15006 THRU 15011

NOAA FORM 76-35

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

DESCRIPTIVE REPORT

Type of Survey Storm Evacuation Mapping T-15006 thru

Job No. PH-7125 *Map No.* T-15011

Classification No. *Edition No.* 1st

LOCALITY

State Texas

General Locality Galveston, Texas

Locality

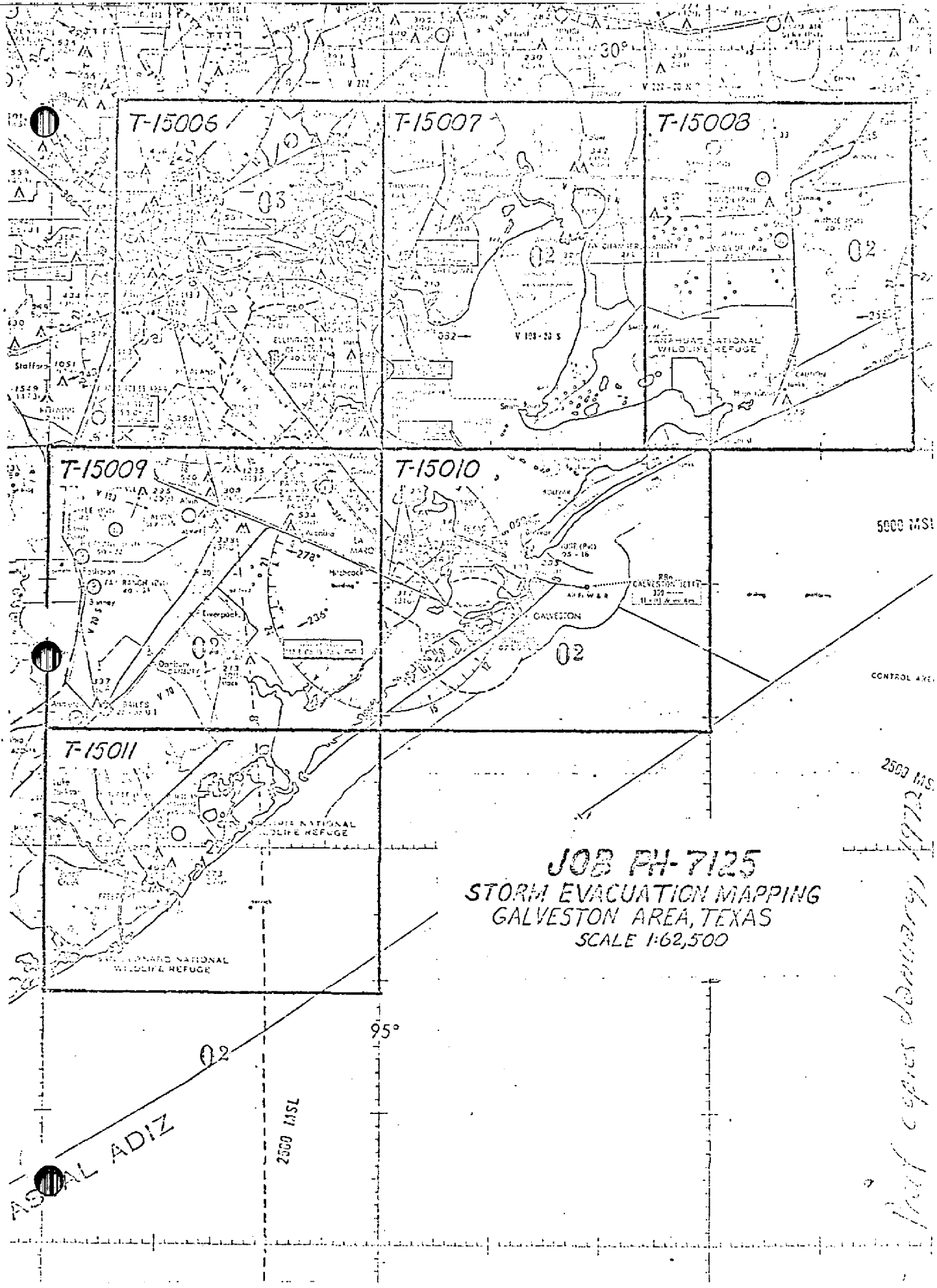
1971 TO 1972

REGISTRY IN ARCHIVES

DATE

☆ U.S. GOVERNMENT PRINTING OFFICE: 1973-761-776

15006 THRU 15011


T-15006
T-15007
T-15008
T-15009
T-15010
T-15011
SANAHUAC NATIONAL WILDLIFE REFUGE
GALVESTON
GALVESTON JETTY
5000 MSL
2500 MSL
95°
ASTAL ADIZ
JOB PH-7125
STORM EVACUATION MAPPING
GALVESTON AREA, TEXAS
SCALE 1:62,500

STORM EVACUATION MAPPING

The Storm Evacuation Mapping Program is a series of maps prepared by NOS at a scale of 1:62,500 in cooperation with the National Weather Service.

They are assigned to provide evacuation information in the event of severe coastal storms. Shown on the maps are principal evacuation routes, critical elevations along these routes, and five-foot contours with color gradients for guidance to high ground.

Details are sufficiently clear so that the maps can be reproduced by mass-communication media, including newspapers and television.

The program will eventually cover those areas of the Gulf and East Coasts which are vulnerable to flooding as a result of tropical cyclones and hurricanes.

Guidance and data received by National Ocean Survey from the National Weather Service include priority areas to be mapped, historical hurricanes and coastal storm-water levels at selected locations.

The maps are used by authorized emergency officials to determine probable areas of inundation by relating predicted maximum water elevations to the map contours.

The body of the map includes delineation of the main evacuation routes and feeder routes, low points along the road that might be engulfed, and high areas which are likely to remain above flood waters, thus affording some degree of refuge. These critical elevations are spaced on the map at intervals of at least two miles.

Both surfaced and unsurfaced evacuation roads are identified, along with county, state, and federal route designations, and the number of lanes for each road.

Contours on the maps provide a means of estimating areas of possible flooding. These areas are shown in increments of 5 and 10 feet in distinctive color tones.

Urban populations and normal and summer populations of resort areas are also shown.

A data block on each map gives the storm-water levels at selected locations of previous hurricanes.

Submitted:

A.K. Heywood
November 23, 1973

Storm Evacuation Mapping
PH-7125

Galveston, Texas
T-15006 thru T-15011

This project consists of 6 manuscripts compiled at a scale of 1:62,500.

