TWEED SAND BYPASSING

Friends of Rainbow Bay

3 April 2023

TSB OVERVIEW

- History
- Objectives
- Operations
- Monitoring

Why was it needed?

- Severe beach erosion on Southern Gold Coast Beaches due to accumulation of sand at Letitia
- Tweed River Entrance Navigability

What does it do?

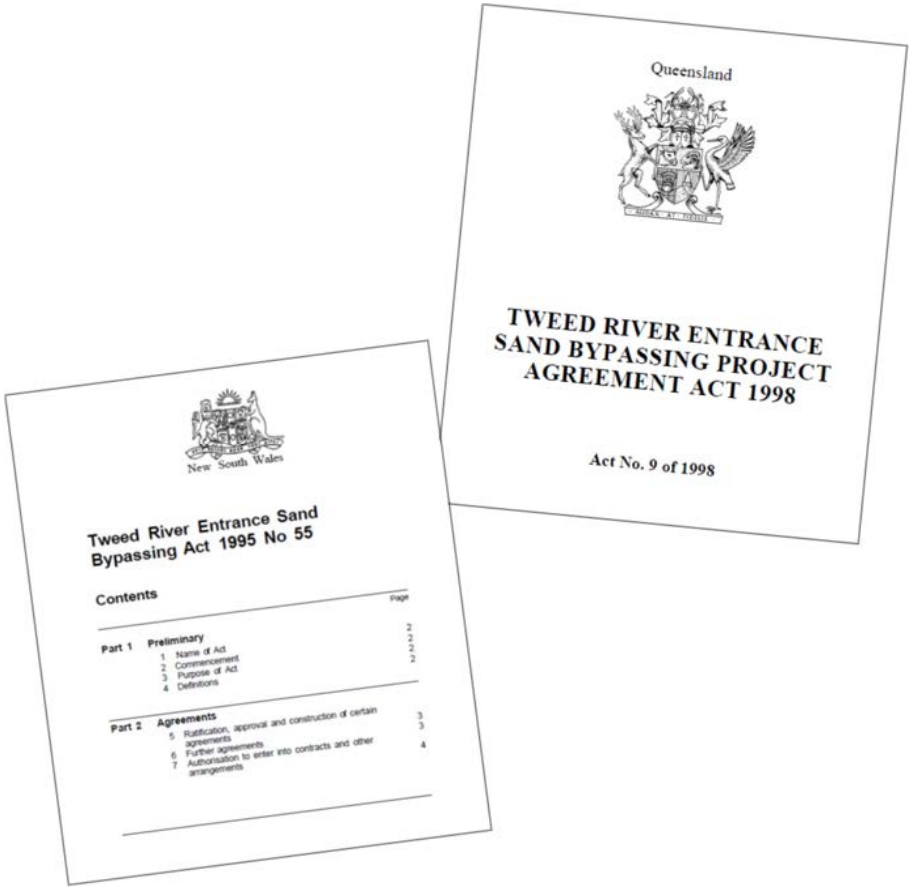
- Collects and transports sand from Letitia spit to north of the Tweed River (6 various outlet locations)
- Incorporates dredging of the Tweed River Entrance (the jetty doesn't capture all the sand)

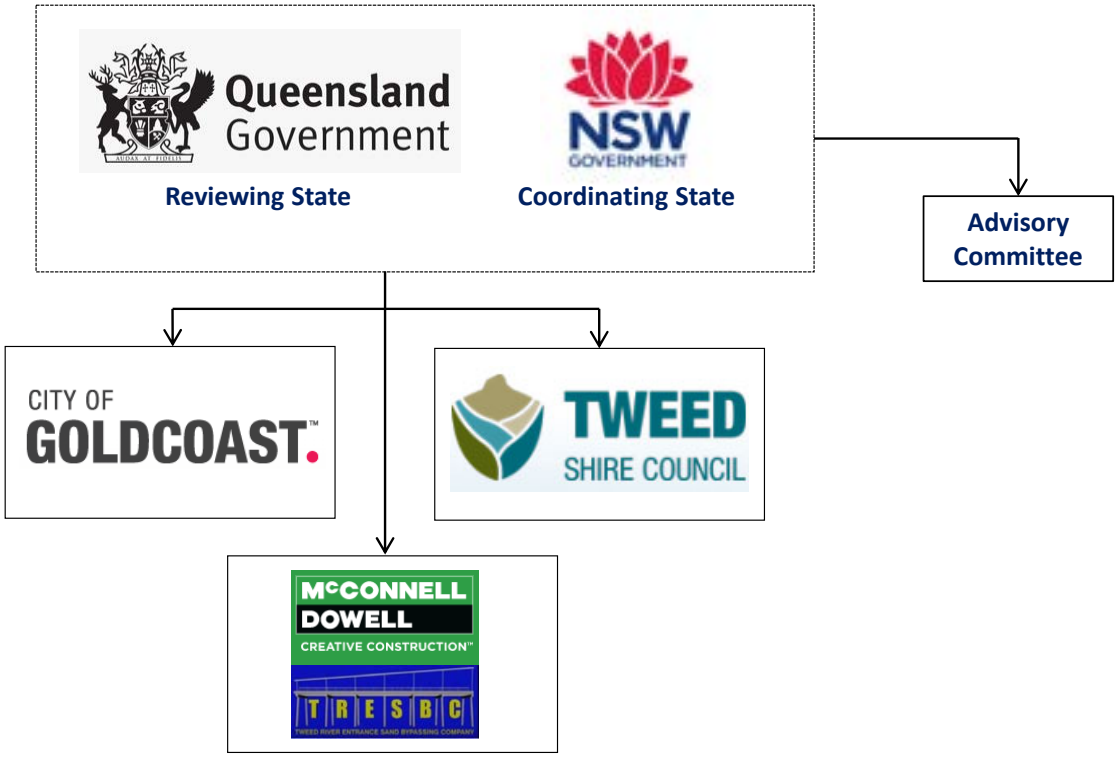
TWEED SAND BYPASSING

Cost	• $5M and $8M per year to operate and maintain
Operation	• Third party under a Concession Agreement • Agreement expires 30 Sept 2024 • 500,000m^3 / year over the Long term, or calculated LTA
Funding	• NSW 50% • Qld 25% • CoGC 25%
Governance	• NSW manage on behalf of Governments • Working Group (board) and an Advisory Committee (community)
Staff	• 6 FTE in NSW • 3 FTE in Qld
Opportunity	• Significant benefit to beach amenity and channel navigability • Significant monitoring and analysis • Continual improvement initiatives

Overview

TWEEDSAND BYPASSING





Pumping system details

First Sand Pumped 2001

4.1km of underground pipeline

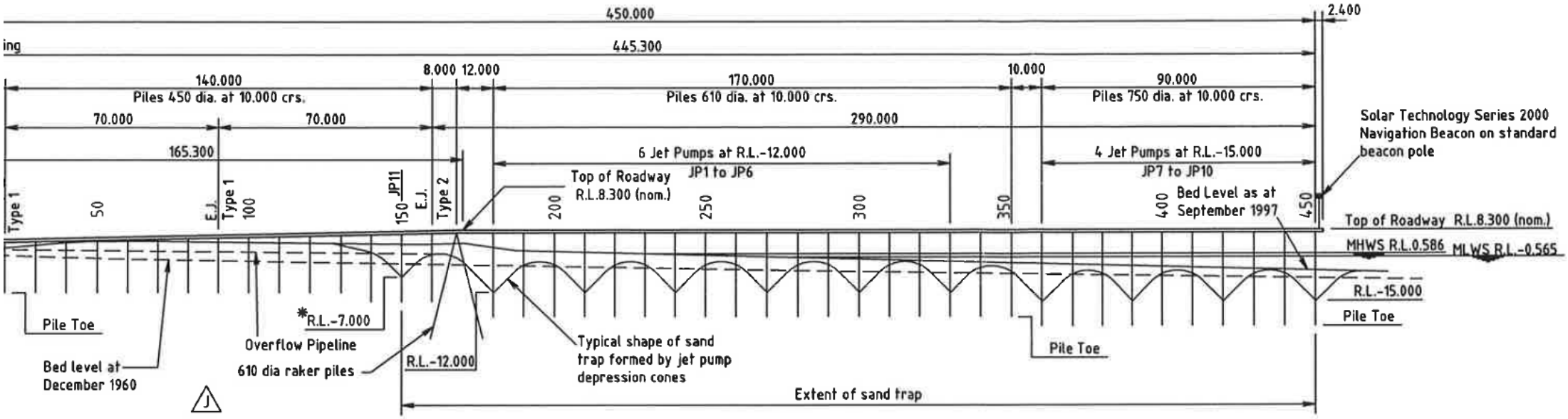
10 Jet Pumps

625m³ per hour

350,000m³ to 750,000m³ per year

450 Long Jetty

Pumping system details



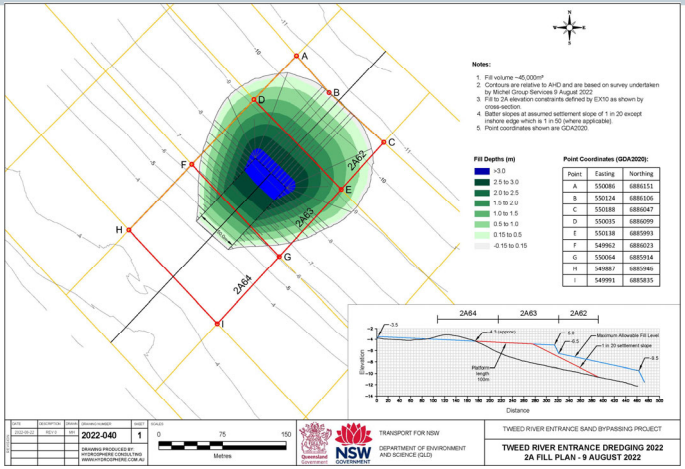
ELEVATION
1:1000

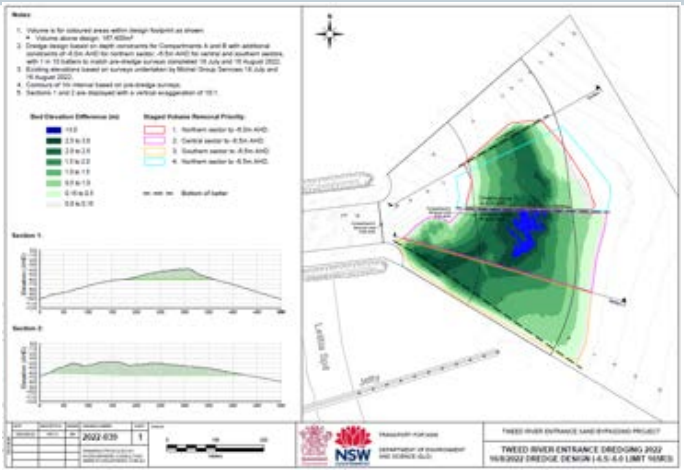
* JET PUMP (JP11) AT CH.150 NOT TO BE IN SERVICE DURING STORM CONDITIONS.

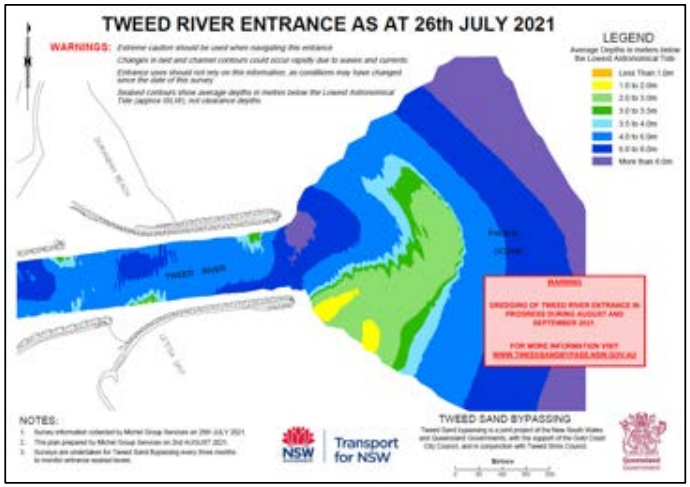
TWEEDSAND BYPASSING

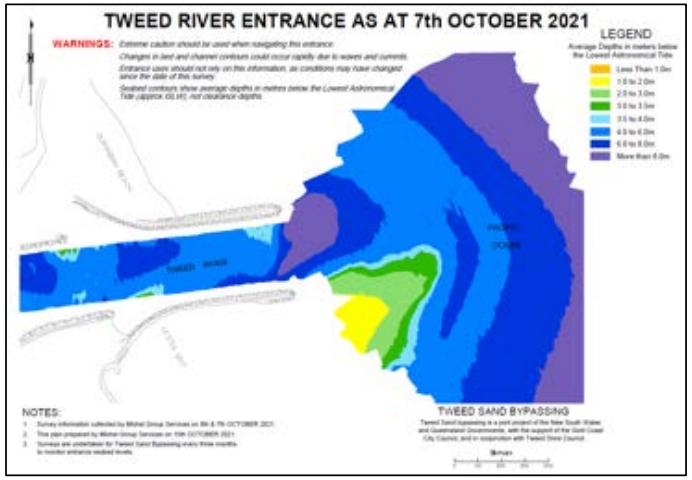
Dredging

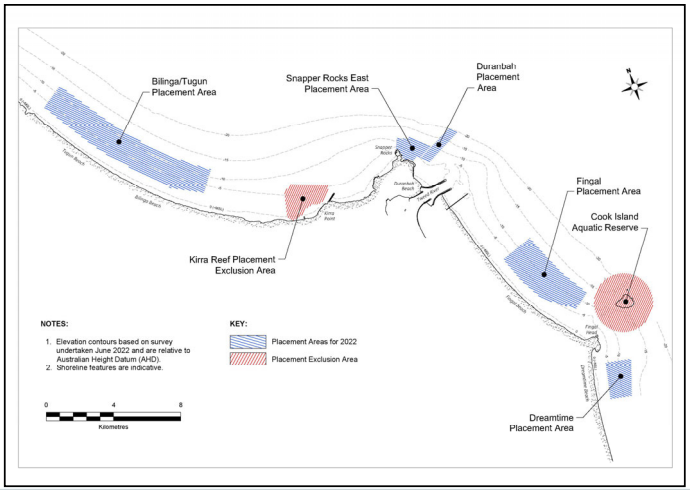
- Annual maintenance dredging
- Up to approx. 200,000m3 per year
- Placed in various approved locations



