GEORGETOWN WATERFRONT STUDY

for

CITY OF GEORGETOWN

SOUTH CAROLINA

PRELIMINARY DRAFT

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HENNINGSON, DURHAM & RICHARDSON, INC.,
Of North Carolina
ARCHITECTS ENGINEERS PLANNERS

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CHAPTER I

INTRODUCTION

A. GENERAL

The City Council of Georgetown retained the consulting firm of Henningson, Durham & Richardson, Inc., of North Carolina to develop a proposed plan of improvements for the waterfront area and prepare a preliminary design of the proposed plan. During the development of the plan, the Corps of Engineers were consulted to incorporate their ideas. The primary purpose of the study was to determine if a bulkhead could be constructed in the Sampit River behind Front Street within the constraints imposed by the Corps of Engineers and the types of soils in the River bed but in accordance with the proposals of Mr. Russell Wright. Mr. Wright's proposals are presented in the report entitled, "A Presentation Plan For The Georgetown Historic District." Furthermore, the type of construction and materials utilized were to be identified.

The soils investigation was conducted in two phases and the results are presented in Chapter 2. The structural aspects and construction techniques for the proposed improvements are described in Chapter 3.

The length of the bulkhead was identified as beginning behind the Naval Reserve Building and continuing along the shore to a point behind the Rice Museum. This distance is approximately 1600 feet and parallels the three blocks between King & Screven Streets. The shoreline of the Sampit River curves in along this reach of the waterway and the distance from Front Street to the River is at a minimum at Broad Street. Initially, the bulkhead was to protrude 100 feet into the River at each end and was to be a straight line between these end points, Under such a configuration the width would vary from 100 feet on the ends to about ~~185~~ 200 feet at the end of Broad Street. However, the Corps of Engineers objected to such a large encroachment at

Broad Street. Therefore, the width selected was a constant 100' and parallel to the shoreline. ~~See~~ as shown in Figure 1. The concept of building a causeway across the River to Goat Island would not be ~~totally~~ ~~un~~acceptable ~~by~~ to the Corps of Engineers.

E. HISTORICAL ASPECTS

Except for large plantations, little settlement of what is ~~not~~ now Georgetown took place until the late 1720's at which time it was laid out as Prince George Parish, named in honor of King George II. At that time two important crops were grown in the area, namely, rice and indigo. The planters employed a unique system of irrigation based on the rise and fall of the tides. Later Georgetown became an important shipping center with large quantities of lumber and naval stores passing through the area. Today the City is an important manufacturing center with International Paper Company and Georgetown Steel Corporation being the largest industries.

The Georgetown Historic District was added to the National Register of Historic Places in 1971. The Historic District is an area of approximately 220 acres and is bounded by the Sampit River, Wood, Church (U. S. Route 17), and Meeting Streets and includes virtually all of the land as laid out for sale in 1735 except those adjacent to the Sampit River. Today, the Historic District is the core area of the City and serves as the major business area for much of the Waccamaw region. THE HISTORIC DISTRICT IS SHOWN IN FIGURE 2.

The "Preservation Plan for the Georgetown Historic District" presented three determinants for the Preservation Plan and these were as follows:

1. Maintain vistas to the Sampit River
2. Preserve the original grid plan of the City
3. Capitalize on the asset of having a waterfront.

The vistas to the waterfront have been maintained in the proposed improvements. The City's grid system for laying out the streets and lots is not effected by these improvements. The proposed plan of improvements concentrates on the asset of having a waterfront and suggests methods whereby Georgetown could capitalize on such a possession. ~~The~~ One major concern in attempting to ~~do so~~ benefit from ~~having~~ developing the waterfront is defining the revenue generating capabilities of the waterfront area. This financial concern is addressed in Chapter 5. The architectural concepts of the proposed plan are presented in Chapter 4.

PRELIMINARY

CHAPTER 2

SOILS INVESTIGATION

A. INTRODUCTION

The soils investigation was performed in two phases. The first phase entailed taking soil borings in the Sampit River and the second phase involved taking soil samples in Winyah Bay. The soil borings provided the information needed to determine what type of construction and material would best suit the proposed plan. The soil samples from Winyah Bay would indicate the quantity, quality and location of fill material available. The detailed soils reports are available upon request.

