NEW ORLEANS TO VENICE, LOUISIANA

HURRICANE PROTECTION

REACH B-1 - TROPICAL BEND TO FORT JACKSON

EMPIRE FLOODGATE

PERIODIC INSPECTION REPORT NO. 3

29 JULY 1981

United States Army
Corps of Engineers
...Serving the Army
...Serving the Nation

New Orleans District

LMVED-GS (NOD 23 Nov 81) 5th Ind
SUBJECT: New Orleans to Venice, Louisiana (Hurricane Protection); Reach B-1 - Tropical Bend to Fort Jackson, Empire Floodgate, Periodic Inspection Report No. 3, 29 July 1981

DA, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg, MS 39180

20 OCT 82

TO: Commander, New Orleans District, ATTN: LMNED-DG

The disposition of comments presented in the preceding 4th Ind is satisfactory.

FOR THE COMMANDER:

for Robert L Kaufman, P.E.
R. H. RESTA, P.E.
Chief, Engineering Division

wd incl

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P. O. BOX 60267
NEW ORLEANS, LOUISIANA 70160

REPLY TO
ATTENTION OF:

LMNED-DG

23 November 1981

SUBJECT: New Orleans to Venice, Louisiana (Hurricane Protection); Reach B-1 - Tropical Bend to Fort Jackson, Empire Floodgate, Periodic Inspection Report No. 3, 29 July 1981

Commander, Lower Mississippi Valley Division
ATTN: LMVED-G

Subject report is submitted herewith for your approval.

FOR THE COMMANDER:

FREDERIC M. CHATRY
Chief, Engineering Division

1 Incl (quad)
As stated

S: 14 May 82

LMVED-G (NOD 23 Nov 81) 1st Ind
SUBJECT: New Orleans to Venice, Louisiana (Hurricane Protection); Reach B-1 - Tropical Bend to Fort Jackson, Empire Floodgate, Periodic Inspection Report No. 3, 29 July 1981

DA, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg, MS 39180

23 MAR 82
TO: Commander, New Orleans District, ATTN: LMNED-DG

1. The inclosed periodic inspection report is approved subject to the following comments:

a. General. A list of previous periodic inspection reports for this project, dates of the periodic inspections, and the dates the periodic inspection reports were approved should be included at the beginning of this report.

b. Para 2-01. The second sentence of the paragraph implies that Plate I-1 is a location map. However, Plate I-1 presents the location of instrumentation devices for this project. This discrepancy should be reconciled.

c. Para 3-02, page III-1. The meaning of this paragraph is not clear. It is not apparent why remedial work proposed 3 years ago should have to be coordinated with the Plaquemines Parish Commission Council (PPCC) in FY 82. This would seem to imply that the PPCC has been negligent in performing maintenance work on this structure when this is definitely not the case (see Appendix A, para 5d of LMVD trip report). This paragraph should be clarified.

d. Para 4-02. This paragraph, "Analysis of Instrumentation Data," is not satisfactory. The paragraph should indicate the type and locations of the instruments, and briefly state the intended purpose of, and the schedule for reading of each type of instrumentation. For example, it should be indicated that the concrete T-walls are instrumented with reference marks in order to measure settlement, changes in alignment, and movement at the joints while the sheetpile I-walls are instrumented with settlement reference marks to determine when settlement of the levee is essentially completed. Reference should be made to appropriate plates for instrumentation locations and observational data. Each set of data; i.e., alignment of the T-walls, settlement of the T-walls, joint movement of the T-walls, and settlement of the I-walls, should be discussed and evaluated separately. In this regard, the change in wall alignment between 1978 and 1981 as indicated by data on Plate I-2A should be evaluated. Possible cause for this movement should be indicated in your evaluation. The discussions should be consistent with the observations made during the periodic inspection as discussed in para 5-03. In particular, the observed joint movement discussed in para 5-03a(1) should be related to joint movement data.

e. Paras 5-03b and 6-02b. During the periodic inspection, representatives from this office were informed by representatives from your office that when the sheetpile I-wall is capped with concrete, which will be

accomplished when settlement of the levee is essentially complete, the joint between the I-wall and concrete T-wall will be modified so that the waterstop on the I-wall will be in contact with the concrete T-wall. If this is the case, para 5-03b should be revised to indicate this and para 6-02b should be modified accordingly.

f. Para 6-02i. As stated in para 5a(3) of the LMVD trip report (Appendix A), it was agreed during the periodic inspection that the problem of silt buildup in the gatebay will be studied further and that your office would make recommendations as to the solution of the problem in the periodic inspection report. Paragraph 6-02i, makes no reference to any study effort by your office and simply states the silt will be removed to prevent further damage to the gate but does not say what method will be used, the frequency of removal (this was discussed during the inspection), when this work would be accomplished, etc. This paragraph does not present a remedial action plan for removal of the silt buildup in the gatebay both now and in the future. You should revise this paragraph to address your plans (both short- and long-term) for resolving the silt buildup problem.

g. Plate I-2.

(1) Time-settlement plots similar to those shown for the T-wall reference mark data shown on Plates I-3 and I-4 should also be prepared for the data from the sheetpile I-wall settlement reference marks. These plots should be included in the inspection report.

(2) In light of the continued and significant settlement of the I-walls, T-walls, and structure, and to aid in evaluation of the settlement data, a profile of settlement from Sta 3+03E to Sta 3+03W (including the structure settlement data) should be prepared and presented in the report. This plate should be similar to Plate I-2A except that settlement would be plotted on the vertical axis.

(3) See comment in para 1d above. In evaluating the T-wall settlement data, you should indicate whether the observed settlement is considered reasonable when compared to settlement predicted in design.

h. Plate I-4. It is noted that no settlement data are plotted for RM-20 in Jan 81. The Jan 81 data for RM-20 in the tabulation "Settlement Reference Marks - Structure and T-wall" on Plate I-2 indicate a rebound of this mark which is not consistent with Jan 81 data for the wall and structure. In view of the significant settlement which has occurred and continues to occur, if not previously accomplished, you should obtain another reading on this point. These data should be presented in your response to this indorsement.

i. Refer to comments in red on Plate I-1, I-3, I-4, I-6, and I-7.

S: 14 May 82

LMVED-G (NOD 23 Nov 81) 1st Ind 23 MAR 82
SUBJECT: New Orleans to Venice, Louisiana (Hurricane Protection);
Reach B-1 - Tropical Bend to Fort Jackson, Empire Floodgate,
Periodic Inspection Report No. 3, 29 July 1981

2. The report should be revised in accordance with the comments in para 1 above and revised pages and plates of the report should be submitted to this office by 14 May 82.

FOR THE COMMANDER:

for Robert J Kaufman
R. H. RESTA
Chief, Engineering Division

1 Incl (dupe)
wd 2 cy

LMNED-DG (23 Nov 81) 2nd Ind
SUBJECT: New Orleans to Venice, Louisiana (Hurricane Protection); Reach B-1 Tropical Bend to Fort Jackson, Empire Floodgate, Periodic Inspection Report No. 3, 29 July 1981

DA, New Orleans District, Corps of Engineers, P.O. Box 60267, New Orleans, LA 70160 18 May 1982

TO: Commander, Lower Mississippi Valley Division, ATTN: LMVED-G

The disposition of comments presented in the 1st Ind follows. Para. numbers refer to like numbered paras. in the indorsement. Duplicate copies of inclosures are submitted for your files.

a. General. A list of previous periodic inspection reports for this project, dates of the periodic inspections, and the dates the periodic inspection reports were approved are included at the beginning of this report. See Incl 2.

b. Para. 2-01. Concur. Refer to Incl 3.

c. Para. 3-02, page III-1. While Plaquemines Parish Commission Council (PPCC) has not performed the specific remedial work proposed in Periodic Inspection Report No. 2, Section VI, para. 6-02, they have scheduled this work for completion during the summer of 1982.

d. Para. 4-02. Concur. Refer to Incl 4.

e. Paras. 5-03b and 6-02b. Concur. See Incl 5.

f. Para. 6-02i. The remedial action plan for removal of the silt build-up in the gate bay is included in referenced para.. See Incl 6.

g. Plate I-2.

(1) Time settlement plots are presently being prepared for the data from the sheetpile I-wall settlement reference marks. These plots will be issued to your office upon completion by our drafting personnel.

(2) Concur. A profile of settlement from Sta. 3+03E to Sta. 3+03W (including the structure settlement data) will be prepared and issued to your office.

(3) Concur. The observed settlement of 4 inches is considered reasonable compared to the predicted design settlement of 6 inches for the T-wall data.

h. Plate I-4. Upon completion of the next scheduled annual survey, data for RM20 will be investigated to determine its consistency with previous data. This is the only method to determine whether the Jan 81 data was a field survey error.

LMNED-DG 18 May 1982

SUBJECT: New Orleans to Venice, Louisiana (Hurricane Protection); Reach B-1 - Tropical Bend to Fort Jackson, Empire Floodgate, Periodic Inspection Report No. 3, 29 July 1981

1. Plates I-1, I-3 and I-4 are being revised by drafting personnel. These plates will be issued to your office upon completion. The details noted on Plates I-6 and I-7 are anomalous obstructions picked up during the scour survey. Usually these obstructions are trash on the channel bottom.

FOR THE COMMANDER:

for William B. Seale
FREDERIC M. CHATRY
Chief, Engineering Division

5 Incl (dupe)
Wd incl 1
Added incl 2 thru 6
As stated

LMVED-GS (NOD 23 Nov 81) 3d Ind
SUBJECT: New Orleans to Venice, Louisiana (Hurricane Protection); Reach B-1 - Tropical Bend to Fort Jackson, Empire Floodgate, Periodic Inspection Report No. 3, 29 July 1981

DA, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg, MS 39180

20 JUL 82

TO: Commander, New Orleans District, ATTN: LMNED-DG

The disposition of comments presented in the preceding 2d Ind is satisfactory subject to the following comments:

a. Para d and Incl 4, para 4-02e. Measurements of "gaps" at the wall joints should not be compared directly with "joint movements" determined from measurements between reference bolts. A "gap" measurement, which is measured from inside face to inside face of a wall joint, can be compared only to a previous "gap" measurement to determine if movement is occurring at the joint. This movement can be compared with movement determined from the measured distances between the two reference bolts at that wall joint only if the reference bolt measurements were made on approximately the same dates that the "gap" measurements were made.

b. Para f and Incl 6, para 6-02i. Your schedule for presenting the short and long term alternatives to the Plaquemines Parish Commission Council should be cited.

c. Paras g(1), g(2), and i. When drafting of the data plots referenced in paras g(1) and g(2) and correction of the plates referenced in para i are completed, copies of these plates should be submitted to this office for review by indorsement to this chain of correspondence.

d. Para h. Since the previous survey was made in Jan 81, the next scheduled annual survey should have been completed in Jan 82 and thus the data available for comparison in this correspondence chain. This matter should be addressed by indorsement to this correspondence chain.

FOR THE COMMANDER:

Robert J Kaufman, P.E.
for R. H. RESTA, P.E.
Chief, Engineering Division

wd incl

LMNED-DG (23 Nov 81) 4th Ind
SUBJECT: New Orleans to Venice, Louisiana (Hurricane Protection); Reach B-1, Tropical Bend to Fort Jackson, Empire Floodgate, Periodic Inspection Report No. 3, 29 July 1981

DA, New Orleans District, Corps of Engineers, PO Box 60267, New Orleans, LA 70160 30 September 1982

TO: Commander, Lower Mississippi Valley Division, ATTN: LMVED-G

The disposition of comments presented in the 3d Ind follows. Paragraph numbers refer to like numbered paragraphs in the indorsement. Duplicate copies of the inclosures are submitted for your files.

a. Para. d and Incl 4, Para. 4-02e. Concur. Refer to revised para. 4-02e, inclosure 7.

b. Para. f and Incl 6, Para. 6-02i. Refer to revised para. 6-02i, inclosure 8, for the approved short and long term solution.

c. Paras. g(1), g(2), and i. Concur. Subject plates will be submitted by 1 Nov 82.

d. Para. h. Although the previous survey was made in Jan 81, the next annual survey was completed on 30 Jun 82. Upon comparing the present settlement data for RM-20 with the reading for Jan 81, it is apparent that the Jan 81 data was a field survey error. The settlement reading for RM-20 on 30 Jun 82 was 14.05 ft. which is consistent with the degree of settlement for previous surveys other than the Jan 81 reading of 14.40 ft.

FOR THE COMMANDER:

William B. Seale
FREDERIC M. CHATRY
Chief, Engineering Division

2 Incl (dup)
Added incl 7 & 8
As stated

NEW ORLEANS TO VENICE, LOUISIANA

HURRICANE PROTECTION

REACH B-1 - TROPICAL BEND TO FORT JACKSON

EMPIRE FLOODGATE

PERIODIC INSPECTION REPORT NO. 3

29 JULY 1981

U.S. ARMY ENGINEER DISTRICT

CORPS OF ENGINEERS

NEW ORLEANS, LA

EMPIRE FLOODGATE

PHOTO TAKEN 28 JULY 1976

SUMMARY

The Empire Floodgate was inspected on 29 July 1981 by representatives of LMVD and NOD and found to be safe, stable, adequately maintained and in satisfactory operation condition.

Some remedial action is required. Deficiencies noted during the inspection were minor and will be accomplished by the local interest (Plaquemines Parish Commission Council) in FY 82 pending availability of funds.

EMPIRE FLOODGATE

PERIODIC INSPECTION NO. 3

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*Revised 13 May 82

EMPIRE FLOODGATE

PERIODIC INSPECTION NO. 3

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SECTION I - INTRODUCTION

1-01 Authority. Authority is provided by ER 1110-2-100, subject, "Periodic Inspection and Continuing Evaluation of Completed Civil Works Structures."