In addition to the U.S. Geological Survey Quadrangles that were used to delineate the manuscript, the following U.S. Department of Agriculture photo mosaics were used:

Galveston County	flown 1968	parts 1,2,3,&4
Chambers County	flown 1970	parts 1,2,3,&4
Harris County	flown 1964	parts 8 & 9
Liberty County	flown 1964	parts 6,7,&8
Jefferson County	flown 1966	parts 1,2,3,4,&5
Brazoria County	flown 1965	parts 1,2,3,4,5,6,&7

Road map of Brazoria County, 1971
General Highway Map, Galveston County, revised to May 1970

T-15006 U.S. Geological Survey Quads: 1:24,000

Aldine (1967)
Houston Heights (1967)
Bellaire(1967)
Almeda (1969)
Humble (1967)
Settegast (1967)
Park Place (1967)
Pearland (1969)
Harmaston (1967)
Jacinto City (1967)
Pasadena (1967)
Friendswood (1969)
Crosby (1967)
Highlands (1967)
La Porte (1967)
League City (1969)

T-15007 U.S. Geological Survey Quads: 1:24,000

Sheeks (1961)
Moss Bluff (1961)
Shiloh (1961)
Whites Bayou (1961)
Mont Belvieu (1969)
Cove (1961)
Anahuac (1961)
Monroe City (1961)

T-15007 (Cont.)

Morgan Point (1969)
Umbrella Point (1961)
Oak Island (1961)
Oyster Bayou (1961)
Bacliff (1969)
Smith Point (1961)
Lake Stephenson (1961)
Frozen Point (1962)

T-15008 U.S. Geological Survey Quads: 1:24,000

Whites Bayou (1961)
Winnie N.W. (1962)
Fannett West (1962)
Fannett East (1962)
Monroe City (1961)
Stowell (1952)
Hamshire (1962)
Alligator Hole Marsh (1962)
Oyster Bayou (1961)
Stanolind Reservoir (1962)
Whites Ranch (1962)
Star Lake (1961)
South of Star Lake (1962)
Mud Lake (1961)
High Island (1962)
Frozen Point (1962)

T-15009 U.S. Geological Survey Quads: 1:24,000

Juliff (1963)
Manvel (1969)
Algoa (1969)
Dickinson (1969)
Rosharon (1963)
Liverpool (1963)
Mustang Bayou (1963)
Hitchcock (1969)
Angleton (1963)
Danbury (1963)
Hoskins Mound (1963)
Sea Isle (1963)

T-15010 U.S. Geological Survey Quads: 1:24,000

Texas City (1969)
Port Bolivar (1969)
Flake (1969)
Caplen (1969)
Virginia Point (1969)
Galveston (1969)
The Jetties (1969)
Lake Como (1969)

T-15011 U.S. Geological Survey Quads: 1:24,000

Angleton (1963)
Danbury (1963)
Hoskins Mound (1963)
Sea Isle (1963)
Lake Jackson (1963)
Oyster Creek (1963)
Christmas Point (1965)
San Luis Pass (1963)
Jones Creek (1963)
Freeport (1964)
Cedar Lakes East (1964)

The field work for the Galveston, Texas, area was started in July 1971 and completed in November 1971.

These maps were published in January 1972.

Submitted by:

J.B. Phillips

J.B. Phillips

Approved and Forwarded:

Federal Records Center

Quads having field inspection notes:

(1:24,000)

Sea Isle, Texas
Jones Creek, Texas
Freeport, Texas
Oyster Creek, Texas
Danbury, Texas
Cedar Lakes East, Texas
Christmas Point, Texas
San Luis Pass, Texas
Angleton, Texas
Lake Jackson, Texas
Hoskins Mound, Texas
Lake Como, Texas
The Jetties, Texas
Port Bolivar, Texas
Flake, Texas
Caplen, Texas
Texas City, Texas
Virginia Point, Texas
Galveston, Texas
Dickinson, Texas
Hitchcock, Texas
Mustang Bayou, Texas
Algoa, Texas
Manvel, Texas
Liverpool, Texas
Rosharon, Texas
Juliff, Texas
Winnie N.W., Texas
High Island, Texas
Frozen Point, Texas
Fannett East, Texas
Whites Bayou, Texas
Monroe City, Texas
Oyster Bayou, Texas
Stanolind Reservoir, Texas
Whites Ranch, Texas
Star Lake, Texas
Mud Lake, Texas
South of Star Lake, Texas
Stowell, Texas
Alligator Hole Marsh, Texas
Fannett West, Texas
Hamshire, Texas
Settegast, Texas
Humble, Texas
Highlands, Texas
Crosby, Texas
League City, Texas
Park Place, Texas
Harmaston, Texas
Smith Point, Texas
Jacinto City, Texas
La Porte, Texas
Bacliff, Texas
Lake Stephenson, Texas
Mont Belvieu, Texas
Shiloh, Texas
Morgan Point, Texas
Umbrella Point, Texas
Sheeks, Texas
Almeda, Texas
Pasadena, Texas
Anahuac, Texas
Cove, Texas
Houston Heights, Texas
Bellaire, Texas
Moss Bluff, Texas
Friendswood, Texas
Pearland, Texas
Oak Island, Texas

38 Form 685A
Recovery Note, Bench Mark

6 Wye Level Books:
(1 for each manuscript - T-15006, T-15007, T-15008, T-15009, T-15010, T-15011)

2 Hurricane - Flood Protection Maps "Status of Project" May 1971 (one of Freeport and vicinity - the other of Texas City and vicinity)

Ozalid copies of manuscripts with field inspection:
T-15006 (2 copies)
T-15007
T-15008 (2 copies)
T-15009
T-15010
T-15011

Also used to compile Galveston Area:
General Highway Map, Galveston County, Texas, 1962, revised to May 1, 1970
Road Map of Brazoria County, Texas 1971
Street Map of Brazosport, Texas, 1971
Chambers County Road Map 1965

Bureau Archives

Copy of published maps
Descriptive Report (one report for T-15006 thru T-15011)

Reproduction Division

Negatives of the published maps are filed by "T" number in the Reproduction Division.

PHOTO PARTY 63

JOB 7125

Galveston, Texas

Storm Evacuation Mapping

July, 1971

T-15006

Field Inspection Report

Respectfully Submitted,

Dale M. Fuller

Dale M. Fuller
Chief, Photo Party 63
U.C.A.A. - L.C.S.

PHOTO PARTY 63

Job 7125

Galveston, Texas

Storm Evacuation Mapping

July, 1971

T-15006

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1. Assignment:

Field work was assigned to Photo Party 63. Field work was done in accordance with Project Instructions dated 2 July, 1971.

2. Unusual Conditions:

Local engineers and surveying organizations state that due to subsidence U.S.C. & G.S. level lines along Galveston Bay area are sinking at a rate of approximately .01 ft to 0.20 ft per year. Their studies are based on the 1964 level circuit. All elevations used by this party were of the latest published elevations of the N.O.S.

3. Additional Information:

Mr. Volbrecht MIC of Houston and Mr. Benton MIC of Galveston were contacted and provided assistance in the selection of routes and information relative to the area encompassed by this map.

4. Evacuation Routes:

All evacuation routes and critical elevations were delineated in red ink on the USGS quads or a red check mark was placed by the route number and name if found correct as mapped to alleviate congestion of detail. This was also done if the number of lanes were correct.

Respectfully Submitted,

Dale M. Fuller

Dale M. Fuller
Chief, Photo Party 63

Field Edit Report

Maps T-15006 and T-15007

Galveston, Texas Area

Storm Evacuation Mapping

Photo Party 63

November, 1971

T-15006

All field edit questions were answered in red ink on the field edit copy of the manuscript (ozalid).