B. SOIL BORINGS IN SAMPIT RIVER

There were 16 borings taken in the area of the proposed waterfront improvements. Ten of these borings were marine borings made along the proposed bulkhead line and were designated by the letter "B". Six of the borings were made along the tie-back line (basically the existing shoreline) ~~basically)~~ and were designated by the letter "T". Four of these "T" borings were made on land and two were marine borings. The locations of these 16 borings are shown in Figure 3. The results of these borings are depicted in Figures 4, 5 and 6.

C. SOIL SAMPLES IN WINYAH BAY

Three areas were selected in Winyah Bay for investigation for possible hydraulic fill material. These areas were labeled zones 1, 2 and 3 as shown in Figure 7. The maximum pumping distance considered to be economical was 12,000 feet. The 12,000 foot radius line from the proposed project site is delineated in Figure 7.

Zone 1 was investigated first and ample quantities of suitable backfill material were found in the southern portion. Hence, Zone 2 and 3 were not examined. It is estimated that approximately 1.5 million cubic yards of material are available.

PRELIMINARY

CHAPTER 3

STRUCTURAL CONSIDERATIONS

Five structural alternatives were investigated for providing a hard-stand area along the waterfront behind the business district in Georgetown. The general location and size of the bulkhead is shown in Figure 1.

The basic design parameters used in developing the structural alternatives were as follows:

1. The proposals of Russell Wright should be implemented insofar as possible.

2. The structure must be in accordance with the limitations established by the Corps of Engineers.

3. The waterfront area should be approximately 100 feet wide and should parallel the existing pierhead-bulkhead line from King Street at the Naval Reserve Building to Screven Street at the Rice Museum (Old Town Hall).

4. The necessary construction techniques should be environmentally acceptable.

5. The elevation of the new area should generally match the existing elevation of Front Street along the waterfront.

6. ,The structure should be amenable if phased construction.

7. The structure should be designed for long life and low maintenance.

To satisfy the design parameters and provide a common base for comparing alternatives, the following assumptions were made:

1. The finished grade was assumed at + 6.0 mean low water (mlw) which approximately matches the existing elevation of Front Street.

2. Future dredging below -12.0 mlw was not anticipated.

3. A 100 foot encroachment beyond existing pierhead-bulkhead line would receive favorable consideration by the Corps of Engineers.

Design of five alternatives has been developed to the point that the advantages, disadvantages and relative costs of each has been identified.

The cost estimates are preliminary estimates based on the conceptual designs and are intended to form a basis for selecting the alternative or alternatives to be pursued in final design (if the proposed project is undertaken).

PROBLEM AREAS

Of the problems encountered, several affected all alternatives and these will be discussed in the following paragraphs.

1. "Zero-blow" Mud

The hard calcareous clay layer (Marl) at an average depth of -18.0 mlw was overlain by approximately 7 feet of very soft, organic, silty clay. This "zero-blow" mud causes two problems: (1) it exerts very high lateral loads on walls or confining structures when surcharged; (2) it consolidates very slowly. The first problem is relatively easy to solve by providing heavier wall sections and anchorages. The increased costs of the heavier members is offset by the savings of not having to remove the unsuitable material. The second problem is more troublesome. Consolidation under load would be slow, requiring possibly years to reach equilibrium. Extensive provision for vertical drainage could be provided, but careful evaluation of the consolidation process and the resulting costs would be necessary. Settlement due to the decomposition of the organic franction of the clay would be even more diffcult to predict and could continue indefinitely. Neither of these problems prevents placing sand fill over the mud, but they would prohibit the use of the hardstand area for several years. With such an indefinite delay combined with the relative costs associated with removal of the unsuitable mud and replacement with sand fill, it was concluded that the "zero-blow" mud be removed before placing the sand fill.

2. Availability of Suitable Dredged Fill Material

Discussions with local dredging firms indicated that finding an adequate source of suitable dredge material near the site was questionable. The area near the Holiday Inn in the Pee Dee and Black Rivers was used as a borrow area for reclaiming the marshland on both sides of Highway 17. Some dredge material was still available in this area at the end of the project but it conained considerable amounts of mud and organic matter. Due to the presence of this material, approximately 3 to 4 times as much material as required would have to be pumped. Furthermore, changes in the quantity or quality of the dredge material may have occurred in the ensuing years. Therefore, it was decided to obtain soil borings in Winyah Bay to determine the location, quantity and quality of suitable dredge material.

For the purposes of estimating it was assumed that a pumping distance of 12,000 feet from the waterfront area would be required. This distance would permit use of nearly any source found in Winyah Bay.

