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Ardissone Condominiums C/O Robert McDorman 4400 Gulf Shore Boulevard North, Unit # 501 Naples, FL 34103

#### **RE:** Seawall Assessment for Ardissone Condominiums

This report was prepared for Mr. Robert McDorman, for the property referenced in the subject line above, to assess the seawall of said property. Appendix A provides site photos of the structures with details from the assessment completed on January 22, 2019. THA staff arrived at the site at 7:30 am, low tide conditions were present and the water clarity was average, as a result, the majority of the seawall face was visible. The property has a significant amount of seawall, therefore, for clarity within this report the nomenclature of the structures and structural components are identified in Figure 1 and Figure 2.



Figure 1. Aerial view of the property.



### Seawall Assessment

The seawall at the property is a concrete tongue and groove panel seawall with a concrete cap approximately 1,350 linear feet long, as it surrounds all sides of the peninsula, except for access to Gulf Shore Blvd N. To assess the seawall a THA Staff Engineer paddled around the entire property and walked as much of the seawall as possible. There are two types of seawall on the property; type 1 is located on both sides of the short access road with the guard house and gate, type 2 is along the buildings and boat docks. Underneath building 2, 3, pool, 4 and 5 is the type 2 seawall with a 3 foot high stacked block retaining wall on top of the seawall cap.

Seawall type 1 is an unconventional seawall as it acts more as a gravity wall and roadway with a drainage culvert. The wall has a 10 inch high poured in place cap and seawall panels measured at 5 feet wide, assumed to be 15 feet tall and 6 inches thick based on the exposed face (distance from the mud line to the top of seawall) in that area at 8.5 feet. Overall, this section of seawall was in fair condition with the only defect observed being a horizontal crack across the face of one panel on the south side.

Seawall type 2 is a conventional seawall design with a cap measured at 23 inch wide and 13 inch high, it would have been poured in place with steel reinforcement and a tieback system. The tieback system is likely steel tieback rods that extend at least 15 feet into the uplands with concrete anchors (called deadmen) supporting the seawall. Due to the inspection being noninvasive, neither the tiebacks or deadmen were inspected. The panels were measured at 5 feet wide, assumed to be 14 to 16 feet tall and 6 inches thick based on the exposed face ranging from 7.5 to 10.5 feet. A few unique characteristics were observed; the first is that the corners of the seawall were encased with poured in place concrete, this concrete ensures that the seawall panels do not kick out, however, there are significant voids in the intertidal zone, indication that this concrete is deteriorating. The second is the retaining walls on top of seawall cap along most of the property. The retaining walls are used for flower beds, roadway support and under the buildings. This is unique because the

seawall face and subsequent load is essentially increased several feet from the retaining walls. The third and last is the stormwater system on the property, 99% of the property is hardened and stormwater directly discharges into the bay. As a result, the seawalls are not loaded with the typical amount of hydrostatic pressure by saturated soils. Previous repair work to the seawall was observed during the assessment. Repair work included; patching panel seams and weep holes, installation of jet filters and stainless steel rectangular panel seam covers. The intent of those repairs were to alleviate soil leaching and hydrostatic pressure release. Common defects observed in this section of seawall were sparse minor cracking in the cap, consistent moderate cracking in the seawall panels and structural bleeding. Structural bleeding is the result of salt water intrusion into the concrete, causing corrosion of structural steel. The vast majority of panel cracking observed were located within 50 feet of the property corners. [The following defects observed are outside of the scope of work of this report but should be noted; there was cracking in the overwater foundation pile caps, cracking in the under building retaining wall and leaning/settling retaining walls behind the docks].

### Recommendations & Conclusion

The property was developed and the seawall was installed in the 1970's, making the seawall about 45 years old. Due to the over water buildings, this seawall may have been designed for a longer lifespan but a typical seawall lifespan is 30 years. Overall, the seawall is in fair condition, while it is impossible to predict when the existing seawall will fail, the seawall as is, likely has 5-7 years of safe/useful life remaining. When determining seawall recommendations for this property it is important to keep in mind the impacts to the driveway, parking and building foundation a seawall failure may have to the property. Therefore, seawall failure is not an option. In addition, degradation of the wall is exponential so it is best to complete recommended repair work as soon as possible.

There are numerous path forward options that balance short term and long term repair entombment work, there is no correct path forward just one that works best with Ardissone's available reserves and preferences. Ultimately, the seawalls outside of the docks need to be entombed with riprap to preserve them for the foreseeable future and the dock seawall will be entombed with a new seawall. The following are two path forward options with THA recommended work. Option 1 is to move forward with the long term repair work in the next few years, details below. Option 2 is to complete short term supplemental repairs in the next few years, putting off the long term repair for 10-15 years, also detailed below.

Short term repairs;

- For the type 1 seawall, a helical and c-channel should be installed in the one cracked panel and the culvert should be clean of oysters to better allow flushing of the basin.
- For the type 2 seawall, install a helical and c-channel every 10 feet on center and into every cracked panel with a continues reinforced concrete waler around the entire property up to the access drive (approximately 1,300 linear feet). This repair will provide supplemental support to the existing seawall and extend its useful life. The estimated cost to complete is approximately \$525,000.00.
- The cost of the long term repair will also be incurred but not for 10-15 years.

Long term repair;

The seawalls outside of the docks need to be entombed with riprap to preserve them for the foreseeable future and the dock seawall will be entombed with a new seawall. For planning purposes, the budget below includes rebuilding the docks at the same time the dock seawall is entombed. The estimated cost to complete the replacement and entombment work for the dock and seawall is approximately \$1,570,000.00; a breakdown is provided below.

Description	Total Price
Riprap entombment	\$735,000.00
Seawall entombment	\$292,500.00
Dock Demo	\$20,000.00
Fixed Dock	\$227,500.00
electric/water/fire	\$136,000.00
Site Lighting	\$10,000.00
Dock Accessories	\$8,000.00
Total	\$1,429,000.00
20% Contingency	\$138,800.00
Total with contingency	\$1,567,800.00

Table 1. Cost estimate for seawall and dock rebuild.

As previously stated, there are numerous other path forward options, such as; entomb the seawalls outside of the docks with riprap and install helicals in the dock seawalls in the next few years, then entomb the dock seawall with a new seawall in 10-15 years. Completing more long term repair work now is more cost up front but greater savings over time. These cost estimates do not include any engineering or permitting costs. If you wish to proceed with our company, we can -provide you with a proposal for design, permit and construction management of the recommended repair work.

Sincerely,

Patrick W. Scheele, Staff Engineer / Project Manager

Seawall Assessment Ardissone Condominiums February 2019

## Appendix A – Site Photos



Figure 3. Overview of the seawall (access road seawall, north side)



Figure 4. Overview of the seawall (west side, at the docks)



Figure 5. Overview of the seawall (north side, under the buildings).



Figure 6. Overview of the seawall (east side, under the buildings)



Figure 7. Seawall panel defects and repairs.



Figure 8. Seawall panel defects and repairs.