ENGINEERING REPORT

ANASTASIA's POOL

4 Feb 2014

Location
Anastasia's Pool is located at Gantheaume Point in the locality of Minyirr, approximately 10km to the South West of Broome.

Anastasia's Pool locality diagram.

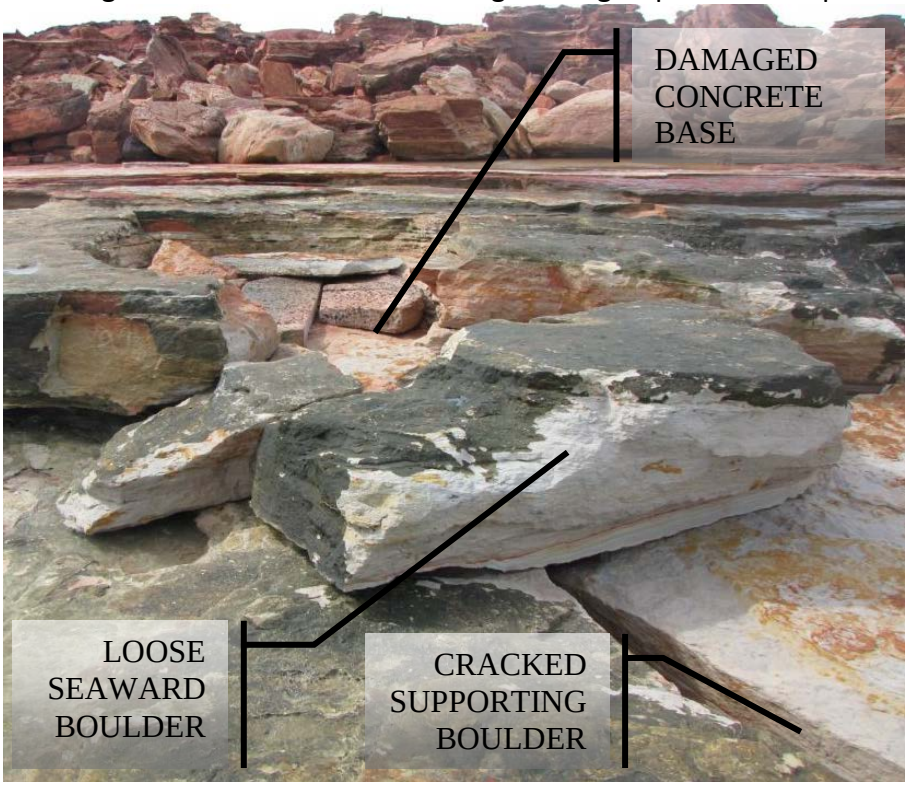
Historical Background
Anastasia's Pool is a small, intertidal, natural, rock pool that a former lighthouse keeper adapted by way of a hand placed concrete bottom to form a smooth base. Patrick Percy made the modifications to enable his arthritic wife (Anastasia Percy) to exercise her stiffening limbs.

An earlier photo of Anastasia's Pool as appeared in the Broome Advertiser, 30 January 2014.

Timeline
First damage noticed: 21 January 2014 with an estimate of 50% damage to the structure.
Site Inspection: 30 January 2014, with an estimate of 70% damage to the structure.

Council were formally notified by Department of Parks and Wildlife (DPaW) regarding the break up of the rock at Anastasia's Pool on the 21 January 2014.

A photo from DPaW is reproduced below to underscore the speed with which the break up of Anastasia's Pool is occurring as evident from Council's Engineering Department inspection on the 31 Jan 2014.



21 January 2014 (Courtesy DPaW). Anastasia's Pool as viewed towards the land. The large boulder in the foreground once formed the seaward wall of Anastasia's Pool. Concrete to the base of Anastasia's

Pool shows signs of loss of structure. Note the large vertical crack underneath this boulder, in the supporting rock platform.

On 30 January 2014, the Broome Advertiser reported on the break up of Anastasia's Pool. The front page featured a picture of the Shire president standing adjacent to the remains of a portion of the concrete floor.