Discussions with local dredging firms indicated that there were 3 areas having the greatest potential for finding the necessary dredge material. These areas and the results of the soils investigation are shown in the appendix. The main question that was anasered was that suitable dredge material in sufficient quantities is available in Winyah Bay within the selected 12,000 foot pumping distance. (The borrow area is south-southwest of Waccamaw Point about 800 to 1,000 feet.)

Due to the significatn pumping distances required, consideration should be given to allowing alternate bids for trucked-in fill. Dredging firms estimate dredging costs for 12,000 foot pumping distance are currently about $2.65 per cubic yard. This assumes 90,000 cubic yards and 30 percent unsuitable material. Since a flat fee hauling charge of $2.00 per cubic yard is common for the Georgetown area, it is not likely that trucked-in fill would be economical unless the relative economics of dredged versus trucked fill would change significantly.

3. Penetrating the Calcareous Clay and Cemented Shell Layers

Construction problems associated with trying to penetrate the cemented shell layer are evident from the random spacing and misalignment of the prestressed concrete piles at the steel mill dock at Georgetown. Early attempts at designing a conventional sheet pile bulkhead anticipated driving the sheet pile through the hard clay to the cemented shell with the required embedment being obtained by placing sand fill along both the inside and outside faces of the bulkhead line. Soil tests for determining design parameters for the hard clay layer revealed the extreme difficulty or, in many cases impossibility of driving sheet pile into the clay layer. This finding essentially eliminated a conventional bulkhead from consideration and indicated the desirability of predrilling bearing piles into the hard clay and cemented shell layers to achieve the required fixity. Additional informatiok on the nature of the foundation materials is contained in the correspondence from Soil Consutlants, Inc., copies of which are included in the Appendix.

4. Flood Levels in Georgetown

A basic assumption of this study was that the finished grade of the hardstand area should match the existing elevation of Front Street or about + 6.0 mlw. Information from the Corps of Engineers indicates that this level is even below the 10-year flood level, which on the average occurs once every 10-years.

This predicted 10-year flood level (8.03 feet mlw) increases to 11.63 feet mlw for the 25-year flood and to elevation 16.23 mlw for the 100-year flood. It is interesting to note that, by comparison, in the early days of Georgetown's history the maximum height of roofs on the buildings along the river side of Front Street was restricted to not over 15 feet above mean low water.

The flood potential in Georgetown is obviously very great, However, it is unrealistic to expect that the flooding situation could be significantly altered by the proposed waterfront improvement, and thus no consideration has been given to trying to find ways to elevate the hardstand area above the 100-year level. It may be desirable, however, to raise the hardstand area to + 8.0 or + 10.0 mlw to keep it above the less-frequent floods. In the discussion of each alternative the relative costs for the structural provisions necessary to raise the finished grade of the hardstand area to + 10.0 mlw are discussed.

The potential flooding situation combined with recent federal policy decisions concerning development in flood prone areas essentially rules out the possibility or desirability of building any type of building or structure on the waterfront area that could not withstand a flood. Inasmuch as the insurance rates for existing properties are actuarially determined under the Federal Insurance Administration (Dept. of HUD) and thus dependent on frequency of flood damage, ways of reducing flood damages and flood insurance rates should be identified and evaluated prior to selecting the finished grade elevation of the proposed hardstand area.

STRUCTURAL ALTERNATIVES:

Alternative 1 - Conventional Anchored Sheet Pile Bulkhead - Figure 2

As mentioned earlier, a conventional anchored sheet pile bulkhead was determined to be unfeasible due to the inability of driving the sheet pile to the required penetration through the hard calcareous clay layer (marl) overlying the cemented shell. Suitable embedment could be provided by placing fill on both sides of the bulkhead, but the fill on the river side would have to extend up to elevation + 1.0 mlw which would interfere with the navigation channel and would not offer any advantage over Alternative 2.

Alternative 2 - Rockfill Berm - Fugure 3

A rockfill berm or jetty around the outer limits of the hardstand area avoids the problem of having to penetrate the hard underlying soils.

The rockfill berm would have to be backfilled with sand. To provide a solid foundation for the berm, the organic silty clay mud would have to be removed prior to placing the rockfill. Since mud has a tendency to flow into an excavation and since the base width of the rockfill berm would be at least 90 feet, this alternative would require removal by dredging of unsuitable material from a much larger area than a structural bulkhead arrangement.