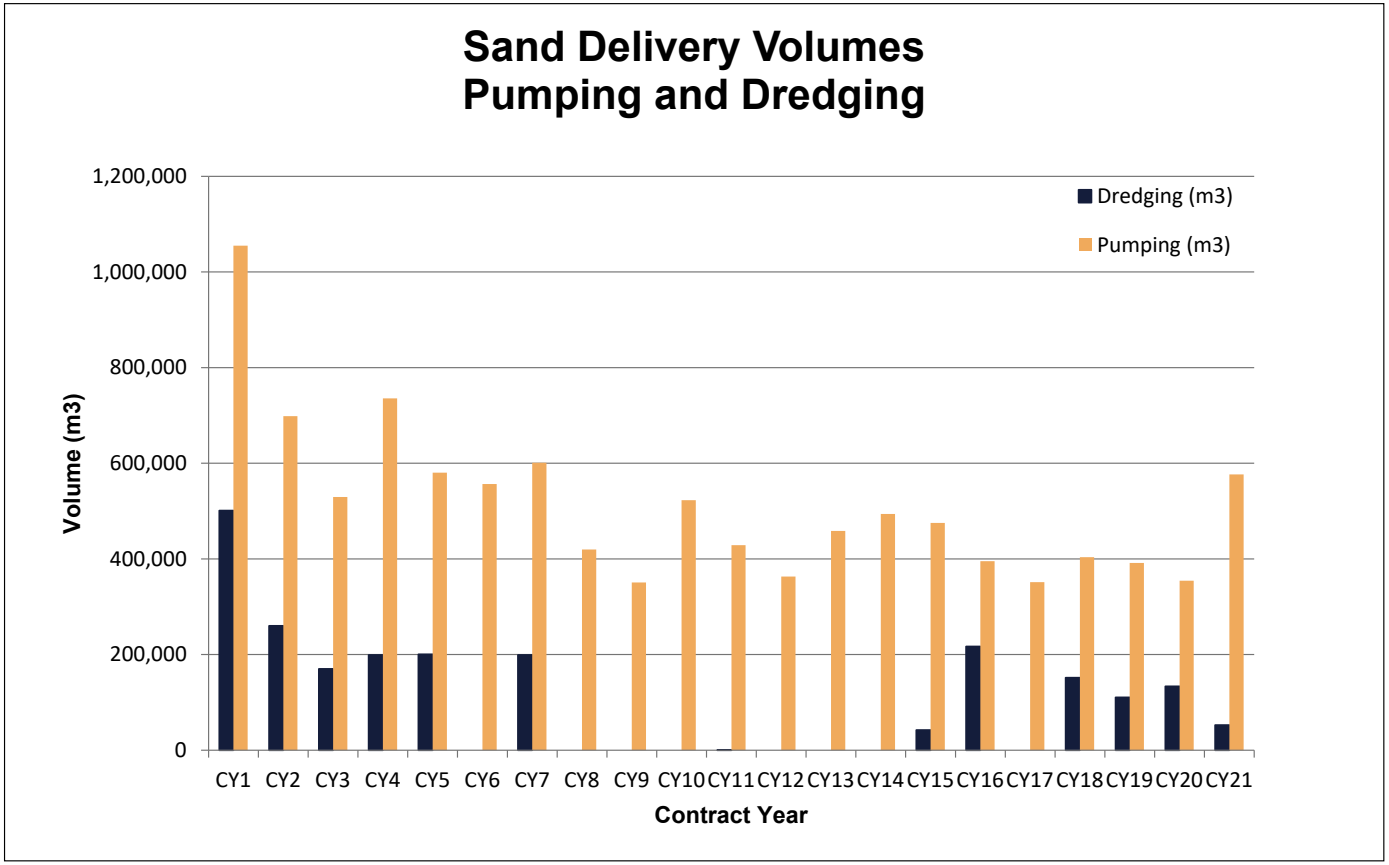


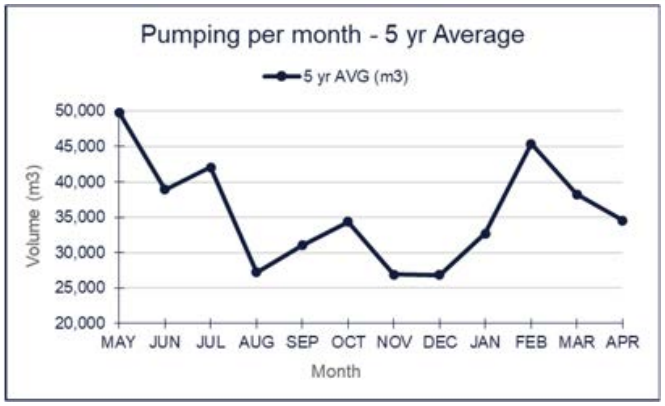


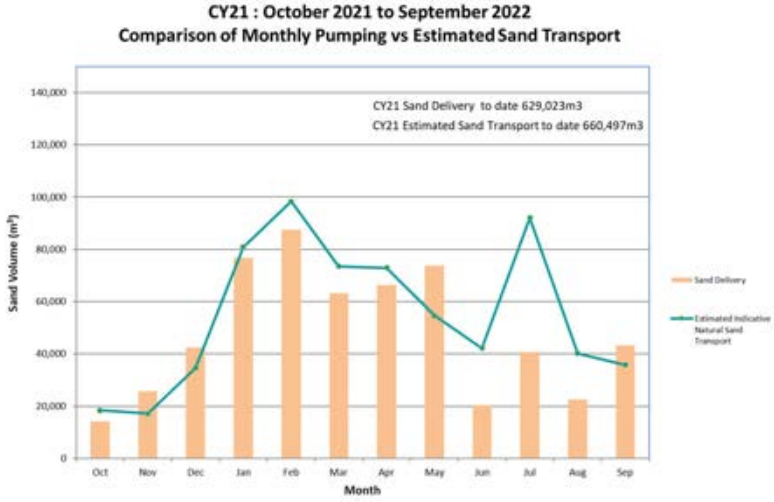




Delivery details

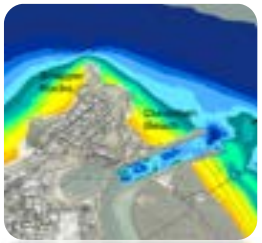




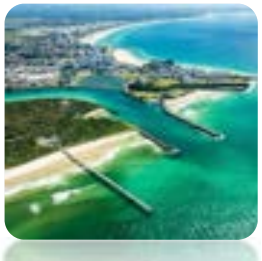


Monitoring activities

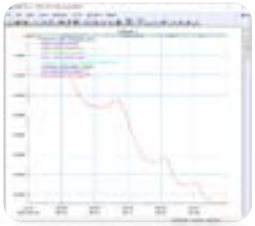
Wave and tidal data
Three wave buoys deployed supplying wave height, period and directional data. Ocean tide gauge is installed on the jetty



Hydrographic surveys
Hydrographic surveys capture the beach and seabed between Dreamtime and Currumbin. Multiple entrance surveys captured each year



Aerial imagery
Quarterly oblique photo runs to monitor beach amenity, orthorectified aerial imagery used for GIS mapping and shoreline analysis



Sediment transport modelling
Monthly numerical model calculates the estimated longshore sediment transport, this is compared to sand delivery volumes.

Reef biota monitoring
Kirra Reef, Cook Island, Palm Beach Reef field surveys compare the variety and abundance of fish assemblages, threatened species, and benthic communities

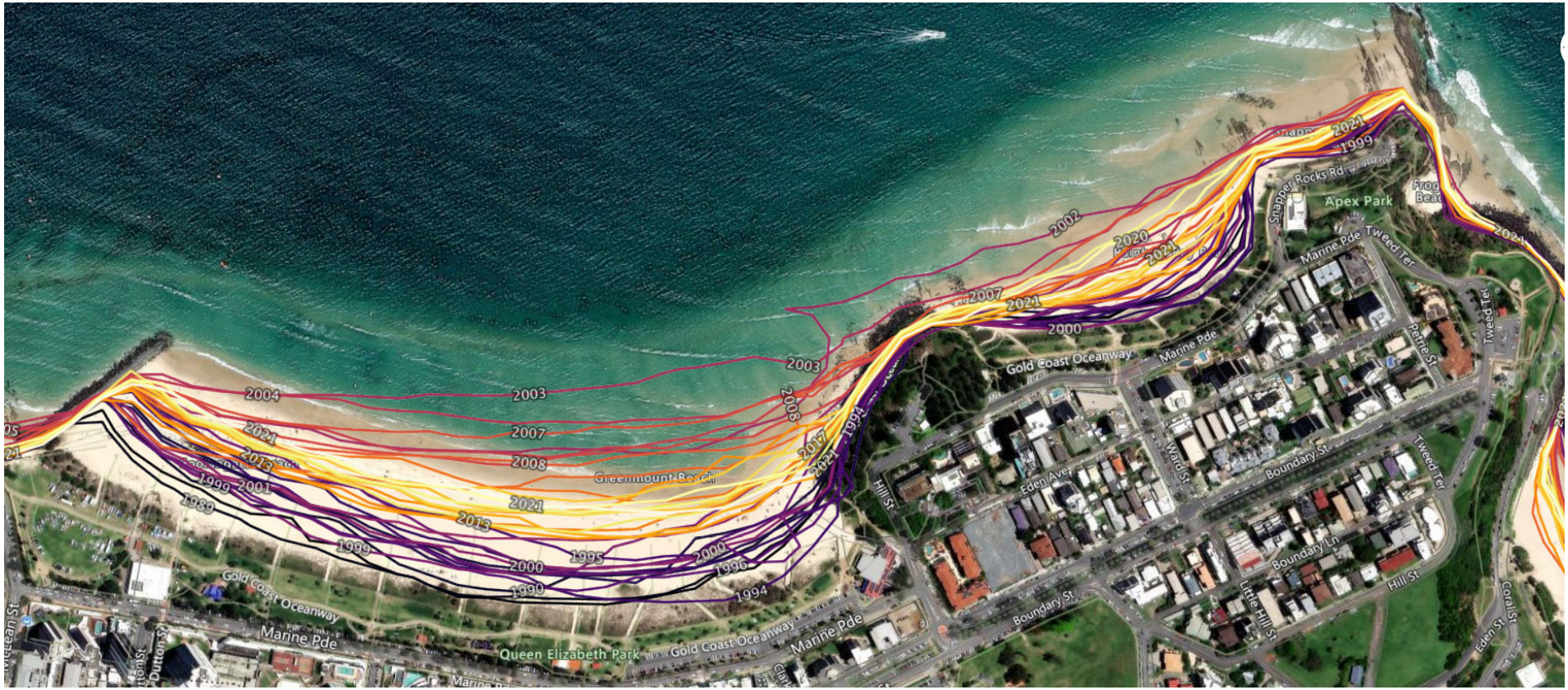
Shoreline and surf monitoring
Beach width tracking and timelapse video monitoring at Duranbah, Rainbow Bay, Coolangatta and Kirra beaches

