URGENT REPAIRS TO SEAWALLS AT 44 & 48 CHILDE STREET, BELONGIL

Prepared By

International Coastal Management

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1. BACKGROUND

The existing erosion protection works at, and adjacent to, 44 & 48 Childe Street have been damaged by erosion and wave action. These works have been in a state of disrepair for some time.

The existing erosion protection works consist of rock along the seaward boundary of the subject properties and extending both to the NW and wrapping around the south-east boundary (Figure 1). The property to the NW is private property and the property to the SE is the old jetty site, State owned public lands.

Worley Parsons (WP 2013) prepared a report for Byron Shire Council (BSC) in 2013 entitled “Byron Bay Erosion Protection Structures – Risk Assessment” (WP 2013). Without repairs the existing works could be further damaged, and become increasingly a threat to the public.

WP found all of the structures along Belongil to be substandard as per Table 1 of WP 2013 (copied below). Notes re Table 1:

- The Belongil walls are numbered 2.1 to 3.5.
- The walls along the subject properties form the southern section of Structure 3.1.
- Structures 3.2 and 3.3 have been upgraded in 2015 from geotextile containers to an engineered rock wall.

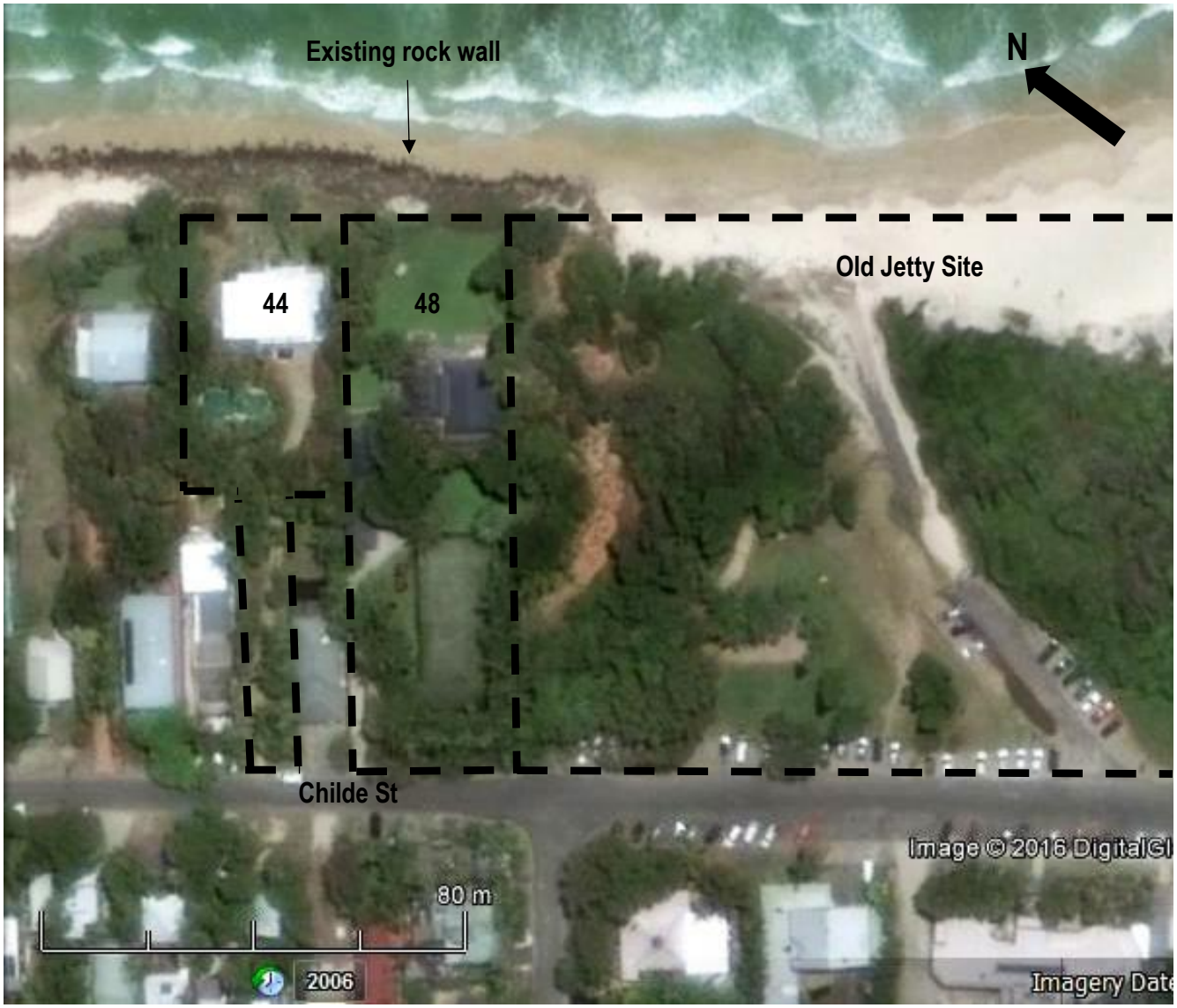

Figure 1 Site location. Rock rubble wall partly visible.

