Can you reduce risk and build resilience from a disaster and climate change …

in a tropical coastal area, impacted by urbanisation?

… Coastal Forum – 6 August 2024

Today I am presenting about one of our key coastal projects

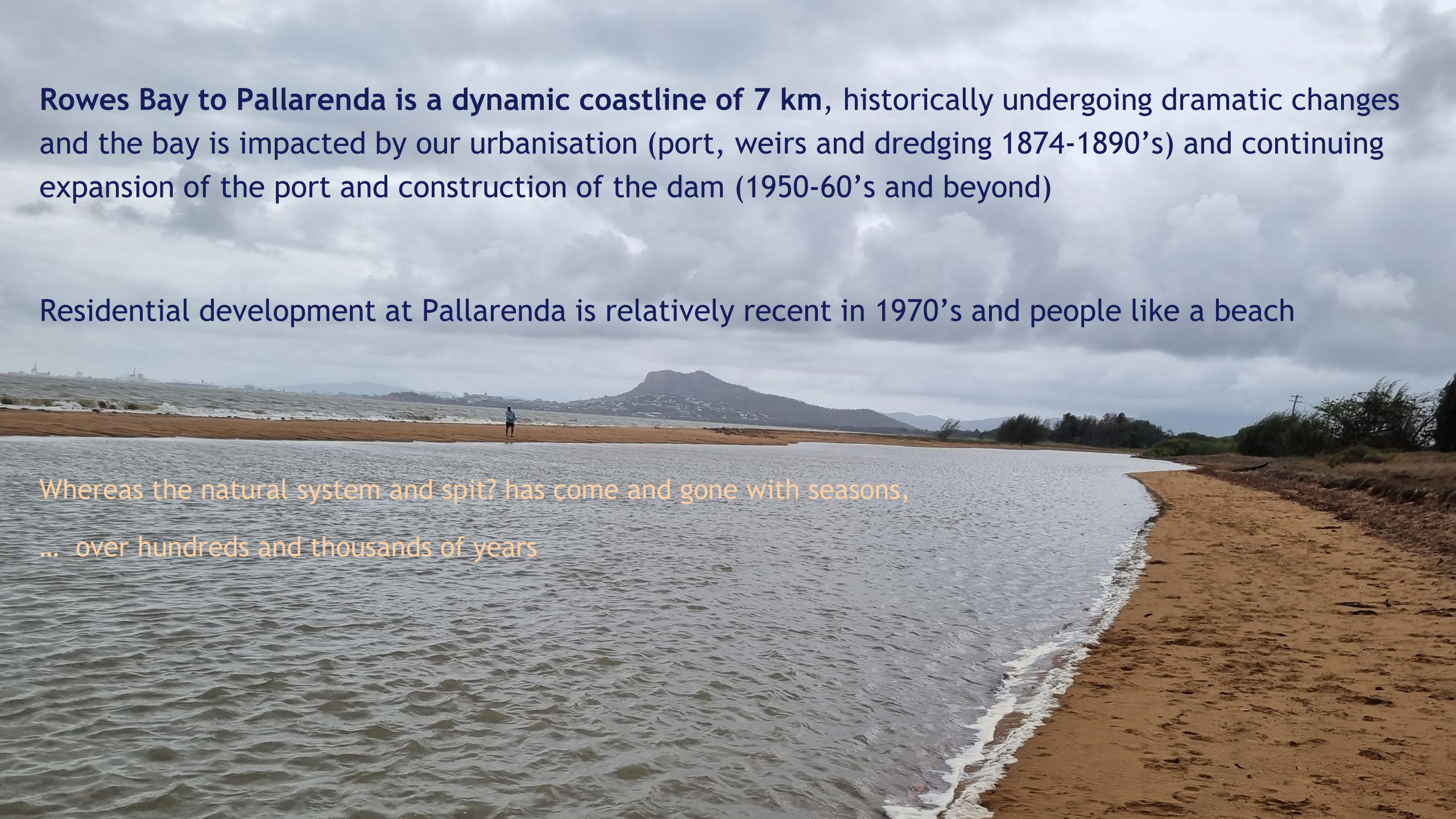
The Rowes Bay-Pallarenda Coastal System

… with integrated coastal leadership, management and regeneration, over 25 years

… Greg Bruce (Chief Sustainability Officer)

Rowes Bay to Pallarenda is a dynamic coastline of 7 km, historically undergoing dramatic changes and the bay is impacted by our urbanisation (port, weirs and dredging 1874-1890's) and continuing expansion of the port and construction of the dam (1950-60's and beyond)

Residential development at Pallarenda is relatively recent in 1970's and people like a beach



Whereas the natural system and spit? has come and gone with seasons,

… over hundreds and thousands of years

What are we covering today?

- **A local, regional and deeper context** (CC & SLR thoughts)
- Some key **local and historical coastal considerations**
- Some **management** thoughts
- Pre-Post Disaster considerations – **TC Kirrily**
- Community perspectives – **some people don't like a spit and other matters**
- Our **monitoring and data** analysis
- **Key actions, responses and points** for Council
- Our **Action Plan**

Some local context

Covering context, proof of context, and local context

Some boarder context (CC & SLR thoughts); and

Deeper context

Key local and historical coastal considerations

Management

Pre-Post Disaster considerations – TC Kirrily

Community perspectives

Some scientific monitoring and data analysis

Key actions, responses and points for Council

Our Action Plan

Half the beach erosion in Rowes Bay and Pallarenda occurred **when Cyclone Althea hit** Townsville in 1971 … an **acute** impact, with before and after **chronic** impact

(SEMP 2010)

Some local context

Our coastal work buffers against such impacts – with majority of the coastline hosting a 30-70 m buffer and only at one 500m section at Rowes Bay is at 20 m.

A complex system with some wicked problems

- A system of dunes, seas, and currents with a variable spit and fan delta
  - evidenced from air photographs in 1989, 1992, 2000, 2004/5, 2010, 2022-23, and
  - remnants of a spit are seen back in the 1950's, 60's and 1980's,
  - even when system was sand starved from weirs, dam and port, and

perhaps other coastal changes at a local and regional level?

The SEMP (2010) endorsed sand placement at Rowes Bay is **intended to slowly erode and be distributed by natural processes northwards to replenish Pallarenda Beach** with sand. Since nourishment has started, the sand has largely remained on the Rowes Bay Beach. The challenge is that the eroded scarp at top of beach is there, until the beach arc is rebalanced – with building a bigger beach (SEMP 2010)

Successful nourishment over several decades has resulted in an abundance of sand along the beaches towards 3 Mile Creek and at Pallarenda. Prior to 1998, Pallarenda Beach was sand starved, despite the offshore sand store at 3 Mile Ck.