1-02 Purpose and Scope. The results and conclusions of the inspection and evaluation for assuring the structural integrity and operational adequacy of the structure are presented herein.

1-03 Datum. All elevations, except where otherwise indicated, are in feet and refer to the National Geodetic Vertical Datum (NGVD), formerly Mean Sea Level (m.s.l.)

1-04 Previous Inspections.

Report No.	Date of Inspection	Date Report Approved
1	4 Sep 75	7 Apr 76
2	4 Oct 78	13 Aug 79

*Revised 13 May 82

SECTION I - INTRODUCTION

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SECTION II - PROJECT DESCRIPTION AND BACKGROUND

2-01 General. The description of the structure, historical and other general background information, are included in report no. 1 which also contains selected construction drawings illustrating *typical sections and details. A location map for this project is included in this report (plate I-1A).* This report is supplementary to previously numbered reports.

*Revised 13 May 82

SECTION II - PROJECT DESCRIPTION AND BACKGROUND

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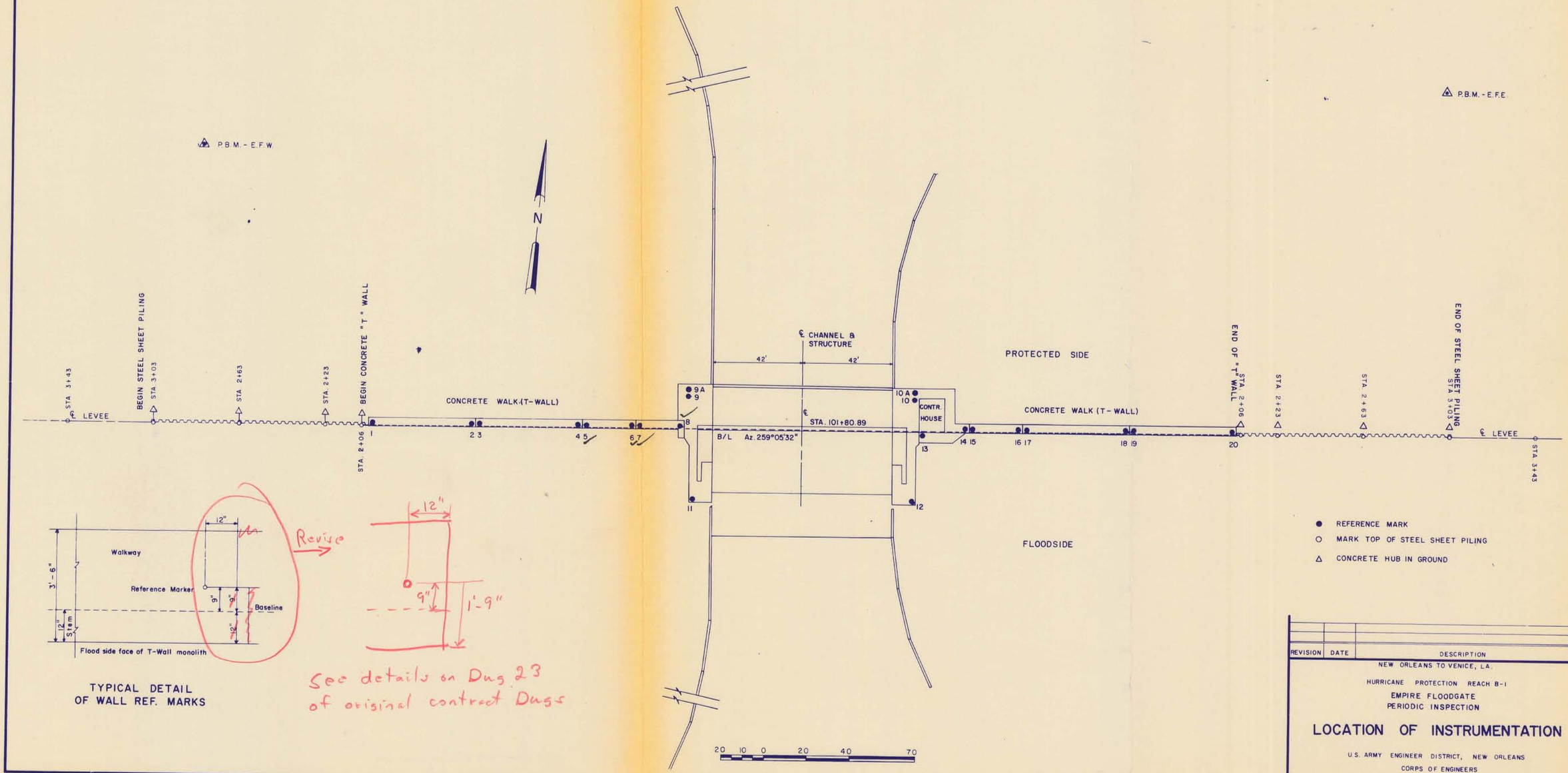


TYPICAL DETAIL
OF WALL REF. MARKS

Revise

See details on Dwg 23
of original contract Dwgs

REVISION	DATE	DESCRIPTION	BY

NEW ORLEANS TO VENICE, LA.

HURRICANE PROTECTION REACH B-1

EMPIRE FLOODGATE
PERIODIC INSPECTION

LOCATION OF INSTRUMENTATION

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

SHEET OF SHEET

FILE NO H-4-27323

PLATE I-1

SETTLEMENT REFERENCE MARK - SHEET PILING & LEVEE

REFERENCE MARK EAST OR WEST	2+06E	2+06E	2+23E	2+23E	2+63E	2+63E	3+03E	3+03E	3+43E
INITIAL DATE	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75
ORIGINAL READINGS (FT)	14.13	7.65	13.89	8.13	13.78	7.96	13.76	14.45	14.11
DATE OF OBSERVATIONS: 19 MAY 1976	14.01	7.46	13.69	7.92	13.45	7.62	13.33	13.96	13.64
18 APRIL 1977	13.86	7.26	13.51	7.70	13.20	7.34	13.02	13.54	13.31
5 JULY 1977	13.84	7.21	13.48	7.65	13.16	7.29	12.98	13.47	13.24
9 NOVEMBER 1977	13.82	7.18	13.45	7.62	13.12	7.24	12.92	13.37	13.17
23 MARCH 1978	13.79	7.14	13.44	8.56 *	13.12	7.20	12.86	13.15	13.06
21 SEPTEMBER 1978	13.83	7.16	13.42		13.08	7.12	12.87	13.11	13.06
① 9 APRIL 1980	13.49	6.73	13.07	7.27	12.72	6.70	12.44	12.60	12.60
① 5 JANUARY 1981	13.43	6.62	13.00	②	12.60	6.56	12.36	12.38	12.45
	8.5"	1'	10 5/8	10 5/16	1'-3"	1'-5	1'-5	2'-1	1'-8

REFERENCE MARK EAST OR WEST	-E-W-	2+06W	2+06W	2+23W	2+23W	2+63W	2+63W	3+03W	3+03W	3+43W
INITIAL DATE		12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75
ORIGINAL READINGS (FT)		13.87	7.11	13.38	7.56	13.03	7.80	12.65	13.91	11.69
DATE OF OBSERVATIONS: 19 MAY 1976		13.82	7.04	13.31	7.48	12.94	7.66	12.52	13.75	11.49
18 APRIL 1977		13.74	6.90	13.22	7.35	12.80	7.52	12.36	13.53	13.03
5 JULY 1977		12.74	6.87	13.22	7.31	12.79	7.49	12.34	13.48	11.21
9 NOVEMBER 1977		13.71	6.84	13.17	7.28	12.74	7.45	12.28	13.43	11.08
23 MARCH 1978		13.72	6.82	13.18	7.28	12.67	7.44	12.26	13.39	10.85 *
21 SEPTEMBER 1978		13.82	6.88	13.27	7.33	12.82	7.52	12.33	13.45	10.89
① 9 APRIL 1980		13.50	6.46	12.93	6.93	12.46	7.08	11.93	13.02	10.43
① 5 JANUARY 1981		13.47	6.41	12.91	6.83	12.42	6.99	11.89	12.91	10.35
		5"	8 1/2"	5 1/2"		7 1/4	9 3/4	9	1'-0	1'-4

NOTE: FIRST STATIONINGS LISTED ARE ON STEEL SHEET PILINGS. ELEVATIONS FOR 3+43 E & W ARE ON CONCRETE MONUMENTS

* Appears to be field error

SETTLEMENT REFERENCE MARKS — STRUCTURE & T-WALL

NO. OF REFERENCE MARKS	RM-1	RM-2	RM-3	RM-4	RM-5	RM-6	RM-7	RM-8	RM9	RM-9A	RM-10	RM10A
INITIAL DATE	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	5-19-76	12-2-75	5-19-76
ORIGINAL READINGS (FT)	14.59	14.72	14.73	14.78	14.76	14.77	14.79	14.74	14.76	14.77	14.71	14.70
DATE OF OBSERVATIONS: 19 MAY 1976	14.56	14.71	14.72	14.77	14.74	14.75	14.76	14.70	14.73	14.72	14.67	14.66
5 JULY 1977	14.51	14.68	14.68	14.72	14.70	14.70	14.71	14.64	14.68	14.67	14.62	14.61
15 SEPTEMBER 1978	14.49	14.66	14.66	14.70	14.68	14.68	14.68	14.62	14.64	14.64	14.56	14.56
① 9 APRIL 1980	14.29	14.47	14.48	14.53	14.51	14.51	14.51	14.43	14.47	14.46	14.40	14.39
① 5 JANUARY 1981	14.27	14.46	14.46	14.51	14.48	14.49	14.49	14.42	14.42	14.46	14.37	14.37
	4"	[illegible]	3"		3"		3"		4"		4	

NO. OF REFERENCE MARKS	RM-11	RM-12	RM-13	RM-14	RM-15	RM-16	RM-17	RM-18	RM-19	RM-20	Temp	Gage1	Gage2	Remarks	P.B.M.** E.F.E	P.B.M.** E.F.W
INITIAL DATE	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	49°	0.32			12-2-75	
ORIGINAL READINGS (FT)	14.74	14.73	14.75	14.68	14.67	14.67	14.66	14.61	14.61	14.57					3.122	
DATE OF OBSERVATIONS: 19 MAY 1976	14.71	14.69	14.71	14.65	14.63	14.63	14.63	14.58	14.58	14.51	71°	0.30			3.122	
5 JULY 1977	14.66	14.64	14.65	14.59	14.58	14.59	14.58	14.53	14.53	14.43	88°	0.00				4.363
15 SEPTEMBER 1978	14.63	14.59	—	14.54	14.53	14.54	14.53	14.48	14.48	14.36		0.90			3.122	4.396
① 9 APRIL 1980	14.45	14.42	14.43	14.37	14.36	14.37	14.35	14.29	14.29	14.15	73°	0.20	0.20		2.971	4.281
① 5 JANUARY 1981	14.44	14.40	14.41	14.35	14.34	14.34	14.33	14.25	14.25	[illegible]	51°	-0.9	-0.8		2.971	4.206
	3 1/2		3		4		4		4							
							↓ .33	↓ .35	↓ .35	↓ .17						

** ELEVATION OF BENCH MARK USED

DISTANCES TO REFERENCE MARKS

NO. OF REFERENCE MARKS	RM2-RM3	RM4-RM5	RM6-RM7	RM9A-RM10A	RM11-RM12	RM14-RM15	RM16-RM17	RM18-RM19	TEMP	Remarks
INITIAL DATE	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	54°	
ORIGINAL DISTANCE (IN.)	24.313	24.500	23.750	105.83 *	103.96 *	24.000	24.094	24.313		
DATE OF OBSERVATIONS: 24 MAY 1976	24.312	24.500	23.406	106.86	104.98	24.000	24.094	—	78°	
1 JULY 1977	24.437	24.531	23.750	106.82	104.97	23.968	24.125	24.531	88°	
14 SEPTEMBER 1978	24.468	24.500	23.625	106.92	105.07	23.937	24.250	24.531	89°	
9 APRIL 1980	24.688	24.750	24.750			24.031	24.281	24.781	70°	
5 JANUARY 1981	24.844	24.875	24.625			24.156	24.281	24.906	55°	

NOTE * APPEARS TO BE SURVEY ERROR.