Table 1 Summary of risk Assessment from WP2013, Table 1

Structure No.	Structure Description	Structure Resilience Rating	Coastal Processes Rating	Coastal Ecology Rating	Public Use and Amenity Rating
1.1	Interim coastal protection works at Byron SLSC	HIGH	LOW	LOW	LOW
1.2	Rock protection at Byron SLSC	MODERATE	MODERATE	MODERATE	LOW
1.3	Rock protection in front of the main reserve area adjacent to the surf club, separated from adjacent protection by concrete ramp	MODERATE	MODERATE	MODERATE	MODERATE
1.4	Rock protection in front of main reserve	EXTREME	MODERATE	MODERATE	MODERATE
1.5	Rock protection in front of Jonson Street carpark and east of groyne marking location of original jetty	MODERATE	MODERATE	MODERATE	MODERATE
1.6	Rock protection in front of Jonson Street carpark and west of groyne marking location of original jetty	HIGH	MODERATE	MODERATE	MODERATE
1.7	Rock toe protection in front of First Sun Caravan Park	HIGH	MODERATE	LOW	MODERATE
2.1	Border Street geotextile container interim protection works	LOW	LOW	LOW	MODERATE
2.2	Rock protection adjacent to Border Street works	MODERATE	MODERATE	EXTREME	EXTREME
2.3	Don Street geotextile container interim protection works	LOW	MODERATE	MODERATE	MODERATE
2.4	Concrete cube and rubble protection works adjacent to Don Street works	MODERATE	MODERATE	EXTREME	EXTREME
2.5	Geotextile container revetment adjacent to ad-hoc rubble works	MODERATE	MODERATE	MODERATE	MODERATE
3.1	Rock revetment north of old jetty site	EXTREME	HIGH	EXTREME	EXTREME
3.2	Manfred Street geotextile container interim protection works	MODERATE	MODERATE	MODERATE	MODERATE
3.3	Geotextile container revetment fronting private land adjacent to the Manfred protection works	MODERATE	HIGH	MODERATE	MODERATE
3.4	Rock protection north of the geotextile container revetment	EXTREME	HIGH	EXTREME	EXTREME
3.5	Geotextile container revetment works at northern flank of the rock protection at Belongil Spit.	MODERATE	MODERATE	MODERATE	MODERATE

WP 2013 provided a risk assessment only and no recommendations were made to repair and make safe any of the walls. Since the WP 2013 report:

- Structures 3.2 and 3.3 have been upgraded by BSC to a rock wall and a similar rock wall upgrading is proposed for 2.3.

- WP have prepared a report in 2014 for BSC investigating the options to upgrade at and adjacent to Jonson Street (Collectively referred to as Jonson Street Structure and structure numbers 1.1 – 1.7 in Table 1).
- Periods of beach erosion have occurred including erosion due to a major storm in early June that caused erosion along the NSW coastline and further damage to the walls.

Looking at the detailed hydraulic stability evaluation for 44 and 48 Child St (part of structure 3.1) by WP 2013:

Structure No.	Structure Description	Design standard 30 – 40% damage (from Table 3); initial damage for geotextile revetments	Rating	Comments
3.1	Rock revetment north of old wharf site	<1yr ARI	Poor	Rock armour is too small to withstand estimated wave heights at this structure for events greater than the 1 year ARI

The public use and amenity rating by WP for the private structures along Belongil is between moderate and extreme. The public use and amenity rating for the subject property was extreme. These ratings were in 2013 and the public use and amenity rating may now be worse and the structure should be repaired and made safe. The repair works would improve the public use and amenity rating.

Works to repair the existing seawall structures protecting these properties are to be carried out in accordance with recent Supreme Court of NSW consent orders made 12/8/16.

2. REPAIR DESIGN

To determine the extent of repair works:

- An inspection of the walls covered under the consent orders was carried out by ICM engineers on 13/10/16 to ascertain the present condition.
- Historical photos and surveys held by ICM were reviewed to ascertain the previous condition.