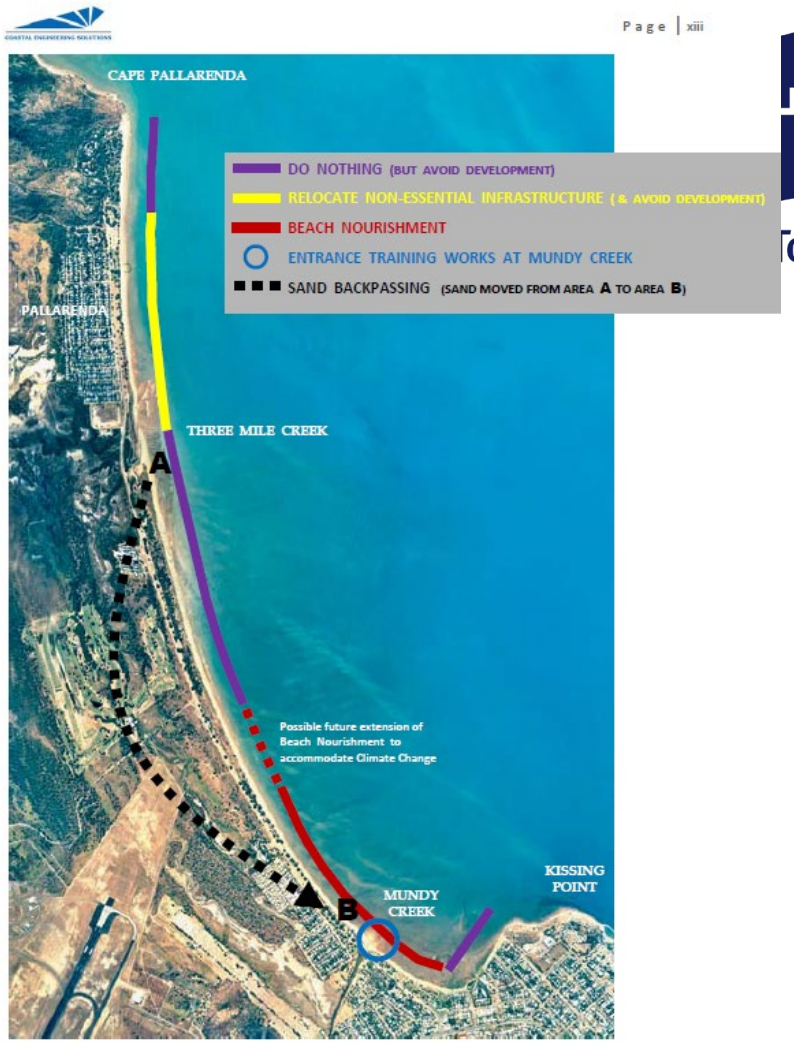
- This is evidenced by our own coastal surveys and geospatial mapping.

Sand accumulates at 3 Mile Creek in cycles, toggling back and forth over seasons and decades between delta and spit.

This process is dependent upon a number of coastal factors: including **winds, seas and tide** in shelter of Virago Shoals and Magnetic Island.

Back passing of this excess sand from the 3 Mile Ck sand spit to Rowes Bay helps maintain the natural processes of sand movement within the bay and assists in preventing the 3 Mile Ck mouth from migrating northwards where it is generating some minor localised bank erosion due to tidal movements.

The modelled and estimated 900-950,000 m3 off 3 Mile is calculated by SEMP coastal engineers to be a 500year accumulation of sand.



… and coast at 3 Mile Creek at Pallarenda

… demonstrably alternating between

- sand **fan delta** and
- **estuary-spit**, and is dependent upon

acute impact of **cyclones/storms/floods** and

chronic impact and strength of **tides, currents & winds**

Local context

- so where is the spit coming from? … and
- what are the dynamics at play in our bay?

Local context

- **Geomorphically, the Bay's coastal sand dunes** formed relatively recently, and
- **Rowes Bay - Pallarenda** has historically been an **accumulation zone for sand**
- The coastalscape has been **deprived of an external sand budget for 78 years**
  - from **c.1920 until 1998**
- Where there has been little to no new inputs of **sand supply** from local rivers and creeks (Ross/Alligator), nor other bigger rivers (Burdekin?) ...

Local context

- Despite this this **coastal system has been maintained** in relatively good condition.
- … and this is through Council's actions, which **commenced in 1998**
- Subsequently we believe we have maintained a relatively healthy and complex marine ecosystem/s in our bay … from Magnetic Island to Pallarenda and back to Rowes Bay
- And it's all part of Great Barrier Reef World Heritage Area (GBRWHA) and Marine Park.

A broader local context - Climate Change/SLR

- **Sea Level Rise (SLR) has been recorded in the past 25 years** (CSIRO) and are likely to rise
  - recent Tide Tables have been updated for SLR and
  - impact of SLR was felt in recent Highest Astronomical Tide (HAT) events in Feb 2024 (and March) being highest ever recorded.

- **Additionally with climate change**
  - **coastal sea winds directions and currents may have changed** over past 30 years,
  - the area is dynamic both short and longer term.

Context - key long term coastal dynamics and processes

- 10-20,000 years ago, the **sea level was 150m lower** and **50km further out to sea**,
- **6000 years ago**, as the sea level rose, **Rowes Bay was 3-4km further** inland and the dunes formed relatively quickly with sand sediments accumulating from large flood events, and

- Note: in the past our Earth's sea level at Rowes Bay-Pallarenda has also been **c.2 m higher** than it is now (120,000 years ago), the **coastline was c.10 km inland** and Many Peaks Range and Castle Hill were islands.

A deeper context

- Importantly, inland sand dunes (Town Common) **formed up to 6000 years ago as sea level rose**, and **sand accumulated and became trapped** between Many Peaks and Castle Hill
  - which is perhaps indicative of the relative low energy environment of Rowes Bay-Pallarenda.

- These **inland coastal sand dunes** store **c.150-200 million m3 of sand** which has accumulated with the historic sea level rise.

Context

*'residents not appreciate the **dynamic nature of our tropical beaches, estuaries and spits**, and*

*wish for "their" beach to **remain the same***

*when these beaches are **constantly changing**'*

In this lie some Key Local Considerations

- **Mapping, and geospatial analysis shows** that Pallarenda beach historically was starved of sand between 1920 and 1998 (SEMP 2010) a period of 78 years, and **in our direct experience**:
  - In 1995 erosion of Pallarenda Beach was chronic
  - The beach shoreline was 12 m further back from where it is now
  - In the 90's at Pallarenda Beach
    - the Stinger Net bank retreating, and
    - boat ramp was eroding, and
    - Residents regularly complained about lack of sand on the beach and coastal erosion along the entire foreshore.

“we build and live in our homes,

in the middle of this time, space and geomorphic drama”

Historical Coastal Considerations

- Pre-Cyclone Althea (1971) a rock wall was built at Pallarenda.
- After Cyclone Althea destroyed the road, the Pallarenda Road was relocated 52m further inland.
- Pallarenda beach with beach nourishment at Rowes Bay, has now built out over the past 10-15 years and Council manages the area as an integrated and connected coastal eco-system.
  - Longshore drift is c.3500m3/annum (SEMP 2010) and renourishes 7 km of beach – at Pallarenda
  - Half deposits at 3 Mile Creek entrance and half redistributed sand renourishes beach north
  - Noting a paradox that there is an extensive store of sand at 3 Mile Creek – which only feeds back into the beach area after storms and probably associated with loss of sea grass beds
    - 500-year accumulated supply of 900-950,000 cm3 between 3 Mile Creek and Virago Shoals

