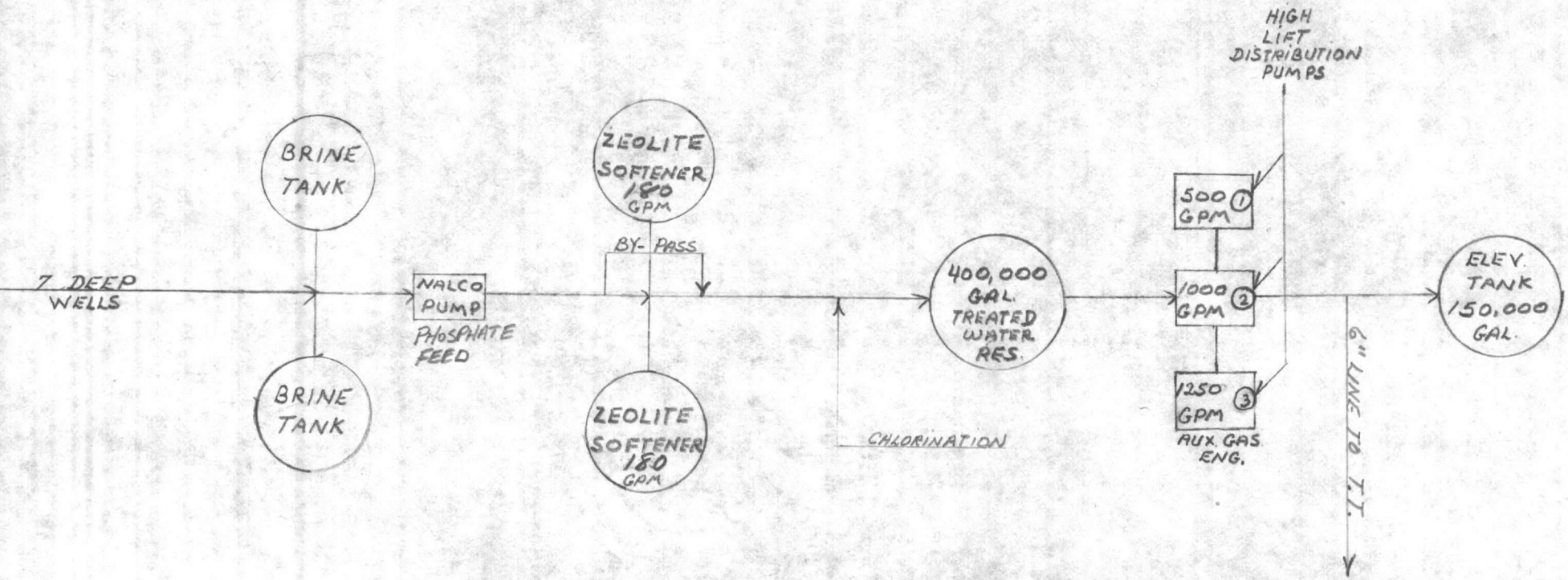
MONTFORD POINT BLDG. M-178

CAPACITY 750,000 GPD

WITH 7 DEEP WELLS

ZEOLITE SOFTENING PLANT



MONTFORD POINT BLDG. M-139
SWIMMING POOL

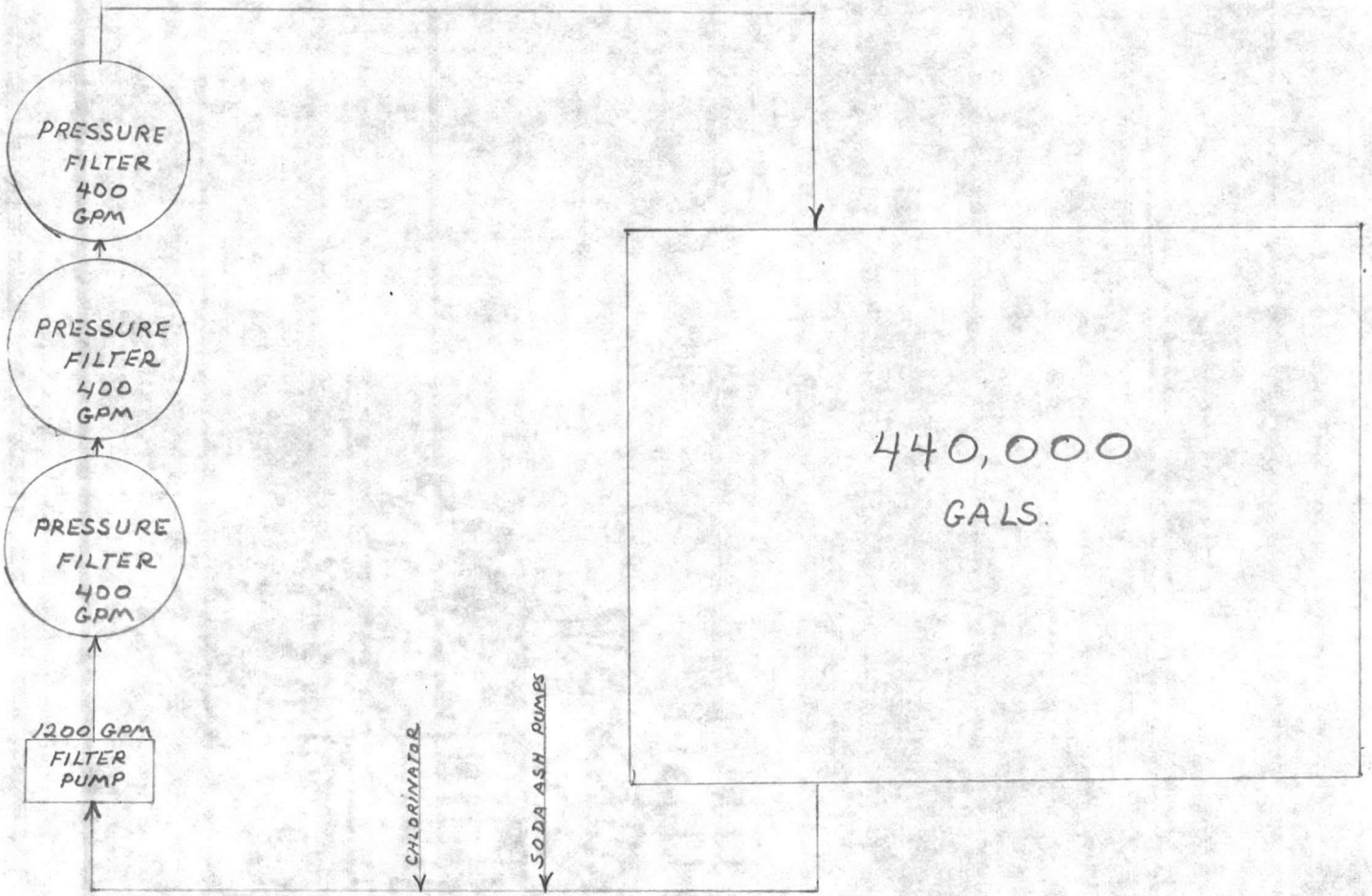


Table III C 3

WELL SURVEY SHEET*

Sheet No. 6 DATE: 3-3-77

WELL NO.	WELL TYPE	DRILLED DEPTH ft.	STATIC LEVEL (ft)	CASING SIZE (in.)	STAGES	DRAWDOWN AT RATED CAPACITY (feet)	RATED CAPACITY (gpm)	PRESENT CAPACITY (GPM)
M-142	DRILLED	69'	24'	8"	9	21'	100	75
M-168	DRILLED	151'	24'	8"	4	35'	100	50
M-197	DRILLED	200'	34'	8"	5	17'	155	100
M-243	DRILLED	95'	27'	8"	7	21'	150	Caved
~~M-627~~	~~DRILLED~~	100'	11'	~~8"~~	8	16'	~~150~~	Caved
M-628	DRILLED	67'	14'	8"	5	17'	100	75
M-629	DRILLED	WELLS JUST INSTALLED - AWAITING INFO FROM PUBLIC WORKS						100
M-630	DRILLED							125

WELL NO.	SPECIFIC CAPACITY (gpm/ft of drawdown)	PUMP HEAD (ft)	MOTOR H. P.	CHLORINATION (AMOUNT)	RESIDUAL CHLORINE (ppm)	AUXILIARY POWER (type)	DD FORM 710	DD FORM 686
M-142	4.8	147'	7.5					
M-168	2.8	105'	5.0			GASOLINE		
M-197	9.0	135'	10.0			GASOLINE		
M-243	7.1	148'	10.0					
M-627	9.4	164'	7.5					
M-628	5.9	150'	7.5					
M-629	WELLS JUST INSTALLED - AWAITING INFO FROM PUBLIC WORKS					GASOLINE		
M-630						GASOLINE		

MONTFORD POINT BLDG. M-178

CAPACITY 750,000 GPD

WITH 7 DEEP WELLS

ZEOLITE SOFTENING PLANT

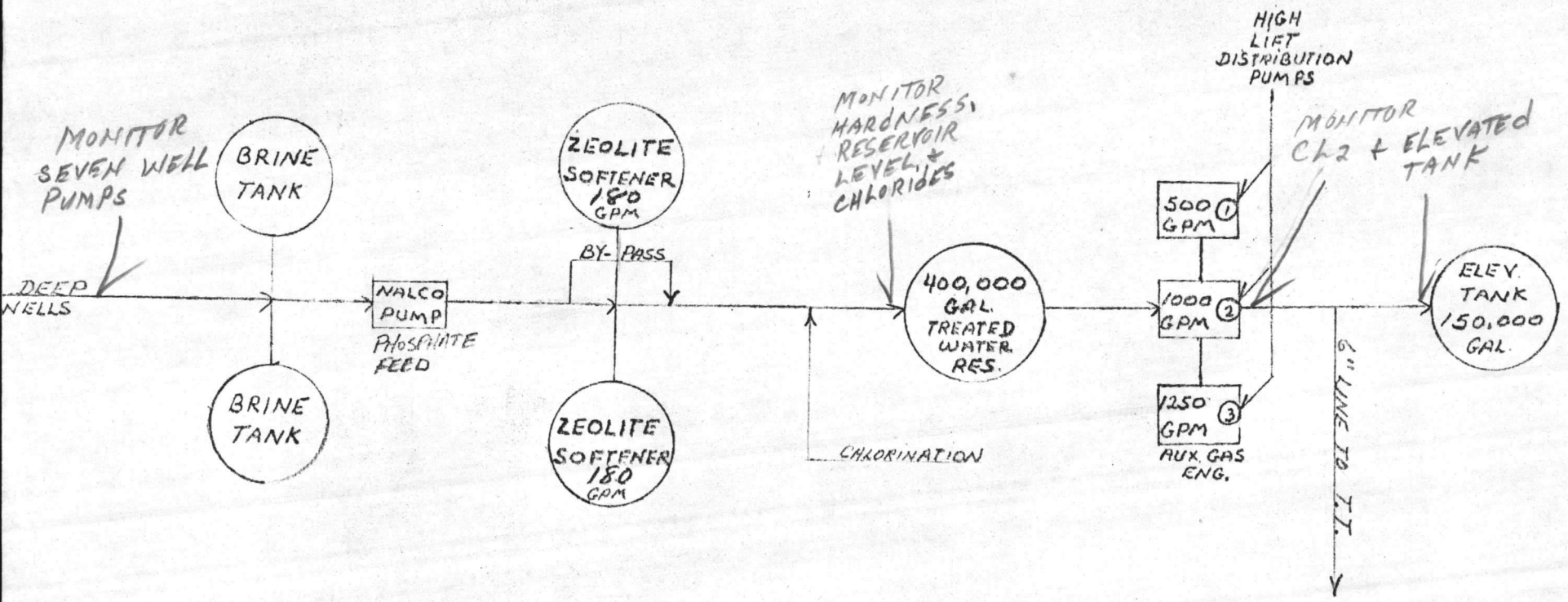


Table III C 3

WELL SURVEY SHEET*

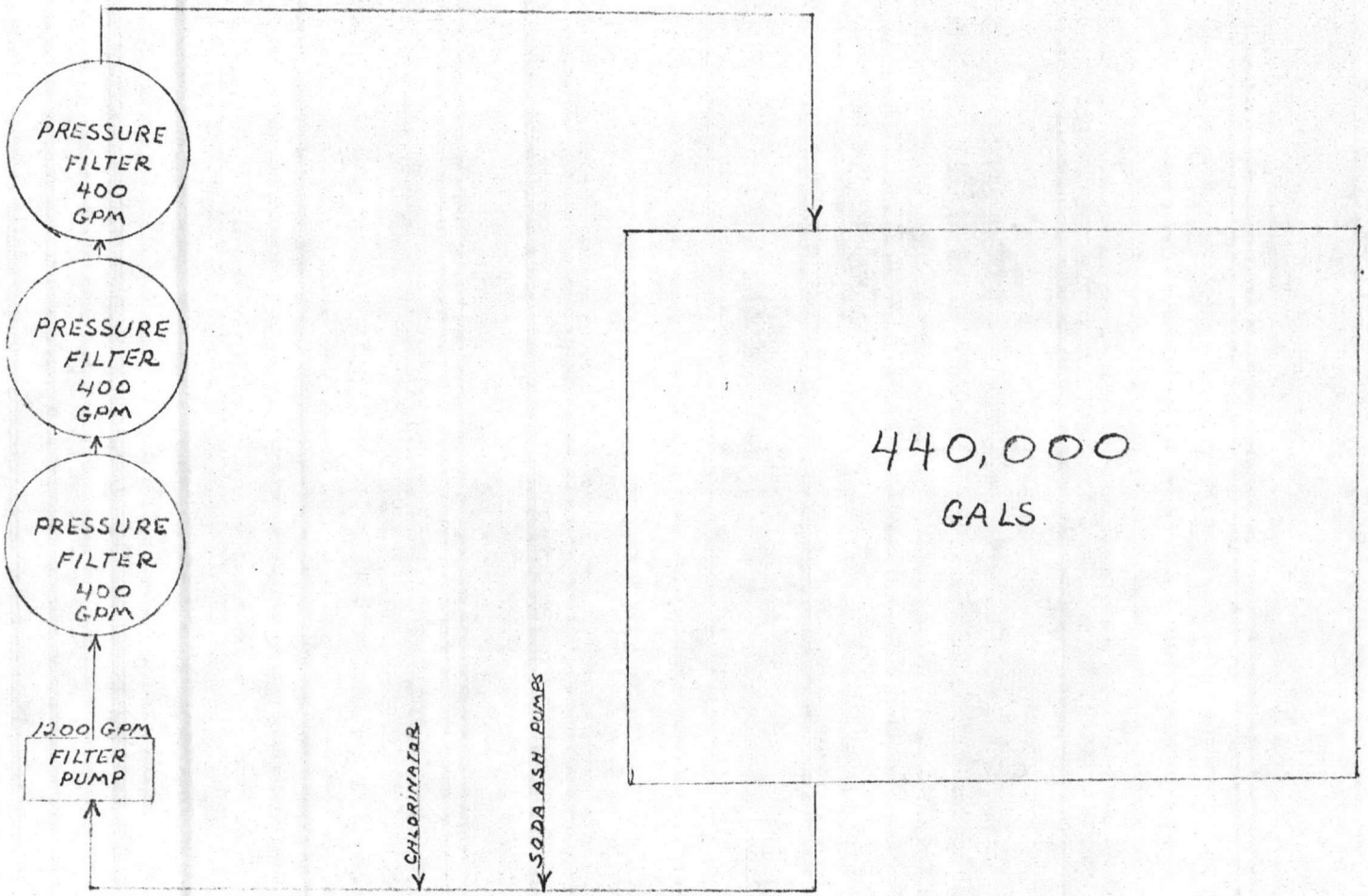
Sheet No. 6 DATE: 3-3-77

WELL NO.	WELL TYPE	DRILLED DEPTH ft.	STATIC LEVEL (ft)	CASING SIZE (in.)	STAGES	DRAWDOWN AT RATED CAPACITY (feet)	RATED CAPACITY (gpm)	PRESENT CAPACITY (GPM)
M-142	DRILLED	69'	24'	8"	9	21'	100	75
M-168	DRILLED	151'	24'	8"	4	35'	100	50
M-197	DRILLED	200'	34'	8"	5	17'	155	100
M-243	DRILLED	95'	27'	8"	7	21'	150	Caved
~~M-627~~	~~DRILLED~~	~~100'~~	~~11'~~	~~8"~~	~~8~~	~~16'~~	~~150~~	Caved
M-628	DRILLED	67'	14'	8"	5	17'	100	75
M-629	DRILLED	WELLS JUST INSTALLED - AWAITING INFO FROM PUBLIC WORKS						100
M-630	DRILLED							125

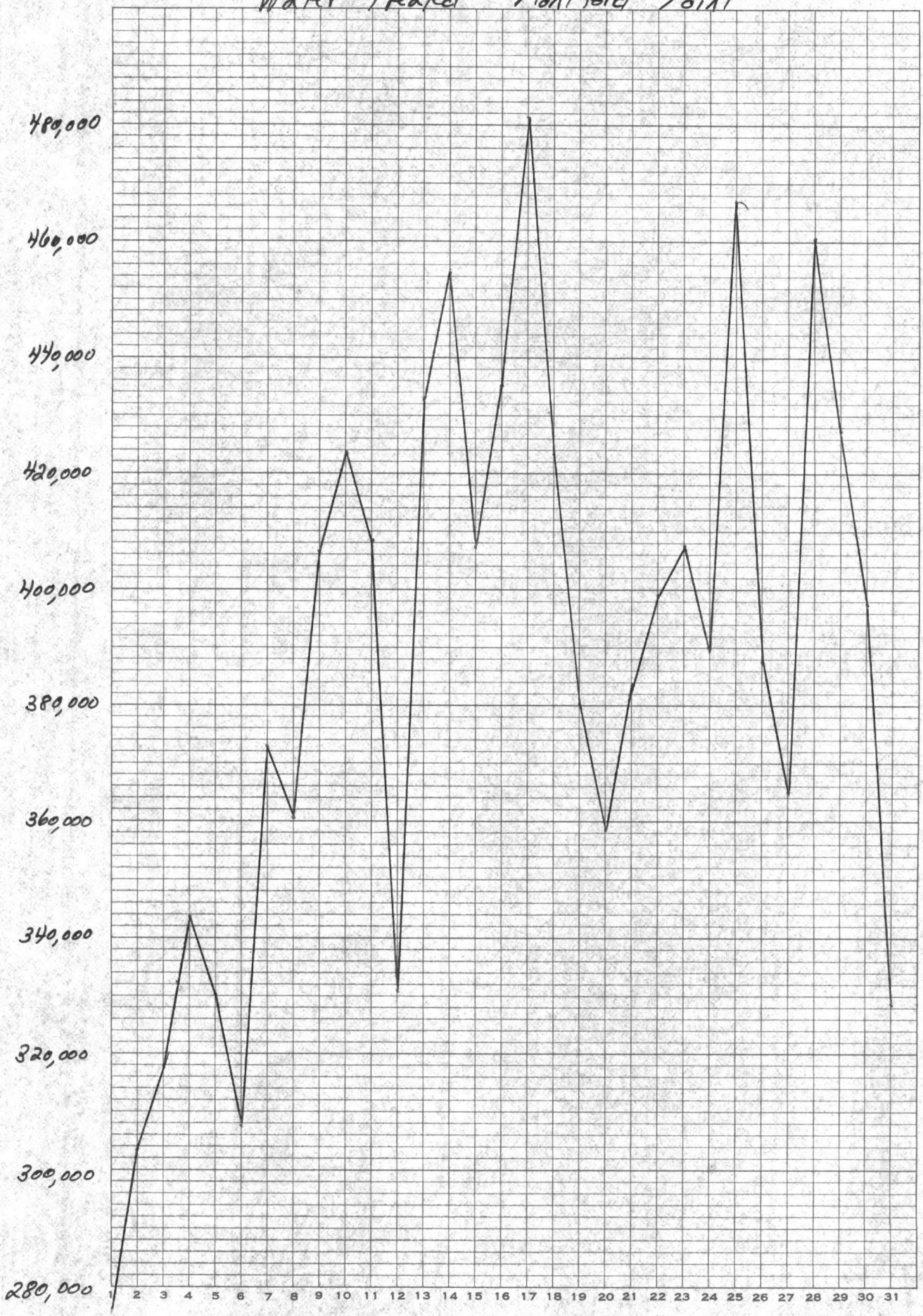
WELL NO.	SPECIFIC CAPACITY (gpm/ft of drawdown)	PUMP HEAD (ft)	MOTOR H. P.	CHLORINATION (AMOUNT)	RESIDUAL CHLORINE (ppm)	AUXILIARY POWER (type)	DD FORM 710	DD FORM 686
M-142	4.8	147'	7.5					
M-168	2.8	105'	5.0			GASOLINE		
M-197	9.0	135'	10.0			GASOLINE		
M-243	7.1	148'	10.0					
M-627	9.4	164'	7.5					
M-628	5.9	150'	7.5					
M-629	WELLS JUST INSTALLED - AWAITING INFO FROM PUBLIC WORKS					GASOLINE		
M-630						GASOLINE		

MONTFORD POINT BLDG. M-139

SWIMMING POOL



Water Treated Montford Point



MONTH January 19 79

Water Treatment and Pumping Plant Bldg.#178 Montford Point

I. Pool, Montford Point

56. Unit#1 - Pool Bldg.#M-139.
Size: 150 feet 1 inch long, 60 feet wide; Capacity: 440,000.
(a) Air Rater

(1) Valve, Gate; Influent;

(2) Valve, Gate; Effluent;

(b) Pump, Booster (For filling pool) (Not in Use)
Name: Weinman; Manufacturer: The Weinman Pump Manufacturing Company, Columbus, Ohio.
Type: Horizontal Centrifugal; Size: 4; GPM: 300; Type: G; Foot Head: 25; Number: 33781; RPM: 1725; Stage: 1; Head: 25 feet; Date: Feb. 5, 1944.
(1) Motor, Electric
Name: Master; Manufacturer: The Master Electric Company, Dayton, Ohio.
Serial No. 016190; Type: PA; Frame: 225; Style: 61958; HP: 13 (?); Volts: 208; Amps: 8.4; RPM: 1750; Cycles: 60; Phase: 3.
(aa) Switch, Safety Electric (Main for Motor)
Name: Square D Company; Manufacturer: Square D Company, Detroit, Mich.
Catalogue No. 56351; Series: 2; Volts: 230; Amps: 30.
(bb) Switch, Electric (For Reset, Start, and Stop)
Name: General Electric; Manufacturer: General Electric, Fort Wayne, Indiana.
Catalogue No. 103; Volts: 208-220; Cycles: 60.
(2) Valve, Gate, Influent; Mueller, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA.
(3) Valve, Check; Effluent; Chapman, 6 inches; 150 WSP; Pat. No. 1744798.
(4) Valve, Gate; Effluent; Mueller, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA.
(5) Valve, Gate; By-pass for Booster Pump; Mueller, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA.
(6) Valve, Gate; Effluent from bottom of pool; Mueller, Chattanooga, Tenn.; 6 inches; 00 12; 100 WP.
(c) Pump, Circulating
Name: Weinman; Manufacturer: The Weinman Pump Manufacturing Company, Columbus, Ohio.
Type: Horizontal Centrifugal; Serial No. 33784; Type: L-2; Size: 6; Stage: 1; RPM: 1800; GPM: 1200; Head: 70 feet.
(1) Motor, Electric
Name: Sterling; Manufacturer: Sterling Electric Motors Inc., Los Angeles, California.
Serial No. 144725; Frame: 365; Type: KF; HP: 25; RPM: 1800; Cycles: 60; Volts: 208/416; Amps: 63.5/31.8; Phase: 3.

1. Pool, Montford Point

56. Unit 1 - Pool Bldg. TP-179.
Size: 150 feet 1 inch long, 60 feet wide; Capacity: 418,000.
(a) Air Water

(1) Valve, Gate; Inflment;

(2) Valve, Gate; Efflment;

(b) Pump, Booster (For filling pool) (Not in Use)
Name: Peerless Manufacturer: The Peerless Pump Manufacturing Company,
Columbus, Ohio.
Type: Horizontal Centrifugal; Size: 8; GPM: 300; Type: G; Foot Head:
25; Number: 37781; RPM: 1750; Stages: 1; Head: 25 Feet; Date: Feb. 1,
1940.
(1) Motor, Electric
Name: Century Electric Manufacturing Company, Saylon,
Ohio.
Serial No. 01284; Type: Pa; Frame: 225; Style: 41384; Hp: 15 (4);
Volts: 220; Amps: 40; RPM: 1750; Cycles: 60; Phase: 3.
(2a) Switch, Safety Electric (Main Power Switch)
Name: Square D Company; Manufacturer: Square D Company,
Detroit, Mich.
Catalogue No. 50351; Series: 2; Volts: 230; Amps: 30.
(2b) Switch, Magnetic (For Heads, "Start", and Stop)
Name: General Electric; Manufacturer: General Electric,
Fort Wayne, Indiana.
Catalogue No. 103; Volts: 220-230; Cycles: 60.
(2) Valve, Gate, Inflment: Fuller, Indianapolis, Ind.; 6 Inches;
GPM: 300 Feet:
(3) Valve, Check; Efflment; Crane. 6 Inches;
(4) Valve, Foot; Inlet: Crane.
(5) Valve, Gate; By-pass for Booster Pump; Fuller, Chattanooga,
Tenn.; 6 Inches; GPM: 300 Feet;
(6) Valve, Gate; 6 Inches; 300 Feet;
(c) Pump, Circulating:
Name: Peerless Manufacturer: The Peerless Pump Manufacturing Company,
Los Angeles, California.
Type: Horizontal Centrifugal; Serial No. 37704; Type: L-2; Size: 6;
Stages: 1; GPM: 1200; Head: 70 Feet.
(1) Motor, Electric
Name: Fleetlite; Manufacturer: Fleetlite Motor Co., Los
Angeles, California.
Type: [illegible]; Serial No. 2[illegible]; Size: [illegible]; Style: [illegible]; Hp: [illegible];

I. Pool, Montford Point

56. Unit#1 - Pool Bldg.#M-139.
Size: 150 feet 1 inch long, 60 feet wide; Capacity: 440,000.
(a) Air Rater

(1) Valve, Gate; Influent;

(2) Valve, Gate; Effluent;

(b) Pump, Booster (For filling pool) (Not in Use)
Name: Weinman; Manufacturer: The Weinman Pump Manufacturing Company, Columbus, Ohio.
Type: Horizontal Centrifugal; Size: 4; GPM: 300; Type: G; Foot Head: 25; Number: 33781; RPM: 1725; Stage: 1; Head: 25 feet; Date: Feb. 5, 1944.
(1) Motor, Electric
Name: Master; Manufacturer: The Master Electric Company, Dayton, Ohio.
Serial No. 016190; Type: PA; Frame: 225; Style: 61958; HP: 13 (?); Volts: 208; Amps: 8.4; RPM: 1750; Cycles: 60; Phase: 3.
(aa) Switch, Safety Electric (Main for Motor)
Name: Square D Company; Manufacturer: Square D Company, Detroit, Mich.
Catalogue No. 56351; Series: 2; Volts: 230; Amps: 30.
(bb) Switch, Electric (For Reset, Start, and Stop)
Name: General Electric; Manufacturer: General Electric, Fort Wayne, Indiana.
Catalogue No. 103; Volts: 208-220; Cycles: 60.
(2) Valve, Gate, Influent; Mueller, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA.
(3) Valve, Check; Effluent; Chapman, 6 inches; 150 WSP; Pat. No. 1744798.
(4) Valve, Gate; Effluent; Mueller, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA.
(5) Valve, Gate; By-pass for Booster Pump; Mueller, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA.
(6) Valve, Gate; Effluent from bottom of pool; Mueller, Chattanooga, Tenn.; 6 inches; 00 12; 100 WP.
(c) Pump, Circulating
Name: Weinman; Manufacturer: The Weinman Pump Manufacturing Company, Columbus, Ohio.
Type: Horizontal Centrifugal; Serial No. 33784; Type: L-2; Size: 6; Stage: 1; RPM: 1800; GPM: 1200; Head: 70 feet.
(1) Motor, Electric
Name: Sterling; Manufacturer: Sterling Electric Motors Inc., Los Angeles, California.
Serial No. 144725; Frame: 365; Type: KF; HP: 25; RPM: 1800; Cycles: 60; Volts: 208/416; Amps: 63.5/31.8; Phase: 3.

Pool, Montford Point Continued

(aa) Switch, Electric (Main for Motor)
Name: Thumbull; Manufacturer: The Thumbull Electric Manufacturing Company, Plainville, Conn.
Catalogue No. 66324; Type: RPA; Volts: 230; Amps: 200.

(bb) Switch, Electric (Starter, Stop, and Reset)
Name: Westinhouse; Manufacturer: Westinghouse Electric Corporation, Beaver, Pa.
Class: 11200-93; Style: 941902; Parts Style: 940747.

(2) Valve, Gate; Influent; Mueller Company, Chattanooga, Tenn.; 12 inches;EAS.

