

**COMPUTATION SHEET**

Project: **Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study**

Labor No. **L62212**

**Project #1: Jefferson Parish-St. Charles Parish Return Levee and Reach 1**

**Return Levee:**

Reference Drawings:

1. Jefferson Parish-St. Charles Parish Return Levee, Airport to West Esplanade Floodwall, USACE, 1988
2. Jefferson Parish-St. Charles Parish Return Levee, West Esplanade to Lakefront Floodwall, USACE, 1989
3. Jefferson Parish-St. Charles Parish Return Levee, I-10 and Lkft B/L 0+86 to 9+00 Floodwalls and Return Levee Landscaping, USACE, 1993
  - Existing T-wall @ El. +13.5 from W/L 2+00 to 65+57.95
  - Existing T-wall @ El. +14 from W/L 65+87.95 to 92+72.95
  - Existing T-wall @ El. +14 from W/L 94+40 to 125+00
  - Existing T-wall @ El. +15 from W/L 125+00 to 140+99.62
  - Existing T-wall @ El. +14.5 from W/L 140+99.62 to 173+36.62
  - Existing T-wall @ 1V to 100H from W/L 173+36.63 to 175+86.62
  - Existing T-wall @ El. +17 from W/L 175+86.62 to 180+91.62
  - Existing Sheet Pile @ El. +17.5 from 181+19.62 to 182+14.47
  - I-10 Floodwall, Existing T-wall @El. +13.5 from 28+50 to 29+30 and 31+89.3 to 33+09.3
  - I-10 Floodwall, Existing I-wall from 29+30 to 31+89.3, El. varies from +13.5 to +11.5 when crossing under highway
  - Existing Pedestrian Gate @El. +14 @ W/L C/L 92+12.95
  - Existing Swing Gate @ El. +17 @ W/L C/L 181+05.62

**\*\*Surveyor Combined Project 1 – 4 and recorded El. from Lakefront to Airport of all things Structural.**

Recent (NAVD) Survey, Conducted 10/30/01

No Reference Drawing

Top Concrete Floodwall:

Beginning Sta.	End Sta.	El. (NGVD)	El. (NAVD)	Description
0+00	4+00	≈+17.30	≈+16.50	Top Conc. Floodwall
8+00	38+00	≈+14.80	≈+14.00	“ “ “
38+34	40+00	≈+14.55	≈+13.75	Angle in Wall
40+42	42+00	≈+13.55	≈+12.75	Sag in Wall

Top of Gate Structure:

44+64	44+70	≈+14.61, 14.57	+13.81,+13.77	Gate No. W8
-------	-------	----------------	---------------	-------------

**Filename: I:\B2EDTAV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc**

Designed By:   AJV   Date:   01/22/02  

Checked By: \_\_\_\_\_ Date: \_\_\_\_\_

## COMPUTATION SHEET

Project: **Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study**

Labor No. **L62212**

Top Concrete Floodwall:	46+00	86+00	≈+14.30	≈+13.50	Top Conc. Floodwall
Top of Gate Structure:	87+51	87+59	≈+14.22, 14.27	+13.42,+13.47	Gate No. W7
Top Concrete Floodwall:	90+00	132+00	≈+13.80	≈13.00	Top Conc. Floodwall
Pumping Station:	132+48		≈+14.22	+13.42	TCF @ Angle in Wall # Fence line to Pump Station, North Side
	132+95		≈+14.13	+13.33	TCF @ Fence line, South Side Pump. Sta.
Top Concrete Floodwall:	133+00	148+00	≈+13.80	≈+13.00	Top Conc. Floodwall
	148+29		≈+13.34	+12.54	TCF @ North Edge I-10 West
	148+97		≈+13.11	+12.31	TCF @ South Edge I-10 West
	149+52		≈+13.14	+12.34	TCF @ North Edge I-10 East
	150+21		≈+12.73	+11.93	TCF @ South Edge I-10 East
	156+00		≈+13.76	+12.96	TCF @ Veterans Blvd.
	177+93		≈+13.81	+13.01	TCF @ South End
Top of Sheet Pile:	177+93		≈+12.79	+11.99	Top Edge Sheet Piling
	182+46		≈+11.30	+10.50	West Top Edge Sheet Pile, North of East-West Runway on West Side @Airport
	0+50		≈+13.15	+12.35	West Top Edge Sheet Pile, South of East-West Runway on West Side
		17+00	≈+11.52	+10.72	Top of Sheet Pile
Railroad Track:	17+44		≈+11.21	+10.41	TSP @ South End RxR track
		17+86	≈+11.08	+10.28	TSP @ North End RxR track
Top of Sheet Pile:	18+00	27+62	≈+11.55	≈+10.75	Top of Sheet Pile

### Reach-1:

Recent (1988 NAVD) Survey, Conducted 10/18/01:

Reference Drawing: from USACE

- File No. H-8-44822
- Lake Pontchartrain La and Vicinity  
Jefferson Parish Lakefront Levee  
Lakeside Runoff Control  
Reach 1  
Right of Way  
Jefferson Parish, LA.
- Date: Aug 1997
- Dwg. 1 of 4

**Filename: I:\B2EDTAJV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc**

Designed By:   AJV   Date:   01/22/02  

Checked By: \_\_\_\_\_ Date: \_\_\_\_\_

**COMPUTATION SHEET**

**Project: Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study**

**Labor No. L62212**

\*\* Surveyor plotted 3 Elevations in 1988 NAVD along Floodwall using B/L Stations on reference drawing.