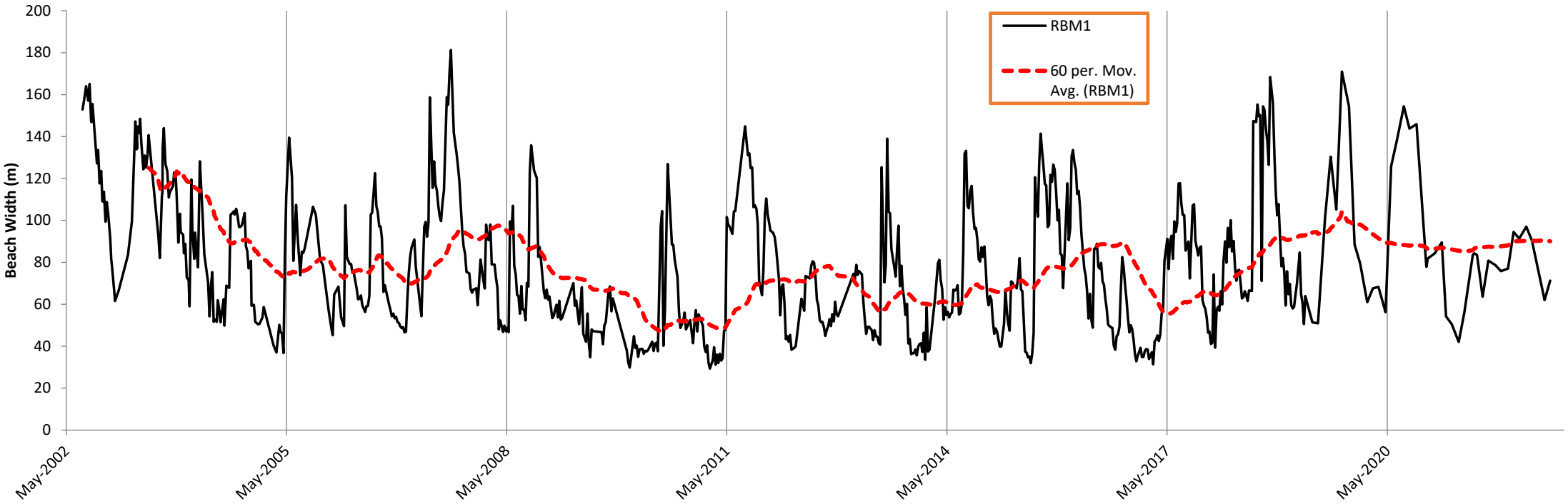
Long term operational and environmental monitoring

- Historical shoreline position
- Beach width tracking
- Sand volumes from hydrographic survey

DEA Shorelines

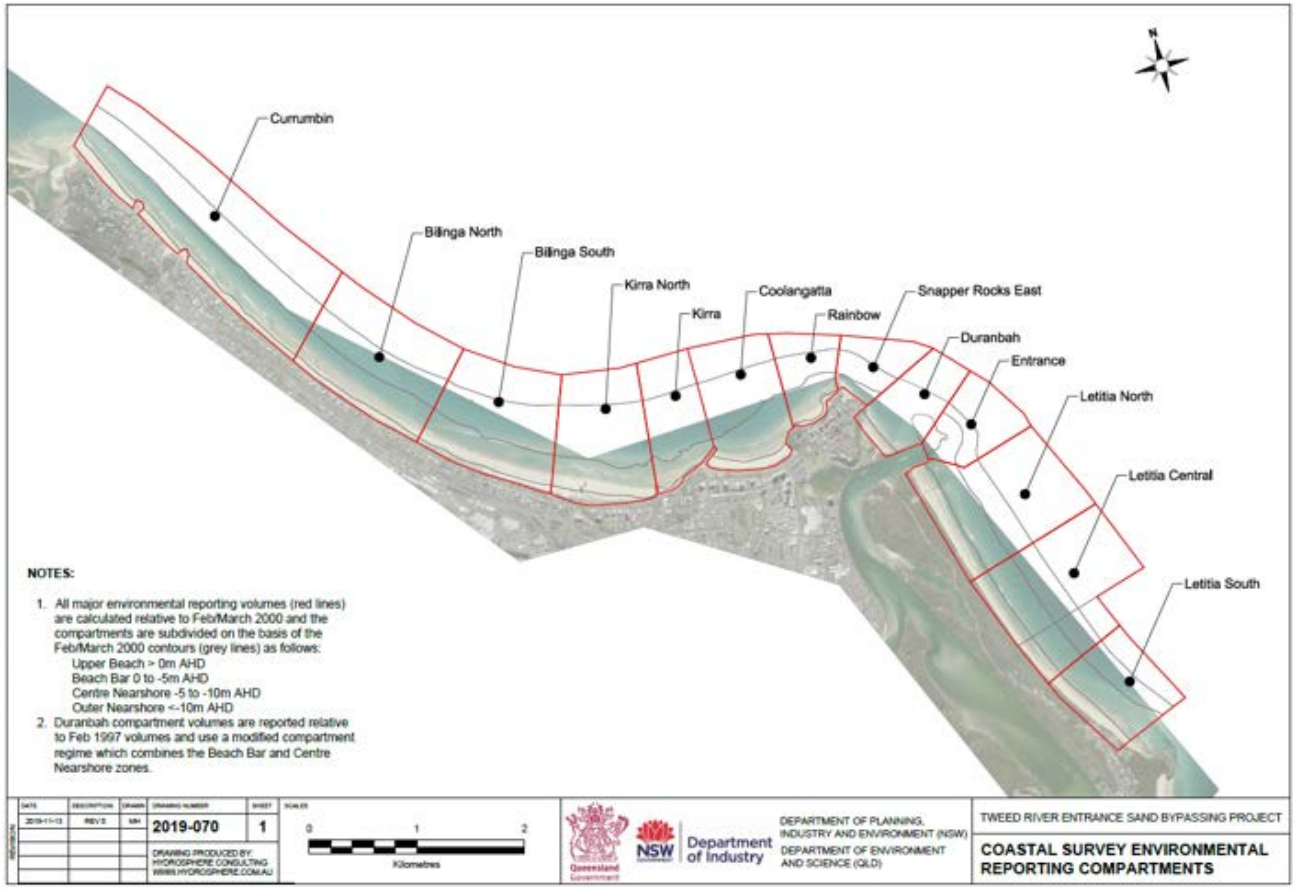
Rainbow Bay & Coolangatta

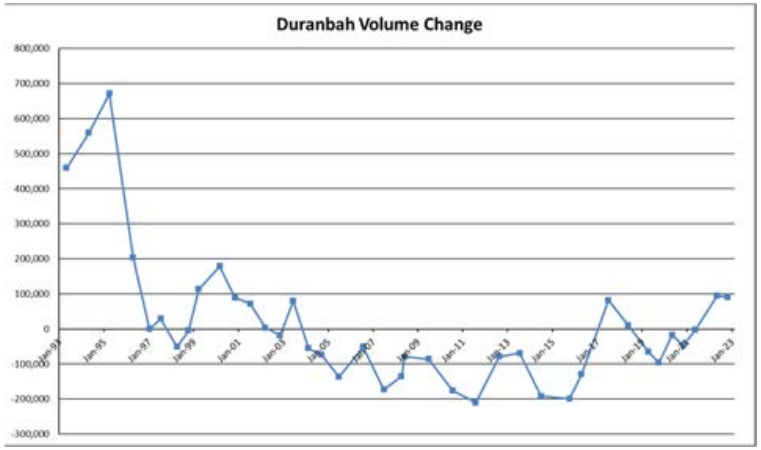


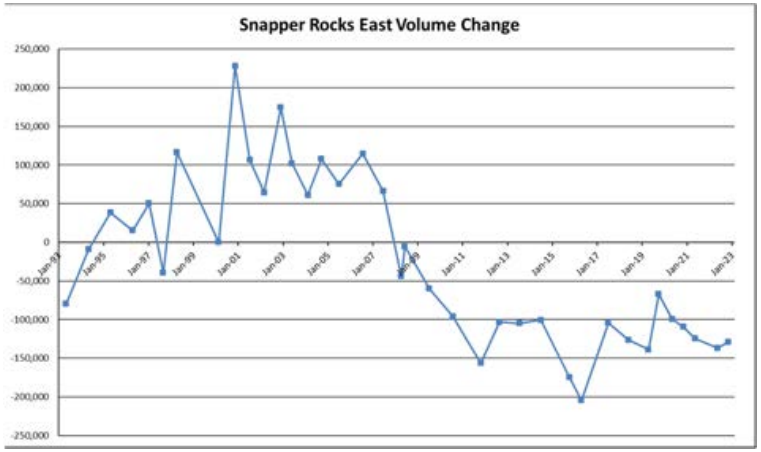


Rainbow Bay – historical Beach width data

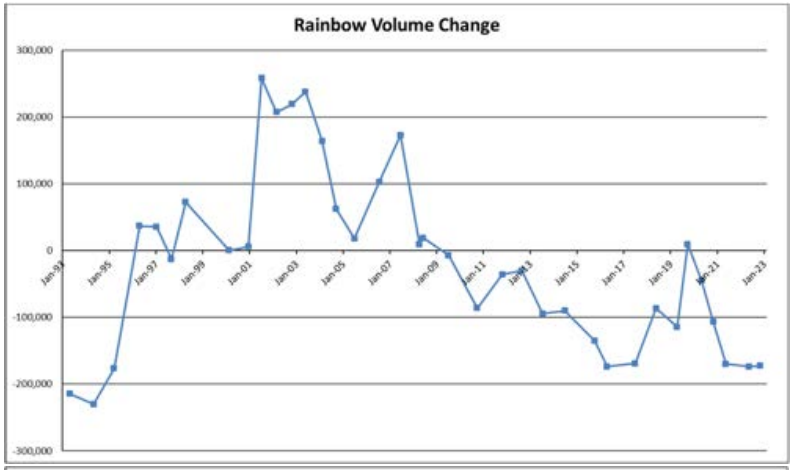
Compartment Volume Monitoring

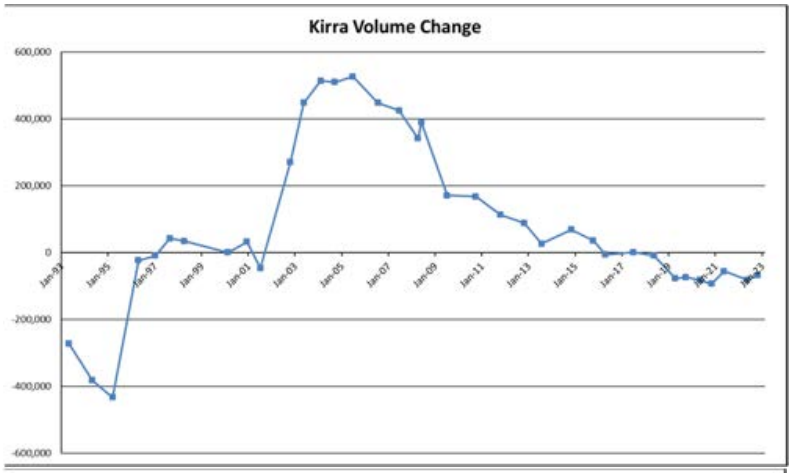


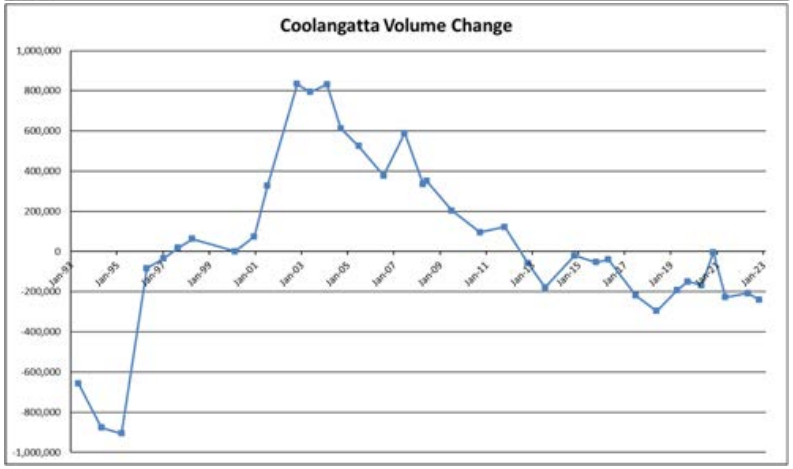


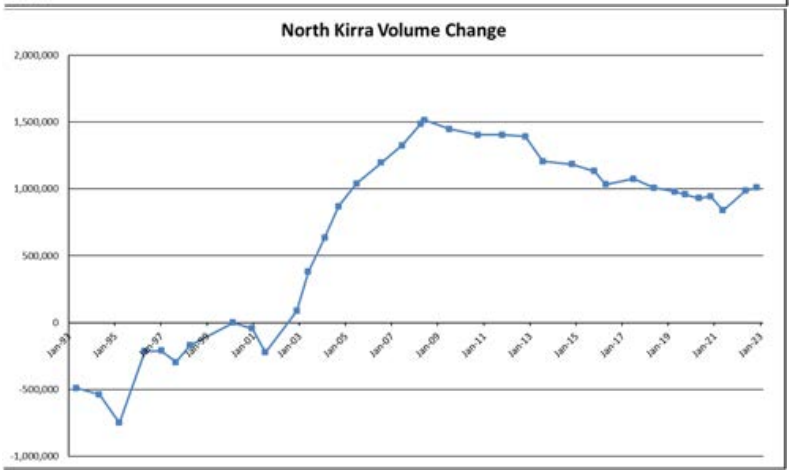


Compartment Volume Monitoring









TWEEDSAND BYPASSING

Rainbow Bay
early 2000's

Rainbow Bay
Apr 2021

Coolangatta
early 2000's

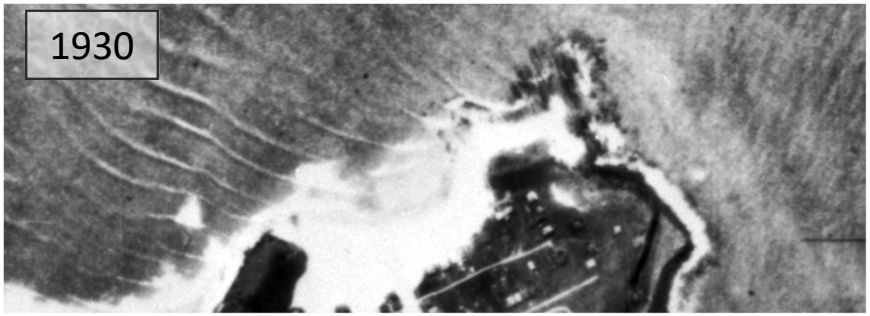
Rainbow Bay
Jan 2023

Historical comparisons

- Aerial imagery
- Pre training wall extension → pre TSB → TSB operations to present