Anastasia crumbles

Glenn Cordingley

A historic Broome tidal pond hand carved by a loving husband for his arthritic wife has collapsed in the wake of thunderous seas pounding the pindan coast, and its repair is unlikely.

Anastasia's Pool at Gantheaume Point has become a magnet for tourists and locals over the decades, but last week Mother Nature ended its long and romantic past when boulders supporting the structure and its concrete base fractured and fell away.

The Department of Parks and Wildlife last week sent photographs of the damage to responsible agencies the Shire of Broome and the Yawuru Park Council.

The pool was built by the first private owner of the lighthouse keeper's residence, Irishman Patrick Percy.

His wife Anastasia would sit inside exercising her stiffening limbs.

She died in November 1929 at the age of 53 and her husband passed away in 1931.

Percy has been described as a flamboyant character known for wearing diamonds on his shirtfront.

He bought the property in 1922, when the lighthouse was automated and a lighthouse keeper was no longer required.

He arrived in Broome in 1896 as a police constable, but soon became proprietor of the Roebuck Bay Hotel.

In 1905 he became a pearling master and quickly built up a fleet of eight luggers and the schooner Gwendoline.

He served as chairman of the Broome Roads Board for a period and was noted for his invention of a safety box for storing pearls on luggers while at sea.

Percy had one of his Chinese crewmen Wing Loong, assisted by his gardener Paddy, concrete the surrounds of the rock pool that sat on a ledge near the house.

The sea would break on the ledge during spring tides, keeping it clean.

Anastasia's Pool is featured in tourist brochures and travel guides in WA and across the world, with many visitors making specific trips to sample its so-called healing qualities.

Shire president Graeme Campbell visited the site last week and was doubtful repairs to the structure were possible because massive rocks had broken away and split.

Mr Campbell said council engineers would inspect the site,

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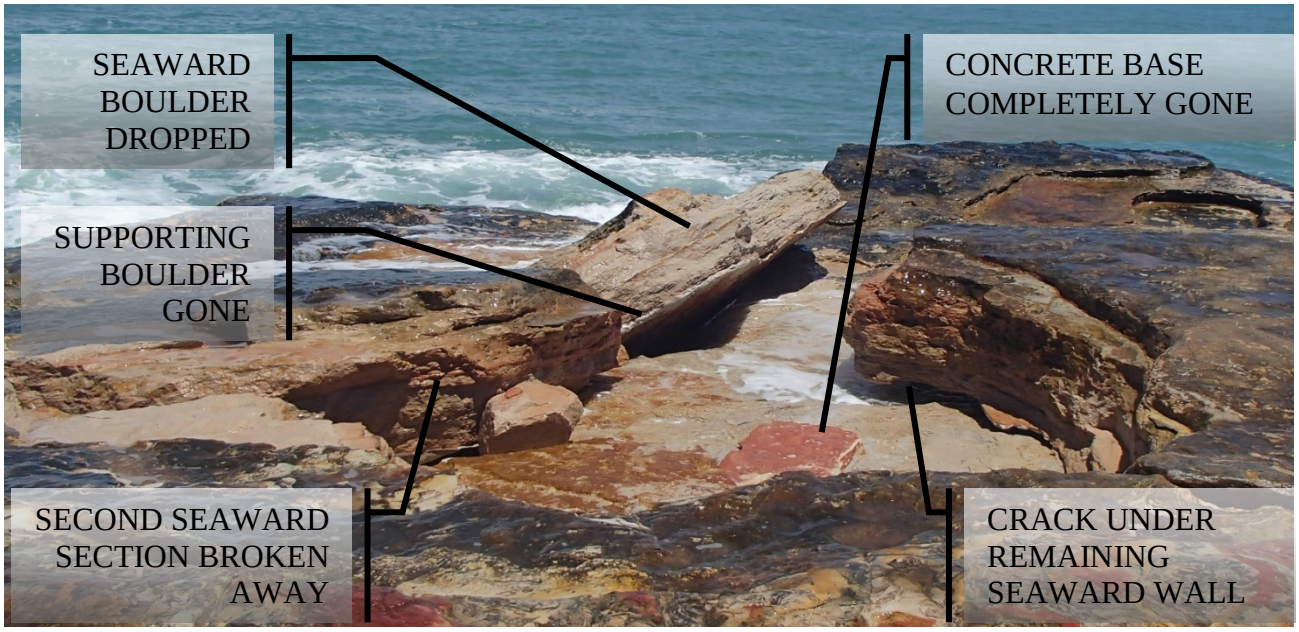
Broome Shire president Graeme Campbell inspects the damage caused to Anastasia's Pool by storm surges.
Picture: Glenn Cordingley