Top of Floodwall:

Sta.	El. (NGVD)	El. (NAVD)
1	+17.36	+16.56
2	+17.12	+16.32
3	+16.04	+15.24

**Filename: I:\B2EDTAJV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc**

**Designed By:    AJV    Date:   01/22/02**

**Checked By:                    Date:**

# COMPUTATION SHEET

Project: Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study

Labor No. L62212

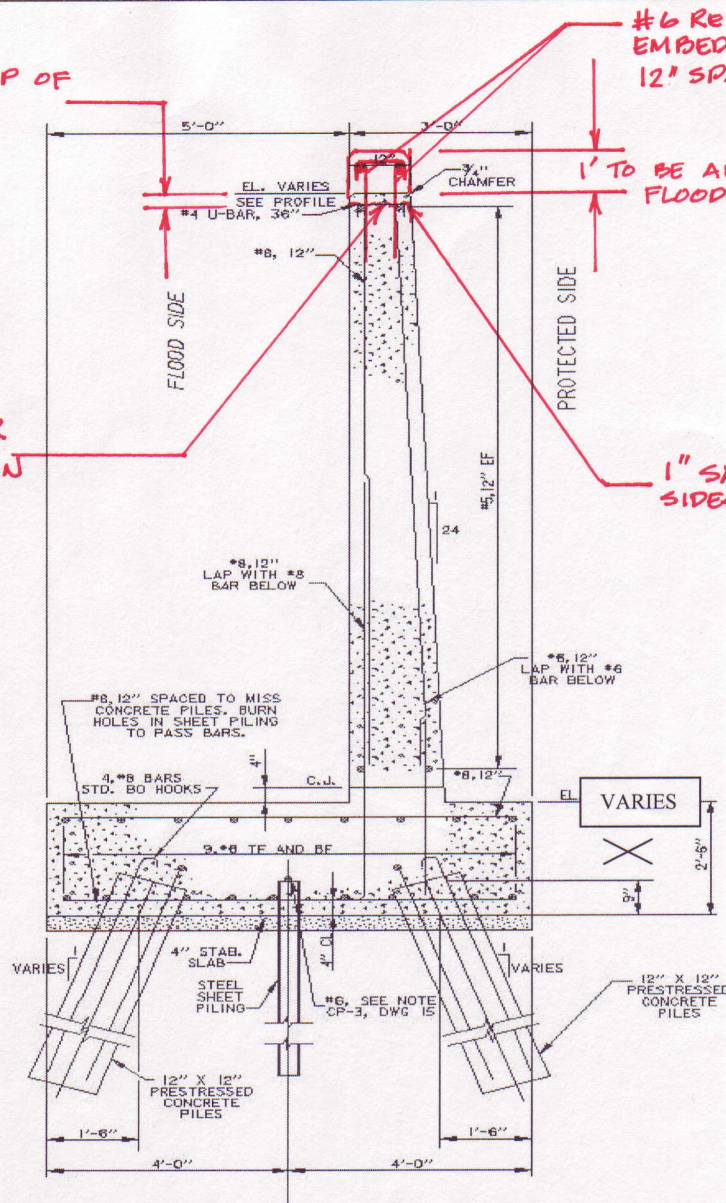
3" OF EXISTING TOP OF FLOODWALL TO BE REMOVED