(3) Strainer, Mueller Steam Spect. Company; Number: 917; Size: 12 inches. (### #### removed since old inventory)

(4) Valve, Gate; Effluent; Mueller Company, Chattanooga, Tenn.; 12 inches; (Has been removed since old inventory)

(5) Valve, Check; Effluent; Chapman, 10 inches; 150 WSP; Pat. No. 1744798.

(6) Valve, Gate; Effluent; Mueller Company, Chattanooga, Tenn.; 10 inches; 100 WP.

(7) Valve, Gate; By-pass the Pump; Mueller Company, Chattanooga, Tenn.; 10 inches.

(d) Filter, Pressure; Number: 1.
Name: Permutit Water Filter; Manufacturer: The Permutit Company, New York, New York.
Number: BKC34578; Rate of flow: 400 GPM; Size: 8 feet Diameter, 20 feet long; Operating pressure: 28 pounds.

(1) Indicators, Rate of flow
Name: Permutit; Manufacturer: The Permutit Company, New York, New York.

(2) Valve, Gate; Influent; Crane, 6 inches; 6DD; 45234; 200 WOG.

(3) Valve, Gate; Effluent; Crane, 8 inches; FS DD; 45235; 200 WOG.

(e) Filter, Pressure; Number: 2.
Name: Permutit Water Filter; Manufacturer: The Permutit Company, New York, New York.
Number: BKC34578; Rate of flow: 400 GPM; Size: 8 feet diameter, 20 feet long; Operating pressure: 28 pounds.

(1) Indicator, Rate of flow
Name: Permutit; Manufacturer: The Permutit Company, New York, New York.

(2) Valve, Gate; Influent; Crane, 6 inches; 6DD; 45234; 200 WOG.

(3) Valve, Gate; Effluent; Crane, 8 inches; FS DD; 45235; 200 WOG.

(f) Filter, Pressure; Number: 3.
Name: Permutit Water Filter; Manufacturer: The Permutit Company, New York, New York.
Number: BKC34578; Rate of flow: 400 GPM; Size: 8 feet diameter, 20 feet long; Operating pressure: 28 pounds.

Pool, Montford Point Continued

(aa) Switch, Electric (Main for Motor)
Name: Thumbull; Manufacturer: The Thumbull Electric Manufacturing Company, Plainville, Conn.
Catalogue No. 66324; Type: RPA; Volts: 230; Amps: 200.

(bb) Switch, Electric (Starter, Stop, and Reset)
Name: Westinhouse; Manufacturer: Westinghouse Electric Corporation, Beaver, Pa.
Class: 11200-93; Style: 941902; Parts Style: 940747.

(2) Valve, Gate; Influent; Mueller Company, Chattanooga, Tenn.; 12 inches;EAS.

(3) Strainer, Mueller Steam Spect. Company; Number: 917; Size: 12 inches. (Has been removed since old inventory)

(4) Valve, Gate; Effluent; Mueller Company, Chattanooga, Tenn.; 12 inches; (Has been removed since old inventory)

(5) Valve, Check; Effluent; Chapman, 10 inches; 150 WSP; Pat. No. 1744798.

(6) Valve, Gate; Effluent; Mueller Company, Chattanooga, Tenn.; 10 inches; 100 WP.

(7) Valve, Gate; By-pass the Pump; Mueller Company, Chattanooga, Tenn.; 10 inches.

(d) Filter, Pressure; Number: 1.
Name: Permutit Water Filter; Manufacturer: The Permutit Company, New York, New York.
Number: BKC34578; Rate of flow: 400 GPM; Size: 8 feet Diameter, 20 feet long; Operating pressure: 28 pounds.

(1) Indicators, Rate of flow
Name: Permutit; Manufacturer: The Permutit Company, New York, New York.

(2) Valve, Gate; Influent; Crane, 6 inches; 6DD; 45234; 200 WOG.

(3) Valve, Gate; Effluent; Crane, 8 inches; FS DD; 45235; 200 WOG.

(e) Filter, Pressure; Number: 2.
Name: Permutit Water Filter; Manufacturer: The Permutit Company, New York, New York.
Number: BKC34578; Rate of flow: 400 GPM; Size: 8 feet diameter, 20 feet long; Operating pressure: 28 pounds.

(1) Indicator, Rate of flow
Name: Permutit; Manufacturer: The Permutit Company, New York, New York.

(2) Valve, Gate; Influent; Crane, 6 inches; 6DD; 45234; 200 WOG.

(3) Valve, Gate; Effluent; Crane, 8 inches; FS DD; 45235; 200 WOG.

(f) Filter, Pressure; Number: 3.
Name: Permutit Water Filter; Manufacturer: The Permutit Company, New York, New York.
Number: BKC34578; Rate of flow: 400 GPM; Size: 8 feet diameter, 20 feet long; Operating pressure: 28 pounds.

Pool, Montford Point Continued

(1) Indicator, Rate of flow
Name: Permutit; Manufacturer: The Permutit Company, New York, New York.
(2) Valve, Gate; Influent; Crane,
6 inches; 6DD; 45234; 200 WOG.
(3) Valve, Gate; Effluent; Crane,
8 inches; FS DD; 45235; 200 WOG.

(g) Meter
Name: Venturi meter Menometer; Manufacturer: Iron Foundry Company,

Number: 53269; Size: 10 X 5.

(h) Wash Water Pit
Size: $5\frac{1}{2}$ X $9\frac{1}{2}$; Capacity:
(1) Valve, Gate; Wash Water Outlet; Mueller Company, Chattanooga, Tenn.; 10 inches; 2-20; Float operated butterfly valve.
(2) Valve, Gate; Waste Water Outlet Valve; Mueller Company, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA; Float operated butterfly valve.

(i) Valve, Gate; Filtered Water Outlet;(Going to top of Pool)
10 inches;

(j) Valve, Gate; Filtered Water Outlet; (Going to bottom of Pool); Mueller Company, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA.

(k) Two Pumps, Condensate
Name: Aurara; Manufacturer: Aurara Pump Company,
Serial No. 115B78253;
(1) Motor, Electric
Name: Westinghouse; Manufacturer: Westinghouse Electric Corporation Beaver, Pa.
Serial No. 19848; Style: 1077858-X; Type: CS; Frame: 254; HP: 5;
RPM: 1750; Volts: 208; Amps: 3.2; Cycles: 60; Phase: 3.
(aa) Switch, Electric Safety
Name: Trumbull; Manufacturer: The Trumbull Electric Manufacturing Company, Plainville, Conn.
Catalogue No. 66321; Type: RBA; Volts: 230; Amps: 30.
(bb) Switch, Electric
Name: Westinghouse; Manufacturer: Westinghouse Electric Corporation, Beaver, Pa.
Class: 11200-S12; Mech. Style: 967224D.

Name: Aurara; Manufacturer: Aurara Pump Company,
Serial No. 115B78253BF;
(1) Motor, Electric
Name: Westinghouse; Manufacturer: Westinghouse Electric Corporation Beaver, Pa.
Serial No. 26043; Style: 1077858-X; Type: CS; Frame: 254; HP: 5;
RPM: 1750; Volts: 208; Amps: 3.2; Cycles: 60; Phase: 3.
(aa) Switch, Electric Safety
Name: Trumbull; Manufacturer: The Trumbull Electric Manufacturing Company, Plainville, Conn.
Catalogue No. 66321; Type: RBA; Volts: 230; Amps: 30.

Pool, Montford Point Continued

(1) Indicator, Rate of flow
Name: Permutit; Manufacturer: The Permutit Company, New York, New York.
(2) Valve, Gate; Influent; Crane,
6 inches; 6DD; 45234; 200 WOG.
(3) Valve, Gate; Effluent; Crane,
8 inches; FS DD; 45235; 200 WOG.

(g) Meter
Name: Venturi meter Menometer; Manufacturer: Iron Foundry Company,

Number: 53269; Size: 10 X 5.

(h) Wash Water Pit
Size: 5½ X 9½; Capacity:
(1) Valve, Gate; Wash Water Outlet; Mueller Company, Chattanooga, Tenn.; 10 inches; 2-20; Float operated butterfly valve.
(2) Valve, Gate; Waste Water Outlet Valve; Mueller Company, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA; Float operated butterfly valve.

(i) Valve, Gate; Filtered Water Outlet;(Going to top of Pool)
10 inches;

(j) Valve, Gate; Filtered Water Outlet; (Going to bottom of Pool); Mueller Company, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA.

(k) Two Pumps, Condensate
Name: Aurara; Manufacturer: Aurara Pump Company,
Serial No. 115B78253;
(1) Motor, Electric
Name: Westinghouse; Manufacturer: Westinghouse Electric Corporation Beaver, Pa.
Serial No. 19848; Style: 1077858-X; Type: CS; Frame: 254; HP: 5;
RPM: 1750; Volts: 208; Amps: 3.2; Cycles: 60; Phase: 3.
(aa) Switch, Electric Safety
Name: Trumbull; Manufacturer: The Trumbull Electric Manufacturing Company, Plainville, Conn.
Catalogue No. 66321; Type: RBA; Volts: 230; Amps: 30.
(bb) Switch, Electric
Name: Westinghouse; Manufacturer: Westinghouse Electric Corporation, Beaver, Pa.
Class: 11200-S12; Mech. Style: 967224D.

Name: Aurara; Manufacturer: Aurara Pump Company,
Serial No. 115B78253BF;
(1) Motor, Electric
Name: Westinghouse; Manufacturer: Westinghouse Electric Corporation Beaver, Pa.
Serial No. 26043; Style: 1077858-X; Type: CS; Frame: 254; HP: 5;
RPM: 1750; Volts: 208; Amps: 3.2; Cycles: 60; Phase: 3.
(aa) Switch, Electric Safety
Name: Trumbull; Manufacturer: The Trumbull Electric Manufacturing Company, Plainville, Conn.
Catalogue No. 66321; Type: RBA; Volts: 230; Amps: 30.

Pool, Montford Point Continued Bldg.#M-139

(s) Pump, Chemical Feed Number Three (Soda Ash)
Name: Milton Roy; Manufacturer: Milton Roy Pump, 1300 East Mermaid Avenue, Philadelphia, Pa.
Model No. MD 1 1A574P; Pressure: 50; Stroke: 3; Job No. 3654 6; Pat. No. 2263429.

Pool, Montford Point Continued Bldg.#M-139

(s) Pump, Chemical Feed Number Three (Soda Ash)
Name: Milton Roy; Manufacturer: Milton Roy Pump, 1300 East Mermaid Avenue, Philadelphia, Pa.
Model No. MD 1 1A574P; Pressure: 50; Stroke: 3; Job No. 3654 6; Pat. No. 2263429.

Water Treatment and Pumping Plant Bldg.#178 Montford Point

Pool, Montford Point Continued Bldg.#M-139

(bb) Switch, Electric
Name: Westinghouse: Manufacturer: Westinghouse Electric Corporation, Beaver, Pa.
Class: 11200-S12; Mech. Style: 967224D.

(3) Valve, Gate; Influent; Mueller Company, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA. (Cold Water Inlet Valve)

(4) Valve, Gate; Effluent; Mueller Company, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; Awwa. (From Heater to bottom of Pool)

(5) Valve, Gate; Effluent; Mueller Company, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA; (From Heater to top of Pool)

(l) Ammoniator (not in use)
Name: Wallace and Teirnan; Manufacturer: Wallace and Teirnan Incorporated, 25 Main Street, Belleville 9, New Jersey.
Serial No. N4972; Direct feed Ammoniator.

(m) Chlorinator Cost: $255.00
Name: Fischer and Porter; Manufacturer: Fischer and Porter Company, County Line Road, Warminister, Pennsylvania.
Number: A631053; Capacity: 1-50 pounds; Vacmum feed.

(n) Fan, Exhaust
Name: American; Manufacturer: American Blower Corporation,

Serial No. 11617; Model No. 150-B-1.

(1) Motor, Electric
(It has been removed)

(o) Tank, Alum Mixing (Not in use)
Size: 4 feet 4 inches deameter, 3 feet 4 inches deep.

(p) Tank, Soda Ash Mixing
Size: 3 feet 5 inches diameter, 3 feet 6 inches deep.

(q) Pump, Chemical Feed Number One (Soda Ash)
Name: Milton Roy; Manufacturer: Milton Roy Pump, 1300 East Mermaid Avenue, Philadelphia, Pa.
Model No. MD 1 1A2 74; Pressure: 50; Stroke: 3; Job Nol 3654 3; Pat No. 2263429.

(1) Motor, Electric
Model Motor: 5KH45AB854A; Model Gear: 7GW712DT1; Gear Speed: 74; Gear Ratio: 25 . 5; HP: 1/6; Volts: 115; Motor Speed: 1725; Phase: 1 Cycles: 60 Amps: 2.6; Temp. Rise: 55°C; Temp. Rate: Cont.

(aa) Switch, Electric
Thumb

(r) Pump, Chemical Feed Number Two (Soda Ash)
Name: Milton Roy; Manufacturer: Milton Roy Pump, 1300 East Mermaid Avenue, Philadlphia, Pa.
Model No. MD 1 1 A574P; Pressure: 50; Stroke: 3; Job No. 3654 4; Pat. No. 2263429.

(1) Motor, Electric
Model Motor: 5KH45AB854A; Model Gear: 7GW712DT1; Gear Speed: 74; Gear Ratio: 25 . 5; HP; 1/6; Volts: 115; Motor Speed: 1725; Phase: 1 Cycles: 60; Amps: 2.6; Temp. Rise: 55°C; Temp. Rate: Cont.

(aa) Switch, Electric
Thumb

Water Treatment and Pumping Plant Bldg.#178 Montford Point

Pool, Montford Point Continued Bldg.#M-139

(bb) Switch, Electric
Name: Westinghouse: Manufacturer: Westinghouse Electric Corporation, Beaver, Pa.
Class: 11200-S12; Mech. Style: 967224D.

(3) Valve, Gate; Influent; Mueller Company, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA. (Cold Water Inlet Valve)

(4) Valve, Gate; Effluent; Mueller Company, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; Awwa. (From Heater to bottom of Pool)

(5) Valve, Gate; Effluent; Mueller Company, Chattanooga, Tenn.; 6 inches; PATD; 300 Test; AWWA; (From Heater to top of Pool)

(l) Ammoniator (not in use)
Name: Wallace and Teirnan; Manufacturer: Wallace and Teirnan Incorporated, 25 Main Street, Belleville 9, New Jersey.
Serial No. N4972; Direct feed Ammoniator.

(m) Chlorinator Cost: $255.00
Name: Fischer and Porter; Manufacturer: Fischer and Porter Company, County Line Road, Warminister, Pennsylvania.
Number: A631053; Capacity: 1-50 pounds; Vacmum feed.

(n) Fan, Exhaust
Name: American; Manufacturer: American Blower Corporation,

Serial No. 11617; Model No. 150-B-1.

(1) Motor, Electric
(It has been removed)

(o) Tank, Alum Mixing (Not in use)
Size: 4 feet 4 inches deameter, 3 feet 4 inches deep.

(p) Tank, Soda Ash Mixing
Size: 3 feet 5 inches diameter, 3 feet 6 inches deep.

(q) Pump, Chemical Feed Number One (Soda Ash)
Name: Milton Roy; Manufacturer: Milton Roy Pump, 1300 East Mermaid Avenue, Philadelphia, Pa.
Model No. MD 1 1A2 74; Pressure: 50; Stroke: 3; Job Nol 3654 3; Pat No. 2263429.

(1) Motor, Electric
Model Motor: 5KH45AB854A; Model Gear: 7GW712DT1; Gear Speed: 74; Gear Ratio: 25 . 5; HP: 1/6; Volts: 115; Motor Speed: 1725; Phase: 1 Cycles: 60 Amps: 2.6; Temp. Rise: 55°C; Temp. Rate: Cont.

(aa) Switch, Electric
Thumb

(r) Pump, Chemical Feed Number Two (Soda Ash)
Name: Milton Roy; Manufacturer: Milton Roy Pump, 1300 East Mermaid Avenue, Philadlphia, Pa.
Model No. MD 1 1 A574P; Pressure: 50; Stroke: 3; Job No. 3654 4; Pat. No. 2263429.

(1) Motor, Electric
Model Motor: 5KH45AB854A; Model Gear: 7GW712DT1; Gear Speed: 74; Gear Ratio: 25 . 5; HP; 1/6; Volts: 115; Motor Speed: 1725; Phase: 1 Cycles: 60; Amps: 2.6; Temp. Rise: 55°C; Temp. Rate: Cont.

(aa) Switch, Electric
Thumb

DEPARTMENT OF THE NAVY
BUREAU OF
YARDS AND DOCKS

NAVDOCKS
SPECIFICATION
NO. 47371
ADDENDUM NO.3

WATER TREATMENT FACILITIES, MONTFORD POINT

at the

Marine Corps Base, Camp Lejeune, N. C.

SECTION 1. GENERAL CLAUSES

1-08. Drawings accompanying specification. - Add the following sub-paragraph:

"(b) Additional changes to drawings. - Additional changes will be made to the drawings as described hereinafter. Prints of the revised drawings will not be issued at this time, but the drawings will be revised and new prints issued after the award of the contract.

Y&D Dwg. No.	Title/Revision
646699	Equipment Layout and Process Piping (1) The Plan and Section AA will be revised to indicate an orifice meter in the raw water supply line between the air release valve and the 1" pipe connection to solenoid valve. This meter is to actuate the raw water chlorinator."

SECTION 2. EARTHWORK

2-15. Seeding. - At the beginning of this paragraph, insert, "Areas specified to be covered with topsoil shall be seeded."

SECTION 15. PLUMBING

15-03. Fixtures

(b) In the first line, delete, "outfit No. EK30GF," and insert, "outfit No. EK24GF."

SECTION 17. MECHANICAL EQUIPMENT

17-03. Chlorinators. - In the first line after, "manually adjustable," insert, "pedestal type."

Encl (1)

(a) The equipment, etc. - At the end of this sub-paragraph, add the following: "The raw water chlorinator shall be actuated by connection to the orifice meter in the raw water supply main within the building. The treated water chlorinator shall be actuated by connection to the venturi tube in the Treated Water Meter Vault outside the building."

NOTICE

Each bidder shall refer in his bid to all addenda, failure to do so may consstitute an informality in the bid.

Camp Lejeune, N. C. 26 January 1956

W. SIHLER
RADM (CEC) USN
Officer in Charge of Construction
Fifth Naval District

FOR:

ROBERT H. MEADE
RADM (CEC) USN
Chief of Bureau of Yards and Docks
Department of the Navy

DEPARTMENT OF THE NAVY
BUREAU OF
YARDS AND DOCKS

NAVDOCKS
SPECIFICATION
NO. 47371
ADDENDUM NO.3

WATER TREATMENT FACILITIES, MONTFORD POINT

at the

Marine Corps Base, Camp Lejeune, N. C.

SECTION 1. GENERAL CLAUSES

1-08. Drawings accompanying specification. - Add the following sub-paragraph:

"(b) Additional changes to drawings. - Additional changes will be made to the drawings as described hereinafter. Prints of the revised drawings will not be issued at this time, but the drawings will be revised and new prints issued after the award of the contract.

Y&D Dwg. No.	Title/Revision
646699	Equipment Layout and Process Piping (1) The Plan and Section AA will be revised to indicate an orifice meter in the raw water supply line between the air release valve and the 1" pipe connection to solenoid valve. This meter is to actuate the raw water chlorinator."

SECTION 2. EARTHWORK

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SECTION 15. PLUMBING

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17-03. Chlorinators. - In the first line after, "manually adjustable," insert, "pedestal type."

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NOTICE

Each bidder shall refer in his bid to all addenda, failure to do so may consstitute an informality in the bid.

Camp Lejeune, N. C. 26 January 1956

W. SIHLER
RADM (CEC) USN
Officer in Charge of Construction
Fifth Naval District

FOR:

ROBERT H. MEADE
RADM (CEC) USN
Chief of Bureau of Yards and Docks
Department of the Navy

Contract NOy-91281

DEPARTMENT OF THE NAVY
BUREAU OF
YARDS AND DOCKS

NAVDOCKS
SPECIFICATION
NO. 47371
ADDENDUM NO.2

WATER TREATMENT FACILITIES, MONTFORD POINT

at the

Marine Corps Base, Camp Lejeune, N. C.

SECTION 1. GENERAL CLAUSES

1-08. Drawings accompanying specification. - Add the following sub-paragraph:

(a) Changes to drawings. - Changes will be made to the drawings as described hereinafter. Prints of the revised drawings will not be issued at this time, but the drawings will be revised and new prints issued after the award of the contract.

Y&D Dwg. No.	Title/Revision
646694	Foundation and Floor Framing Plan and Details (1) This drawing will be revised to conform with Sketch No. 1 and Sketch No. 2, copies of which are attached.
646696	Floor Plans and Elevations (1) This drawing will be revised in accordance with Sketch No. 1 and Sketch No. 3, copies of which are attached.
646697	Sections and Details (1) This drawing will be revised in accordance with Sketch No. 1 and Sketch No. 2.
646699	Equipment Layout and Process Piping (1) This drawing will be revised in accordance with Sketch No. 1 and Sketch No. 2.

Y&D Dwg. No.	Title/Revision
646702	Interior Electrical (1) This drawing will be revised to serve relocations shown on Sketch No. 1.
646706	Yard Piping (1) The location of the pump discharge lines will be revised to conform to those shown on Sketch No. 1."

1-15. Rates of wages at the site. - Line 5, deleto "Secretary of Labor No. P-5334", and insert "Secretary of Labor No. P-8495".

From the "LIST OF WAGE RATES" attached to the specification delete "DECISION P-5334, 18 October 1955", and insert "DECISION P-8495, 29 December 1955".

SECTION 6. MISCELLANEOUS METALS.

6-04. Grating. - At the end of the subparagraph insert:"Grating shall be fabricated to fit around pipes prior to zinc-coating. Holes around valve bonnets shall be cut in the field."

SECTION 15. PLUMBING

15-02. Piping. - Add the following subparagraph:
"(f) Running traps shall be installed where indicated. Traps shall have double brass cleanouts."

SECTION 20. WATER PIPING

20-06. Valves

(c) Check valves. - In the second line after, "Class 150" insert "tilting disc".

NOTICE

Each bidder shall refer in his bid to all addenda, failure to do so may constitute an informality in the bid.

Camp Lejeune, N. C. 18 January 1956

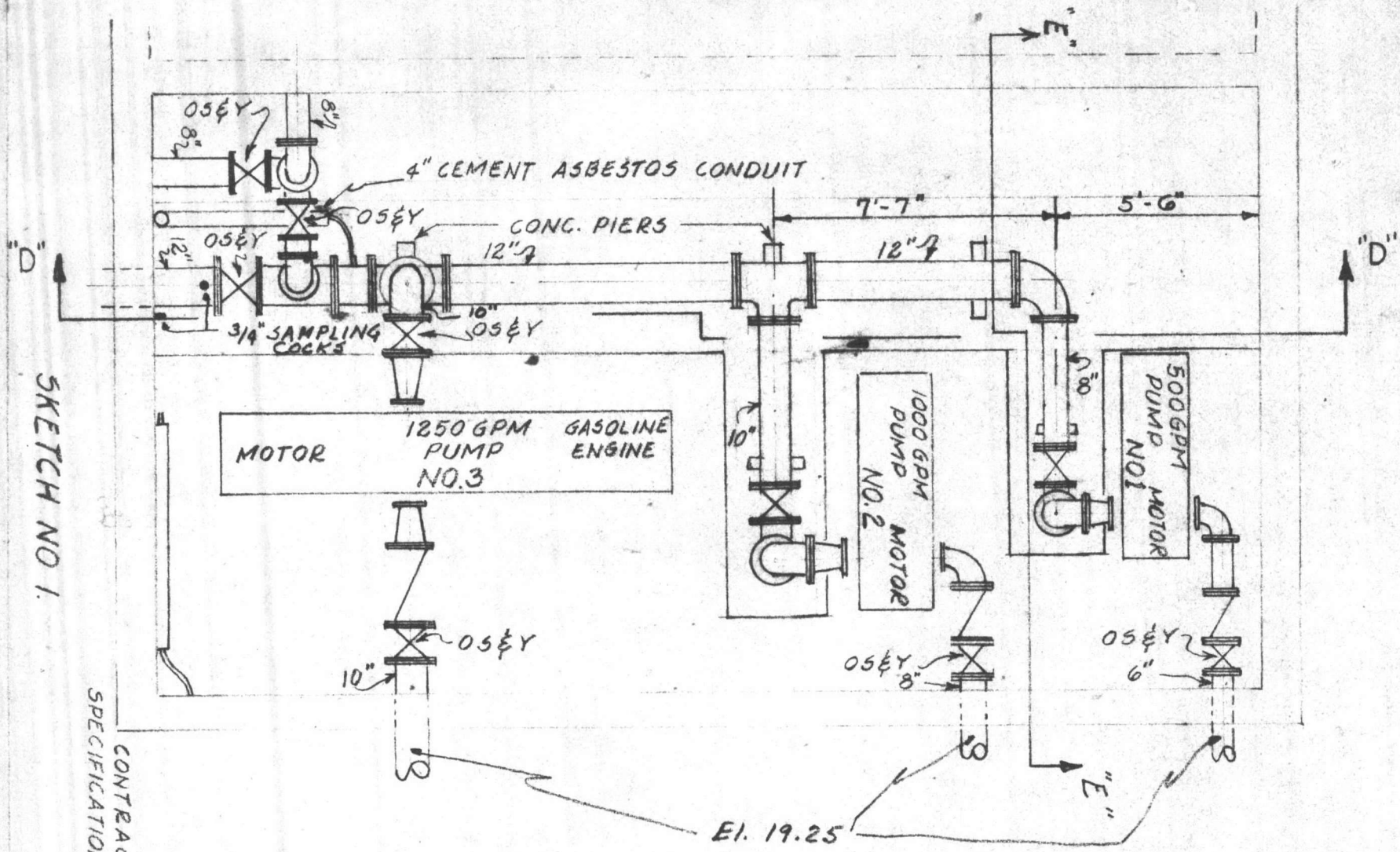
SPECIFICATION NO. 47371

W. SIHLER
RADM (CEC) USN
Officer in Charge of Construction
Fifth Naval District

FOR:

ROBERT H. MEADE
RADM (CEC) USN
Chief of Bureau of Yards and Docks
Department of the Navy

Contract NOy-91281

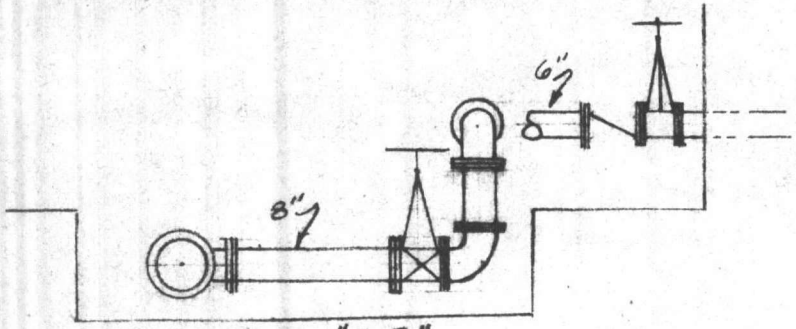


PLAN OF PUMP ROOM

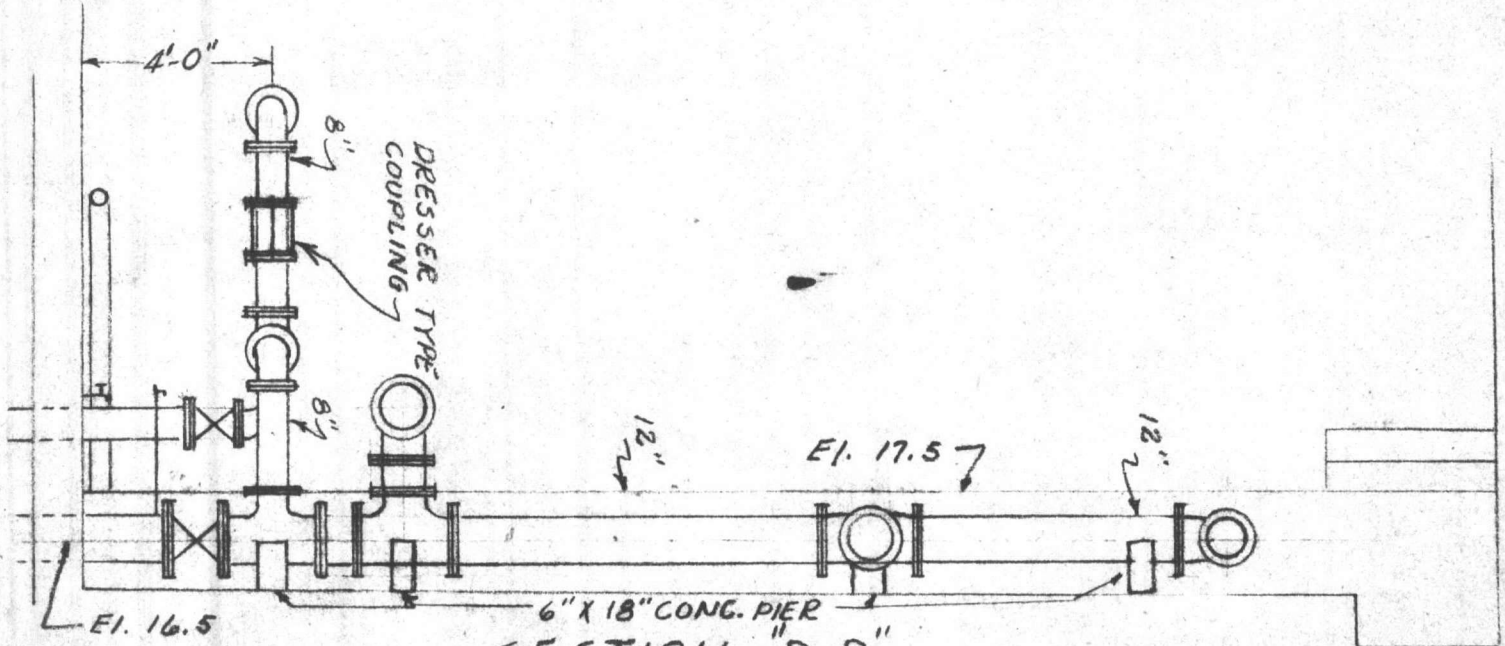
SCALE 1/4" = 1'-0

SKETCH NO 1.