At present, the wall is partially covered by sand but loose rocks are evident (Figure 2 and Figure 3). During erosion events these rocks and concrete blocks can be 2-3m above sand level and there is a risk of them falling. During eroded beach conditions beach users may be forced to use the beach close to the wall and could be at risk.

Figure 2 44 Childe Street (ICM 13/10/16)

Figure 3 48 Childe Street (ICM 13/10/16)

The historical photos show rocks and concrete blocks from the slope have been dislodged and during erosion events there is a wider toe than originally constructed that can adversely impact on beach amenity and safety during major erosion events (Figure 4). These displaced rocks will be removed to the mid and upper slope in a stable configuration during repairs.

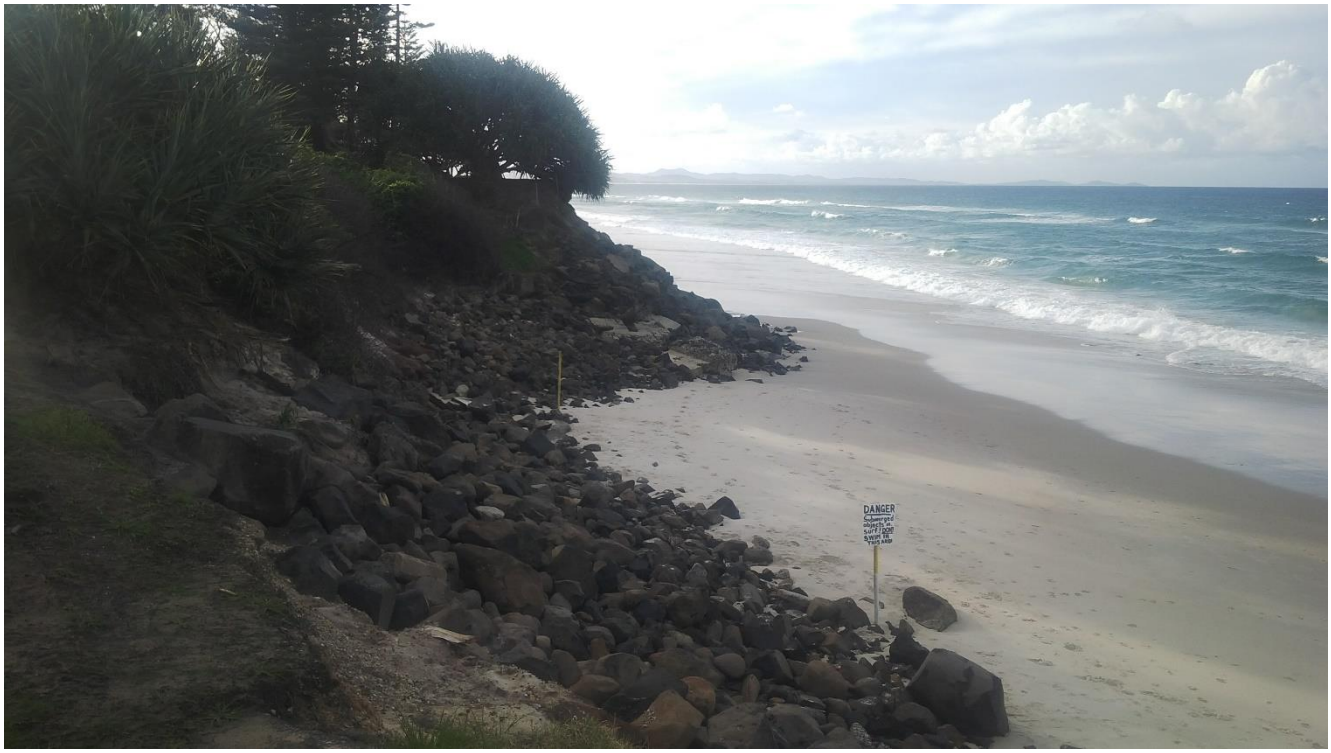

Figure 4 Toe and adjacent wall to southward exposed during erosion in 2013 (ICM photo)

These investigations confirmed that the works are in need of repair. Drawings of the extent of repair works have been prepared (See Appendix 4).

3. REPAIR CONSTRUCTION METHODOLOGY

The proposed methodology is similar to the methodology used to investigate and repair sub-standard private and public seawalls along the Gold Coast.