T-15007

All field edit questions were answered in red ink on the field edit ozalid. Two additional elevations were determined and recorded on the Oak Island Quadrangle. They were also annotated on the ozalid.

Respectfully Submitted,

Dale M. Fuller

Dale M. Fuller
Chief, Photo Party 63
N.O.A.A. - N.O.S.

Field Edit Report

Map T-15008

Storm Evacuation Mapping

Galveston, Texas Area

Photo Party 63

November, 1971

All corrections and questions were answered in red ink on the ozalid copy of the field edit manuscript.

Dale M. Fuller
Chief, Photo Party 63

Field Inspection Report

Photo Party 63

Storm Evacuation Mapping

T-15007

July, 1971

Dale M. Fuller

Dale M. Fuller

Chief, Photo Party 63

Field Inspection Report

Photo Party 63

Storm Evacuation Mapping

Job 7125

Map T-15007 July, 1971

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1. General Area:

The area encompassed by this map in general are the northern and eastern shorelines of Galveston Bay. The land area in general is flat. Critical elevations generally were found to be 1 to 2 feet above or below the normal contours. The northern portion of this map is traversed by I-10 a 4lane divided highway. A plethoric of elevations were determined on this highway though it is mostly above the 20 foot contour to enhance the map.

2. Critical Elevations:

Critical elevations were recorded in the Wye Level Volume and also annotated on the USGS Quads in red ink.

3. Unusual Conditions:

As stated in the field inspection report for T-15006, a general subsidence is occurring in the area and level lines are reported by surveying organizations to be subsiding at a rate of 0.1 to 0.2 foot per year.

4. Additional Information:

Mr. Benton M I C of Galveston, Texas was contacted and informed of the criteria for the selection of evacuation routes. It is recommended by Mr. Benton that the first 5 foot contour of the final map be shown in a separate shade of red.
The four USGS Quads on the eastern border of this map overlap T-15008 and will be submitted with this map.

Respectfully Submitted,

Dale M. Fuller

Dale M. Fuller
Chief, Photo Party 63
N.O.A.A. - N.O.S.

Field Inspection Report

Photo Party 63

Storm Evacuation Mapping

T-15008

September, 1971

Dale M. Fuller
Dale M. Fuller
Chief, Photo Party 63
N.O.A.A. - N.O.S.

Job PH 7125

General:

Map T-15008 was Field Inspected by Photo Party 63 in accordance with Project Instructions dated 2 July, 1971 and amended 30 August, 1971.

The area encompassed by this Map is generally low and flat. It is mainly farm land and oil fields. Three major roads traverse the Map. I-10 to the north, State 87 to the south, and State 124 in the center.

Critical Elevations:

Critical elevations were determined in accordance with Project Instructions, annotated in red ink on their respective USGS Quads, and recorded in the Wye Level Volume. Critical Elevations were indexed on the fly leaf of the Wye Volume by page, number, and Quad.

Unusual Conditions:

Two road locations were noted as not being current. The proper location was sketched on the appropiate USGS Quad and verified by Chambers County Engineer.
Also one route number was changed and corrected on the Quad.

Additional Information:

Mr. Benton of the NWS Galveston, Texas was informed of the Map and shown the evacuation routes.
The four USGS Quads of the western boundary of this Map overlap Map T-15007.

STORM EVACUATION MAPPING

OCTOBER, 1971

PHOTO PARTY 63

JOB PH-7125

MAP T-15009

Respectfully Submitted,

Dale M. Fuller

Dale M. Fuller
Chief, Photo Party 63
N.O.A.A. - N.O.S.

Job PH-7125

Map T-15009

General:

Map T-15009 was Field Inspected by Photo Party 63 in accordance with Project Instructions dated 2 July, 1971 and amended 30 August, 1971.

The area encompassed by this map is generally low and flat.

Critical Elevations:

Critical elevations were determined in accordance with Project Instructions, annotated on their respectives USGS Quads in red ink, and recorded in the Wye Level Volume. Critical elevations were indexed on the fly leaf cover of the Wye Level Volume by page, number, and Quadrangle.
The ozalid copy of this map should be considered as a complete inventory of all evacuation routes used and their location.

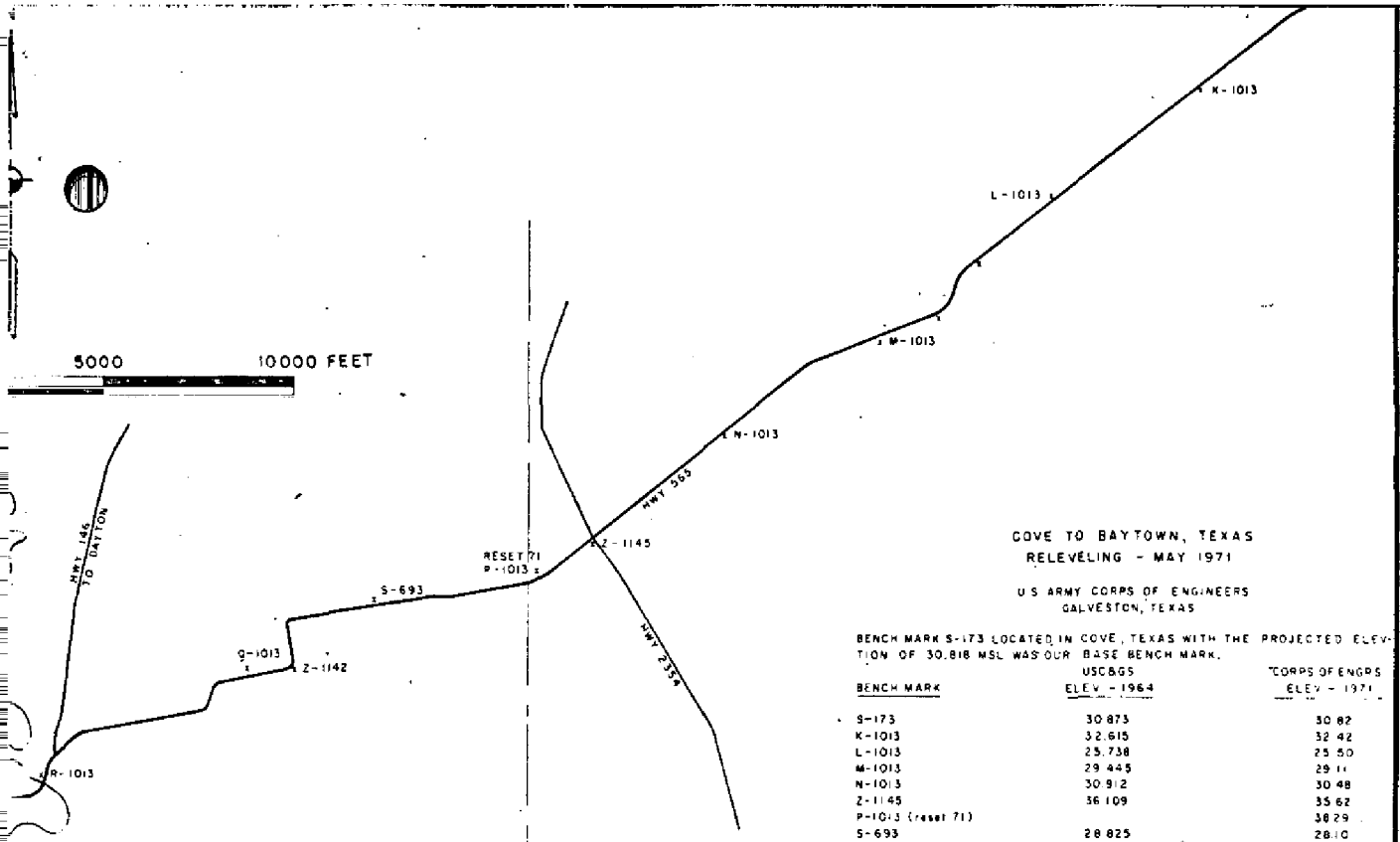
Unusual Conditions:

One road location was not current (south section of route 2917) and was drawn correctly on the appropiate quad in red ink.

Various engineering concerns are aware of a general subsidence in the area. Data has been submitted with this report concerning the subsidence of USC&GS level marks. No attempt was made to adjust or otherwise use this material in leveling. All elevations were of the published elevations by the USC&GS.

Additional Information:

Mr. Benton of the NWS Galveston, Texas was informed of the evacuation routes selected.
The four quadrangles on the south boundary of this Map also effect Map T-15011.



COVE TO BAYTOWN, TEXAS
RELEVELING - MAY 1971

U S ARMY CORPS OF ENGINEERS
GALVESTON, TEXAS

BENCH MARK S-173 LOCATED IN COVE, TEXAS WITH THE PROJECTED ELEVATION OF 30.818 MSL WAS OUR BASE BENCH MARK.

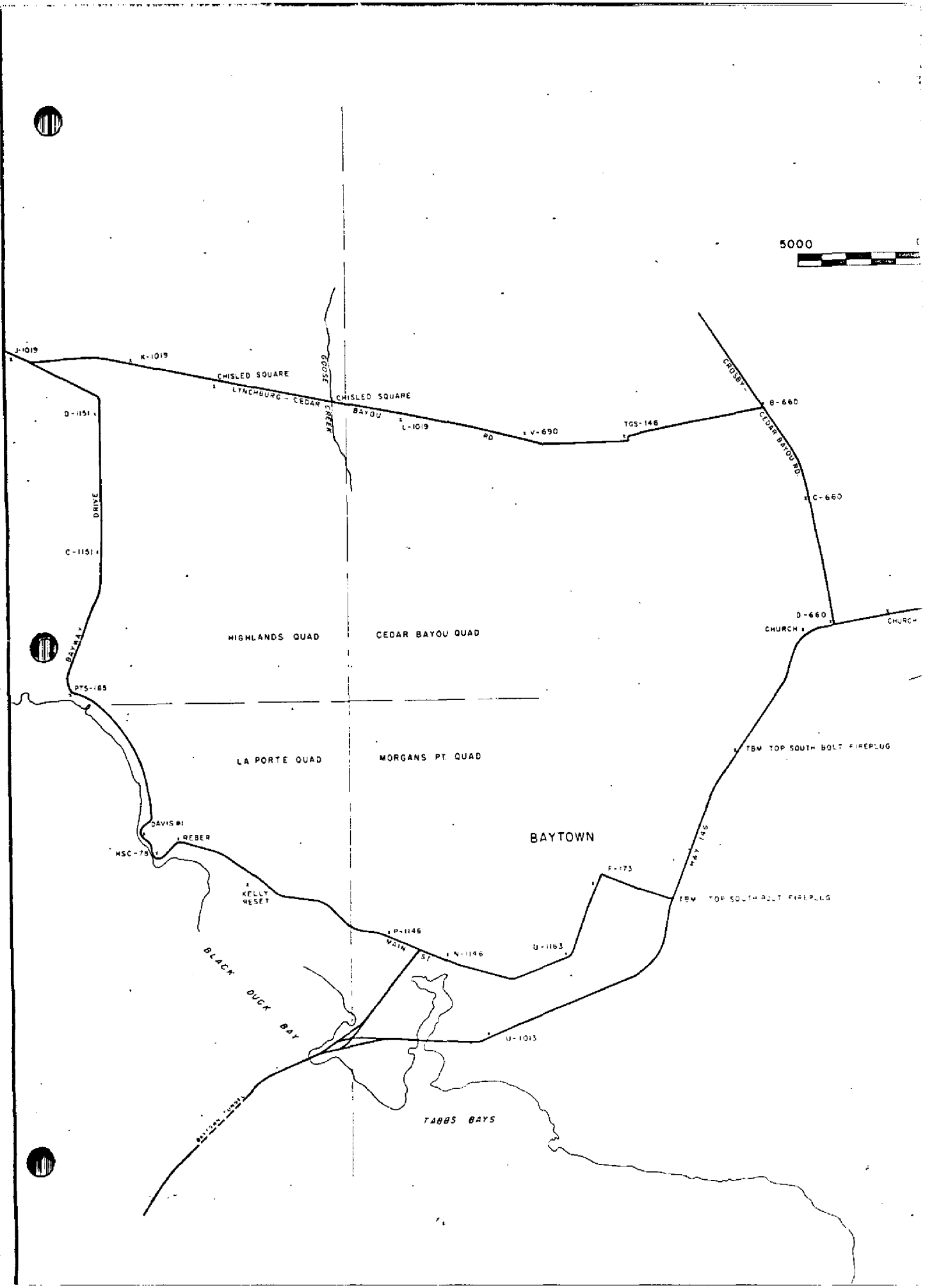
BENCH MARK	USC&GS ELEV. - 1964	CORPS OF ENGRS ELEV. - 1971
S-173	30.873	30.82
K-1013	32.615	32.42
L-1013	25.738	25.50
M-1013	29.445	29.11
N-1013	30.912	30.48
Z-1145	36.109	35.62
P-1013 (reset 71)		38.29
S-693	28.825	28.10
Z-1142	22.559	21.89
Q-1013	21.332	20.62
R-1013	23.238	22.68
H-173 (reset 53)	20.745	19.94
CHURCH AZ	24.751	23.95
D-660	27.323	26.49
C-660	27.890	26.92
B-660	29.249	28.39
146 (reset 59)	28.638	27.50
V-630	28.015	27.13
L-1019	30.216	29.47
CHISLED SQUARE - BRIDGE GOOSE CREEK		26.50
CHISLED SQUARE - R.R. SIGNAL, INTER. WADE & CEDAR BAYOU		29.32
K-1019	33.691	32.31
J-1019	19.882	13.10
D-1151	32.447	31.27
C-1151	27.923	26.52
PTS-185	24.213	22.46
NAIL IN POST		22.55
DAVIS #1	25.817	24.15
DAVIS TRIG STA	23.753	22.15
HSC 7-8		12.45
PEBER	16.818	15.14
KELLY (reset 71)		16.27
P-1146	14.042	12.57
N-1146	10.420	9.20
Y-1183	20.636	19.05
U-1013	15.636	14.06
U-1183	25.879	24.29
F-173	31.493	30.13
BOLT - INTER - 146 & PEARCE		28.91
BOLT - FIREPLUG - MITCHELL REAL ESTATE		33.91
CHURCH #2	29.199	27.20
CHURCH TRIG STA	27.316	26.19
CHURCH #1	27.418	26.44