ALINEMENT

REFERENCE MARK	3+43W	RM-1	RM-2	RM-3	RM-4	RM-5	RM-6	RM-7	RM-8	RM-13 **
INITIAL DATE	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75
ORIGINAL DISTANCE (IN)		11.844	11.750	11.938	12.219	12.063	12.219	11.813	12.063	21.563
DATE OF OBSERVATIONS: 24 MAY 1976		12.438	12.344	12.375	12.812	12.938	12.750	12.562	12.781	20.625
5 JULY 1977		12.562	12.500	12.500	12.750	12.593	12.750	12.531	12.656	20.500
19 SEPTEMBER 1978		12.750	12.812	12.812	13.093	12.437	12.562	12.250	12.531	20.437
9 APRIL 1980		12.719	12.625	12.531	13.000	13.469	13.719	13.125	13.313	20.281
5 JANUARY 1981		12.781	12.563	12.500	12.906	13.531	13.750	13.156	13.344	20.250

REFERENCE MARK	RM-14	RM-15	RM-16	RM-17	RM-18	RM-19	RM-20	3+43E	TEMP
INITIAL DATE	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	12-2-75	54°
ORIGINAL DISTANCE (IN)	11.438	11.500	11.750	11.563	11.563	11.469	11.344		
DATE OF OBSERVATIONS: 24 MAY 1976	12.187	12.375	12.562	12.312	12.406	12.500	12.531		78°
5 JULY 1977	12.375	12.625	12.781	12.593	12.531	12.718	12.531		
19 SEPTEMBER 1978	12.625	12.625	12.968	13.656 *	12.750	12.875	13.000		88°
9 APRIL 1980	12.938	12.938	13.250	12.875	12.875	13.063	13.250		70°
5 JANUARY 1981	12.906	12.844	13.188	12.813	12.813	13.063	13.219		47°

NOTE: RM-1 THRU RM-8 ALINEMENT SHOTS ARE TAKEN WITH INSTRUMENT SET UP ON 3+43 W. RM-13 THRU RM-20 ALINEMENT SHOT ARE TAKEN WITH INSTRUMENT SET UP ON 3+43 E

** RM-13 IS SOUTH OF BASELINE ALL OTHER REFERENCE MARKS ARE NORTH OF BASELINE

** RM-13 IS SOUTH OF BASELINE
ALL OTHER REFERENCE MARKS ARE NORTH OF BASELINE

① NOTE: THE DIFFERENTIAL GRAPHS (1975 - DATE) ARE PLOTTED USING THE EQUATION (R - R) - .151' = DIFF. THE 0.151 IS CAUSED BY THE FOLLOWING BENCH MARK (N.G.V.D.) CORRECTIONS; PBM E.F.E (1975-76 (ELEV) 3.122' - 1979 (ELEV) 2.971' = 0.151'

② NOTE: CAP DESTROYED; SHOT NATURAL GROUND.

P.B.M. - E.F.E. (USE) 1975-76 ELEVATION 3.122 FEET N.G.V.D TOP OF 1 1/2 INCH PIPE CAP.

P.B.M. WAS SET AS FOLLOWS: IS TOP OF 1 1/2 INCH DIA. GALVANIZED PIPE SET IN BORE HOLE AT 200 FEET THEN DRIVEN AN ADDITIONAL 5 FEET INTO STRATA. P.B.M. IS LOCATED ON THE EAST BANK OF THE WATERWAY FROM EMPIRE TO GULF OF MEXICO. JUST NORTH OF THE EMPIRE FLOODGATE EAST LEVEE AT STATION 104+80 (BASELINE OF STRUCTURE) AND 160 FT. NORTH OF THE EAST AND WEST LEVEE. PIPE AND CAP ARE ENCLOSED IN A 3 INCH PIPE CASING WHICH IS APPROX. 12 INCHES ABOVE THE GROUND, AND SURROUNDED WITH CONCRETE FLUSH WITH THE GROUND. THE 3 INCH PIPE IS GUARDED BY FOUR 1" DIA. PIPES AND ALL ARE PAINTED YELLOW.

P.B.M - E.F.W. (USE) 1975-76 ELEVATION 4.363 FEET N.G.V.D TOP OF 1 1/2 INCH PIPE CAP.

P.B.M. WAS SET AS FOLLOW: IS TOP OF 1 1/2 INCH DIA. GALVANIZED PIPE SET IN BORE HOLE AT 200 FEET THEN DRIVEN AN ADDITIONAL 5 FEET INTO STRATA. P.B.M. IS ON THE WEST BANK OF THE WATERWAY FROM EMPIRE TO GULF OF MEXICO. JUST NORTH OF EMPIRE FLOODGATE, AT LEVEE STATION 99+00 (BASELINE OF STRUCTURE) AND 130 FEET NORTH OF THE EAST AND WEST LEVEE. PIPE AND CAP ARE ENCLOSED IN A 3 INCH PIPE CASING WHICH IS APPROX. 12 INCHES ABOVE THE GROUND AND SURROUNDED WITH CONCRETE FLUSH WITH THE GROUND. THE 3 INCH PIPE IS GUARDED BY FOUR 1" DIA. PIPES AND ALL ARE PAINTED YELLOW.

P.B.M. J-279 (1971 ADJUSTMENT) ELEVATION 0.755 FEET N.G.V.D

P.B.M WAS SET AS FOLLOWS: ABOUT 1.5 MILES SOUTHEAST ALONG STATE HIGHWAY 23 FROM THE DRAW BRIDGE OVER THE DOULLUT CANAL AT EMPIRE, THENCE 0.1 MILE NORTHEAST ALONG A SHELL DRIVEWAY, 205 FEET NORTH OF THE CENTER OF THE CROSSING OF THE DRIVEWAY AND THE MISSOURI PACIFIC RAILROAD, 174 FEET NORTHWEST OF THE CENTER LINE OF THE DRIVE 65.6 FEET NORTHEAST OF THE NORTHEAST RAIL, 48 FEET SOUTHWEST OF THE CENTER LINE OF A SHELL ROAD WHICH FOLLOWS THE TOP OF THE MISSISSIPPI RIVER LEVEE, 1 1/2 FEET SOUTHEAST OF A POWER POLE, 0.6 FOOT NORTHWEST OF A METAL WITNESS POST, ABOUT LEVEL WITH THE, TRACK, AND ON THE TOP OF A COPPER - COATED ROD THAT IS DRIVEN TO A DEPTH OF 80 FEET AND THAT IS ENCASED IN A 6-INCH METAL PIPE THAT PROJECTS 0.2 FOOT.

P.B.M. - K - 195 (1971 ADJUSTMENT) ELEVATION 7.320 FEET N.G.V.D

P.B.M. WAS SET AS FOLLOWS: AT EMPIRE, SET IN THE TOP OF THE NORTHEAST END OF THE NORTHWEST CONCRETE ABUTMENT OF THE STATE HIGHWAY 23 DRAW BRIDGE OVER THE DOULLUT CANAL AT EMPIRE, 21.4 FEET NORTHEAST OF THE CENTER OF THE HIGHWAY, 4.3 FEET NORTHWEST OF THE BRIDGE OPERATORS HOUSE, 0.8 FOOT SOUTHWEST OF THE NORTHEAST END OF THE ABUTMENT AND 1 FOOT BELOW THE LEVEL OF THE HIGHWAY.

NOTE: THE ABOVE P.B.M. ELEVATIONS WERE DERIVED FROM THE LATEST LEVELING AND ARE BASED ON A SUPPLEMENTARY ADJUSTMENT OF 1971. COPIED FROM VERTICAL CONTROL DATA BY THE GEODETIC SURVEY QUAD 290893, PAGES 1, 5 AND 6. LINE 101 ADJUSTED ELEVATIONS OF 1971. THIS INFORMATION IS ON FILE IN THE SURVEY BRANCH.

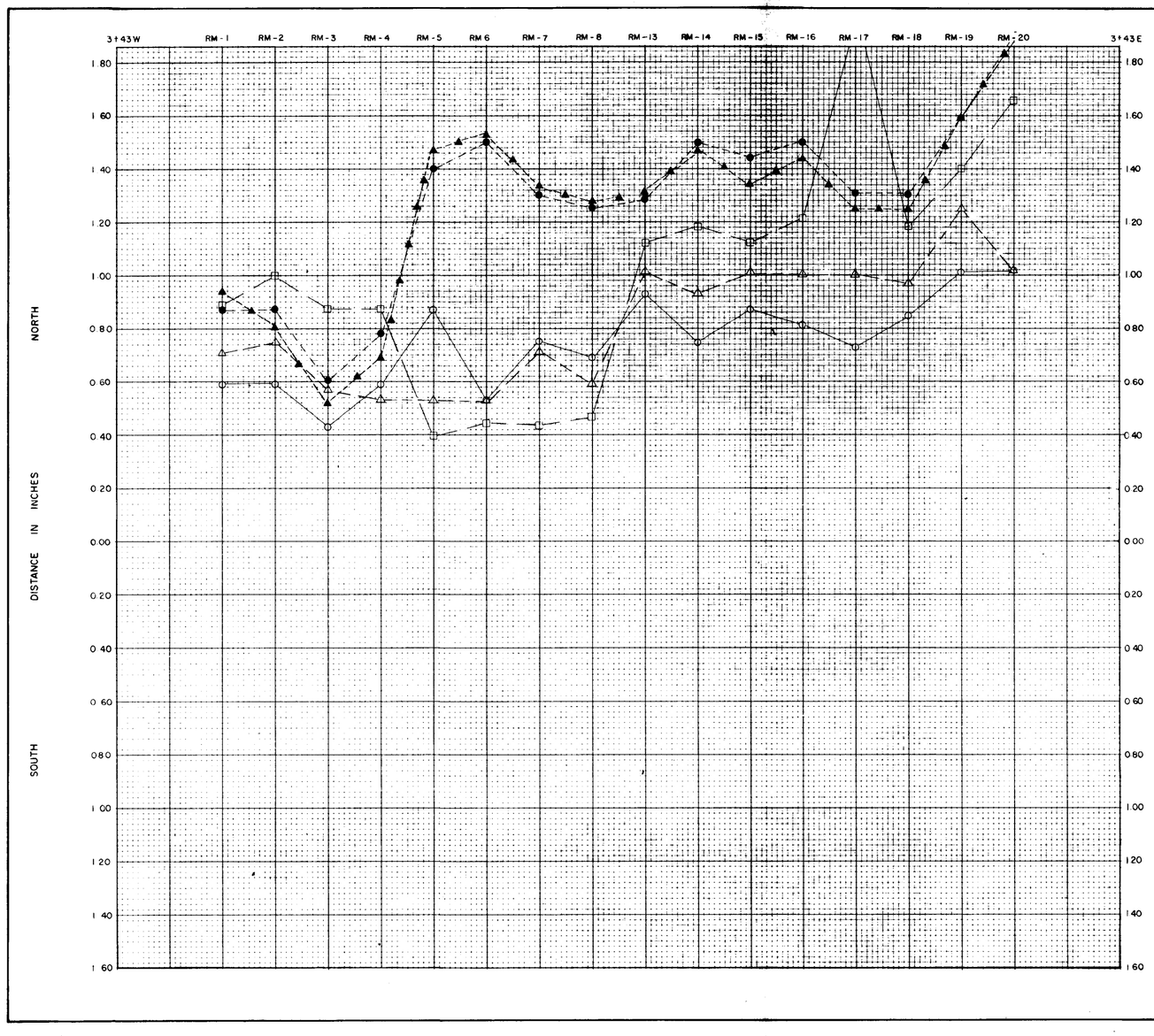
NEW ORLEANS TO VENICE, LA.
HURRICANE PROTECTION REACH B-1

PERIODIC INSPECTION
EMPIRE FLOODGATE

ALINEMENT AND SETTLEMENT REFERENCE MARKS - TABULATIONS

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

SHEET OF SHEET FILE NO. H-4-27323/



LEGEND

- MAY 24 1976
- JULY 5 1977
- SEPTEMBER 1978
- APRIL 1980
- JANUARY 5 1981

NOTE Reference Marks at Sta 3+43 are Brass Caps in Concrete Monument

NOTE For location of Reference Marks see Plate

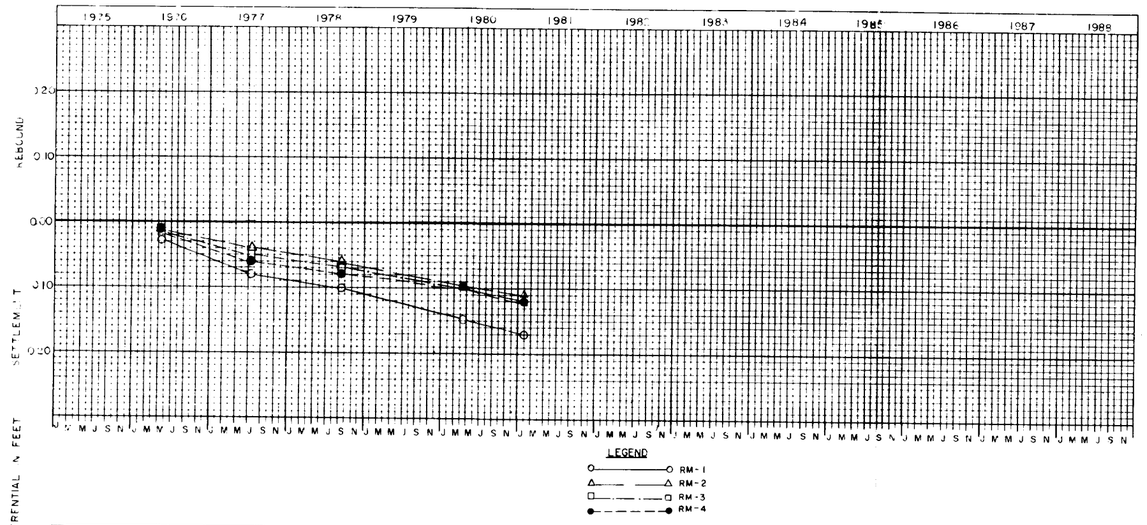
NEW ORLEANS TO VENICE, LA
HURRICANE PROTECTION REACH B-1
PERIODIC INSPECTIOION
EMPIRE FLOODGATE