CONTRACT NOy 91281
SPECIFICATION NO. 47371

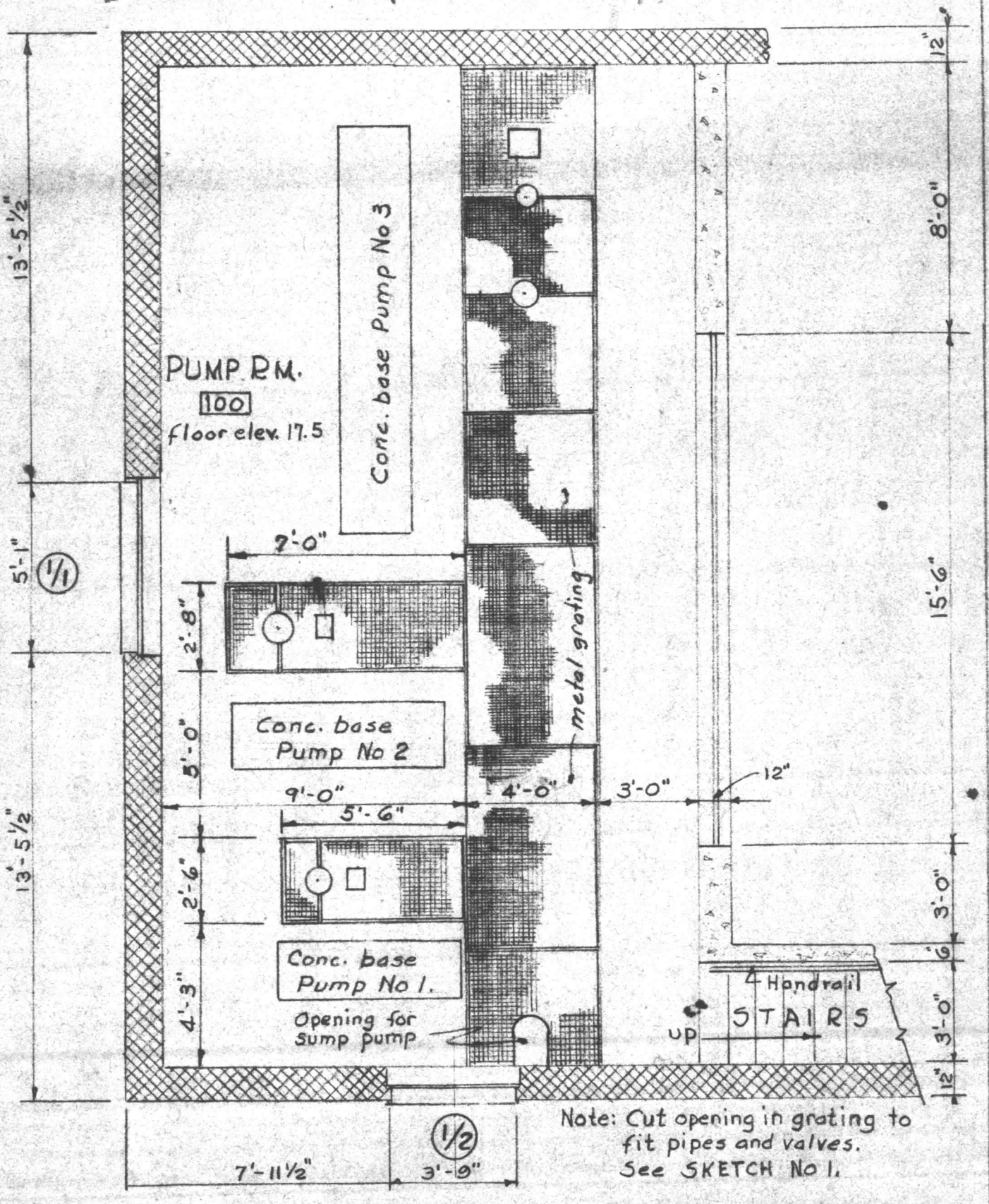


SECTION "E E"
SCALE 1/4" = 1'-0"



SECTION "D-D"
SCALE 1/4" = 1'-0"

SKETCH NO. 2 CONTRACT NO. 9128I SPEC. NO. 47371



Note: Cut opening in grating to fit pipes and valves. See SKETCH No 1.

PUMP ROOM PLAN

Scale ¼" = 1' 0"

SKETCH NO 3.

Cont No. 91281
Spec. No. 47371

DEPARTMENT OF THE NAVY
BUREAU OF
YARDS AND DOCKS

NAVDOCKS
SPECIFICATION
NO. 47371
ADDENDUM NO.1

WATER TREATMENT FACILITIES, MONTFORD POINT

at the

Marine Corps Base, Camp Lejeune, N. C.

SECTION 1. GENERAL CLAUSES

1-08. Drawings accompanying specification. - After Y&D Drawing No. "646699," insert, "Revision 'A'". After Y&D Drawing No. "646702," insert, "Revision '4'".

1-09. Standard specifications. - In line 8 of Page 6, delete, "MIL-V-19634," and insert, "MIL-V-18634." Add the following to the list of MILITARY (JOINT-ARMY-NAVY) Specifications:

"MIL-E-11275A	Aug. 1952	Engines, gasoline, industrial type, 1/2 through 100 BHP general specifications, including Amendment No. 1.
MIL-S-16293C	Apr. 1955	Strainers, sediment, pipeline, water, air, gas, oil, or steam.
MIL-P-17552	Mar. 1953	Pump, centrifugal, water, horizontal, general service or boiler feed.
MIL-L-18145	Dec. 1954	Louver, metal, exhaust opening-gravity closing type."

Add the following to the list of FEDERAL Specifications:

"RR-G-661a	Jan. 1936	Gratings, steel, floor (except for naval vessels)"

SECTION 17. MECHANICAL EQUIPMENT

17-02. Water softening equipment. - At the end of the paragraph, insert, "Waste piping and influent and effluent piping between cast iron headers shall be galvanized wrought iron pipe conforming to Specification No. WW-P-441b. Brine piping shall be as specified in Paragraph 3.9.3. of Specification HIV-W-17121B." After sub-paragraph (p) Sumps, insert, "(q) Salt storage tank is not required."

SPECIFICATION NO. 47371

NOTICE

Each bidder shall refer in his bid to all addenda; failure to do so may constitute an informality in the bid.

Camp Lejeune, N. C. 4 January 1956

W. SIHLER
RADM (CEC) USN
Officer in Charge of Construction
Fifth Naval District

For:

ROBERT H. MEADE
RADM (CEC) USN
Chief of Bureau of Yards and Docks
Department of the Navy

Contract NOy-91281

NOTICE:
Bids to be opened at 2:00 P. M.
EST, 3 February 1956, at the Public
Works Office, Marine Corps Base,
Camp Lejeune, North Carolina

NAVDOCKS
SPECIFICATION
NO. 47371

WATER TREATMENT FACILITIES, MONTFORD POINT

at the

Marine Corps Base, Camp Lejeune, N. C.

CONTRACT NOy-91281

Appropriation: 17X1205 PWN 1956

A priority rating, in consonance with the rating system in effect at the time of award of this contract, will be issued by the Bureau of Yards and Docks.

CONTENTS

SECTION 1. GENERAL CLAUSES

1-01. General intention. - It is the declared and acknowledged intention and meaning to provide and secure water treatment facilities, Montford Point, complete and ready for use.

1-02. General description. - The work includes the construction of a water treatment plant approximately 32 feet by 46 feet with concrete foundations and floor slabs, concrete masonry exterior walls and interior partitions, steel roof trusses with wood decking and asphalt shingles, plumbing, heating, electrical work, softening equipment, chlorinators, high left pumps, meters, recording water level gauges and control equipment; 400,000 gallon concrete reservoir and piping work including valves and fittings; alterations and extensions to raw water supply system; extensions to the existing water distribution system; together with exterior electric and steam lines, paving, fencing and drainage work.

1-03. Location. - The work shall be located at the Marine Corps Base, Camp Lejeune, North Carolina, approximately as shown. The exact location will be indicated by the Officer in Charge.

1-04. Form of contract. - The contract will be executed on U.S. Standard Form No. 23 revised March 1953, and will include U. S. Standard Form 23A, March 1953, General Provisions, and NavDocks Form 113, revised October 1954. Additional General Provisions, with the following modifications:

(a) Clause 19 of Form No. 23A is deleted and the following is substituted therefor:

"19. NONDISCRIMINATION IN EMPLOYMENT

"In connection with the performance of work under this contract, the contractor agrees not to discriminate against any employee or applicant for employment because of race, religion, color, or national origin. The aforesaid provision shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of the non-discrimination clause.

"The contractor further agrees to insert the foregoing provision in all subcontracts hereunder, except subcontracts for standard commercial supplies or raw materials."

(b) The phrase "including connection charges" is inserted after the word "utilities" in the fifth sentence of Clause 43, Government Utilities of Form No. NavDocks 113.

(c) Paragraph (d) of Clause 28 NavDocks 113 is deleted and the following is substituted therefor:

(1) "Accident Prevention. - In order to provide safety controls for protection to the life and health of employees and other persons; for prevention of damage to property, materials, supplies, and equipment; and for avoidance of work interruptions in the performance of this contract; the contractor shall comply with all pertinent provisions of the Publication "Safety Requirements" (Revised 1951) prepared by the Department of the Army, Corps of Engineers, U.S. Army, and published by the U. S. Government Printing Office, and as may be amended, and shall also take, or cause to be taken, such additional measures as the Officer-in-Charge of Construction may determine to be reasonably necessary for the purpose.

"The contractor and his subcontractors shall maintain an accurate record of and shall report to the Officer-in-Charge of Construction in the manner and on the forms prescribed by the Officer-in-Charge, exposure data and all accidents resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies and equipment incident to work performed under this contract.

"The Officer-in-Charge of Construction will notify the Contractor of any non-compliance with the foregoing provisions and the action to be taken. The contractor shall, after receipt of such notice, immediately correct the conditions. Such notices, when delivered to the contractor or his representative at the site of the work, shall be deemed sufficient for the purpose.

"If the contractor fails or refuses to comply promptly, the officer in charge of construction may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop order shall be made the subject of claim for extension of time or for excess costs or damages to the contractor. The contractor will be responsible for insuring that his subcontractors comply with the provisions of this Clause."

1-05. Performance and payment bonds, executed on U. S. Standard Form Nos. 25 and 25A, respectively, will be required as stipulated in U. S. Standard Form No. 20, revised March 1953, Invitation for Bids.

1-06. Time for completion. - The entire work shall be completed within 180 calendar days after date of receipt of a notice of award or any other communication authorizing the contractor to proceed.

1-07. Damages for delay in accordance with Clause 5 of U. S. Standard Form No. 23A shall be at the rate of $85.00 per calendar day. The Government will take no action pursuant to Clause 5, Liquidated Damages, to terminate the right of the contractor to proceed or to assess liquidated or actual damages where the failure of the contractor to complete the work within the time specified elsewhere in this contract is due solely to the operation of the priorities and allocations system and not otherwise caused by the fault or negligence of the contractor. It is understood and agreed that such delays will be considered an act caused by the Government and as such will be excusable within the meaning of Clause 5, and the contractor will be entitled to a time extension by reason thereof.

1-08. Drawings accompanying specification. - The following drawings accompany this specification and are a part thereof. Drawings are the property of the Government and shall not be used for any purpose other than that contemplated by the specification.

Y & D Drawing No.	Title
646692	Location Plan and Index
646693	Site, Grading and Drainage Plan
646694	Water Plant, Foundation and Floor Framing Plan and Details.
646695	Water Plant, Brine Storage Tanks Plan and Miscellaneous Details.
646696	Water Plant, Floor Plans and Elevations
646697	Water Plant, Sections and Details
646698	Water Plant, Roof Framing Plan and Truss Details.
646699	Water Plant, Equipment layout and Process Piping
646700	Water Plant, Plumbing and Drainage System.
646701	Water Plant, Heating.
646702	Water Plant, Interior Electrical
646703	400,000 Gallon Reservoir, Plan and Sections.
646704	400,000 Gallon Reservoir, Sections and Details
646705	400,000 Gallon Reservoir, Piping
646706	Yard Piping
646707	Drainage, Paving and Fencing Details
646708	Steam Distribution System, Plan and Details
646709	Control System
646710	Exterior Electrical
646711	Raw Water Supply and Distribution System

Y & D Drawing No.	Title
646712	Raw Water Supply System, Main "A"
646713	Raw Water Supply System, Main "B"
646714	Water Distribution System and Sanitary Sewer

1-09. Standard specifications. - The standard specifications given in the following list or mentioned elsewhere herein (including the addenda, amendments, and errata listed) shall govern in all cases where references to standard specifications are made. In case of difference between these standard specifications and this specification or its accompanying drawings, this specification or its accompanying drawings shall govern. Especial care shall be exercised to refer in request for quotations, in orders, and in subcontracts to the standard specifications and to all modifications thereof. The requirements for packaging, packing, marking, and preparation for shipment or delivery included in the standard specifications shall apply only to materials and equipment which are furnished directly to the Government and not to materials and equipment which are to be installed by the contractor.

BUREAU OF YARDS AND DOCKS

4Ye	Jan. 1953	Portland cement concrete pavement (except for airplane traffic).
7Yg	Jan. 1934	Roofing, siding, and sheet metal work; damproofing and membrane waterproofing; including addendum No. 2.
9Yf	Oct. 1946	Electrical apparatus, distributing systems, and wiring; including addendum No. 1
10Yc	Jan. 1938	Metal Windows
13Yd	June 1951	Concrete construction, including addendum No. 1 and errata No. 1 thereto.
21Yc	June 1940	Installation of power-plant, heating, and ventilating apparatus and piping.
22Yc	May 1955	Structural Steel work
27Yb	May 1939	Screens (for doors, windows, transoms, and porches).
28Yc	Oct. 1944	Carpentry and Joinery.
31Yc	Sept 1947	Interior plumbing systems.
34Yb	Apr. 1943	Bituminous coatings of steel surfaces.
37Ya	Nov. 1951	Steam-heating and ventilating systems.
42Ya	May 1947	Manholes and frames and covers.

MILITARY (JOINT-ARMY-NAVY)

MIL-C-490A	May 1954	Cleaning and preparation of Ferrous and zinc-coated surfaces for organic protective coatings.
MIL-I-2781B	Sep 1954	Insulation pipe covering, thermal.
MIL-F-16081B	Sep 1954	Fans, exhaust, electric, (for) wall or window

MILITARY (JOINT-ARMY-NAVY) CONTINUED

MIL-W-17121B	Mar. 1955	Water softener unit, zeolite pressure type
MIL-C-17226A	Mar. 1954	Chlorinator, water purification, gas-solution type, with accessories.
MIL-U-17691	July 1953	Unit heater, air-circulating, steam-hot water.
MIL-H-18032	June 1955	Fittings, pipe, butt-welding, ferrous metal
MIL-T-18112	June 1954	Traps, steam, bucket, float, impulse and return; and air vents, fleet and thermostatic.
MIL-V-18436	Jan. 1955	Valves, check.
MIL-P-18472	May 1955	Pumps centrifugal, condensate, feed booster
MIL-V-19634	Apr. 1955	Valves, safety relief (shore use).

FEDERAL

DD-G-451a	Jun. 1951	Glass, flat and corrugated, for glazing, mirrors and other uses, including Amendment No. 1.
FF-B-575	May 1955	Bolts, hexagon and square
FF-H-106a	Dec 1952	Hardware, builders; locks and door-trim, including amendment No. 1
FF-H-111a	Mar. 1955	Hardware, builders'; shelf and miscellaneous, including amendment No. 1.
FF-H-116b	Oct 1947	Hardware, builders'; hinges (nontemplate), including amendment No. 2
FF-H-121c	Jun. 1954	Hardware, builders', door-closing devices.
HH-F-191a	Nov. 1954	Felt; asphalt-saturated (for) flashings, roofing, and waterproofing, including amendment No.2.
HH-G-76b	May 1955	Gaskets, asbestos metallic cloth
HH-I-521c	Dec. 1948	Insulation, building, mineral-wool; batts, loose-fill, and granular-fill, including amendment No.1.
HH-P-387	Jun 1946	Pipe-covering, mineral-wool (molded-type and blanket-type for heated pipes).
QQ-B-71a	Apr. 1949	Bars, reinforcement, for concrete, including Amendment No. 3.
QQ-I-716	Nov. 1948	Iron and steel, sheet, zinc-coated (galvanized), including Amendment No. 3.
QQ-L-156	Nov. 1946	Lead, caulking, including Amendment No. 1.
QQ-S-00693A	May 1953	Steel, sheet, hot-rolled, including Amend. No. 1.
QQ-S-741	Apr. 1941	Steel, structural (including welding) and rivet, for bridges and buildings, including Amend. No.3
QQ-S-775	Mar. 1955	Steel, sheet, zinc-coated, including Amendment No.1
RR-F-183	Nov. 1949	Fence-post, Gates and accessories, incl. amend.No.1
RR-F-191a	Apr. 1955	Fencing; chain-link fabric.
RR-F-221b	Mar. 1953	Fencing (barbed wire, woven wire, and wire netting)
RR-S-141a	Aug. 1952	Screening, wire, insect.
SS-A-706b	Nov. 1943	Asphalt, for use in road and pavement construction
SS-B-656	Jun. 1932	Brick, building (common) clay.

FEDERAL (CONTINUED)

SS-C-153	Aug. 1953	Cement, bituminous, plastic
SS-C-181c	May 1955	Cement; masonry, including amendment No. 1.
SS-C-192a	Apr. 1954	Cements; portland, including amendment No. 1
SS-C-621	May 1935	Concrete-Units, masonry, hollow, including Amend. No. 1.
SS-C-731a	Nov. 1948	Crushed-stone, crushed-gravel, and crushed-slag; for bituminous-concrete-base or surface-course, including amendment No. 2.
SS-L-351	Oct. 1930	Lime, hydrated, for structural purposes.
SS-P-351a	Oct. 1953	Pipe, asbestos-cement
SS-P-361a	Jan. 1953	Pipe clay, sewer, including amend. No. 1.
SS-Q-351	Aug. 1930	Quicklime, for structural purposes.
SS-S-71a	Aug. 1942	Sand, for use in sheet-asphalt or bituminous-concrete pavements.
TT-C-598	Jul. 1951	Compound, caulking; plastic (for masonry and other structures), including amendment No. 2
TT-E-508	Jul. 1953	Enamel; interior, semi-glass, tints and white, including amendment No. 4.
TT-E-543	Oct. 1949	Enamel - Undercoat, interior, tints and white.
TT-P-21	Aug. 1951	Paint; cement-water, powder, white and tints (for interior and exterior use), Including Amend. No.2
TT-P-25a	Aug. 1951	Primer, paint, exterior (undercoat for wood, ready-mixed, white and tints), including Amend. No. 1
TT-P-56b	Feb. 1954	Primer coating (primer-sealer), pigmented oil, plaster and wallboard.
TT-P-86a	Apr. 1951	Paint; red-lead-base, ready-mixed, including Amend. No. 1
TT-P-102	Jul. 1953	Paint (titanium-lead-zinc and oil, exterior, ready-mixed, white and light tints), including Amend. No. 2
TT-P-781a	Jul. 1943	Putty and elastic-compound, for metal-sash glazing, including Amendment No. 1.
TT-P-791a	Jul. 1943	Putty, pure-linseed-oil, for wood-sash glazing, including amendment No. 1.
TT-V-51a	Aug. 1951	Varnish; asphalt, including amendment No. 1.
WW-H-171	Feb. 1955	Hangars and supports, pipe.
WW-H-191	Jun. 1954	Heaters, water, instantaneous, (steam-water-convertor type)
WW-P-401	Jul. 1951	Pipe and pipe-fittings; soil, cast-iron, including amendment No. 3.
WW-P-406	Jun. 1945	Pipe; steel and ferrous alloy (for) ordinary uses (iron pipe size), including amend. No. 1.
WW-P-421a	Mar. 1955	Pipe, cast-iron, bell-and-spigot, water
WW-P-441b	Dec. 1953	Pipe, wrought iron (welded, black or zinc-coated), including amendment No. 1.
WW-P-501b	Sep. 1945	Pipe-fittings, cast-iron (screwed), 125 and 250 pound.

FEDERAL (CONTINUED)

WW-P-521b	Sep. 1945	Pipe-fittings; malleable iron (screwed) 150-pound
WW-P-541b	Sep. 1954	Plumbing fixtures, land use.
WW-V-51a	Jun. 1954	Valves, bronze; angle, check and globe, 125- and 150-pound, screwed and flanged (for land use), including amendment No. 2
WW-V-54	Jun. 1954	Valves, bronze, gate; 125- and 150-pound, screwed and flanged (for land use), including amend.No.2.
WW-V-58	Sep. 1946	Valves, cast-iron, gate 125- and 250-pound, screwed and flanged (for land use), including amend.No.1

NON-GOVERNMENT

NOTE: Non-government standards are not available for distribution by the Department of the Navy; application thereto should be made to the issuing organization.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS
Standard method T 99-49, T 147-49
Desig. M 17-42, M 41-49

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

AMERICAN IRON AND STEEL INSTITUTE

AMERICAN STANDARDS ASSOCIATION
Specification A21.10-51
Specification and Dimensions for Wood Poles.

AMERICAN SOCIETY FOR TESTING MATERIALS
Specification No. A-82.

AMERICAN WOOD PRESERVERS ASSOCIATION
Manual of Recommended Practices

AMERICAN WATER WORKS ASSOCIATION
Standard specifications: C 500-52T, C 601-48

COMMERCIAL STANDARDS
CS-73-48, CS-120-46

GOVERNMENT SAFETY CODE

NATIONAL ELECTRICAL LIGHT ASSOCIATION
Specification No. E-209-22

NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION

NATIONAL BOARD OF FIRE UNDERWRITERS

1-10. "General specification for inspection of material" (issued by the Navy Department) with such appendices thereto as may be applicable, of the issues in effect on the date of the invitation for bids, shall govern for the factory inspection of materials and equipment required under the contract including materials and equipment specified in detail herein or covered by standard specifications. (See also clause 9 of U. S. Standard Form No. 23A). Factory inspection of material and equipment for which tests at the place of manufacture are required may be waived at the option of the Government, provided notarized copies of factory test reports are furnished which show compliance with the specification requirements. Factory inspection will not be required for lumber provided it is grade-marked and trade-marked by the association under whose rules it is graded, or provided it is accompanied by certificates of inspection issued by the association under whose rules it is graded or by another inspection agency which is satisfactory to the officer in charge.

1-11. Optional requirements. - Where a choice of materials and/or methods is permitted herein, the contractor will be given the right to exercise the option unless stated specifically otherwise.

1-12. Definitions. - Where "as shown", "as indicated", "as detailed", or words of similar import are used, it shall be understood that reference to the drawings accompanying this specification is made unless stated otherwise. Where "as directed", "as required", "as permitted", "approved", "acceptance", or other words of similar import are used, it shall be understood that the direction, requirement, permission, approval of acceptance of the officer in charge is intended unless stated otherwise. As used herein, "provide" shall be understood to mean "provide complete in place", that is "furnish and install".

1-13. Samples. - The contractor shall submit for approval samples of the following and of such other materials and equipment as may be required whether mentioned specially herein or not: asphalt shingles and concrete blocks.

1-14. Drawings required of the contractor. - Before commencing the installation of any of this work, the contractor shall submit for approval and in accordance with Clause 29(f) of NavDocks Form No. 113 such drawings as may be required, including those showing:

(a) Shop drawings for structural steel roof framing and for reinforcing steel for reservoir; metal sash, metal doors and frames, hardware schedule listing manufacturer's name and stock number, miscellaneous steel and iron and wood cabinet.

(b) Manufacturer's data, descriptive literature, piping layout, electric diagram of automatic controls for softening equipment.

(c) Manufacturer's data, descriptive literature and piping layout for chlorination equipment and appurtenances.

(d) Manufacturer's data, descriptive literature and characteristic curves on high lift pumps, motors and gasoline engine; recording water level devices for reservoir and overhead tank including wiring diagram for automatic controls; propeller type water meter, recorder and appurtenances; ventura meter including recorder, piping layout and appurtenances; brine pumps including characteristic curve; back pressure regulating valve including wiring diagram for solenoid; pressure control switch for well control.

(e) Manufacturer's data and descriptive literature on valves and hydrants.

(f) Manufacturer's data and descriptive literature on finned tube assembly, unit heaters, control system, traps, strainers and pressure regulator valves in heating system.

(g) Shop drawings on gasoline storage tank and underground steam piping and conduit.

(h) Manufacturer's data on safety switches, disconnect switches, motor starters, breaker type panel, lighting fixtures and transformers.

1-15. Rates of wages at the site. - (See Clause 20 of U. S. Standard Form No. 23A). The contractor shall pay mechanics and laborers employed or working directly upon the site of the work wage rates not less than those contained in the wage determination decision of the Secretary of Labor No. P-5334 which is attached hereto. Any class of laborers and mechanics not listed in the Secretary's decision, which will be employed on the contract, shall be classified or re-classified by the contractor or sub-contractor conformable to the Secretary's decision subject to the approval of the contracting officer; the classification shall be submitted on Form NavDocks 1882 to the officer in charge for approval, prior to their employment in any work under the contract. In the event the interested parties cannot agree on the proper classification or re-classification of a particular class of laborers and mechanics to be used, the question shall be submitted through the contracting officer to the Secretary of Labor for final determination. Where differing rates are listed for the same trades according to the type of construction on which employed, their application shall be conformable to prevailing area practice, subject to the approval of the officer in charge.

(a) Required by Davis-Bacon Act. - The wage determination decision of the Secretary of Labor attached hereto is made a part of this contract solely for the purpose of setting forth the minimum hourly wage rates required to be paid by the Davis-Bacon Act and is not to be considered as a guaranty, warranty, or representation as to the wage determination decision, the wage rates therein, or the availability of labor at the wage rates indicated. Bidders are advised to make their own investigations, and to rely solely upon their own information, as to local labor conditions, such as wage rates necessary to attract labor, the length of the work day and work week, overtime compensation, health and welfare contributions, available labor supply and prospective changes or adjustments of wage rates in the area concerned which might affect operations under the contract. Under no circumstances shall any mistake in attaching the wage determination decision of the Secretary of Labor or in the determination or statement of the wage rates set forth therein, or the payment of higher wage compensation than set forth therein entitle the bidder to the cancellation of his bid or contract, to an increase in the contract price, or to other additional payment or recovery.

(b) Government right to change. - The Government reserves the right to change the wage determination decision attached to the specification or addendum, either before or after the award of this contract, in accordance with the latest wage determination decision applicable at the time of award of this contract under the regulations of the Secretary of Labor. Such change shall be made without liability upon the Government for any increase in the contract price or other additional payment or recovery.

(c) Apprentices employed pursuant to this determination of wage rates must be registered in a bona fide apprenticeship program registered with a State apprenticeship council recognized by the Federal Committee on Apprenticeship, U. S. Department of Labor; or if no such recognized council exists in a State, it shall mean a program registered with the Bureau of Apprenticeship, U. S. Department of Labor.

1-16. Work outside regular hours. - If the contractor desires to carry on work outside the regular hours or on Sundays or holidays, he may submit application to the officer in charge but shall allow ample time to enable satisfactory arrangements to be made by the Government for inspecting the work in progress. At night, he shall light the different parts of the work in an approved manner.

1-17. Security requirements. - No employee or representative of the contractor will be admitted to the site of the work unless he furnishes satisfactory proof that he is a citizen of the United States or if an alien, his residence within the United States is legal.

1-18. Hurricane protection. - Should hurricane warnings be issued, the contractor shall take every practicable precaution to minimize danger to persons, to the work, and to adjacent property, these precautions shall include closing all openings; removing all loose materials, tools, and/or equipment from exposed locations; and removing or securing scaffolding and other work.