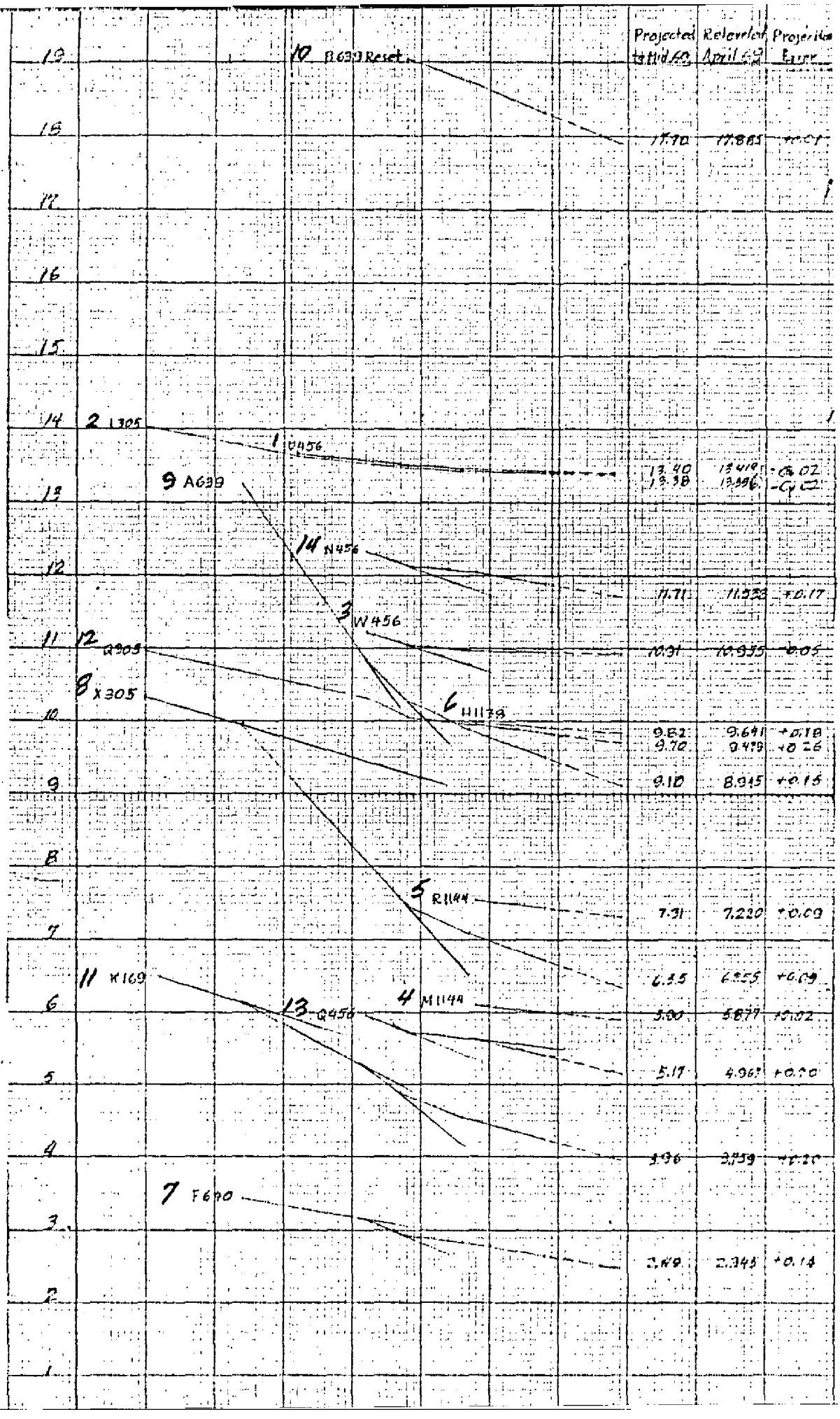
REVISION	DATE	DESCRIPTION	BY

OFFICE OF THE DISTRICT ENGINEER
U.S. ARMY ENGINEER DISTRICT, GALVESTON
CORPS OF ENGINEERS
GALVESTON, TEXAS

DRAWN BY: L.S.
TRACED BY:
CHECKED BY: F.M.A.
SUBMITTED BY:
CHIEF
APPROVED
CHIEF DESIGN BRANCH
APPROVED
CHIEF ENGINEERING DIVISION
DATE MAY 1971

VERTICAL CONTROL DIAGRAM
VICINITY BAYTOWN, TEXAS


5000
J-1019
K-1019
CHISLED SQUARE
LYNCHBURG - CEDAR
CHISLED SQUARE
GOOSE CREEK
BAYOU
L-1019
RD
V-690
TGS-146
CROSBY - CEDAR BAYOU RD.
B-660
C-660
D-1151
DRIVE
C-1151
BAYWAY
HIGHLANDS QUAD
CEDAR BAYOU QUAD
D-660
CHURCH
CHURCH
PTS-185
LA PORTE QUAD
MORGANS PT. QUAD
TBM TOP SOUTH BOLT FIREPLUG
DAVIS #1
REBER
HSC-78
BAYTOWN
HWY 146
F-173
KELLY RESET
TBM TOP SOUTH BOLT FIREPLUG
P-1146
MAIN ST
N-1146
U-1163
BLACK DUCK BAY
U-1013
TABBS BAYS



Projected to Mid 69
Relevelled April 69
Projected Error
10 B639 Reset
17.70 17.885 +0.01
2 L305
1 U456
13.40 13.419 -Cu 02
13.38 13.396 -Cu 02
9 A639
14 N456
11.71 11.533 +0.17
3 W456
12 Q305
10.91 10.955 -0.05
8 X305
6 H1138
9.82 9.641 +0.18
9.70 9.479 +0.26
9.10 8.945 +0.15
5 R1144
7.31 7.220 +0.09
6.35 6.355 +0.09
11 K169
4 M1144
13 Q456
5.90 5.877 +0.02
5.17 4.967 +0.20
3.96 3.759 +0.20
7 F640
2.49 2.345 +0.14