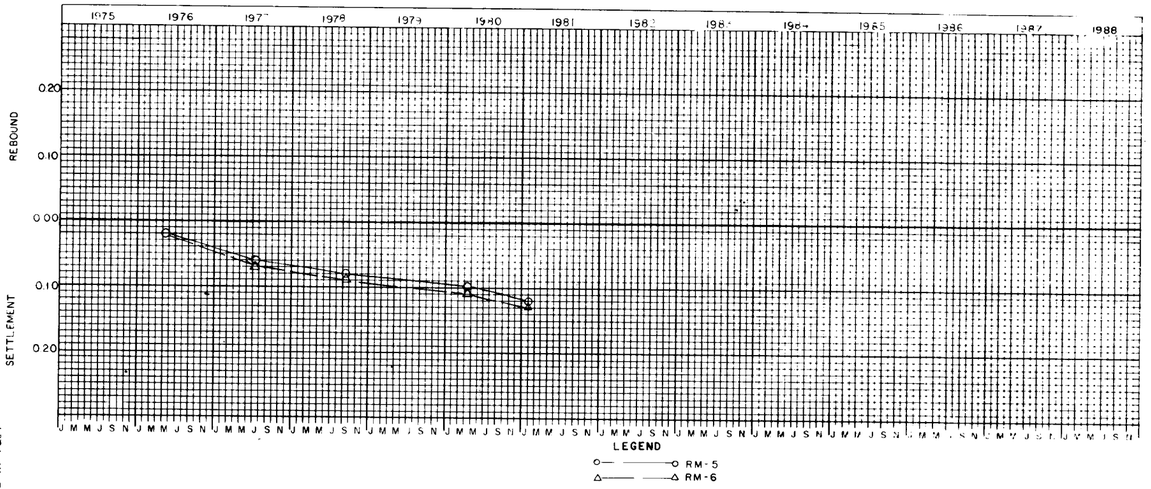
ALINEMENT
DIFFERENTIAL CHART

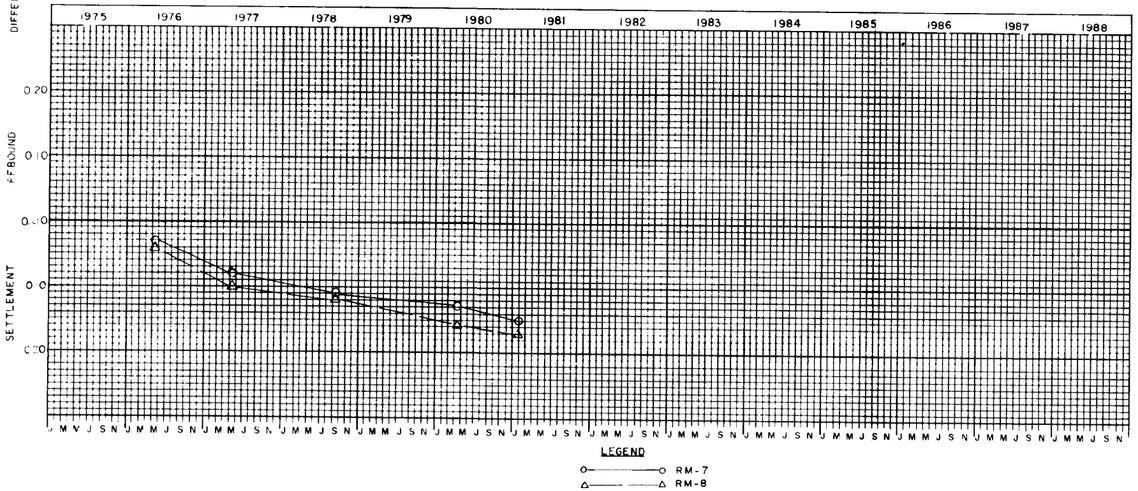
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

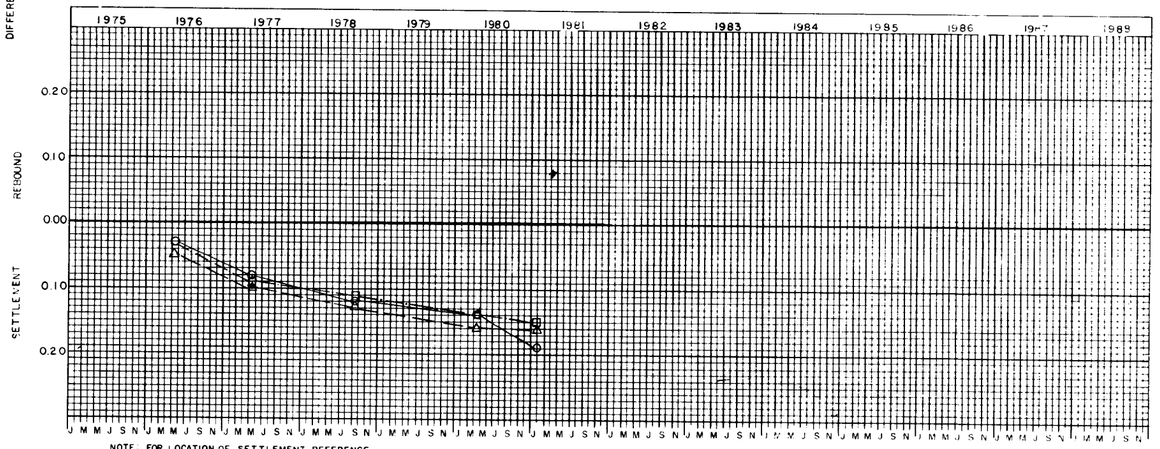
SHEET OF SHEET FILE NO H-4 27323/

PLATE I-2A









NOTE: FOR LOCATION OF SETTLEMENT REFERENCE MARKS SEE PLATE.
FOR TABULATION OF ELEVATIONS SEE PLATE.

NOTE: ALL POINTS PLOTTED AFTER 1979 ARE USING THE EQUATION (R-R) -.151 = DIFF.; SEE TABULATION CHART FOR FURTHER INFORMATION.

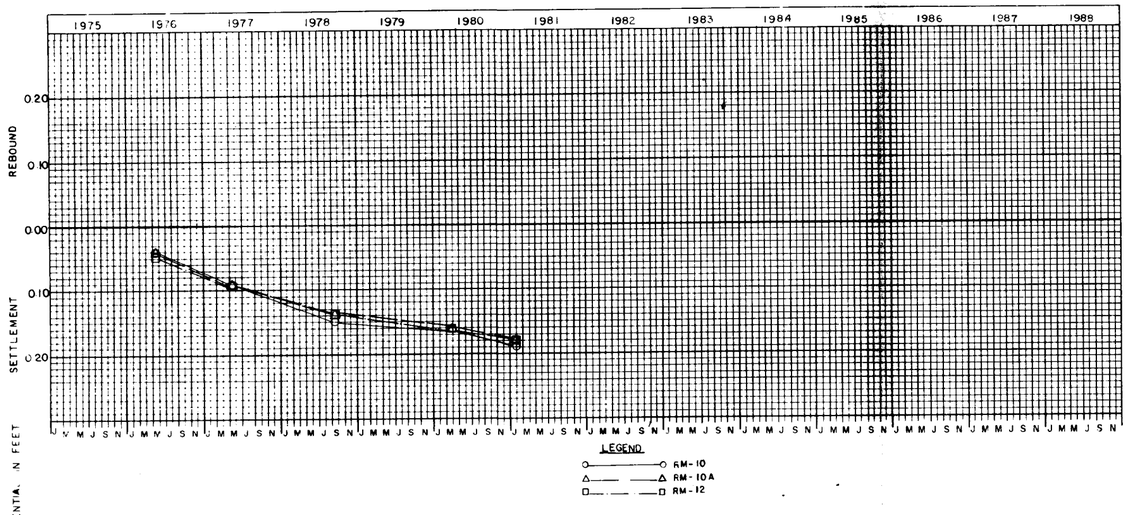
NEW ORLEANS TO VENICE, LA.
HURRICANE PROTECTION REACH B-1

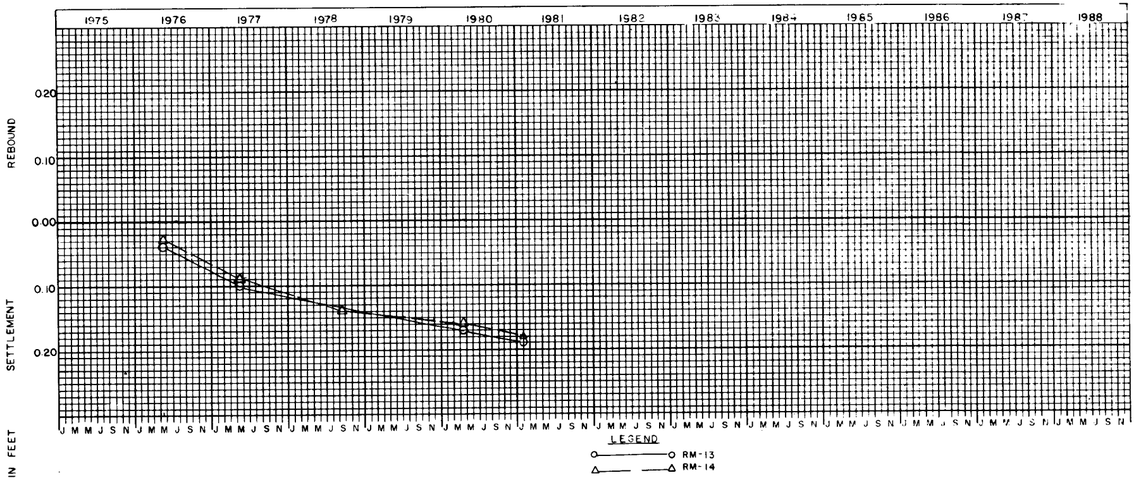
PERIODIC INSPECTION
EMPIRE FLOODGATE

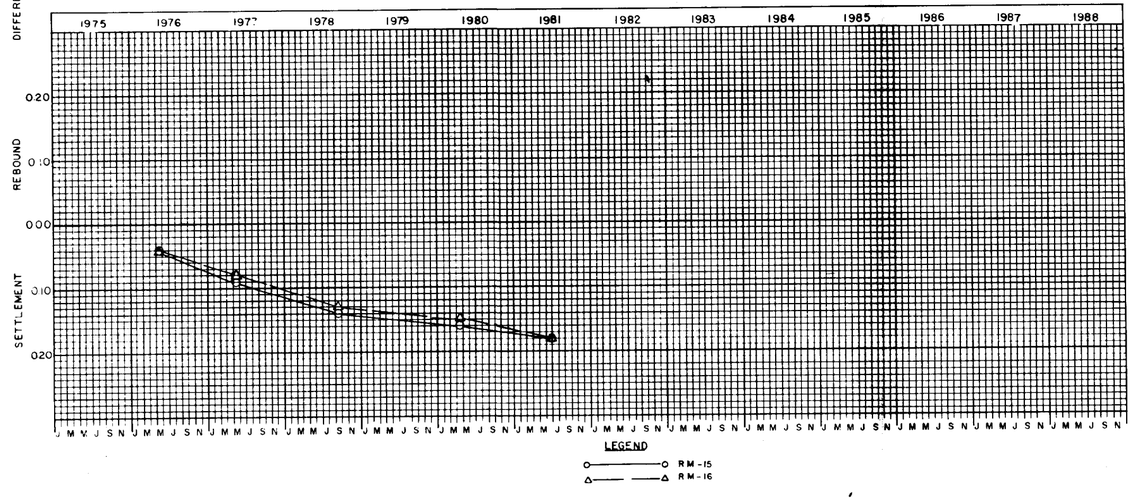
SETTLEMENT AND REFERENCE MARKS DIFFERENTIAL'S MOVEMENT

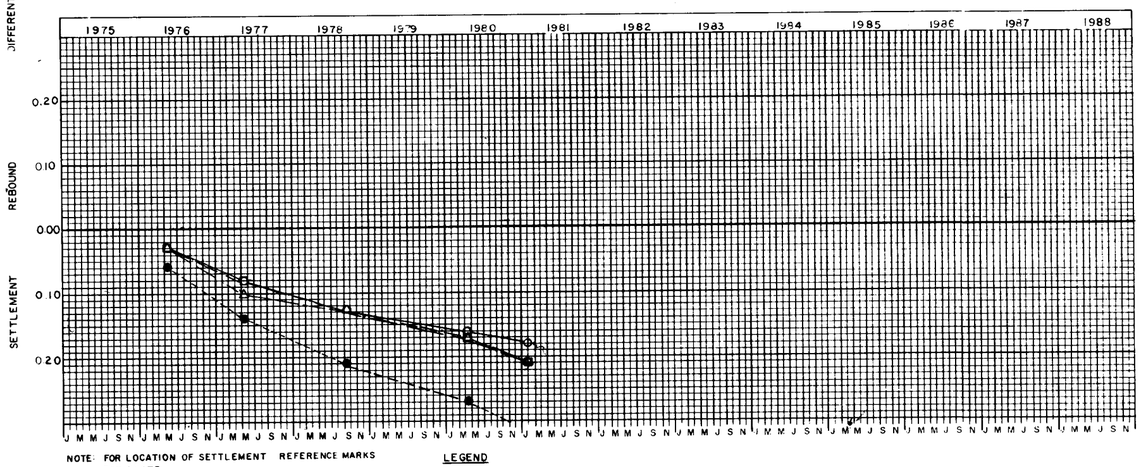
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

FILE NO H-4-27323









NOTE: FOR LOCATION OF SETTLEMENT REFERENCE MARKS SEE PLATE.
FOR TABULATION OF ELEVATIONS SEE PLATE.

NOTE: ALL POINTS PLOTTED AFTER 1979 ARE USING THE EQUATION (R-R)-.151 = DIFF.; SEE TABULATION CHART FOR FURTHER INFORMATION.