1950’s unknown origin, pre training wall extension

TWEED SAND BYPASSING



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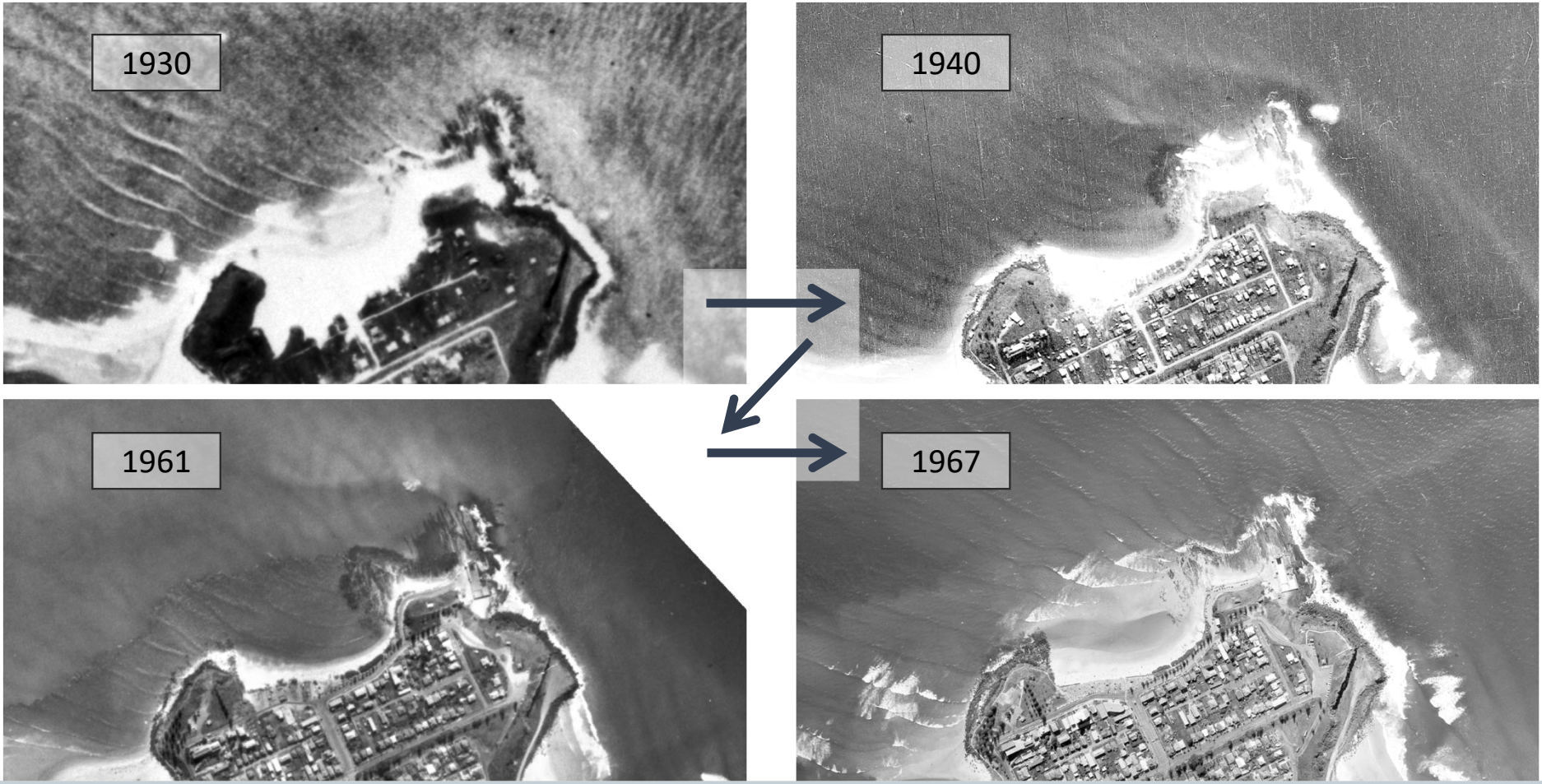

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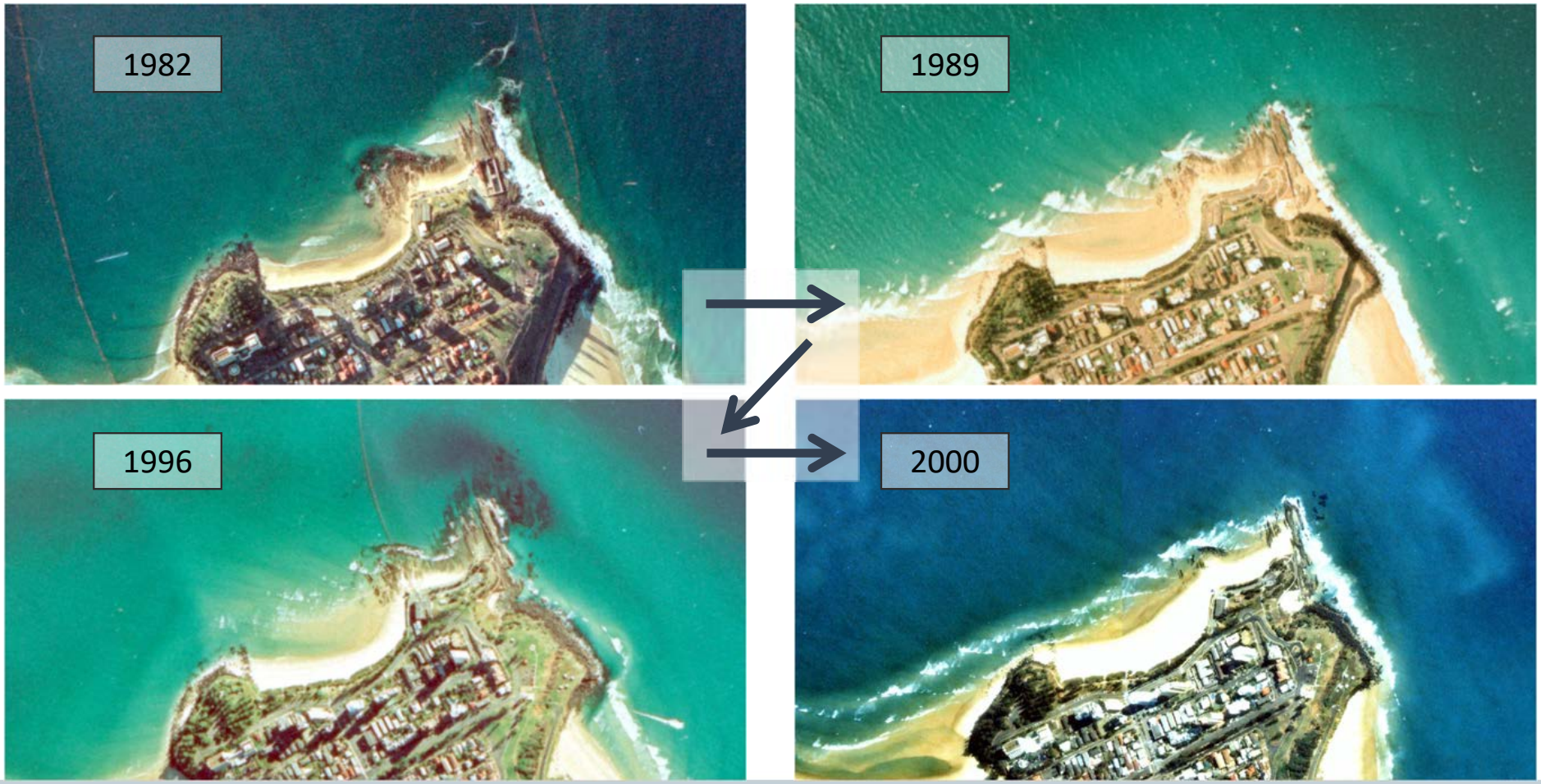


TWEEDSAND BYPASSING

Short term variability

- Oblique photographs
- Beach width tracking and image analysis
- Frequent beach profile surveys