Key Management Considerations

- **Council has effectively reduced coastal erosion and risk to the full 7km of beach and road** from Rowes Bay (Mundy Creek) to Pallarenda – with relatively limited resources (not a high cost).
- Following **Council's active sand nourishment**, at Pallarenda the road is now
  - 65-70m from the top of the beach and overall erosion risk to Pallarenda Beach has ceased.
- The **spit and/or delta provides protection to road and Pallarenda suburb**
  - (3rd Party, Coastal Engineer – Dec 2023).
- A **local oceanographer has argued** that there is a risky cyclone track – SE.
  - despite impact of small erosion point where an estuary mouth stops, and impact of tides inconveniently erode a relatively inconsequential area (abet with a tree growing on seashore in 10 years of shelter)

Key Pre-Post Disaster Considerations – TC Kirrily

- Council has recently **completed transfer of 4000 m3 pre-TC Kirrily** back to Rowes Bay at low cost … and
- this included creating a **nick point in the spit** to encourage a **high flow bypass**, as might be expected to occur in a ‘big wet’ and as permitted

  … yet **impact came from** the **very high tides**, and **not the storm**

Key Now Considerations

- Council is about to repeat this **back passing sand from 3 Mile Creek, to Rowes Bay** and in accord with permits … **5000 sq metres in 2024**
- This is intended to be an annual component (as per current SEMP 2010, and being reviewed)
- We have had a tension between building the beach, and back passing sand

A community perspectives

- Some people at Pallarenda have expressed concerns, including:
  - Loss of fan delta to walk on.
  - Beach erosion of main beach and protection of the road.
  - Forming of a sand spit.
  - Perception that sand renourishment has failed.
  - Power supply to Pallarenda being at risk of erosion.
  - Impact of the bridge infrastructure.
  - Erosion of beach foreshore.

Community Perspectives

- **“Loss of fan delta to walk on”.**
  - Beach fan historically comes and goes, alternating with a spit over cycles of years and decades and forms part of
    - a mapped Erosion Prone Area under Coastal Protection & Management Act
- **“Beach erosion (main beach area) and protection of the road”.**
  - Road is not at risk of erosion, despite any meandering 3 Mile Creek
  - Since sand nourishment began at Rowes Bay, the beach remains full of sand and the frontal dune offers resilience for storms
  - The spit was 50 m longer in 2010 – (mapped, photographed & verified at time). A similar local scouring impact occurred at end of estuary, where it reached Sallow Street, and eroded to the old rock wall. This had no long-term impact and the beach recovered fully.

Community Perspectives

- **“Forming of a sand spit”**
  - Sand spit comes and goes with time (cyclic) and independent of Council’s sand renourishment at Rowes Bay. The spit is formed via a natural process for tropical beaches including Pallarenda and influenced by local engineered infrastructure (roads, bridges and bunds).
  - The spit forms from offshore coastal processes and storms and has occurred in the past many times and was further along the beach 10 years ago.
  - There is evidence of previous spits, estuaries and deltas occurring when derived from air photos, going back to 1950’s. Air photos are intermittent and have gaps between their cycles of forming and eroding with floods (see photo opposite - 1989) and spits have formed at Pallarenda prior to 2010, when less sand ws placed on Rowes Bay (RB) beach:
    - 80,000 m3 from 1998 to 2010, out of a total 226,150 m3 placed at RB in 2024

Community Perspectives

- **“Forming of a sand spit”**
  - Local bank erosion occurs where spit and estuary finishes. Where trees or human infrastructure (seating) find themselves in coastal ‘strand’ vine and foreshore vegetation then as elsewhere, they are at risk of this local erosion impact – being out on the beach slope and up against the post TC Althea rocks

Community Perceptions

- **that “sand renourishment has failed” - at Rowes Bay**
  - **Sand placement at Rowes Bay has been a success**, as the system is a relatively low energy backwater, with a weaker longshore drift regime to Cape Pallarenda, as compared to rest of coastline north of Pallarenda and other coastal parts of Townsville
  - This **nature-based solution** is more affordable than rocking a dynamic coastal system and rocks generally cause more problems than they solve (3rd Party, Coastal Engineer, Dec 2023), due to wave refraction against a hard substance (rocks) displacing energy to surrounding area.
  - **Rock groynes are a costly** and not considered needed for the dynamic 3 Mile Creek and associated **marine ecosystem (Great Barrier Reef Marine Park Yellow Zone)** and **international listed flyway** for migrating waders (seabirds)
  - Sand renourishment is the most **cost-effective solution** at Rowes Bay to Pallarenda and as determined in the current (2010) SEMP – delivered by third-party coastal engineers.
  - This **SEMP is being updated in 2024**, to determine future recommended actions based on current situations. Any actions which come out of this investigation / management plan – will inform the existing 10-year CAPEX plans (rebuilding the shoreline position further out).

Community Engagement

- **“Power supply to Pallarenda being at risk of erosion”**
  - EQ (Ergon Network) have indicated that they will **rock around the pole** within the estuary area and/or replace the pole before it falls over
- **“Impact of the bridge infrastructure”**
  - **To be determined in new SEMP** and will investigate flooding, connection and flow paths back to Mundy Creek
  - However, the drainage runs from Mundy Creek to 3 Mile Creek and is blocked by the **road bund to the bridge**, and **constrained by 2 bridges - one without a span**
- **“Erosion of beach foreshore”**
  - **Minor, can be annoying and interment in wet season**, where estuaries occasionally meets the beach and rocks and can create a public perception challenge for coastal managers

Rowes Bay Buffer Width (meters between Cape Pallarenda Rd edge and Top of Beach)

Medium term goal is to maintain buffer width greater than 20m at all times. Long Term goal is to establish a 30m buffer throughout, returning to pre Cyclone Althea, (1970) condition