290943

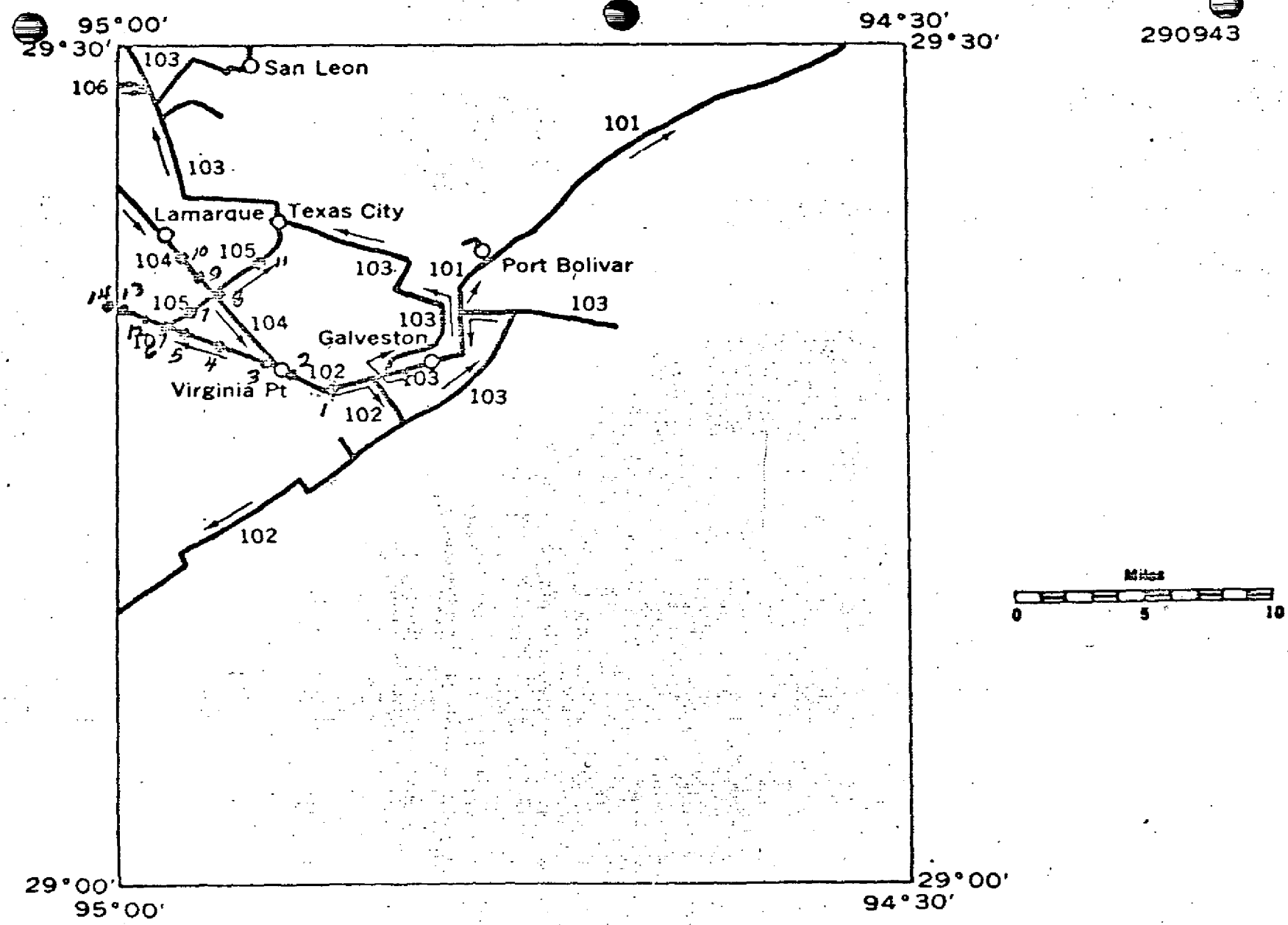


Fig 2

Fig 2

JANUARY 1966

VERTICAL CONTROL DATA

PUBLISHED AND PRINTED BY:
U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY
WASHINGTON D.C.

Coast and Geodetic Survey
SEA-LEVEL DATUM OF 1929

QUAD 29094 3
TEXAS
LATITUDE 29°00' to 29°30'
LONGITUDE 94°30' to 95°00'
DIAGRAM NN 15-7 HOUSTON

LINE 102 - - ADJUSTED ELEVATIONS

Bench Mark	1936 First-order (Feet)	1951 First-order (Feet)	1953-54 First-order (Feet)	1958 First-order (Feet)	1964 First-order (Feet)
~~L 305~~	~~14.009~~	~~13.619~~	~~13.481~~	~~13.415~~	~~13.306~~
~~V 456~~		~~15.718~~	~~15.584~~	~~15.525~~	~~15.422~~
TIDAL 2 CAUSEWAY	13.891	13.465	13.330	13.271	13.255
TIDAL 3 CAUSEWAY	14.350	13.914	13.779	13.717	13.694
~~H 455~~		~~13.684~~	~~13.530~~	~~13.465~~	~~13.419~~
T 456		8.084	7.930	7.877	7.828
M 305	10.276			9.869	9.839
S 456		4.160	3.960	3.816	3.757
L 1137				7.503	7.461
M 1137				4.980	Destroyed
M 1137 RESET (1964)					3.583
10 + 00 (USE)		8.130	Not recovered	Not recovered	Destroyed
B 1137 (USED)				14.797	14.731
C 1137 (USED)				14.888	14.888
20 + 00 (USE)		7.152	Not recovered	Not recovered	Destroyed
D 1137 (USED)				14.905	14.905
30 + 00 (USED)		7.456		7.333	7.323
E 1137 (USED)				14.892	14.892
40 + 00 (USED)		7.051	Not recovered	Not recovered	Destroyed
F 1137 (USED)				14.984	14.984
J 168	7.224	Destroyed			
J 168 RESET (1951)		7.224	Not recovered	Not recovered	Destroyed
50 + 00 (USED)		6.358	Not recovered	Not recovered	Destroyed
60 + 00 (USED)		7.349		7.172	7.110
TIDAL 2 OFFATS BAYOU	7.264	Destroyed			
TIDAL 1 OFFATS BAYOU	5.151	Destroyed			
70 + 00 (USED)		6.670		6.509	6.430
TIDAL 3 OFFATS BAYOU	6.699	Not recovered		Not recovered	Destroyed
K 168	5.020	4.882	Not recovered	Destroyed	

SPUR LINE TO GALVESTON MUNICIPAL AIRPORT

X 639	5.732	5.486	5.282	5.239
X 179		6.516	6.286	6.240
HIGH POINT		6.7	6.1	6.243
AIRPORT 2 (USED)		5.801	5.604	5.548

END OF THE SPUR LINE

PUBLISHED AND PRINTED BY:
U.S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY
WASHINGTON D.C.

