

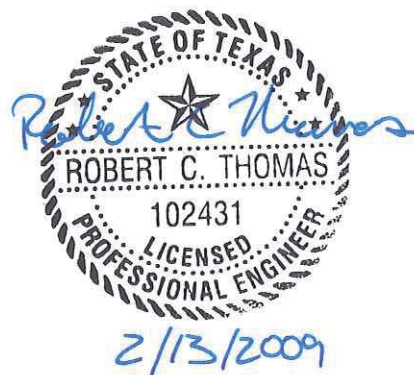
**PROJECT NO. 8**  
**MARINA BREAKWATER IMPROVEMENTS**

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This section is part of an 8-section report. It is only valid in the entire context of the report including the information provided in the cover letter dated February 13, 2009.

## VIII. Project Description

### A. Location

The proposed project repairs and improves the elevated walkway and breakwater on the north side of McGee Beach. The breakwater provides wave sheltering for the marina and storm damage protection for the seawall. Figure VIII-1 shows the location of the proposed project.

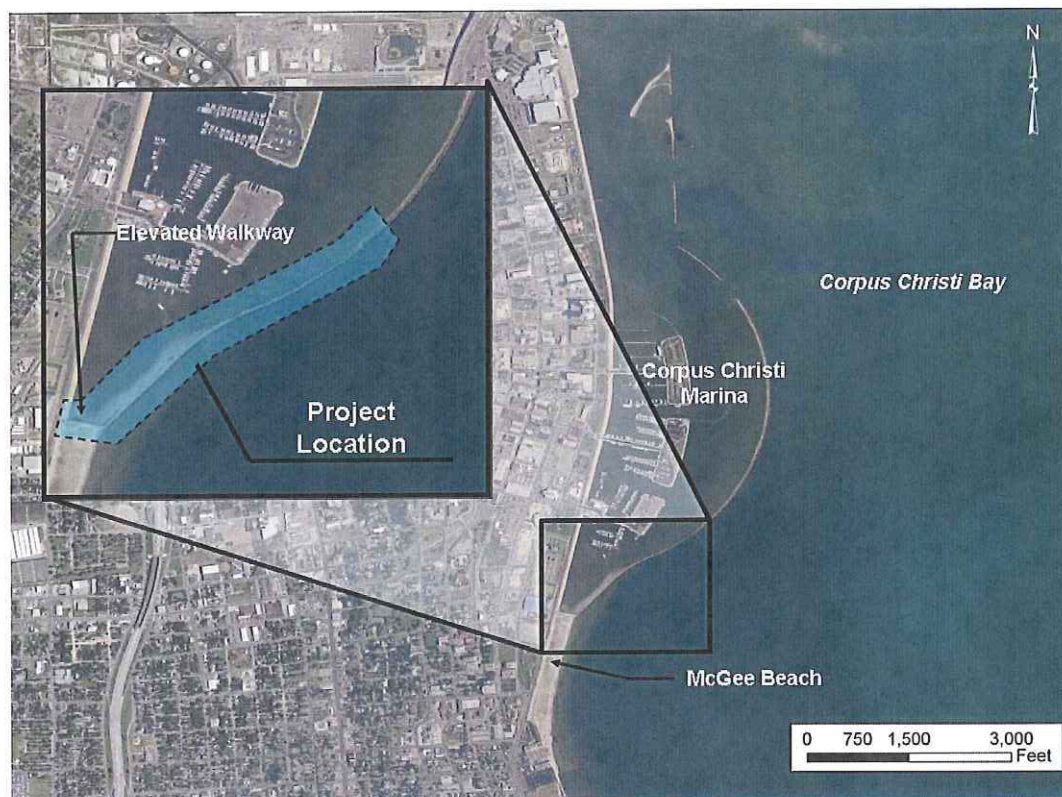


Figure VIII-1. Project location map.

## **B. Existing Site and Facility Conditions**

The marina rock breakwater extends northward from the old Wienerschnitzel building (across the road from the Coliseum) and around the City marina. The breakwater is approximately 5,800 ft long, with the southern 1,800 ft having a 4-ft wide concrete cap for pedestrian access. The breakwater is connected to the seawall by an elevated concrete walkway with a vendor stand. The walkway has significant damage, including spalled concrete and exposed rebar, large cracks, damaged stairs and handrails (Figure VIII-2). Continued degradation of these elements will eventually lead to more significant structural damage, creating a gap in the breakwater that would leave a portion of the seawall more susceptible to potential wave damage during severe storms. In addition, collapse of the walkway could occur during a severe storm, causing structural debris to damage the seawall and landward infrastructure. See attachment VIII-D for additional site photographs.