#6 REBAR EMBEDDED 8 1/2", 12" SPACING

1' TO BE ADDED TO EXISTING FLOODWALL ELEVATION

1/4" AMPLITUDE FOR FLOODWALL EXTENSION BONDING

1" SAWCUT TO BOTH SIDES OF FLOODWALL



**TYPICAL "T"-WALL SECTION**

Filename: I:\B2EDTAJV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc

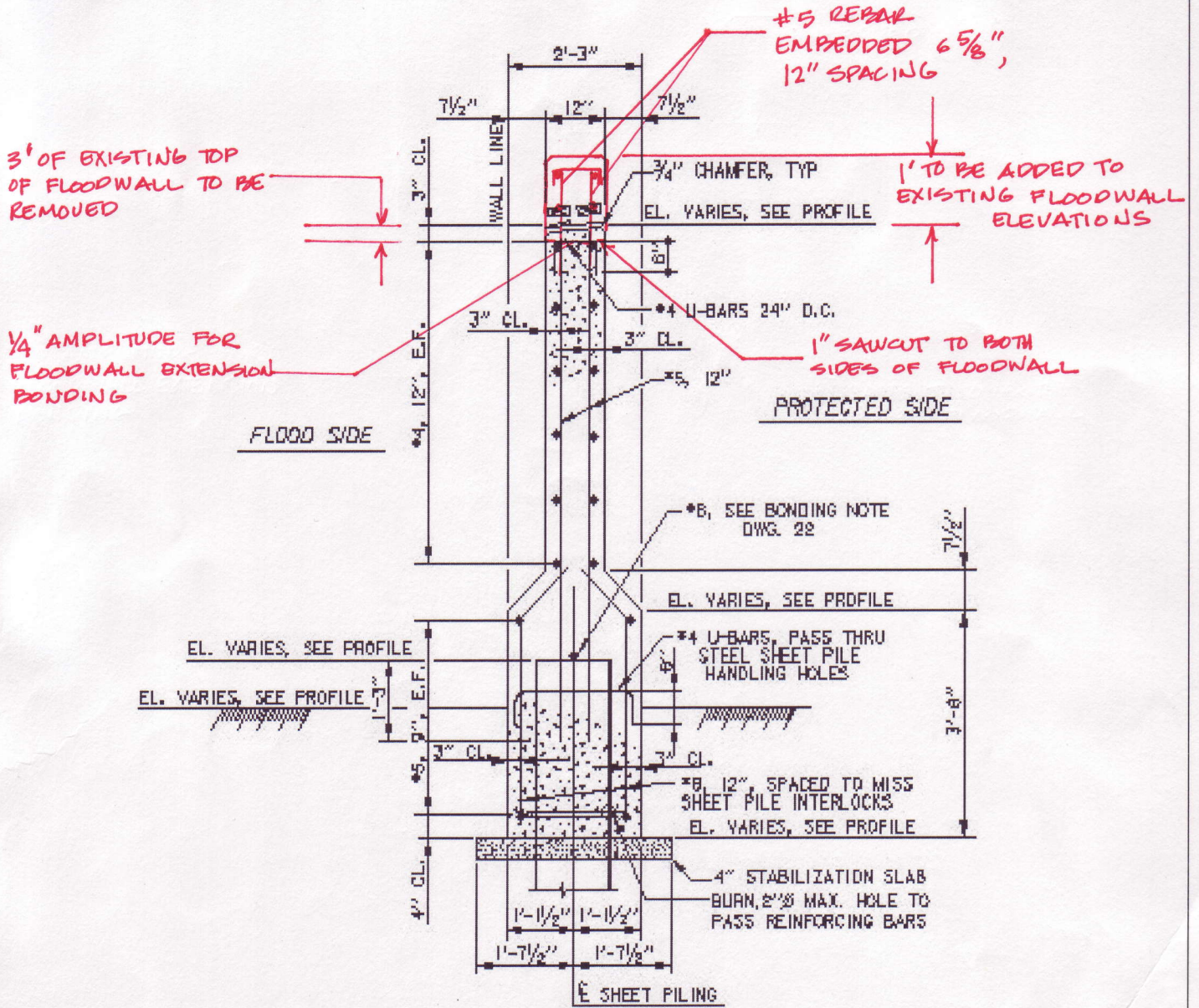
Designed By:   AJV   Date:   01/22/02  

Checked By:                      Date:

COMPUTATION SHEET

Project: Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study

Labor No. L62212



TYPICAL "T"-WALL SECTION

Filename: I:\B2EDTAJV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc

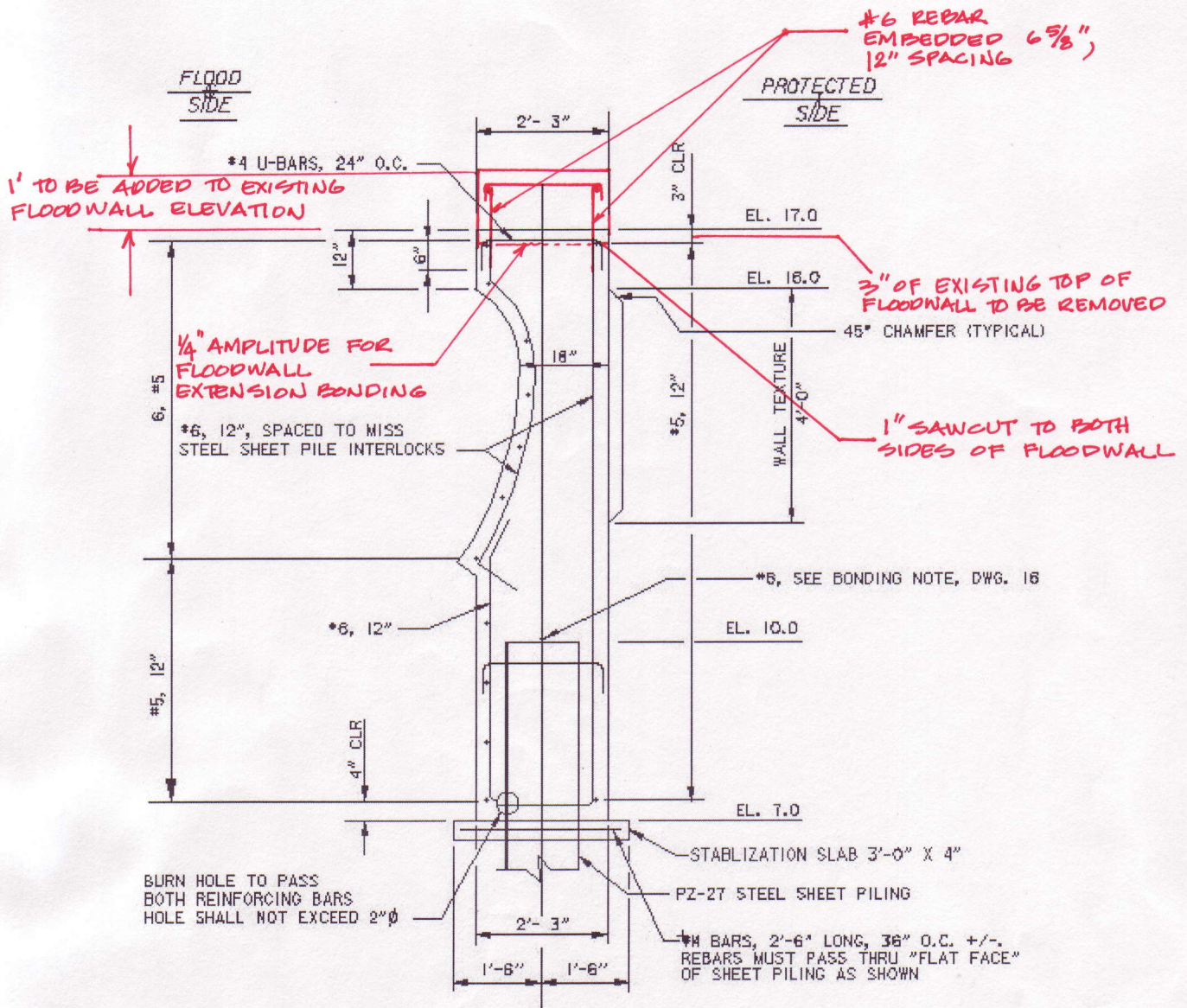
Designed By:    AJV    Date:    01/22/02   