VERTICAL CONTROL DATA

by the
Coast and Geodetic Survey
SEA LEVEL DATUM OF 1929

QUAD 290043
TEXAS
LATITUDE 29°30' to 29°30'
LONGITUDE 94°30' to 95°00'
DIAGRAM NM 15-7 HOUSTON

LINE 103 (CONTINUED) ADJUSTED ELEVATIONS

Bench Mark	1905-6 First-order (Feet)	1936 First-order (Feet)	1951 First-order (Feet)	1953-54 First-order (Feet)	1958 First-order (Feet)	1964 First-order (Feet)
EAGLE POINT RM 1 - TIDAL 2 EDWARDS POINT		12.031		11.558	11.447	11.283
EAGLE POINT - TIDAL 1 EDWARDS POINT		11.854		11.266	11.181	10.991
D 1187						9.633

END OF THE SPUR LINE

W 169 RESET 1945		12.153		11.260	11.096	10.856
WELL 70 A (USGS)				11.519	11.306	11.066
X 169 RESET 1945		17.711		16.827	16.627	Destroyed
V 1186						15.715

LINE 104 - - ADJUSTED ELEVATIONS

Bench Mark	1905-6 First-order (Feet)	1935 First-order (Feet)	1942 First-order (Feet)	1951 First-order (Feet)	1954 First-order (Feet)	1958-59 First-order (Feet)	1964 First-order (Feet)
E 639			15.745	15.230	15.046	14.829	14.583
M.M. 34	18.045	17.762				Not recovered	Destroyed
D 639			17.146	16.827	16.680	16.476	16.266
C 639 RESET 1951				17.694	17.520	17.326	17.133
U 1006					15.476	15.249	14.902
A 9	18.658	18.405	18.107	17.497	Destroyed		
B 639			20.203	19.173	18.871	Not recovered	Destroyed
B 639 RESET 1956					19.038	[illegible]	[illegible]
A [illegible]			13.228	10.853	10.225	[illegible]	[illegible]
T 1187							5.715
X 305		10.322 (1936)	9.947	7.999	7.474	7.096	6.706
S 1187							5.781
Y 457				7.428	7.277	Not recovered	Destroyed
E 1138						4.613	4.531
A 1186							4.735
X 457				1.250	1.089	0.988	Not recovered
W 457				3.530	3.399	3.320	3.297
W [illegible]				11.214	11.063	10.984	10.963

* Second-order elevation.

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WASHINGTON D.C.

VERTICAL CONTROL DATA

by the

Coast and Geodetic Survey

SEA-LEVEL DATUM OF 1929

QUAD 290283
TEXAS
LATITUDE [illegible] to [illegible]
LONGITUDE 94°30' to 95°[illegible]
DIAGRAM NH 15-7 HOUSTON

LINE 106 - - ADJUSTED ELEVATIONS

Bench Mark	1949 Second-order (Feet)	1954 Second-order (Feet)	1959 First-order (Feet)	1964 First-order (Feet)
Z 640 RESET 1949	13.640	13.110	12.884	12.684
K 646 RESET 1949	11.809	11.368	11.146	10.951
W 1186				10.459

LINE 107 - - ADJUSTED ELEVATIONS

Bench Mark	1935 First-order (Feet)	1951 First-order (Feet)	1954 First-order (Feet)	1959 First-order (Feet)	1964 First-order (Feet)
X 456		7.520		Not recovered	Destroyed
L 1144				6.437	6.342
N 305	7.982	7.415		Not recovered	Destroyed
M 1144				6.192	[illegible]
Y 456		8.045		Not recovered	Destroyed
P 305	7.795	6.900		Not recovered	Destroyed
H 1144				7.543	7.441
Z 456		9.045		Not recovered	[illegible]
Q 456		5.965	5.735	5.607	5.409
Q 305	10.958	10.305	10.082	9.880	9.833

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VERTICAL CONTROL DATA

by the
Coast and Geodetic Survey
SEA LEVEL DATUM OF 1929

QUAD 290943
TEXAS
LATITUDE 29°00' to 29°30'
LONGITUDE 94°30' to 95°00'
DIAGRAM NH 15-7 HOUSTON

LINE 105 - - ADJUSTED ELEVATIONS

Bench Mark	1936 First-order (Feet)	1942 First-order (Feet)	1951 First-order (Feet)	1953-54 First-order (Feet)	1958 First-order (Feet)	1964 First-order (Feet)
H 1138					10.000	9.908
TBM 6 A	6.552		5.295	4.974	Not recovered	Destroyed
TBM 6	6.489			4.882	Not recovered	Destroyed
E 640		6.699	5.801	5.482	Not recovered	Destroyed
11 (G.C. & S.F.Ry.)	11.867	11.539	11.043		Not recovered	Destroyed
F 640		3.717	3.143	2.940	2.831	2.651
B 1138					4.029	3.622
F 1138					6.348	6.119
K 169	6.489	6.122	5.217	4.882	4.554	4.216
L 169	7.566		6.355	6.056	5.784	5.509
M 169	9.406		8.317	8.100	7.936	7.769
U 1187						8.123
1249.45 (PARC)						12.812
WELL 698 (USGS)				8.845	Destroyed	
WELL 228 (USGS)				8.740	8.586	8.445
TBM 30 M					7.575	
N 169	10.830		9.636	9.390	9.170	9.009

JANUARY 1966

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VERTICAL CONTROL DATA

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Coast and Geodetic Survey
SEA-LEVEL DATUM OF 1929

LINE 108 - - ADJUSTED ELEVATIONS

Bench Mark	1935 Second-order (Feet)	1942 Second-order (Feet)	1944 Second-order (Feet)	1951 First-order (Feet)	1954 First-order (Feet)	1959 First-order (Feet)	1964 First-order (Feet)
P 456				12.310	12.126	12.051	11.886
R 305	20.256			19.662	19.665	19.573	19.462
S 1144						13.340	13.199
15 (GC&SP RY)	17.641					Not Recovered	DESTROYED
K 456				16.542		16.270	16.135
B 901			20.043	19.610		19.147	18.986
SPUR LINE TO HITCHCOCK NAVAL AIR STATION (ABANDONED)							
C 901			18.524			17.913	17.779
D 901			20.938			20.394	20.272
E 901			15.659			14.879	14.669
END OF SPUR LINE							
S 305	18.343			17.982		17.710	17.549
T 305	25.659	25.354		25.190	DESTROYED		
T 305 RESET 1954					22.175	21.854	Not Recovered
Z 1184							22.018
18 RESET (GC&SP RY.)		22.595			22.441	22.126	21.926
C 753 RESET 1951				24.619		24.304	24.091
ALTA LOMA		27.467		27.782		DESTROYED	
ALTA LOMA 1931 1960							26.440
ALTA LOMA RM 1		26.299		26.145		25.823	25.500
ALTA LOMA RM 2		28.018		27.884		27.569	27.329
V 305	31.529	31.220		31.083		30.774	30.574
Y 1184							28.071
U 305	36.207			35.718	DESTROYED		
U 305 RESET 1954					33.517	33.225	33.028
P 456				32.654		32.385	32.211
K 1144						33.353	33.176
H 1144						32.759	32.575
W 305	34.724			34.183			DESTROYED

were continued through the area and a 3rd order closure obtained. The results of this relevelling compared to the 1964 LPE's are shown in the following table:

Monument	LPE 1964	Releveled 1969	Indicated Settlement
U-456	13.419	13.419	0.000
L-305	13.399	13.396	-0.003
W-456	10.955	10.955	0.000
M-1144	6.004	5.877	-0.127
R-1144	7.441	7.220	-0.221
H-1138	9.908	9.641	-0.267
F-640	2.651	2.345	-0.306
X-305	6.706	6.255	-0.451
A-639	9.498	8.945	-0.553
B-639 (Reset)	18.307	17.885	-0.422
K-169	4.216	3.759	-0.457
Q-305	9.833	9.439	-0.394
Q-456	5.400	4.967	-0.433
N-456	11.886	11.538	-0.348

The relevelling results were added to Fig. 1 and the difference ~~are~~ or "error of projection" shown in the right hand column. The relevelling indicates that most of the monuments are settling at a slightly more rapid rate than is indicated by the straight line projections. This is reasonable as a considerable amount of heavy construction is underway by the chemical and oil industries in Texas City. (increase in water pumping?)

