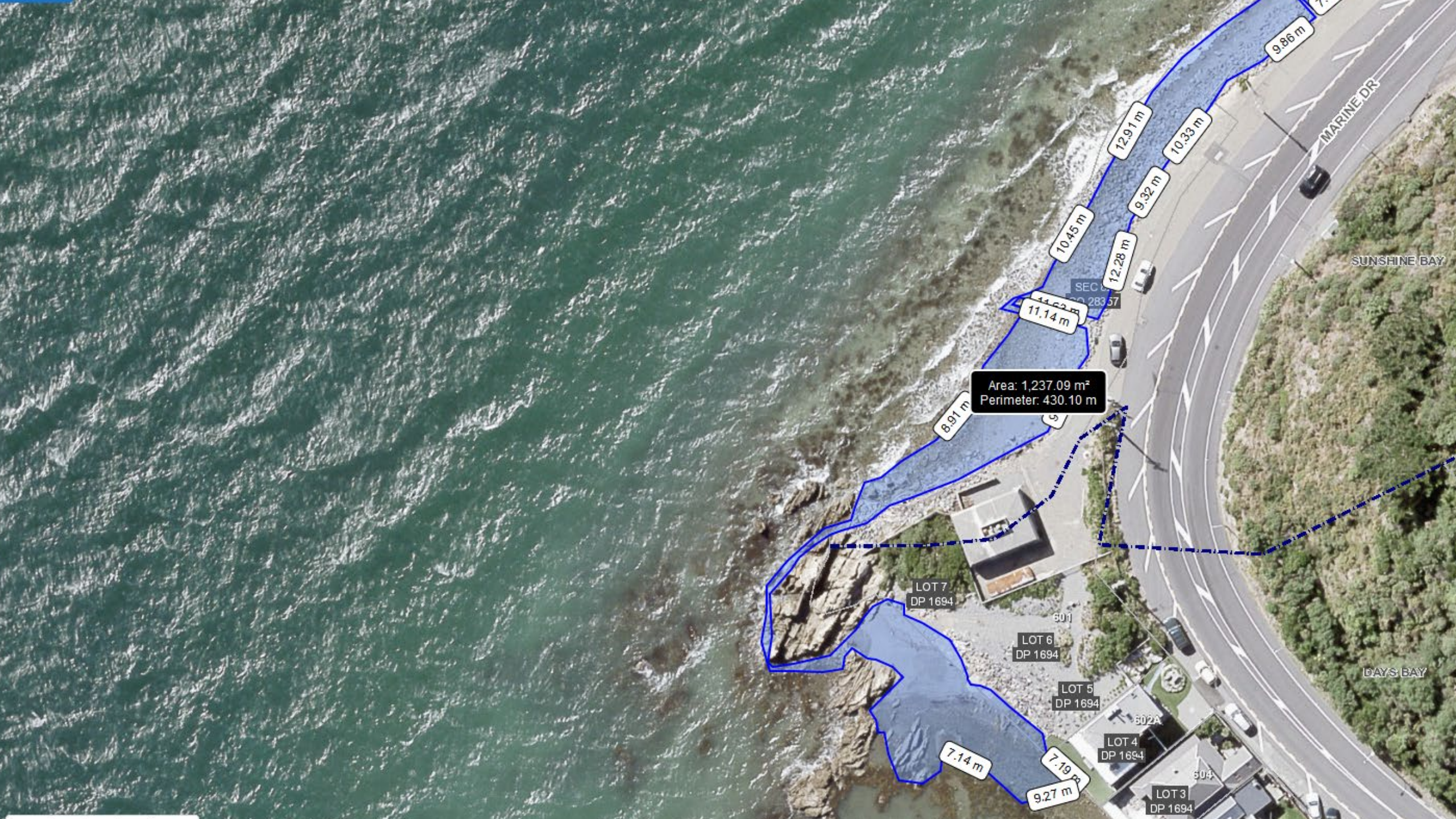
9

Area: 1,174.87 m²
Perimeter: 363.68 m

MARINE DR

517C
SUNSHINE BAY

2/517



Area: 1,237.09 m²
Perimeter: 430.10 m

8.91 m

11.14 m

12.28 m

9.32 m

12.91 m

10.33 m

9.86 m

LOT 7
DP 1694

LOT 6
DP 1694

LOT 5
DP 1694

LOT 4
DP 1694

LOT 3
DP 1694

7.14 m

7.19 m

9.27 m

MARINE DR

SUNSHINE BAY

DAYS BAY

SEC 1
DP 28357

601

602A

604



Area: 365.09 m²
Perimeter: 236.94 m