A major disadvantage of this alternative is that only a portion of any newly acquired area would be usable because the sloping face of the berm requires a horizontal distance of about 22 feet to go from the - 12.0 mlw dredge level at the new pierhead-bulkhead line to elevation + 6 at the hardstand area. It was assumed that the pierhead-bulkhead line would be relocated 100 feet ~~into the water.~~ from shore. This resulted in only a 78 foot hardstand width rather than the 100 foot width provided by the other alternatives. Thus, the cost estimate for the rockfill berm alternatives cannot be directly compared with the other cost estimates.

Advantages of rockfill berm are that the rip-rap slope would provide a rugged shore line and pleasing appearance. However, the rockfill and the rip-rap would have to be trucked-in at a present cost of $6.04 per ton for granite rock dumped at the site. In addition, the rock would have to be reloaded onto a barge for final placement. Since this alternative does not satisfy the design parameter of providing a 100 foot wide waterfront area, it is not included in the alternatives recommended for final design.

<u>Alternative 3</u> - Structural Relieving Platform - Figure 4

A relieving platform, which is a pile supported concrete slab, would avoid the expense of removing the soft mud and replacing it with sand fill. Since this alternative requires a limited amount of fill, trucked-in fill could be used, thus avoiding the high cost of dredge mobilization and pumping through up to 12,000 feet of pipe

The structural relieving platform would be constructed by driving some 686 vertical 16-inch octagonal, prestressed piles on a 15 by 16 foot grid. Lateral stability would be provided by 198 battered piles spaced between the vertical piles along the outer edge of the structure. In addition, predrilling would be required to insure a reasonably true placement of the piles. The piles would penetrate the hard calcareous clay layer and extend approximately another 10-feet into the cemented shell. A transverse reinforced concrete beam would be poured between pile tops and 6-inch thick precast concrete panels would span between the transverse beams. A 4-inch topping of reinforced concrete would be poured over the precast slabs to form a monolithic unit capable of sustaining the weight of earthen fill and other superimposed loads.

If it is decided to raise the finished grade elevation, this alternative would offer a particular advantage in comparison to the others in that the height of the structure could be raised by lengthening the piles at a moderate increase in cost.

A disadvantage is that a relieving platform requires more difficult and sophisticated construction techniques than bulkhead type construction. The hard underlying soil layers would require predrilling for placing the piles and add considerably to the construction cost which made this alternative the most expensive method investigated.

Alternative 4 - Soldier Piles with Sheet Pile Diaphragm - Figure 4

A procedure which offers several advantages for the foundation conditions found at Georgetown consists of heavy steel soldier piles driven into the hard clay and cemented shell connected by a sheet pile diaphragm to confine the fill. The soldier piles would be driven into predrilled pilot holes as in the relieving platform option, but only 90 piles, instead of 686, would be required. The space between the steel piles and the pilot hole would be backfilled with concrete placed through tremies (flexible hoses for placing concrete underwater).

This concrete encasement would serve to provide a uniform bearing area for transmitting the horizontal loads from the backfill into the foundation. The soldier piles would have a sheet pile section welded to the inside face prior to placement. The intermediate sheet pile sections could then be driven to the top of the hard clay layer. The only penetration required would be enough to hold the sheet piles in place during the dredging operation to remove the unsuitable mud from inside the bulkhead. After the sand fill is placed, the sheet pile sections would be in tension and would no longer require embedment.

By being able to install the complete bulkhead, except for access for the dredge, prior to any dredging or filling, adverse environmental effects from the dredging operation and the need for silt curtains would be minimized. This method would also minimize the volume of mud to be removed since no dredging outside the bulkhead would be required as with a rockfill berm.

A tie-back anchor would be required at each soldier pile, but the tie-back and anchorage could be installed above low water level as the fill is placed. The anchorage would consist of 6 feet by 10 feet sections of sheet pile located 60 feet behind the bulkhead and connected to the bulkhead with tie-rods. Tie rods would be 1-3/4" diameter high strength rods with upset threads.

To minimize maintenance increase life expectancy and improve the aesthetics of the installation, all sheet pile and hardware would be made of corrosion resistant steel such as USS Mariner Steel. Increasing the height of fill to + 10.0 mlw with this option would require going to a heavier soldier pile (W24 x 145) and increasing the size of the anchorage system. The only other expense would be that of the increased volume of fill.