Meters North of Mundy Ck	2009.11.23 After X Cyclone Charlotte Storm Surge Erosion	2010.01.28 After sand nourish with DRFA supporting large vol increase	2010.02.02 After Jan Spring Tides	2011-12 No Survey - Mundy Sand Bag Groynes Installed - Cyclone Yasi Impacts	2013.02.20	## No Survey	2015.03.20	## No Survey	2017.10.03	2018.06.23 Pre 2019 Flood	2019.04.29 Post 2019 Flood before DRFA Emergency Works	2019.08.02 after DRFA Emergency Works 8,200m3 of Port Sand transfered	2020.05.12 before DRFA Project 2 sand transfer	2020.08.06 after DRFA Project 2 (phase 1) transfer of 12,500m3 + 5500m3	2021.08.17 after DRFA Project 2 (phase 2) transfer of 17,500m3 DRFA	2022.08.23 after TCC annual BAU sand nourish 5000m3 in June 2022	2023.05.16 Before annual sand nourishment
1020	No data	No data	No data		No data		40.00		35.50	35.70	35.90	36	39	40.7	40.50	39.40	40.80
1000	No data	No data	No data		42.00		41.00			35.00	34.90		36	41	41.50	40.40	40.00
980	No data	No data	No data		41.00		40.00			33.70	31.40	31	34	39	40.70	36.50	38.00
960	No data	No data	No data		41.00		37.00			32.80	28.70		30	36.3	40.10	35.60	36.00
940	No data	No data	No data		38.00		35.00		33.80	34.00	27.70	28	29	33.5	36.40	32.80	34.70
920	No data	No data	No data		35.00		32.00		29.30	32.00	27.50		27.5	31.7	34.60	31.60	33.70
900	No data	No data	No data		32.00		29.00		30.40	31.40	25.20	25	27	30.8	32.80	30.00	31.90
880	27.00	30.00	28.00		31.00		29.00		28.80	29.30	23.00		26.5	28.6	31.30	29.40	30.70
860	28.00	28.00	28.00		27.00		28.00		27.50	28.60	22.40	23	24	28.1	30.30	27.60	29.20
840	27.00	28.00	25.00		28.00		26.00		26.30	27.20	20.50		22	26.5	29.90	26.20	27.30
820	24.00	25.00	21.00		26.00		25.60		24.30	24.60	20.20	21	19.5	25.4	27.20	23.40	24.90
800	22.00	29.00	20.00		26.00		25.00		24.00	23.90	20.20		19.5	24	25.80	23.20	24.70
780	17.00	26.00	18.00		26.00		24.00		21.00	22.60	18.60	19	19	22.6	24.40	23.10	24.30
760	15.00	25.00	20.00		26.00		25.00		21.70	23.70	19.00		17.5	22.5	23.90	22.20	24.30
740	15.00	24.00	19.00		24.00		23.00		20.60	22.40	18.70	19	16.5	20.4	23.30	21.00	20.70
720	14.00	24.00	19.00		23.00		21.00		19.50	21.60	16.50		16	20.5	22.70	20.80	20.90
700	14.00	24.00	19.00		22.00		20.00		19.70	21.80	16.40	16	16	20.2	22.70	20.40	20.20
680	17.00	24.00	19.00		21.00		19.00		19.40	21.40	15.30		15.5	19.1	21.30	19.70	19.00
660	18.00	23.00	19.00		20.00		18.00		17.20	19.10	15.10	17	15	18.8	21.00	18.50	18.10
640	17.00	20.00	18.00		20.00		18.00		18.10	19.80	15.00		15	17.8	20.90	18.20	18.90
620	13.00	19.00	17.00		20.00		18.00		18.30	19.50	14.40	18	14.5	17.9	19.90	18.40	18.50
600	14.00	19.00	16.00		20.00		17.00		17.80	18.90	14.50		15.5	18.7	21.50	19.20	20.50
580	13.00	19.00	15.00		20.00		17.00		17.70	18.60	15.80	19	15.5	18.5	21.00	19.50	20.10
560	12.00	19.00	16.00		20.00		18.00		18.10	21.30	16.50		16.5	19.6	22.30	19.80	20.50
540	14.00	20.00	15.00		20.00		19.00		18.90	21.80	15.80	19	16.5	20	22.50	20.60	21.30
520	13.00	20.00	16.00		20.00		20.00		20.30	23.20	19.00		17.5	20.2	22.20	20.10	22.00
500	13.00	21.00	16.00		21.00		21.00		21.20	22.80	18.60	22	20	22.5	24.20	22.80	23.40
480	10.00	21.00	16.00		22.00		21.00		22.80	23.80	19.80		19.5	22.8	23.90	22.80	23.70
460	15.00	23.00	18.00		23.00		22.00		23.10	24.20	21.20	23	20	23	25.70	24.30	25.20
440	14.00	23.00	19.00		25.00		24.00		23.40	25.60	20.90		21	25.3	28.00	25.80	27.20
420	15.00	24.00	19.00		27.00		25.00		24.00	26.60	21.60	25	22.5	26.2	28.80	26.40	28.60
400	15.00	26.00	20.00		27.00		26.00		24.90	27.90	23.30		23.5	26.1	30.50	28.50	29.10
380	16.00	28.00	22.00		28.00		28.00		25.50	28.30	26.30	28	25	30.1	32.90	30.50	29.80
360	19.00	28.00	24.00		30.00		29.00		28.00	29.80	28.50		27	30.7	33.30	31.60	31.00
340	20.00	31.00	25.00		31.00		31.00		34.80	35.80	30.80	31	29	33.2	35.60	32.40	32.80
320	22.00	32.00	28.00		34.00		33.00		36.50	37.20	32.70		31	35.8	37.40	34.00	34.30
300	24.00	34.00	29.00		36.00		37.00		39.70	41.20	35.20	36	33	38	39.90	35.70	36.00
280	26.00	36.00	32.00		39.00		40.00		43.20	44.00	36.80		34.5	39.2	41.70	38.20	38.20
260	30.00	41.00	35.00		42.00		42.00		44.20	45.20	38.80	41	37.5	41	44.10	42.80	42.40
240	33.00	42.00	37.00		45.00		43.00		44.40	46.20	40.80		39.5	42.6	45.10	44.40	43.70
220	37.00	44.00	39.00		46.00		44.00		45.20	47.10	41.80	42	40.5	43.1	45.40	46.00	44.60
200	38.00	45.00	41.00		48.00		45.00		45.00	46.20	42.80		41	44.1	46.20	45.70	45.40
180	40.00	47.00	42.00		49.00		47.00		46.40	48.30	43.10	44	43	45.5	47.80	46.70	47.40
160	41.00	49.00	44.00		49.00		48.00		47.60	48.20	43.80		43	46.8	48.00	48.10	47.00
140	41.00	50.00	45.00		49.00		49.00		42.20	47.80	43.80	45	44	48.9	49.60	49.50	46.40
120	47.00	51.00	47.00		53.00		51.00		49.80	51.60	48.00		47	50.3	50.50	52.00	51.10
100	45.00	53.00	48.00		55.00		54.00		52.40	53.00	50.00	50	46.4	50.4	51.00	51.60	52.00
80	47.00	53.00	49.00		58.00		56.00		54.50	53.40	48.40		50.5	53.3	53.00	54.10	54.80
60	42.00	51.00	46.00		58.00		53.00		51.70	52.80	53.60	53	53.6	53.9	52.80	53.80	54.60
40	41.00	49.00	44.00		56.00		55.00		53.90	53.90	55.40		54.4	54.5	54.20	55.00	56.10
20	40.00	45.00	40.00		52.00		56.00		56.70	56.90	53.80	54	52	54.7	53.20	55.60	54.70
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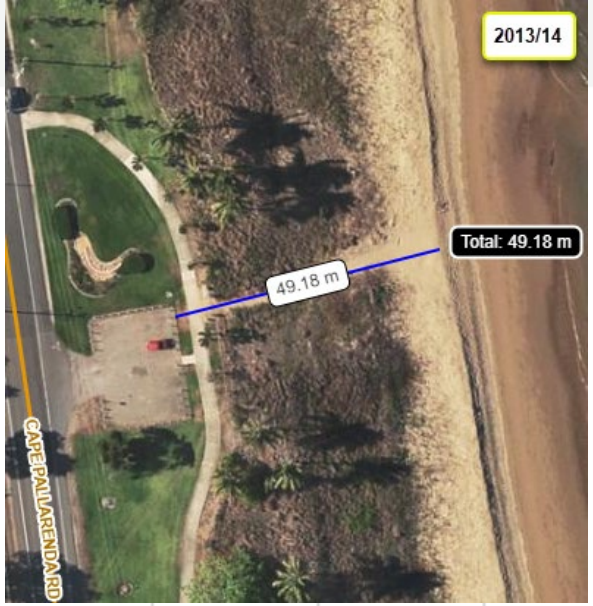
Council's medium-term goal is to nourish Rowes Bay to maintain a buffer width of greater than 20m between the road and top of beach at all times and the long-term goal is to establish a 30m buffer throughout. The buffer at Pallarenda is twice this width