LEGEND
RM-17
RM-18
RM-19
RM-20

NEW ORLEANS TO VENICE, LA.
HURRICANE PROTECTION REACH B-1
PERIODIC INSPECTION
EMPIRE FLOODGATE

SETTLEMENT AND REFERENCE MARKS DIFFERENTIAL'S MOVEMENT

U S ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
FILE NO H-4-27323

PLATE 1-4

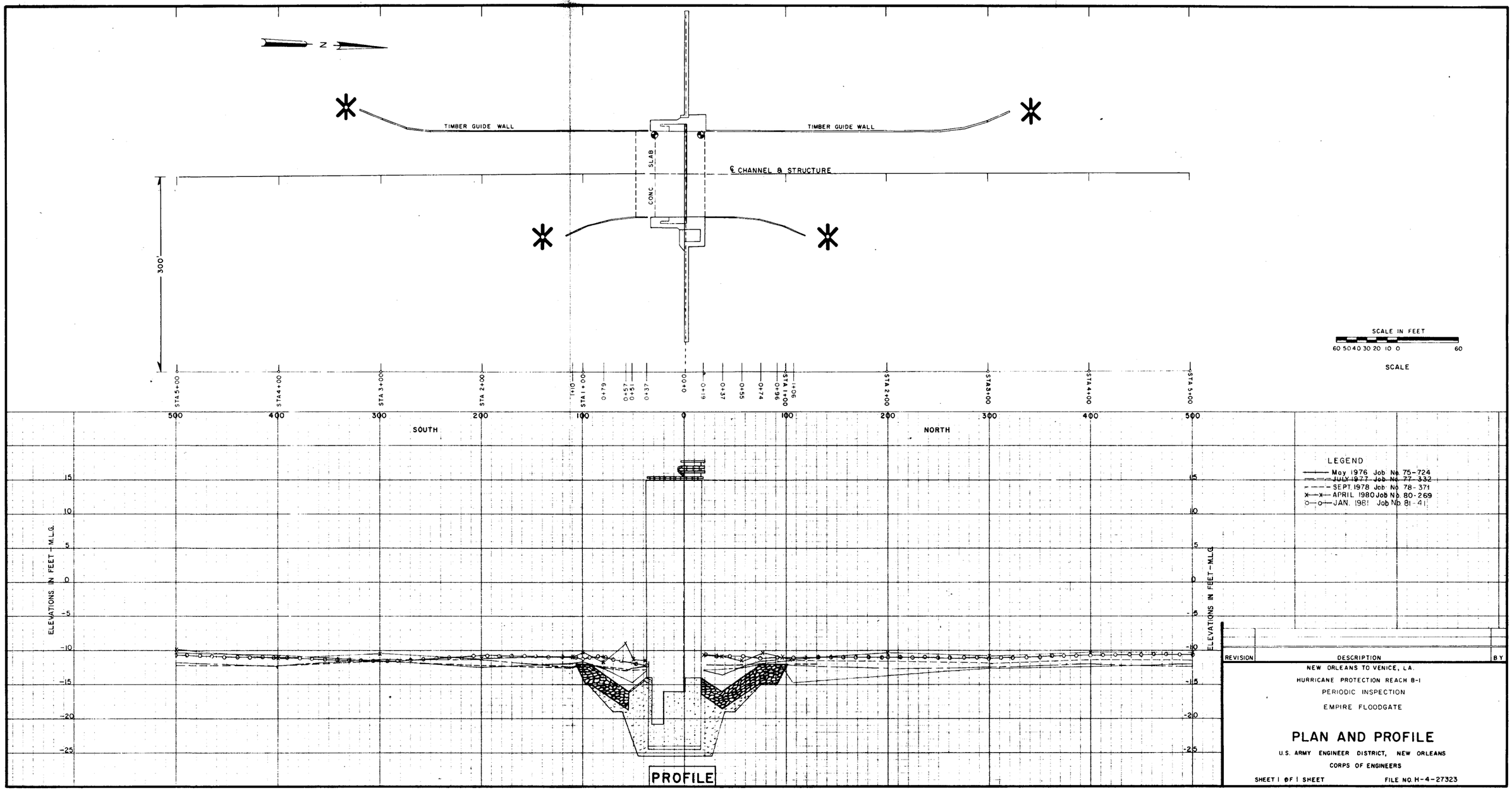

N
TIMBER GUIDE WALL
TIMBER GUIDE WALL
SLAB
CONC
℄ CHANNEL & STRUCTURE
300'
STA 5+00
STA 4+00
STA 3+00
STA 2+00
STA 1+00
0+79
0+57
0+51
0+37
0+00
0+19
0+27
0+55
0+74
0+96
STA 1+00
1+06
STA 2+00
STA 3+00
STA 4+00
STA 5+00
500
400
300
200
100
0
100
200
300
400
500
SOUTH
NORTH
SCALE IN FEET
60 50 40 30 20 10 0
60
SCALE
LEGEND
MAY 1976 Job No. 75-724
JULY 1977 Job No. 77-332
SEPT. 1978 Job No. 78-371
APRIL 1980 Job No. 80-269
JAN. 1981 Job No. 81-41
ELEVATIONS IN FEET - M.L.G.
15
10
5
0
-5
-10
-15
-20
-25
PROFILE
REVISION
DESCRIPTION
BY
NEW ORLEANS TO VENICE, LA.
HURRICANE PROTECTION REACH B-1
PERIODIC INSPECTION
EMPIRE FLOODGATE
PLAN AND PROFILE
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
SHEET 1 OF 1 SHEET
FILE NO. H-4-27323

PLATE I-5

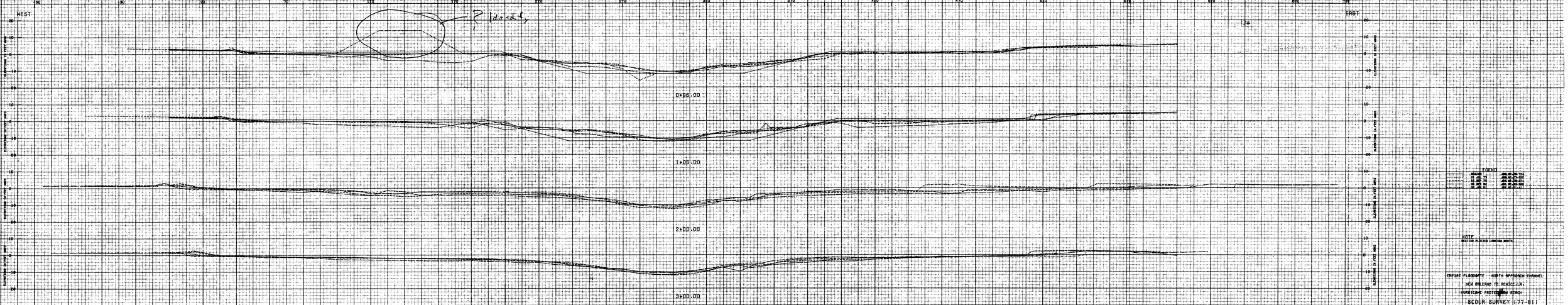
LEGEND

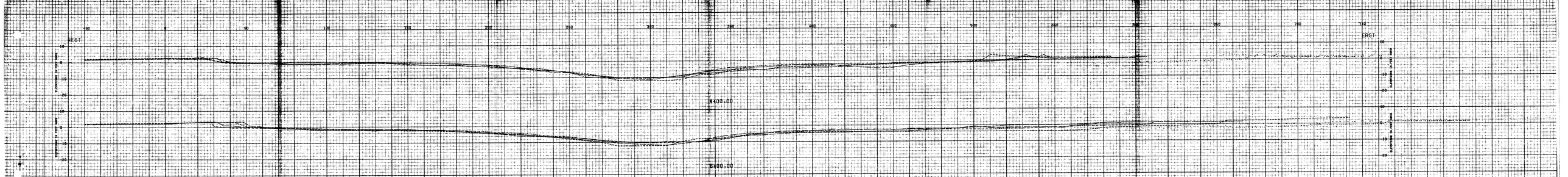
	DESIGN	JOB NO.76-724
	01 JUL 77	JOB NO.77-332
	22 SEP 78	JOB NO.78-371
	07 APR 80	JOB NO.80-269
	05 JAN 81	JOB NO.81-41

NOTE
SECTION PLOTTED LOOKING NORTH

EMPIRE FLOODGATE NORTH APPROACH CHANNEL
NEW ORLEANS TO VENICE, LA.
HURRICANE PROTECTION REACH
SCOUR SURVEY (77-81)
U.S. ARMY ENGINEERS NEW ORLEANS CORPS OF ENGINEERS
SHEET OF JANUARY 1981 FILE NO.

PLATE I-G

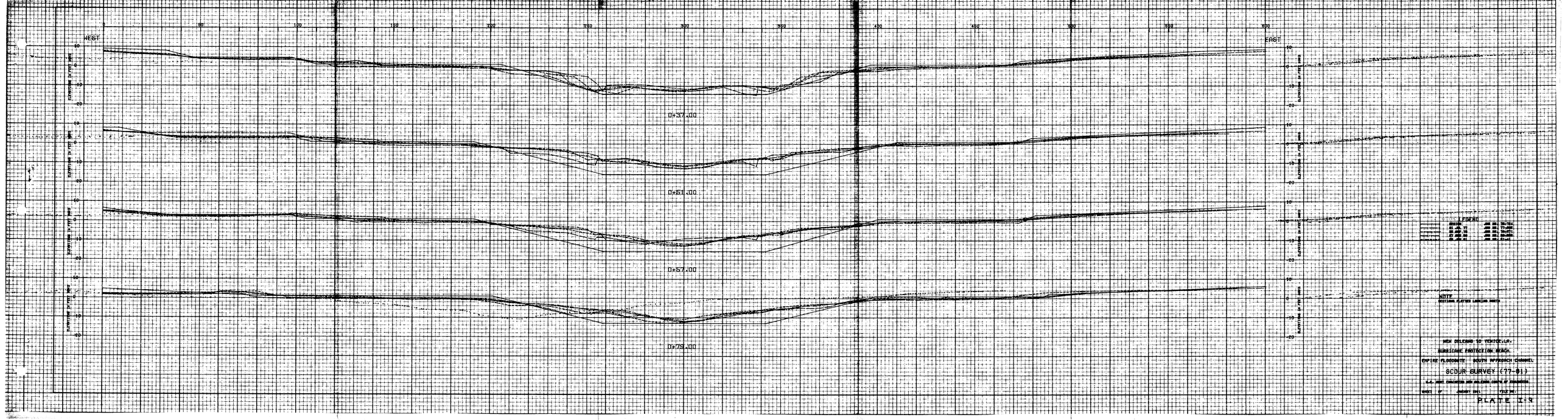

WEST
EAST
0+95.00
1+05.00
2+00.00
3+00.00
LEGEND
NOTE
MATCH PLOTTED LINE ON NORTH
ENGINEERING DIVISION
NEW ORLEANS TO VENICE (LA.)
HURRICANE PROTECTION PROJECT
SCOUR SURVEY (77-81)
PLATE I-7

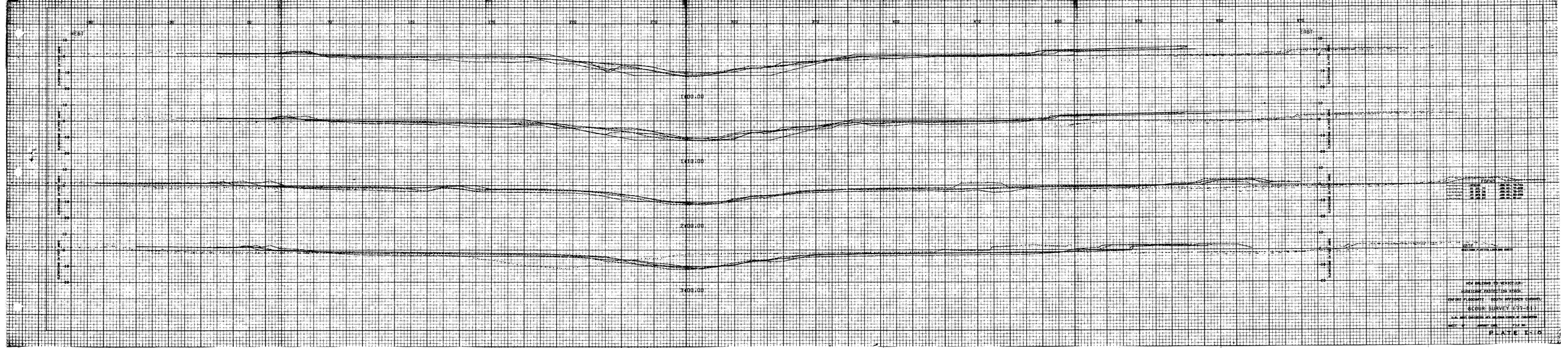


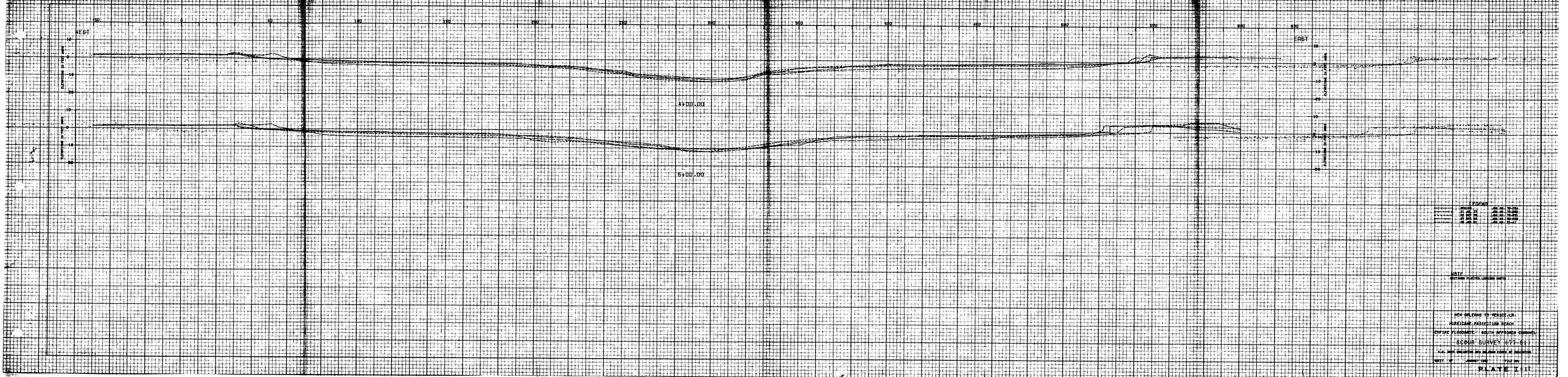
NOTE
SECTION PLOTTED LOOKING NORTH

EXPLORE FLOODGATE: NORTH APPROACH CHANNEL
NEW ORLEANS TO VENICE, LA.
HURRICANE PROTECTION PROJECT
SCOUR SURVEY (677-813)
U.S. ARMY ENGINEER DIST. NEW ORLEANS CORPS OF ENGINEERS
SHEET 1 OF 1 SHEET(S) DWG. NO. FILE NO.