As a secondary concern, the opening under the walkway allows sand from McGee Beach to be blown into the marina. Loss of sand from McGee Beach increases exposure of the seawall to the south of the breakwater to direct wave impacts, increasing potential for undermining and/or damage during severe storms.



Figure VIII-2. Damage on the access walkway to the breakwater. Also note the gap below the walkway, which allows sand to be blown from McGee Beach into the marina.





Figure VIII-3. Existing breakwater and walkway, facing north.

### **C. Proposed Improvement Description**

The proposed improvements consist of demolishing the existing elevated walkway and constructing a new breakwater and walkway in its place. The existing rock breakwater and walkway will be repaired and raised. These improvements will help fortify the seawall against wave attack by preventing failure of the breakwater and excessive erosion of McGee Beach. Figure VIII-4 shows the location of the proposed improvements.

The proposed improvements consist of the following tasks:

- Breakwater Extension
  - Demolish the elevated walkway and concrete sheet pile from the damaged steps seaward of the old Wienerschnitzel building to the existing breakwater.
  - Extend the existing breakwater approximately 200 ft landward to the remaining concrete pad at the old Wienerschnitzel building.
  - Construct a 6 ft wide, 200 ft long concrete walkway on the new breakwater.
- Repair existing concrete walkway over breakwater
  - Remove broken sections of walkway surface. Approximately 25% of the existing walkway will likely need to be partially removed.
  - Construct/place rock ballast (smaller stones) to fill gaps between larger stone and provide a base for proposed concrete walkway.
  - Build new walkway 2 ft wider and 1 ft higher than original. New walkway will be 6 ft wide.
- Install additional amenities along the breakwater walkway
  - Install electrical utilities and lighting along the length of the breakwater.
  - Install signage, trash receptacle, fish cleaning station and other amenities.

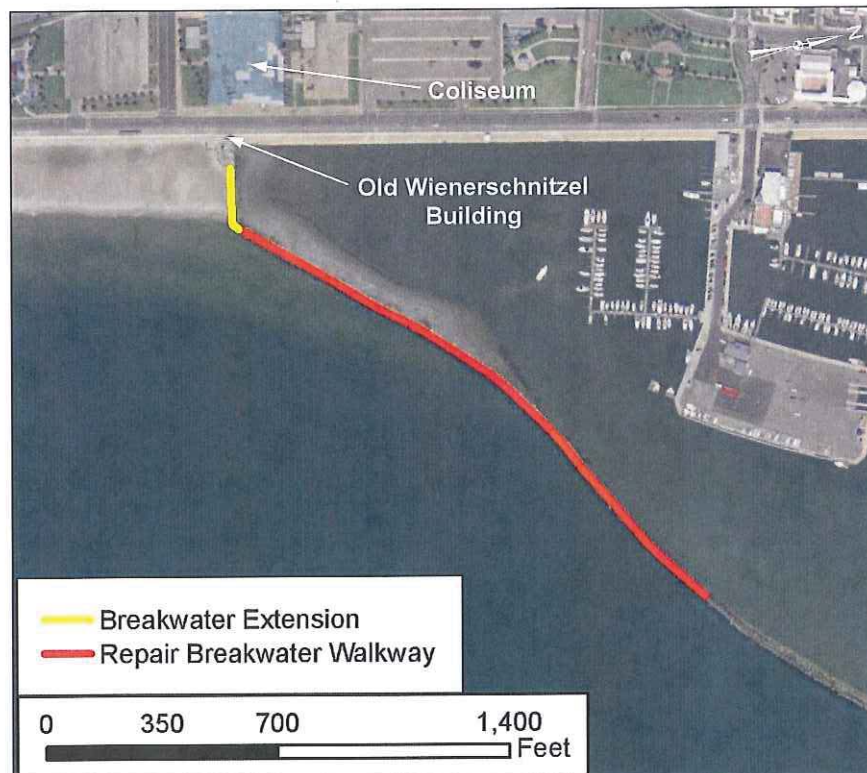


Figure VIII-4. Proposed improvements.



#### **D. Opinion of Probable Project Cost**

The attached conceptual level opinion of cost was developed using conceptual level planning and estimating. As details of the project are developed and identified, more accurate costs can be established.

The opinion of probable project cost (cost) is estimated to be approximately \$2,350,000. However, this cost can vary depending on items including, but not limited to:

- Material availability and fluctuations in raw material, fuel and transportation costs.
- Construction schedules and working restraints.
- General conditions requested of the contractor / professional services by the owner.
- Economic climate at the time of bidding. Typically, when contractors are not busy, one can expect lower prices for construction projects.
- Existing conditions of the facility or location discovered during subsequent field investigations and/or engineering evaluations.