Front Cover of Broom Advertiser, 30 Jan 2014.

The Shire of Broome's Engineering Department undertook an inspection of the structure in order to provide advice on a repair methodology, if any were deemed suitable.

Site Visit

On the high tide of the 31 January 2014 an inspection of Anastasia's pool was undertaken by staff from the Shire's Engineering Department. More than half of the seaward side rock wall had been extensively damaged. The sandstone rock had broken into two pieces, each at least 5t in mass. Rock underneath these pieces had also disappeared, allowing one of the pieces forming the seaward wall of Anastasias pool to drop and rotate away from the pool. There is no longer any concrete in the base of Anastasia's pool.



31 January 2014. Anastasia's Pool, viewed toward the sea. The concrete base, which was visibly damaged in the picture on the 21st January 2014 is now is no longer evident at all. The supporting boulder has disappeared, with the result that the seaward boulder has now dropped. A second seaward section of rock has also broken away. The remaining seaward side of Anastasia's Pool has a large crack at the wall/floor interface.

A possible repair methodology was investigated, as follows:

Firstly, the existing boulders, which form the end wall of the pool, would require lifting, placement and anchoring back into position. A 50t crane or 30t excavator would be required to undertake the lift. To facilitate plant access to the site, a 120m long, 4m wide access track would need to be constructed to Anastasia's Pool. Significantly, the 2-3m high sandstone ledge would require pushing down and boulders moved aside to access the ledge which Anastasia's Pool is formed into. We assessed that the track construction and the impact of heavy machinery on the soft sandstone rock would cause further damage to Anastasia's Pool and the surrounding natural landscape. The access track will need to be removed at the completion of any rectification work.

Once the seaward rocks were back in their original position, the seaward facing wall of Anastasia's Pool would require widespread sealing and patching with concrete and concrete epoxy products. No guarantee could be given as to the durability of this patching methodology given the erodible nature of the source rock. The resulting repair works would be highly visible, greatly detracting from the historical significance and visual amenity of Anastasia's Pool.

The repair methodology outlined above would not be in keeping with the historical significance and visual amenity of Anastasia's Pool.

The extent and character of the natural weathering process of the sandstone rock indicates that any repairs undertaken would be a temporary solution.

Tenure
Anastasia's Pool is located in the intertidal area at Gantheaume Point. The land situated above high tide is Yawuru In-Town Conservation Estate which is controlled by Yawuru Park Council. The intertidal zone is vested in the Broome Port Authority.

Approvals
Due to the extensive nature of the disturbance to the surrounding A Class Reserve, Environmental Approvals would be required.

Compliance
The source rock is severely fractured and weathered. A Geotechnical assessment of the site for the crane works would be required to ensure the safety of a crane or excavator working in the area (OH&S).

Recommendation
There is now very little left of Anastasia's Pool to preserve. The concrete base has been completely washed out of Anastasia's pool. A significant portion of the ledge underlying the structure has broken away. Almost the entire seaward rock wall has been broken up into two main pieces. The remaining section of seaward facing wall has cracking at the base/wall interface.

Anastasia's Pool cannot be repaired. The seaward wall of the pool has broken up into two large boulders and the supporting substrata has disappeared. The repair methodology outlined above would not be in keeping with and demean the heritage and cultural significance of Anastasia's Pool and the surrounding natural beauty of the point.

Provide Signage to identify Anastasia's Pool for future visitors. This outcome would have to be in keeping with the existing visitor information themes at Gantheaume Point.