Alternative 5 - Cellular Cofferdam - Figure 6

The final alternative is a sheet pile cellular cofferdam forming a gravity retaining wall to retain the sand fill. This type of construction would normally not be used for a bulkhead as it requires 3 times as much sheet pile per foot of wall as a conventional anchored bulkhead. However, in this case with firm strata at shallow depth plus the advantage that the cellular cofferam could be placed directly on the clay layer, the increased costs of sheet pile are offset by the savings of not having to predrill and drive piles into the cemented shell.

Construction would be reasonably simple, with sheet pile being driven in the cellular pattern before any dredging is required. A disadvantage of this method is that removal of the unsuitable material and subsequent backfill within the cells would be more difficult. There may be an advantage to removing the "zero-blow" mud prior to placing the cofferdam although this would require a much larger quantity of mud to be dredged.

As with Alternative 4, mariner steel or a similar corrosion resistant steel should be used in order to minimize maintenance increase life expectancy and improve the aesthetics of the installation.

To raise the finished grade with this option, the cofferdam cells would have to be larger as well as higher. Preliminary design suggests that a mean cell diameter of approximately 30 feet would be adequate for finished grade elevations up to + 10. mlw.

COST COMPARISONS OF STRUCTURAL ALTERNATIVES

The following preliminary cost estimates are based on the conceptual structural designs and are intended only to form the basis of selecting the best structural alternatives for final design. These estimates do not include any provisions for utilities, paving, landscaping, restoration of existing buildings or other surface treatment. The costs of such items would be essentially the same for any of the structural alternatives.

Bulkhead Alternative	Estimated Structural Cost + 6.0 mlw		+ 10.0 mlw	
	Total ($\$ \times 10^6$)	\$/Sq.Ft.	Total ($\$ \times 10^6$)	\$/Sq.Ft.
1. Conventional Sheet Pile (1)	-	-	-	-
2. Rockfill Berm (2)	1.9	16.03	0.6	5.97
3. Relieving Platform	3.7	23.59	0.1	0.38
4. Sheet Pile W/Soldier Piles	2.5	16.02	0.2	1.26
5. Cellular Cofferdam	2.7	17.13	0.2	1.14

(1) This alternative not feasible for Winyah Bay, see text.

(2) Alternative 2 provides 22% less surface area

CONCLUSIONS

It has been concluded that both Alternatives 4, Sheet Pile with soldier piles, and 5, Cellular Cofferdam, to be developed during final design and that alternative bids be taken on each. This arrangement would allow contractors to select the system best fitted to their operations and should result in lower bids. There is not enough difference in the preliminary costs to predict with certainty which of these methods would be less expensive.

The structural relieving platform would be considerably more costly than the other alternatives and thus, can be dropped from further consideration unless the City of Georgetown would be unable to obtain a permit for dredging the organic silty clay mud. The rock-fill berm could be considered further if either the pierhead-bulkhead line could be moved further into the river, in which case the cost would increase, or if a 78-foot wide area rather than the 100-foot area could be used. It should be noted that raising the finished grade would also weigh against further consideration of this alternative.

As discussed earlier, it is recommended that the "zero-blow" mud be removed down to the hard clay layer and be replaced with clean sand fill.

While there is every indication that hydraulically placed fill will be more economical than trucked fill, it is recommended that the specifications allow either method at the contractors option.

The final conclusion resulting from the consideration of structural alternatives is that a detailed evaluation be made to determine the potential for providing flood protection for the City of Georgetown. This evaluation should include a determination of applicable flood insurance rates and the effects of various measures on those rates. This information should be available before adopting the final elevation and details of the waterfront improvements.

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CHAPTER 4

ARCHITECTURAL CONCEPTS

A. INTRODUCTION

A conceptual design for the buildings and landscaping was developed for the proposed waterfront area. The conceptual sketch shown in Figure 12 merely suggests what could be done on the reclaimed area. More details are shown in Figures 13 and 14 which are given in Section D of this chapter. The shape and location of the shops and amenities can be altered or omitted as deemed necessary.

B. BASIS OF CONCEPT

The criteria selected to develop the conceptual design were as follows:

1. Waterfront development should financially benefit both the public and private sector in addition to providing amenities for the general public.

2. Waterfront development should be compatible with restoration and preservation of the Georgetown Historic District.

3. Waterfront development should have a uniqueness that attracts people.

4. Waterfront development should improve traffic conditions where possible.

In view of these criteria, the following specific objectives were chosen as a guide in the development of the waterfront improvements:

1. Insure that waterfront development will contribute to the tax base of Georgetown.

2. Restore, renovate or re-use all structures which are structurally sound or which have historical merit.

3. Maintain the visual quality and character of the Historic District with new construction through similarity of materials and scale without compromising the integrity of historical structures by direct copy.