It can be argued that projection of earlier and more severe settlement rates would have introduced an unusually large error. However, projection of the settlement rate of a single monument is not advocated. The settlement rates of several monuments in the area of interest should be projected and levels run through them to determine if they are in reasonable agreement. ~~Comparison~~ Releveling from U456 or L305 to any of these monuments would have discloses change in settlement rate.

Port Arthur

Use

MARCH 1970 RERUN AND ADJUSTMENT OF BENCH MARKS
IN AREA OF PORT ARTHUR, TEXAS UNDERGOING DIFFERENTIAL SUBSIDENCE

1	2	3	4	5	6	7
Bench Mark	USC&GS 1918	USC&GS 1954	USC&GS 1959	Projected to 1970	70 Rerun Adj to V-57 Proj to 70	Diff from Proj to 70
ROW(USE)		4.938	4.902	4.823	4.788	-0.035
P-1015		4.856	4.800	4.677	4.649	-0.028
V-57	9.957	9.678	9.633	9.534	9.534	0.000
H-1135			9.213		9.054	
M-1016		7.172	7.149	7.098	6.997	-0.101
L-1016		9.265	9.232	9.161	9.048	-0.113
S-1015		6.549	6.506	6.464	6.050	0.414
Q-1015		2.989	2.953	2.087	2.274	+0.187
R-1015		5.098	5.046	4.932	4.014	-0.918
F-1016		5.810	5.778	5.708	3.673	-2.035
G-1016		6.381	6.322	6.192	4.075	-2.117
H-1016		7.972	7.972	7.972	6.265	-1.707
J-1135			8.986		7.873	-
J-1016		11.145	11.106	11.020	10.372	-0.648
K-1016		10.705	10.669	10.590	10.175	-0.415
D-1017		15.797	15.725	15.567	15.361	-0.206
F-1017		16.516	16.473	16.378	16.073	-0.305
TBM-U					15.645	
TBM-W					14.432	
Q-1016		16.841	16.831	16.809	16.552	-0.257

Use

MARCH 1970 RERUN AND ADJUSTMENT OF BENCH MARKS
IN AREA OF PORT ARTHUR, TEXAS UNDERGOING DIFFERENTIAL SUBSIDENCE

1	2	3	4	5	6	7
Bench Mark	USC&GS 1918	USC&GS 1954	USC&GS 1959	Projected to 1970	70 Rerun Adj to V-57 Proj to 70	Diff from Proj to 70
TBM-X					16.994	
P-1016		16.965	16.965	16.965	16.713	-0.252
K-1135		16.470	16.453	16.416	16.525	
R-1016		22.293	22.234	22.104	21.801	-0.303
T-1016		16.440	16.299	15.989	15.409	-0.580
V-1016		18.258	18.212	18.111	17.698	-0.413

Storm Evacuation Mapping

PH 7125

Map T 15010

Galveston, Texas

October, 1971

Respectfully Submitted,

Dale M. Fuller

Dale M. Fuller
Chief, Photo Party 63
N.O.A.A. - N.O.S.

Job PH-7125

Map T - 15010

General:

Map T 15010 was Field Inspected in accordance with Project Instructions dated 2 July, 1971 and amended 30 August, 1971.

The area encompassed by this Map is generally low and flat. Two large communities are within the Map.

Critical Elevations:

Critical elevations were determined in accordance with Project Instructions, annotated on their respective USGS Quads in red ink, and recorded on the fly leaf cover of the Wye Volume by page, number, and Quadrangle.

The ozalid copy of this Map should be considered as a complete inventory of all evacuation routes, also by name, route number, and number of lanes. On one quad it was impossible to label all routes and this was done on the Ozalid.

Unusual Conditions:

One new route was constructed since the printing of the Quadrangle. This route was drawn on the Ozalid in red ink and supplemented by a Galveston County Map.

A series of Levees have been constructed in the Texas City area. Maps, data, elevations were obtained from the Corps of Engineers and submitted. No elevations of the levees were submitted as critical elevation points as their horizontal position could not be plotted precisely by the Field Party. Office compilation of the points and elevations are necessary. These points are P.I. of the curves on the levee and will represent the levee as the external distance is generally less than three feet. These levees are built of earth and are 250feet wide at their base and 24 feet wide on top.

Adequacy of the USGS Quadrangles:

With the exceptions of the discrepancies mentioned under the previous heading of this report, Quad elevations (street intersections in Texas City, on or near Texas Avenue) were found incorrect. A Level line was run between at least two USC&GS bench marks to validate this.

Additional Information:

Mr. Benton of the NWS in Galveston, Texas was shown all evacuation routes selected and suggestions by he incorporated in the field inspection of this Map.
A general subsidence of all level marks has been reported by various engine ring organizations. All elevations used by this party were of the 1964 USC&GS leveling .

Storm Evacuation Mapping

Galveston, Texas Area

Map T-15011

Photo Party 63

November, 1971

Respectfully submitted,

Dale M. Fuller

Dale M. Fuller
Chief, Photo Party 63
N.O.A.A. - N.O.S.

Job Ph- 7125

Map T-15011

General:

Map T-15011 was field inspected by Photo party 63 in accordance with Project Instructions dated 2 July, 1971 and amended 30 August, 1971.

The area encompassed by this Map is generally low and flat. Several communities in the southwest section of this Map form an area known as Brazosport. The principal industry being chemical plants.

Critical Elevations:

Critical elevations were determined in accordance with Project Instructions, annotated on the quadrangles in red ink, and recorded on the fly leaf cover of the Wye Volume by page,number, and quadrangle.

A number of elevations were determined or obtained from the Corps of Engineers, Valasco Drainage Commision, and directly from the Quad.

Ozalid:

The ozalid of this Map should be considered as a complete inventory of all evacuation routes. Dashed red lines indicate new routes, and green ink indicates deletions.

Populations:

Additional population figures were obtained from Chamber of Commerces, City Halls, and Civil Defense. Difficulty was encountered obtaining populations of specific isolated sub-divisions. A notation was made on the ozalid concerning this.

Unusual Conditions:

The levees on this map are defined on the USGS quads. One new levee was constructed and drawn on the ozalid. There are roads on top of most of the levees for mainly maintenance purposes. The roads on levees to be used as evacuation routes are so marked on the quad and ozalid.

Additional Information:

Mr. Benton of the NWS and the Civil Defense Director of Brazoria County were shown the ozalid copy of the Map and their ideas used in field inspection.

Adequacy Of USGS Quadrangles:

The USGS quads are adequate with the exception of the extension of state route 1495 on the Freeport Quad.