Checked By:                      Date:

COMPUTATION SHEET

Project: Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study

Labor No. L62212



TYPICAL REINFORCEMENT  
RE-ENTRANT CURVE FLOODWALL

SCALE: 1/2" = 1'-0"

## COMPUTATION SHEET

Project: Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study

Labor No. L62212

### Project #2: Swing Gate, Duncan Canal Pumping Station No.4 and Williams Blvd. Roller Gate

#### Swing Gate and Pump Station:

Reference Drawings: 1—Pumping Station No. 4, 4th Jefferson Drainage Dist., Jefferson Parish, LA.,  
Burk & Associates, 1982

2—Floodwall at Pumping Station No.4 and Williams Blvd.,  
USACE, 1992

- Existing Sheet Pile @ El. +17.5 from W/L 100+45.0 to 101+01.88, W/L 103+01.88 to 104+08.27
- Existing T-wall @ El. +17.5 from W/L 101+01.88 to 103+01.88
- Existing Swing Gate 22' wide @ El. +17 with C/L @ W/L 104+23.27
- Existing I-wall slopes from El. +17.5 to +20 from W/L 104+38.27 to 104+61.98
- Existing T-wall @ El. +19.5 from 104+61.98 to 106+56.31, slopes up to El. +22.5 from W/L 106+56.31 to 108+06.31, then levels @ El. 22.5 from W/L 108+06.31 to 108+56.31
- Existing Pumping Station No. 4 b/w W/L 108+56.31 and 111+46.85
- Existing T-wall @ El. +22.5 slopes down to El. +19.5 from W/L 111+46.85 to 112+96.85, then levels @ El. +19.5 from 112+96.85 to 120+98.85
- Existing I-wall @ El. +19.5 from W/L 120+98.85 to 122+42.81
- Existing Sheet Pile @ El. +19 from W/L 122+42.81 to 122+86.5

Recent (1988 NAVD) Survey, Conducted 10/18/01:

Reference Drawing: from USACE

- File No. H-8-44822
- Lake Pontchartrain La and Vicinity  
Jefferson Parish Lakefront Levee  
Lakeside Runoff Control  
Reach 1  
Right of Way  
Jefferson Parish, LA.
- Date: Aug 1997
- Dwg. 4 of 4

Filename: I:\B2EDTAJV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc

Designed By:   AJV   Date:   01/22/02    
Checked By:            Date:           

**U.S. ARMY CORPS OF ENGINEERS, New Orleans District**

## COMPUTATION SHEET

Project: **Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study**

Labor No. **L62212**

\*\* Survey Sta. Points 1-22 plotted on Reference Drawing with recent El. (1988 NAVD).

Top of Sheep Pile @ West End of Pumping Station:

Sta.	El. (NGVD)	El. (NAVD)	
(Beginning of Sheet Pile)	+17.61	+16.81	
1	+17.78	+16.98	(End of Sheep Pile)

Top of Concrete Wall @ West End of Pumping Station:

Sta.	El. (NGVD)	El. (NAVD)	
2	+17.39	+16.59	(Beginning)
3	+17.37	+16.57	(Centerline)
4	+17.36	+16.56	(End)

Top of Sheet Pile @ West End of Pumping Station:

5	+17.59	+16.79
6	+17.77	+16.97

Top of Gate @ West End of Pumping Station:

7	+18.19	+17.39
8	+18.17	+17.37

Top of Concrete Wall @ West End of Pumping Station:

9	+20.02	+19.22
10	+23.01	+22.21
11	+23.01	+22.21

Top of Pump Station @ Centerline of Discharge:

12	+22.83	+22.03
----	--------	--------

Top of Concrete Wall @ East End of Pumping Station:

13	+23.07	+22.27
14	+23.05	+22.25
15	+21.81	+21.01
16	+20.04	+19.24
17	+19.96	+19.16
18	+19.94	+19.14
19	+20.00	+18.20
20	+19.51	+18.71
21	+19.35	+18.55

Top of Sheet Pile @ East End of Pumping Station:

22	+19.16	+18.36	(End of Sheet Pile Wall @ B/L 125+68)
----	--------	--------	---------------------------------------

Filename: I:\B2EDTAJV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc

Designed By:   AJV   Date:   01/22/02  

Checked By:                      Date:



## COMPUTATION SHEET

Project: **Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study**

Labor No. **L62212**

### Williams Blvd. Bottom Roller Gate:

Reference Drawings: Floodwall at Pumping Station No. 4 and Williams Blvd., USACE, 1992

- Existing I-wall @ El. +15 from W/L 200+00 to 200+27.13 and 200+99.13 to 201+84.13 for support of 60' wide Bottom Roller Gate
- Existing 60' wide Bottom Roller Gate b/w W/L 200+33.13 and 200+93.13

Recent (NAVD) Survey, Conducted 10/29/01:  
No Reference Drawing.

\*\* Survey Sta. Points 1-10 not plotted but El. recorded.

#### Top of Concrete Wall:

Sta.	El. (NGVD)	El. (NAVD)	
1	+15.26	+14.46	(West Top Edge Conc. Wall)
2	+15.26	+14.47	
3	+15.35	+14.55	
4	+15.37	+14.57	
5	+14.96	+14.16	
6	+14.93	+14.13	(Top Conc. Gate Post)
7	+15.40	+14.60	
8	+15.36	+14.56	
9	+15.37	+14.57	
10	+15.26	+14.46	(East Top Edge Conc. Wall)

Filename: I:\B2EDTAJV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc

Designed By:    AJV    Date:   01/22/02    
Checked By:            Date:           

**U.S. ARMY CORPS OF ENGINEERS, New Orleans District**

## COMPUTATION SHEET

Project: **Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study**

Labor No. **L62212**

### Project #3: Elmwood Pumping Station No. 3

Reference Drawing: 1—New Pumping Station No.3, 4th Jefferson Drainage Dist., Jefferson Parish, LA.,  
Burk & Associates, 1980  
2—Plan for Elmwood Pumping Station, Jefferson Parish, LA., URS Greiner, 1998

- Existing I-wall @ (El.+19 for (170' to support East Side of Pumping Station
- Existing Pumping Station
- Existing I-wall on West Side of Pumping Station—no info. found from reference drawings.