30.41 m

26.02 m

21.31 m

10.35 m

10.02 m

MARINE DR

LOT 4
DP 1694

504
LOT 3
DP 1694

LOT 1
DP 307236

603A

603B

LOT 2
307236

SEC 87
SO 25560

605

LOT 33 BLOCK 2
PT LOT 32 BLOCK 2

FLATS 1 & 4
DP 81924

LOT 1
DP 43133

606

607

FLATS 2 & 3
DP 43134

LOT 29 BLOCK 2
DEEDS 280

LOT 1
DP 52230

608

607A

608

SEC 91
SO 25560

609

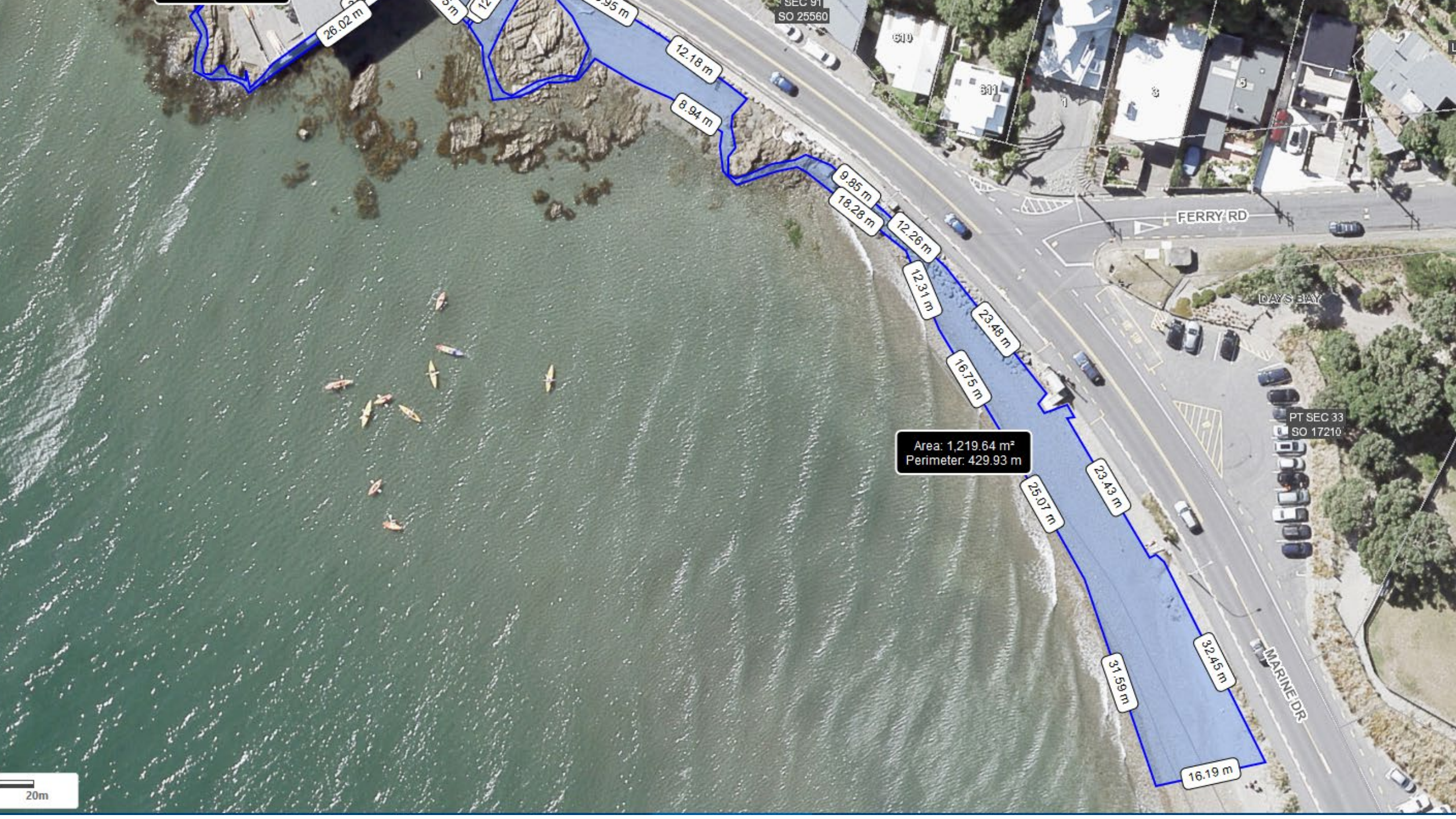
610

611

LOT 27 BLOCK 2
DEEDS 280

LOT 28