Works to repair the existing seawall structures protecting these properties are to be carried out as anticipated by recent Supreme Court of NSW consent orders made 12/6/16. The proposed method of carrying out the works is as follows:

- Pre-Construction
  - All approvals and notifications
  - Safety fencing and signage is to be erected as per drawing 007 to restrict public access to the work area.
  - Construction of a temporary construction track from either the sealed section of Manfred Street or alternatively the access track at the Old Jetty Site that is used for access by BSC for maintenance of Belongil Creek mouth or alternatively from the sealed section of Don Street along the southern boundary or 1 Don Street over the existing SFGC wall (covered with 1200gsm non-woven geotextile) onto the beach.
- Construction (5 days per week, 7am to 6pm. Estimated repair time 1 week)
  - Access onto the fenced works area for equipment and materials will be by temporary construction track.
  - The works shall be carried out in 10 – 15m sections starting from the NW end.
  - The toe of the existing wall will be excavated with a 20-30t hydraulic excavator to about -1m AHD and re-profiled to the original stable slope of about 1V:1.5H with the repaired crest at +6m AHD.
  - The works are to have the rocks well interlocked and are to be tied smoothly into adjacent rock walls to the SE and NW.
  - The crest and toe of the works shall be tapered smoothly into the adjacent crest and toe without interference with the existing structures.
  - The wall is to be progressively surveyed and final “as constructed” drawings prepared.
- Post-Construction
  - The beach is to be groomed and left in a clean condition free from rock or rubble.
  - The access track is to be removed and the area impacted by the track revegetated and restored to the original condition.
  - The safety fencing is to be removed.

4. MITIGATION OF IMPACTS

The works have been designed to avoid adverse impacts. Section 55M of the Coastal Protection Act requires that:

> (a*) the works will not over the life of the works:*
>
> *(i) unreasonably limit or be likely to unreasonably limit public access to or the use of a beach or headland, or*
>
> *(ii) pose or be likely to pose a threat to public safety, and*
>
> *(b) satisfactory arrangements have been made (by conditions imposed on the consent) for the following for the life of the works:*
>
> *(i) the restoration of a beach, or land adjacent to the beach, if any increased erosion of the beach or adjacent land is caused by the presence of the works,*
>
> *(ii) the maintenance of the works*.

With reference to the above conditions:

Re (a) (i);

- The proposed works are to make safe existing works by restacking of the wall to restore a stable slope without loose rocks that could be dislodged during erosion events.
- The proposed works will make public access safer by moving dislodged rock from the base of the existing wall and replacing these on the repaired slope.
- The completed repair works will improve public access along the beach.

Re(a) (ii);

- The proposed repair works will improve public safety by restacking loose rock. Thus, the repair works will not “pose a threat to public safety”.

Re (b) (i);

- The proposed repair works will restore a stable slope. Large loose rocks at the toe will be moved landward onto the steeper mid and upper slope of the wall. The footprint of the repaired wall will be smaller and will not extend as far seaward. The repaired wall face will also be less reflective during erosion events. As a result, any impacts on the beach and adjacent land will be the same, or less, than at present. Thus, any repairs will not cause “any increased erosion of the beach or adjacent land”. .
- The proposed repair works will also reduce the risk of erosion and a breakthrough of the Belongil Spit at this site. A breakthrough would result in:
    - Damage to adjacent properties and Childe Street with the associated public infrastructure to westward of the subject property.

Re (b) (ii);

- The proposed repair works can and should be maintained by the landowners after each erosion event that impacts the wall.
- The wall should be inspected after each erosion event that exposes the seaward face of the wall to wave action. This inspection should compare the condition of the wall to the "as repaired" condition after the proposed repairs. Specifically, the inspection should:
    - Identify any loose, broken or displaced rocks.
        - Any loose rocks should be repositioned to be in a well interlocked and stable orientation.
        - Any broken rocks shall be replaced by a sound unbroken rock of similar size as the broken rock and placed in a well interlocked and stable orientation.
        - Any displaced rocks should be removed and replaced in a similar position to the original position in a well interlocked and stable orientation.
    - Check the crest level and seaward slope angle. Any subsidence or slope adjustment should be repaired to the original "as repaired" condition.

5. SUMMARY

Urgent works are required to repair the existing works. This will have positive benefits to the protection of the property, mitigate the need for emergency works and improve public safe use of the beach. There will be no adverse impacts compared to the present situation.

6. REFERENCES

WorleyParsons (2013), "Byron Bay Erosion Protection Structures – Risk Assessment", 301015- 02975, March 2013.