4. Maintain vistas to the Sampit River.

5. Insure the most efficient use of funds through coordination of public and private sectors.

C.

~~B~~. OVERVIEW OF ARCHITECTURAL CONCEPT

The portion of the waterfront area between the Welcome Center at Broad Street and the Rice Museum culturally would be oriented with an exhibition/pavilion building, open-air theatre, greenhouse and garden areas. The portion of the area between the Welcome Center and the Naval Reserve Building would be commercially oriented but dispersed with grassed areas, ~~and~~ shrubs and trees. The area near the Naval Reserve and Kaminski House would be historically oriented. ~~However,~~ It should be noted that the Rice Museum and Kaminski Hardware, which is adjacent to the Rice Museum, are also of historical significance.

Pedestrian crosswalks and "sidewalk islands" should be provided along Front Street at the intersections with Screven, Broad, Orange, and King Streets. The purpose of such a feature would be to improve pedestrian safety and the aesthetics of Front Street without impeding traffic flow.

The present concept provides access for emergency and service vehicles at the rear of all of the existing buildings along Front Street. All of the proposed buildings would also be accessible to vehicular traffic as required.

Any new construction would have to be oriented in such a fashion so as not to obstruct the view of the Sampit River from Screven, Broad or Orange Streets.

The existing mini-park at Broad Street provides an aesthetically pleasing interface between the existing business district and the Welcome Center on the Waterfront. The Welcome Center would orient and provide information to visitors.

The greenhouse and park area near the exhibition building would compliment the existing mini-park at Broad Street along with the privately developed "mini-park" behind the Rice Museum.

D. LANDSCAPING

The landscaping on the reclaimed area would generally consist of pedestrian boardwalks, grassed areas, secluded parking lots, shrubbery and small trees, such as a palmetto or crape myrtle. The parking areas would be screened from view by wooden fences or bamboo screens.

Park benches, similar to "Charleston" benches, would be placed at appropriate locations along the waterfront. Lighting could be provided by either gas burning fixtures or electrical fixtures that simulate gas fixtures. All of the outdoor furniture should blend in with the historic flavor and character of Georgetown.

It is suggested that most of the buildings have a rustic tone but be of such material and construction that they would have relatively long life, low maintenance, and not be easily damaged by water.

Some terracing can be provided to allow a change in grade for aesthetic purposes, but the area will have to be relatively flat to prevent frequent flooding and simultaneously not drain into the rear of the existing buildings on Front Street.

It is suggested that the walkways be constructed of either treated lumber, textured concrete or brick. A blend of the three materials with the economics of each kept in mind would be desirable.

Approximately 85 parking spaces would be added to the business district under the proposed plan. The majority of these would be on the west end of the area to coincide with the commercial activity and in particular the restaurant. As mentioned previously, each parking area would be screened from view.

E ~~D~~. INDIVIDUAL FEATURES

It is suggested that the west end of the bulkhead area be joined to the grounds of the Kaminski House by a foot bridge. Such a feature would allow a change in the pattern of the walkways provided elsewhere along the waterfront.

The elevated restaurant would be a primary revenue generator not only during the business day but also in the evenings and on weekends. Such a feature would increase the length of time the reclaimed area was utilized and therefore, increase the revenue potential of the area. A sketch of the restaurant is shown in Figure 13.

The commercial buildings near the restaurant would consist of individual shops such as gift shops or a fish market (not for processing fish). A small courtyard could be located in front of or between the commercial buildings. Some of the commercial shops could justify being open in the evenings during the tourist season and thereby increase the revenue potential of the waterfront. A sketch of the commercial area and view towards Orange Street is shown in Figure 13. A sketch of the commercial area and view along the edge of the bulkhead towards the east end of the waterfront ~~area~~ is shown in Figure 14.

COST SUMMARY

Structural		$2,600,000
Landscaping		500,000
Utilities		150,000
Renovations		175,000
New Construction		1,150,000
Legal, Engineering & Cont.		825,000
	Total	$5,400,000*

* Not all of the costs would be incurred by the City. Utilities, renovations and new construction would have some private money involved.

ADD TEXT TO EXPLAIN ITEMS ABOVE & FINANCING METHODS