PLATE E-8


WEST
EAST
0+37.00
0+51.00
0+57.00
0+79.00
ELEVATION IN FEET MSL
LEGEND
NOTE
SECTIONS PLOTTED LOOKING NORTH
NEW ORLEANS TO VENICE, LA.
HURRICANE PROTECTION PROJECT
ENTIRE FLOODSITE SOUTH APPROACH CHANNEL
SCOUR SURVEY (77-91)
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS, CORPS OF ENGINEERS
SHEET 9 JANUARY 1991 FILE NO.
PLATE E-9


WEST
EAST
1600.00
1610.00
2400.00
3400.00
LEGEND
NOTE
NEW BREAKWATER TO WEST OF:
HURRICANE PROTECTION BEACH,
CHANNEL TO FLOODGATE - SOUTH APPROACH CHANNEL
SCOUR SURVEY (77-61)
PLATE C-10


WEST
EAST
4+00.00
5+00.00
ELEVATION IN FEET MSL
LEGEND
NOTE:
NEW ORLEANS TO VENICE (LA)
HURRICANE PROTECTION REACH
ENTIRE FLOODWAY, SOUTH APPROACH CHANNEL
SCOUR SURVEY (77-61)
PLATE I-11

SECTION III / OPERATING AND MAINTENANCE DATA

3-01 Operation and Maintenance Problems. The following work was done at the structure since the last inspection.

a. May 18, 1979 - Replaced two (2) solar panels on lights and repaired any damage resulting from theft of panels. Total amount to replace panels was $1,009.00.

b. May 21, 1979 - Repaired and replaced damaged items. Vandals kicked in 1 set of shutters, broke 1 glass, ripped 2 screens and removed 1 ratchet jack.

3-02 Action on Deficiencies from Last Inspection. The proposed remedial work included in the last inspection report will be coordinated with the Plaquemines Parish Commission Council in FY 82.

SECTION IV - REVIEW OF DESIGN & ANALYSIS OF INSTRUMENTATION

4-01 Review of Design. A detailed comparison of the original design criteria to current design criteria was recorded in Periodic Inspection Report No. 1, dated September 1975. A review of this comparison shows that the original design is equal to or is more conservative than current design criteria. The allowable working stresses for concrete and structural steel are in accordance with those recommended in "Working Stresses for Structural Design," EM 1110-1-2101, dated November 1963, through change 2 dated 17 January 1972, which is still current. The actual conditions experienced at the floodgate since design and construction have not exceeded the conditions investigated in the design review. There have been no appreciable changes in design criteria, assumptions or function of this structure; therefore, a detailed design analysis is not required.

4-02 Analysis of Instrumentation Data.

a. General. The following chart indicates the type, location and schedule for reading of each type of instrumentation:

Instrumentation Devices	Observation Schedule
1. Settlement	
20 reference marks on structure & floodwall	Annually
18 reference marks on steel sheet pile walls	Annually
2. Scour Survey	
20 ranges in approach channels	Annually

*Revised 13 May 82

3. Floodwall Alinement
16 measurements on floodwalls — Annually

4. Distance Across Chamber
2 measurements across chamber — Annually

5. Joint Measurement
12 measurements across joints — Annually

The concrete T-walls are instrumented with reference marks in order to measure settlement, changes in alignment, and movement at the joints while the sheetpile I-walls are instrumented with settlement reference marks to determine when settlement of the levee is essentially completed.

b. Settlement. Present data indicate significant settlement of the sheetpile I-wall, since original readings, ranging from 5 1/2 inches to 2'-1. Settlement data for the structure and T-wall indicates an average of 4 inches of settlement, since original readings, which are within the predicted design settlement of 6 inches.

c. Scour Survey. Recent scour surveys indicate no appreciable scouring has occurred since the last inspection in October 1978. See plates I-6 thru I-11.

d. Floodwall Alinement. The alinement surveys, as indicated by plates I-2 and I-2A, show an apparent movement to the north. This condition has not affected the structural integrity of the structure. The Alinement Differential Chart, plate I-2A, indicates that RM-5, RM-6, RM-7 and RM-8 have moved an average of one (1) inch since the last inspection in October 1978. As indicated on plate I-1, these reference marks are located on two adjacent concrete T-wall

monoliths. Possible cause of this movement is unknown but these reference marks will be monitored closely during future surveys.

*e. Joint Movement. The current distance to reference marks data, Plate I-2, indicates minor increases in measurements between reference bolts as compared to the initial readings. The measurements between reference marks RM2 - RM3, RM4 - RM5, and RM18 - RM 19 indicated the more significant movements of 1/2, 3/8 and 3/4 inches, respectively, since the initial readings. Actual field inspection of the joints between subject reference marks indicated no structural discrepancies. *

*Revised 10 Sep 82

SECTION IV - REVIEW OF DESIGN AND ANALYSIS OF INSTRUMENTATION

4-01 Review of Design. A detailed comparison of the original design criteria to current design criteria was recorded in Periodic Inspection Report No. 1, dated September 1975. A review of this comparison shows that the original design is equal to or is more conservative than current design criteria. The allowable working stresses for concrete and structural steel are in accordance with those recommended in "Working Stresses for Structural Design", EM 1110-1-2101, dated November 1963, through change 2 dated 17 January 1972, which is still current. The actual conditions experienced at the floodgate since design and construction have not exceeded the conditions investigated in the design review. There have been no appreciable changes in design criteria, assumptions or function of this structure; therefore, a detailed design analysis is not required.

4-02 Analysis of Instrumentation Data.

a. Scour Survey. Recent scour surveys indicate no appreciable scouring has occurred since the last inspection in October 1978.

b. Alinement. The alinement surveys indicate an apparent movement to the north. This condition does not affect the structural integrity of the structure.

c. Settlement. Between September 1978 and February 1981 negligible settlement has occurred at the structure.

4-03 Instrumentation Plates.

Plate No.	Title	File No.
I-1	Location of Instrumentation	H-4-27323
I-2	Alinement and Settlement Reference Marks - Tabulation	H-4-27323
I-2A	Alinement Differential Chart	H-4-27323
I-3	Settlement and Reference Marks Differential Movement	H-4-27232
I-4	Settlement and Reference Marks Differential Movement	H-4-27323
I-5	Plan and Profile	H-4-27323
I-6	Scour Survey	
I-7	Scour Survey	
I-8	Scour Survey	
I-9	Scour Survey	
I-10	Scour Survey	
I-11	Scour Survey	

SECTION V - INSPECTION

5-01 Inspection Team. The inspection of the structure was conducted on 29 July 1981 by the following personnel:

LMVD

F. N. Johnson	Technical Engineering Branch
C. C. Trahan	Geology, Soils & Materials Branch

NOD

Johnny B. Drummond	General Engineering Section
Janis Hote	Hydraulics & Hydrologic Branch
Rick Deubert	Foundation & Materials Branch
Rick Tillman	Structural Design Section
J. Perry	Structural Design Section
R. Kahl III	Operations Division
Gerry Jesclard	General Engineering Section
Dennis Strecker	General Engineering Section

PLAQUEMINES PARISH COMMISSION COUNCIL

Henry Urban (Project Manager)
David Becnel
Stephen Musselwhite (Engineer)
Ricky Thornton
Ruben Victory

5-02 Orientation. Prior to the inspection, the team members were given a brief orientation of the following features of the structure: Hydraulic and hydrology, structural considerations, foundations, operating machinery and construction history.

5-03 Observations. The floodgate was not dewatered at the time of the inspection, therefore, the following observations were limited to those visible above the water surface.

a. Reinforced Concrete.

(1) Floodwall. There were a few shrinkage and temperature hairline cracks on top of the East and West walkways which were not considered serious.

The overall condition of the exposed concrete surfaces is satisfactory. The T-wall joints between instrumentation reference marks RM2-RM3, RM4-RM5, and RM18-RM19 have gaps of approximately 2-1/2", 1" and 1-1/2" respectively. It was decided that these movements occurred after construction and is expected to stabilize in the near future.

(2) Gatebay Monolith. The ladders and wall armour on each of the channel walls were extensively corroded. The corrosion appeared to be worse between approximate elevation 8.0 NGVD and the water surface. (See photo #1). Water was observed flowing through 8 small holes in the North face of the concrete wall adjacent to the counterweight recess and above the pump platform on the structures East side. These holes were all in close proximity to each other and were located just above the horizontal construction joint as can be seen in photo #2. Both counterweight recesses contained entrapped water in them. The surface of the water in the East recess was approximately 5 feet from the top of the concrete and contained a small amount of floating debris. The water level was receding very slowly. The surface of the water in the West recess contained no floating debris and was approximately 1 foot from the top of the concrete. The water level was not receding in this recess. The high water levels observed in each of the counterweight recesses would seem to indicate that the drain holes at elevation -9.5 NGVD were not functioning properly. There was an area of concrete which had spalled-off from the top of the concrete underneath a handrail anchor plate on the Northeast corner of the structures West side channel wall. Additionally, on the West side channel wall on the Southeast corner underneath another handrail anchor plate there is an area of concrete which is cracked and could also possibly spall-off. On both sides of the T-wall tie-in to the gatebay monolith on the structure's West side, there were some form liner bolt holes approximately 2 feet from the top of the concrete which had water leaking through them. (See photo #5). Overall the gatebay

monolith, superstructure above the water, control house and pump platform appeared to be in good condition.

(3) Needle Storage Rack. In general, the overall condition of the needles, needle girders, and storage rack was excellent. The only deficiencies noted were sand deposits in the needle girders resulting in small areas of corrosion, and a cracked timber blocking underneath the needle girder which is decaying.

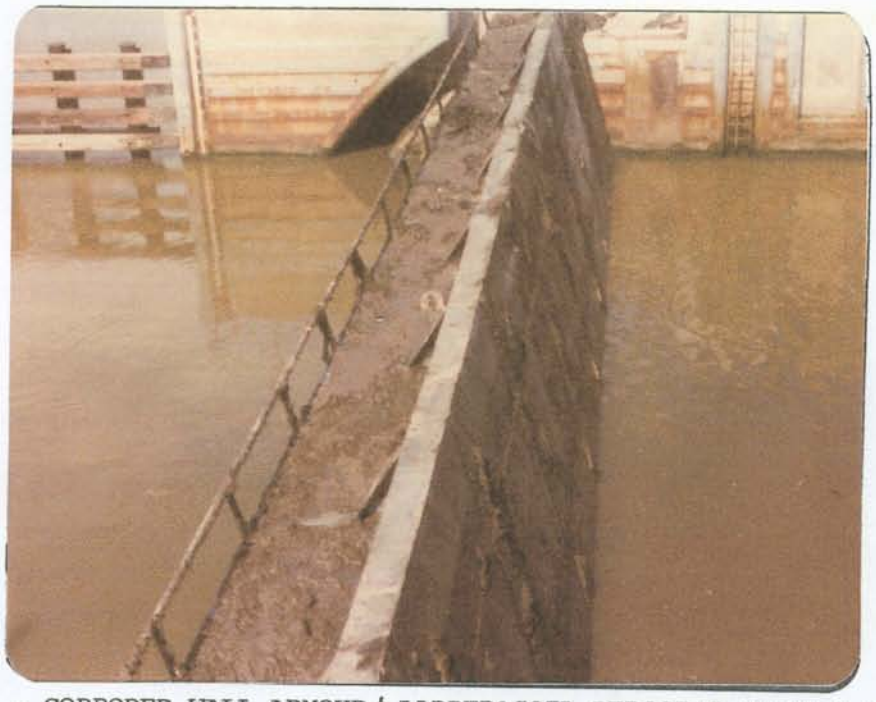


PHOTO NO. 1 - CORRODED WALL ARMOUR & LADDER; SOIL DEPOSITS ON FLAP GATE WALKWAY

PHOTO NO. 2 - SMALL HOLES IN CONCRETE WALL

PHOTO NO. 3 - SEPARATION OF WATERSTOP BETWEEN I-WALL AND T-WALL INTERFACES

PHOTO NO. 4 - SOIL DEPOSITS IN THE GATE LIFTING RECESSES

PHOTO NO. 5 - WATER LEAKING THROUGH FORM LINER BOLT HOLES

b. Sheetpile. The sheetpile I-wall was corroded and has settled on both sides of the structure near the tie-in levees. As a result of the settlement, the waterstops between the I-wall and T-wall interfaces no longer make contact. When the sheetpile I-wall is capped with concrete, after settlement of the levee is essentially complete, the joint between the I-wall and T-wall will be modified so that the waterstop on the I-wall will be in contact with the T-wall. These resulting open spaces are approximately 1 to 2 inches at the joints (see photo #3).*

c. Flap Gate. The flap gate was raised to the closed position. The operation of the gate was satisfactory. Only that portion of the gate above the water surface was inspected. The paint on both sides of the gate appeared to be in good condition with no corrosion being noted at all. There were large deposits of soil trapped on the walkway with smaller amounts of soil still remaining on the skin plate. (See photo #1). The soil deposits on the walkway were worse in each of the end areas of the gate which move within the confines of the gate lifting recesses. (See photo #4). Two large dents were noted on the skin plate at the top of the gate near each of the two vertical center ribs. These dents do not, in any way, affect the operation of the gate but would seem to indicate that the gate didn't seat properly in the fully opened position and that a large heavy object had struck it while passing over it (See photo #1). Periodic dredging would appear to be the ultimate solution however, in the interim it would seem appropriate to issue a navigation bulletin