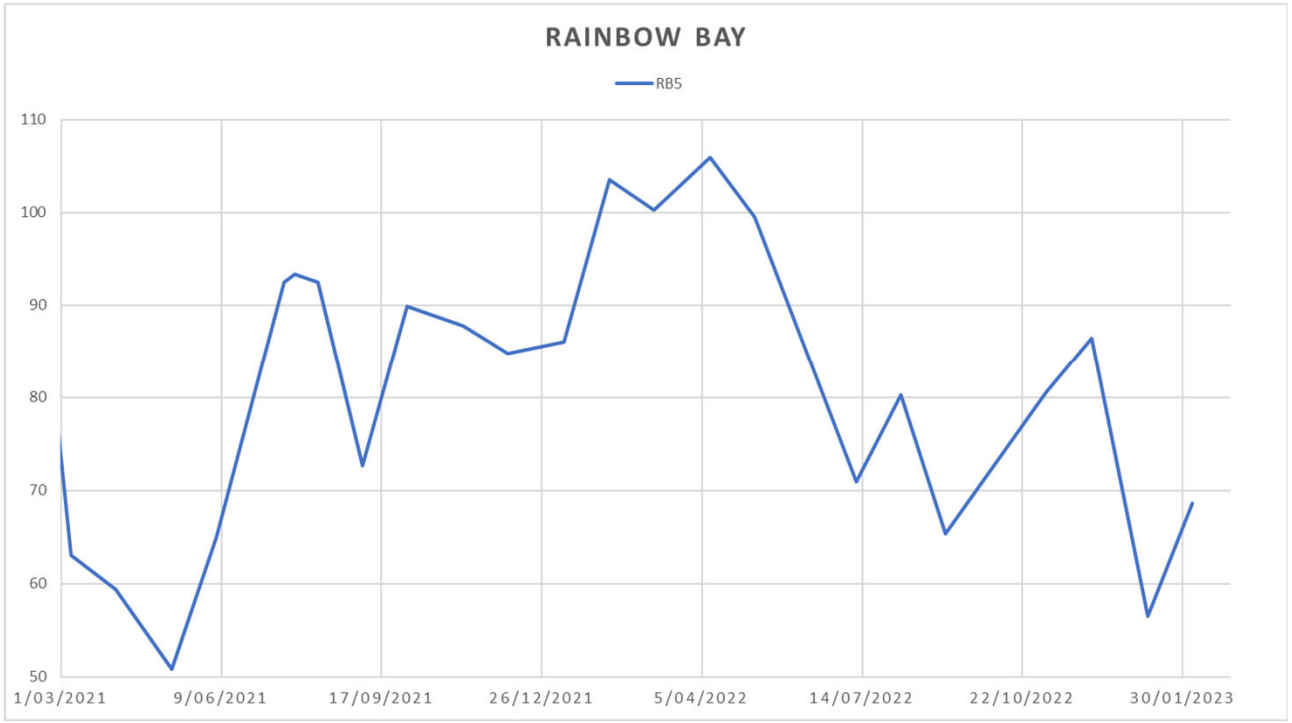
TWEEDSAND BYPASSING

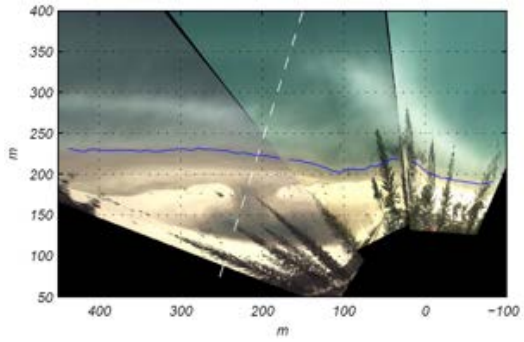
7 July 2022

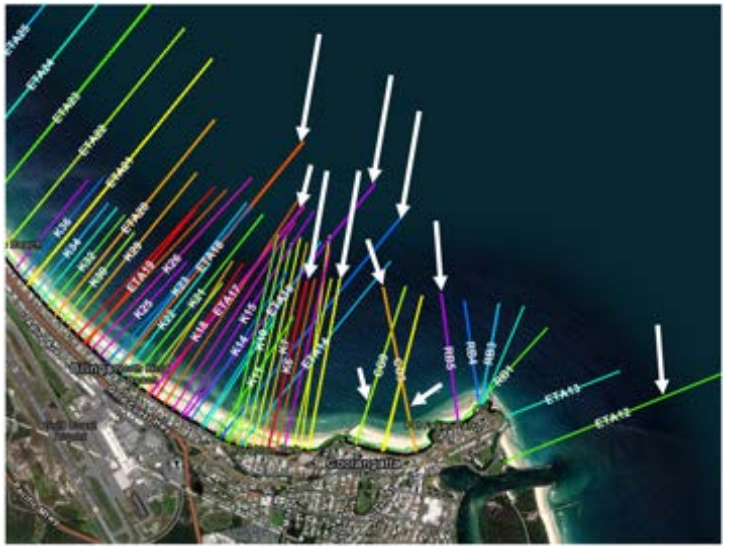
19 January 2023

Snapper Rocks
Rainbow Bay

15 October 2022



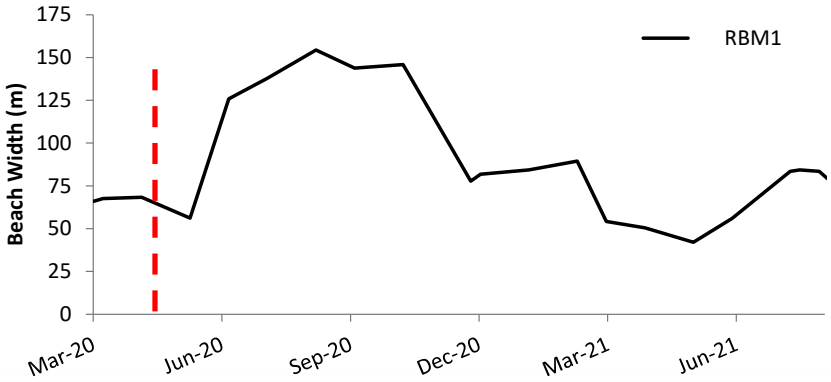


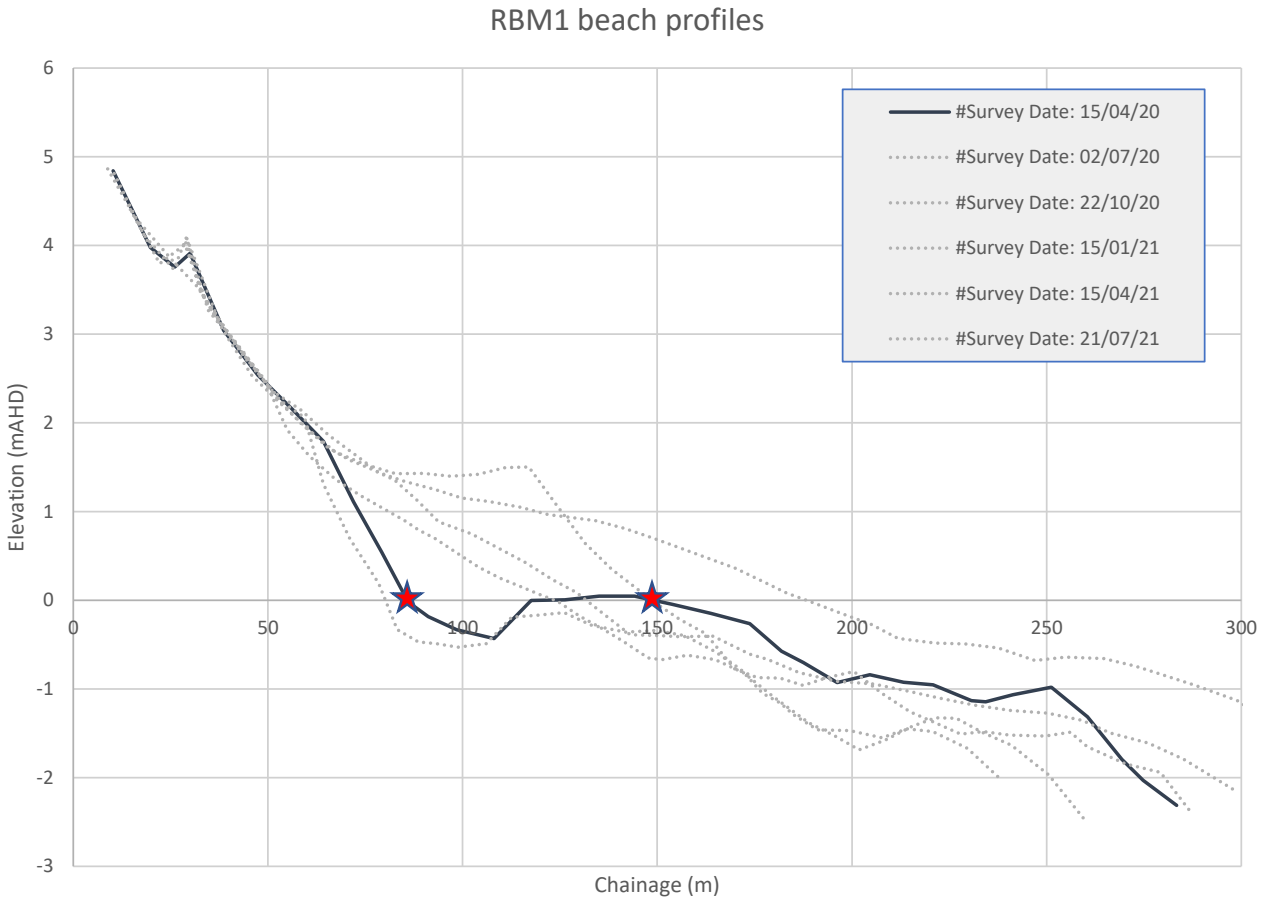


Rainbow Bay – Recent Beach width data

Rainbow Bay – 15 Apr 2020

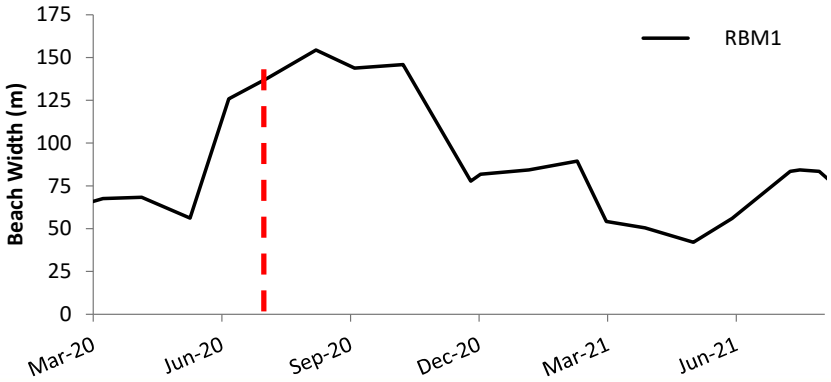
TWEEDSAND BYPASSING

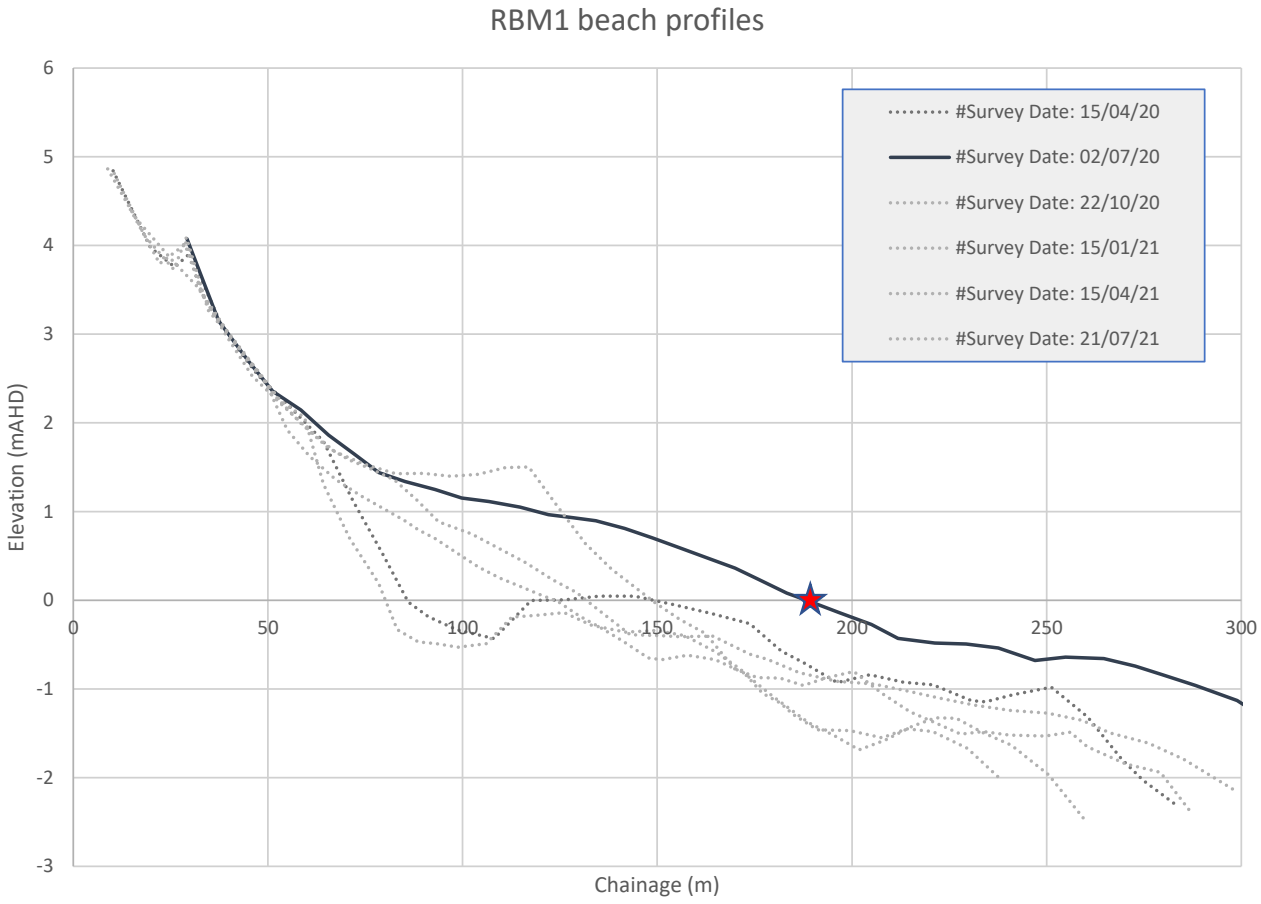




Rainbow Bay – 2 Jul 2020

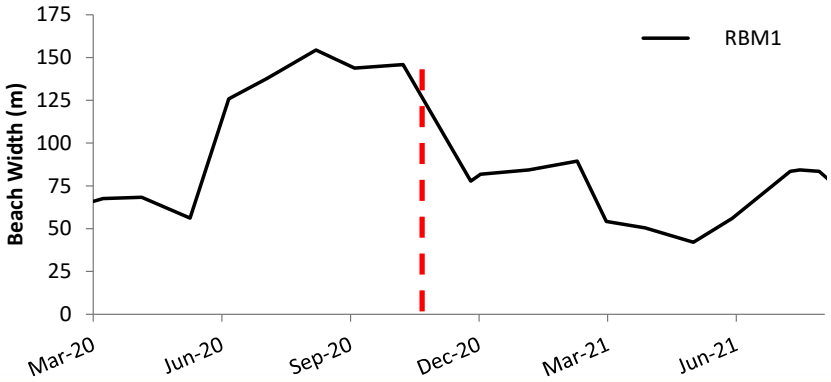
TWEEDSAND BYPASSING

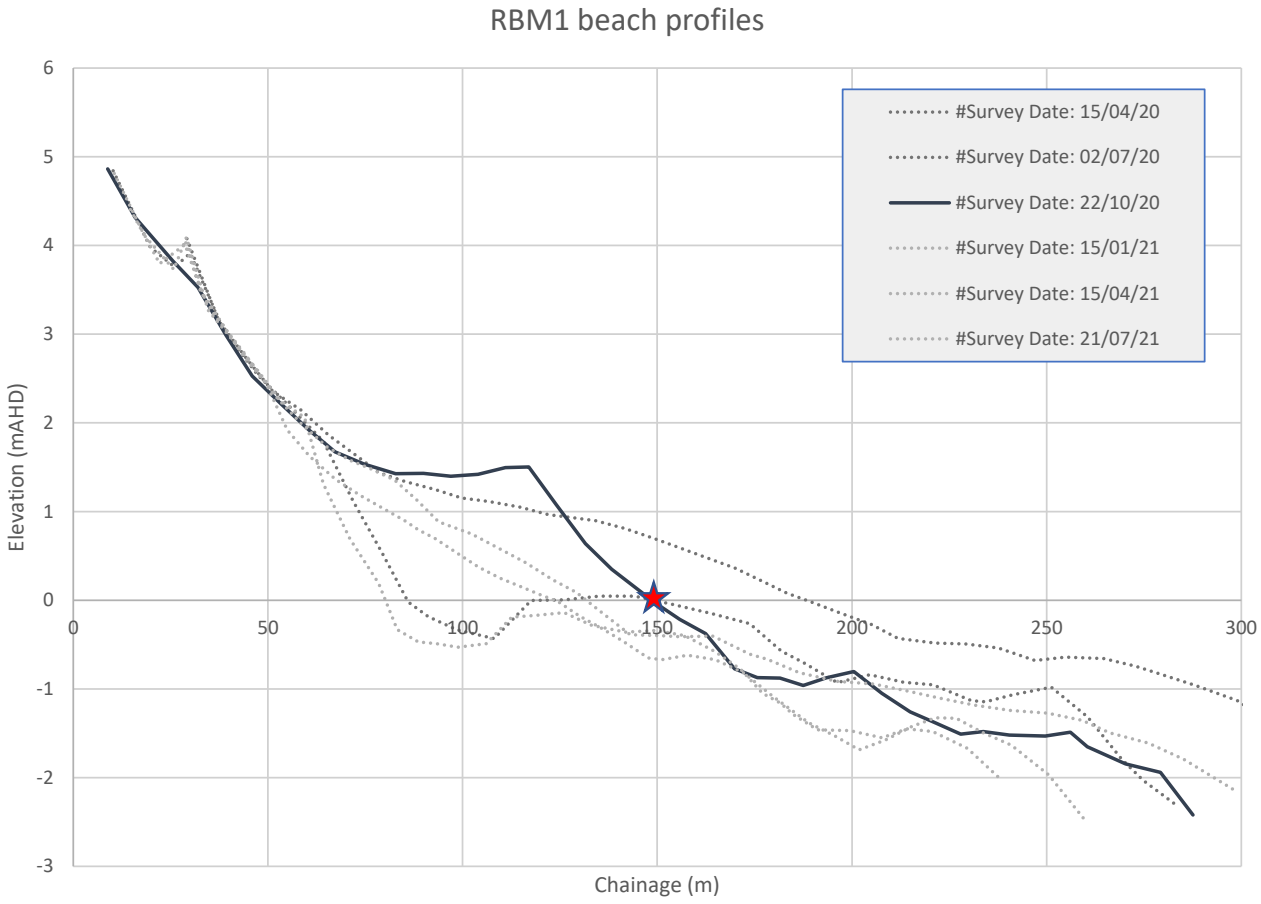




Rainbow Bay – 22 OCT 2020

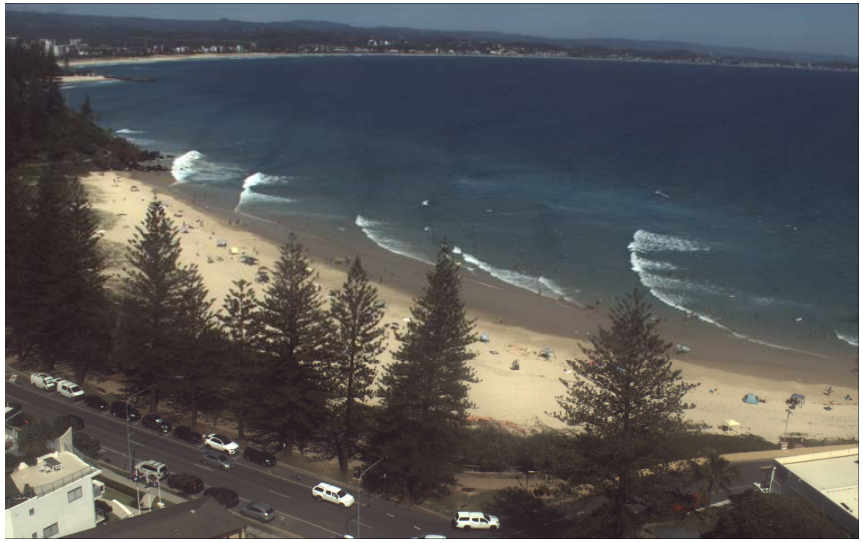
TWEEDSAND BYPASSING

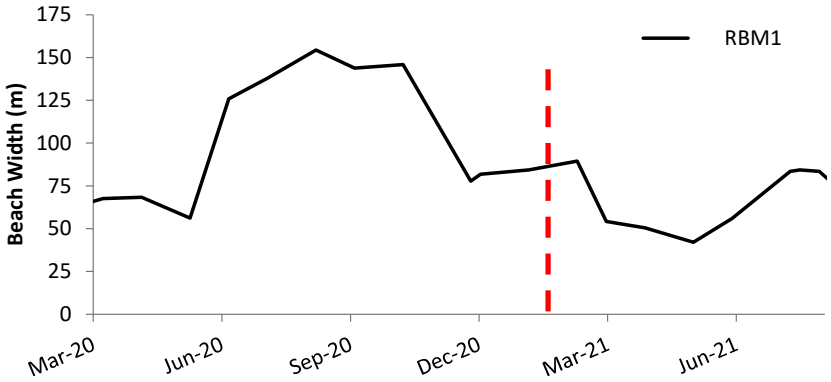


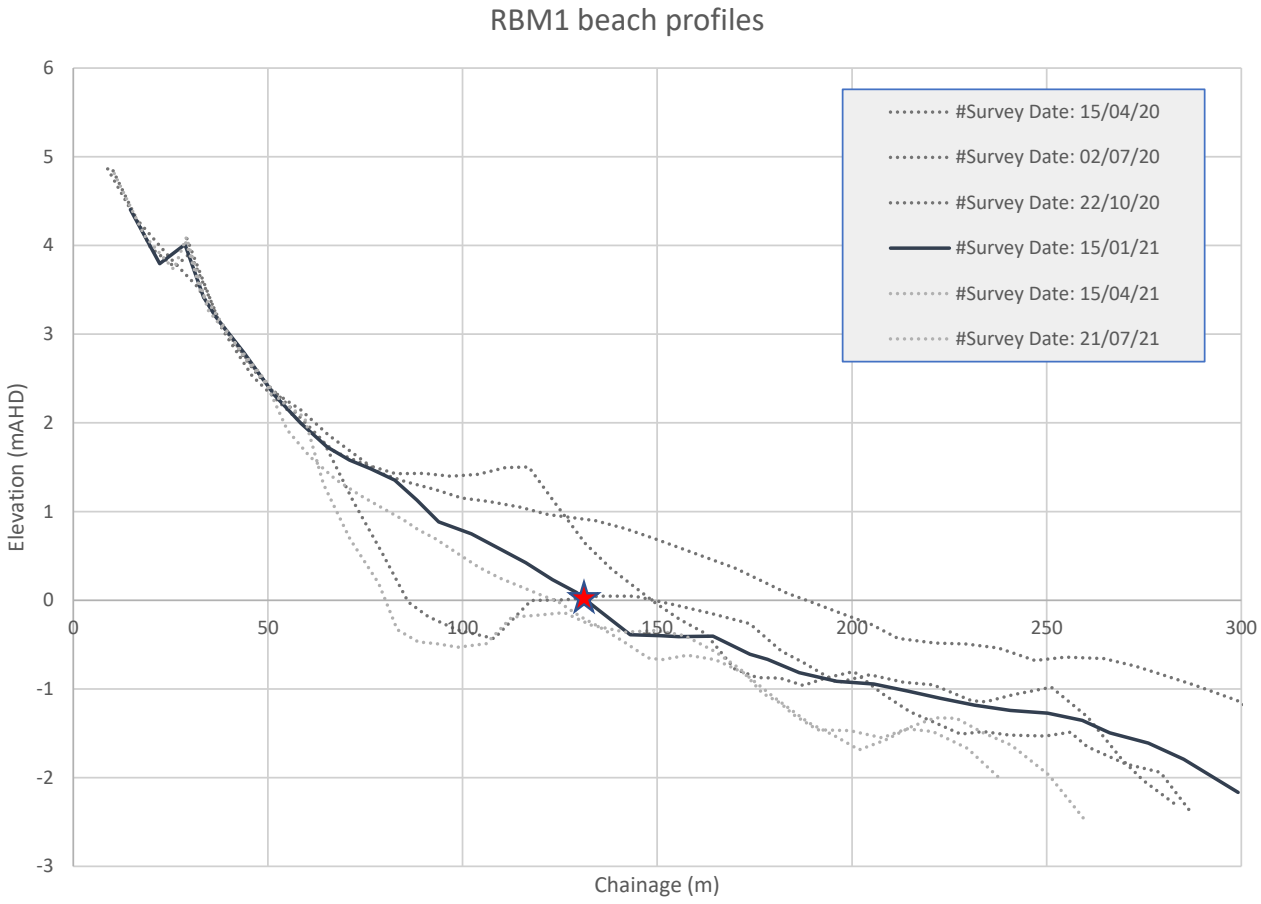


Rainbow Bay – 15 Jan 2021

TWEEDSAND BYPASSING

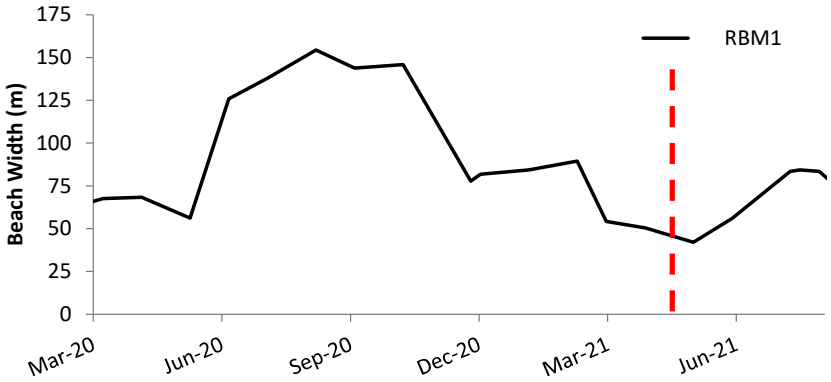


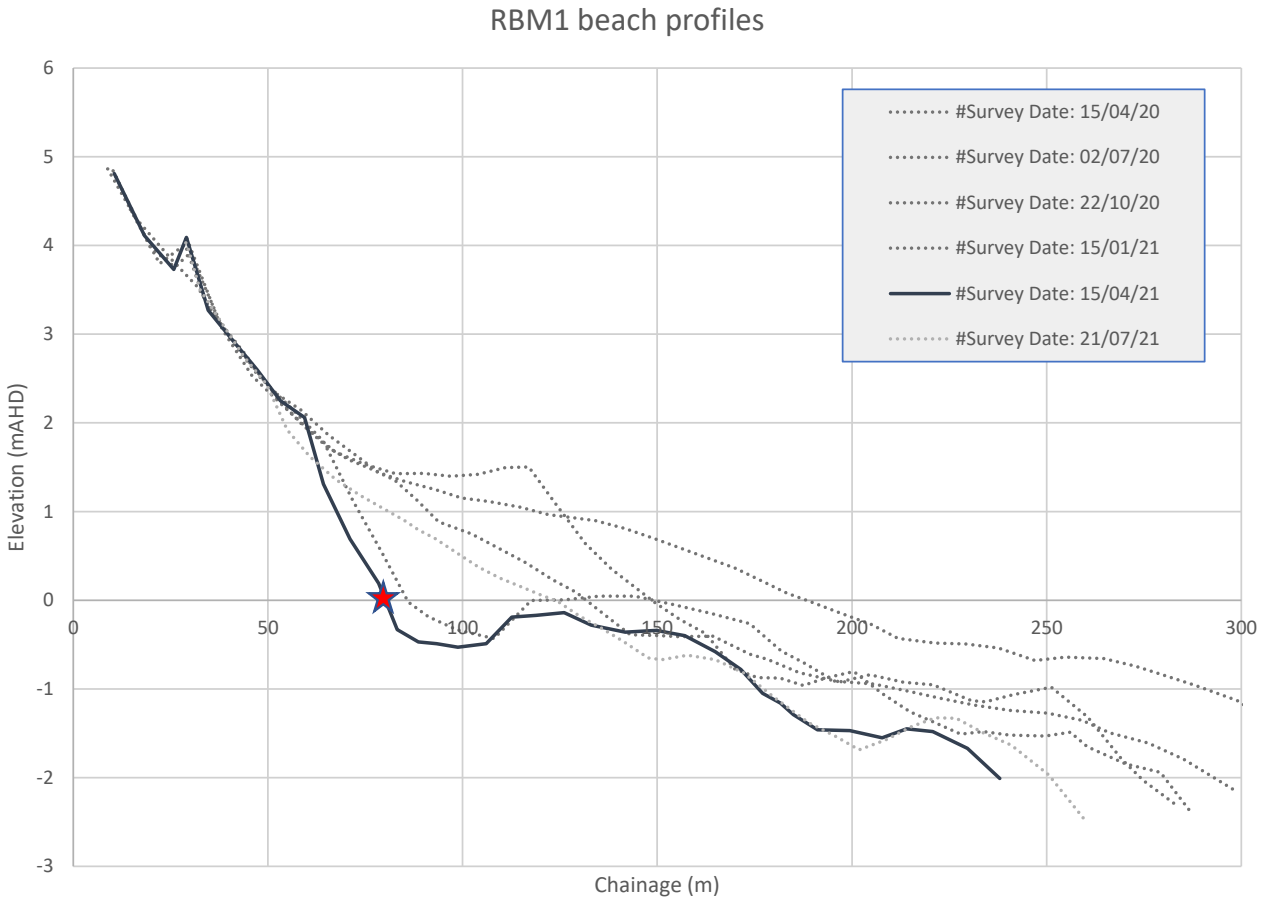




Rainbow Bay – 15 apr 2021

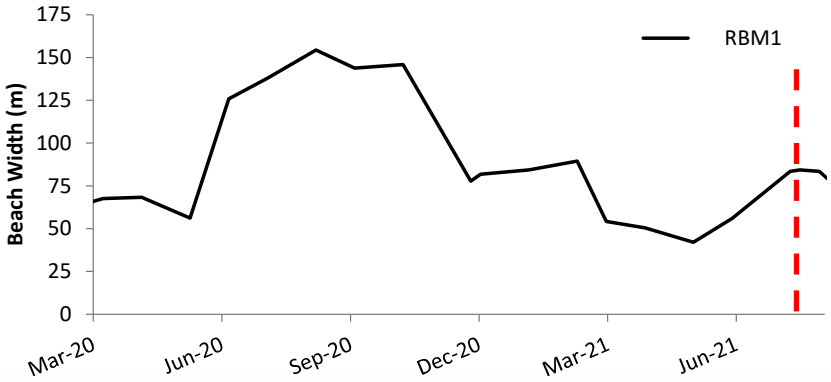
TWEEDSAND BYPASSING

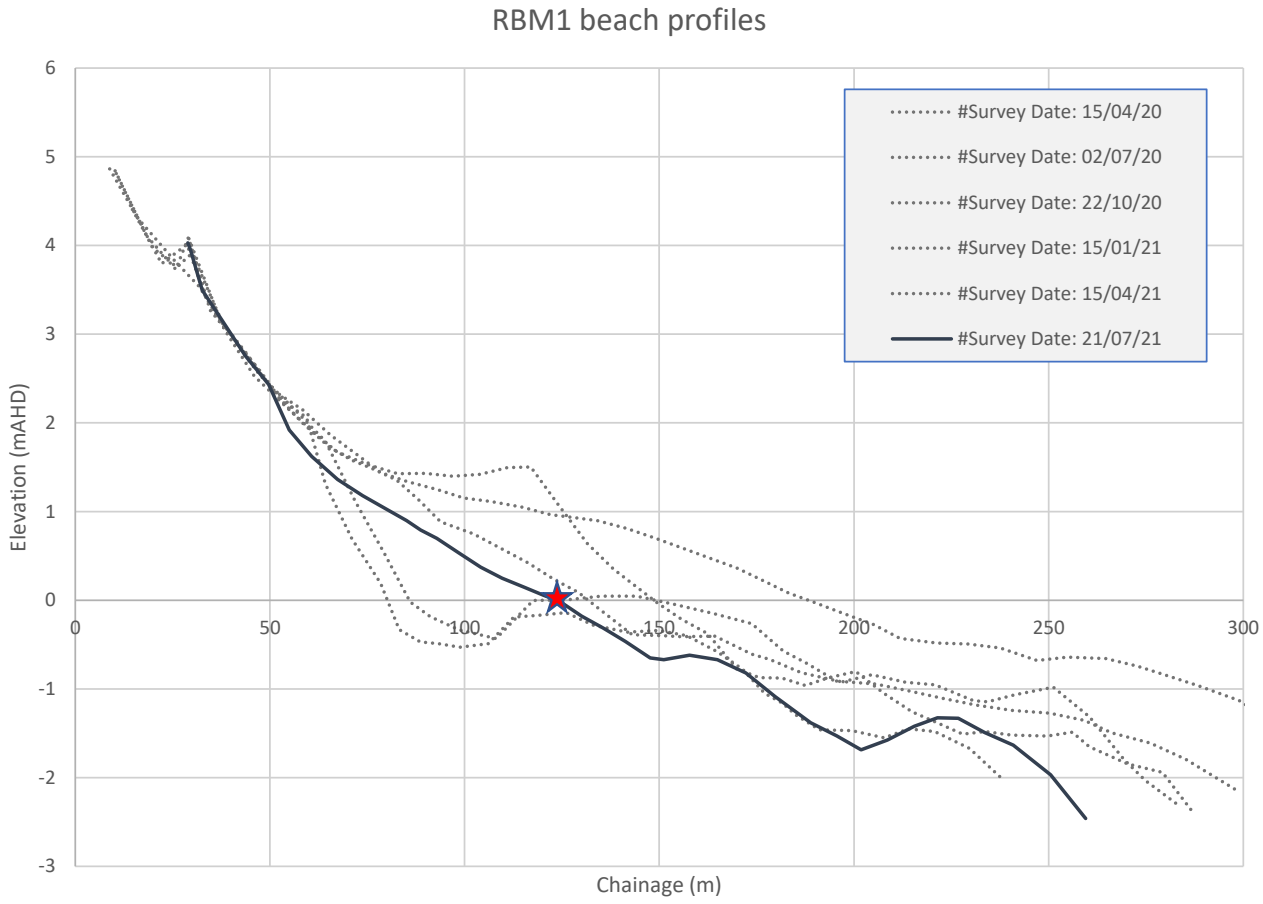




Rainbow Bay – 21 jul 2021

TWEEDSAND BYPASSING





TWEED SAND BYPASSING

Jul 2020

Mar 2021

TWEEDSAND BYPASSING

Aug 2020

APR 2021

TWEEDSAND BYPASSING

Timelapse Nov 2020 – Feb 2021

- Wide beach from winter/spring conditions
- December swell moves sand offshore
- January beach widths stable

Timelapse Apr 2021 – jul 2021

- Summer wave conditions had reduced the overall beach width
- From April, Eastern end first to fill with sand from banks migrating onshore

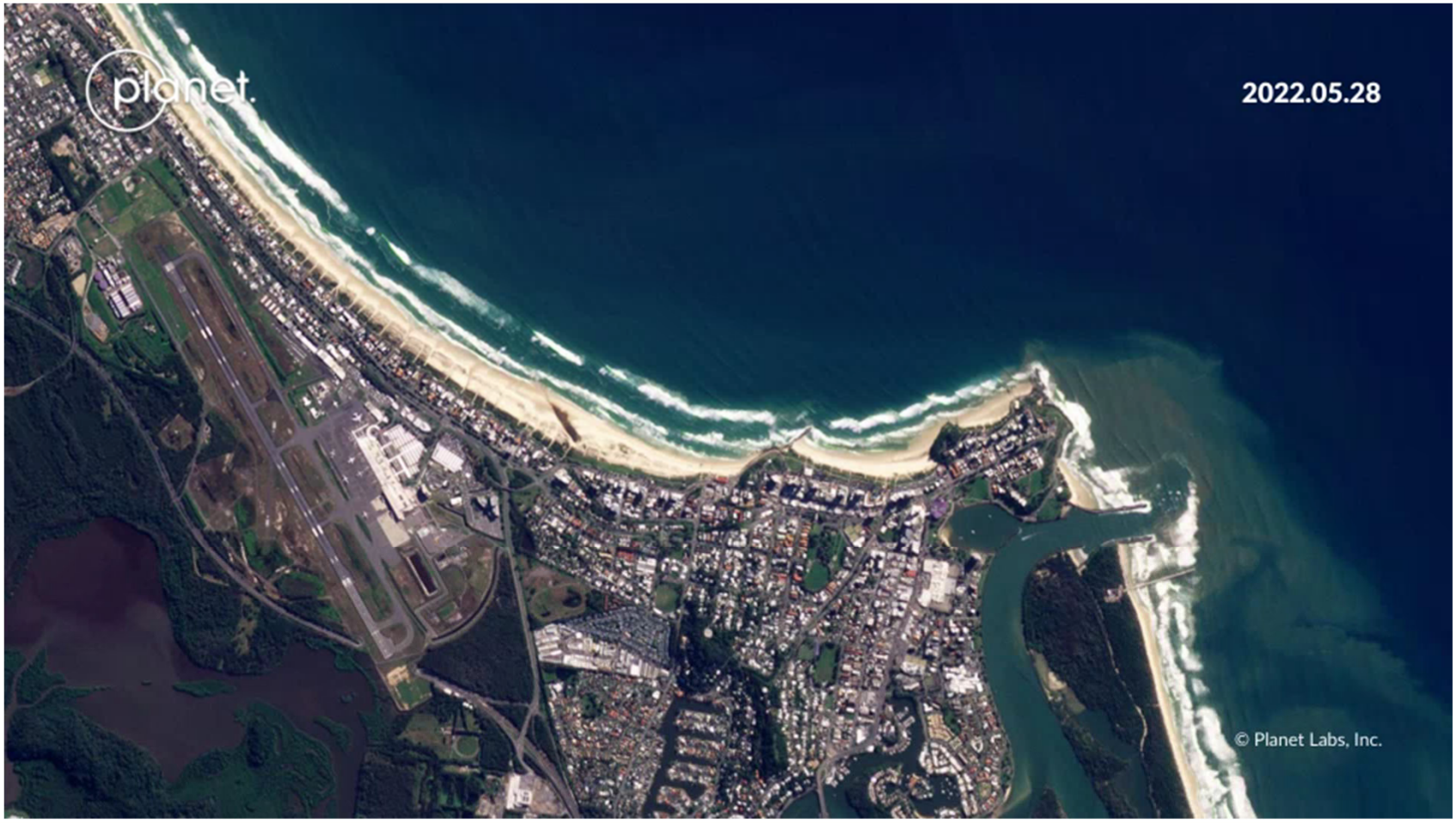
Jan 2023

- Surfing bank offshore
- Nearshore small surf waves
- Lagoon for swimmers
- Separation of users / activities

Jan 2023

- Monthly timelapse from 25-Jan through Feb
- Sandbank migrates shoreward
- Lagoon fills in from eastern end and progresses west
- Beach width near Greenmount stable, will increase as sand continues to move through

