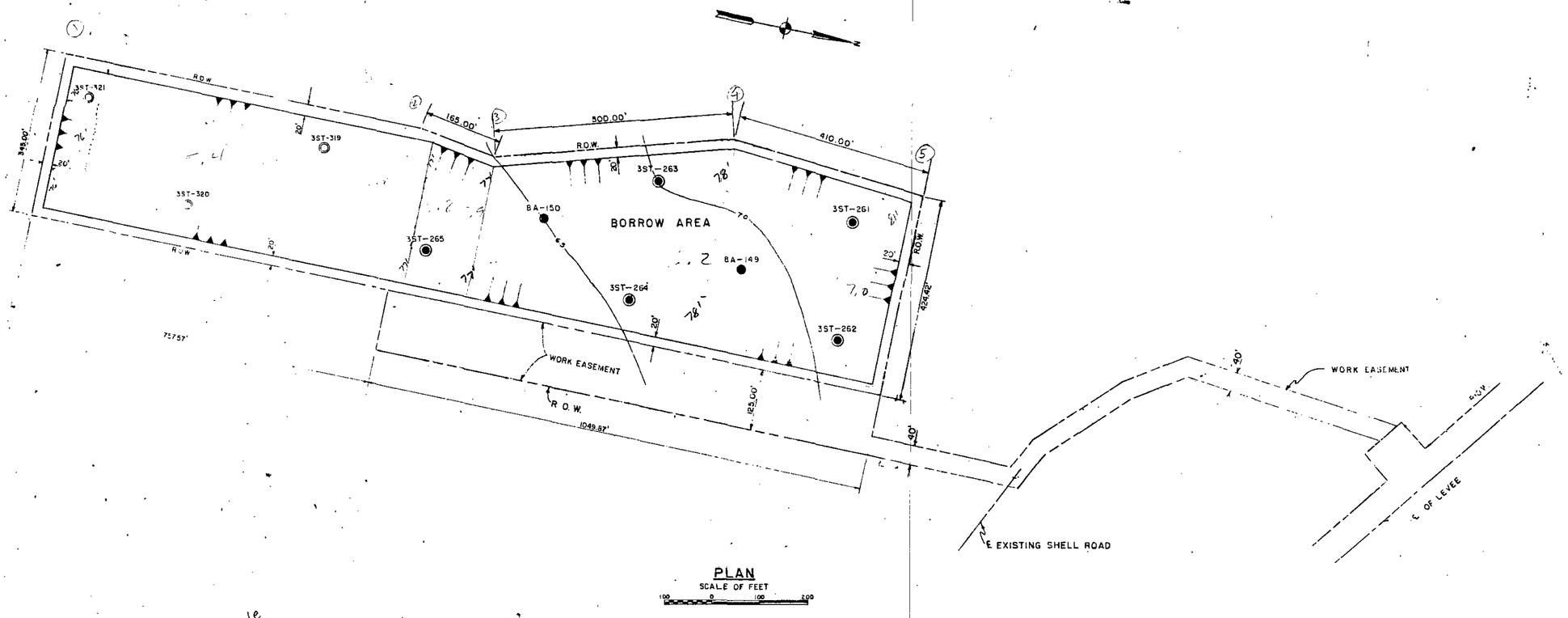
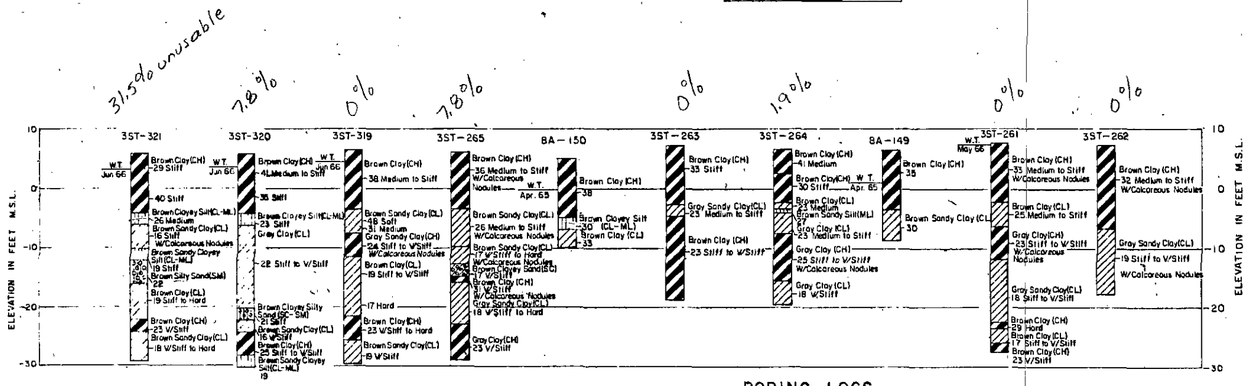
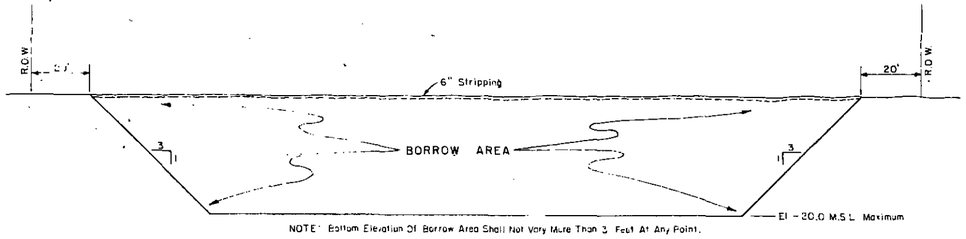