1-19. Approval of samples, cuts, and drawings. - Matter submitted for approval shall be accompanied by complete information concerning the material, articles, and/or design proposed for use in sufficient detail to show compliance with the specification; and shall be approved before incorporation into the work. Approval thereof will not be construed as relieving the contractor of compliance with the specification, even if such approval is made in writing unless the attention of the officer in charge is called to the non-complying features by letter accompanying the submitted matter. Partial submittals, or submittals of less than the whole of any system made up of interdependent components, will not be considered.

1-20. Methods and schedules of procedure. - The work shall be executed in a manner and at such times that will cause the least practicable disturbance to the occupants of the buildings and the normal activities of the station. Before starting any work, the sequence of operations and the methods of conducting the work shall have been approved.

1-21. Operation of station utilities. - The contractor shall not operate nor disturb the setting of any valve in the station water system. The Government will operate the valves as required for normal conduct of the work. The contractor shall notify the officer in charge, giving reasonable advance notice, when such operation is required.

1-22. Examination of premises. - Before submitting proposals, bidders are expected to visit and inspect the site of the work and satisfy themselves as to the physical conditions at the site; the general and local conditions, including availability of labor, the nature and extent of the work; the character and effect of existing adjoining and/or adjacent work; the other factors that can affect the cost of the performance of the contract to the extent that such information is reasonably obtainable.

1-23. Protection and repairs. - The contractor shall comply with the Fire Prevention Requirements, as published by the officer in charge of construction, security rules and regulations of the activity, and shall provide approved means necessary for the protection of all Government and private property, including contents of buildings affected directly or indirectly by his operations. All damage to Government or private property, resulting directly or indirectly from the contractor's actions, shall be made good by him without expense to the Government.

1-24. Existing work damaged or otherwise affected by the contractor's operations shall be restored to a condition as good as existed before the work was commenced, except where indicated or specified otherwise. Where new construction adjoins, connects to, or abutts the existing work, the junction shall be made in a substantial workmanlike and weathertight manner as the case requires. All new work shall match, as nearly as practicable, the existing adjoining and/or adjacent similar work unless indicated otherwise. Except where specifically designated as being retained by the Government or to be reinstalled in the new construction, all materials, fixed equipment and/or debris resulting from demolition and removal operations shall be removed by the contractor from the limits of the Government reservation at such times during the progress of the work as directed.

1-25. Accident reports. - The contractor and his sub-contractors shall maintain an accurate record of, and shall report to the officer in charge, exposure data and all accidents resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, and equipment incident to work performed under the contract. The report shall be in accordance with the pamphlet entitled "Instructions to Contractor for Preparation of Accident Reports, NavDocks P-275" and shall be submitted on the standard form prescribed therein; the pamphlet and the required forms will be furnished by the officer in charge.

1-26. Payrolls and affidavits. - The prime contractor, subcontractors, and sub-sub-contractors will be required to submit a copy of each weekly payroll together with a Notarized Contractor's Weekly Payroll Affidavit covering the payroll to the officer in charge of construction within seven days after the regular payment date of the payroll period. The receipt of these payrolls and affidavits is made a condition precedent to payment for any amounts due under the contract.

(a) The payroll shall be identified by the name of the contractor, NOy-Contract Number and the location of the site of the work. Payrolls shall state accurately and completely for each employee, his name, classification, social security number, rate of pay, daily and weekly hours worked, wages earned, all deductions from such wages and the actual weekly wages paid. Contractors are required to submit employees addresses with the payroll on which the employee's name first appears.

(b) Contractor's Weekly Payroll Affidavit (NavDocks Form 118) (1-55) which must be used shall be reproduced by the contractor for his use. This form combines the required payroll affidavit and certification of payrolls. In order to provide uniformity with regard to information, contractors are advised to list by title, or name, all deductions made, omitting from the listing the dollar amount of the deductions.

(c) A sworn affidavit accomplished by the contractor, stating that he and his sub-contractors have complied with the Labor Standards provisions of the contract, must accompany each request for reimbursement. Affidavit form will be furnished by the officer in charge of construction.

1-27. Schedule of prices. - Upon award of the contract, the contractor shall promptly prepare Y&D Form 83 "Schedule of Prices", in octuplicate and submit to the officer in charge of construction. Submission of these prices shall not affect the contract terms. These forms will be furnished by the officer in charge of construction.

1-28. Sub-contractors and personnel. - Promptly after the award of the contract, the contractor shall submit to the officer in charge of construction in triplicate, a list of his sub-contractors and the work each is to perform together with the sub-contract price.

(a) On this form shall appear the names of the key personnel of the contractor and sub-contractors, together with their home addresses and telephone numbers, for use in event of an emergency.

(b) From time to time as changes occur and additional information becomes available, the contractor shall amplify, correct and change the information contained in previous lists.

1-29. Lines and grades required for execution of the work shall be established by the contractor.

1-30. As-built drawings. - On completion of the work, one print of each of the drawings accompanying this specification shall be neatly and clearly marked in red to show all variations between the construction actually provided and that indicated or specified in the contract documents, and delivered to the officer in charge. Where a choice of materials and/or methods is permitted herein; and where variations in the scope or character of the work from the entire work indicated or specified is permitted either by award on bidding items specified for that purpose or by subsequent change to the contract; the as-built drawings shall define the construction actually provided. The representation of such variations shall conform to standard drafting practice and shall include such supplementary notes, legends, and details as may be necessary for legibility and clear portrayal of the as-built construction; the marked prints shall be subject to approval before acceptance.

1-31. Quarantine. - The entire Camp Lejeune reservation, including Camp Lejeune, Camp Geiger, and Marine Corps Air Facility, Peterfield Point (New River) have been quarantined by the United States and North Carolina Departments of Agriculture for the White Fringed

Beetle. Compliance with the quarantine regulations established by these authorities as set forth in the U.S.D.A. Quarantine No. 72 and North Carolina State Quarantine No. 7 is required for operations hereunder. Pertinent requirements of the quarantines include the following:

(a) Certification is required for the following articles and they shall not be moved from the reservation unless accompanied by a valid inspection certificate issued by an authorized White Fringed Beetle Inspector.

1. Soil, sand, or gravel moved independently or attached to other articles, such as heavy equipment including drag lines, road grading machines, ditch diggers, bulldozers, and equipment with tracks or cleats.

2. Nursery stock, plants and sod.

3. Scrap metal.

Authorization for movement of equipment shall be obtained from the officer in charge, and requests for inspection shall be made sufficiently in advance of the date of movement to permit arrangements for the services of authorized inspectors. The equipment shall be prepared and assembled so that it may be readily inspected. Articles and materials requiring certification for movement shall be removed from the equipment by washing with water and such other means as are necessary to accomplish complete removal. Resulting spoil shall be wasted as directed.

SECTION 2. EARTHWORK

2-01. Elevations and obstructions. - Bids shall be based on the following:

(a) that the surface elevations are as indicated;
(b) that no pipes or other artificial obstructions, except those indicated, will be encountered; and
(c) that hard material will not be encountered.

In case the actual conditions differ substantially from those stated and/or shown, the provisions of Clause 4 of U. S. Standard Form No. 23A respecting an adjustment for changed conditions shall apply, subject to the requirement of notification thereunder being given. Hard material shall be defined as solid ledge rock, boulders more than one-half cubic yard in volume, or any cemented material requiring blasting for removal.

2-02. Topsoil. - Material from the excavation suitable for topsoil shall be deposited in piles separate from other excavated material. Piles of topsoil shall be so located that the material can be used readily for the finished surface grading in the areas designated for planting, and the topsoil shall be protected and maintained until needed. Topsoil shall be spread to a uniform thickness of four inches over the ground in the areas where the natural soil condition has been disturbed as a result of the operations of this contract and elsewhere within the project area as defined for clearing where the undistrubed soil is not suitable for planting. If sufficient topsoil cannot be secured from the project area site, it shall be secured from borrow pit less than 2 miles distant. Where used for finished grading of the surfaces to be planted to grass, topsoil shall be spread uniformly over the designated areas.

2-03. Clearing and Grubbing. -

(a) Clearing shall be performed within the entire project area which is defined as being within the area bounded by the asphalt pavement on the front or east side of the site and a line drawn five feet outside of fence line on the north, east, and south sides of site; and five feet each side of the center line on all underground off site utility lines.

(b) Pine trees over four inches in diameter, hardwood trees and natural shrubbery of ornamental value which do not interfere with the new construction shall be retained. The location of walks shall be shifted as directed where necessary to avoid removal of same. The entire area shall be staked out at the beginning of the work and trees selected to remain shall be marked and care shall be taken by the contractor to protect same from injury.

(c) Grubbing shall be performed within all areas previously designated for clearing and shall include the removal of all vegetation and other objectionable material under foundations regardless of depth, to a depth 12 inches below subgrade or under fill within the limits of construction of parking areas and walks, to a depth of 6 inches below trench bottoms and to a depth of 6 inches below subgrade or natural ground within remaining area.

(d) Disposal of cleared and grubbed material. -

(1) All trees from which saw logs, pulpwood, posts, poles or ties can be produced shall be considered merchantable timber. All merchantable timber shall be trimmed of limbs and tops and shall be sawed into merchantable lengths and stockpiled adjacent to the site in areas designated by the officer in charge.

(2) All shrubs, brush, stumps, matted roots, refuse and other objectionable material shall be burned within the cleared area, except that when permitted by the officer in charge, large stumps and other material that will not burn may be otherwise disposed of. Materials that will not burn will be considered debris and disposed of as outlined elsewhere in these specifications. All fires for burning refuse shall be at locations specified by the officer in charge and shall be tended in a manner to eliminate all hazards to buildings, structures, trees, and other property. The officer in charge shall be notified before fires are set. Disposal by burning shall be under constant attendance until the embers have burned out or have been extinguished.

2-04. Excavation. -

(a) General. - All materials shall be excavated to dimensions and levels indicated on the drawings or in these specifications. Where roots, stumps, or other materials have been removed or excavations carried below grade, the spaces shall be filled with clean, thoroughly compacted earth except that when excavations for building foundations or concrete structures are carried below grade the spaces shall be filled with concrete of the same class as that of the structure.

(b) Precautions shall be taken for the protection of existing electrical, sewer, water, and other existing utility lines containing existing services until disposition of such services has been made as described in other sections of this specification.

(c) Trenching. - Pipe trenches shall be excavated true to line and grade and of sufficient width to afford six inches clearance between trench wall and extreme outside dimension of the pipe.

In the excavation of pipe trenches, beds of clean, well-tamped earth shall be provided, so placed as to insure that the full length of the pipe barrel is supported by a firm but slightly yielding bed.

(d) Trench backfill. -

(1) As soon as practicable after the pipe has been installed and joints have acquired a suitable degree of hardness, backfilling of the trench shall begin and shall thereafter be prosecuted expeditiously. The space between pipe and sides of the trench shall be packed full by hand shovel with selected sand and thoroughly compacted with hand tamper as fast as placed up to a level one foot above top of pipe. The fill shall be placed uniformly on both sides of the pipe and neither horizontal nor vertical alignment of the pipe shall be disturbed.

(2) The remainder of the trench shall be filled with clean earth free from vegetation or other objectionable material, and compacted as directed, either by puddling, rolling or mechanical tamping dependent upon the method best suited to the materials, sufficiently to prevent subsequent settlement.

(3) Puddling. - If backfill material is compacted by puddling, it shall be done by depositing the material in water. Where dams or dikes are constructed in trench to hold back water used for puddling, they shall be compacted by mechanical tamping as described below.

(4) Rolling. - If backfill material is compacted by rolling, a satisfactory roller or a tractor with caterpillar tread shall be used after the trench has been filled, care being exercised to compact thoroughly the material close to the bank as well as that in all other portions of the trench.

(5) Mechanical tamping. - Where impractical to compact by other methods and under all roadways, service drives, sidewalks, and other travelled areas, the backfill material shall be compacted by mechanical tamping. Clean, refuse-free material shall be placed in six inch layers and each layer thoroughly tamped with an approved mechanical tamper. If required, material shall be wet by sprinkling before rolling or tamping.

(6) Whatever method is used, care shall be taken that lumps shall not become nested and that all voids between lumps shall be completely filled with fine material. No large masses of backfilling material shall be dropped into the excavation, as from a grab bucket, in such manner as to disturb pipe or structure.

(e) Drainage during construction. - During excavation operations, the work shall be kept shaped and drained at all times. Drains and ditches to insure proper drainage shall be installed as required.

(f) Slopes. - All slopes shall be uniformly dressed to the lines shown on the drawings or called for in the specifications, or as directed, and the work left in a finished, neat, and acceptable condition. Open drainage ditches shall be finished to a tolerance of 0.1 of a foot above or below the grades shown on the drawings.

2-05. Shoring and pumping. - Excavations shall be shored and braced by numbers of suitable sizes and arrangement where necessary to prevent danger to persons or structures, injurious caving or erosion. Shoring, bracing, and sheeting shall be removed, as the excavations are back-filled, in a manner such as to prevent injurious caving. Excavations shall be kept free from water while construction therein is in progress.

2-06. Embankment. - Where shown on the drawings, embankments are to be formed to the lines, grades and elevations indicated.

(a) All depressions or holes below the ground surface, whether caused by grubbing or otherwise, shall be backfilled with suitable material and compacted to the ground surface before construction of embankment will be permitted to start.

(b) Preparation of subgrade. - Immediately prior to the placing of fill materials, the entire area upon which embankment is to be placed shall be scarified and harrowed to a depth of 6 inches. Scarifying shall be done approximately parallel to the axis of the fill. All roots, stones, or other objectionable material that would cause interference with compaction of the fill shall be removed and disposed of, as directed. A thin layer of fill material (approximately 3 inches thick) shall be spread over the scarified foundation and compacted to the required density.

(c) Material. - Embankments shall be formed of approved material spread in horizontal layers for the widths approved by the officer in charge of construction. The material shall be placed in successive layers not to exceed 12 inches of loose thickness and shall be compacted to a density of 90 percent as determined by compaction test specified hereinafter.

(d) Slopes. - All slopes shall be trimmed neatly to the lines shown on the drawings, and all work shall be left in a finished, neat, and acceptable condition.

(e) Maintenance of embankment. - The contractor, shall be responsible for the stability of all embankments and shall replace all sections which have been damaged or misplaced due to the carelessness or neglect on the part of the contractor or due to natural cuases other than those attributable to the unavoidable movement of the natural ground upon which the embankment is made until completion of the work.

2-07. Filling, backfilling and grading. -

(a) Immediately prior to the placing of fill material, the entire area of original ground under concrete slabs which are to be placed on fill shall be scarified and harrowed to a depth of 6 inches. All roots, stones, or other objectionable material that would interfere with compaction of the fill shall be removed and disposed of as directed. A layer approximately 3 inches thick of fill material shall be spread over the scarified foundation and compacted to the required density.

(b) Sand and gravel fill shall be provided under interior floor slabs on ground. Fill shall be not less than six inches thick and shall consist of a four inch base layer of gravel and a two-inch top layer of sand. The fill shall be compacted so that it will provide an unyielding base. All materials shall be clean; the sand shall be sharp and coarse; and the gravel shall be well-graded from fine to coarse, shall be retained on a No. 4 screen, and pass a $1\frac{1}{2}$ inch diameter ring.

(c) Material for fill and backfill shall be free from vegetable matter and refuse, and the moisture content shall be such that proper compaction will be obtained. Fill and backfill under concrete slabs shall be placed in successive layers not more than 6 inches thick when compacted, and shall be compacted to a density of 95 percent, as determined by compaction test specified hereinafter.

(d) All backfill about the structures shall be placed, as far as practicable, as the work of construction progresses, except that backfilling against foundation walls shall be done only when directed.

(e) Finished site grading in all cases shall conform to the grades shown on the drawings. Local variations above or below the grades shown on the drawings will be acceptable provided the variations represent unavoidable waves in the surface and not sharply defined hollows or high spots. All grades shall be sloped to drain surface water away from structures. Abrupt changes in slopes shall be rounded. All work shall be left in a finished, neat and acceptable condition for subsequent operation.

2-08. Compaction tests. -

(a) Wherever in the specifications percentages of density are called for, the percentages actually obtained shall be measured by in-place density tests made in accordance with A.A.S.H.O. Standard Method T 147-49.

(b) The in-place densities actually obtained shall equal or exceed the percentages of laboratory maximum densities at optimum moisture content, as determined in accordance with A.A.S.H.O. Standard Method T 99-49.

(c) Samples of all materials for testing, both before and after placement and compaction, will be taken at frequent intervals and if the degree of compaction obtained is not as specified, additional compaction will be required.

2-09. Borrow. - If borrow is required, it shall be taken only from approved locations. Borrow pits shall be so excavated that drainage is provided and shall not be left in unsightly or unsanitary condition. Maximum soil borrow haul shall not exceed two miles.

2-10. Disposal of surplus material. - Surplus material not required or unsuitable for fill, or grading shall be wasted as directed; waste haul shall not exceed two miles.

2-11. Subgrade. - Necessary traffic over the subgrade of paved or seeded areas shall be so distributed as to avoid the formation of ruts. Any ruts formed in the subgrade shall be removed by alternate filling and blading. Subgrade of areas to be seeded is defined as four inches below finish grade.

2-12. Priority of installation. - Where utility lines, foundations, or other subsurface structures are sufficiently close that excavation for one might disturb another, the lower shall be installed first. No change in grade or alignment shall be made to protect the contractor from the consequences of failure to observe this provision.

2-13. Drainage ditches. - The contractor shall schedule his operation in such a manner as to avoid pocketing water within the construction area and shall provide for the disposition of rainfall and/or runoff as rapidly as conditions permit. As far as possible he shall provide the designed drainage facilities in advance of the grading work and shall make every reasonable effort to maintain a dry grade. Ditches shall be excavated true to line, grade and cross-section. Unsuitable materials shall be removed and replaced with clean well-tamped earth.

2-14. Pavement cuts. - Wherever necessary, pavement may be carefully cut to permit the installation of any type utility. Trenches shall be cut on straight lines to a minimum width of 12" and a depth of not less than 24". After the utility has been installed, trenches shall be backfilled with clean, refuse-free material placed in 6" layers with each layer thoroughly tamped with a mechanical tamper. No broken concrete or macadam shall be used in the backfill; such materials may be used in the rock base course as directed. The top 8" of the trench shall be crushed stone, crowned over 1" above the existing surface and left open to traffic for a minimum of 30 days before placing the asphalt top. Material from the broken pavement cuts suitable for stone surfacing shall be deposited in piles separate from other excavated material. Piles of stone surfacing shall be located so that the material can be used readily for the finished surfaced grading and shall be protected and maintained until needed. Broken asphalt or concrete of un-usable size, larger than passing a 3" ring, shall be hauled to a government dump, a distance not exceeding 2 miles from the site of the work.

2-15. Seeding. - The quality of all fertilizer, lime and seed and all operations in connection with the furnishing of this material shall comply with the requirements of the North Carolina Fertilizer, Lime and Seed Law; and with the rules and regulations adopted by the North Carolina Board of Agriculture in accordance with the provisions of said law.

(a) Seeding operations shall not be done if the completion of the work should occur after November 15 and before March 1, in this event the seeding shall be done by government forces during the next planting season and adjustment in the contract price will be made in accordance with Clause 3 of Standard Form 23-A.

(1) Lime and fertilizer shall be uniformly spread over the area and thoroughly disced, harrowed or raked into the top one and one-half inches of surface, and watered. The lime will be applied at the rate of 20 pounds per 1,000 square feet and fertilizer at the rate of 12 pounds per 1,000 square feet at least three days before seeding. The lime shall be an approved hydrated agricultural lime. The fertilizer shall be a ready-mixed fertilized or organic base bearing analysis of a recognized authority. Formula for the fertilizer shall be 6% nitrogen, 8% phospheric acid, and 6% potash. Both lime and fertilizer shall be delivered on the job in the manufacturer's container, plainly marked and unopened.

(2) The seed shall be delivered to the job in original containers showing the guaranteed seed mixture, which shall contain the following percentages by weight:

80% Bermuda Grass
20% Red Top (Herd Grass)

No seed in the mixture shall show a purity of less than 90% or germination equality of less than 85%. The seed shall be uniformly sown, at the rate of seven pounds per 1,000 square feet of area, by hand or approved seeding equipment. The surface of the seed bed shall be lightly raked or otherwise worked to cover the seed with a layer of soil, not more than one-fourth inch in depth, after which it shall be rolled with an approved lawn roller, weighing not more than two hundred ten pounds per foot of width, and watered with a fine spray.

(3) No lime, fertilizer or seed shall be applied when the wind is strong or when the soil is extremely wet or otherwise unworkable. No rolling shall be done if precipitation after seeding should make the operation detrimental to the seed bed. The contractor shall notify the officer in charge and receive his approval before performing any planting operation. All seeded areas shall be maintained by watering, mowing, and weeding for a period of thirty days after rolling has been completed.

SECTION 3. CONCRETE CONSTRUCTION

3-01. General requirements. - Concrete work, including reinforcing, shall conform to the applicable requirements of Specification No. 13Yd except as modified herein. Horizontal steel shall be returned eighteen (18) inches at corners. In addition to intermediate-grade billet steel reinforcement bars as covered in Specification No. 13Yd, hard billet steel and hard rail steel as covered by Federal Specification No. QQ-B-71a are acceptable for use as reinforcement bars; however, bending of hard grade bars shall be at temperatures above 60 degrees F. and welding of hard grade bars will not be permitted. Sidewalk construction is specified under another section.

3-02. Concrete for reservoir and brine tank construction. -

(a) Concrete for reservoir shall be air-entrained, class E-1. Concrete for salt storage tank shall be air-entrained, class F-1. Floor and wall of reservoir shall be placed in single pours respectively. Floors and walls of the salt storage tanks shall be placed monolighically. Internal vibrators shall be used for compacting all of the concrete.

(b) Forms. - Forms shall conform to paragraphs 4-01 and 4-02 of Specification No. 13Yd. Form ties shall be in accordance with paragraph 4-01 of Specification No. 13Yd, for watertight work.

(c) Placing and curing shall be in accordance with sections 6 and 7 of Specification No. 13Yd, except as specified otherwise herein. Under floor slabs, the subgrade shall be brought to a smooth surface compacted thoroughly and the entire subgrade under the slab shall be underlain with a single thickness of waterproof, reinforced craft paper immediately before the concrete is placed; all joints shall be lapped and sealed. The subgrade shall be maintained in a smooth condition during the time of the placing of the paper and concrete. Walls shall be placed in horizontal lifts not to exceed two (2) feet. The concrete shall be deposited at frequent intervals around the periphery. No temporary joints shall be allowed to become "cold" before the adjacent concrete is placed. The time interval shall not exceed forty-five (45) minutes. All concrete shall be water-cured for not less than fourteen (14) days. Floor of reservoir, after pouring, shall be kept saturated with water until walls have been constructed.

(d) Finishing shall be in accordance with paragraph 8-01 of Specification No. 13Yd, except as specified otherwise herein. A floated finish shall be provided for floor slabs; the surface of the slab shall be struck off true at the finish floor level; all surface water shall be removed and the surface floated to a smooth, hard, reasonably non-slip finish, using a wood float.

3-03. Concrete for building and miscellaneous structures. -

(a) Concrete shall be class D-1.

(b) Forms for exposed surfaces of the building foundation shall provide a special smooth finish in accordance with paragraph 4-03 of Specification No. 13Yd. Other forms shall conform to paragraph 4-02 of Specification No. 13Yd.

(c) Sub-grades. - Floor slabs shall be underlain with a single-thickness of waterproof, reinforced craft paper. All joints shall be lapped and sealed and the paper turned up into expansion joints two (2) inches. The earth under foundations and platform slabs shall be wetted, as directed, immediately before the concrete is placed.

(d) Expansion joints between vertical concrete surfaces and floor slabs laid on the earth shall be as shown on drawings and as described in Paragraph 2.13 and 6.05 of Specification No. 13Yd.

(e) Floor shall be dished 3/4 inch immediately at floor drains and the drains set to meet the dished portion.

(f) Surface finishes. -

(1) All exposed surfaces cast against forms shall be given a standard finish.

(2) All interior floor surfaces, except the recessed portion of processing room floor, sumps and trench, shall be given a light duty non-slip finish in accordance with paragraph 9-07a. The concrete shall be brought to final elevation in one lift, thoroughly compacted, and struck off. The aggregate shall be forced away from the surface and the slab floated and screeded to a true, level surface at the elevations indicated on the drawings. After the concrete has set sufficiently to support the weight of the equipment, excess surface water shall be removed and the surface compacted with a heavy power-driven rotary float of the metal disc type. Dry cement or cement aggregate mixtures shall not be sprinkled on the floor to absorb moisture. Following the compacting, and after water sheen has disappeared from the surface, the floor surface shall be troweled to a smooth, dense finish. Troweling shall be held to a minimum consistent with obtaining the desired finish. Concrete to be so finished shall not contain more than five gallons of water per sack of cement.

(3) Exterior steps and landings shall receive a light duty non-slip finish.

3-04. Materials installed in connection with the concrete work, including anchors, bolts and sleeves, shall be placed and secured in position when the concrete is poured.

SECTION 4. MASONRY

4-01. General requirements. - The contractor shall furnish all labor and materials necessary for the proper completion of the masonry work as indicated on the drawings and as specified herein.

4-02. Materials shall be delivered and stored and handled in a manner that will prevent inclusion of foreign materials or damage to the material.

(a) Brick shall be grade H conforming to Specification No. SS-B-656. Variations from the nominal dimensions, 2-1/4 inches x 3-3/4 inches x 8 inches, shall not exceed the tolerances given in Specification No. SS-B-656. All brick shall have true faces and straight, sharp edges and shall be so handled that exposed edges and faces shall be free from chips, spalls and cracks.

(b) Concrete blocks. - Concrete masonry units shall conform to the applicable requirements of Specification No. SS-C-621, except as may be modified by the drawings and/or this specification. The units shall be Type I, load bearing, smooth surfaced, cast from concrete weighing more than 100 pounds per cubic foot. The units shall be free from deleterious matter that will stain stucco, mortar, or paint or will corrode ferrous metal. All units for exterior walls shall be made by the same manufacturer.

(1) Moisture content of the units at time of delivery to the site and when laid up in the walls shall be not greater than 30 percent of the maximum absorption of the units when tested in accordance with Specification No. SS-C-621. Prior to delivery of the units, samples, selected at the manufacturer's plant by the officer in charge shall be tested by a recognized testing laboratory at the contractor's expense and certified test reports showing compliance with the specification shall be furnished to the officer in charge for approval. The number of samples shall be in accordance with Specification No. SS-C-621; the contractor shall identify and weigh the units in the presence of a representative of the officer in charge before shipment to the laboratory. The contractor will be required to certify that concrete masonry units delivered to the site have been manufactured, cured, and dried in the same manner as were the samples tested, and shall so arrange the plant storage that the officer in charge may readily determine that the lots from which samples were selected are being held in separate storage and are the units to be delivered to the construction site. Additional samples will be selected at random during the period of delivery to the site and at least twice each week during construction, and shall be tested by the contractor as specified above; the field samples will be taken at the approximate rate of one unit per each 2,000 and will be so selected that they are representative of the units currently being used. Field stockpiles represented by samples failing to comply with the moisture content limitation shall not be used until re-test indicates compliance.

(2) Age. - The units shall not be laid up within thirty (30) days after manufacture; acceptable evidence of the age of the units shall be furnished as directed.

(3) Protection from weather. - Masonry units at the job site shall be stored on a cribbing or other suitable platform that will prevent contact with the ground and provide ventilation under the stacks. The units shall be covered in storage with a tarpaulin or other waterproof material. Masonry in walls shall be kept similarly covered until completed and capped, while work on the specific section of wall is not in progress.

(c) Precast concrete for window sills shall be class G-0.75 concrete in accordance with the requirements of Specification No. 13Yd. Sills shall be reinforced as indicated and shall be set plumb, level and true to line. Soft wood, water-soaked, wedges shall be used to prevent crushing of mortar bed; they shall be removed before pointing. Faces of cast stone shall be kept free from mortar. All joints shall be brushed clean, wetted thoroughly and pointed flush; when initially set, they shall be finished with metal tool to form a dense, smooth concave surface without hair cracks or crevices.

(d) Precast lintels. - Concrete shall be Class E-1. Reinforcement shall be as shown on the details. Lintels shall be marked on the top and the lintel installed with the top surface up. Forms for cast in place lintels shall be true to line and elevation and shall be firmly supported by wood shoring. Shoring shall be kept in place for a period sufficient to permit the concrete to cure and gain sufficient strength to support all loads.

4-03. Mortar for brick and concrete-masonry unit work shall be mixed in the proportions by volume, of one part portland cement, one part lime paste, and six parts sand, or of one part masonry, cement and three parts sand. The aggregates shall be introduced and mixed in such a manner that the materials will be distributed uniformly throughout the mass, after which a sufficient amount of water shall be added gradually and the mass further mixed until a mortar of the plasticity necessary for the purposes intended is obtained. The mortar may be machined mixed in approved mixers of the type in which the quantity of water can be controlled accurately and uniformly. The mortar shall be used so that it will be in place before the initial setting of the cement has taken place; retempering of mortar in which cement has started to set will not be permitted. The color of the cement and sand used in the exposed exterior work shall produce, without the admixture of any coloring matter, a mortar of uniform shade.