Recent (1988 NAVD) Survey, Conducted 10/18/01:

Reference Drawing: from URS Greiner

- File No. H-4-45030
- Southeast Louisiana Urban Flood Control Project  
Jefferson Parish, Louisiana  
Elmwood Pumping Station No. 3  
SITE PLAN
- Date: 02/22/99
- Dwg. C-1 of 159

\*\* Survey Sta. Points 1, 4, 5, 6, 10, 11, 12, 13, and 15 are plotted on the reference drawing with recent El. in 1988 NAVD.

Concrete Wall on Pumping Station:

Sta.	El. (NGVD)	El. (NAVD)
1	+15.13	+14.32
4	+18.59	+17.79
5	+18.59	+17.79
6	+18.79	+17.79
10	+14.97	+14.17

Top of Sheet Pile @ West End of Pumping Station:

11	+14.39	+13.59
12	+14.89	+14.09

Top of Sheet Pile @ East End of Pumping Station:

13	+14.49	+13.69
15	+14.54	+13.74

**Filename: I:\B2EDTAJV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc**

Designed By:    AJV    Date:   01/22/02  

Checked By:                      Date:

## COMPUTATION SHEET

Project: **Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study**

Labor No. **L62212**

### Project #4: Suburban Canal Pumping Station No. 2

Reference Drawings: 1—New Pumping Station No. 2, Jefferson Parish, LA., Burk & Associates, 1971  
2—Pumping Station No. 2, Pump Additions & Station Modifications, 4th Jefferson Drainage District, Jefferson Parish, LA., 1983  
3—Southeast Louisiana Urban Flood Control Project, Jefferson Parish, LA., Pumping Station No. 2-Suburban Canal, 2400cfs Expansion, Waldemar S. Nelson and Company, 1999

- Existing T-wall (Not much info. found on this structure.)
- Existing Pumping Station

Recent (1988 NAVD) Survey, Conducted 10/18/01:

Reference Drawing: from Frederic R. Harris, Inc.

- File No. H-2-44957
- Southeast Louisiana Urban Flood Control Project  
Jefferson Parish, Louisiana  
Pumping Station No. 2-Suburban Canal  
SITE PLAN
- Date: June 1999
- Dwg. C02 of C38

**\*\* Survey Sta. Points 1-10 are plotted on the reference drawing with recent El. in 1988 NAVD**

**Top of Sheet Pile @ West End of Pumping Station:**

Sta.	El. (NGVD)	El. (NAVD)
1	+12.66	+11.86
2	+13.13	+12.33
3	+12.85	+12.05
4	+12.70	+11.90
5	+13.74	+12.94

**Concrete Wall on Pump Station:**

6	+14.16	+13.36
7	+14.31	+13.51
8	+14.31	+13.51
9	+14.39	+13.59

**Concrete Wall East Side of Pump Station @ Discharge Canal:**

10	+14.26	+13.46
----	--------	--------

**Filename: I:\B2EDTAJV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc**

**Designed By:   AJV   Date:   01/22/02    
Checked By:            Date:**

**U.S. ARMY CORPS OF ENGINEERS, New Orleans District**

# COMPUTATION SHEET

Project: Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study

Labor No. L62212

## Project #5: Reach 4 (Causeway Blvd Floodwall) and Bonnabel Pumping Station No.1

### Causeway Blvd Floodwall:

Recent (1988 NAVD) Survey, Conducted:

Reference Drawing: from USACE

- File No. H-4-40400
- Lake Pontchartrain, Louisiana and Vicinity  
High Level Plan  
Causeway Boulevard Floodwall  
Jefferson Parish Lakefront Levee  
Jefferson Parish, Louisiana  
SITE PLAN
- Date: June 1995
- Dwg. 3 of 23

\*\* Survey Sta. Points 1-7 are not plotted on the reference drawing but on a separate sketch paper with recent El. in 1988 NAVD.

#### WEST: Sheet Pile

Sta.	El. (NGVD)	El. (NAVD)
1	+7.14	+16.34
2	+7.18	+16.38
3	+4.26	+13.46
4	+4.36	+13.56

#### Concrete Wall

4A	+16.81	+16.01
5	+16.64	+15.84
6	+16.66	+15.86
7	+16.68	+15.88

#### EAST: Sheet Pile

Sta.	El. (NGVD)	El. (NAVD)
1	+17.30	+16.50
2	+17.36	+16.56
3	+17.35	+16.55
4	+17.46	+16.66

Filename: I:\B2EDTAJV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc

Designed By:   AJV   Date:   01/22/02  

Checked By:                      Date:

## COMPUTATION SHEET

Project: **Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study**

Labor No. **L62212**

Concrete Wall

5	+16.94	+16.14
6	+16.92	+16.12
7	+16.78	+15.98
8	+16.75	+15.95
9	+16.92	+16.12
10	+16.95	+16.15

### Bonnabel Pumping Station No. 1:

Reference Drawing: Floodwall at Pumping Station No. 1, USACE, 1994

- Existing Uncapped Sheet Pile @ El. +16.5 from W/L 0+00 to 0+55
- Existing I-wall @ El. +16.5 from W/L 0+55 to 1+61.00 and slopes up to El. +18.5 @ 1+85.50
- Existing T-wall slopes up @ El. +18 on a 1V to 50H slope to +22.5 from W/L 1+90 to 4+61.21 for support of Pumping Station
- Existing Pumping Station b/w W/L 4+61.21 to 6+21.21
- Existing T-wall slopes down @ El. +22.5 on a 50H to 1V slope to +17 from W/L 6+21.21 to 9+35.13
- Existing I-wall @ El. +17.5 slopes down to El. +16.5 from W/L 9+35.13 to 9+64.13 and levels @ El. +16.5 to W/L 10+37.13
- Existing Uncapped Sheet Pile @ El. +16.5 from W/L 10+37.13 to 10+69.01

Recent (1988 NAVD) Survey, Conducted 10/29/01:

Reference Drawing: No reference dwg.