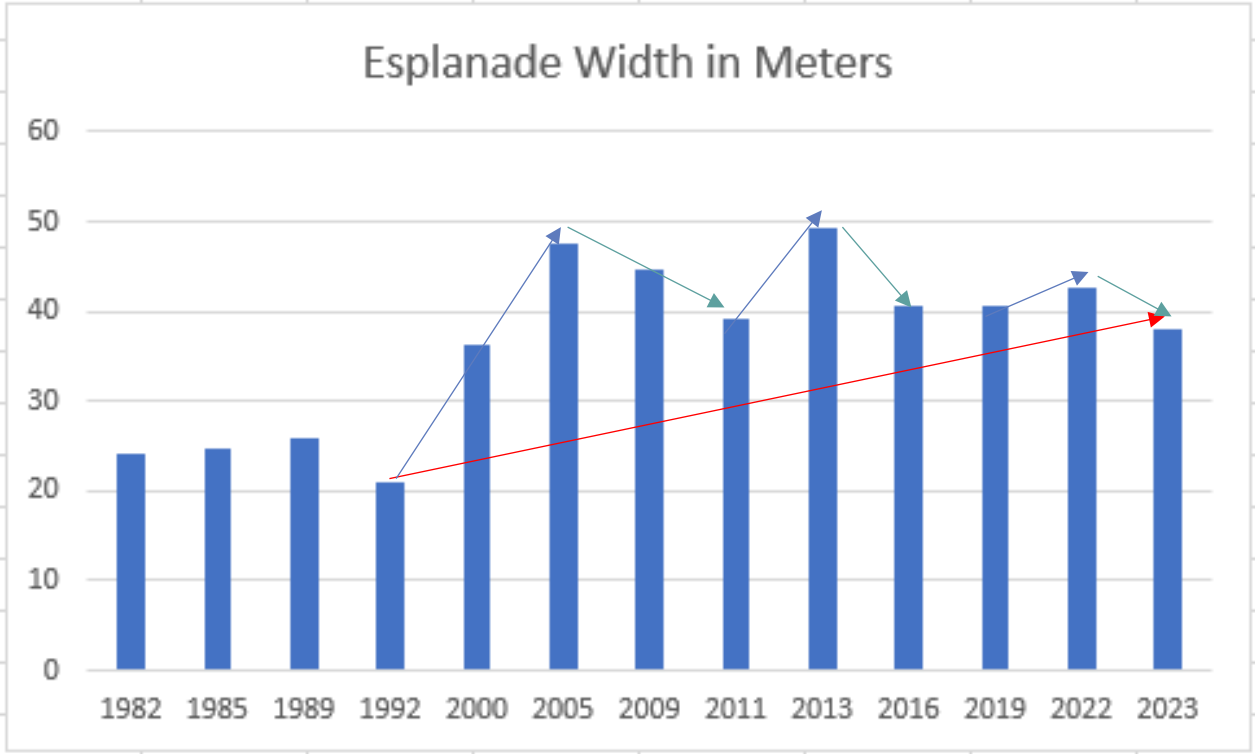


The buffer between the car park near Maskell Street & the top of the beach has increased by c.20-30 m from

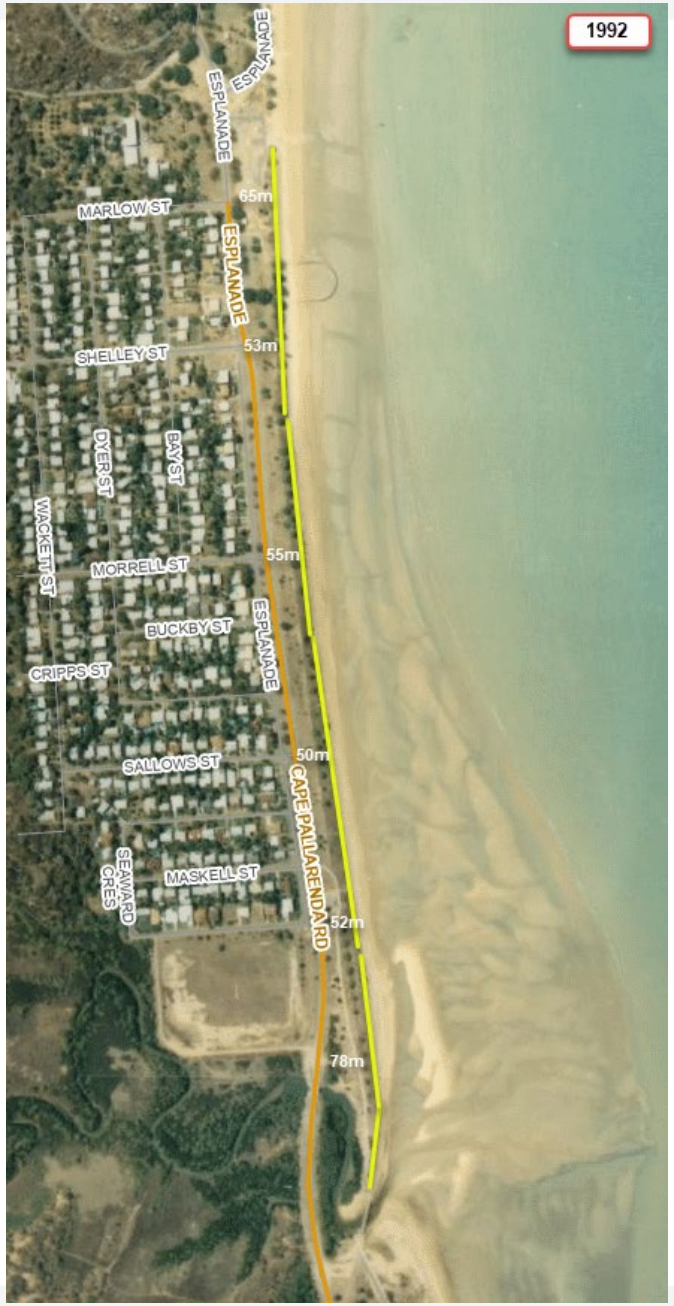
- 21m wide in 1992 to
- 49m wide in 2013, and
- 38m wide in 2023, (red arrow).

During this time the coast has experienced multiple periods of growth (blue arrows) and retreat (yellow arrows)

Year	Meters
1982	24.03
1985	24.61
1989	25.9
1992	21.08
2000	36.34
2005	47.47
2009	44.7
2011	39.18
2013	49.18
2016	40.72
2019	40.72
2022	42.58
2023	38.07



Pallarenda – Centre of Cape Pallarenda Rd to top of beach in 1992 average 58m



Pallarenda – Centre of Cape Pallarenda Rd to top of beach in 2022 average 71m

Key Action and Points for Council

- By-passing work pre-post Cyclone Kirrily worked with storm and high tides (HAT), including sand harvesting from Spit (4000 m3)and bypassing back to Rowes Bay
  - See the photos overleaf
- Part of the spit was lowered to assist flood (storm) and/or tide impact (HAT)
  - Refer to oblique drone photos overleaf and associated digital terrain mapping (Jan 24 and May 24)