TWEEDSAND BYPASSING



Extract from TSB EIS – Technical Appendix II: Coastal Process modelling

Rainbow Bay

The shape and condition of the beach at Rainbow Bay is largely dependent on the condition of the offshore shoals around Snapper Rocks. With the bypassing plant operational, it is likely that the offshore shoals around Snapper and Marley Rocks will be consistently full, ensuring a strong persistent sand supply to this area.

This will represent a return to the natural condition existing prior to training wall extension, characterised by:

- strong and persistent development of the nearshore shoal extending directly past Rainbow Beach from Marley Rocks to Greenmount Hill;
- strong and persistent longshore sand transport along this shoal to Greenmount;
- the common occurrence of a nearshore lagoon between the shoal and the main public beach, in which wave action and currents are relatively calm;
- increased occurrence of a wider recreational beach;
- separation of areas of general beach and surf use from areas used by surfboard riders; and
- increased nearshore sand buffer against excessive beach erosion during storm events;

Despite this, the beach will behave dynamically, with beach width and nearshore shoal bathymetry varying considerably over the short to medium term associated with natural variability of wave conditions and storm erosion events.

Transition project

- Concession Agreement expiry
- Staged investigations and assessment
- Future system operating model

TRANSITION PROJECT – PHASE OVERVIEW

PHASE 1

- Review and assessment of current/past operations

Late 2018 to June 2021

PHASE 2

- New System options identification and evaluation

July 2020 to Nov 2021

PHASE 3

- Preparation for implementation of a new system

July 2021 to April 2024

PHASE 4

- Implementation of a new system

April 2024 to September 2024