\*\* Survey Sta. Points 1, 2, 14, 21, 24, 31-35, 44, 47, 54, 55, 62-64 are plotted on a sketch paper with recent El. in 1988 NAVD.

Top of Sheet Pile @ West End of Pumping Station:

Sta.	El. (NGVD)	El. (NAVD)
1	+15.94	+15.14
2	+16.40	+15.60

Concrete Wall @ West End of Pumping Station:

3	+16.44	+15.64
14	+18.09	+17.29
21	+20.35	+19.55
24	+21.61	+20.81
31	+22.92	+22.12

Filename: I:\B2EDTAJV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc

Designed By:    AJV    Date:   01/22/02  

Checked By:                      Date:

## COMPUTATION SHEET

Project: **Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study**

Labor No. **L62212**

Concrete Wall around Pump Station:

32	+22.91	+22.11
33	+22.82	+22.02
34	+22.81	+22.01

Concrete Wall @ East End of Pumping Station:

35	+22.81	+22.01
44	+20.87	+20.07
47	+19.60	+18.80
54	+17.01	+16.21
55	+17.48	+16.68
62	+16.41	+15.61
64	+16.46	+15.66

Filename: I:\B2EDTAJV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc

Designed By:    AJV    Date:   01/22/02  

Checked By:                      Date:                     

**U.S. ARMY CORPS OF ENGINEERS, New Orleans District**

**COMPUTATION SHEET**

Project: **Hurricane Protection, Jefferson Parish, Louisiana Reconnaissance Study**

Labor No. **L62212**

Project #6: 17th St. Canal Butterfly Gate

Reference: No drawings were found for this structure.  
Consult with Sami Mosrie for any info. on this structure

- Butterfly Gate

Filename: I:\B2EDTAJV\Recon Study, Hurricane Protection, Jeff Parish\newQuantity.doc

Designed By:    AJV    Date:   01/22/02  

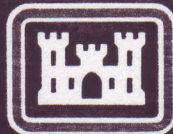
Checked By:                      Date:

**LAKE PONTCHARTRAIN, LA.  
AND VICINITY  
LAKE PONTCHARTRAIN  
HIGH LEVEL PLAN**

**DESIGN MEMORANDUM NO. 20  
GENERAL DESIGN  
ORLEANS PARISH  
JEFFERSON PARISH  
17th. St. Outfall Canal  
(Metairie Relief)**

**IN TWO VOLUMES  
VOLUME I**

**DEPARTMENT OF THE ARMY  
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS  
NEW ORLEANS, LOUISIANA  
MARCH 1990**



**US Army Corps  
of Engineers  
New Orleans District**

**SERIAL NO.**



#### OTHER PLAN CONSIDERED

45. Butterfly Valve Structure Alternative. A butterfly valve structure was considered for providing hurricane protection at the 17th Street Outfall Canal. The proposed structure would consist of reinforced concrete components and steel butterfly valves (gates). Operation of the structure is based on the theory of vertical self-operating, eccentrically pinned, butterfly valves. Under normal circumstances, the valves would be maintained in a passive, open position to allow pumping of interior drainage into Lake Pontchartrain. When a hurricane approaches, the valves would be placed in the active (automatic) mode. In this case, the valves would remain open when the water level in the outfall canal exceeds that on the lake side of the structure but would close when the water level on the lake side of the structure is greater than that in the outfall canal. Closure of this type would normally be in response to the lake side water level rising due to a hurricane driven surge. In the open (trimmed) position, the axis of each valve would be rotated 12 degrees from the center line of its gate bay. During a surge flow, the eccentricity of the pin and the 12 degree offset (trim) would induce closure. This self-operating feature would permit continuous operation of the pumping station during a hurricane. This would be possible because the valves would prevent surge flows from entering the outfall canal and would automatically reopen when the water level on the lakeside of the control structure recedes to a level below that in the outfall canal. When the threat of further hurricane induced surge has passed, the valves would be returned to their passive, open condition. Along with the above described self-operating feature, machinery would be provided to permit manual operation of the valves. This would only be required in the event of a malfunction of the proposed automatic operating system.

46. Butterfly Valve Structure Features. The butterfly valve structure alternative would contain the following features:

a. Gate Bays. The structure would be located just south of the Hammond Highway Bridge and would have six gate bays. They would be constructed in three monoliths, two abutments and one interior, founded on 14"x14" prestressed concrete piles. Each gate bay would provide a 28' wide x 23' high opening with a sill elevation of -18.4 NGVD. One set of steel sheet pile dewatering bulkheads and structural steel needle girders would be provided and each gate bay would have recesses for their installation to allow dewatering for maintenance and/or repairs. Protection against seepage under the structure would be provided by a steel sheet pile cutoff extending to elevation -35.0. For details see Plates 28, 29 and 32. A dewatering system for construction of the butterfly valve along with pile capacity curves for the structure are contained in Appendix B, Volume 1. See Plates 1 through 3.

b. Approach Aprons. The aprons would be reinforced concrete monoliths extending 25 feet on either side of the gate bay monoliths.

