



WATER-RIGHT DOCKET

Assateague Island National Seashore

Docket No: 1

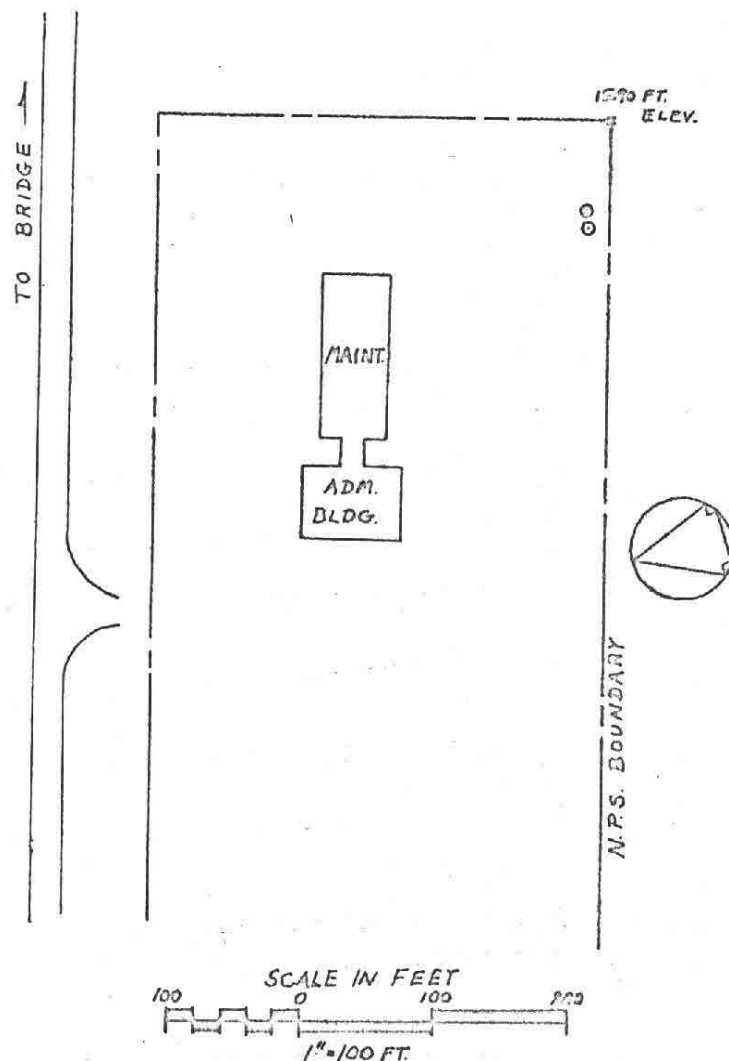
HEADQUARTERS WELL

Supporting Hydro Data

05-12-1967: log of well for assateague island national seashore

R. L. MAGETTE WELL DRILLING COMPANY											
SMITHFIELD, VIRGINIA											
LOG OF WELL For <u>Assateague Island National Seashore</u>											
Located at Headquarters Site _____ in <u>Worcester</u> County, State <u>Maryland</u>											
Date Drilling Started _____, 19____ Date Started _____ 19____											
Finished Drilling _____, 19____ Finished _____ 19____											
Formation And Depth Of Well					Dimensions Of Casing And Screen						
Total Depth Of All Strata		Depth Of Each Stratum		Formation Found At Each Stratum	Total Length Of All Screens And Casings		Length Of Each Sec. Of Screen Or Casing		Specify Screen Or Casing	Size Of Screen Or Casing	
Ft.	In.	Ft.	In.		Ft.	In.	Ft.	In.			
PUMPING TEST											
Date	Time	GPM	DD	P1							
5-12-67	6:10	102	124'	130'							
	7:10	102	129'	135'							
	8:10	102	135'	141'							
	9:10	102	137'	143'							
	10:10	100	138'	144'							
	11:10	100	140'	146'							
	12:10	100	140' 7"	146' 7"							
	1:10	100	141' 1"	147' 1"							
	2:10	100	141'	147' 1"							
0	- 6	Medium soft yellow clay									
6	- 15	" " " sand									
15	- 22	" " " white " (some gravel)									
22	- 28	Coarse gravel									
28	- 34	Sandy Clay									
34	- 42	Medium hard blue clay									
42	- 52	Medium soft sandy clay									
52	- 63									WELL DATA:	
63	- 73	Sandy clay & shell								Preliminary Test	
73	- 83	Coarse sand, gravel & clay								Date Tested _____ 19____ Stati	
83	- 94	" " " (washed)								Production _____ GPM Pump	
94	- 104	" " " "								Permanent Test	
104	- 115	Medium soft clay & sand								Date Tested _____ 19____ Stati	
115	- 124	Coarse sand & gravel (washed)								Production _____ GPM Activ	
124	- 134	" " " "								Draw Down _____ Pump	
134	- 143	Soft coarse sand								Remarks: _____	
143	- 154	" " " & green clay									
154	- 162	Medium hard green clay									
162	- 172	" soft "									
172	- 180	Coarse sand, gravel & some shell (soft)									
180	- 191	" " " "									
191	- 200	" " " "									
200	- 208	Soft medium sand & shell									
208	- 211	Sand, shell & clay									
211	- 221									PUMP DATA:	
221	- 231	Medium soft blue clay & shell								Shop No. _____ Type Lumber	
231	- 241	Soft medium to fine sand real soft								Type Head _____ Size Suction	
241	- 251	" " " " & clay								Depth Setting _____ (BP to MB)	
251	- 262	Soft sandy clay & sand								Size Column _____ Length Suction	
262	- 273	" " " "								Type Bowl _____ Length Air Li	
273	- 282	Fine to medium sand								No. Stages _____ Discharge-	
282	- 292	" " " "								Cap'y. and Head _____ Pressure	
292	- 303	" " " "									
303	- 313	" " " "									
313	- 323	" " " " & shell									
										MOTOR DATA:	

5-67



LOCATION OF WELLS HEADQUARTERS, SANDY POINT BRIDGE VISITORS' CENTER, ASSATEAQUE ISLAND NATIONAL SEASHORE N.P.S.

PUMPING TEST

Location: Sandy Point Bridge Visitors' Center, 80 feet west of the east boundary and 15 feet north of the south boundary of National Park Service compound.

Ownership: Assateague Island National Seashore, National Park Service, Department of the Interior

Well Data: 300 feet deep x 6 inches diameter with 30 feet of 5 5/8-inch Johnson stainless-steel, wire-wound screen, #15 slot, set in the Manokin aquifer without gravel pack between 270 feet and 300 feet on 10 feet of 5 5/8-inch casing welded into bottom of 6-inch casing at 260 feet. Well grouted between 6-inch casing and 8-inch hole from 260 feet to within 4 feet of land surface. Well developed by air pumping and surging for 7 hours on Thursday, May 11, 1967. Air discharged through split nipple in screen-washdown pipe set at about 210 feet below top of casing.

Static Water Levels: Water level at 3.44 feet below top of casing which was 3.4 feet above land surface on Tuesday, May 9, 1967, after standing for one week and prior to setting screen.

Water level at 6.0 feet below top of casing which was 3.4 feet above land surface on Friday, May 12, 1967, immediately before starting test.

Pump Settings: 7.5 HP submersible test pump with 5 bowls set with top of bowls at 147 feet below top of casing which was 3.4 feet above land surface.

Time of Test: Pumping started at 6:10 a.m., Friday, May 12, 1967.
Pumping stopped at 2:55 p.m., Friday, May 12, 1967.

Measurement Conditions:

Water Levels: Measured between 2-inch discharge line and 6-inch casing with electric tape. On recovery, increments of recovery for predetermined times were measured between masking-tape markers on electric-tape line.

Time: Measured with wrist watch with sweep second hand.

Discharge: Measured with 3-inch orifice plate on 10 feet of 4-inch horizontal discharge pipe. Manometer readings recorded.