BLOCK 2
DEEDS 280

DAYS BAY



26.02 m

12.18 m

8.94 m

12.18 m

8.94 m

9.85 m

18.28 m

12.26 m

12.31 m

23.48 m

16.75 m

25.07 m

23.43 m

31.59 m

32.45 m

16.19 m

Area: 1,219.64 m²
Perimeter: 429.93 m

SEC 91
SO 25560

610

611

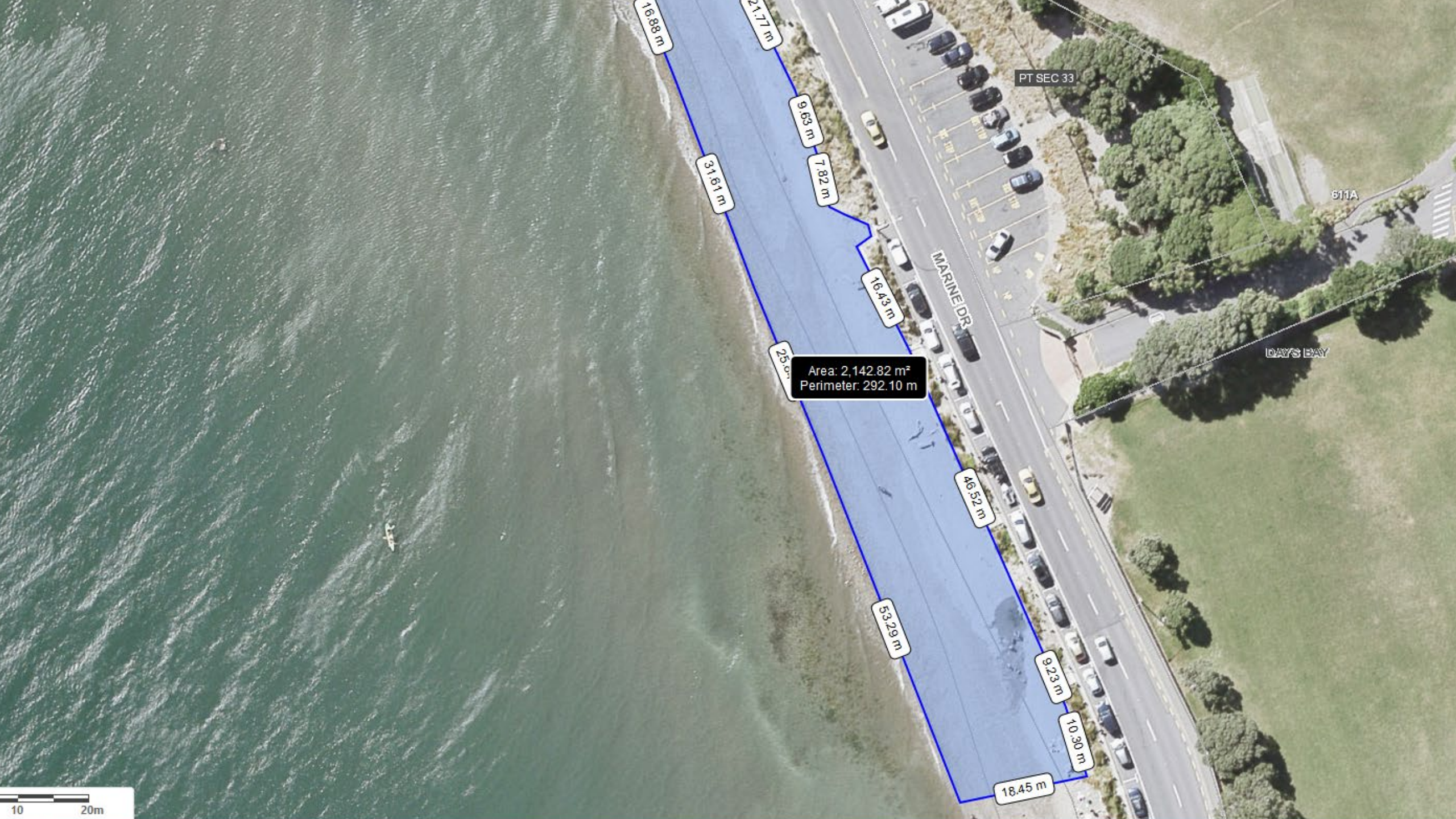
FERRY RD

DAYS BAY

PT SEC 33
SO 17210

MARINE DR

20m



16.88 m

21.77 m

9.63 m

7.82 m

31.61 m

16.43 m

25.00 m

Area: 2,142.82 m²
Perimeter: 292.10 m

46.52 m

53.29 m

9.23 m

10.30 m

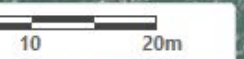
18.45 m

PT SEC 33

611A

DAYS BAY

MARINE DR





29.61 m

36.22 m

26.45 m

47.55 m

32.06 m

PT SEC 33

Area: 1,990.64 m²
Perimeter: 282.47 m

MARINE DR

DAYS BAY



Area: 3,200.06 m²
Perimeter: 303.10 m

- 12.89 m
- 8.12 m
- 22.95 m
- 15.63 m
- 8.06 m
- 33.97 m
- 12.68 m
- 16.57 m
- 7.94 m
- 15.42 m
- 8.74 m
- 27.48 m
- 42.00 m