* Revised 13 May 82

Incl 5

informing mariners of the problem. Large signs placed in both directions along the waterway well in advance of the structure may also be helpful. Now that the hurricane season is here, it is of the utmost importance that serious damage to the gate be avoided.

d. Handrails. Overall, the condition of the handrail system is excellent, but there were a few small deficiencies noted, however. The handrail was only slightly loose in one area, on the Northeast corner of the West channel wall, where the concrete had spalled-off from underneath the handrail anchor plate. There were also a few missing and corroded handrail anchor bolts. It was also noted that the safety chain across the needle girder opening on the West channel wall handrail was missing.

b. Sheetpile. The sheetpile I-wall was corroded and has settled on both sides of the structure near the tie-in levees. As a result of the settlement, the waterstops between the I-wall and T-wall interfaces no longer make contact. These resulting open spaces are approximately 1 to 2 inches at the joints. (See photo #3).

c. Flap Gate. The flap gate was raised to the closed position. The operation of the gate was satisfactory. Only that portion of the gate above the water surface was inspected. The paint on both sides of the gate appeared to be in good condition with no corrosion being noted at all. There were large deposits of soil trapped on the walkway with smaller amounts of soil still remaining on the skin plate. (See photo #1). The soil deposits on the walkway were worse in each of the end areas of the gate which move within the confines of the gate lifting recesses. (See photo #4). Two large dents were noted on the skin plate at the top of the gate near each of the two vertical center ribs. These dents do not, in any way, affect the operation of the gate but would seem to indicate that the gate didn't seat properly in the fully opened position and that a large heavy object had struck it while passing over it. (See photo #1). Periodic dredging would appear to be the ultimate solution however, in the interim it would seem appropriate to issue a navigation bulletin informing mariners of the problem. Large signs placed in both directions along the waterway well in advance of the structure may also be helpful. Now that the hurricane season is here, it is of the utmost importance that serious damage to the gate be avoided.

d. Handrails. Overall, the condition of the handrail system is excellent, but there were a few small deficiencies noted, however. The handrail was only slightly loose in one area, on the Northeast corner of the West channel wall, where the concrete had spalled-off from underneath the handrail anchor plate. There were also a few missing and corroded handrail anchor bolts. It was also noted that the safety chain across the needle girder opening on the West channel wall handrail was missing.

e. Approach Channels. In general, the overall condition of the timber guidewalls, fenders and dolphins was excellent.

f. Slope Protection. Vegetation growing within the riprap slope protection should be periodically cleared to avoid displacement of the stone.

SECTION VI - CONCLUSIONS AND REMEDIAL ACTION

6-01 Conclusion. It is concluded that Empire Floodgate is a stable, safe, well maintained structure in satisfactory operating condition.

6-02 Remedial Action. The following remedial actions will be accomplished by the local interest (Plaquemines Parish Commission Council) in FY 82 pending availability of funds:

a. The T-wall monoliths will be closely monitored for any further signs of movement. Any opening at the joints will be sealed.

b. The openings between the sheetpiling and T-wall monolith interfaces will be modified so that the waterstop on the I-wall will be in contact with the concrete T-wall.

c. The ladders and wall armour on each of the channel walls will be cleaned of all corrosion by sandblasting and be repainted.

d. The 8 holes on the North face of the concrete wall on the structures East side which had water flowing through them shall be sealed.

e. The counterweight recesses shall be cleaned of all debris and the drain holes at elevation -9.5 NGVD shall be cleared of all obstructions such that the proper water level will be maintained in each of the recesses.

*Revised 13 May 82

f. The two areas on the West side of the structure underneath the handrail anchor plates where the concrete has spalled off and is cracked, shall be repaired with an epoxy and the handrails resecured to them.

g. The sand deposits shall be cleaned out of the needle girders. In addition, the small areas of corrosion which were noted on the needle girders shall be cleaned off and repainted.

h. The cracked and decaying timber blocking which supports the needle girders shall be replaced as is found necessary.

i. In Aug 82, the Plaquemines Parish Commission Council had the accumulated soil deposits underneath the flap gate and the gate lifting recesses cleaned out by contract dredging and labor forces. This short term method will be used periodically to assure that the gate will seat properly when in its fully opened position, thereby eliminating further damage to the gate by being struck by large vessels passing over. Long term alternatives are suspended and subject to the availability of future funds.

j. The safety chain for the needle girder recess on the structures West side handrail which was missing shall be replaced. In addition, all missing and corroded handrail anchor bolts shall be replaced.

*Revised 13 Sep 82

SECTION VI - CONCLUSIONS AND REMEDIAL ACTION

6-01 Conclusion. It is concluded that Empire Floodgate is a stable, safe, well maintained structure in satisfactory operating condition.

6-02 Remedial Action. The following remedial actions will be accomplished by the local interest (Plaquemines Parish Commission Council) in FY 82 pending availability of funds.

a. The T-wall monoliths will be closely monitored for any further signs of movement. Any opening at the joints will be sealed.

b. The openings between the sheetpiling and T-wall monolith interfaces will be sealed during regular maintenance work.

c. The ladders and wall armour on each of the channel walls will be cleaned of all corrosion by sandblasting and be repainted.

d. The 8 holes on the North face of the concrete wall on the structures East side which had water flowing through them shall be sealed.

VOID

e. The counterweight recesses shall be cleaned of all debris and the drain holes at elevation -9.5 N.G.V.D. shall be cleared of all obstructions such that the proper water level will be maintained in each of the recesses.

f. The two areas on the West side of the structure underneath the handrail anchor plates where the concrete has spalled-off and is cracked, shall be repaired with an epoxy and the handrails resecured to them.

g. The sand deposits shall be cleaned out of the needle girders. In addition, the small areas of corrosion which were noted on the needle girders shall be cleaned off and repainted.

h. The cracked and decaying timber blocking which supports the needle girders shall be replaced as is found necessary.

i. The accumulating soil deposits underneath the flap gate and the gate lifting recesses shall be cleaned out so that the gate will seat properly when in its fully opened position, thereby eliminating further damage to the gate by being struck by large objects passing over it.

j. The safety chain for the needle girder recess on the structures West side handrail which was missing shall be replaced. In addition, all missing and corroded handrail anchor bolts shall be replaced.

k. Vegetation shall be cleared within the riprap slope protection area.

6-03 Next Inspection. The next inspection of Empire Floodgate is scheduled for July 1984. The structure will not be dewatered at that time.

VOID

APPENDIX A - LMVD TRIP REPORT

DISPOSITION FORM

For use of this form, see AR 340-15; the proponent agency is TAGO.

REFERENCE OR OFFICE SYMBOL	SUBJECT
LMVED-G	Periodic Inspection No. 3, Empire Floodgate, 29 Jul 81

XX THRU C/GSM Br
C/Tech Eng Br
C/WC Br
Asst C/Eng Div
Act C/Con-Ops Div
C/Eng Div

FROM Messrs. Trahan & Johnson

DATE 26 Aug 81

CMT 1 Trahan/Johnson/bh/5525

TO MAIN FILES

1. On 29 Jul 81, the undersigned participated in the third periodic inspection of Empire Floodgate together with representatives of the New Orleans District and representatives of the Plaquemines Parish Commission Countil (local interest). This structure is located near the town of Empire, LA, about 60 miles south of New Orleans. It was completed by the Corps in 1975 and turned over to the Plaquemines Parish Commission Council for operation and maintenance. Personnel participating in the inspection are listed in Incl 1.

2. Purpose. This inspection was made in accordance with provisions of EM 1110-2-100, Periodic Inspection and Continuing Evaluation of Completed Civil Works Structures. The structure was not dewatered for the inspection.

3. Description of Project. The Empire Floodgate is part of the New Orleans to Venice, LA, Hurricane Protection levee system. It serves to provide drainage for an area of about 365 acres inclosed by hurricane protection levees and Mississippi River Levees and allows water traffic to proceed normally along the waterway from Empire, LA, to the Gulf of Mexico.

4. Description of Structure. The Empire Floodgate structure consists of a reinforced concrete gate bay, supported on prestressed concrete piles, timber guide walls, pile supported inverted "T" reinforced concrete floodwalls, and uncapped steel sheet piling connecting the "T" floodwalls to the earthen levee on each side. The gate bay is 109 ft in length and has a channel width of 84 ft. The floodgate is a bottom hinged single-leaf flap gate which, in the open position, rests in a recess in the base slab of the structure.

5. Observations and Recommendations. The structure was generally in good condition. Deficiencies observed and recommendations made during the inspection are as follows:

a. Bottom Hinged Flap Gate.

(1) During the inspection the gate was lifted up in a "gate closed" position and then reopened. As the gate was lifted out of the water, we observed approximately 2 to 2 1/2 ft of silt build up on top of the flapgate. the material appeared to have a high content of fine sand. We were informed that since the gate is operated periodically, the thickness of silt seldom exceeds that which was observed (one of the design loads was for a maximum of 4 ft of silt).

(2) After the gate was well out of the water and the silt layer had slid off, two large dents were noted on the leading edge of the gate (see Incl 2). This damage was apparently caused by a passing tow dragging a couple of spuds. The damage was confined to the skin plate and the structural channel member and did not affect the operation of the gate in any way. Further conversations with Mr. Henry Urban (the project manager) indicated that the gate does not seat properly on the end sill (see Incl 3) due to a build up of silt. Mr. Urban told us that he had tried washing the material. out with the water pump but the discharge from the pump was not great enough to make any significant difference in the build up. Mr. Urban said he had even hired a large tug boat to tie off in the gate bay and direct the wheel wash in the silted area of the end sill but again with no success. He said that the most effective method for seating the gate so far is to simply "slack" the hoist chain after lowering the gate. The weight of the gate then pushes the gate down into the mud until the slack in the chain is used up. Successive "slackings" of the chain over a period of from several hours to a full day will allow the gate to settle into the silt as far as possible but still leaving the leading edge of the gate approximately 2 ft above the top of the end sill. The gate was probably in this position when it was struck by the tow.

(3) NOD will study the above problem further and make recommendations in the inspection report. Periodic dredging would appear to be the utimate solution, however, in the interim it would seem appropriate to issue a navigation bulletin informing mariners of the problem. Large signs placed in both directions along the waterway well in advance of the structure may also be helpful. Now that the hurricane season is here, it is of the utmost importance that serious damage to the gate be avoided.

b. Concrete Gate Monolith.

(1) As a result of the normal silt build up in the channel and periodic dumping of silt on the backside of the gate due to gate operations, the drain holes for the counterweight wells (el -9.5) are now covered with about $1\frac{1}{2}$ ft of silt. This has resulted in the counterweight wells in the structure walls filling with rain water. The project manager will investigate means of unstopping the drain holes to allow the water level in the wells to fluctuate with the tide.

(2) On the north face of the east wall, water was observed leaking from hairline cracks in a construction joint (el 6.33) in the vicinity of the counterweight well which is filled with rain water to approx. el 10.0. The excess water will be pumped from this well and the cracks injected with epoxy to prevent rusting of the reinforcing steel. No leaks were observed on the west wall even though the water level in the well was at approx. el 14.0. The excess water will also be pumped out of this well.

(3) Minor spalls were noted at the base plates of a couple of handrail posts on the west wall. This will be repaired by the project work crew. A safety chain that was missing will be replaced.

c. Miscellaneous.

(1) According to Mr. Urban the structure is subjected to vandalism on a regular basis. There is little that can be done to prevent this since this is an unmanned structure. Mr. Urban has made minor additions and/or modifications to certain components of the structure which have eliminated certain acts of vandalism. Mr. Urban said that on several occasions, local fishermen have reported seeing youths diving from the top of the Control House (approx. el 32.5) into the main channel. As an added thrill the youths often dive off as a boat passes below in an attempt to miss the stern of the vessel by as small a margin as possible.

(2) As a point of interest, all of the navigation aids, the fog horn and some of the structure lighting has been converted over to solar power. Mr. Urban said this has resulted in significant savings in time required to change batteries, etc., and has been much more reliable than the original system.

d. Mr. Urban and his staff are to be commended for the manner in which the maintenance of this structure has been carried out and for the improvements they have made to the structure.

6. Actions Required. No actions are required by the Division office. New Orleans District will prepare a periodic inspection report to be submitted to LMVD for review and approval by 29 Nov 81.