<u>Drawdown Data</u>					
<u>Time</u>	<u>Time since pumping started, in minutes, t</u>	<u>Water level, in feet below top of casing</u>	<u>Orifice plate manometer, in inches</u>	<u>Discharge in gallons per minute</u>	<u>Specific con- ductance</u>
6:10 a.m.	0	6.0	0.0	0	-
6:28	18	130.3	5.25	102	-
6:45	35	135.6	-	-	-
7:12	62	137.8	5.25	102	-
7:40	90	140.1	-	-	457
8:00	110	141.05	-	-	460
8:10	120	141.7	5.25	102	-
8:30	140	142.6	5.1	101	-
8:50	160	142.8	5.1-5.0	100	457
9:10	180	143.7	-	-	-
9:43	213	144.6	4.9-5.1	100	-
11:10	300	146.3	4.7-4.8	98	460
12:10 p.m.	360	146.7	-	-	-
1:10	420	147.1	-	-	-
2:40	510	*147.5 ⁺	4.7-4.8	98	460
2:55	525	End of drawdown test			

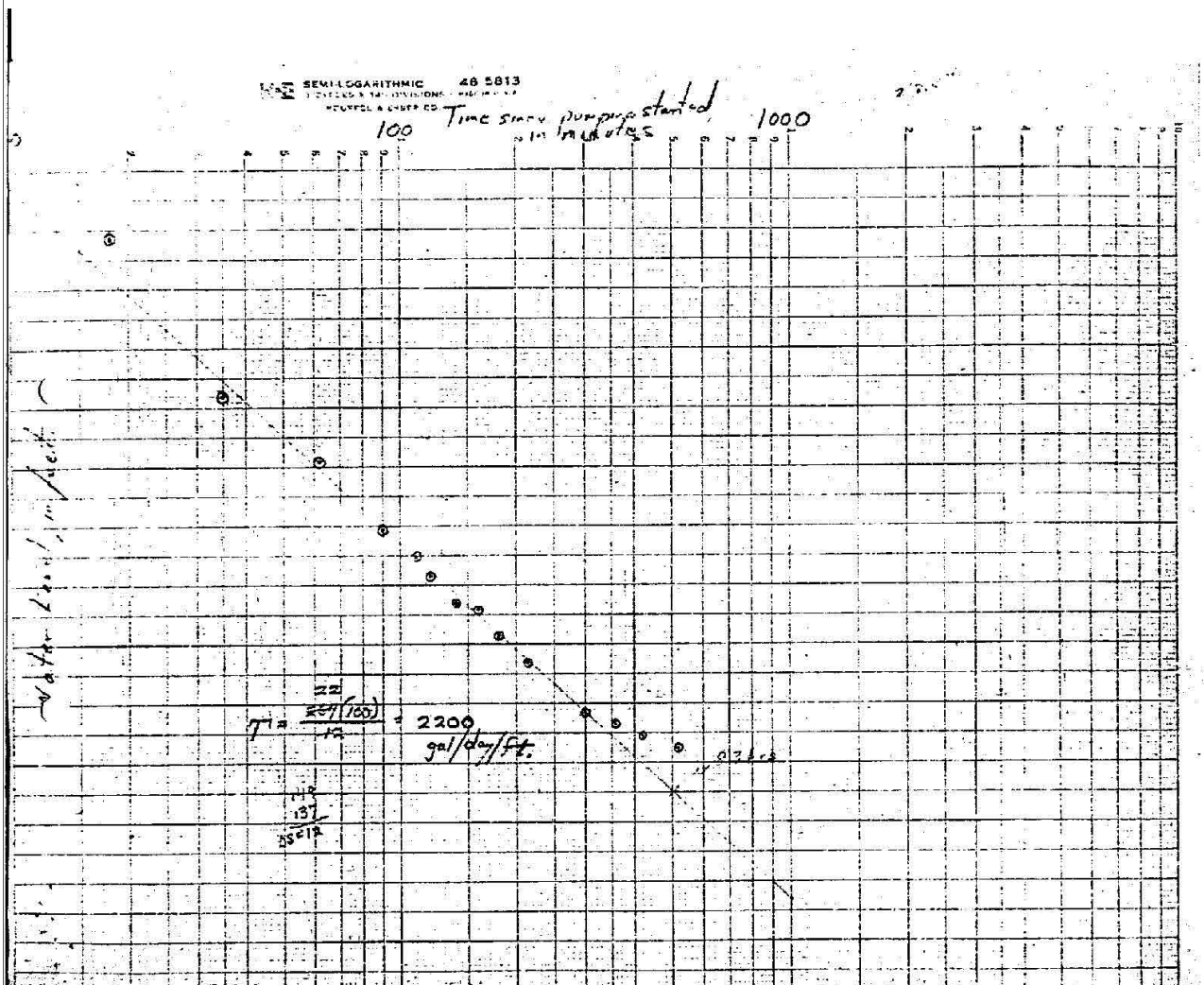
*at pump bowls

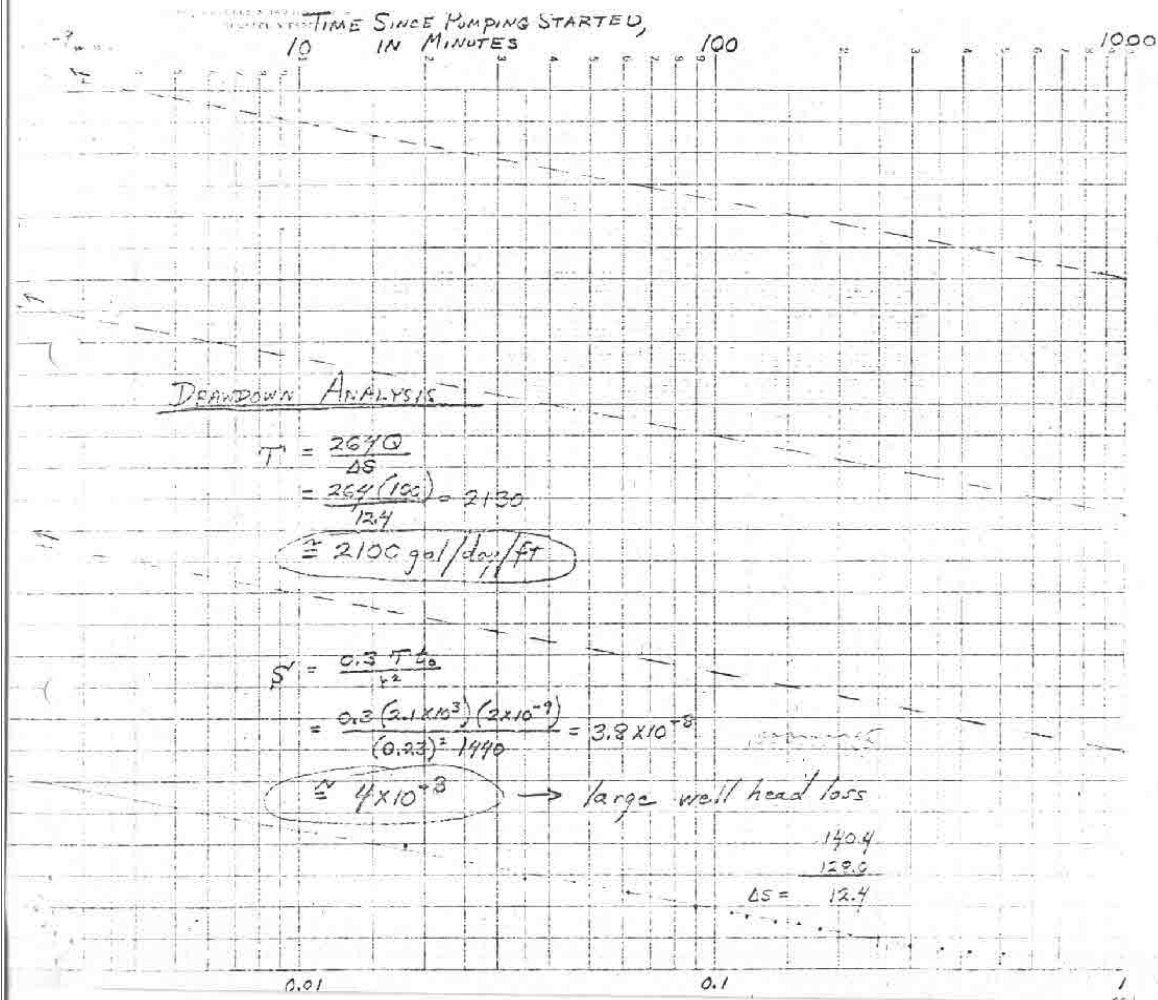
Recovery Data

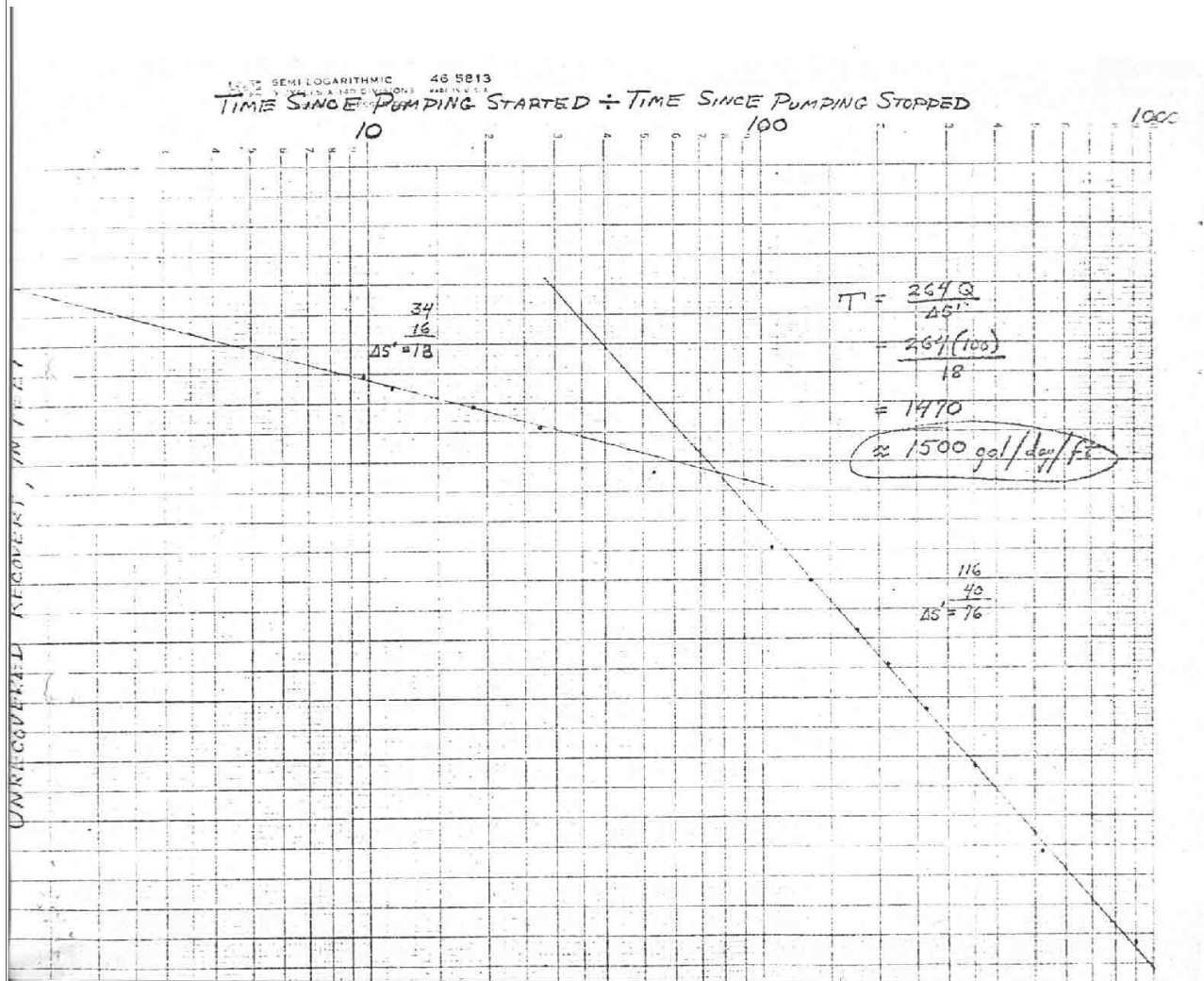
<u>Time</u>	<u>Time since pumping stopped, in minutes, t'</u>	<u>Water level recovery, in feet above 147.5- foot pumping level, s</u>
2:54:50	0	0.0
2:55:25	0.58	30.0
2:55:50	1.0	45.6
2:56:20	1.5	60.0
2:56:50	2.0	69.7
2:57:20	2.5	77.2
2:57:50	3.0	83.0
2:58:50	4.0	91.3
2:59:50	5.0	96.9
3:04:50	10.0	109.7
3:14:50	20.0	117.3
3:25	30.0	120.84
3:45	50.0	124.05
3:55	60.0	126.05

Recovery Analysis

<u>Time since pumping started, in minutes, t</u>	<u>Time since pumping stopped, in minutes, t'</u>	<u>Ratio of time started to time stopped, t/t'</u>	<u>Unrecovered recovery, in cent, a'</u>
525	0.0	<i>D</i>	141.5
525.58	0.58	901.	111.5
526.0	1.0	526.	95.9
526.5	1.5	351.	81.5
527.0	2.0	264.	71.8
527.5	2.5	211.	64.3
528.0	3.0	176.	58.5
529.0	4.0	132.	50.2
530.0	5.0	106.	44.6
535.0	10.0	53.5	31.8
545.0	20.0	27.3	24.2
555.0	30.0	18.5	20.7
575.0	50.0	11.5	17.5
585.0	60.0	9.75	15.5







R. L. MAGETTE WELL DRILLING COMPANY

SMITHFIELD, VIRGINIA

LOG OF WELL For Assateague Island National SeashoreLocated at Tom's Cove in Accomac County, State Maryland

Date Drilling Started _____, 19____ Date Started _____ 19____

Finished Drilling _____, 19____ Finished _____ 19____

Formation And Depth Of Well				Dimensions Of Casing And Screen			
Total Depth Of All Strata		Depth Of Each Stratum		Formation Found At Each Stratum		Total Length Of All Screens And Casings	
Ft. In.		Ft. In.				Ft. In.	
0	-	12		Brown coarse sand (washed)			
12	-	24		"			
24	-	34		Medium coarse grey sand			
34	-	45		Medium fine grey sand - some clay			
45	-	55		Clay & streaks of sand - fine			
55	-	65		" " " - medium hard clay			
65	-	75		Sandy clay & shell			
75	-	85		Fine sandy clay & shell			
85	-	96		" " " "			
96	-	106		Soft clay & shell			
106	-	116		" " " "			
116	-	126		" " " "			
126	-	136		" " " "			
136	-	146		Soft blue clay			
146	-	156		Shell, gravel & some soft sand			
156	-	164		" " " "			
164	-	174		Sand & shell			
174	-	184		" " " "			
184	-	194		Sand & soft clay			
194	-	205		Medium soft clay			
205	-	215		Medium soft clay & shell			
215	-	225		" " " " w/medium coarse sand			
225	-	235		Medium fine sand - soft			
235	-	245		Sandy clay			
245	-	256		" " " " w/traces of shell			
256	-	266		Clay w/traces of sand			
266	-	276		" " " " " "			
276	-	286		Medium soft clay & shell			
286	-	296		Soft sand & shell			
296	-	307		" " " " " "			
307	-	317		Medium soft sand clay			
317	-	327		Medium fine sand - soft			
327	-	337		Medium sand			
337	-	347		Shell & sand			
347	-	357		Hard streaks of shell - sandstone & sand			
357	-	367		" " " " " "			