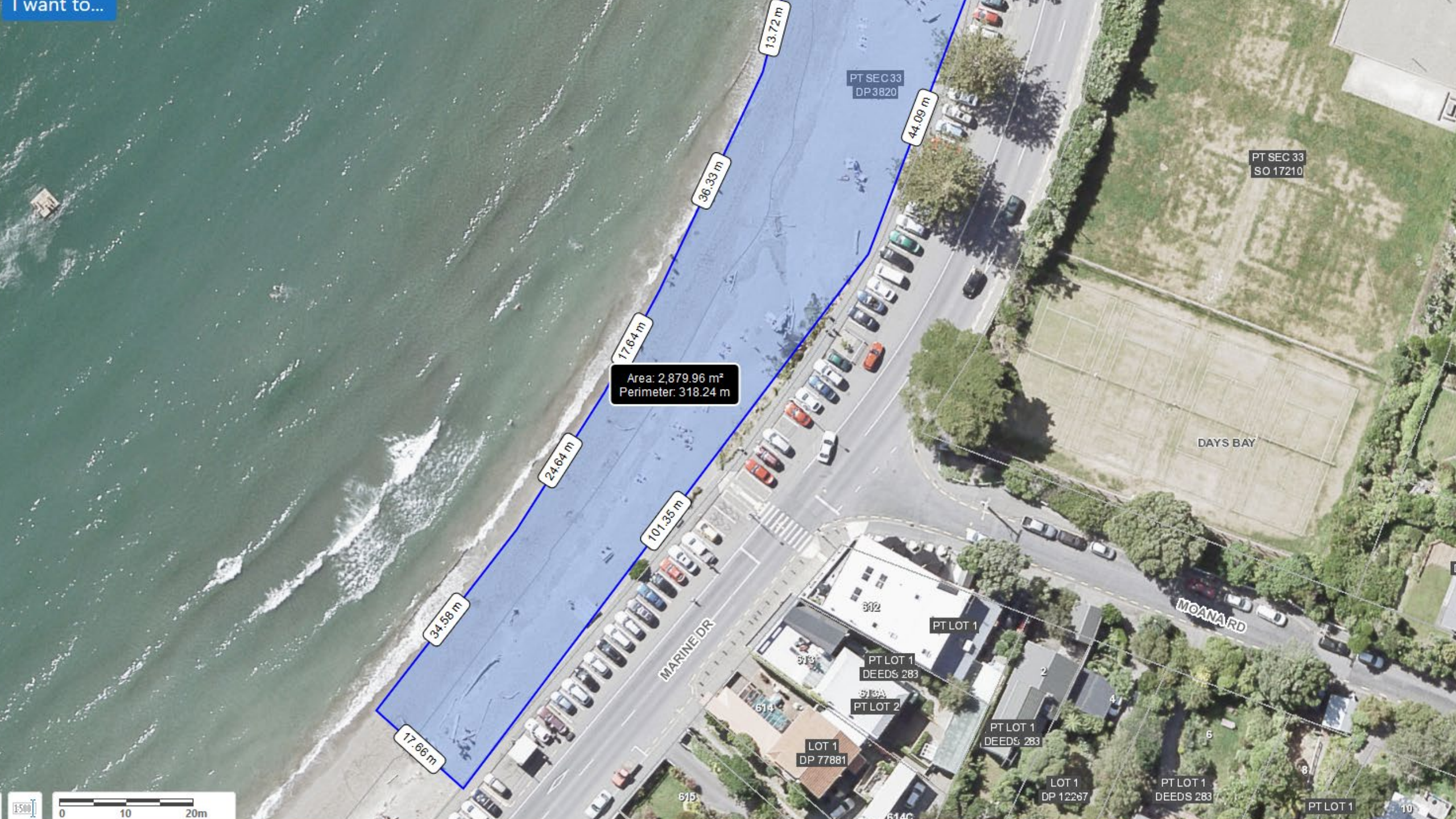
DAYS BAY

KERERU RD

SEC 1
SO 22924

16D





Area: 2,879.96 m²
Perimeter: 318.24 m

PT SEC 33
DP 3820

PT SEC 33
SO 17210

DAYS BAY

MOANA RD

MARINE DR

PT LOT 1

PT LOT 1
DEEDS 283

PT LOT 2

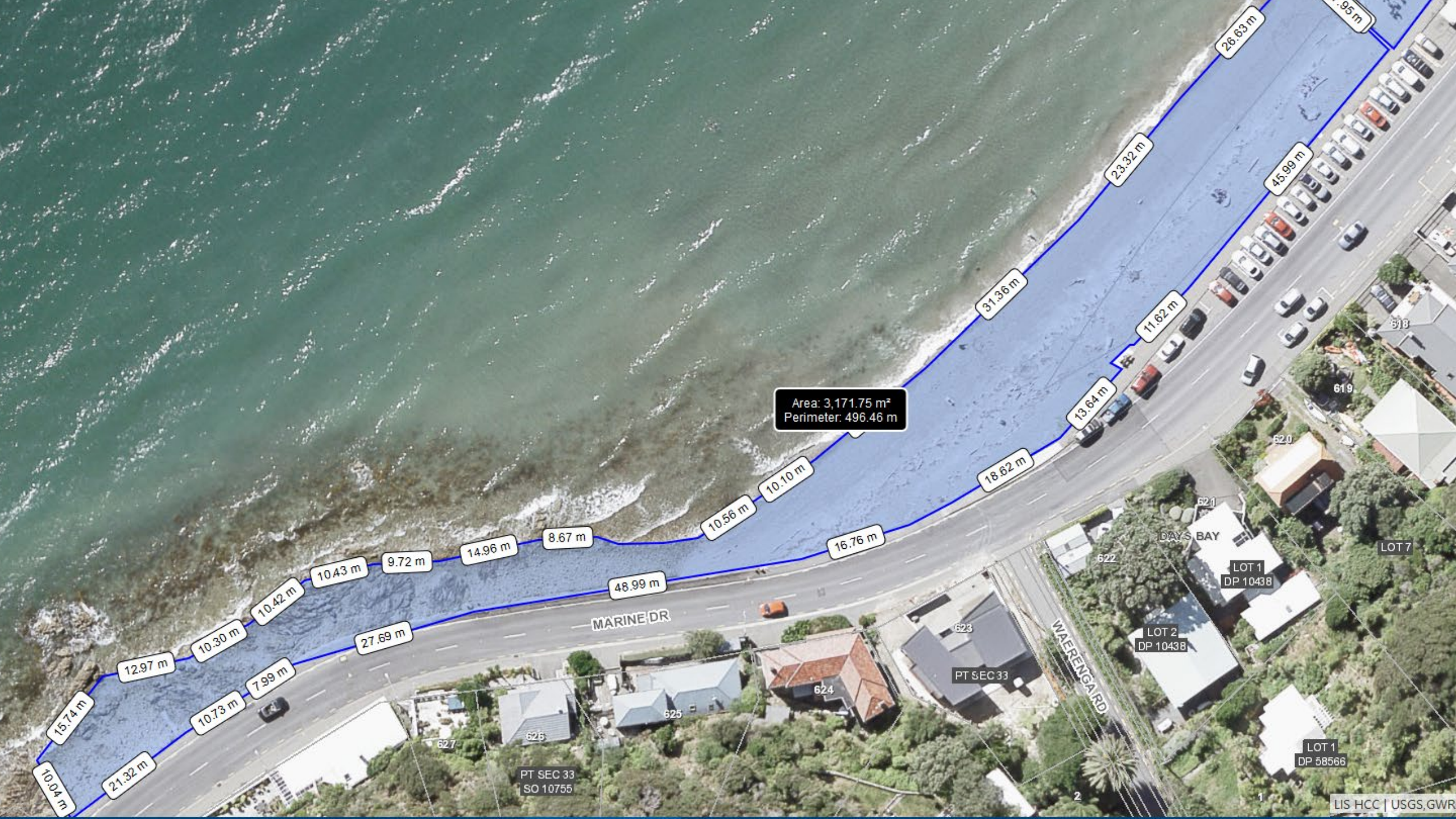
PT LOT 1
DEEDS 283

LOT 1
DP 77881

LOT 1
DP 12267

PT LOT 1
DEEDS 283

PT LOT 1



Area: 3,171.75 m²