PLAN
SCALE OF FEET
100 0 100 200



BORING LOGS
Vertical — As Shown
Horizontal — None



NOTE: Bottom Elevation Of Borrow Area Shall Not Vary More Than 3 Feet At Any Point.

TYPICAL BORROW AREA SECTION
NO SCALE

REVISION	DATE	BY

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

DRAWN BY: BAS
TRACED BY:
CHECKED BY: RMS
SUBMITTED BY: Chief, Soil Design Section
APPROVED: Chief, Fnds & Matls Br.
APPROVED: Chief, Engineering Division
DATE: MAY 1967

FREEPORT AND VICINITY, TEXAS
OYSTER CREEK LEVEE
BORROW AREA

PREPARED UNDER THE DIRECTION OF JOHN E. UNVERZERTH COLONEL, C.E., DISTRICT ENGINEER

SCALE:
SPEC. DATE
DRAWING NUMBER 28
SHEET
FILE NO BRAZ 515-15

Freeport & Vicinity, Texas
Hurricane Flood Protection
Oyster Creek Levee
Chubb Lake Borrow Area

JMC - Apr 74

Average Moisture Content of Clayey Materials In Chubb Lake Borrow Area Based on Government Borings: 8A-149, 8A-150, 35T-261 thru 35T-265 and 35T-319 thru 35T-321. Material included in average were the clayey materials in the first 20' of boring except for borings 8A-149 and 8A-150 where the boring were only 15' deep.

$$\text{Avg MC} = \frac{\Sigma(MC_i \times t_i)}{\Sigma t_i}$$

where:
t_i = layer thickness
MC_i = moisture content of layer.

$$\text{Avg MC} = \frac{5675}{185.5} = 30.6\%$$

Average Moisture Content, Average Unit Dry Weight & Average Moisture Content for 100% Saturation Based on Undisturbed samples from Government borings 35T-261 thru 35T-265 and 35T-319 thru 35T-321. Material included in averages were the undisturbed clayey materials in upper 20'.

$$\text{Avg MC} = \frac{4543.5}{154.5} = 29.4$$

same formula as above

a

$$\text{Avg } \gamma_d = \frac{\Sigma(\gamma_{di} \times t_i)}{\Sigma t_i}$$

where: t_i = layer thickness
γ_{di} = unit dry weight of layer

$$= \frac{14513}{154.5} = 93.9 \text{ PCF}$$

Using Specific Gravity = 2.67,
(Average from borings 74-118 thru 74-120)