367	-	376		Sand & streaks of rock			
376	-	386		Soft black clay			
386	-	394		" " " " & streaks of rock			
394	-	404		" " " " " "			
404	-	416		Soft sandy clay			
416	-	425		" " " " " "			
425	-	435		Medium soft clay			
435	-	446		Fine soft sand			
446	-	456		Medium soft clay			
456	-	466		" " " " " "			
466	-	475		Soft sandy clay			
475	-	486		" " " " & shell			
486	-	496		Grey clay w/shell			
496	-	507		Medium fine sand w/shell & clay			
507	-	516		" " " " w/clay			
516	-	526		" " " " w/shell			
526	-	536		Sandy clay			
536	-	546		" " " " " "			
546	-	556		Soft sandy clay w/traces of shell			
556	-	566		" " " " " "			
566	-	576		Soft sandy clay			
576	-	586		" " " " " "			
586	-	596		" " " " " "			

WELL DATA:

Preliminary Test

Date Tested _____ 19____ Stat

Production _____ GPM Pump

Permanent Test

Date Tested _____ 19____ Stat

Production _____ GPM Act

Draw Down _____ Pump

Remarks: _____

PUMP DATA:

Shop No. _____ Type Lumber

Type Head _____ Size Section

Depth Setting _____ (BP to MB)

Size Column _____ Length Suct

Type Bowl _____ Length Air

No. Stages _____ Discharge

Cap'y. and Head _____ Pressure

MOTOR DATA:

Horse Power _____ Voltage

RPM _____ Phase

Type _____ Cycles

Make _____ Frame No.

COMPLETION REPORT

#14-10-5: 622-002

Drilling Test Wells

COMPLETION REPORT

Contract #14-10-5: 622-002

Drilling test water wells at AINS headquarters and Tom's Cove, Assatengue
Island National Seashore.

Bid opened: 2/24/67 3:00 p.m.

Contract Awarded:

Contract Amount: \$12,132.00

Contract Winner: R. L. Magette Company
Smithfield, Virginia

Notice to Proceed: 3/17/67

Reconstruction Conference: 3/20/67 1:00 p.m.

Started work: 3/21/67

Finished work: 5/26/67

COMPLETION REPORT

Narrative

Test drilling was necessary to determine if a potable ground-water supply was available at park headquarters, AINS, Worcester Co., Md., and Tom's Cove, Accomac Co., Va., (see topographic maps, enclosed). In the event that a potable water supply was available, test wells should be completed to production wells in order to expedite development of the Seashore.

Previous reconnaissance reports published by State and Federal agencies indicated that water-bearing rocks were present, but the chloride concentration in the water might be too high for use in a public water supply.

Under Bid Schedule A, a test well was drilled and electrically logged to 314 feet at headquarters without complications. The log indicated at least five water sands containing suitable-quality water. In order to insure against vertical leakage of salt water from Sinepuxent Bay, the deepest sand was selected for screening the production well. A shutter-type screen, approved in preconstruction conference, was installed but failed to keep flowing sand out of the well. As remedial action, the shutter screen was removed, and a pre-cast-gravel-wall well screen selected by the contractor was installed in a new hole at no cost to the Park Service. This screen also failed and was removed. A continuous-slott, wire-wound screen with slott size designed to exclude the sand was then installed in the new hole (see diagram enclosed), and proved entirely satisfactory. The well was developed and then tested for 8 1/3 hours, continuously pumping 100 gallons per minute with 143 feet of drawdown for a specific capacity of 0.70 gallons per minute per foot of drawdown.