The interior monoliths would be soil founded slab with underslab drainage blankets. The drainage blankets would consist of a perforated pipe and layers of gravel and sand that are designed to relieve and protect against the building of excess uplift pressure under the soil founded slabs. The exterior monoliths would be inverted T type walls founded on 14"x14" prestressed concrete piles. Protection against erosion under the aprons would be provided by steel sheet pile cut-off extending to elevation -35.0. For details see Plates 28 and 29.

c. Floodwalls. I-type floodwalls consisting of steel sheet piling capped with reinforced concrete would be provided as follows:

(1) Sta. 0+00.00 W/L (E/B) to Sta. 11+19.81 W/L (E/B). This reach of floodwall would be located on the east bank of the 17th Street Outfall Canal. At Station 0+00.00 W/L (E/B), the new floodwall would tie into the existing Orleans Parish Lakefront Levee. At Station 10+05.31 W/L (E/B), the new floodwall would tie into the butterfly valve structure. At Sta. 11+19.81 W/L (E/B), the floodwall would tie into the existing levee system on the east bank of the 17th Street Outfall Canal, southside (protected side) of the butterfly valve structure.

(2) Sta. 0+00.00 W/L (W/B) to Sta. 6+57.23 W/L (W/B). This reach of floodwall would be located on the west bank of the 17th Street Outfall Canal. At Station 0+00.00 W/L (W/B), the new floodwall would tie into the existing Jefferson Parish Lakefront Levee. At Station 5+67.45 W/L (W/B), the floodwall would tie into the butterfly valve structure. At Sta. 6+57.23 W/L (W/B) the floodwall would tie into the existing levee system on the west bank of the 17th Street Outfall Canal.

d. Breakwater System. To assure a smooth operation of the butterfly valve structure, a breakwater system would be provided in Lake Pontchartrain near the north end of the 17th Street Outfall Canal where it discharges into Lake Pontchartrain. The details of the breakwater system are shown on Plates 26 and 33. The cantilever wall stability analysis for the breakwater is shown in Appendix B, Volume I Plate 4.

A breakwater system is needed not only to prevent wave action from funneling up the canal and striking the butterfly valve gates, but is needed to protect the extensive riparian development at the lake end of the canal along with the numerous small boats in the "Bucktown fishing fleet." During the extreme lake levels the buildings located in this area would be inundated and subject to direct wave attack. The buildings and boats would most likely become debris which could lodge against the gates. Therefore, to insure proper operating conditions for the butterfly valve structure, a breakwater system was developed.

e. Operating Machinery. The machinery is designed for automatic and manual gate operation. In the automatic mode the gate is powered by the water hydraulic forces acting on the gate. In this mode the machinery acts as a damper and shock absorber. Damping time would be field adjustable and accomplished with two hydraulic cylinders and a set of parallel adjustable nonpressure compensated and pressure compensated

flow control valves. The nonpressure compensated flow control valves would provide for low pressure damping, below 200 psi, while the pressure compensating valves would provide for a control rate of damping above a system pressure of 200 psi.

Manual operation of the gate would be accomplished by powering the damping cylinders with a hydraulic power unit consisting of a hydraulic pump driven by an electric motor. In this manner approximately 417 to 513 kips-ft of torque can be imparted to the gate at the hinge for swinging the gate in either direction.

Incorporated with the machinery is a spring. The spring is designed to assist the gate's closing forces generated by tidal flow from the lake into the canal by providing the gate with preliminary closing torque when the gate is fully open. Lesser torque would be applied as the gate moves towards the closed position. Because the opening forces due to drainage pumping is less than the spring loading the gate will fully open and will not increase the head across the structure.

f. Gate Bearings. The pintle would be a spherical bearing. The ball would be stainless steel and the bearing would be a high lead bronze such as ASTM B584-932. The top bearing or hinge would be a commercially available spherical roller bearing. Plate No. 34 illustrates the proposed machinery layout and the proposed design of the hinge and pintle.

#### ACCESS ROADS

47. Access Roads. Vehicular access to the project site from both the east and west sides of the canal is available via many public roads. The following streets are listed as potential access roads:

##### East Side Levee

Conrad Blvd.  
West End Blvd.  
Bellaire Drive  
West Harrison Ave.  
W. Kenilworth Drive  
Academy Drive

##### West Side Levee

Hammond Highway  
Lake Ave. and connecting streets  
West Esplanade Ave.  
Bonnabel Blvd.  
Orpheum Ave.  
Veterans Blvd.  
N. Frontage Road  
Canal St. (Metairie)

#### RELOCATIONS

48. General. Under the authorizing law, local interest are responsible for the accomplishment of ". . . all necessary alteration and relocations to roads, railroads, pipelines, cables, wharves, drainage structures and other facilities made necessary by the construction work . . . ." There are no relocations necessary for the east side

levee/  
relocat  
and a  
Plate 8

Th  
the we  
Gate N  
vicinit

49. C  
floodwa  
within  
and th  
Highway  
Jeffers  
Jeffers

50.  
opossum  
some ar  
resting  
Various  
terns a

The  
poor;  
resourc

The  
classif  
quality  
not exp  
the eff  
Act. 1  
Assessm

The  
habitat  
limited  
species  
oxygen  
organis

51. E  
critica

SUMMARY OF GDM SCOPE COST ESTIMATE FOR BUTTERFLY VALVE STRUCTURE (ALTERNATIVE PLAN)