Volume solids in 1 CF of soil mass

$$= \frac{\text{Weight of solids}}{\text{Specific gravity} \times \text{Unit weight of water}}$$

$$= \frac{93.9 \text{ PCF}}{(2.67)(62.4 \text{ PCF})} = 0.564 \text{ CF}$$

Volume of Voids in 1 CF = 1.0 - 0.564
= 0.436 CF

Moisture Content For 100% Saturation

$$= \frac{\text{Volume of voids} \times \text{Unit weight of water}}{\text{Weight of solids}} \times 100\%$$

$$= \frac{(0.436)(62.4 \text{ PCF})}{93.9 \text{ PCF}} \times 100\% = 29\%$$

Freeport & Vicinity, Texas
Hurr - Flood Protection
Oyster Creek Levee
Chubb Lake Borrow Area
JMC

Average Moisture Content, Dry Unit Weight, and Percent Saturation of Materials In Borrow Area From 0 to 20' depth. April 74

Average of Borings 8A-149, 8A-150, 3ST-261 thru 3ST-265 & 3ST-319 thru 3ST-321

$$\text{Avg. MC} = \frac{\Sigma MC_i \times t_i}{\Sigma t_i}$$ where t_i = layer thickness

MC_i = moisture content of layer

$$= \frac{5675}{185.5} = 30.6\%$$

4601

30.7 $\frac{5837.45}{190}$

Average MC of Borings 3ST-261 thru 3ST-265 & 3ST-319 thru 3ST-321

$$\text{Avg MC} = \frac{4543.5}{154.5} \quad 29.4\%$$

30.0 $\frac{4806.75}{160}$

Avg γ_d of Borings 3ST-261 thru 3ST-265 & 3ST-319 thru 3ST-321

$$\frac{\cancel{14357.5}\ \cancel{14513}}{154.5} \quad \cancel{92.9}\ 93.9$$

$\frac{14727}{155.5} = 94.7$

Using Sp Gr = 2.67

$$V_{solids\ in\ 1\ CF} = \frac{\cancel{92.9}\ 93.9\ PCF}{(2.67)(62.4)} = \cancel{0.558}\ 0.564\ CF$$

$$V_{voids\ in\ 1\ CF} = \cancel{0.442}\ 0.436\ CF$$

Weight of water if saturated (100%) = $(\cancel{0.442}\ 0.436)(62.4$

$$\text{Moisture Content for 100\% Saturation} = \frac{(\cancel{0.442}\ 0.436\ CF)(62.4\ PCF)}{\cancel{92.9}\ 93.9\ PCF} \times 100$$

$$= \cancel{29.7\%}\ 28.9\%$$

Inclosure 3

Hurricane Flood Protection
Oyster Creek Levee
Chubb Lake Borrow Area

JMC April 7

Data From Borings 74-118 thru 74-121 taken between Chubb Lake and Borrow Area. Average Moisture Content, Unit Dry Weight, Specific Gravity and Moisture Content for 100% Saturation.

$$\text{Avg MC} = \frac{\Sigma(MC_i \times t_i)}{\Sigma t_i}$$

$$= \frac{2412}{76.5} = 31.5\%$$

$$\text{Avg } \gamma_d = \frac{\Sigma(\gamma_{di} \times t_i)}{\Sigma t_i}$$

$$= \frac{6990}{76.5} = 91.4 \text{ PCF}$$

$$\text{Avg. Sp. Gr.} = \frac{\Sigma(\text{Sp Gr})_i}{\Sigma i}$$

$$= \frac{16.03}{6} = 2.67$$

Using Sp Gr = 2.67,

Volume solids in 1 CF of Soil Mass

$$= \frac{\gamma_d}{\text{Unit Weight of water} \times \text{Specific Gravity}}$$

$$= \frac{91.4 \text{ PCF}}{62.4 \text{ PCF} \times 2.67} = 0.549$$

Volume of Voids in 1 cf = 1.0 - 0.549 cf

= 0.451 cf

Moisture Content for 100% Saturation

$$= \frac{\text{Weight of water}}{\text{Weight of soil}} \times 100\% = \frac{(V_{voids})(\gamma_{water})}{\gamma_d}$$

$$= \frac{(0.451)(62.4\ pcf)}{91.4\ pcf} \times 100\% = 30.8\%$$

Note: Data included in averages were clayey materials in 20' depth.