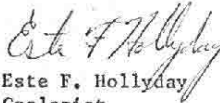
Many delays in executing the contract resulted from inappropriate screen design, waiting for equipment delivery, equipment repair, and travel time from contractor's offices to job site (see Contract Work Log, enclosed).

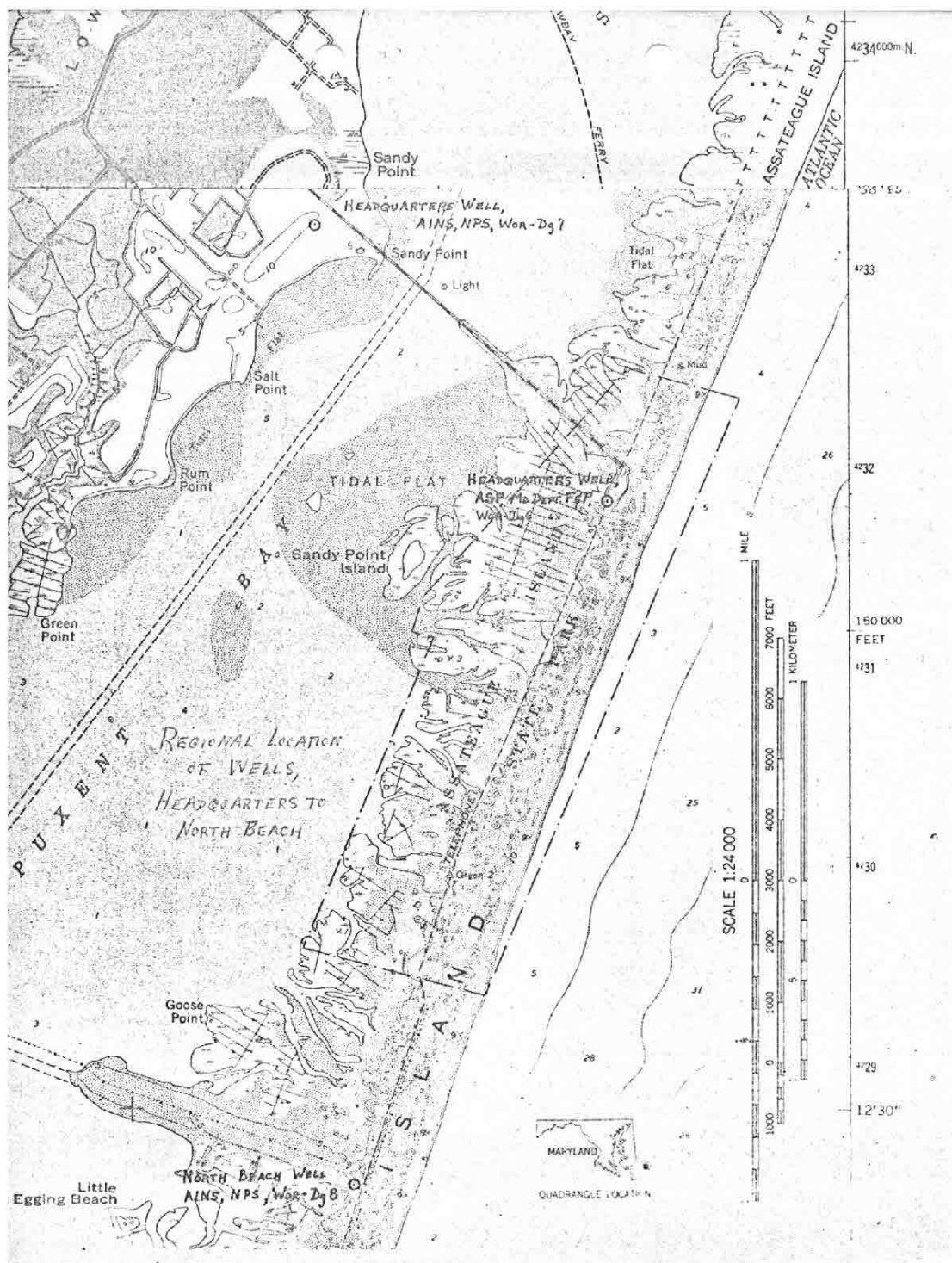
The completed production well, however, is of excellent construction and should give many years of trouble-free service.

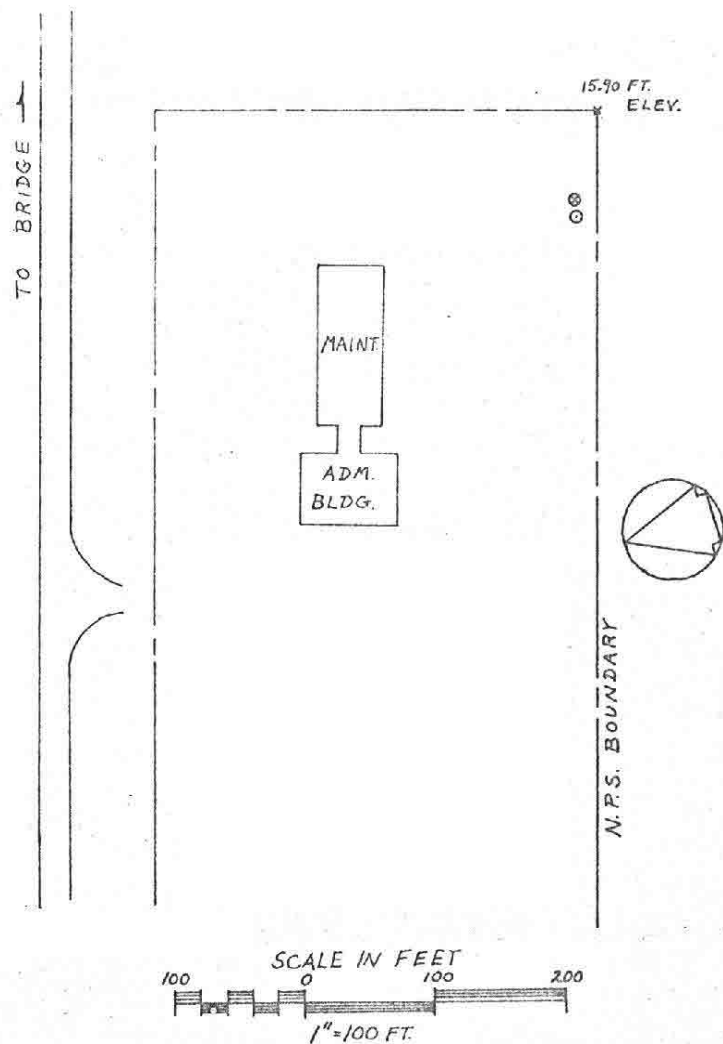
Under Bid Schedule B, a test well was drilled and electrically logged to 506 feet at Tom's Cove. The log indicated at least four water sands, all of questionable quality. Under change order, the test well was deepened from 506 feet to 800 feet and relogged. Two additional water sands were encountered, also of questionable quality. Water samples indicated that no sand was encountered with water containing less than 1,000 parts per million chloride.

(U. S. Public Health Service recommends 250 parts per million as a limit for drinking water). The test hole was grouted from 160 feet to land surface and abandoned.

All work went smoothly under Bid Schedule B, and the Park Service obtained concrete evidence that a potable ground-water supply does not exist within 800 feet of the surface in the vicinity of the Round-Up Restaurant at Tom's Cove.