(a) Portland cement shall be Type I conforming to Specification No. SS-C-192a.

(b) Masonry cement shall be Type II conforming to Specification No. SS-C-181c.

(c) Lime paste shall be made with pulverized quicklime or with hydrated lime, which shall be allowed to soak not less than 72 hours before use, except that hydrated lime processed by the steam method shall be allowed to soak not less than 12 hours, and shall be made by adding the lime to the water. In lieu of hydrated lime paste for use in mortar, the hydrated lime may, at the contractor's option, be added in the dry form. Pulverized quicklime shall conform to Specification No. SS-Q-351, and shall pass a No. 20 sieve, and 90 percent shall pass a No. 50 sieve; hydrated lime shall conform to the requirements as to chemical composition and finess given in Specification No. SS-L-351 and, in addition thereto, the total free (unhydrated) calcium oxide (CaO) and magnesium oxide (Mg O) in the hydrated product as delivered shall not exceed 8 percent. After being soaked for the period specified, the lime paste shall pass the test for plasticity given in Specification No. SS-L-351 for Type F lime.

(d) Sand shall be an approved grade, clean, and free from dirt, silt, organic matter, and other impurities.

(e) Water for mixing shall be fresh and clean, and free from excess acids, alkalies, and other deleterious matter.

4-04. Joints and coursing of walls. - Thickness of joints shall be 3/8 inch. All joints shall be tooled slightly concave. All vertical joints shall be staggered. Where anchor bolts and other ties occur within the cells of the units, such units shall be filled with mortar.

4-05. Joint reinforcement. - Longitudinal joint reinforcement shall be provided in horizontal joints in the exterior walls as follows:

(1) The joint located one course above concrete foundation walls.

(2) The joints located one and two courses below, and the joint located one and two courses above windows.

(3) The joint located one course above doors or other isolated openings. The reinforcing to extend 6 feet on either side of the opening or to a building corner, whichever is less.

(4) In additional intervening joints so that continuously reinforced joints are spaced not more than three courses apart.

The reinforcement, except as specified, shall be continuous around the entire periphery of the building, or to the jamb of an opening, as applicable. The reinforcement shall consist of two No. 9 U. S. Steel Wire Gauge side wires with laterally extending weld connected ties spaced not more than 16 inches apart, the lateral ties being designed to insure proper positioning of each longitudinal member continuously in the approximate center of its respective face shell mortar bed. The ties shall be so arranged that the thickness of the assembly does not exceed that of the main longitudinal wires. The reinforcement shall have a minimum of 5/8 inch protective cover after tooling of the joints. The reinforcement shall be lapped not less than 12 inches at splices, and shall be bent and lapped at corners. The wire shall be cold drawn, steel wire conforming to A.S.T.M., Specification No. A-82, except that the ultimate tensile strength shall be 100,000 psi. Breakage of welds between ties and main wires will be cause for rejection of any piece. The reinforcement assemblies shall be zinc-coated after forming.

4-06. Workmanship. - Units shall be so handled that their edges and faces will not be chipped, spalled, or cracked. All beds on which masonry is to be laid shall be cleaned and wetted properly. The work shall be built level, square, plumb, and true. All drilling, cutting, and fitting required by other work and for making good after such work shall be done as necessary. The first course of concrete-masonry units shall be laid in a full bed of mortar, for the full width of the unit. Concrete-masonry units laid with the cells vertical shall have the bed-joints formed by applying the mortar to the entire top surfaces of the inner and outer face shells and the head joints formed by applying the mortar for a width of about one inch to the ends of the adjoining units laid previously. The mortar for joints shall be smooth (not furrowed), and of such thickness that it will be forced out of the joints as the units are being placed in position. All joints between bricks shall be filled completely with fresh mortar. Bed joints shall be full, flat, and of uniform thickness; they shall not be furrowed. Cross joints shall be obtained by applying a full bed of mortar on the entire end of the stretcher or on the entire edge of the header to be laid, as the case requires, and then shoving the brick tightly against the brick already in place; the scrapings into the empty joints will not be permitted. Longitudinal joints within walls shall be formed as specified for cross joints, or may be formed by applying the mortar to the surfaces of the bricks previously laid, and then shoving the brick into place. Closure brick shall be laid with a bed joint and cross joints, and the brick shall be placed carefully without disturbing the brick previously laid.

4-07. Setting miscellaneous material. - All anchors, bolts, door and window frame, and all other material occuring in connection with masonry shall, where practicable, be placed and secured in position when the masonry is placed.

4-08. Cleaning. - Upon completion, all masonry work shall be pointed where necessary. All exposed surfaces of masonry work shall be scrubbed with water and soap and rinsed thoroughly with clean water. All other work that might be damaged, stained or discolored, shall be protected during the cleaning, and all work so affected by the process of cleaning shall be replaced.

SECTION 5. STRUCTURAL STEELWORK.

5-01. General requirements. - Structural steelwork including roof framing and incidental structural steel and fastenings shall conform to the applicable requirements of Specification No. 22Yc except as modified herein. Structural steel shall be Types I and II for riveted and welded work, respectively, and Grade B in accordance with Specification No. QQ-S-741 except that tolerances in rolling and cutting shall conform to the current editions of the manuals of the American Iron and Steel Institute.

5-02. Cement-mortar grout for setting steel bearing plates of roof framing members shall consist of equal parts of portland cement, sand and dry powder compound composed of specially prepared metallic aggregates combined with cement dispersing agents and reagents to promote oxidation and strength. Before grouting the masonry surface shall be cleaned thoroughly and the surface flushed with neat cement grout immediately before the cement-mortar is placed.

SECTION 6. MISCELLANEOUS METALS.

6-01. General requirements. - Miscellaneous steel and iron work shall be well formed as to shape and size and sharp lines and edges. Shearing and punches shall leave clean, true lines and surfaces. Materials shall be clean, free from mill scale, flake, rust and pitting. Steel shall be stock material of commercial quality. Cast iron shall be soft, tough, gray iron. All steel and iron work, except anchor bolts, shall receive a shop coat of red lead paint.

6-02. Anchors and fastenings. - Ties, anchors, and other miscellaneous fastenings shown, specified or necessary for the securing of the work in place shall be furnished and installed.

6-03. Thresholds shall be made of cast bronze of the pattern shown on drawings. All thresholds shall be set in mastic and fastened with expansion screws not more than three inches from ends and eight inches on centers between end screws.

6-04. Grating. - Steel grating for trench cover shall conform to Specification No. RR-G-661a, Type I, welded construction. Bearing bars shall be 1 inch by 1/8 inch spaced at 1 3/16 inches on centers. Grating shall be zinc-coated after fabrication.

6-05. Pipe railings shall be constructed of 1 1/2 inch diameter standard weight steel pipe. All joints and connections in railings shall be welded, without exposed fittings, and all changes in direction shall be rounded neatly. Posts shall be set into pipe sleeves and caulked securely with molten lead or sulphur. Slip joints shall be provided in railing where the removable portion is indicated. Substantial cast iron or steel wall brackets spaced not more than 5 feet apart shall be provided for the support of wall rails. Railings terminating at masonry surfaces shall have suitable flanges and shall each be fastened with toggle bolts or expansion bolts.

6-06. Metal ladder where shown shall be fabricated of sizes and to dimensions indicated, with flat mild steel side rails, and round steel rungs, with shouldered ends headed into and riveted to side of rails. Ladder shall be anchored at bottom, top and intermediate points not over 6 feet apart with brackets of same size as side rails and of proper length to hold ladder 6 inches away from wall; secure brackets to wall with expansion bolts.

6-07. Manhole steps shall be cast iron conforming to the applicable requirements of section 3-08 of Specification No. 42Ya.

SECTION 7. METAL DOORS AND FRAMES.

7-01. General requirements. - Doors shall be pressed steel construction of the panel and glazed type. Sheet steel for forming stiles and rails shall be not less than .0598 inch thick and sheets for panels not less than .0478 inch thick. Bottom rails shall be not less than 6 inches wide and all other rails and stiles shall be not less than $4\frac{1}{2}$ inches wide. Connections of rails and stiles shall be welded thoroughly and all corners reinforced internally, insuring against sag and weave. All welded joints shall be ground leaving a smooth finished surface. Reinforcement shall be provided where necessary for the proper installation of hardware and where necessary for strength or rigidity. Astragals shall be provided for double doors. Glazing stops shall be placed on the interior side of exterior doors.

7-02. Metal frames shall be formed as detailed and fabricated from cold-rolled steel not less than .0598 inches thick. All corners shall be mitered, welded the full length of the joint and ground smooth. Each jamb shall be anchored securely with anchors spaced not more than 2 feet on centers. All frames shall be reinforced as required for proper installation of hardware.

7-03. Shop painting. - All doors and frames shall receive a shop applied coat of baked-on rust-inhibiting paint.

7-04. Hardware shall conform to the applicable requirements of specification Nos. FF-H-106a, FF-H-111a, FF-H-116b and FF-H-121c. Hardware not specified otherwise shall have a U. S. 10 finish. Two keys shall be provided for each lock. Cylinder locks shall be master keyed and two master keys furnished. One flat brass key tag, approximately 1-1/8 inches in diameter, with brass chain shall be provided for each key. Tags shall be numbered as directed.

(a) Schedule

(1) Door 2/3 - shall have:
3 pair of butts, type $2080\frac{1}{2}$ P, 5" x 5"
1 lock set, type 86B - 4
1 chain bolt, type F1023A, 6" long
1 foot bolt, type F1023B, 6" long
2 stops, type 1329E

(2) Door 2/6 - shall have:
4 pair of butts, type $2080\frac{1}{2}$ P, 5" x 5"
1 lock set, type 86B-4
1 chain bolt, type F1023A, 6" long
1 foot bolt, type F1023B, 6" long
2 stops, type 1329E

(3) Door 2/10 - shall have:
1½ pair of butts, type 2080½ P, 5" x 5"
1 lock set, type 86B-4
1 stop, type 1329E

SECTION 8. METAL WINDOWS

8-01. General requirements. - Metal windows shall conform to the applicable portions of Specification No. 10Yc except as modified herein. Windows shall be constructed of commercial grade new billet steel, given an approved rust preventative treatment and equipped with all necessary hardware. All windows shall be commercial projected with ventilator projecting out. Loading tests will be waived in cases where the contractor furnishes satisfactory evidence, including affidavits from the sash manufacturer, that units of a similar type have met such tests.

8-02. Screens shall be provided on all windows, shall be removable type and conform to the requirements of Specification No. 10Yc. All screens shall be rewireable and shall have 16 mesh cloth type III conforming to Specification No. RR-S-141a.

SECTION 9. GLAZING

9-01. General requirements. - Glass shall conform to Specification No. DD-G-451a, where applicable. Putty for glazing wood doors and windows shall be Type II, conforming to Specification No. TT-P-791a. Elastic glazing compound, Type I, conforming to Specification No. TT-P-781a, shall be used for glazing metal sash and metal doors.

9-02. Obscure glass, Type IIIc, Pattern Class IV, unpolished, not less than 1/8 inch in thickness shall be used for glazing the window in toilet room.

9-03. Clear sheet glass for glazing the remaining windows shall be Type II, B quality, double strength, and 7/32 inch in thickness for glazing doors.

9-05. Workmanship. - All glass shall be accurately cut to fit the openings and shall be set with equal bearing on the entire width of the pane. Glass shall be properly bedded and backputtied and set without springing or forcing. Glass in doors shall be held in place with stop beads. Glass in windows shall be secured with glazing clips and puttied on a bevel. The corners in putty shall be carefully made and all excess putty shall be removed and surface cleaned. On completion, all dirt and stains shall be removed and the glass shall be washed.

SECTION 10. CAULKING

10-01. General requirements. - The work includes the caulking of all joints between the heads, jambs, and sills of all door, window, louver and other openings in exterior walls; and where indicated or necessary to provide weather-proof and water-tight construction. Unless otherwise specified, the caulking material shall be applied with a gun in an approved manner.

10-02. Caulking material shall be Grade 1, in accordance with Specification No. TT-C-598 and shall be nonstaining and approved light gray color.

10-03. Preparation of surfaces. - Joints and spaces to be caulked shall be thoroughly dry before the caulking compound is applied and the joints shall be freed from dust by swabbing with waste moistened with turpentine or mineral spirits. Where the joints or spaces are deeper than 3/4" they shall be filled solidly to within 3/4" of the face with oakum.

10-04. Application of caulking. -

(a) No caulking compound shall be installed when the temperature is below 40 degrees F.

(b) In all cases, all joints and spaces shall be filled completely with the caulking compound forming neat and smooth beads with the edges flush with the adjoining surfaces and with the beads not extending more than 1/4 inch out beyond the face of frames or moldings.

SECTION 11. CARPENTRY AND JOINERY

11-01. Materials and methods of application shall conform to the applicable requirements of Specification No. 28Yc, except as modified by the drawings and/or specification. Moisture content shall not exceed 19% for framing or 15% for finish items.

(a) Timber for roof framing and studding shall be No. 2 dimension short leaf southern pine.

(b) Lumber for roof and wall sheathing shall be No. 2 common short leaf southern pine.

(c) Lumber for exterior and interior trim shall be Grade C or better southern pine.

(d) Plywood for scuttle shall be Douglas Fir, plypanel grade.

(e) Lumber for wooden covers shall be No. 1 common grade of cypress.

11-02. Doors. - Interior swinging doors shall be Grade B Douglas Fir or Grade 2 Ponderosa Pine conforming to the requirements given in commercial standards CS-73-48 and CS-120-46 respectively. They shall be stock design and of the paneled or paneled and glazed type, except where specified otherwise. The doors shall be of water-resistant construction.

11-03. Screens. - Material and methods of construction shall conform to the applicable requirements of Specification No. 27Yb except as modified herein. Screen doors shall be Class I, type A. Screen door frames shall be 1-3/8" thick. Screens for door 2/3 shall be two panel type; screens for door 2/6 shall be three panel type. Wire panel guards shall be installed in lower panels of screen doors. Wire screen cloth, type III, conforming to Specification No. RR-S-141a. Hardware shall be as specified under the hardware section of this specification.

11-04. Asbestos cement board shall be composed of Portland cement and asbestos fibers formed into dense sheets; plain surfaced, light gray in color. Asbestos cement board shall be 3/16" thick. Joints shall be filled with non-staining caulking compound. Nailing shall be at 16 inches on centers, except that nails shall be spaced 8 inches on centers at all edges. Nails shall be cement coated.

11-05. Felt conforming to Specification No. HH-F-191a, type I, shall be applied over sheathing at gable ends.

11-06. Thermal insulation shall be installed over the entire ceiling of the building and shall be placed between ceiling joists. Insulation material shall conform to specification No. HH-1-521c, type I, class C, 15 inches wide in strip form. Insulation material shall have a minimum thickness of two inches.

11-07. Cabinet shall be of the size and style indicated on the drawings and shall be shop fabricated, or, at the option of the contractor, may be a manufactured product approximately of the size and arrangement shown. Plywood shall be used for all construction where practicable; it shall be interior grade A-B, except that for tops and other backing for laminated plastic, it shall be EXT-DFPA-A-B grade plywood with face veneers of birch, maple or other wood which is not susceptible to grain raising. Plastic counter top covering shall be a thermo-setting plastic laminate sheet of at least 1/16 inch thickness factory-bonded to wood counter with waterproof cement. Inside angles and exposed edges shall be trimmed with heavy gauge stainless steel mouldings. Plywood for tops and other backing for laminated plastic, shelves, doors, and drawer fronts shall be not less than 3/4 inch thick; drawer sides shall be not less than 1/2 inch thick; and drawer bottoms shall be not less than 1/4 inch thick. The drawer bottoms shall be let into the drawer sides and fronts not less than 1/4 inch. Hardware shall be as specified under another section of this specification.

SECTION 12. ROOFING AND SHEET METAL WORK

12-01. General requirements. - Materials and methods of installation shall conform to the applicable requirements of Specification No. 7Yg, except as specified otherwise herein.

12-02. Mineral-surfaced asphalt shingles shall be three tab square butt, standard or thick butt strip shingles, 12 inches by 36 inches and shall weigh not less than 250 pounds per 100 square feet. Shingles shall be laid with a 2-inch headlap, nailed with zinc-coated large-head roofing nails not less than 3/4 inches long. Two (2) nails shall be used per tab. Colors shall be blue-black. The wood roof sheathing shall be covered with one layer of felt weighing not less than 15 pounds per 100 square feet; the felt shall be lapped not less than 3 inches at all longitudinal joints and 6 inches at end joints and shall be secured along the edges with 3/4 inch zinc-coated roofing nails to hold the felt in place until the remainder of the roofing is laid. An additional strip of felt shall be laid continuously over the ridge of the roof.

12-03. Thru-wall flashing shall be copper weighing not less than 14 ounces per square foot. Flashing at door and window heads shall be at least 12 inches longer than opening width.

12-04. Gutter and downspouts. - Gutters shall be formed of 20 ounce copper and shall conform with applicable requirements of Section 3-03 of Specification No. 7Yg. Downspouts shall be formed of 16 ounce copper and shall conform to the applicable requirements of Section 3-05 of Specification No. 7Yg.

12-05. Pipes passing through the roof shall be flashed to conform with applicable requirements of Paragraph 3-17 of Specification No. 7Yg.

12-06. Sheet metal for covering wood manhole covers shall be zinc-coated sheet steel in accordance with the requirements of paragraph 1-23 of specification 7Yg and shall be type A, class 5, specification no. QQ-S-775. Flashing shall be applied in accordance with the applicable requirements of paragraph 3-17 of specification no. 7Yg.

SECTION 13. FINISH, HARDWARE

13-01. General requirements. - All hardware necessary for the complete finish of the building shall be furnished and installed and shall conform to the applicable requirements of Specification Nos. FF-H-106a, FF-H-111a, FF-H-116b and FF-H-121c. Hardware not specified otherwise shall have a U. S. 10 finish except that finish in toilet shall be U. S. 26.

13-02. Schedule. -

(a). Doors 102, 103, 105, and 106, each shall have:
1½ pair of butts, type 2014½ P, 4½" x 4½"
1 lock set, type 86N-5

(b) Screen doors for openings 2/3 and 2/6 - each shall have:
3 pair of butts, type 2010½ P, 4" x 4"
2 closers, type 3010
2 pulls, type 436
4 push bars, type 472A
2 kick plates, type 1226

(c) Cabinet shall be provided with the following:
Doors shall have 1 pair of semi-concealed hinges 1 friction catch, type 1074 and one pull type 1306D. Drawers shall have 1 pull, type 1306D, set horizontally.

SECTION 14. FIELD PAINTING

14-01. General requirements. - Surface to be painted shall include all work installed under the contract except exterior and interior concrete surfaces, copper metal work and all work concealed above the ceiling. Paint shall be applied to dry and thoroughly clean surfaces and shall be worked thoroughly into all joints, crevices and open spaces. Surfaces shall be free of rust, dirt, loose and disintegrated paint and scale before the field coats are applied. Finish surfaces shall be smooth, even and free of defect. The number of paint coats specified for new work shall be in addition to the shop coat. At least 24 hours shall elapse between coats. Color and shade of colors shall be as selected by the officer in charge. All zinc-coated surfaces shall be given a special primer before application of the field coats specified hereinafter. The touch-up of shop and factory finish coats is included in the work.

14-02. Materials shall be in accordance with the standard specifications listed; those not covered by special standards shall conform to the requirements given hereinafter and shall be of approved brands. Paints and materials therefor shall be delivered in unbroken original packages bearing the manufacturer's name and brand designation. Paints containing both linseed oil and varnish shall be mixed immediately prior to use and shall not be stored. Four notarized copies of paint formulae which show compliance with specifications shall be furnished the officer in charge of construction.

(1) Exterior oil paint — TT-P-102 Type A

For dark shades, the pigment composition given in Specification No. TT-P-102 shall be changed to the following:

	Percent by weight	
	Maximum	Minimum
White lead	----	30
Zinc Oxide	----	25
Color and extender pigments	45	----
Organic colors	none	----
Sulfide sulphur	none	----

(2) Wood primer, exterior — TT-P-25a
(3) Red-lead-primer for metal surfaces — TT-P-86a, Type I
(4) Portland cement paint — TT-P-21
(5) Paint; primer-sealer, plaster & wallboard — TT-P-56b
(6) Enamel-undercoat, interior — TT-E-543
(7) Enamel; interior, semi-gloss — TT-E-508
(8) Varnish, asphaltic — TT-V-51a

14-03. Exterior painting -

(a) Exterior concrete masonry surfaces shall receive two coats of portland cement paint as specified hereinafter.

(1) Preparation of surfaces. -

(1a) Surface cleaning. - Dirt, dust, form oil, and other loose or objectionable matter shall be removed. The surface shall be hosed with clean water and brushed where necessary to insure cleaning. Form oil may be removed with lye solutions, with abrasive stones, or steel brushes or combinations thereof, or by light sandblasting.

(1b) Removing glaze. - Surfaces that are extremely dense and impervious (glazed) shall be acid washed, lightly sandblasted, or dry rubbed with coarse grit abrasive stones until the glaze is removed and a positive "tooth" and suction for the paint are provided.

(1c) Wetting of surface. - Before applying paint the masonry shall be thoroughly wetted to control surface suction and provide a reserve of moisture to aid in curing the paint. A garden hose nozzle adjusted to a fine spray is adequate for the purpose. Dampening with a brush dipped in water is not acceptable. The masonry shall be dampened in one operation not more than one hour nor less than thirty minutes before painting. The spray shall be applied in such manner that each part is sprayed three or four times for about ten seconds, time being allowed between applications for the water to soak into the surface. If the surface tends to dry rapidly, as in hot weather, it shall be redampened slightly just in advance of painting. The surface shall be moist but without free water when paint is applied.

(2) Mixing of paint. - The proportion of powder to water shall be as recommended by the manufacturer, but shall be subject to the approval of the officer in charge. The final coat shall have the consistency of rich cream, and shall be mixed in the proportion by volume of approximately one part water to one part powder. The first coat may be very slightly thinner to obtain some penetration. The paint shall be mixed as recommended by the manufacturer and shall be allowed to soak for thirty to forty-five minutes prior to application. No paint shall be applied more than four hours after mixing, and if it contains calcium chloride and the weather is hot, it shall be used sooner as directed. The batches shall be kept in tightly covered containers when not in use, and shall be kept vigorously stirred to uniform color and consistency during application.

(3) Application. - No painting shall be done when the paint may be exposed to temperatures below forty degrees F. within forty-eight hours after application. The paint shall be applied in two coats of the same color; the application shall be at the rate of not less than one gallon per fifty square feet for the two coats. Paint shall be scrubbed into the surface with short, stiff fiber bristle brushes. Coverage shall be uniform and laps well brushed out. At least twenty-four hours shall elapse between coats, and in no case shall the second coat be started until the first coat has become so hard that it cannot be marked with the brushes used. In hot weather, the first coat shall be slightly moistened before applying the second coat.

(4) Curing. - Between coats and for at least two days following the final coat, the painted surfaces shall be sprinkled three times per day with the same fog spray used for dampening the surfaces before painting.

(b) Exterior wood work, including screen doors and putty shall receive one coat of wood primer and two coats of exterior oil paint.

(c) Exterior ferrous metal. - The shop applied prime coat shall be touched up with red-lead primer and given two coats of exterior oil paint.

14-04. Interior painting. -

(a) Masonry walls and cement asbestos board. - Masonry walls shall be neutralized with a solution consisting of four pounds of zinc sulphate to one gallon of water. The solution shall be allowed to dry at least forty-eight hours following which all loose crystals shall be removed by brushing. Next, all surfaces, including asbestos cement board, shall be primed with a primer sealer. If suction spots appear after this coat is dry, they shall be spot-primed with the primer. All walls and ceilings shall be given two finish coats of high quality rubber base flat wall paint. A band six inches high forming a color base shall be provided in all rooms.

(b) Ferrous metal shall have the shop applied primer spot painted as required with red-lead primer and given one coat of enamel undercoat followed by one coat of semi-gloss enamel.

(c) Exposed woodwork. - Interior woodwork and putty shall receive one coat of wood primer, one coat of enamel undercoat, and one coat of semi-gloss enamel.

(d) Mechanical equipment and piping shall be painted in accordance with Specification No. 21Yc, except that lead and oil paint colored as directed shall be substituted for aluminum paint. Piping and insulation where exposed in room spaces, shall be painted to match the spaces in which it occurs.

(e) Electrical switch, fuse boxes and control panels shall be color painted to conform to the Government Safety Code requirements. Electrical conduit, where exposed in room spaces, shall be painted to match the spaces in which it occurs.

(f) Workmanship shall be first class in every respect. Paints and varnishes shall be applied carefully with good, clean brushes, or by approved spraying equipment, except that the initial coat on any surface shall be brushed in. The work shall be so conducted as to avoid contamination of other surfaces and public and private property in the area; any damage thereto shall be made good by the contractor at his expense. Sufficient time shall be allowed between coats to permit thorough drying and each coat shall be in proper condition to receive the next coat. Each coat shall be sufficiently heavy to cover completely the preceding coat or surface. Paint shall not be applied during foggy or rainy weather or, when in the opinion of the officer in charge, the surfaces are not in proper condition for painting. A period of at least one week of drying weather shall prevail between the completion of the painting of exterior masonry and before starting interior painting. Time for completion will be extended to compensate for time lost due to unfavorable weather conditions.

14-05. Exterior and interior metal work at the reservoir shall be given two coats of asphaltic varnish.

14-06. Clean-up. - Paint shall be removed immediately where spilled or splattered on surfaces adjacent to the work, including fixtures, glass and fittings. The premises shall be kept free at all times from accumulation of waste material and/or rubbish resulting from the work and upon completion of the work, all tools; scaffolding, surplus materials and rubbish shall be removed and the premises left clean.

SECTION 15. PLUMBING

15-01. General requirements. - The work includes the provision and installation of all fixtures, accessories, material, appurtenances, and equipment for complete plumbing system, including floor drains and sump drains, as shown. All piping shall be inspected, tested and approved before being covered, buried or concealed. Pipe, valves and accessories may be taken from stock, but if required, the contractor shall submit certificates identifying the materials furnished. Except as specified otherwise hereinafter, all work shall conform to Specifications No. WW-P-541b, No. 31Yc and material specifications hereinafter noted.

15-02. Piping. -

(a) Water piping 3" and smaller shall be galvanized wrought iron pipe conforming to Specification No. WW-P-441b, Class A.

(b) Drain lines below ground shall be extra heavy cast iron soil pipe in accordance with Specification No. WW-P-401, connected to outside drain not less than five (5) feet outside of building wall.

(c) Sanitary piping above ground shall be standard weight zinc-coated steel pipe in accordance with Specification No. WW-P-406, except vent stacks which shall be extra heavy cast iron, in accordance with Specification No. WW-P-401.

(d) Drainage fittings above ground shall be cast iron, recessed and banded, screw-jointed, drainage pattern, long radius type except where short radius fittings are specifically permitted.

(e) Lead for caulking shall conform to Specification No. QQ-L-156, Type I.

15-03. Fixtures. - Fixtures, trimmings, fittings, accessories, and miscellaneous plumbing supplies shall be in accordance with Specification No. WW-P-541b. All trimmings and fittings shown and/or described therein for the fixtures specified herein, including compression stops shall be provided. The trimmings, fittings and accessories shall be brass or red metal, nickel or chromium plated.

(a) Water closet shall be outfit No. VW16.

(b) Laboratory sink shall be outfit No. EK30GF with stainless steel rim with two Type 10 faucets furnished in lieu of combination faucet.

(c) Floor drains shall be area drain, Type 220.

(d) Lawn faucets shall be Type 207.

(e) Sampling faucets shall be Type 63.

(f) Miscellaneous plumbing supplies, as follows, shall be furnished and installed as directed in the toilet room; one (1) toilet paper holder, Type 433 and one (1) coat hook, Type 419.

15-04. Insulation. - Insulation of cold water piping is not required.

15-05. Sterilization. - The entire cold water plumbing system shall be thoroughly sterilized with a solution containing not less than 50 parts per million of available chlorine. The chlorinating material shall be liquid chlorine gas-water mixture, calcium hypo-chlorite, or sodium hypo-chlorite, or chlorinated lime and water mixture conforming to the requirement of the American Water Works Association, and shall be introduced into the system in an approved manner. The sterilizing solution shall be allowed to remain in the system for a minimum period of 24 hours, but until pronounced safe and fit for human consumption by the officer in charge. During the sterilizing period, all valves and outlets shall be opened and closed several times. After sterilization, the solution shall be flushed from the system with clean water until residual chlorine content is not greater than 0.2 parts per million unless otherwise directed.

SECTION 16. HEATING

16-01. General Requirements. - The work includes the provision of a low pressure steam heating system in the water plant building and mechanical ventilation in chlorinator room and includes accessories, material, appurtenances and equipment for complete and operating heating and ventilating systems. Except as modified, all work shown and/or specified shall conform to Specifications 37Ya and 21Yc and to material specifications hereinafter listed.