Perimeter: 496.46 m

MARINE DR

WAERENGARD

DAYS BAY

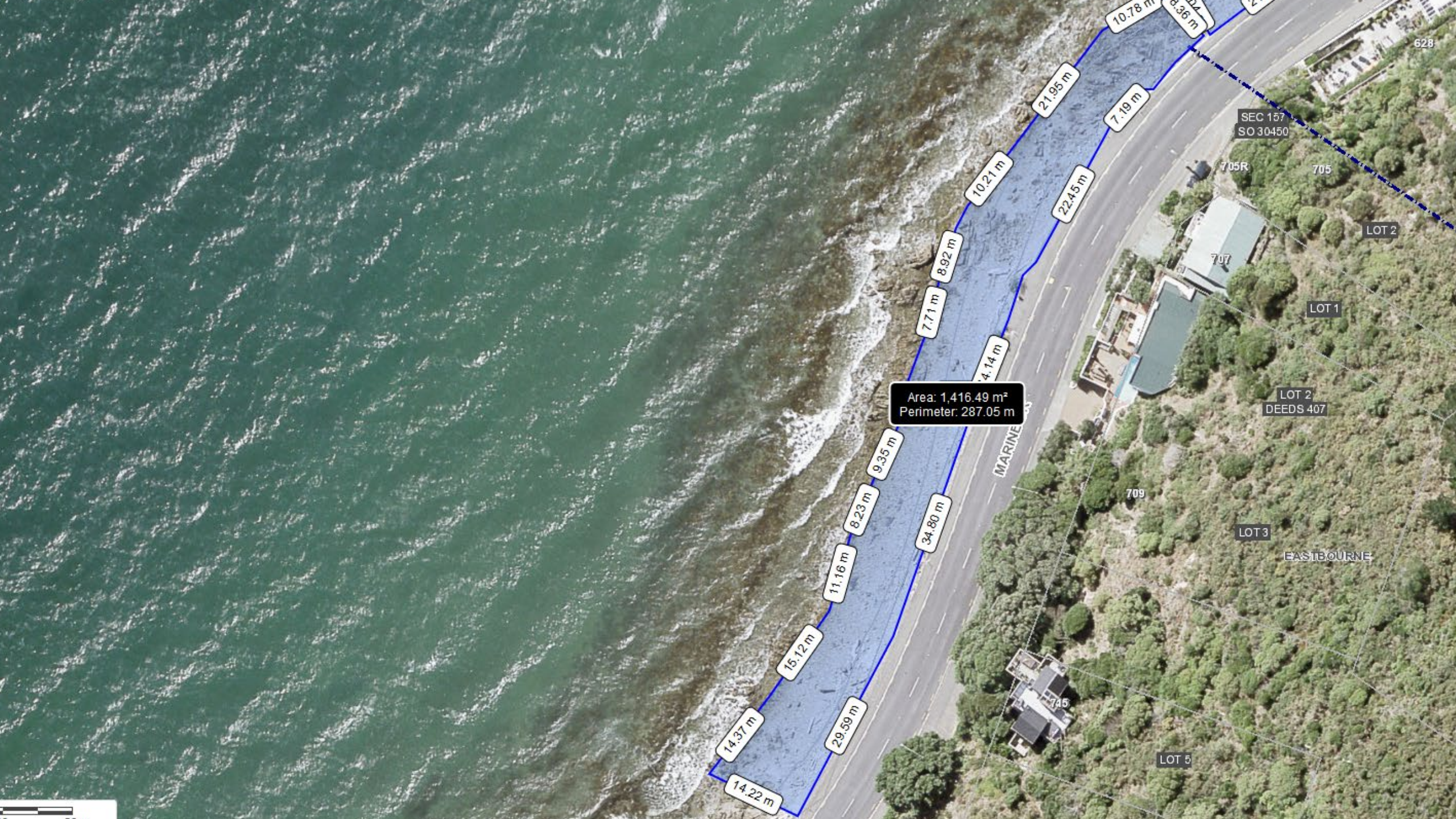
LOT 1
DP 10438

LOT 2
DP 10438

LOT 1
DP 58566

PT SEC 33
SO 10755

PT & EC 33



Area: 1,416.49 m²
Perimeter: 287.05 m

MARINE

SEC 157
SO 30450

705R

705

LOT 2

LOT 1

LOT 2
DEEDS 407

709

LOT 3

EASTBOURNE

LOT 5

715

628





Area: 1,051.35 m²
Perimeter: 381.45 m

7.56 m

10.66 m

9.33 m

10.77 m

11.49 m

7.18 m

2.06 m

8.98 m

22.92 m

10.19 m

23.23 m

12.63 m

MARINE DR

LOT 2
DP 385378

EASTBOURNE
LOT 1
DP 385378

LOT 10

LOT 11

LOT 7

725

727

729

731

733



Area: 322.05 m²
Perimeter: 181.85 m

SEC 104
SO 24686

PT SEC (ROAD) 37 & 39
SO 10686

PT SEC 37 & 39
SO 10686

PT SEC 37 & 39
SO 10686

EASTBOURNE

759

761

MARINE DR

11.64 m

7.56 m

10.66 m

9.33 m

10.00 m