Este F. Hollyday
Geologist

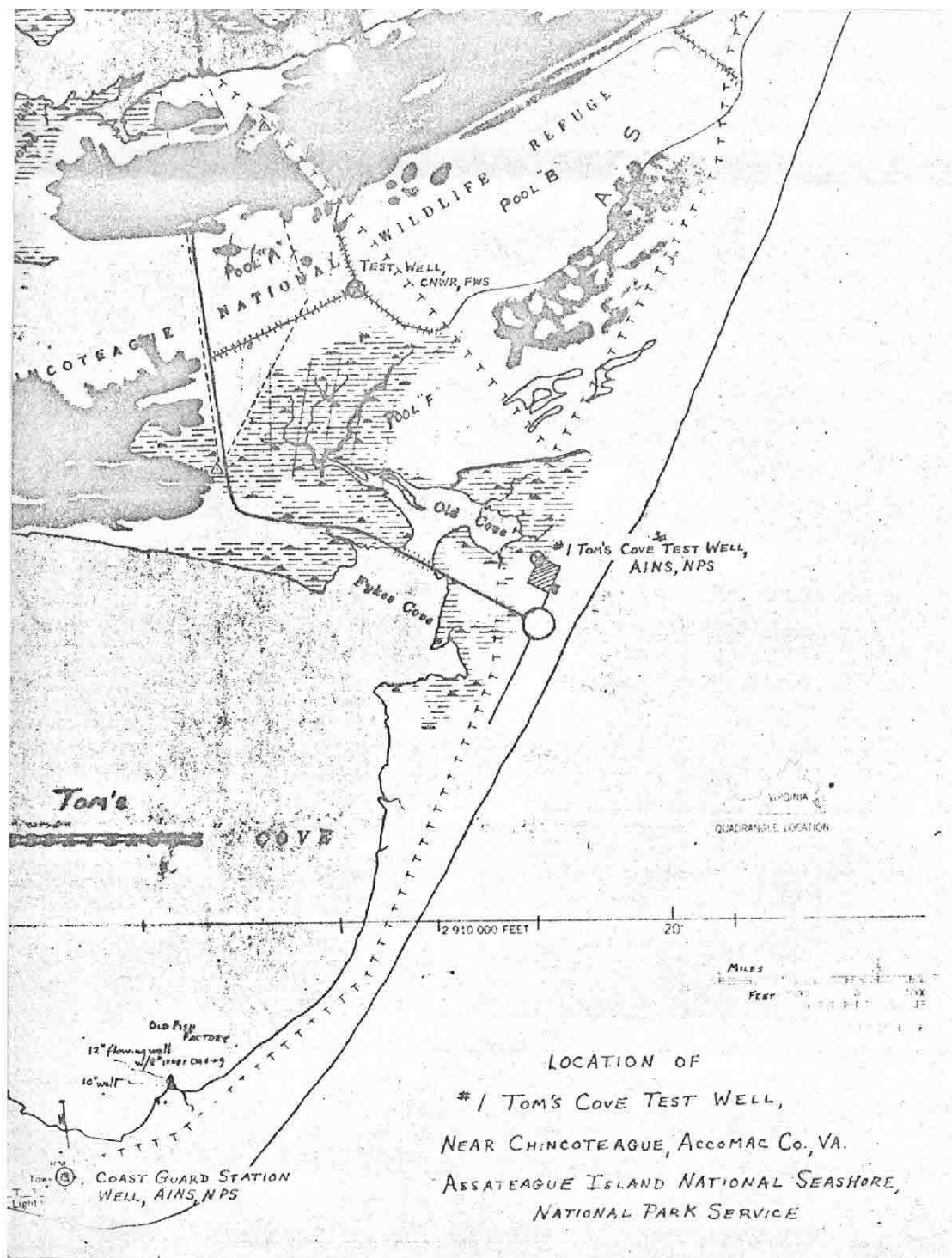


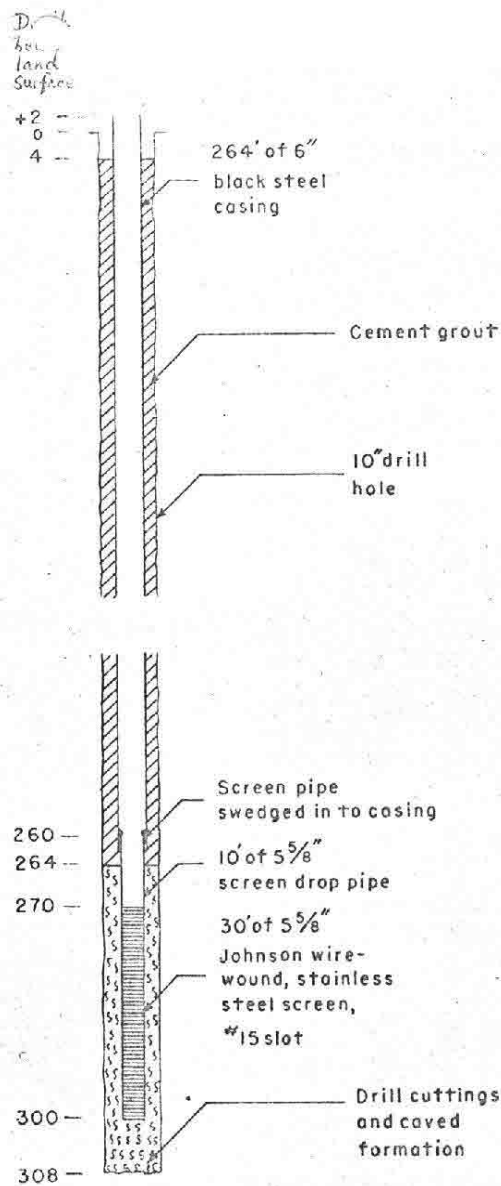


- ⊗ TEST WELL
- PRODUCTION WELL

LOCATION OF WELLS

HEADQUARTERS, SANDY POINT BRIDGE
VISITORS' CENTER, ASSATEAQUE ISLAND NATIONAL SEASHORE
N.P.S.





Construction Diagram of Headquarters Well,
Assateague Island National Seashore, N.P.S.
Well Wor - Dg 7

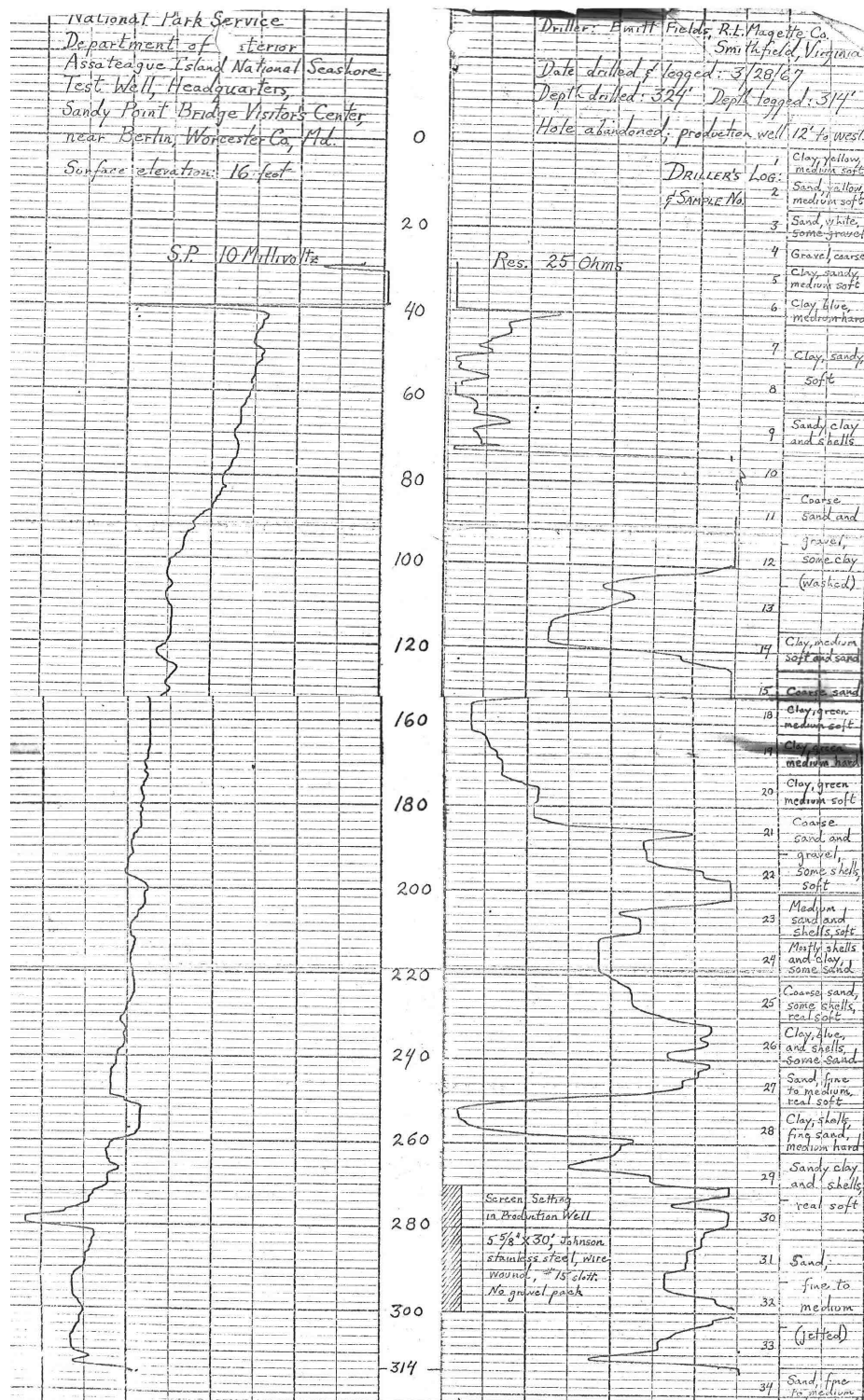
CONTRACT WORK LOG MONTH MARCH YEAR 1967 # 14-10-5:622-002
 Drilling Test Water Wells, AWS

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		21 Pipe truck broke down near Pocahontas. Crew & equipment arrived @ drilling site 3:30 PM. Raining and too muddy to move onto drilling location @ Hudquiers.	22 Bulldozer moved rig onto drilling location; dug mud pits, set-up rig; equip drive-point well for water for drilling.	23 Spud down to 24' to set surface casing. Kelly swivel leaking badly.	24 Kelly returned to Smithfield, Va, repair shop @ 4:00 AM. Rest of crew return to Va @ 8:00 AM	25 No drilling activities
26 No drilling activities	27 Crew with pipe truck and repaired Kelly returned @ 3:30 PM. Too muddy to get into drilling location	28 Unload Kelly, gravel & drilling clay. Set 40' of surface casing. Drill 6" hole to 32'. Sample formations. Circulate from 4:30-5:30 PM. E-log hole @ 5:30 PM.	29 Hole caved overnight. Flush hole to 160'. Construct 2" steel military well to test water @ 165 to 150'. Develop 150' zone from 2:30 PM to 3:30 PM. Wait on geologist for water outliner	30 Pumped 150' zone for 2 hrs; collect clear water sample; yield 50 gpm @ 4 hr. Dismantle military well; ream hole from 6" to 10" down to 120' by end of day.	31 Ran out of drilling clay late Thursday; screen not yet delivered to job site; crew returned to Va. in early morning.	