7. Next Inspection. The next periodic inspection of this structure is scheduled for Jul 84.

3 Incl
as

C. C. TRAHAN

F. N. JOHNSON

CF:
LMNED-DG

Team Members

Periodic Inspection No. 3

Empire Floodgate

29 Jul 81

LMVD

1. F. N. Johnson
2. C. C. Trahan

NOD

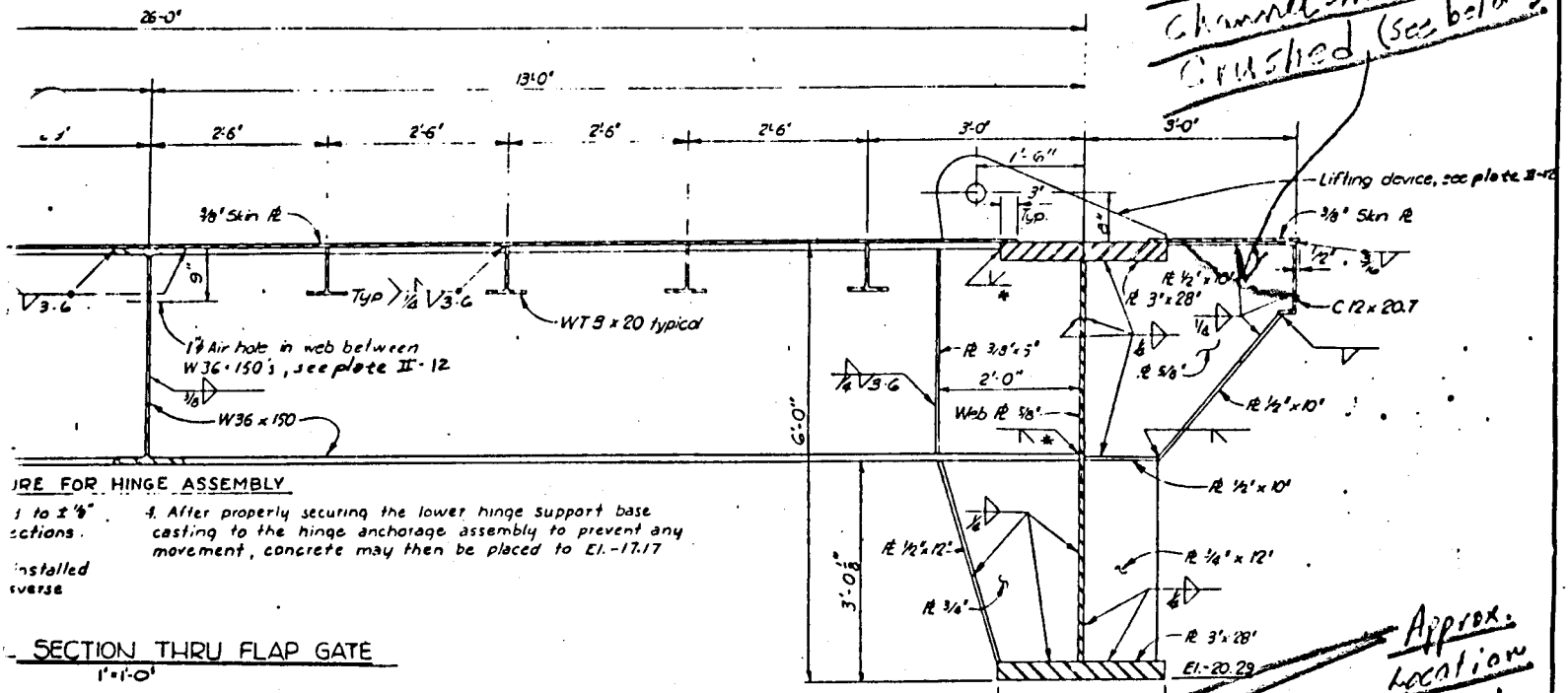
1.	Johnny B. Drummond	General Engineering Section
2.	Janis Hote	Hydraulics and Hydrologic Branch
3.	Rick Deubert	Foundation and Materials Branch
4.	Rick Tillman	Structural Design Branch
5.	J. Perry	Structural Design Branch
6.	R. Kahl III	Operations Division
7.	Gerry Jesclard	General Engineering Branch
8.	Dennis Strecker	General Engineering Branch

Plaquemines Parish Commission Council

1. Henry Urban (Project Manager)
2. David Becnel
3. Stephen Musselwhite (Engineer)
4. Ricky Thornton
5. Ruben Victory

Incl 1

Skin plate and Channel member Crushed (see below)



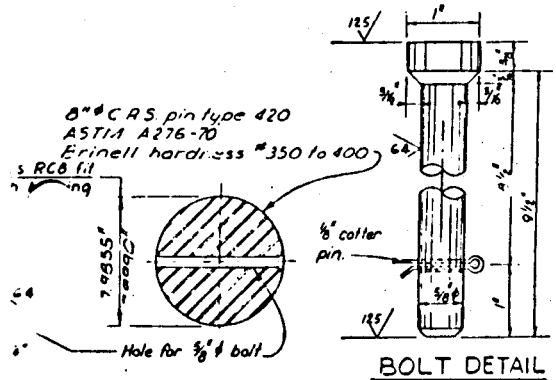
JRE FOR HINGE ASSEMBLY

s to 1 1/8" ections.

nstalled verse

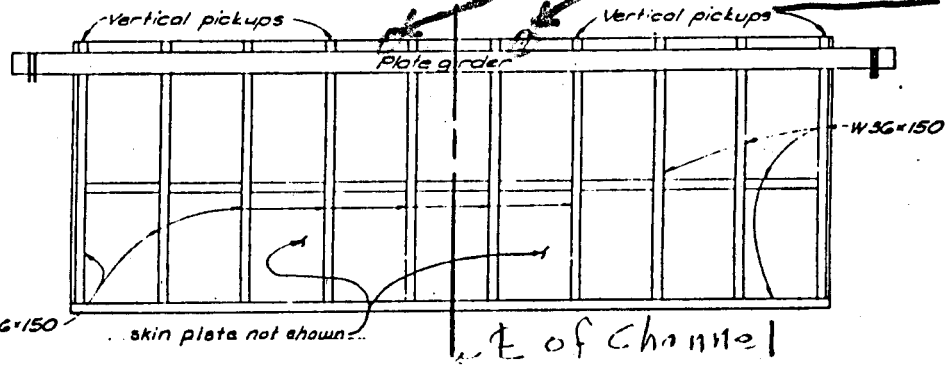
4. After properly securing the lower hinge support base casting to the hinge anchorage assembly to prevent any movement, concrete may then be placed to El. -17.17

SECTION THRU FLAP GATE
1"=1'-0"



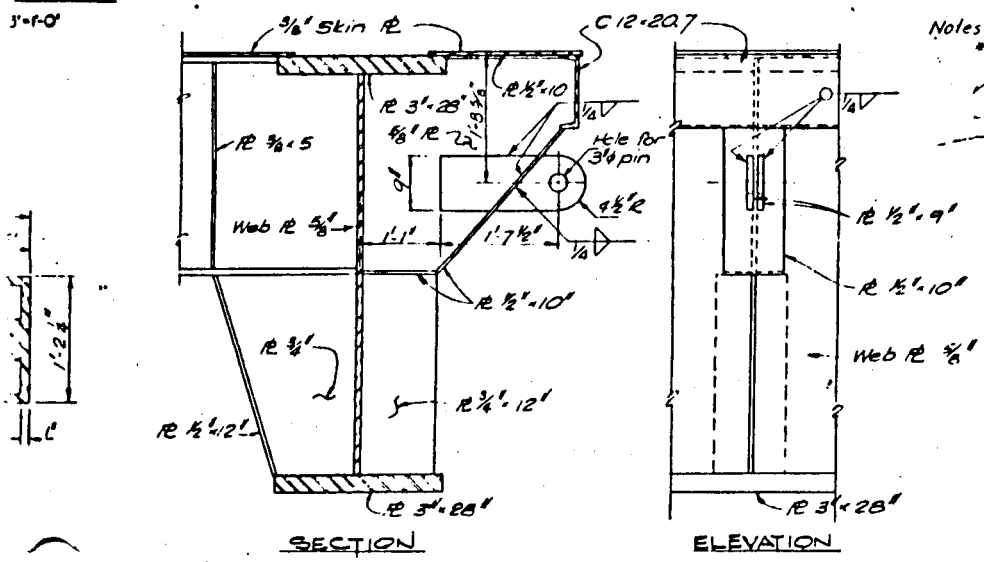
BOLT DETAIL
Scale: 1"=1"

Approx. location of dents



LAYOUT FOR VERTICAL PICKUPS
Scale: 1/8" = 1'-0"

GE PIN
3"=1'-0"



SECTION

ELEVATION

DETAIL OF VERTICAL PICKUP
Scale: 1"=1'-0"

Notes:
* Denotes welds which shall be radiographed Lower and upper hinge support castings shall be radiographed.

REVISION	DATE	DESCRIPTION	BY

U S ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS LA

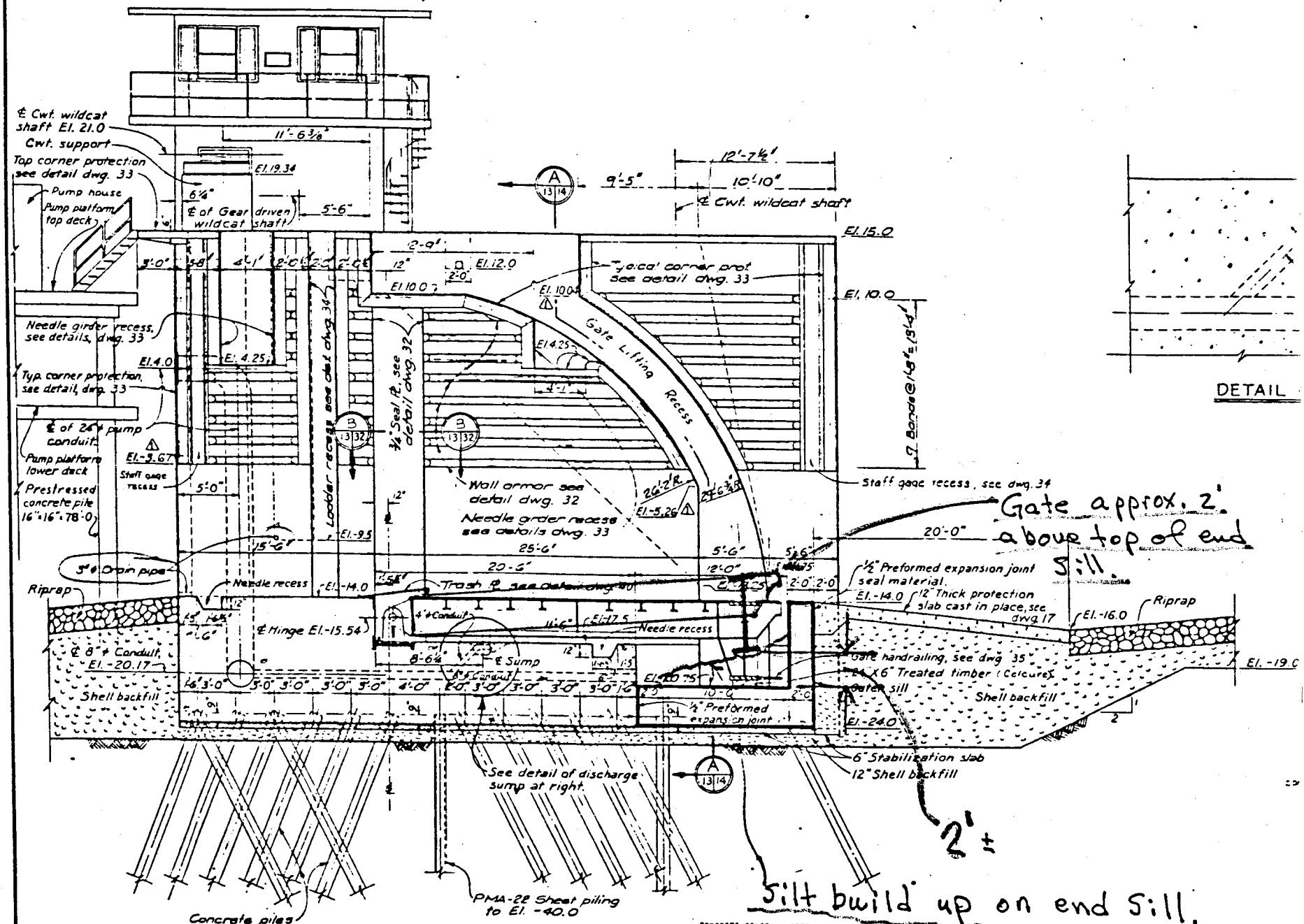
NEW ORLEANS TO VENICE, LOUISIANA
HURRICANE PROTECTION, REACH B-1
EMPIRE FLOODGATE
PLAQUEMINES PARISH, LA

FLAP GATE SECTION AND HINGE DETAILS

DESIGNED	DRAWN	CHECKED	DATE	SCALE	FILE NO
E J M	C W	F N J	FEB 1973	AS SHOWN	H-4-26081
APPROVED			SPEC NO		
Col L. Hambaugh			DACW29-73-B-0111		37 of 64

PLATE - 14

Incl 2



SECTIONAL ELEVATION

Scale: ¼"=1'-0"

CONCRETE GENERAL NOTES:

Elevations are expressed in feet and refer to mean sea level.

Items marked C.R.S. shall be corrosion-resisting steel.

All unformed surfaces shall be given a wood float finish.

Unless otherwise indicated all exterior formed surfaces not to be covered by backfill shall be class "A" finish. All exterior formed surfaces to be covered by backfill shall be class "D" finish.