3 Mile Creek Mouth, Delta and Beach

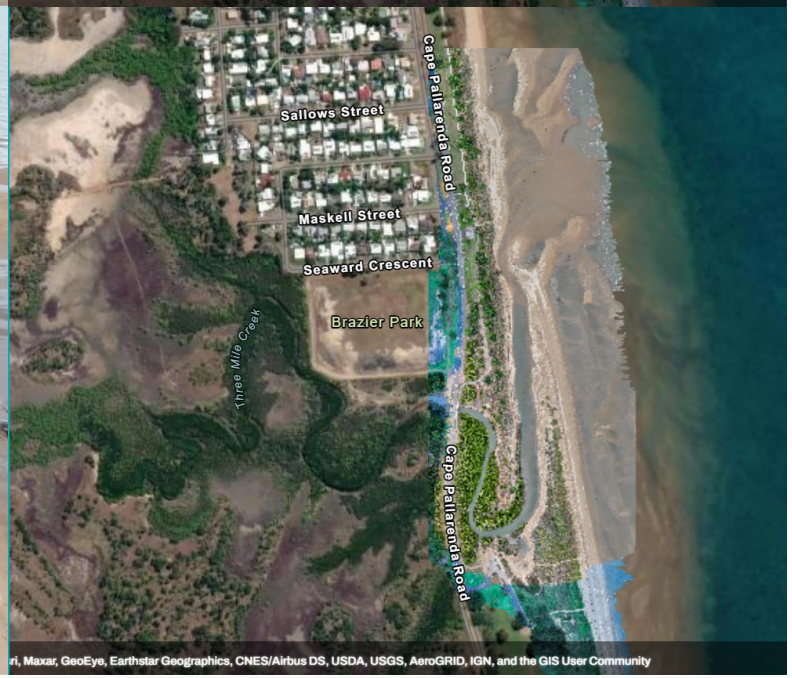
Top drone photo - 29 Jan 24

Spit to Maskell Street

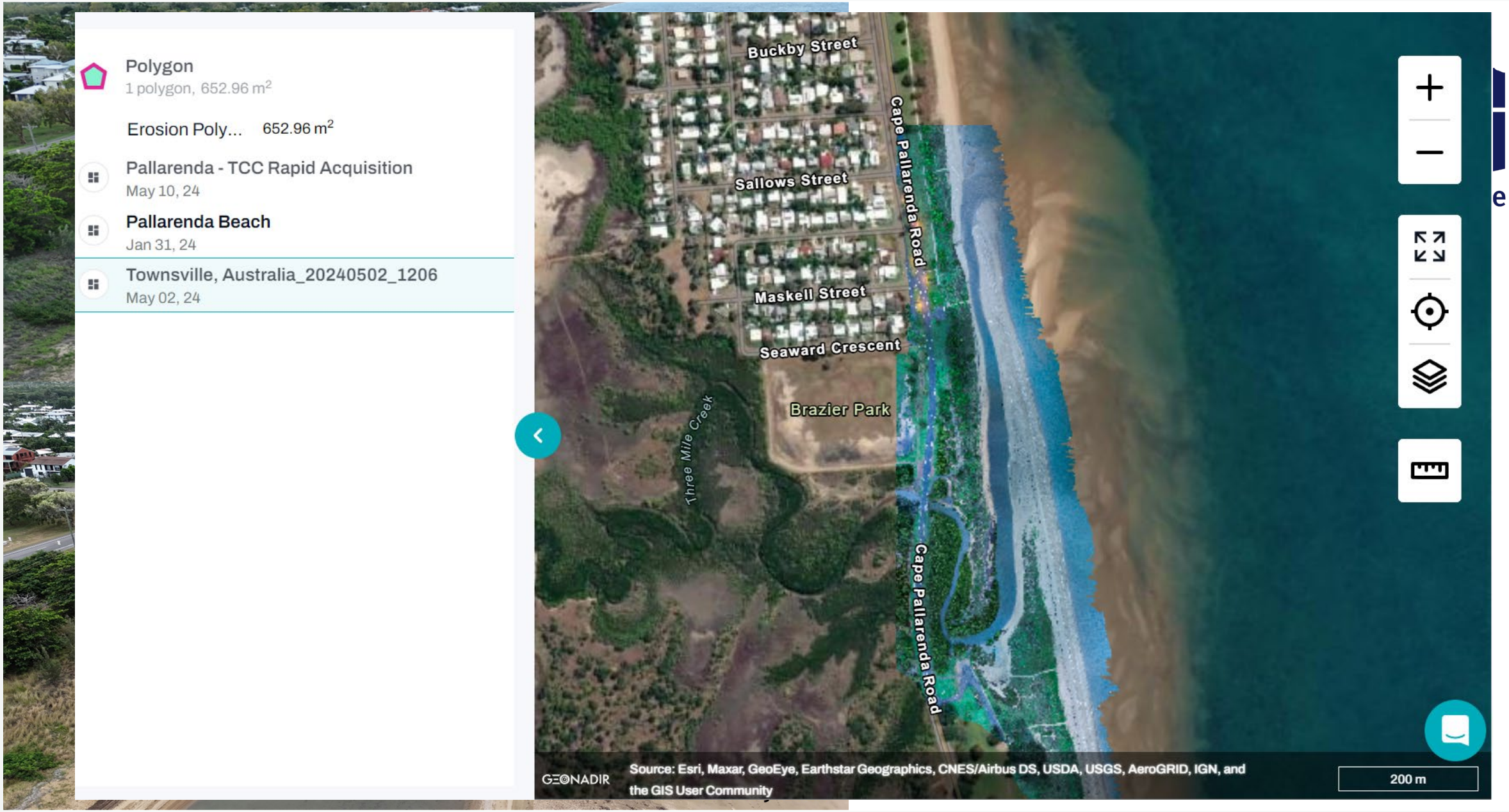
Bottom drone photo – 10 May 24

Redefined spit condition following TCC pre-TCC Kirrily back-passing work and mimicry of flooded waterway and delta process – opening has moved south.

Shows eroding bend of estuary mouth, and a fallen tree (10 years old) which was unfortunately growing in the ‘strand vegetation’ beach zone and always at risk from coastal erosion (Erosion Prone Area (EPA)



City of Townsville


Polygon
1 polygon, 652.96 m²
Erosion Poly... 652.96 m²
Pallarenda - TCC Rapid Acquisition
May 10, 24
Pallarenda Beach
Jan 31, 24
Townsville, Australia_20240502_1206
May 02, 24
Buckby Street
Sallows Street
Maskell Street
Seaward Crescent
Cape Pallarenda Road
Brazier Park
Three Mile Creek
Cape Pallarenda Road
GEONADIR
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
200 m