16-02. Description of heating system. - The heating system will receive steam at approximately 100 psig which will be reduced by a pressure regulating valve assembly to 15 psig for heating purposes. Heat within the building will be obtained by the use of unit heaters and fin-type radiators as indicated.

16-03. Pipe and fittings.

(a) Steam piping shall be standard weight black steel pipe in accordance with Specification No. WW-P-406, type I. Fittings shall be cast iron in accordance with Specification No. WW-P-501b, Type I, Class A.

(b) Condensate piping shall be black wrought iron pipe in accordance with Specification No. WW-P-441b, Class A. Fittings shall be zinc-coated, malleable-iron fittings in accordance with Specification WW-P-541b.

16-04. Valves. - Valves shall conform to the following specifications and shall be installed in accordance with Specification 21Yc.

(a) Gate valves, 2 inches and larger for steam service shall be cast iron conforming to Specification No. WW-V-58, Type I, Class A. Valves $1\frac{1}{2}$ inches and smaller shall be bronze, conforming to Specification No. WW-V-54, Type I, Class A.

(b) Globe angle and check valves shall conform to Specification No. WW-V-51a, Class A.

(c) Safety valves shall conform to Specification MIL-V-18634, Class II.

16-05. Miscellaneous accessories.

(a) Lift trap shall conform to Specification No. MIL-T-18112, Type II, Class 1.

(b) Strainers shall be in accordance with Specification No. MIL-S-16293C.

(c) Bucket traps shall conform to Specification No. MIL-T-18112, Type I, Class 1.

(d) Drips, gauges and other miscellaneous accessories indicated and/or shown shall be in accordance with Specifications 21Yc and 37Ya.

16-06. Installation of piping. - Steam supply and return piping shall be installed exposed below ceilings. Alignment, anchoring and supporting of piping shall be in accordance with the applicable requirements of Specification No. 21Yc. Anchors shall conform to Specification No. WW-A-171.

16-07. Pressure temperature regulating valves. - The steam pressure and temperature regulating valves shall be pilot operated with pressure, temperature and electric pilots. Electric pilot shall be normally closed. The valve shall be single seated for dead-end service. The main valve shall open against pressure and the main valve spring shall not be in the path of the steam flow. The pilot valves shall be mounted on the side of the main valve and shall be connected with copper tube control piping. Main valve and pilots shall have cast iron bodies and stainless steel trim. The valves shall be provided with permanently attached brass tags bearing the following information: Name of manufacturer; inlet steam pressure; reduced pressure; and capacity in pounds per hour. The valve shall be installed with a three-way by-pass and initial and reduced pressure indicating gauges, solenoid pilots, safety valve and other necessary accessories. Valve shall have minimum capacity as indicated.

16-08. Unit heaters. - Unit heaters shall conform to Specification No. MIL-U-17691, Type I, designed for horizontal delivery. Heaters shall have the capacity indicated on the drawings for each installation when operating under the conditions shown. Heaters shall have on-off system of control with aquastat to control fan motor and limit controller to prevent fan operation when supply line is cold. Motor shall be single speed, suitable for operation on 120 volt, 60 cycle, single phase current.

16-09. Radiators. - Radiators shall be of the finned-tube radiation type with either copper or steel tube. Fins shall be securely fastened to the steam carrying sections. Heating elements shall be provided with ends extended to receive standard fittings. The element shall be tested to withstand the steam pressure of at least 125 psig. Enclosures shall be made of 1/2 inch expanded metal not lighter than 18 gauge with baked on prime finish. The completed units shall be suitably supported and rigidly mounted in place.

16-10. Controls. - Temperature control shall be by an adjustable thermostat located where indicated on the drawings which shall control the flow of steam to the heating system by means of an electrically operated valve.

16-11. Cleaning. - All piping and fittings shall be maintained cleaned during the work of installation. The completed system shall be thoroughly flushed out with water. All piping, radiators, and other equipment required to be provided, or insulated, shall be cleaned of all dirt, rust and grease.

16-12. Insulation. - After testing and painting in accordance with Specification 37Ya, steam and condensate piping, pipe fittings, valves and appurtenances shall be insulated in accordance with Specification No. 21Yc. Insulation shall be either Grade one, Class B, in accordance with Specification No. MIL-I-2781B, or fibrous glass as specified in Paragraph 2-22(e) of Specification No. 21Yc. Nominal one-inch thickness of insulation shall be installed on condensate lines and nominal two-inch thickness of insulation shall be installed on steam lines in accordance with Table II of Specification No. MIL-I-2781B. If the fibrous glass insulation is used, the thickness shall be such as to provide an insulating efficiency not less than that provided by the thickness of the other insulating material specified above.

16-13. Air ducts for ventilation. - Ductwork shall be provided in a neat workmanlike manner as indicated and/or required. Ductwork shall be constructed of zinc-coated sheet steel in accordance with Specification QQ-I-716, and the construction and installation shall conform to the applicable recommendations of the National Board of Fire Underwriters, Pamphlet No. 90, Part I. The cuts shall be properly braced and reinforced as specified and in no case spaced more than 48 inches on centers. All slip joints shall be made in the direction of flow. All ducts, unless otherwise approved, shall be true to the dimensions indicated and shall be straight and smooth on the inside with neatly finished airtight joints. The ducts shall be securely anchored into the building construction in an approved manner and shall be completely free from vibration under all conditions of operation.

16-14. Exhaust fan for installation in chlorination room shall be a 10-inch fan having a capacity of approximately 460 cfm at 1140 rpm and shall conform to the applicable requirements of Specification No. MIL-F-16081B. Motor shall be designed for 120 volt, 60 cycle, single phase current. Automatic gravity type louvers shall be provided and shall conform to the applicable requirements of Specification No. MIL-L-18145.

16-15. Test. - The system shall be tested as in service and in accordance with Specifications No. 21Yc and 37Ya. Automatic controls shall be adjusted to the required setting. A balanced flow of steam throughout the system shall be demonstrated with thermostats calling for heat. All defects disclosed during the test shall be corrected promptly at the expense of the contractor, and the test repeated until satisfactory results are obtained.

SECTION 17. MECHANICAL EQUIPMENT

17-01. This section of the specification includes all materials, equipment, labor and appurtenances required to provide where indicated, water softening equipment, chlorination equipment, brine pumps, high lift pumps, sump pump, raw water meter, treated water meter, altitude gauge and pump controller, recording reservoir gauge and controller, recording pressure gauge and well control system, complete and in operating condition.

17-02. Water softening equipment. - The equipment shall be the downflow, pressure type, sodium cycle, brine regenerated, zeolite water softeners conforming to the applicable requirements of Specification No. MIL-W-17121B, except as specified otherwise herein. The equipment shall consist of the softeners complete with all necessary working parts, interconnecting piping, valves, fittings, meters, gauges, and shall include a main operating valve system, brine measuring tanks, and all associated controls.

(a) Service. - This equipment is to be used to reduce the hardness of water for domestic consumption and to impede plumbing deterioration. The number of units shall not be greater than necessary to meet the stated condition but shall not be less than two. The diameter of the units shall not exceed 6 feet and the allowable head room is 12 feet.

(b) Source. - The raw water is derived from wells as indicated on the drawings.

(c) Raw water analysis. - Analysis of water is as follows:

Item	PPM
1. Calcium (Ca)	69.2
2. Magnesium (Mg)	4.99
3. Sodium (NA) and Potassium (k) (as NA)	6.83
4. Silica (SiO_2)	18.0
5. Iron (Fe) Total	0.6
6. Bicarbonate (HCO_3) (as $Ca\ CO_3$)	172.0
7. Carbonate (CO_3) (as $Ca\ CO_3$)	0.0
8. Hydrocide (OH) (as $Ca\ CO_3$)	0.0
9. Sulphate (SO_4)	16.9
10. Chloride (CL)	14.0
11. Phosphate (PO_4)	0.0
12. Dissolved solids	252.0
13. Suspended solids	10.4
14. Carbon Dioxide (CO_2) (Free)	22.5
15. Total hardness (as $CaCO_3$)	195.0
16. pH	7.2
17. Color	25.0

This is a composite analysis as taken from the wells and will be subjected to chlorination prior to softening to retain a residual chlorine content of approximately 0.7 ppm subsequent to softening.

(d) Effluent analysis. - Raw water and softened water shall be proportioned so as to provide a combined effluent with a total hardness not to exceed 60 ppm as $CaCO_3$ nor an iron content in excess of 0.3 ppm. No adjustment is required for the pH.

(e) Capacity. - The softening battery shall have the capacity to produce a service water effluent as herein described at the rate of 750,000 gallons per 24 hours. This rate includes the properly proportioned raw water by-pass, but excludes rinse, backwash, and other regeneration waters. It is the intent of this specification that this equipment will be capable of producing a minimum of 750,000 gallons of service water having the described effluent analysis every 24 hours.

(f) Temperature. - Maximum temperature of water is 65° F.

(g) Controls. - Softening equipment shall be automatically controlled. The proportioning equipment shall be adjustable and shall provide the specified effluent analysis for flows ranging from 50 per cent to 150 per cent of required average flows.

(h) Water pressure. - A minimum of 35 psig will be available for operating a brine ejector.

(i) Current. - Power supply will be 120/208 volts, 60 cycle, 3 phase current.

(j) Length of cycle shall be not less than 8 hours.

(k) Electrical equipment shall have radio interference reduction.

(l) Repair and maintenance parts and tools. - A set of all special tools required for access to, repairs to, and operation of the equipment, other than ordinary mechanics tools, shall be furnished.

(m) Air vent. - A hand operated air vent will be provided for each softening tank.

(n) Production test model will not be required.

(o) Process piping. - Process piping between the raw water meter and the back pressure control valve is functional only and may be altered as required by softening equipment subject to approval by the contracting officer. Cost of such alteration, however, shall be borne by the contractor at no additional expense to the Government.

(p) Sumps. - If the rinse water and backwash water flow rate controls are of the external type and require sumps, the sumps shall be constructed of reinforced concrete to dimensions as recommended by the manufacturer and as approved by the contracting officer.

17-03. Chlorinators. - Two (2) fully automatic manually adjustable gas-solution type chlorinators shall be provided. One chlorinator shall be installed to feed chlorine solution to the raw water prior to softening or to the raw water after softening; the points of application shall be as indicated. The other shall be connected to feed the chlorine solution to the suction side of the high lift pumps as indicated. The 2 chlorinators shall be interconnected for interchangeable use. The chlorinators shall be in accordance with Specification No. MIL-C-17226A except as modified herein. One platform scale without wheels having a maximum capacity of 500 pounds shall be provided for use with the 2 chlorinators as indicated.

(a) The equipment shall be the gas type, each designed to feed from 0 to 40 pounds of chlorine per 24 hours. A minimum water pressure of approximately 35 psig is available for the operation of the equipment. The water pressure at the point of application prior to softening will be approximately 25 psig, and the water pressure at the other points of application will not exceed 8 psig.

(b) Three (3) copies of complete operating instructions and 3 copies of spare parts catalogue shall be furnished with the equipment.

(c) Spare parts auxiliary equipment and maintenance tools shall be furnished as specified in Paragraph 3.21 of Specification No. MIL-C-17226A.

(d) Radio-interferance reduction is required.

17-04. Brine pumps, motors and starters shall be in accordance with the applicable requirements of Specification No. MIL-P-18472 except as modified herein.

(a) The pumps shall be of the centrifugal type and all parts exposed to the corrosive action of the brine shall be bronze designed and constructed to resist the action of the brine.

(b) Brine pumps shall be designed to deliver 40 gallons of brine per minute against a total dynamic head of 20 feet.

(c) Float switches, adjustable to start and stop pumps at pre-determined levels shall be provided in each brine tank. Parts exposed to the corrosive action of the brine shall be constructed of materials that will resist such corrosive action.

(d) Motors shall be drip proof, designed to operate on 208 volts, 60 cycle, 3 phase current. Starting equipment, wiring, etc., shall be in accordance with the Electrical Section of this specification.

17-05. High lift pumps. - High lift pumps shall conform to the applicable requirements of Specification No. MIL-P-17552, Type I, Class 1, except as modified herein. Pumps No. 1 and No. 2 shall be electric motor driven and pump No. 3 shall be dual driven (electric motor and gasoline engine).

(a) Pumping conditions. - Each pump shall be designed to pump the capacity herein specified when discharging against a total dynamic head of 130 feet including a positive suction of 3 feet. The speed of the pumps shall not exceed 1800 rpm.

(1) Pump No. 1, 500 gpm.
(2) Pump No. 2, 1000 gpm.
(3) Pump No. 3, 1250 gpm.

(b) Stuffing boxes shall have packing rings.

(c) Pumps shall be of the split case, double suction type.

(d) Motors shall be designed to operate on 208 volt, 3 phase, 60 cycle current. Motors shall be of the squirrel-cage type and shall be drip-proof. Speed shall not exceed 1800 rpm. Motor shall have ample capacity to properly operate the pump through its entire head-capacity range without exceeding the temperature limits of N.E.M.A. and shall be rated on a basis of 55 degree centigrade temperature rise.

(e) Motor starters shall be provided in accordance with Paragraph 3.13.1.1 of Specification MIL-P-17552, and shall contain thermal overload protection and under voltage protection.

(f) Gasoline engine for dual driven Pump No. 3 shall be a complete self-contained, multi-cylinder, water cooled, heavy duty gasoline power plant with maximum horse-power 30% in excess of the maximum brake horse-power required to operate the pump continuously at its rated speed, over the entire head-capacity range of the pump. The engine shall be arranged for motor cranking, and shall be equipped with high tension ignition system, battery and required appurtenances. Equipment and accessories shall include an adjustable governor, carburetor, gasoline pump and filter, one gallon emergency gasoline tank and hand priming pump, air cleaner, 18 ampere generator, oil filter, starting crank, exhaust pipe muffler, and radiator. The gasoline engine shall conform to the applicable requirements of Specification No. MIL-E-11275A, Class III, except as modified herein.

(1) The gasoline engine shall be connected to and arranged for operation from a 275-gallon underground gasoline storage tank. The tank shall conform to the standards of the National Board of Fire Underwriters and shall have a capacity not less than that indicated. Fuel piping shall be wrought iron in accordance with Specification No. WW-P-441b. Concrete foundation shall be in accordance with another section. Painting of tank, hold draw rods and accessories shall be in accordance with Specification No. 34Yb.

(2) The exhaust pipe from the engine shall be carried through the wall of the pump room in an asbestos-cement sleeve, and a suitable muffler mounted on the end of the exhaust pipe, one foot from the wall. The muffler shall be properly supported in an approved manner.

(3) A metal instruction plate shall be mounted on the engine unit giving the manufacturer's recommendations for lubricating oil and other pertinent information.

(g) Centrifugal clutch-coupling shall be provided for connection of the auxiliary gasoline engine to the dual driven high lift pump (Pump No. 3). The coupling shall be designed to permit the engine to idle at any pre-determined speed, automatically picking up the pump load when the engine speeds up and again releasing the pump at the idling speed. The coupling shall be of sufficient capacity to transmit the torque developed by the engine.

(h) Bedplate for dual driven pump shall conform to the applicable requirements of Paragraph 3.11 of Specification No. MIL-P-17552, and shall be of sufficient strength for strains imposed and of sufficient size to maintain motor, pump, and gasoline engine in alignment.

(i) Overall efficiency (wire to water) of pumping units shall be not less than 70%. After the pumps are installed, field tests shall be run to determine compliance with guaranteed field performance curves submitted. The Government will furnish electric power and water for conducting the tests. The contractor shall furnish all equipment and personnel necessary for conducting the test.

(j) Approved safety guards shall be provided for all couplings and for cooling fan on gasoline engine.

17-06. Sump pump for installation in the pump room shall be as described in Paragraph 5-05, Specification No. 31Yc. Pump motor shall be designed for use with 110 volt, 60 cycle, single phase current. Pump shall have a capacity of at least 750 gph against a 20 foot head. Motor shall not be less than 1/4 H.P. Speed shall not exceed 1750 rpm.

17-07. Raw water meter.

(a) Meter shall be of the propeller type, self-contained and self-operated with built-in straightening vanes. The body shall be

close grained, high tensile, cast iron, suitable for 150 psi working pressure. Ends shall be flanged, 125 pound American Standard. The propeller shall be made of high strength Bakelite molded in one piece. All working parts shall be of corrosion and wear-resistant materials. The propeller shaft shall be of stainless steel mounted on stainless steel ball bearings.

(b) Electrical controlled totalizer-indicator-recorder shall be provided and mounted on the wall where indicated. The rate of flow shall be indicated and recorded in gallons per minute for 24 hour periods. The recorder shall contain a 12-inch chart, for 24-hour rotation, electric motor driven, operated by 110 volt, 60 cycle current. The totalizer shall have at least 6 digits and shall record the total amount pumped in thousands of U. S. gallons.

(c) The overall accuracy of the meter shall be within plus or minus 2 per cent of the actual rate of flow over a range from 100 gallons per minute to 800 gallons per minute. The loss of head, at a flow of 600 gallons per minute, shall not exceed 12 inches.

(d) The remote electric control shall include a suitable transmitter and receiving unit. Control wiring shall be not less than No. 18 gauge, and shall be installed in accordance with the Electrical Section of this specification.

17-08. Treated water meter. - The meter shall include a venturi tube installed in the treated water line where indicated, and a wall-mounted indicating, recording and totalizing recorder installed in the operating room where indicated, including all piping, valves and appurtenances for a complete and operating meter.

(a) Operating condition. - The venturi meter shall be designed to measure flows from a maximum of approximately 4,000,000 gallons per day to a minimum of approximately 400,000 gallons per day with an average error not exceeding plus or minus 2% over the entire range. The average pressure at the venturi tube will be approximately 50 psi.

(b) The venturi tube shall be of the concentric type constructed of good gray cast iron of Class 150 thickness with flanged ends for installation in the 12-inch discharge main. The tube shall be designed for measurement of clear water and shall have a bronze lined throat. There shall be an annular pressure ring at the main diameter with a sufficient number of holes leading from the interior of the tube to the pressure ring. These holes shall be bronze bushed with the ends of the bushing at right angles to and flushed with the inside diameter of the tube and free of burrs. There shall also be a pressure ring at the throat section of the venturi tube, the inner wall of which will consist of the bronze throat liner. The liner shall contain a sufficient number of holes leading from the inside diameter of the throat section to the pressure ring, these holes being at right angles to the throat and free from burrs. On each pressure ring, there shall be at least 2 properly designed handholes and

at least 4 suitably designed cleaning valves. Immediately downstream of the throat section, there shall be a handhole by means of which inspection can be given to the throat and upstream barrel at any time.

(c) An indicating, recording and totalizing meter register designed for wall bracket mounting shall be provided for use with the venturi tube. The instrument shall indicate the instantaneous flow through the line at all times on a uniformly graduated direct reading flow scale having a peripheral length of approximately 9 inches. The rate of flow shall be recorded on a 12-inch diameter evenly spaced circular and concentrically graduated chart designed for daily removal. The totalizer shall have at least 6 digits and shall record the total amount pumped in thousands of U. S. gallons. The totalizer and chart elements shall be actuated by electric clock drives. The instrument shall be of the mercury, float-operated purely mechanical type.

(d) There should be included with the meter register, a year's supply of charts, pens, ink, usual tools and accessories, together with a setting device for checking the accuracy of the meter at any time.

(e) The metering equipment shall be installed complete in accordance with the manufacturer's recommendations. Piping between the venturi throat and the recording device shall be zinc-coated wrought iron pipe conforming to Specification No. WW-P-441b.

17-09. Remote recording altitude gauge and pump controller shall be designed to record at the water plant, where indicated, the elevation of the water level in the elevated tank approximately 3000 feet distance, and to schedule the operation of the 3 high lift pumps to maintain pre-determined water levels in the elevated tank. The equipment shall be designed to operate on 120 volt, 60 cycle current, and shall include the following:

(a) A transmitter which shall be housed in a suitable metal wall-mounted moistureproof case and shall incorporate a pressure measuring element calibrated for a range of 75 feet to 95 feet of water. The transmitter shall send out a time impulse (electrical), the duration of which will be proportional to the measured pressure.

(b) A receiver shall be provided and shall be housed in a suitable rectangular metal wall-mounted case with glass door. The receiver shall use a 12-inch circular chart for 24-hour rotation and have uniform gradations of from 0 to 20 feet. The receiver shall have incorporated in it, or in an auxiliary control box, mercury switches actuated by the receiver providing an adjustable start and a separate adjustable stop contact for 2 individual pumps. The mercury switches shall be connected into each pump circuit, and a selector switch provided in order that the mechanism can control any 2 of the 3 high lift pumps at any one setting. The controller shall be designed to start any one pump when the water in the tank drops to a selected level. This pump shall continue to operate

until a lower selected level is reached at which time a second pump will automatically start. Both pumps will continue to operate until another selected level is reached, at which point the second pump will stop and the first pump continues to operate until the tank is full at which point the first pump will cut off. The automatic pump control shall be accurate within one (1) foot.

(c) An underground cable shall be provided from the transmitter located at the existing elevated water tank to the receiver located within the new water plant. This cable shall be 6 conductor, No. 14AWG-600 volt, color coated polyvinyl insulated cable, bronze wrapped, and shall be installed as indicated. Operating current for the transmitter shall be provided by extending 2 No. 12 RHL wires in 1/2 inch conduit from an existing cathodic protection cabinet, located on one of the existing tower legs, down the tower leg and underground to the transmitter shelter. Electrical wiring shall be in accordance with the Electrical Section of the specification. The transmitter shall be connected to the cast iron supply pipe as indicated, with 3/4-inch wrought iron pipe. Piping and valves shall be as specified under the Water Piping Section of this specification.

17-10. Recording reservoir gauge and controller shall be designed to record in the water plant the elevation of the water level in the concrete reservoir and to control the operation of the backwater pressure valve and solenoid valve which are specified in another section of this specification. The equipment shall be designed to operate on 120 volt, 60 cycle current, and shall include the following:

(a) A transmitter which shall be housed in a suitable metal wall-mounted moisture-proof case located in the pump room. The transmitter shall incorporate a pressure measuring element calibrated for a range of 0 feet to 15 feet of water. The transmitter shall send out a time impulse (electrical) the duration of which will be proportional to the measured pressure.

(b) A receiver which shall be housed in a suitable rectangular metal wall-mounted case with glass door shall be located on the wall of the operating room, as indicated. The receiver shall use a 12-inch circular chart for 24-hour rotation and have uniform gradations of from 0 to 15 feet. The receiver shall have incorporated in it, or in an auxiliary control box, at least 2 mercury switches actuated by the receiver providing an adjustable on and a separate adjustable off contact for opening and closing an electrical circuit.

(c) Installation. - The mercury switches in the receiver shall be connected into an electric circuit to the solenoid pilot valve of the back pressure control valve and to a solenoid valve connected between the high pressure system and the raw water supply line. This circuit shall be closed when the water in the reservoir reaches a selected

level, closing the solenoid pilot valve on the back pressure control valve which is normally open, and opening the solenoid valve in the connection between the high pressure system and the raw water supply line which is normally closed. This circuit shall be connected into the control system operating the automatic regeneration feature of the softening equipment in such manner as to prevent the circuit from closing while the softeners are in the process of regeneration. The back pressure control valve and the solenoid valve are specified in the Water Piping Section of this specification. Electrical work shall be in accordance with the Electrical Section of this specification. Piping, valves and fittings shall be in accordance with the Water Piping Section of this specification.

17-11. Well control system. - There shall be provided in the existing well houses as indicated, mercury pressure switches which shall be connected into the electrical starting circuit to cut on and cut off the raw water pumps at selected pressures. The pressure switch shall contain 2 mercury switches providing an adjustable start and a separate adjustable stop contact for operating the pumps. Each of these switches shall be adjustable from 20 to 60 psi.

(a) In each well house installation, a steel surge tank shall be provided and connected into the well supply line as indicated on the drawings. The surge tank shall be designed for a maximum of 150 pounds per square inch water pressure. Materials and workmanship shall be as hereinbefore specified.

(b) Electrical work shall be in accordance with the Electrical Section.

17-12. Supervisory engineer. - The services of a supervisory engineer employed by the manufacturer of the water softening equipment being furnished shall be provided for a period of 3 working days, and the services of a supervisory engineer employed by the manufacturer of the chlorination equipment being furnished shall be provided for a period of 2 working days. These engineers shall make such final adjustments to the system as may be required, and shall familiarize local maintenance forces with maintenance procedures on the equipment. Under supplementary bidding items, bidders shall state the amount by which the contract shall be increased or decreased for each working day in excess of or less than the working days specified, that the engineer is required to remain at the site of the system upon the written direction of the contracting officer and for cause for which the Government is responsible; such amount per day shall include the salary and all living and other expenses of the engineers. The services of the engineers shall be furnished upon written notice of the contracting officer.

SECTION 18. INTERIOR ELECTRICAL

18-01. General requirements. -

(a) The work shall include the provision of complete and operating interior electrical wiring systems in conduit for serving current to lighting, power and control.

(b) The work shall include the service entrance and distribution complete, all wires, conduit, outlet and junction boxes, wall switches, receptacles, fused switches or circuit breakers, disconnect switches, lighting fixtures complete with lamps, wiring of motor starters and automatic control devices, lighting panel, service entrance switch, service entrance cable in conduit, conduit weather fitting and four spool wire rack.

(c) All electrical work shall be done as specified herein, as shown, and, unless otherwise specified or shown, in accordance with Specification No. 9Yf and other specifications listed therein.

18-02. Existing conditions. - The water softening plant in which the work is to be done will be a completely new building of concrete block construction.

18-03. Electrical characteristics. - The electrical service to the building shall be 120/208 volts, 3 phase, 4 wire solid grounded neutral, 60 cycles. Lighting and convenience receptacle outlets shall operate from 120 volt branch circuits. As may be specified or shown, motors under 1/2 H.P. shall operate from single phase 120 or 208 volts and motors 1/2 H.P. and above, on 3 phase, 208 volts.

18-04. Drawings Diagramatic. - The electrical drawings are primarily diagramatic in nature, intended to indicate the purpose and connections of the conduit and/or circuits rather than the exact locations of the runs which may be modified by the contractor to meet construction conditions at the time of work.

18-05. Method of wiring. - All wiring shall be done in rigid conduit concealed above the ceiling and exposed below ceiling on wall construction.

18-06. Work at service entrance shall include the specified wire rack on the building, the service entrance weather cap, conduit, cable, service switch, secondary distribution backboard, secondary distribution switches, and all connections to and between all parts to establish a complete and operating electrical service to the building.

18-07. Service switch. - The service switch shall be a Type A, 800 ampere, 4 pole, solid neutral type, quick make and quick break fused safety switch, approved for service entrance duty, in a NEMA type 1 enclosure having an exterior operating handle interlocked to prevent access to the interior when switch is closed. An equivalent air circuit breaker, approved for service entrance duty and calibrated to protect the service entrance cable will be acceptable.

18-08. Fused safety switches. - All fused safety switches shall be Type "A" quick make and quick break type having ampere ratings as specified or shown in NEMA type 1 enclosure, equipped with exterior operating handle interlocked to prevent access to interior when switch is closed. Equivalent air circuit breakers calibrated to protect the associated feeders will be acceptable.

18-09. Non-fused disconnect switches. - Adjacent to every motor located out of sight of its control location, there shall be installed an unprotected disconnect switch for isolating the motor electrically for maintenance. For each motor, the quality and rating of the disconnect switch shall be the same as the associated controller and shall conform to the same specifications except to be without the protective feature.

18-10. Magnetic motor controllers. - Magnetic motor controllers shall be of the quick make and quick break type having overload and low voltage release and with hand reset overload trip mechanisms. Controllers shall conform to the latest applicable NEMA standards for the type and class as specifically applied. All magnetic controllers will be furnished with the equipment under the mechanical section but shall, unless integral with the equipment, be installed and wired by the electrical contractor. The controller shall be in a NEMA type 1 enclosure, arranged for surface mounting.

18-11. Conduit. - Conduit shall be of the rigid type and shall be zinc-coated for both inner and outer surfaces. Standard lengths shall be threaded previous to treatment. All conduit shall be cut with a hacksaw and reamed to size. No bends shall be made of greater than 90 degrees and manufactured elbows shall be used on 1-inch size and above.

18-12. Outlet boxes. - Flush outlet boxes wherever used to terminate conduit at equipment or lighting fixture location, shall be 4-inch square hot dipped zinc-coated boxes with a cover in each case suitable for the respective purpose. Pendant fixture boxes shall have aligning covers. All surface boxes shall have threaded hubs.

18-13. Pull and junction boxes. - The contractor shall provide and install all necessary or required pull or junction boxes. Such boxes shall be constructed of code gauge of steel standard for the respective dimensions and equipped with a turned-in flange to which the cover shall be mounted by screws into threaded holes.

18-14. Local wall switches. - Wall switches shall be single pole, or three-way toggle type, "T" rated, 20 ampere, 125 volt, in composition base.

18-15. Convenience receptacles. - Convenience receptacle outlets shall be duplex, 15 ampere, 125 volts, "T" slot, double sided contacts with four (4) terminal screws, in composition base. All receptacles shall be three pole polarized, equipped with three pole cord caps, one pole of receptacle and cord cap arranged for grounding appliance enclosure independent of power conductors. Two conductor cords integral with furnished equipment or appliances shall be renewed with three conductor cords and caps.