MONTH APRIL YEAR 1967

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
30 No drilling activities						1 No drilling activities
2 No drilling activities	3 Drilling crew absent	4 Drilling crew absent	5 Drilling crew returned to jobsite @ Noon with screen and more gravel and clay. Flushing and reaming hole below 120' depth.	6 Ream hole down to 240'.	7 Finished reaming to 308', under ream to 18" between 280' and 308'; install casing, screen, and gravel pack; develop well for 1 hr. Well clearing after 45 min some sand.	8 No drilling activities
9 No drilling activities	10 Develop well for 4 hrs; clear with very little sand; install pump; discharge 120-130 gpm.	11 Morning: muddy again; pull pump and develop with air discharging about 150 gpm; water cleared.	12 Water muddy and sandy again; using submersible, pumped a whole truckload of sand.	13 Jet down through gravel pack with gravel line to shift gravel evenly around screen; jetting unsuccessful.	14 Crew returned to Virginia; contractor passes to pull, shift screen and install pre-cast gravel-wall well screen.	15 No drilling activities
16 No drilling activities	17 No drilling activities; awaiting shipment of new screen.	18 Awaiting shipment of new screen.	19 Awaiting shipment of new screen.	20 Awaiting shipment of new screen.	21 Awaiting shipment of new screen.	22 No drilling activities
23 No drilling activities	24 Drilling crew arrived in late afternoon.	25 On job @ 8:00 AM; Encountered difficulty pulling casing and screen past the 18" surface casing; when pulled screen was 1/2 filled with sand.	26 Attempt to install new pre-cast gravel-wall well screen and casing in old well; well had caved; impossible to install new equipment.	27 Driller chooses to abandon original test hole and drill new well; drilling new well to 310'.	28 Crew returned to Virginia.	29 No drilling activities

Contract Deadline: Monday, June 19th



Other Supporting Information

Form 10-1
(June 1967)UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Work Order No. 2116.0 2/17/69

2101, and 2803

FACE SHEET FOR COMPLETION REPORT

Park Assateague Island National Seashore	Region Northeast	Fund Symbol MX1035
Location in Park Sinepuxent Neck	State(s) Maryland	Year Programmed 1967
	County or Counties Worcester	PCP No. 01, 01, 03
		Master Plan No. None assigned
☒ Contract and/or ☐ Day Labor		Master Plan Corrected By
Work Order Title Temporary visitor facilities Wells, Water Systems, Sanitary Systems Parking Area for 1,050 Cars		As Built Drawings By
		Date Started
		February 20, 1967
		Date Completed

DESCRIPTION OF FIXED ASSETS
(For completion by employee in charge of project)TOTAL COSTS
(For completion by FFO)

XXXXXXXXXXXXXXXXXX

1. Temporary ground-level maintenance building and administration building, 4,000 sq. ft.; ground level visitor center building, 1,600 sq. ft., 2 restrooms

210 ROADS AND PARKWAYS

1. Primary Roads

39,615.75

212 TRAILS

2. Surfaced trails

1,894.21

220 GENERAL BUILDINGS

1. Offices

168,339.21

224 GENERAL STRUCTURES

951.90

230 UTILITY SYSTEMS

2. Sewer systems

13,355.62

240 GROUNDS AND OTHER IMPROVEMENTS

1. Grounds, general

4,716.60

TOTAL

\$ 228,873.29

XXXXXXXXXX

DISTRIBUTION	THE FIXED ASSET DESCRIBED ABOVE HAS BEEN COMPLETED IN ACCORDANCE WITH APPROVED DRAWINGS, SPECIFICATIONS, AND AUTHORIZED CHANGES		
No. To	Submitted	Title:	Date:
DC-100	John H. Flister	Project Supervisor	
DC-200	By: John Flister		
DC-300	Approved	Title:	Date:
DC-400	By: R. E. Mott	Sept.	MAR 7 1969
DC-500	COSTS VERIFIED	Title:	Date:
DC-600	BY: Ralph E. Mott	Regional Budget Officer	1/31/69
DC-700			

A DC 65-14218

11360

Form 10-411
(July 1965)UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

DISTRIBUTION OF COPIES

NO.	TO
1	WASO
2	Washington
1	DEC
2	Superintendent

PROJECT CONSTRUCTION PROPOSAL

1. STATEMENT OF MANAGEMENT'S REQUIREMENTS, PROPOSED WORK, AND ITS RELATIONSHIP TO OTHER FACETS OF THE PARK PROGRAM. (Provide detail data for "Management Information" on Form 10-411a, Supplemental Sheet and attach.)

Provide building for basic visitor information with minimum exhibits at the Park Headquarters site. Included in the project is the temporary office wing for administrative use that should be designed for conversion to maintenance use when other programs supply additional space. This basic facility is needed to serve the visitors to the National Seashore on an interim basis as well as the management space needs.

2. ADVANCE REQUIREMENTS DATA

LAND STATUS Government owned	MASTER PLAN NO.	APPROVAL DATE
PCP NUMBERS OF PREVIOUSLY COMPLETE PORTIONS	INTERRELATED & DEPENDENT PROJECT PCP NUMBERS U-1 U-2 U-3 R-1 B-2	
INTERPRETIVE PROSPECTUS APPROVAL DATA		DATE

WATER RIGHT NEEDS & STATUS

RESEARCH NEEDS & STATUS

Basic field work by PSC accomplished and reported in field trip reports.

OTHER

3. RECOMMENDED BY SUPERINTENDENT (Signature & Date)

B. B. Christenson

12/19/66

4. APPROVED BY REGIONAL DIRECTOR (Signature & Date)

M. B. Christenson

M. B. Christenson, Program Coordinator 1/11/67

5. LOCATION WITHIN AREA OR TERMINI

Park Headquarters 1/2 mile west of Sinepuxent Bridge.

6. BLDG. OR RT.# AND SEC.

7. REGION

NERO

8. PARK

Assateague Island National Seashore

9. PROJECT

Temporary visitor facilities (portion)

Worcester

(County)

Maryland

(State)

10. PCP INDEX NO.

B-1

CLASS ☐ (A) - Estimate based on working Drawings
 CLASS ☐ (B) - Estimate based on preliminary plans
 CLASS ☐ (C) - Estimate based on similar facilities in other parks

P. S. & S. by

BPR ☐ NPS ☐

ESTIMATE

ITEM	QUANTITY	COST
Vinyl Asbestos flooring	1600 s.f./\$.35 s.f.	560
Painting	35,715 s.f./14¢s.f.	5,000
Info. Desk - sales case-Metal ladder	L. S.	1,700
Misc. Shelves, Rods, etc.	L. S.	500
Heat & A.C.	10. tons/\$1,250 per ton	12,500
		74,150
Insc., Hauling, Tool shed & Misc.	5%	3,708
Overhead & Profit	25%	19,465
		~~XXXXXXXXXX~~
		\$97,323
Furnishings	L. S.	1,200
Estimate based on Working Drawing #NS-AI 3007A and Bid Opening Schedule, 1/24/67.	Constr. Total	\$98,523

RESEARCH ESTIMATE APPROVED:

(Asst. Director, Resource Studies)

(Date)

CONSTRUCTION ESTIMATE APPROVED:

H. Reese Smith

(Design Office Chief)

1/19/67

(Date)

INTERPRETIVE ESTIMATE APPROVED:

(Asst. Regional Director,

rations)

(Date)

ESTIMATE TOTALS

RESEARCH.....	98,550
Construction.....	~~XXXXXXX~~
Plans, Surveys, and	19,710
Supervision.....	~~XXXXXX~~
	13,140
Contingencies	~~XXXXXX~~
CONSTRUCTION	131,400
SUB TOTAL	~~XXXXXXXX~~
INTERPRETIVE	
SUB TOTAL (100%)	131,400
AND TOTAL	~~XXXXXXXX~~