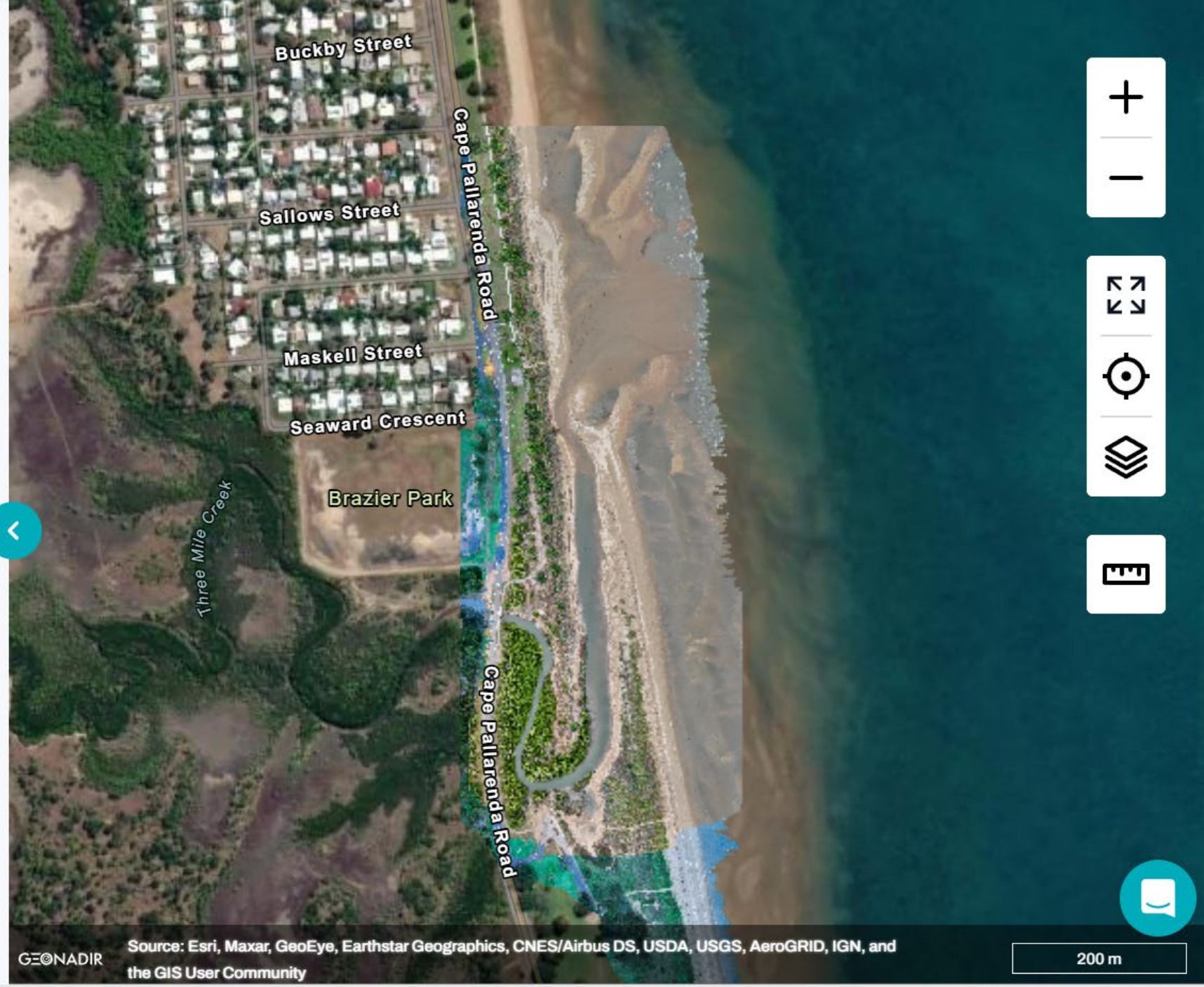
Polygon
1 polygon, 652.96 m^2

Erosion Poly... 652.96 m^2

Pallarenda - TCC Rapid Acquisition
May 10, 24

Pallarenda Beach
Jan 31, 24

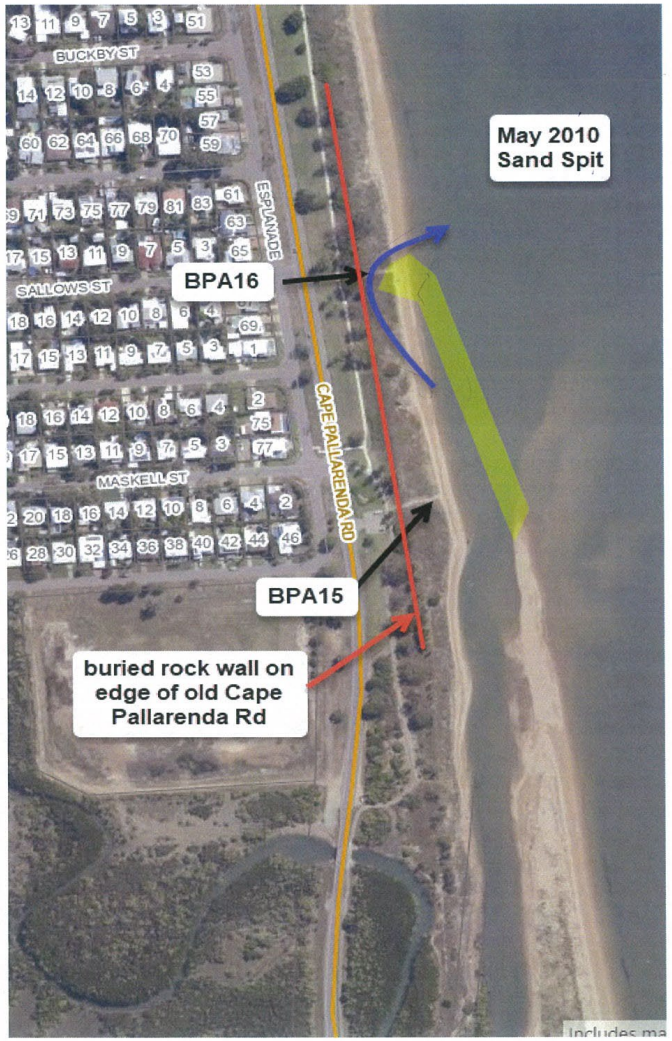
Townsville, Australia_20240502_1206
May 02, 24



3 Mile Ck Sand Spit at Pallarenda – 2010 to 2011.

The 3 Mile Ck sand spit in May 2010 extended to beach access 16, then in 2011 Cyclone Yasi pushed the whole sand bar in, joining it with the shoreline so it effectively disappeared, and the Esplanade/Beach grew forward.

Because we have 2009 aerials before the sand sprit grew that long and then 2011/12 after Yasi pushed the sand spit in, we don't see the furthest extent to which the sand spit grew. However it is captured in photos in following pages:



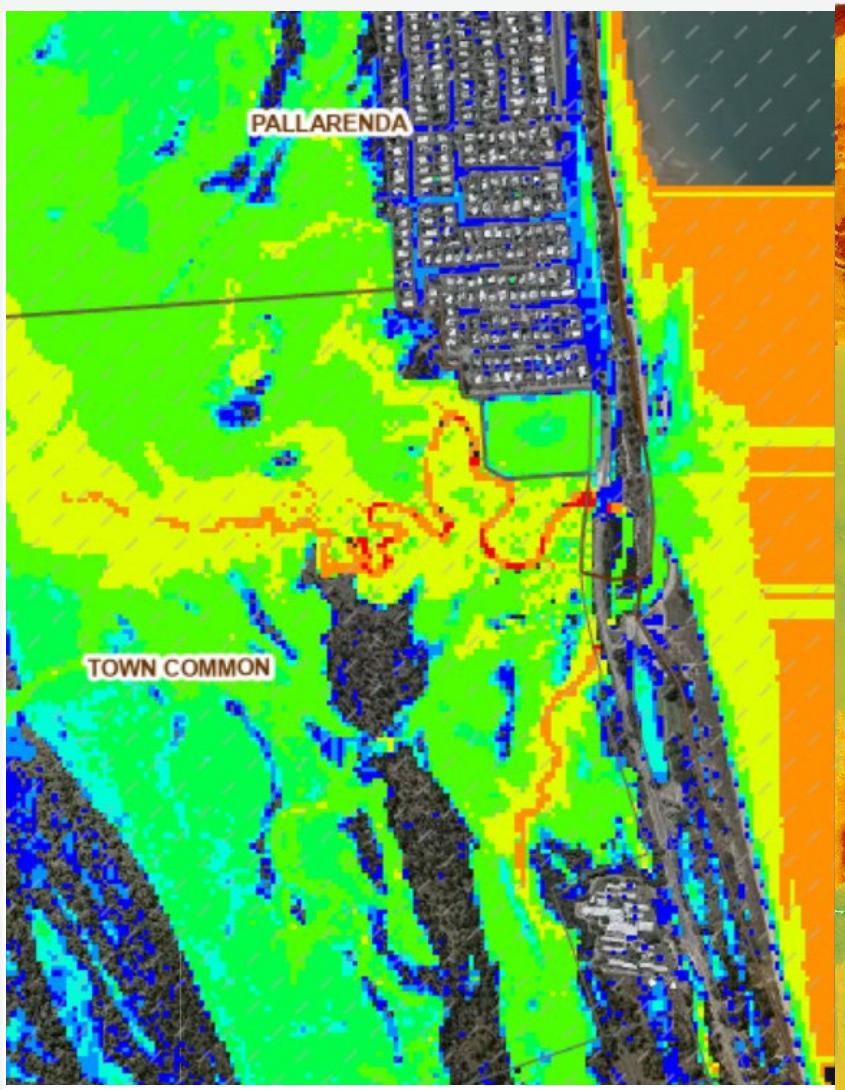
7th May 2010 – Beach Access 16 with bend in 3 Mile Ck - erosion

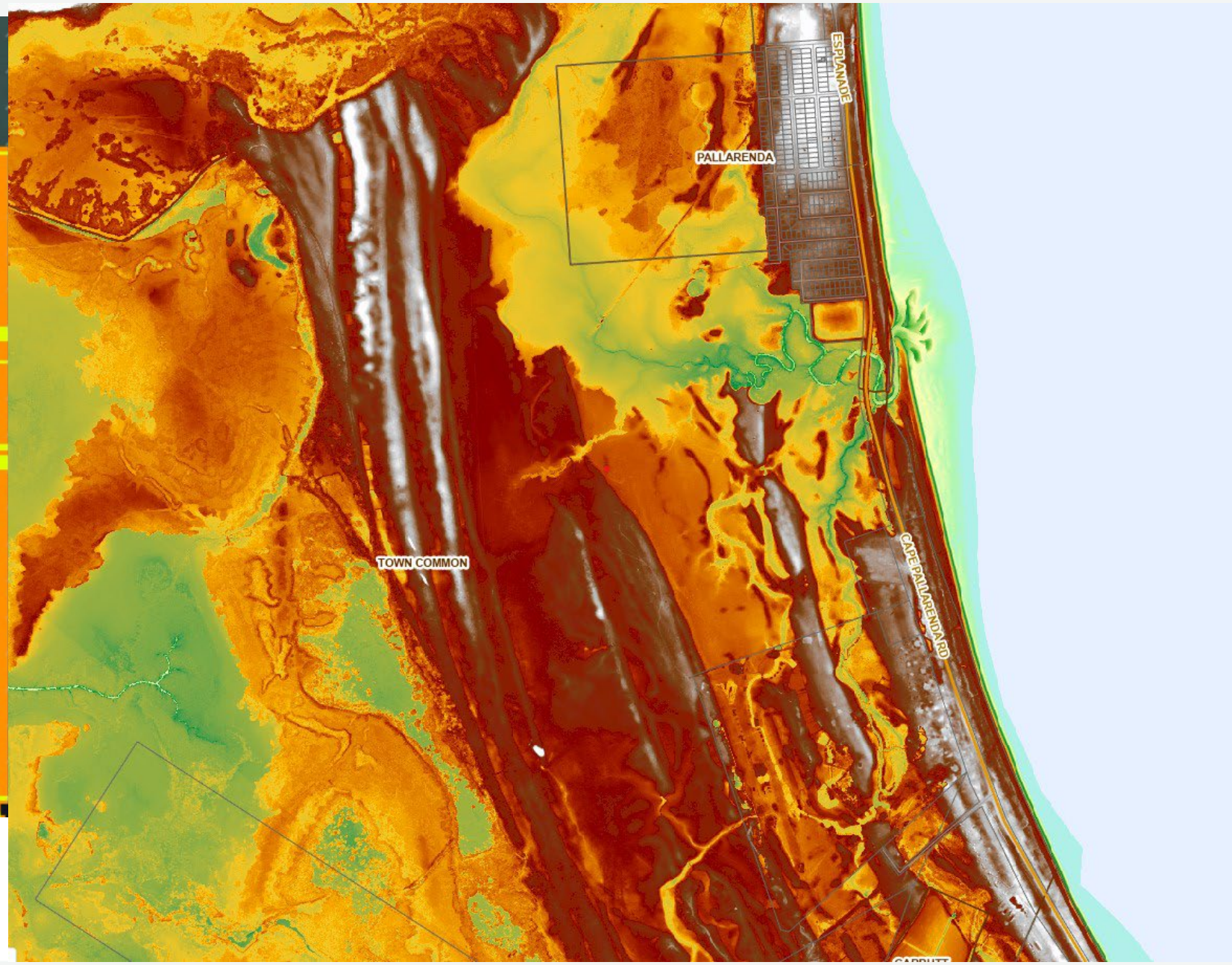
20 April 2011 Rapid sand recovery at beach access 16 due to Cyclone Yasi pushing the 3 Mile Ck sand bar into and joining the shoreline.

1965 and 1974

1961 and Coastal Survey Lines

2009 and 2009/10


PALLARENDA
TOWN COMMON


ESPLANADE
PALLARENDA
TOWN COMMON
CAPE PALLARENDA RD

Key Action and Points for Council

- A key narrative is **value of maintaining overall beach health of 7km** from Rowes Bay to Pallarenda – as demonstrated historically and recently through measurement and assessment.
  - from **c.900-950,000 m3** of sand recorded/modelled (SEMP 2010) at 3 Mile Creek and offshore
  - TCC places **226,150 m3 total sand placed** at Rowes Bay renourishment area (along 500 m) , and
  - Of this 226,150 m3, only **80,000 m3** (representing 2-4,000 m3 per year) makes its way to Pallarenda, in longshore drift
  - While some sand renourishes from Rowes Bay, it is believed that the majority of sand which cyclically builds the spit is coming from:
    - either the 900-950,000 m3 of stored sand 3 Mile Creek, and/or via
    - Cleveland Bay currents, or
    - Town Common dunes via 3 Mile Creek (150-200 million m3 of sand supply available from the inland coastal dunes)

Key Points

ACTION PLAN – July, August and September to December 2024

- About to review TCC Shoreline Erosion Management Plan(2010)

1. Appointed contractor (certified Coastal Engineer) to meet with, acknowledge input and develop response to community perspectives and modelling.
2. SEMP may be conducted in stages

Overleaf please see drone and terrain models of 3 Mile Creek and Pallarenda Beach

Rowes Bay beach at medium tide, not low tide – a wide beach and variable scarp – **plan to build out**

THANK YOU


City of
Townsville