18-16. Heavy duty receptacles shall be rated as noted on drawings, in composition base and equipped with one pole in addition to those required for power conductors for the purpose of independent grounding. A co-ordinating cord cap shall be furnished with each receptacle. Cords when furnished shall be three wire.

18-17. Lighting panel shall consist of the number of circuits noted, single, quick make and quick break branch circuit breakers rated as noted on drawing feeding from a 120/208 volt, 3 phase, 4 wire bus. The breakers shall be assembled on a heavy formed steel back plate drilled for universal mounting of 50 ampere frame size breakers and shall be arranged for easy removal from the front without disturbing adjacent units. Lugs only to be furnished on the mains. Breakers to be equipped with trip free handles. The breaker mechanism shall be mounted in a hot moulded phenolic case sealed to prevent unauthorized tampering with the fixed calibration. Tripping shall be accomplished by means of a bi-metallic thermostatic latch accurately calibrated for the specific rating. The cabinet shall be surface type made of not less than code gauge steel and shall have a turned-in flange around the outside edges for fastening the trim, and shall have a removable steel barrier. The trim shall be equipped with a hinged door having a latch and lock and a half round moulding around the edge for stiffening. Exposed surfaces of the cabinet shall be primed for finish painting. Allow for not less than two spare circuits.

18-18. Lighting fixtures shall be of the highest quality for the applicable design and wattage as called for under the fixture schedule shown on the electrical drawing and shall conform to the design, handlingdata and specifications as delineated in the applicable sections and

charts of Specification No. 9Yf, or as shown. Canopies shall cover ceiling openings at outlet boxes. All fixtures shall be complete with lamps.

18-19. Automatic control wiring. - Unless otherwise specified under this section, all electrically operated control devices integral with equipment specified under other sections for inclusion in the work shall be wired under this section. If such material is furnished separate from the equipment, both the installation and wiring of the devices shall be done under this section. The contractor shall secure the equipment manufacturer's diagrams and install in accordance therewith.

18-20. Backboards at service entrances and distribution locations. - Switches shall be mounted on a backboard consisting of 2 inch by 4 inch uprights (or channel iron) secured to the building structure and surfaced with 3/4 inch finished lumber. Previous to mounting equipment, the backboard shall be given two coats of asphaltum varnish.

18-21. Additional supports. - Wherever required to secure the location shown on drawing for the lighting fixtures, electrical devices or control equipment, the contractor shall provide and install additional supports such as wood bracing, angle iron or channel construction, steel strap extensions or by other approved means effect the proper and rigid support of the electrical work.

18-22. Grounding. - The grounding of the neutral shall be secured by connecting to the service point of the water service pipe using #8 bare wire. The overall resistance to ground shall not be greater than 3 ohms. A ground connection shall be made to all metal enclosures and the conduit system and the grounding terminals of receptacles shall be connected to the outlet box.

18-23. Secondary wire rack shall be of solid construction hot dipped zinc-coated of not less than #9 gauge steel, having points on 8-inch centers, welded or strongly riveted to the channel. Attached by one 5/8" through bolt at the top and 1/2" by 4" lag screw at the bottom. The rack shall be complete with wet processed porcelain insulators.

18-24. Wires and cables shall conform to the following where applicable:

(a) No conductor smaller than #12 AWG shall be used.

(b) All wire in conduit installed in dry locations shall be type RH.

(c) All wire in conduit installed wholly or in part in damp locations, outside, in or under the floor slab or underground shall be type RHL.

(d) The number and size of conductors shall be as shown.

SECTION 19. EXTERIOR, ELECTRICAL

19-01. General requirements. -

(a) The work shall include the extension to the building of the existing overhead primary distribution, and the provision at the building of a platform mounted transformer bank and a complete and operating service drop.

(b) The work shall include all primary and secondary wires, new transformers, fused cutouts, lightning arrestors, complete grounding systems, a pole platform structure, guys and anchors, new pole numbers, and all incidental parts and devices required to establish the electrical service to the building.

(c) All electrical work shall be done as specified herein, as shown on drawings and, unless otherwise specified or shown, in accordance with Specification No. 9Yf and other standard specifications listed therein.

19-02. Existing conditions. - The primary source of electrical energy for the work shall be the 12470/7200 volt, three phase, four wire overhead distribution line existing along Montford Landing Road. The four #4 primary wires are extended from Pole No. 1M11 to terminate on Pole No. 1MA4 from which the service shall be extended to the new transformer bank at the building.

19-03. New transformers shall be pole platform mounted as shown and shall be of the outdoor, oil-filled type designed for single phase, 7200/240/120 volts with four 2½% taps below normal rated voltage, 60 cycles and arranged for three phase wye primary, wye secondary, in a group of three to deliver 120/208 volts, three phase, four wire secondary current to the building. The transformers shall conform to the current standards of the NEMA, ASA and AIEE for transformers of this size and voltage, including a sampling device.

19-04. Line wires. - Primary and secondary line wires shall be medium hard drawn bare copper having 98% conductivity sized as indicated on drawing.

19-05. Lightning arresters. - Shall be of the 9,000 volt type for cross arm mounting. They shall be designed for outdoor service and of the encased valve type. Ground wires shall be protected by wood moulding extending at least 8 feet above ground. Arrester grounds shall be a separate grounding system.

19-06. Fused cutouts. - There shall be a 15,000 volt fused cutout in each primary wire connected to the transformer stations. The ampere ratings shall be in accordance with standards set up for good practice and adequate protection for the several conditions involved. The cutouts shall be of the open trip-out type for cross arm mounting. They shall be point pressure type equipped with solderless connector terminals, swivel type mounting brackets, positive tripping mechanism and lifting hooks for easy installation and removal of cartridge. The thermal element of the fuse link shall be held under tension in the center of the cartridge tube surrounded by a dead air space to prevent carbonization of the cartridge. Flash-over values shall be in accordance with NEMA specifications.

19-07. Transformer ground. - The primary and secondary wye connections of the bank shall be grounded at the transformer pole. The transformer case and all pole hardware and equipment shall be grounded to the same common grounding system.

19-08. Ground rods. - Each ground rod required under this section of the specification for lightning arresters, transformer secondary, or for any other purpose, shall consist of two sections of ten foot lengths of not less than 5/8 inches O.D. copper-encased sectional steel rod driven to a depth of at least twenty-one feet.

19-09. Ground resistance. - The ground resistance at each rod, previous to any connections, shall be not greater than 25 ohms. If additional material and/or labor is required to obtain the above resistance, payment will be made therefor, as described under Clause 4, U. S. Standard Form 23A.

19-10. Ground wires. - All ground wires shall be #6 AWG, bare solid copper and shall be protected by wood moulding to a height of not less than eight feet above ground. Attachment to ground rods shall be made by means of heavy duty solderless bronze clamps.

19-11. Suspension insulators. - There shall be two (2) $7\frac{1}{2}$" diameter suspension insulators for each primary wire at every dead end. The overall flash-over value of the two (2) insulators in series shall not be less than 125 KV dry and 60 KV wet. The positive flash-over value shall be not less than 210 KV and the negative impulse flash-over value shall be not less than 210 KV. Insulators shall be of the wet process type.

19-12. Pin type insulators. - Shall be of the wet process type, having flash-over values not less than 85 KV dry and 55 KV wet.

19-13. Spool insulators shall be of the wet process type. The over-all flash-over value of the insulators shall be not less than 36 KV dry and 26 KV wet.

Radio influence voltage shall have approximately the following values:

Type of Insulator	Test KV RMs to Ground	Maximum Micro Volts at 1000 KC
Suspension insulators (2 in series)	10	50
Pin type insulators (ea)	15	100
Spool insulators (ea)	10 (Approx.)	50 (Approx.)

19-14. Pole hardware and accessories shall be hot dipped zinc-coated.

19-15. Guys. - Strand shall have a minimum breaking strength of 10,000 pounds and shall be 7-wire, specification strand type. Each guy shall be made up with 3-bolt heavy duty clamps and thimble eyes. Guard shall be half round metal, bolted to guy, eight (8) feet in length and installed on all guys in this contract.

19-16. Strain insulators. - Shall be installed on each guy and shall have a dry flash-over of 30 KV, a wet flash-over of not less than 15 KV, minimum strength of 10,000 pounds and made by the wet process method.

19-17. Anchors may be either of the expanding type not less than 120 square inches with holding power of 10,000 lbs. in sand and equipped with 3/4 inches by nine (9) foot rods having thimble eye or five (5) feet by eight (8) inches diameter logs, creosoted after cutting and framing, complete with 3/4 inches by nine (9) feet thimble eye rod, nut and washer. Anchor or log shall be installed five (5) feet below grade.

19-18. Poles and cross arms. - Poles shall be American Standards Association, Class 3, as indicated on distribution drawing, yellow pine poles, creosoted to twelve pounds retention by the empty cell process according to the specifications of the American Wood Preservers Association. Cross arms shall be close-grained Douglas Fir (Coast).

19-19. Double arming. - All dead ends shall be double armed, with two (2) cross arms provided, one on either side of the pole; double arming bolts shall be installed.

19-20. Cross arm braces shall be 1/4 inch by 1-1/4 inch by 32 inches (flat steel bars, galvanized after punching), punched for a 1/2 inch screw at the pole end and a 3/8-inch bolt at the arm end, bolted to the front of arm after it has been carefully aligned. They shall be secured to pole with 4-1/2 inches drive screws. Buck arms shall be installed if required for good construction as in standard practice.

19-21. Insulator pins. - Steel pole top and cross arm pins shall have a 1-inch lead thread and a minimum strength of 1,500 pounds based on a 10 degree deflection.

19-22. Bolts and nuts shall conform to NELA specification No. E-209-22. Bolts shall be of sufficient length to accommodate the necessary nuts, washers, etc., without projecting more than 1 inch at the free end except that they shall not project more than 1/4 inch into the eye when an eye nut is installed.

19-23. Pole numbering. - Provide on each of the new poles No. 1MA5 and No. 1MA6 a pole designation, with the code letters arranged horizontally and the numerals arranged vertically not less than one (1) inch and not over two (2) inches below. The height of mounting shall be seven (7) feet above the adjacent road grade to the bottom of the lowest numeral.

(a) Letters and numerals shall be two (2) inches high embossed from polished aluminum and of Arabic Type. Each numeral shall have a minimum of two (2) nail holes and letters shall have a sufficient number of additional nail holes to insure firm support to the pole of all portions of the letter. Both the letters and numerals shall duplicate those on existing poles.

19-24. Non-interruption of service. - By careful planning of his work, the contractor shall minimize interruptions to the normal operation of the existing distribution system. If an outage becomes unavoidable, notification shall be made in writing to the officer in charge seventy-two (72) hours previous to the proposed outage and a written directive obtained and followed stipulating the time and duration permitted.

SECTION 20. WATER PIPING.

20-01. General Requirements. - Piping may be any of the types and materials specified herein, and shall be of new and unused material. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate the bells and joints. Any pipe that has the grade of joint disturbed after laying shall be taken up and relaid. The interior of the pipe shall be thoroughly cleaned of all foreig matter before being laid in the trench, and shall be kept clean during laying operations by means of plugs or other approved methods. When work is not in progress, open ends of pipe and fittings shall be securely closed so that no trench water or other foreign substance will enter the pipes or fittings. All 1/16 and sharper cast iron bends shall be securely blocked in the direction of flow with poured in place concrete bearing solidly against the pipe and affording a minimum of 3 square feet of bearing area against a vertical trench face for 4-inch pipe and 6 square feet for larger pipe. The work includes connections to existing mains and services indicated.

20-02. Pipe and fittings. -

(a) All pipe four inches and larger shall be one of the following, except that all piping within the yard piping system shall be cast iron as hereinafter specified.

(1) Cast iron pipe, Class 150, outside coated, cement lined, in accordance with Specification No. WW-P-421a.

(2) Asbestos-cement pipe and couplings, class 150, conforming to Specification No. SS-P-351a.

(b) Pipe three (3) inches and smaller shall be standard weight, with threads and couplings, zinc-coated wrought iron pipe, in accordance with Specification WW-P-441b.

(c) Fittings and specials, including fittings and specials for asbestos-cement pipe, shall be cast iron, Class D in accordance with standards of American Water Association, except that fittings for mechanical joint pipe and for flanged pipe shall be short-body fittings in accordance with American Standards Association, Specification No. A21.10-51 with mechanical joints for mechanical joint pipe and flanges conforming to American 125-pound standard for flange pipe; and except that fittings for asbestos-cement pipe shall have all bell connections of standar American Water Works Association dimensions, or special dimensions as require or shall be equipped with adapters of the proper class for the size of pipe recommended by the manufacturer. Adapters shall be provided for connection of bell and spigot and mechanical joint pipe to flanged accessories.

(d) Fittings for use with pipe three inches and smaller shall be zinc-coated malleable iron conforming to Specification No. WW-P-521b.

(e) Wall castings shall be provided where indicated and all necessary precautions shall be taken to accurately locate castings and to prevent their displacement during the pouring of concrete. Castings shall be poured with lead on each side of wall and caulked.

20-03. Placing and laying.

(a) Cast iron pipe shall be inspected in the sling before lowering into the trench, and tapped with a light hammer to detect cracks. Defective, damaged, or unsound pipe will be rejected. Deflections from a straight line or grade, as required by vertical or horizontal curves or offsets shall not exceed 6/D inches per lineal foot of pipe, where D is the nominal diameter of the pipe in inches, between the center lines extended, of any two connecting pipes. If the alignment requires deflection in excess of that limitation, the contractor shall provide special bends or a sufficient number of shorter lengths of pipe to conform to the limitation specified. Except where necessary in making connections with other lines, pipe shall be laid with the bells facing in the direction of laying. Except at closures not less than two lengths of pipe shall be in position ahead of each joint, with packing installed and earth fill tamped alongside the pipe, before the joint is poured. Where cutting of pipe is necessary, it shall be done with approved mechanical cutters in a manner that will not damage the pipe. Where coatings are damaged, they shall be touched up with material similar to that used for the original coating.

(b) Asbestos cement pipe, couplings and fittings shall be handled and installed in accordance with the recommendations of the pipe manufacturer.

(c) Zinc-coated screw jointed wrought iron pipe shall be free from fins and burrs and joints shall be made with a lubricant applied on the male threads only. Threads shall be full cut and not more than three threads on the pipe shall remain exposed.

(d) All water pipe shall be installed at an average depth of three feet to top of pipe unless otherwise indicated. Minimum cover shall be not less than two feet.

20-04. Joints.

(a) Bell and spigot joints. Before jointing, all lumps, blisters and excess coating material shall be removed from the bell and spigot ends of the pipe. All oil or grease shall be removed. The outside of the spigot and inside of the bell shall be wire brushed and wiped clean and dry. Spigots shall be adjusted in the bells so as to give uniform space all around and if any pipe does not allow sufficient space for proper caulking, it shall be replaced with one of proper dimensions. Adjacent lengths of pipe shall be adjusted with reference to each; blocking or wedging between hub and spigot will not be permitted. Molded or tubular rubber, asbestos, or especially prepared paper rings treated to prevent deterioration or support of bacteria shall be used as gaskets. The gasket shall be driven or caulked tightly into the annular spaces between the pipes, and shall be of proper size to seal the joint tightly and leave sufficient space for lead as specified. Where rubber rings are used as gaskets, a braided or twisted hemp or jute ring shall be caulked into the joint after

the rubber ring is placed to prevent contact of the molten lead with the rubber. Gaskets shall not project into the bore of the finished joint. When the joints are approved for pouring, the joints shall be cleaned and the remaining space filled at one pouring with lead which shall be caulked in a manner that will assure tight joints without overstraining the bells. The depth of lead shall be not less than 2-1/4 inches measured from the face of the bell. After caulking, the lead shall be practically flush with the face of the bells. The lead shall conform to Specification No. QQ-L-156.

(b) Roll on joints shall be made with the standard materials furnished with the pipe, and in accordance with the recommendations of the manufacturer, subject to approval of the officer in charge.

(c) Asbestos cement pipe shall be joined in accordance with the recommendations of the manufacturer, subject to the approval of the officer in charge. Connections to cast iron fittings shall be as specified for cast iron pipe.

(d) Mechanical joints. - The jointing shall be in accordance with the recommendations of the manufacturer of the joint except as specified otherwise. Installation shall conform to the procedure recommended in Specification No. WW-P-421a. Bolts, nuts and exposed threads shall be coated with asphalt varnish after installation.

(e) Flanged joints. - The joints shall be firmly bolted with machine bolts. Bolts shall be regular hexagon bolts conforming to Specification FF-B-575, Type II. Gaskets shall be made of asbestos metallic cloth conforming to Specification HH-G-76b.

20-05. Pipe supports. - Exposed piping in the Water Plant shall be adequately supported from floor ceilings or walls as required. Hangers shall conform to Specification WW-H-171. Pipe below the ceiling shall be suspended from steel roof trusses, and where necessary, additional steel supports shall be provided between trusses for adequate support of hangers.

20-06. Valves.

(a) Gate valves for use with pipe 4 inches and larger shall be th double disc type with non-rising stems unless indicated or specified otherwise, and shall conform to American Water Works Association Standard AWWA C500-52T. Stem shall have nuts similar to those on valves of the existing system except exposed flanged valves in Water Plant and Reservoir shall have standard size wheels. Gate valves shall be of one make and shall open by a counter-clockwise rotation of the valve stem for non-rising stems; valves with rising stems shall open by a counter-clockwise rotation of the operating wheel.

(b) Gate valves for use with pipe 3 inches and smaller shall be bronze wedge disc in accordance with Specification WW-V-54, Type I, Class A.

(c) Check valves for use with pipe 4 inches and larger shall be cast iron body, bronze mounted, Class 150, non-slamming type, and shall conform to the applicable requirements of Specification No. MIL-V-18436, Type II, Style A.

(d) Check valves for use with pipe 3 inches and smaller shall be bronze and shall conform to Specification No. WW-V-51a, Class A.

(e) Float valves for controlling the brine level in the brine tanks shall be of the angle, single seating type having an internal piston disc holder and pilot valve. The valve shall have bronze body and bronze internal parts except for the rubber composition disc. The float and lever arm shall be constructed of bronze or other suitable material that will resist the corrosive action of brine.

(f) Pressure air valve - Where indicated, an approved pressure air valve shall be provided to automatically permit air to escape while the pipe line is in service and under pressure. The valve shall be iron body, bronze mounted and designed for 125 pounds working pressure. The float shall be made of hard rubber with phosphor-bronze levers. The seat shall be hard rubber and plunger of hard quality soft rubber. The construction of the valve shall be such that valve seats may easily be replaced.

(g) Back pressure control valve. - The back pressure valve shall be designed to maintain a back pressure, adjustable from 50 to 20 pounds, and shall be normally open with hydraulic pilot in control. The valve shall also be equipped with a solenoid pilot normally open when the hydraulic pilot is in control and when energized shall close, and, in turn, close the main valve. The back pressure valve, when in the closed position, shall be watertight with an up-stream pressure of 60 pounds per square inch. When the solenoid pilot valve is de-energized, the main valve shall open with hydraulic pilot again in control. The valve shall be cast iron bronze mounted, class 150, with flanges drilled for American 125 pound standard and shall be complete with all auxiliary valves, strainers and appurtenances.

(h) Solenoid valve. - Solenoid valve shall be of the globe type constructed of bronze with non-metallic valve disc. The valve shall be normally closing and designed for 125 psi water pressure with a water temperature range of from 50 degrees to 90 degrees F. The valve shall have moisture proof coils designed for operation on 120 volts, 60 cycle, single phase current.

20-07. Floor stands. - Valves shall be equipped with stem extensions, floor stands and operating wheels where indicated. Stem extensions shall be solid round steel rods of required size and length. Operating wheels shall be cast iron of sufficient diameter to easily operate the respective valves. Floor stands shall be manufacturers' standard with indicator for operation with non-rising stem valves and shall be arranged to permit secure bolting to concrete slab. The stands shall be approximately 36 inches in height.

20-08. Roadway boxes. Each valve on underground piping shall be provided with an adjustable cast-iron roadway box of a size suitable for the valve on which it is used. The head shall be round and shall have the word "Water" cast upon it. The least diameter of the shafts of the boxes shall be 5.25 inches. Boxes shall be given a heavy coat of bituminous paint.

20-09. Air valve manholes. - Manholes shall be constructed as detailed. Materials and workmanship shall be in accordance with Specification No. 42Ya. Frame and cover shall be Pattern No. 1 for paved areas, and Pattern No. 2 for unpaved areas. The word "WATER VALVE" shall be cast in the cast iron cover.

20-10. Hydrants shall be a standard type conforming to the latest specifications for valves and hydrants of the American Waterworks Association and shall be a type approved by the National Board of Fire Underwriters. They shall be 6 inches in diameter with 5-inch clear opening through the valve and shall be provided with a 4.5-inch pumper connection and two 2.5-inch hose connections. Hydrants shall be of the frost proof and non-flooding type which will not flood in case the barrel or valve stem is damaged, with waste orifices for draining the hydrant when the valve is closed, and shall be of the type which opens against the water pressure. Hydrant construction shall permit 360-degree orientation without disturbing sub-surface setting. The hydrants shall be designed for 150 pounds working pressure or 300 pounds hydrostatic pressure and shall open counter-clockwise. All working parts shall be bronze. Hose and pumper connection threads and operating nut shall be National Standard. Each hydrant shall be preceded in the line by a gate valve.

20-11. Setting hydrants, valves and valve boxes. Hydrants, valves and valve boxes shall be set plumb, and centered, with valve boxes placed directly over the valves. Valve boxes shall, if possible, be located outside the area of roads and streets. Earthfill shall be carefully tamped around the valve box to a distance of 4 feet on all sides of the box, or to the undisturbed trench face if less than 4 feet. Hydrants shall be set with the invert of the pumper connection 18 inches above grade. The connecting pipe will have the same depth of cover as the distributing mains. The hydrant shall be set upon a slab of stone or concrete not less than 4 inches thick and 15 inches square. The back of the hydrant, opposite the pipe connection, shall be firmly blocked against the vertical face of the trench with poured-in-place concrete to prevent the hydrant from blowing off the line. If the character of the soil is such that in the opinion of the officer in charge the hydrant cannot be securely blocked, bridle rods and rod collars shall be used. Bridle rods and rod collars shall be not less than 3/4 inch stock and shall be protected by a coat of bituminous paint. Not less than 7 cubic feet of broken stone shall be placed around the base of the hydrant to insure drainage. The backfill around hydrants shall be thoroughly compacted to the grade line. Hydrants and valves shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and the hydrant or valve shall be inspected in opened and closed positions, to see that all parts are in working condition.

20-12. Connections to existing mains. -

(a) Four inch pipe and larger. - Where indicated, standard tapping sleeves and valves shall be used for connections to existing mains. Sleeves shall be the all bell split type with head gaskets and flange connection for valve. Valve shall be as herein specified but especially constructed

for use with tapping sleeves. All bolts for sleeve and for connecting valve shall be galvanized. Bell joints of sleeve shall be poured with lead and caulked prior to making tap under pressure.

(b) Three inch pipe and smaller. - Connections of galvanized wrought iron pipe to existing and new cast iron mains or asbestos-cement pipe shall be made by cutting in or installing cast iron tees of the proper size or at the option of the contractor, inserting one inch (1") bronze corporation stops of sufficient number to provide the equivalent area of the pipe being connected and the final connection made with lead or copper goosenecks. When connections are made to asbestos-cement pipe an approved type service clamp shall be used.

20-13. Tests. Before being covered, the completed piping shall be subjected to a hydrostatic pressure test of 200 pounds per square inch maintained for 2 hours. All pipe, joints, valves, and fittings in the test section shall be examined. Defective material disclosed as a result of the test shall be replaced and the test repeated; any joint showing visible leakage shall be made watertight.

20-14. Sterilization.

(a) Before being placed in service, the new piping shall be flushed and sterilized by chlorination in accordance with the American Water Works Association Standard AWWA C601-48. The chlorine solution shall remain in the system at least 24 hours. After final flushing, the quality of the water shall be approved by the officer in charge before acceptance.

(b) Before being placed in service, the reservoir and piping shall be flushed out and scrubbed with scrub brushes and rinsed. After rinsing, the interior surface of the reservoir, outer surface of all pipes, columns, valve and appurtenances and manhole steps shall be mopped or sprayed with a strong chlorine solution and allowed to stand for 4 hours. The reservoir shall be given a final flushing prior to filling.

SECTION 21. SANITARY SEWERS.

21-01. General requirements. - The work includes the provision of and installation of all sewer mains, manholes, and all other miscellaneous pipe work to make the installation complete and ready for use as shown on the plans and as hereinafter specified.

21-02. Cast iron sewer. - Cast iron pipe shall be extra heavy cast iron woil pipe in accordance with Specification No. WW-P-401. Lead for caulking shall conform to Specification No. QQ-L-156, Type I. Installation shall be in accordance with Specification No. 31Yc.

21-03. Manhole. - Manholes shall be a standard manhole, constructed in accordance with Specification No. 42Ya, as shown on plate No. 5, except that special manhole shall be as detailed on drawings. Frame and cover shall be pattern No. 1 for paved areas, and pattern No. 2 for unpaved areas. The word "Sewer" shall be cast in the cast iron cover. Covers of manholes shall be set two inches above finish grade.

SECTION 22. STEAM DISTRIBUTION

22-01. General requirements. - The work includes the provision of a steam lateral from the existing aerial steam distribution system to the new water plant and includes aerial and underground steam and condensate piping in conduit, expansion loop, and anchors together with wood poles, pole hardware, piping, valves, insulation and connection to the existing steam distribution system. The installation shall be in accordance with Specification No. 21Yc, and material specifications and standards as hereinafter specified, and shall be delivered complete, connected as specified, and in perfect working order.

22-02. Description. - The system will receive steam at 125 psig. from the point of connection with the existing aerial steam main and shall convey the steam by means of an underground steam pipe in conduit to the building. Condensate shall be similarly returned to the existing return main.

22-03. Pipe supports. -

(a) Poles shall be in accordance with table 5 of the "American Standard Specifications and Dimensions for Wood Poles". Poles shall be set six feet into the ground and shall be of sufficient length to maintain the elevations shown on the drawings. Poles shall be straight within the limit of sweep direction as follows: A straight line joining the surface of the pole at the ground line and the edge of the pole at the top shall not be distorted from the surface of the pole at any point by an amount greater than one inch for each six feet of length between the points. Poles shall be well proportioned from butt to top. Minimum butt circumferences shall be taken at the ground line, six feet from the butt end of the pole and shall not be less than shown in the table mentioned above. Class of pole shall be as hereinafter specified and/or shown on the drawings.

(b) Poles shall be treated with creosote oil in accordance with the "American Wood Preservers' Association Manual of Recommended Practice" using the empty cell process with a final retention of twelve pounds per cubic foot. Poles shall be roofed and gained after setting and shall be treated as hereinafter described in this section. Gain shall be made on the concave side of poles having sweep or curvature. Poles shall not be dragged on the ground, nor shall cant hooks, pole tongs, or other tools which might cut or bruise the surface be used in handling poles.

(c) Roofs, gains, holes, and other cuts made in the field, or blemishes due to accidental injury shall be field treated with at least two coats of hot preservative solution painted or sprayed on as directed and followed by a final heavy coat of hot coal tar pitch. Preservative for field treatment shall be of the same analysis as original treatment and shall be heated at least 150 to 200 degrees F. before application. Field treatment shall comply with standards M-4 of the American Wood Preservers' Association.

(d) Poles shall be set in the ground at a depth of at least six feet measured from the low side of the hole. Poles shall be set with gain facing away from the main steam line.

(e) Pole trim. - Crossarms, braces, bolts and appurtenances used on poles and in the erection of the system shall be commercial quality steel, free from warps, twists, bends, imperfections, rust and shall be erected in a workmanlike manner. Sizes shall be as shown on the drawings.

(f) Hangers. - Spring hangers or supports of approved manufacturer shall be of the steel-cased type and furnished with a loading indicator and scale. Spring sizes for supports are indicated on drawings.

22-04. Materials. -

(a) Steam pipe shall be Type I, Class A (standard weight) steel in accordance with Specification No. WW-P-406.

(b) Condensate pipe shall be extra heavy wrought iron pipe in accordance with Specification No. WW-P-441b.

(c) Gate valves 2" and larger shall be cast iron in accordance with Specification No. WW-V-58 and shall be of the non-rising stem type, Type I, wedge disc. Class B for working pressures of 250 psig. Valves shall be of the flange type. Gate valves 1-1/2" and smaller shall be bronze in accordance with Specification No. WW-V-54, Type I, Class B and hydrostatically tested to 250 psig.

(d) Welding fittings for building service shall be of the individual stock welding type designed for making a right angle outlet such as ells, tees, and side outlets. Fittings shall taper at the proper angle to provide for a single bevel groove joint at the crotch section blending into a V-butt joint at the ear portion. The button may be removed as desired either before or after the outlet is welded to the main pipe.