CLASS ☒ (A) - Estimate based on Engineering Drawings
 CLASS ☐ (B) - Estimate based on preliminary plans
 CLASS ☐ (C) - Estimate based on similar facilities in other parks

P. S. & S. by

BPR ☐NPS ☒

ESTIMATE

ITEM	QUANTITY	COST
Excavation, foot trenches clearing	300 c.y./\$1.50c.y.	450
Conc. footings - depressed slabs, etc.	23 c.y./\$40 c.y.	920
Conc. slab & fill under	6000 s.f./\$.57s.f.	3,420
Conc. blks.	3000 s.f./\$.84 s.f.	2,500
Brick work - Veneer & solid	4000 s.f./\$1.89s.f.	7,600
Metal Walls	1850 s.f./\$.65/s.f.	1,200
Metal Roof	8000 s.f./\$1 s.f.	8,000
Gutters	350 l.f./\$2 l.f.	700
Overhead Door 18' x 10' - 4 panels	1 @ \$450	450
Rough Hardware	1 @ \$500	500
Electrical work in Bldg. only	11 fixt.	1,200
Plumbing work in Bldg. only	11 fixt./\$300 ea.	3,300
Toilet Stalls	4/\$175 ea.	700
Partitions with finish both sides	3100 s.f./\$4 s.f.	12,400
Acoustic Ceiling	5000 s.f./\$.34 s.f.	1,700
Insulation - Walls & Ceilings	7500 s.f./\$.17 s.f.	1,300
Glass work, incl. Gl.Doors, etc.	1200 s.f./\$5 s.f.	6,000
Interior doors, trim, fin. hardware	17/ \$49.30 ea.	850
Vinyl wall covering	@\$.55 s.f.)	700
Cove Base	@\$.50 l.f.)	

(Continued)

Form 10-411
(July 1965)

UNITED

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

DISTRIBUTION OF COPIES

NO.	TO
1	WASO
2	Wetzelton
1	D&C
2	Superintendent

PROJECT CONSTRUCTION PROPOSAL

1. STATEMENT OF MANAGEMENT'S REQUIREMENTS, PROPOSED WORK, AND ITS RELATIONSHIP TO OTHER FACETS OF THE PARK PROGRAM. (Provide detail data for "Management Information" on Form 10-411a, Supplemental Sheet and attach.)

Provide the headquarters area with an adequate supply of potable water via a Service owned well. The available supply will need to be adequate to furnish water for Service operated public restrooms, headquarters offices, maintenance area, four government owned residences, and a fire fighting system.

2. ADVANCE REQUIREMENTS DATA

LAND STATUS Government owned	MASTER PLAN NO.	APPROVAL DATE
PCP NUMBERS OF PREVIOUSLY COMPLETE PORTIONS	INTERRELATED & DEPENDENT PROJECT PCP NUMBERS B-1 B-2 U-2	
INTERPRETIVE PROSPECTUS APPROVAL DATA		DATE

WATER RIGHT NEEDS & STATUS

RESEARCH NEEDS & STATUS

U.S. Geological survey to do test drilling early in calendar 1967.

OTHER

Basic research indicates good water bearing area good possibility at about 300 feet.

3. RECOMMENDED BY SUPERINTENDENT (Signature & Date)

[Signature] 12/19/66

4. APPROVED BY SUPERINTENDENT (Signature & Date)

[Signature]
M.E. Christenson, Program Coordinator 1/11/67

5. LOCATION WITHIN AREA OR TERMINI

Park Headquarters $\frac{1}{4}$ mile west of Sinepuxent Bridge.

7. REGION

N&RO

8. PARK

Assateague Island National Seashore

9. PROJECT

Wells (portion)

Worcester

(County)

Maryland

(State)

6. BLDG. OR RT. # AND SEC.

10. PCP INDEX NO.

U-1

CLASS ☒ (A) - Estimate based on Working Drawings CLASS ☐ (B) - Estimate based on preliminary plans CLASS ☐ (C) - Estimate based on similar facilities in other parks	P. S. & S. by BPR ☐ NPS ☒
--	---

ESTIMATE	ITEM	QUANTITY	COST
	Wells	L. S.	3,500
Estimate based on Working Drawing #NS-AI 3007A and Bid Opening Schedule, 1/24/67.			
RESEARCH ESTIMATE APPROVED: _____ (Asst. Director, Resource Studies) (Date)		ESTIMATE TOTALS	
CONSTRUCTION ESTIMATE APPROVED: _____ H. Reese Smith (Design Office Chief) 1/19/67 (Date) INTERPRETIVE ESTIMATE APPROVED: _____ (Asst. Regional Director) (Date)		RESEARCH	
		Construction..... 3,520	
		Plans, Surveys, and Supervision..... 710	
		Contingencies..... 470	
		CONSTRUCTION SUB TOTAL..... 4,700	
		INTERPRETIVE SUB TOTAL (100%)	
		GRAND TOTAL \$4,700	

GSA DC 66-2827

Form 10-411
(July 1965)UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

PROJECT CONSTRUCTION PROPOSAL

DISTRIBUTION OF COPIES	
NO.	TO
1	WASO
2	Washington
1	DLS
1	Superintendent

1. STATEMENT OF MANAGEMENT'S REQUIREMENTS, PROPOSED WORK, AND ITS RELATIONSHIP TO OTHER FACETS OF THE PARK PROGRAM. (Provide detail data for "Management Information" on Form 10-411a, Supplemental Sheet and attach.)

Provide necessary sewerage disposal services for that portion of the Park

Headquarters, information center, and maintenance shops constructed during

fiscal year 1967.

2. ADVANCE REQUIREMENTS DATA

LAND STATUS	MASTER PLAN NO.	APPROVAL DATE
Government owned		
PCP NUMBERS OF PREVIOUSLY COMPLETE PORTIONS	INTERRELATED & DEPENDENT PROJECT PCP NUMBERS	
	B-1 B-2 U-1-2-3 R-1	
INTERPRETIVE PROSPECTUS APPROVAL DATA	DATE	

WATER RIGHT NEEDS & STATUS

RESEARCH NEEDS & STATUS

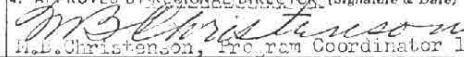
Basic research provided through field trip reports for this project.

OTHER

3. RECOMMENDED BY SUPERINTENDENT (Signature & Date)

 12/19/66

4. APPROVED BY REGIONAL DIRECTOR (Signature & Date)

 H.E. Christenson, Regional Coordinator 1/11/67

5. LOCATION WITHIN AREA OR TERMINI

Park Headquarters $\frac{1}{4}$ mile west of Sinepuxent Bridge.

7. REGION

NERO

8. PARK

Assateague Island National Seashore

9. PROJECT

Sanitary systems (portion)

Worcester

(County)

Maryland

(State)

6. BLDG. OR RT.# AND SEC.

10. PCP INDEX NO.

U-3

CLASS ☒ (A) - Estimate based on working Drawings	P. S. & S. by
CLASS ☐ (B) - Estimate based on preliminary plans	BPR ☐ NPS ☒
CLASS ☐ (C) - Estimate based on similar facilities in other parks	

ESTIMATE	ITEM	QUANTITY	COST
	6,000 Gal. Septic Tank	L. S.	5,000
	80' of 4" C.I. Sewer-pipe	\$5.50/ft.	440
	50' of 6" C.I. Sewer-pipe	\$6/ft.	300
	42' x 83' seepage bed	\$1/sq.ft.	3,486
			\$ 9,226
	Miscellaneous -		274
	Total		\$ 9,500

Estimate based on Working Drawing #NS-AI 3007A
and Bid Opening Schedule, 1/24/67.