The number reflected above includes a 25% contingency and it is recommended that contingencies not be deducted or reduced at this stage of the project.

Reference Attachment No. 8-A for a more detailed breakdown of the costs.

Key assumptions or clarifications of the cost opinion include:

- 1) 75% of the existing breakwater walkway does not have to be partially demolished.
- 2) Old Wienerschnitzel building does not have to be demolished.
- 3) Quantity take-offs based on limited available data. Accurate topographic and bathymetric data may result in substantial quantity changes.
- 4) Americans with Disabilities Act (ADA) compliance can be difficult to obtain for marine structures. Limited contingency is included for design modifications necessary to comply with ADA standards.

### **E. Opinion of Project Schedule**

The attached opinion of project schedule was developed using conceptual level planning and is provided to illustrate only the anticipated duration of the project from a start date which has not yet been determined. As details of the project are developed and identified, a more accurate schedule can be established.

The duration of the project schedule is estimated to be approximately 16 months. However, this schedule can vary depending on items including, but not limited to:

- Material availability at the time of construction
- Contractor and equipment backlog and availability
- Weather conditions
- Construction schedules and working restraints
- General conditions requested of the contractor / professional services by the owner

Reference Attachment No. 8-B for a more detailed illustration of the project schedule.

Key assumptions or clarifications of the schedule opinion include:

- 1) To be determined.



## **F. Key Project Considerations**

The following key considerations were taken into account during this conceptual level study which will need to be addressed as the project develops:

- Old Wienerschnitzel building and concrete area landward of the elevated walkway does not have to be demolished.
- Limited topographic/bathymetric data were available for developing the project concept. Obtaining and analysis of more detailed size data may result in different requirements for the project.
- Walkway will be 6 ft wide and constructed over the existing walkway where possible. More rigorous assessment of the existing structure may result in identification of additional necessary work.
- Opportunity to improve water quality within the marina may be created by this project. Water quality may be improved by installing culverts through the breakwater and/or improving existing water exchange. Water quality improvement opportunities should be investigated during preliminary design.


In addition, the following are key considerations which will need to be addressed as the project develops:

- Length of the walkway in this proposed layout matches that of the existing walkway. Depending on available funding, a longer or shorter walkway may be opted for.
- The structure, for the purposes of this analysis, was primarily considered for its ability to provide increased storm damage protection to the seawall. This structure has obvious recreational benefits as well. Amenities can be added or modified to tailor the structure to the City's needs.

## **G. Seawall Enhancement Explanation**

In this study, improvements to the seawall and flood protection system have been limited to structural strengthening or enhancements which provide additional protection to individual components of the flood protection system. This project will enhance the structure by:

- 1) Maintaining components of the breakwater and elevated approach walkway that, if otherwise left to continue deteriorating, may result in more significant structural damage and potential failure during a severe storm. Such structural failure would essentially create a gap in the breakwater, leaving greater exposure of the seawall to storm damage.
- 2) Sealing the opening under the elevated approach walkway is recommended to reduce wind-blown sand transport from McGee Beach into the marina. Loss of sand at McGee Beach increases exposure of the southern portion of the seawall to undermining and wave impacts during severe storms.
- 3) Raising the existing breakwater crest by approximately 1 ft over the length of the walkway may help improve wave attenuation during storm surges. Increasing the breakwaters ability to attenuate waves approaching the seawall would reduce wave impacts to the seawall.