PHASE 1 – REVIEW AND ASSESSMENT OF CURRENT/PAST OPERATIONS (2018-2021)

Assessment of whether the current system has met the legislated objectives

Social Economic Impact

Governance and Contracts

Asset management

Comparison of operations with Gold Coast Waterways Authority

Environmental monitoring

Comparison of financials with Gold Coast Waterways Authority

Stakeholder engagement

PHASE 1 – KEY FINDINGS

Assessment of Project Objectives

TSB has generally achieved the legislated project objectives. Areas identified to be partially deficient were primarily focussed on dredging.

bluecoast CONSULTING ENGINEERS

Social and Economic Impact

Value distribution of current (base case) was estimated (over 95% attributed to Beach and Surf Recreation)

BOND UNIVERSITY

Governance and Contracts

The contractual framework and Governance arrangements were considered generally effective in managing the risks of the TSB, however inflexibility in both.

CLAYTON UTZ

Asset Management

Functional asset management system is in place however there are noted concerns with the age and usability of the software in place.

PROJENCE project diligence

PHASE 1 – KEY FINDINGS

Operational comparison with GCWA	Improvements in slurry density at TSB (via changes to the operating regime) could result in efficiency improvements. Investigations into the usage of JP1 and JP2 were recommended
Environmental Monitoring	Opportunities for improvement in restructuring sub plans and rationalisation of various monitoring activities.
Financial comparison with GCWA	Cost per m^3 is more expensive for TSB however reasons for the difference are due to transfer of risk (dredging, maintenance etc), expected rate of return for operator and, overheads.
Stakeholder Engagement	The stakeholder engagement showed most people are aware of what TSB are doing and felt that it was doing a good job with sand management.