(e) Flanges and fittings shall be of the same material as the pipe upon which it is used and shall conform to the requirements of Specification No. MIL-F-18032. Fittings shall be classed H-250.

22-05. Conduit. - Prefabricated underground conduit assemblies shall be sturdy in construction and the component parts shall not become loose, weakened or lose any of its insulating or waterproofing characteristics under normal construction and installation handling. The pipe ends shall be of the welded type and extend beyond the casing ends to allow sufficient room to align and weld each pipe section together. The encased piping shall be substantially supported internally to eliminate the possibility of sagging within the casing, and at the same time maintain its proper grade and alignment and allow for the required pipe expansion and contraction. Standard unit lengths shall not be less than 20 feet except for special fitted sections. Extreme care shall be exercised when handling or storing the material on the job site, especially out of doors to prevent pipe corrosion damage to the outer protective covering and the

collection of moisture within the insulation. If any doubt arises as to the presence of moisture in the insulation of any section or if the system is being installed under wet conditions, it shall be thoroughly dried by passing live steam through the lines to completely dry the insulation before sealing any casing joints, insulation and waterproofing material. A test shall be applied to the inner piping system as required in 21Yc, Section 6. After the pipe joints have proven satisfactory under the prescribed test, they shall be insulated and sealed with a waterproof material and enclosed in a metal collar. Insulation at fitted and welded joints shall have the same insulating qualities as used on the enclosed buried pipe. Where the conduit passes through manhole or building walls, care shall be exercised in making water-tight the joint between the outer surface and the wall. Supporting pads and anchor blocks shall be provided as indicated or as hereinafter described or as necessary for the service. When supporting pads are not required, the conduit shall be laid in a firm, graded, undisturbed trench bottom. Underground conduit insulation thickness shall be sufficient so as to not have a temperature greater than 150°F. on its outer surface when the system is under the required normal operating conditions. Water-proof, insulated, prefabricated conduit sections shall consist of single pipe systems firmly supported but free to expand and constructed with an insulated, water-proof conduit.

(a) Type I.

(1) Inner pipe support guides shall be an approved cast iron or fabricated steel spider type spaced not more than 9-foot centers. There shall be at least three support guides in every 21-foot standard unit. The pipes shall be free to expand and contract through the support guides with no excessive wear or injury to the insulating material. The support guides shall keep the enclosed piping in alignment and grade under normal operating conditions. Pipe support guides shall transmit a minimum amount of heat to the outer conduit surface.

(2) Insulating material shall be machine molded, water resistant asbestos fiber or glass fiber conforming to Specification HH-P-387. The insulation shall be protected with a 30-pound asphalt-saturated asbestos felt jacket with all joints lapped or telescoped, and stapled. Pipe expansion and contraction shall not injure the insulation in any way. Insulating material for conduit joints shall be molded half sections strapped around pipe.

(3) Corrugated zinc-coated steel conduit shall be helically constructed from corrugated sheets joined with a full welded lock seam to insure a waterproof pressure-tight conduit and designed for strength to prevent deformation in service. Each conduit section, after the seam is welded, shall be hot dipped zinc-coated and factory tested at a pressure of not less than 15 psig. The corrugated black sheets shall have a nominal weight of not less than 2.50 pounds per square foot. The conduit ends shall have heavy smooth steel collars welded on for field connecting of conduit sections. The collars shall have a nominal weight of not less than 5.625 pounds per square foot. All outside corrugated

surfaces of the metal conduit shall be machine coated with two layers of high melting point asphalt to a minimum thickness of 3/16 inch over crests of corrugations, with one inter-posed layer of asphalt-saturated asbestos pipe line felt, applied under tension. Conduit coating shall be finished with one layer of heavy kraft paper for protection in handling and shipping. Conduit ends shall be presealed around pipe to prevent water and moisture penetration during shipping, storing, and handling at job site.

(4) Conduit joint couplings shall be of the welding type, made of smooth heavy steel, rolled to fit over the conduit end collars and shall be 0.1046 inch thick and weight not less than 4.375 pounds per square foot. The conduit joint coupling shall be fitted snugly around the collar and then welded water tight. After couplings have been installed in an approved manner and the pressure test applied and conduit proven satisfactory, an asphalt blanket shall be field applied with heat over exposed metal and fused into factory coating on adjacent units. The inside conduit surfaces shall be phosphatized in accordance with MIL-C-490A, and coated with baked phenolic resin.

(5) Conduit fitting units such as elbows, T-branches, anchors, expansion loops, and gland seals shall be prefabricated and tested at the factory in a similar manner as the standard straight unit. These units shall be installed in a similar manner as the straight standard units. Fittings shall be presealed the same as standard conduit sections.

(6) Steel anchor plate shall be of sufficient size and thickness to hold the inner attached piping in alignment while the expansion loops provide for adequate expansion and contraction. The plate shall be welded securely to the inner piping and to the conduit casing. The anchor plate shall be provided with small vent holes so as to not block off the continuous venting of the conduit system. The concrete anchor block shall be of sufficient size so as to hold the anchor conduit section in firm position and alignment. All welding, where the anchor plate and conduit casing join, shall be water tight and factory tested. The heat transfer from the anchor plate to the concrete anchor block shall be designed for a minimum loss.

(7) Gland seals shall be furnished pre-fabricated and installed in manholes, pits, or building walls, consisting of a packed stuffing box and gland follower mounted on a steel plate welded to conduit ends. The seal shall be provided with a suitable drain plug at its lowest point. Means shall be provided for maintenance on the stuffing box, and the gland shall be adjustable for packing take-up from time to time.

(8) Testing of the inner piping system shall be held at the required pressure for two consecutive hours before checking for any leaks. A steam pressure of one and one-half times the working pressure shall be applied. The system shall be proven tight before any joints are

insulated and water-proofed. An optional method shall be an air pressure or pressure or hydrostatic test of twice the operating pressure but not less than 100 psig. Proper venting of the piping shall be accomplished in order that the testing medium, if other than air, can penetrate to every part of the system. If the air pressure test is used, all joints shall be checked for leaks with a soap solution at every field welded joint. No drop in pressure shall be allowed on a gage attached at the furthermost point from the pressure entering point of the section or system being tested. If leaks occur, they shall be repaired and the test repeated until proven tight. Valving shall be required to cut off the testing equipment from the system while the test is being conducted.

(9) Testing of the conduit system shall be accomplished by using compressed air at 15 psig. Upon satisfactory testing of the inner piping, all joints shall be insulated and the steel coupling welded in place on the conduit end collars. The conduit ends shall be sealed air tight and the air pressure test applied for a period of two consecutive hours with no loss of pressure showing on an attached pressure gage. During the testing period, all welded conduit joints shall be given a soap solution test to determine if leaks occur. If leaks do occur, they shall be repaired and the test repeated.

(10) Wrapping. - After all joints have been proven tight and free of all leaks, the joint coupling shall be wrapped with an asphalt blanket, heating the inside surface and pressing it around the coupling and overlapping part of the factory installed wrapper on the conduit. The heavy kraft wrapping paper shall be partly removed so that the asphalt ends of the asphalt blanket can be fused to the conduit asphalt wrapper by the use of a torch and a hot point trowel.

b. Type II.

(1) Inner pipe support guides shall be made of a rigid material capable of supporting the enclosed piping in correct alignment and grade and permitting free noiseless movement of the inner piping for expansion and contraction. The supports shall retain the inner piping in a uniform alignment so as to have adequate air spacing between the outer insulating surface and the inner conduit wall.

(2) Insulating material for all standard conduit sections and joints shall be of the molded type having maximum insulating qualities and shall not lose its insulating properties when moistened and then dried out. The insulation shall not be injured in any way from pipe expansion and contraction. Insulating material for joints shall be molded half sections strapped in place around pipe.

(3) Outer waterproof protective casing shall be of spiral welded black steel of a nominal weight of not less than 3.125 pounds per square foot. The spiral joints shall be of the lockseam welded type. The

ends shall be plain but reinforced to a thickness of not less than 0.1345 inches, beveled for field welding. After fabrication, the conduit shall be zinc-coated and in addition, coated with a protective water repellant compound inside and outside. Standard unit lengths shall be not less than 20 feet. Conduit ends shall be presealed around the pipe and casing at the factory to prevent water and moisture penetration.

(4) Conduit fittings shall be of black steel and have a nominal weight of not less than 5.625 pounds per square foot. The fittings shall be horizontal half sections with all edges and ends beveled for field welding and shall have a protective water repellant compound coating on the inner surfaces, but not near the beveled welding edges. The bottom half fitting sections shall be welded to the straight conduit thus permitting true conduit alignment during installation and at the same time exposing the inner piping joints for inspection and tests.

(5) Anchor plates shall be an integral part within the conduit at any predetermined joint location and shall require no concrete anchor block. The anchor plate shall be welded to the inner piping and the conduit at a joint. The anchor plate shall not obstruct the air space at the top running from one section to another or the continuous drainage at the bottom throughout the conduit system. The anchor plate shall be of required strength to hold the piping in alignment while the expansion loop provides adequate expansion and contraction.

(6) Conduit seals. - A mechanical seal with high temperature packing and an adjustable and removable gland for maintenance purposes shall be installed at conduit ends to prevent moisture penetration within the conduit. The inner piping shall be free to expand and contract without disturbance to the watertight seal.

(7) Testing of the inner piping system shall be held at the required pressure for two consecutive hours before checking for any leaks. A steam pressure of one and one-half times the working pressure shall be applied. The system shall be proven tight before any joints are insulated and water-proofed. An optional method shall be an air pressure or hydrostatic test of twice the operating pressure but not less than 100 psig. Proper venting of the piping shall be accomplished in order that the testing medium, if other than air, can penetrate to every part of the system. If the air pressure test is used, all joints shall be checked for leaks with a soap solution at every field welded joint. No drop in pressure shall be allowed on a gage attached at the furthermost point from the pressure entering point of the section or system being tested. If leaks occur, they shall be repaired and the test repeated until proven tight. Valving shall be required to cut off the testing equipment from the system while the test is being conducted.

(8) Testing of conduit shall be accomplished by using compressed air at 15 psig. The conduit ends shall be sealed air tight and the air test applied for a period of two consecutive hours, with no loss of pressure showing on an attached pressure gage. During the testing period, all welded conduit joints shall be given a soap solution test to determine if leaks occur. If leaks do occur, they shall be repaired and the test repeated.

(9) Insulating and coating. - After the steam and condensate piping has been proven tight, the inner surface of the bottom half of the conduit fitting and its immediate surrounding area shall be coated with a protective water repellant compound. Insulation shall then be applied and the remaining top half of the fitting welded in place. After all welded joints have been proven tight and free of all leaks, the outer surface of the conduit shall be coated with a recommended water-proofing compound.

(c). Type III.

(1) Casing support guides shall be of a heavy metal supporting ring slipped snugly over the insulating material and shall not come in direct contact with the pipe except in the construction of expansion loops and fittings where a load bearing block is used as well as a support. The circular supports shall transmit the weight of the pipe directly to the outside of the casing and shall be spaced between 24 to 30 inches on centers. The support shall be designed to allow hot water-proofing compound to flow freely through and from one support to another so as to provide a continuous coating of water-proofing compound over the entire system. The piping shall not be designed to slide on the supports but shall slide freely and noiselessly within the insulation while expanding and contracting.

(2) Insulating material shall be of the factory molded full circular type which will retain its physical, chemical, and insulating qualities after being thoroughly soaked in water by immersion and dried out. The insulation shall not be injured in any way or lose any of its properties from expansion and contraction of the inner piping. Insulating joint half sections shall fit snugly and shall be of the same material. After they are in place, the joint insulation shall be secured by wrapping.

(3) Protective covering for the insulation shall be hot asphalt poured around the insulation in a circular zinc-coated metal casing which shall have a nominal weight of not less than 0.906 pound per square foot and with suitable vents and pour holes. The asphalt shall have a minimum softening temperature of 230 degrees F. and be at least 1 inch thick. The asphalt shall not soften or lose its protective properties when the system is operated at its maximum temperature. The conduit ends shall be presealed around the pipe at the factory to prevent water and moisture penetration during shipping, storing and handling at the job site.

(4) Coupling casings shall be of similar zinc-coated steel as used for protective casing and shall be cut to a length so that section ends will be partly overlapped. A pour and vent hole shall be provided as required and the metal shall be shaped to fit the adjacent conduit metal casing. After the insulation is applied to the joint, the metal coupling shall be secured to adjacent conduit casings with sheet metal screws, and a 1-inch layer of hot asphalt poured. The finished joint shall be absolutely water tight.

(5) Section fittings such as elbows, tees, anchors, expansion bends or loops, and other types of fittings shall be prefabricated at the factory in a manner similar to the straight sections.

(6) Insulating type anchor plates shall be of sufficient size and thickness to hold the inner piping in alignment while the expansion assembly provides for the required expansion and contraction. Heat loss shall be held to a minimum at the anchor.

(7) Packed end cap shall be used in manhole or building wall entrances where the piping has sliding movement and would allow moisture to enter the system. The packing which seals the section end shall be of a material which will withstand high temperatures. The stuffing box gland shall be adjustable for take up from time to time. Means shall also be provided for maintenance.

(8) Testing of the inner piping system shall be held at the required pressure for two consecutive hours before checking for any leaks. A steam pressure of one and one-half times the working pressure shall be applied. The system shall be proven tight before any joints are insulated and water-proofed. An optional method shall be an air pressure or hydrostatic test of twice the operating pressure but not less than 100 psig. Proper venting of the piping shall be accomplished in order that the testing medium, if other than air, can penetrate to every part of the system. If the air pressure test is used, all joints shall be checked for leaks with a soap solution at every field welded joint. No drop in pressure shall be allowed on a gage attached at the furthermost point from the pressure entering point of the section or system being tested. If leaks occur, they shall be repaired and the test repeated until proven tight. Valving shall be required to cut off the testing equipment from the system while the test is being conducted.

22-06. Testing. - Tests after installation shall be in accordance with Section 6 of Specification No. 21Yc.

22-07. Insulation. - After testing and painting, steam piping, condensate piping, fittings and valves in aerial portion of system shall be insulated. Insulation for steam piping shall be nominal 2" thickness and condensate piping shall be nominal 1" thickness. Insulation shall conform to Specification No. MIL-I-2781B, Grade I, Class B, or at the contractor's option, shall be fibrous glass insulation conforming to paragraph 2-22(e) of Specification No. 21Yc. The thickness of fibrous glass insulation, as selected shall be such as to provide an insulating efficiency not less than that provided by the thickness of the other insulating material specified above. Installation shall be in accordance with Specification 21Yc.

(a) Insulation on steam and condensate piping and fittings shall be given a water-proof covering in accordance with Specification No. 21Yc except as specified otherwise. Roofing felt shall be class RA-20 or AA-30, weighing not less than 30 pounds per 100 square feet.

(b) Roofing felt shall be secured to the insulation with 14 gage copper clad wire spaced not over 9" on centers. A final coat of bituminous plastic cement at least 1/16" thick shall be applied over the roofing paper. The cement shall be hard setting type which shall not become appreciably soft at 220 degrees F. and shall conform to Specification No. SS-C-153.

(c) Pipe shall be painted one coat of an approved black, heat-resistant paint before the insulation is applied.

22-08. Painting. - All pole hardware, nuts and miscellaneous metal items shall be given a prime coat of asphalt paint and a finished coat of approved asphalt varnish.

SECTION 23. PAVING AND DRAINAGE

23-01. General requirements. - The work includes the provision of rolled shellrock base course; asphaltic concrete surface course; concrete sidewalks; concrete catch basins; reinforced concrete pipe and shellrock gutter.

23-02. Rolled shellrock base course. -

(a) After the sub-grade has been prepared and brought to true line, grade and cross-section as provided in another section, the base cours shall be placed, consisting of rolled coquina rock (locally known as shellrock) to the thickness indicated. The base materials shall be comgined in such proportions as to produce a mixture conforming to the following composition limits by weight:

Standard Square Mesh Laboratory Sieves

Sieve Designation	Passing Percent by Weight
2½"	100
2"	90 - 100
1"	55 - 90
½"	45 - 75
No. 4	30 - 60
No. 40	10 - 35
No. 200	5 - 20

(b) The base course material shall be spread with shovels from dumping boards or from approved dumping devices attached to trucks. It may be spread directly from approved vehicles constructed for this purpose, but the material shall not be dumped in piles directly on the sub-grade.

(c) The base material shall be placed and rolled in at least two layers of approximately equal depth and shall be continually machined with a motor grader of approved design. The roller, either flat wheel or pneumatic tire type, satisfactory to the Officer-in-Charge shall be used to obtain thorough compaction and the surface of the base course shall be sprinkled with water as directed to aid in the compacting and bonding.

(d) Spreading of the base material shall begin at the point nearest the source of supply. Hauling shall be done and traffic permitted over the base to assist in compaction. Any ruts formed by the traffic shall be carefully filled by the motor grader and re-rolled. After the base course is in place, machining and rolling shall continue until the surface is smooth, hard, well bonded and true to the designed cross-section.

(e) The base shall be machined as often as necessary to maintain it smooth and true to grade and cross-section until the surface course is applied.

23-03. Asphaltic concrete surface course. -

(a) Materials. - The fine aggregate shall conform to the requirements of Specification No. SS-S-71a. The coarse aggregate shall be crushed stone, size 3/8 inch to No. 8 conforming to Specification No. SS-C-73la. The asphalt cement shall be type AP-3, Specification No. SS-A-706b. Mineral filler shall conform to AASHO designation M 17-42.

(b) Asphaltic concrete. - The mineral aggregate and bituminous material in the surface course shall be combined in such proportions as to produce a mixture conforming to the following composition limits by weight:

Standard Square-mesh Laboratory Sieves

Passing	Retained on	Percent by Weight
3/4 inch		100
3/4 inch	No. 4	10 - 35
No. 4	No. 10	5 - 25
No. 10	No. 40	15 - 40
No. 40	No. 80	10 - 30
No. 80	No. 200	5 - 30
No. 200		4 - 10
Bitumen		7 to 9.5

(c) Job mix - Before starting work, the contractor shall submit for approval the formula for the mix he proposes to furnish for asphaltic concrete surface, specifying a definite percentage of bitumen to be added to the aggregate. The mixture shall remain uniform within the following tolerances:

Retained on ½ inch to No. 80 sieves	+ or - 7%
Retained on No. 200 sieve	+ or - 5%
Passing No. 200 sieve	+ or - 3%
Bitumen	+ or - 0.5%

(d) Mixing - The bituminous material shall be brought to a temperature between 250° and 325° and the aggregate shall be brought to a temperature between 250° and 400° F. before being introduced into the mixer. Temperatures selected from within the above range shall be maintained within a tolerance of 20° F. Minimum mixing time shall be as directed.

(e) Construction methods. - All equipment, tools, machinery and plant shall be subject to approval before the work is started and shall be maintained in satisfactory condition. The equipment shall be capable of spreading the bituminous mixture to a uniform density and striking a

smooth finish, true to section and free from inequalities. Rolling and the condition of the material shile being deposited shall be as approved by the Officer-in-Charge and placing shall be as nearly continuous as possible. No material shall be placed except when the work is done under dry conditions with the temperature above 40° F. The finish asphaltic concrete surface shall have a minimum thickness of 1½" and no tack coat shall be required. The pavement shall be protected after final rolling and no traffic will be permitted until hardening and in no case less than six hours.

23-04. Concrete sidewalks. - Concrete for sidewalks shall be class E-1-1/2 in accordance with Specification No. 13Yd. Construction joints and finish shall be in accordance with applicable sections of Specification No. 4Ye. Sidewalks shall have a thickness of four inches unless otherwise indicated.

23-05. Reinforced concrete pipe. - Pipe shall be standard strength, reinforced concrete pipe conforming to American Association of State Highway Officials Standard Specification No. M-41-49, of sizes indicated.

(a) Culverts shall be laid to exact line and grade. The trench shall be excavated sufficiently far below grade so that the outside of the bell will clear the trench bottom when the pipe is placed on grade. The excavation shall then be brought to grade by back-filling the trench bottom with clean, sandy earth carefully tamped so that the pipe rests for its full length and 20% of its circumference on a firm, slightly yielding bed. The spigot shall be shoved home and centered in the bell and the annular space completely filled with mortar composed of one part of Portland cement and two parts of clean, sharp sand.

(b) Before succeeding sections of the pipe are laid, the lower portions of the bell or groove of the pipe shall be filled from the inside with cement mortar with a sufficient thickness to bring the inner surface of the abutting pipes flush and even. After the pipe is laid, the remainder of the joints shall be solidly filled with mortar and sufficient additional mortar used to form a bed or ring around the outside of the joints. Inside of the joints shall be wiped and finished smooth. After the mortar has taken an initial set, the mortar on the outside shall be protected from the air and sun with a cover of thoroughly wetted earth or burlap.

(c) Pipe which is not in true alighment, or which shows any settlement after the laying, shall be taken up and relaid.

23-06. Drainage structures. - Concrete catch basins shall be constructed as detailed on the drawing. Materials and workmanship shall be in accordance with the applicable requirements of Specification No. 42Ya.

23-07. Frames, covers, and gratings shall conform to the applicable requirements of Specification No. 42Ya and in accordance with the details on drawings.

23-08. Miscellaneous drainage pipe. - Drains from the building floor drains and sump drains shall be connected to the outside drainage system as indicated.

(a) Vitrified clay sewer pipe shall conform to Specification SS-P-361a.

(b) Pipe laying.

(1) Each section of pipe shall be brought to exact line and grade, the spigot centered in the bell of the preceding length and shoved solidly home. The annular space shall be caulked with tight twisted tarred oakum driven solidly against the back of the bell. Joints shall then be made with hot poured bituminous compound. The interior of the pipe shall be kept clean by dragging a swab upstream past each joint immediately after its completion. Any defective joint shall be removed, thoroughly cleaned, and remade.

(2) Bituminous joints shall be used for vitrified clay pipe. Material used for hot poured bituminous joints shall be approved by the Officer in Charge prior to delivery and shall be delivered to the job site in the manufacturer's package, plainly marked and unopened. Heating and pouring shall be in accordance with the manufacturer's recommendations. In pipe having a nominal diameter not greater than eight inches, as many as two lengths of pipe may be pre-jointed in a vertical position, provided that the pipe shall be supported for its full length when lowered into the trench and no joint shall be subjected to strain.

23-09. Shellrock gutter. - The gutter shall be constructed of shellrock, the grading of which shall be as specified for rolled shellrock base course.

(a) The stone shall be placed in one layer and thoroughly compacted by tamping to thickness shown. Finished surfaces shall be brought to a true grade at the elevations indicated.

SECTION 24. FENCING

24-01. Materials. - Fence posts, gates and accessories shall conform to specification No. RR-F-183. The fabric conforming to specification No. RR-F-191a. The barb wire conforming to specification No. RR-F-221b.

24-02. Fence Posts, Gates and Accessories. - Line posts, corner and gate posts shall be set in concrete footings. Footings for line post shall be 36" deep by 11" diameter and post set to bottom of concrete. Corner and gate post footing shall be 48" deep and 16" diameter and post set 42" in the concrete. Concrete footings to be Class D-1 in accordance with specification No. 13Yd. The footings to extend about two inches above the finished grade with the tops and exposed surfaces floated to a smooth finish. Gates shall be double leaf vehicular and single leaf pedestrian swing type and supplied with an approved type of padlock with three keys furnished for each lock with brass chains on brass identification tags properly marked. Top rail and bottom reinforcing wire shall be provided. An approved type of post top shall be provided for each post having one arm set at approximately 45° towards the outside and carrying three barbed wire.

24-03. Fabric shall be Type A, 2-inch woven wire diamond mesh No. 6 wire, 84 inches in height with the top and bottom selvage having a twisted and barbed finish.

24-04. Barb wire shall be Type A, 4-point. Strand to be 12 ga., barb to be 14 ga., 3 wires shall be constructed on top of fabric. The uppermost barb wire shall be approximately 12 inches horizontally from the fabric line.

24-05. Installation. - Fencing shall be installed in a workmanlike manner with the wires stretched and fastened securely to the posts and fabric stretched so that there will be no slack edges or warped sections.

SECTION 25. BIDS

25-01. Instruction to bidders, U. S. Standard Form No. 22 revised March, 1953, and Invitation for Bids, U. S. Standard Form No. 20, shall be observed in the preparation of bids. Envelopes containing bids must be sealed, marked and addressed as follows:

Bid for Water Treatment Facilities, Montford Point, Specification No. 47371.

Public Works Officer
Building 1005
Marine Corps Base
Camp Lejeune, N. C.

25-02. Items of Bids. - Bids shall be submitted, in triplicate, on U. S. Standard Form No. 21 revised March, 1953, Bid Form, and in accordance with U. S. Standard Forms No. 20 and No. 22, upon the following items.

Item 1. - Price for the entire work, complete in accordance with drawings and specifications.

Item 2. - Price for the entire work complete in accordance with the drawings and specifications based on the omission of all work in connection with the provision of the 8-inch water distribution main "C".

Item 3. - Price the contract shall be increased or decreased for each working day of the supervisory engineer for the water softening equipment in excess of or less than the working days specified. The amount per day shall include the salary and all living and other expenses of the engineer.

Item 4. - Price the contract shall be increased or decreased for each working day of the supervisory engineer for the chlorination equipment in excess of or less than the working days specified. The amount per day shall include the salary and all living and other expenses of the engineer.

25-03. Telegraphic modification of bids in accordance with U. S. Standard Form No. 22 may be made. Two signed copies of the telegram in a sealed envelope marked "Copies of telegraphic modification of bids for Water Treatment Facilities, Montford Point, Specification No. 47371," should be forwarded immediately to the office to which the written bids were submitted.

25-04. Reference to addenda. - Each bidder shall refer in his bid to all addenda to this specification; failure to do so may constitute an informality in the bid.

SPECIFICATION NO. 47371

NOTICE

The Government forms, Bureau of Yards and Docks Standard Specifications mentioned and other information necessary may be obtained from the District Public Works Officer, Headquarters, Fifth Naval District, U. S. Naval Base, Norfolk 11, Virginia, or Public Works Officer, Navy Department, Building 1005 Marine Corps Base, Camp Lejeune, N. C. The remainder of the Standard Specifications and other materials referred to may be examined at the District Public Works Office or at the Public Works Office, or the Standard Government Specifications may be obtained from the Superintendent of Documents, Washington 25, D. C., at their established prices.

Camp Lejeune, N. C. 22 December 1955

W. SIHLER
RADM (CEC) USN
Officer in Charge of Construction
Fifth Naval District

For:

ROBERT H. MEADE
RADM (CEC) USN
Chief of Bureau of Yards and Docks
Department of the Navy

LIST OF WAGE RATES
DECISION #-5334, 18 October 1955
CAMP LEJEUNE, ONSLOW COUNTY, NORTH CAROLINA

	Per Hour
Air Tool Operators (jackhammerman vibrator)	$ .935
Asbestos workers	2.75
Asbestos workers improvers:	
1st year	1.25
2nd year	1.64
3rd year	1.85
4th year	2.07
Asphalt rakers	1.00
Boilermakers-blacksmith	2.975
Boilermakers helpers	2.725
Bricklayers	2.50
Carpenters	1.65
Cement masons	1.625
Electricians	2.40
Elevator constructors	2.20
Elevator constructors helpers	1.54
Glaziers	1.50
Iron workers, structural	2.50
Iron workers, ornamental	2.50
Iron workers, reinforcing	2.25
Laborers	.90
Lathers	1.75
Marble setters	1.75
Marble setters helpers	.85
Mason tenders	$ 1.00
Mortar mixers	1.00
Painters, brush	1.65
Painters, structural steel	2.00
Piledriverman	1.65
Pipe layers (concrete and clay)	.90
Plasterers	2.00
Plasterers tenders	.935
Plumbers	2.50
Roofers	1.50
Sheet metal workers	1.75
Soft floor layers	1.65
Steam fitters	2.50
Stone masons	2.50
Sprinkler fitters	2.83
Terrazzo workers	2.00
Terrazzo workers helpers	.85
Tile setters	2.00
Tile setters helpers	.85
Truck drivers	.85
Welders - receive rate prescribed for craft performing operation to which welding is incidental	

Power Equipment Operators:	
Backhoes	2.125
Cranes	2.125
Cableways	2.125
Derricks	2.125
Beam hoist	2.125
Draglines	2.125
Dredge or other floating equipment	2.25
Pile drivers	2.25
Pavers	2.125
Heavy duty mechanics	2.125
Scrapers, wheel type	2.125
Shovels	2.125
Truck cranes	2.125
Tractors with attachments	2.125
Tractors without attachments	1.875
Trench machines	2.125
Welding machines	2.125
Tournapull	2.125
Air compressors	1.75
Bulldozers	1.875
Fireman	1.55
Hoist, double drum	1.875
Hoist, one drum	1.625
Finishing machine	1.875
Mixers (Larger than 10-S)	1.75
Mixers (Smaller than 10-S)	1.625
Motor graders	2.00
Pump over 2" discharge	1.75
Pump under 2" discharge	1.625
Rollers, earth	1.87
Rollers, asphalt	2.00
Apprentice engineers and oilers	1.55