<b>OPINION OF PROBABLE PROJECT COST</b>		<b>Project No. 8 - Marina Breakwater Improvements</b>			
<b>Seawall 4A Board Projects Study Corpus Christi, Texas</b>		PREPARED FOR: Pete Anaya, P.E. City of Corpus Christi Engineering Corpus Christi, Texas		Project Manager: D. Brent Moore, P.E. Est. by: RCT HDR PROJECT No.: 105201 UPDATED: February 13, 2009	Checked by: DJH
ITEM DESCRIPTION	QUANTITY		UNIT COST	TOTAL INCL. O&P	EXTENDED TOTALS
	NUMBER	UNIT			
<b>ITEM No. 1 - Construction Surveying</b> <span style="float:right">\$55,000.00</span>					
Bathymetric/Topographic Surveying	1	LS	\$40,000.00	\$40,000.00	
Hazard (Magnetometer) Survey	1	LS	\$15,000.00	\$15,000.00	
<b>ITEM No. 2 - Breakwater Extension</b> <span style="float:right">\$323,300.00</span>					
Demolish elevated walkway	1	LS	\$100,000.00	\$100,000.00	
Foundation preparation	1	LS	\$10,000.00	\$10,000.00	
Geotextile fabric	800	SY	\$7.00	\$5,600.00	
Quarystone and Ballast	200	LF	\$800.00	\$160,000.00	
Breakwater Walkway	200	LF	\$201.00	\$40,200.00	
Concrete Transition	1	LS	\$7,500.00	\$7,500.00	
<b>ITEM No. 3 - Improve Breakwater Walkway</b> <span style="float:right">\$900,600.00</span>					
Demolish unsalvageable walkway	450	LF	\$100.00	\$45,000.00	
Ballast Stone	1,800	LF	\$200.00	\$360,000.00	
Improve Breakwater Walkway	1,800	LF	\$167.00	\$300,600.00	
Temporary Floatation Channel (optional)	39,000	CY	\$5.00	\$195,000.00	
<b>ITEM No. 4 - Additional Items</b> <span style="float:right">\$85,000.00</span>					
Electrical Line/Lighting Breakwater Walkway	2,000	LF	\$30.00	\$60,000.00	
Trash receptacles, signage, etc	1	LS	\$25,000.00	\$25,000.00	
<b>ITEM No. 5 - Overhead and Miscellaneous</b> <span style="float:right">\$460,975.00</span>					
Mobilization / Demobilization				\$100,000.00	
Insurance / Bonds				\$20,000.00	
Contingency (Subtotal x 25%)				\$340,975.00	
<b>SUBTOTAL (Work Items)</b> <span style="float:right">\$1,769,875.00</span>					
<b>Overhead and Miscellaneous Costs</b> <span style="float:right">\$566,362.00</span>					
Permitting	(Subtotal x 5%)			\$88,494.00	
Basic Services Engineering	(Subtotal x 12%)			\$212,385.00	
Additional Services - (Geotech/Surveying)	(Subtotal x 5%)			\$88,494.00	
Construction Observation / Administration	(Subtotal x 5%)			\$88,494.00	
Materials Testing	(Subtotal x 0%)			\$0.00	
Engineering Services (City of CC)	(Subtotal x 3.5%)			\$61,946.00	
Bond Issuance (City of CC)	(Subtotal x 1%)			\$17,699.00	
Miscellaneous (Printing, Advertising, Etc.)	(Subtotal x 0.5%)			\$8,850.00	



ITEM DESCRIPTION	QUANTITY		UNIT COST	TOTAL INCL. O&P	EXTENDED TOTALS
	NUMBER	UNIT			
PROJECT GRAND TOTAL (Including Contingency)					\$2,336,237.00

Notes and Assumptions:

1. ADA compliance included in contingency
2. Walkway that must be demolished will be based on rigorous investigation. Conceptual opinion is based on 25% of total length.
3. New walkway is based on 6 ft wide by 12 inches thick.
4. Walkway volumes based on limited field data. Detailed survey will be required.
5. Cost based on assumption that old Wienerschnitzel building is structurally sound and does not have to be replaced. Rigorous structural investigation should be performed.
6. Connection from the breakwater extension to the old Wienerschnitzel area will include concrete transition.
7. BW walkway will consist of small stone (approx 3 to 12 in diameter) to reduce voids, 3000 psi concrete filler with RC placed for the walkway cap.
8. Lengths are approximate based on aerial photo and limited ground measurements.
9. Construction methods may employ the optional floatation channel at the Contractors preference.
10. Cost of new breakwater walkway is based on bids from TAMU-CC beach.
11. Cost for improved walkway based on \$400/CY concrete.

Project No. 8 - Marina Breakwater Improvements

ID	Task Name	Duration	Start	Finish	May	June	July	August	September	October	November	December	January	February	March	April
1																
2	Project No. 8 - Marina Breakwater Improvements	466 days	Mon 6/1/09	Mon 3/14/11												
3	Permitting	9 mons	Mon 6/1/09	Fri 2/5/10												
4	Engineering Phase	6 mons	Mon 6/1/09	Fri 11/13/09												
5	Bid Phase	76 days	Mon 2/8/10	Mon 5/24/10												
6	Construction Phase	210 days	Tue 5/25/10	Mon 3/14/11												

Project: Gantt Chart 1  
Date: Fri 2/13/09

Task



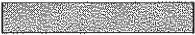
Progress



Summary



External Tasks



Deadline



Split



Milestone



Project Summary



External Milestone



Project No. 8 - Marina Breakwater Improvements

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Task

Progress

Summary

External Tasks

Deadline

Split

Milestone

Project Summary

External Milestone