Code	Item	Const. Time	Unit	Amount	Contingencies	Project Cost
15.---	BUTTERFLY VALVE STRUCTURE	2 & 1/2	yrs	\$5,495,000	\$1,440,000	\$6,935,000
11.---	LEVEES AND FLOODWALLS (EAST SIDE)	10	mths	\$585,000	\$88,000	\$673,000
11.---	LEVEES AND FLOODWALLS (WEST SIDE)	10	mths	\$519,000	\$81,000	\$600,000
10.---	BREAKWATERS AND SEAWALLS	1	yr	\$5,374,000	\$1,607,000	\$6,981,000
02.---	RELOCATIONS (WEST SIDE)	*		\$102,000	\$20,000	\$122,000
	* Relocations for the West Side Floodwall to be performed concurrently with floodwall construction.					
TOTALS FOR BUTTERFLY STRUCTURE, BREAKWATER, LEVEES & FLOODWALLS				\$12,075,000	\$3,236,000	\$15,311,000
30.---	ENGINEERING AND DESIGN					\$1,531,000
30.---	ENGINEERING MODEL STUDY					\$600,000
30.---	SUNK COST GDM PREPARATION					\$631,000
31.---	CONSTRUCTION MANAGEMENT (S&I)					\$2,380,000
	PROJECT CONTINGENCIES:			27%		
TOTAL PROJECT COST, BUTTERFLY STRUCTURE, BREAKWATER, LEVEES & FLOODWALLS:						\$20,500,000

**COST ESTIMATE-LOUISIANA CATEGORY 4 HURRICANE PROTECTION, JEFFERSON PARISH RECON STUDY**

ACCOUNT CODE	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT	CONTINGENCIES	COST
	<b>PROJECT #1: JEFFERSON PARISH-ST. CHARLES PARISH RETURN LEVEE AND REACH 1</b>						
	<b>Mob and Demob</b>	LS					
	<b>Floodwall</b>						
	Sawcut 1" each face, 3" below top of floodwall	37327	LF				
	Concrete to be removed leaving 1/4" amplitude	180	CY				
	Reinforced concrete to be added	923	CY				
	Rebar needed for doweling #5	6273	LF				
	#6	56862	LF				
	<b>Gates and Asso. Items</b>						
	Pedestrian Gates(W7,W8)						
	Structural Steel	515	LBS				
	Rubber Seals	4	LF				
	Swing Gate						
	Structural Steel	1192	LBS				
	Rubber Seals	2	LF				
	<b>PROJECT #2: SWING GATE, DUNCAN CANAL PUMPING STATION NO. 4 AND WILLIAMS BLVD. ROLLER GATE</b>						
	<b>Mob and Demob</b>	LS					
	<b>Floodwall</b>						
	Sawcut 1" each face, 3" below top of floodwall	4259	LF				
	<b>Subtotal Page 1</b>						

ACCOUNT CODE	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT	CONTINGENCIES	COST
	Concrete to be removed leaving 1/4" amplitude	21	CY				
	Reinforced concrete to be added	104	CY				
	Rebar needed for doweling #5	521	LF				
	#6	6676	LF				
	Sheet Pile PZ-27	168	LF				
	PZ-35	44	LF				
	<b>Swing Gate</b>						
	Structural Steel	1784	LBS				
	Rubber Seals	2	LF				
	<b>Roller Gate</b>						
	Structural Steel	1316	LBS				
	Rubber Seals	2	LF				
	<b>PROJECT #3: ELMWOOD PUMPING STATION NO. 3 AND BREAKWATER</b>						
	<b>Mob and Demob</b>	LS					
	<b>P.S. No. 3 Floodwall</b>						
	Sawcut 1" each face, 3" below top of floodwall	864	LF				
	Concrete to be removed leaving 1/4" amplitude	4	CY				
	Reinforced concrete to be added	20	CY				
	Rebar needed for doweling #6	1476	LF				
	<b>Breakwater</b>						
	Remove Handrail (Undistrubed)	1434	LF				
	Reinforced concrete to be added	106	CY				
	Replace Handrail	1434	LF				
	<b>Subtotal Page 2</b>						

ACCOUNT CODE	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT	CONTINGENCIES	COST
	<b>PROJECT #4: SUBURBAN CANAL PUMPING STATION NO. 2 AND BREAKWATER</b>						
	<b>Mob and Demob</b>	LS					
	<b>P.S. No. 2 Floodwall</b>						
	Sawcut 1" each face, 3" below top of floodwall	864	LF				
	Concrete to be removed leaving 1/4" amplitude	4	CY				
	Reinforced concrete to be added	20	CY				
	Rebar needed for doweling #6	1476	LF				
	<b>Breakwater</b>						
	Remove Handrail (Undistrubed)	1048	LF				
	Reinforced concrete to be added	78	CY				
	Replace Handrail	1048	LF				
	<b>PROJECT #5: REACH 4 (CAUSEWAY BLVD FLOODWALL) AND BONNABEL PUMPING STATION NO. 1</b>						
	<b>Mob and Demob</b>	LS					
	<b>Floodwall (P.S. included)</b>						
	Sawcut 1" each face, 3" below top of floodwall	2002	LF				
	Concrete to be removed leaving 1/4" amplitude	9	CY				
	Reinforced concrete to be added	130	CY				
	<b>Subtotal Page 3</b>						

ACCOUNT CODE	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT	CONTINGENCIES	COST
	Rebar needed for doweling						
	#4	4856	LF				
	#5	738	LF				
	#6	2610	LF				
	Sheet Pile						
	PZ-22	235	LF				
	PZ-35	85	LF				
	 <b>PROJECT #6:       17TH ST. CANAL BUTTERFLY GATE</b>						
	 <b>Mob and Demob</b>	LS					
	Refer to cost estimate made in: DM No. 20 General Design Orleans Parish Jefferson Parish 17th St. Outfall Canal (Metairie Relief) Volume 1						
	Subtotal Page 4						
				<b>TOTAL</b>			