JACOBS

BMT

MARSDEN JACOB ASSOCIATES

nation partners

PHASE 2 – OPTIONS IDENTIFICATION AND EVALUATION (2020-2021)

- Base case
- Base case + improvements
- Jetty extension + additional jet pumps
- Restart nearshore jet pump
- Extension of training wall
- Dredge only, cease pumping

INFRASTRUCTURE

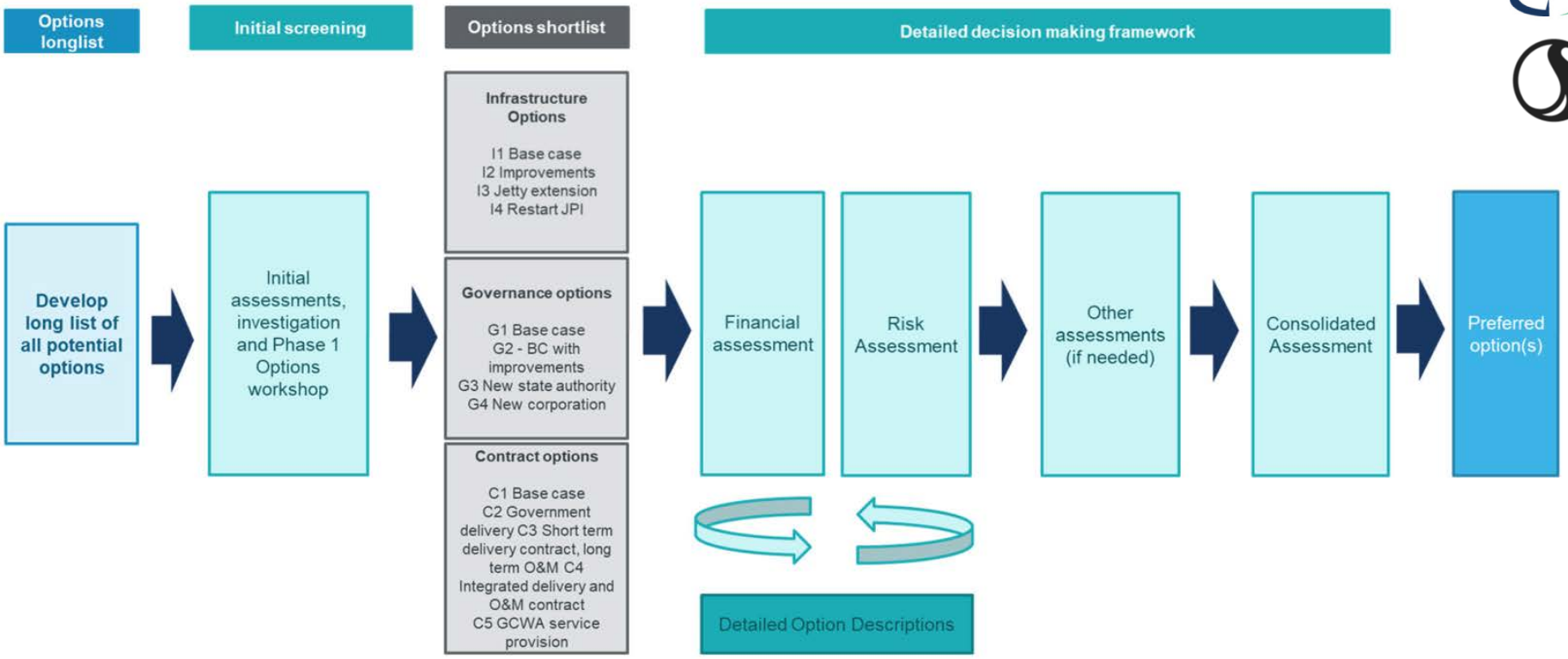
- Base case
- Base case + improvements
- New State Authority
- New Corporations Act Company
- Transfer to Councils
- Transfer to Private Entity

GOVERNANCE

- Base case
- Government oversight of delivery
- Short Term Delivery and Operations Contracting
- Integrated Delivery and Operations Contracting
- GCWA service provision

CONTRACT

PHASE 2 – OPTIONS IDENTIFICATION AND EVALUATION (2020-2021)



PHASE 2 – PREFERRED OPTION

PREFERRED OPTION BASED ON FINANCIAL RANKING

I1	**- Base case (infrastructure)**
G1	**- Base case (governance)**
C2	**- Government oversight of delivery (contracting)**

Sensitivity testing completed – no major changes to outcomes

BENEFITS

- A reduction in ongoing expenditure is expected under the preferred option
- Increased flexibility in system operation is expected
- Improved integration of operations and management
- No constraints under the preferred option to pursue improvements

PHASE 3 – PREPARATION FOR IMPLEMENTATION OF A NEW SYSTEM (2022-2024)

KEY COMPONENTS

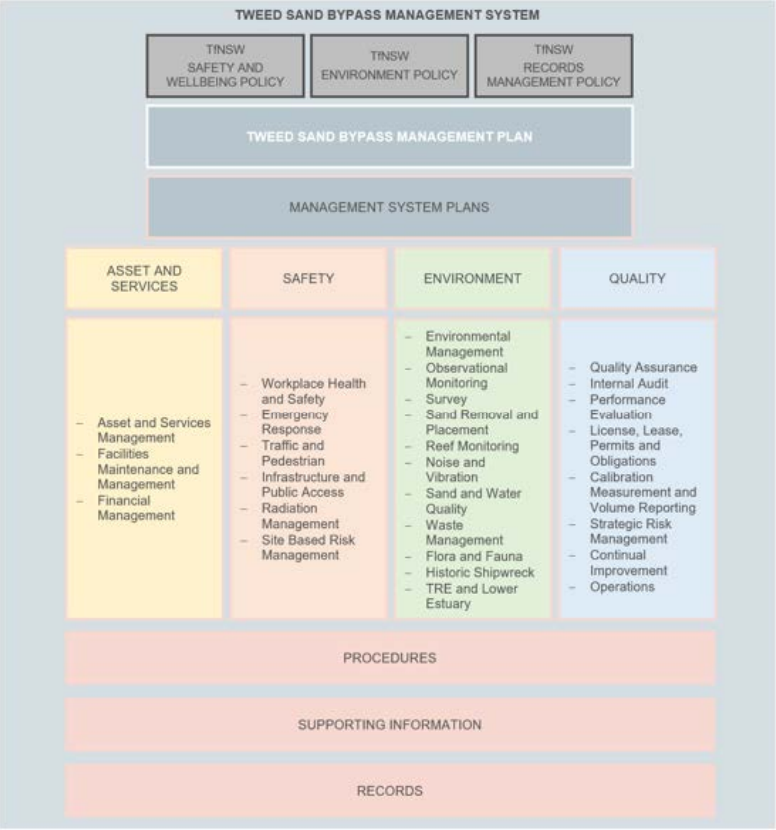
- IT
- Legal
- Concession Agreement handover – asset condition acceptance
- Permits, Licences, Approvals
- Goods and services contracts
- Staffing – 3 additional TfNSW full time employees
- TSB Management System development

PHASE 3 – TWEED SAND BYPASS MANAGEMENT SYSTEM

REGULATORY INSTRUMENTS
NSW and Qld TRESBP Acts
Enviro, WH&S, Etc

NSW/Qld AGREEMENT FOR TSB OPERATION, MAINTENANCE AND MANAGEMENT

TWEED SAND BYPASS STRATEGY
FY2024/25 to FY2028/29



PHASE 4 – IMPLEMENTATION OF A NEW SYSTEM (2024-onward)

- TSB Management System to be put into practice
- New staff onboarding and revised team structure
- Operations and contracts now Government responsibility

TSB Communications

- Communication and engagement
- Project video

Communications and Engagement

Meetings

Four formal community meetings annually and additional on-site community meetings.

Noticeboards

5 local area educational noticeboards.

Visits

School and university guided tours of facility.

Online

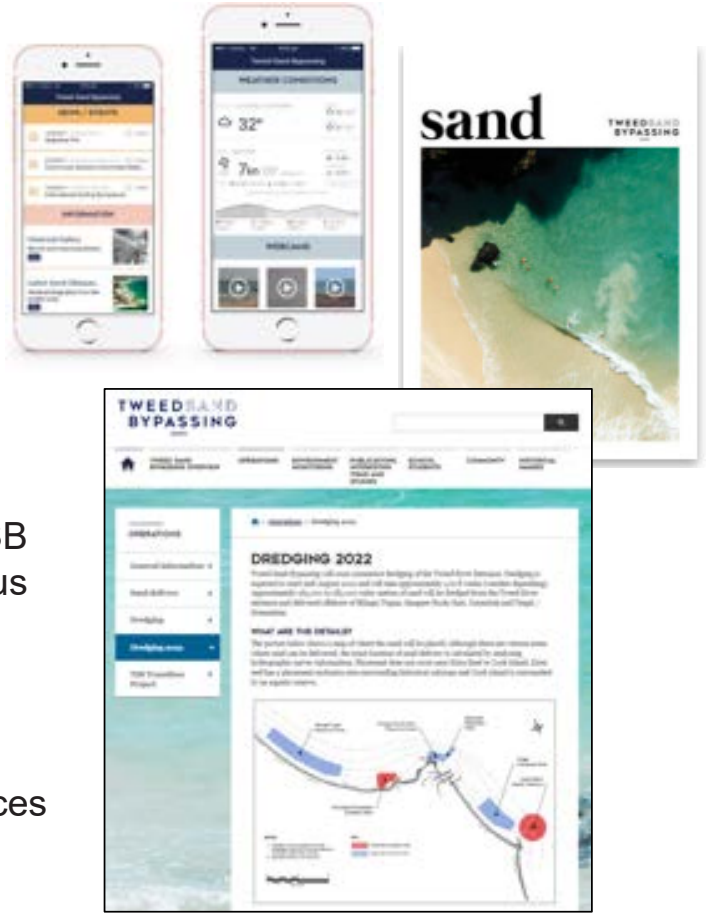
TSB website, TSB App, TSB Instagram posts and various online surf website media.

Emails

Project updates to Advisory Committee members.

Other

Presentations at Conferences and/or a trade booths.



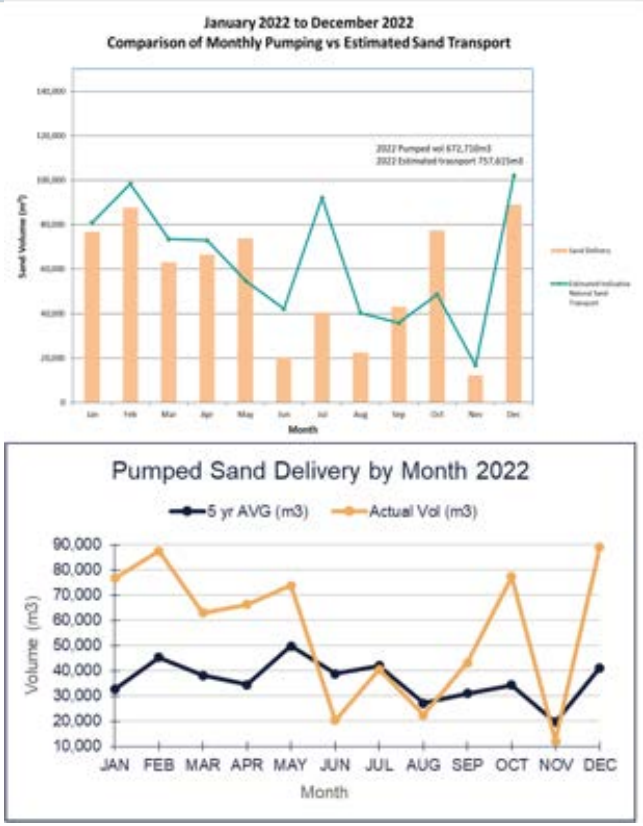
Project Video

TWEED SAND BYPASSING

Thank You

Pumping operations 2022

PUMPING BY JETTY MOUNTED SYSTEM 2022				
MONTH	Vol SRE (m3)	Vol D'Bah (m3)	Total Vol (m3)	5 Yr AVG (m3)
JAN	76,670	0	76,670	20,473
FEB	56,018	31,502	87,520	31,642
MAR	63,092	0	63,092	37,290
APR	66,392	0	66,392	31,266
MAY	73,797	0	73,797	42,847
JUN	20,317	0	20,317	48,578
JUL	29,130	11,445	40,575	39,333
AUG	22,517	0	22,517	28,636
SEP	42,505	681	43,186	26,424
OCT	77,432	0	77,432	21,637
NOV	12,241	0	12,241	26,921
DEC	88,971	0	88,971	26,864
TOTAL	**629,082**	**43,628**	**672,710**	**381,910**



5 yr (2017-21) Avg Vol - Jan to Dec = 381,910m3
5 yr (2018-22) Avg Vol - Jan to Dec = 435,347m3
Act Vol – Jan to Dec 2022 = 672,710m3

Pumping operations 2023

PUMPING BY JETTY MOUNTED SYSTEM 2023				
MONTH	Vol SRE (m3)	Vol D'Bah (m3)	Total Vol (m3)	5 Yr AVG (m3)
JAN	48,339	0	48,339	32,712
FEB			0	45,401
MAR			0	38,229
APR			0	34,569
MAY			0	49,844
JUN			0	38,920
JUL			0	42,051
AUG			0	27,248
SEP			0	31,027
OCT			0	34,389
NOV			0	19,699
DEC			0	41,258
TOTAL	**48,339**	**0**	**48,339**	**435,347**