RESEARCH ESTIMATE APPROVED:	ESTIMATE TOTALS
(Asst. Director, Resource Studies) _____ (Date) _____	RESEARCH.....
	Construction..... 9,520
	Plans, Surveys, and Supervision..... 1,910
	Contingencies 1,270
CONSTRUCTION ESTIMATE APPROVED:	CONSTRUCTION SUB TOTAL 12,700
H. Reese Smith _____ 1/19/67 (Date)	INTERPRETIVE SUB TOTAL (100%)
INTERPRETIVE ESTIMATE APPROVED:	AND TOTAL ~~12,700~~ \$12,700
(Asst. Regional Director, _____ (Date) _____)	

GSA UC 66-2827

Form 10-174A
(June 1962)UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Work Order Number

211701

Fund Symbol

14X1035

COMPOSITION OF COST FOR COMPLETION REPORT

Park	Region	Year Programmed
Assateague Island National Seashore	Northeast	1967
Location in Park		
Sinepuxent Neck		
Work Order Title		
Temporary Visitor Facilities, Wells, Water Systems, Sanitary Systems		

COMPOSITION OF COST

COSTS CHARGED TO FUNDS ALLOTTED TO FIELD FINANCE OFFICE

(1) Personal Services.....	\$ 458.26	
(2) Travel.....		
(3) Contract Work.....	153,163.02	
(4) Supplies and Materials.....	294.05	
(5) Other Direct Expenses.....	937.00	
(6) Operation of Equipment.....		
(7) Depreciation of Equipment.....		
(8) Purchase of Construction Equipment.....		
(9) Purchase of Other Accountable Equipment.....		
(10) Other Costs:		
(11) TOTAL COST CHARGED TO FFO FUNDS.....	xxxxxxxxxx	\$ 154,852.33

OTHER COSTS:

(12) PS&S, AP, and/or Facilitating Services @ 16 %.....	\$ 24,776.37	
(13) Inventory and Other Non-Fund Costs		24,776.37
(14) GROSS WORK ORDER COSTS.....	xxxxxxxxxx	\$ 179,628.70
LESS:		
(15) Residual Value of Construction Equipment on Line 8.....	\$	
(16) Other Credits		
(17) NET COST OF FIXED ASSETS.....	xxxxxxxxxx	\$ 179,628.70

Identify other costs and other credits by line item entry, on an attached schedule, or explain in narrative.

Form 10-174A
(June 1962)UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Work Order Number

211702

Fund Symbol

14X1035

COMPOSITION OF COST FOR COMPLETION REPORT

Park	Region	Year Programmed
Assateague Island National Seashore	Northeast	1967
Location in Park		
Sinepuxent Neck		
Work Order Title		
Temporary Visitor Facilities, Wells, Water Systems, Sanitary Systems		

COMPOSITION OF COST

COSTS CHARGED TO FUNDS ALLOTTED TO FIELD FINANCE OFFICE		
(1) Personal Services.....	\$ 721.78	
(2) Travel.....		
(3) Contract Work.....	2,230.33	
(4) Supplies and Materials.....	419.15	
(5) Other Direct Expenses.....	3,652.73	
(6) Operation of Equipment.....		
(7) Depreciation of Equipment.....		
(8) Purchase of Construction Equipment.....		
(9) Purchase of Other Accountable Equipment.....		
(10) Other Costs:		
(11) TOTAL COST CHARGED TO FFO FUNDS.....	xxxxxxxxxx	\$ 7,023.99
OTHER COSTS:		
(12) PS&S, AP, and/or Facilitating Services @ 16 %.....	\$ 1,123.84	
(13) Inventory and Other Non-Fund Costs		1,123.84
(14) GROSS WORK ORDER COSTS.....	xxxxxxxxxx	\$ 8,147.83
LESS:		
(15) Residual Value of Construction Equipment on Line 8.....	\$	
(16) Other Credits		
(17) NET COST OF FIXED ASSETS.....	xxxxxxxxxx	\$ 8,147.83

Identify other costs and other credits by line item entry, on an attached schedule, or explain in narrative.

NARRATIVE

This contract provided for the construction of a two-unit complex consisting of a visitor facility with a breezeway connection to temporary administrative offices and maintenance building. Site work, sewerage system, roads and parking area and concrete paving were included with the above construction.

The visitor facility is of steel frame construction with masonry and glass walls. This facility includes public comfort stations, information station, interpretive exhibit, audiovisual, storage and heating and air conditioning. Ceilings are acoustical tile and floors are vinyl asbestos on concrete.

The administrative-maintenance building is a prefabricated metal building modified to suit design considerations. Extension walls are a combination of brick, concrete block and metal panels. Interior walls are exposed concrete block, painted with partitions of wood framing and prefinished plywood.

Ceiling is suspended, removable panel type of acoustical material. Heating and air conditioning are separate from the visitor facility. Floors are steel troweled concrete.

Project was under the supervision of Mr. William A. Ernst from February 7, 1967, until his death April 3, 1967. Mr. Harold H. Hogen took over Mr. Ernst's duties until said time that Mr. John H. Flister could be moved from Everglades National Park. Project supervision was taken over by Mr. Flister from May 1, 1967 till June 5, 1967. The work progress was slow due to many delays due to weather and shipping tie ups. However, the contractor did an excellent job in spite of all the delays and I believe that the Government has received a usable and functional building.

John H. Flister

John H. Flister

WATER SYSTEMSPECIFICATION 7501-0 GENERAL:

1-1 Work Included: Consist of furnishing all materials and satisfactorily installing a water system including underground discharge unit, submersible well pump, water meter, air compressor and temporary and permanent electric and control system and all excavation trenching and backfill as indicated on the attached sketches and specified herein.

The pneumatic tank, water level indicator, air volume control, pressure switch, 2 inch check valve with sniffer valve and 2 - 2 inch gate valves are included under the original building contract.

2-0 MATERIALS:

2-1 Excavation, Trenching and Backfill shall conform to the requirements of National Park Service Specification 702.

2-2 Water Piping and Appurtenances: Shall conform to the requirements of National Park Service Specification 703.

2-3 Underground Discharge Unit: Shall be 6 inch case size, 3 foot bury depth, watertight cap suitable for installation on 6-inch well casing. The unit shall be "Monitor PS" as manufactured by Baker Manufacturing Company, Evansville, Wisconsin or approved equal.

2-4 Submersible Well Pump: Shall be designed to pump 40 GPM against a total head of 200 feet. The pump shall be Demming Unit No. 8-XHL2 with built-in check valve and 3-HP, 220 volt electric motor as manufactured by Crane Company, Chicago, Illinois or approved equal.

Pump shall be equipped with SCH 80 threaded PVC or standard galvanized steel riser pipe to set pump 150 feet below ground surface.

A 2 inch check valve with snifter and a drain fitting with 2-inch tee shall be installed in the riser pipe to supply additional air to the pressure tank.

2-5 Water Meter: Shall be 2 inch size with horizontal dial totalizer reading to 999,999 gallons. The meter shall be Type S, Model 157 as manufactured by Neptune Meter Company, New York, N. Y. or approved equal.

2-6 Air Compressor: Shall be capable of delivering 3 cubic foot per minute against a discharge pressure of 60 psi. The compressor shall be Model 221 mounted on a steel base with a 1 HP, 230 volt electric motor and 1/2-inch discharge line and check valve manufactured by Jacuzzi Brothers, Inc., Richmond, Virginia.

2-7 Pressure-Relief Valve: Size 1 inch with bronze body with screwed side outlet, exposed regulating screw and a male inlet. The pressure setting shall be at 75 psi. The valve shall be mounted on top of the pressure tank.

2-8 Temporary Electric and Control System: A field assembled temporary automatic pump electric and control system shall be furnished and installed to provide water service until the specified permanent controls can be obtained and installed.

The temporary control system shall utilize the pressure switch specified under the original building contract for on-off control of the 3 HP well pump. The pressure switch shall be adjusted to start the well pump when the tank pressure drops to 25 psi and stop the pump at a tank pressure of 45 psi. The temporary system shall include furnishing and installing the following items:

- (a) One wall mounted NEMA Size "0", 3-pole across-the-line type motor starter in NEMA 1 enclosure for control of the 3 HP well pump (Square D Class 8536 Type BG-2, or equal).
- (b) One steel post mounted 30 amp, 4-wire, solid neutral, 3 blade, 3 fuse, 240 volt, safety switch in NEMA III enclosure. (Square D Cat. No. D321NRB, or equal) for control of the pump at the well site.
- (c) Two suspension type electrodes installed in the well as directed by the Contracting Officer at a depth of about 150 feet. Each electrode shall be supported by standard well electrode suspension wires.
- (d) Four No. 4 and two No. 12, 600 volt, type USE direct burial cables between the motor starter and the post mounted safety switch at the well site.
- (e) Four No. 4, 600 volt, type RHW cables in the existing 2-inch conduit between the existing main building electrical distribution panel and the above described pump motor starter.

(f) All wiring and incidentals required to hook up and place the above described pump and control equipment in service.

The above described temporary control equipment shall be designed for use on 120/208 volt, 3-phase, 4-wire, 60-cycle power.

2.9

PERMANENT ELECTRIC AND CONTROL SYSTEM:

There shall be furnished a completely coordinated electrical and control system for the well pump, air compressor, air vent solenoid valve, and future hypochlorinator. The system shall include a factory assembled, wall mounted automatic control panel designed for combination float and pressure control to maintain the air water balance in the 1600-gallon hydro-pneumatic tank at 40 to 60 psi. The control shall be of the type in which the well pump is started at a given (40 psi) low pressure by a bellows operated mercury contactor and stopped at a normal high water level (30% tank liquid capacity) by a separately mounted float switch with mercury contacts. Pressure control for the air compressor and air vent solenoid valve shall be electrically interlocked with the pump control to automatically add or release air required to maintain 60 psi tank pressure, after the well pump stops. The assembly shall include low well level cutoff with automatic reset for the well pump. The low well level cutoff shall be activated by two suspension electrodes in the well utilizing the pump casing and discharge pipe as a common ground for the system.

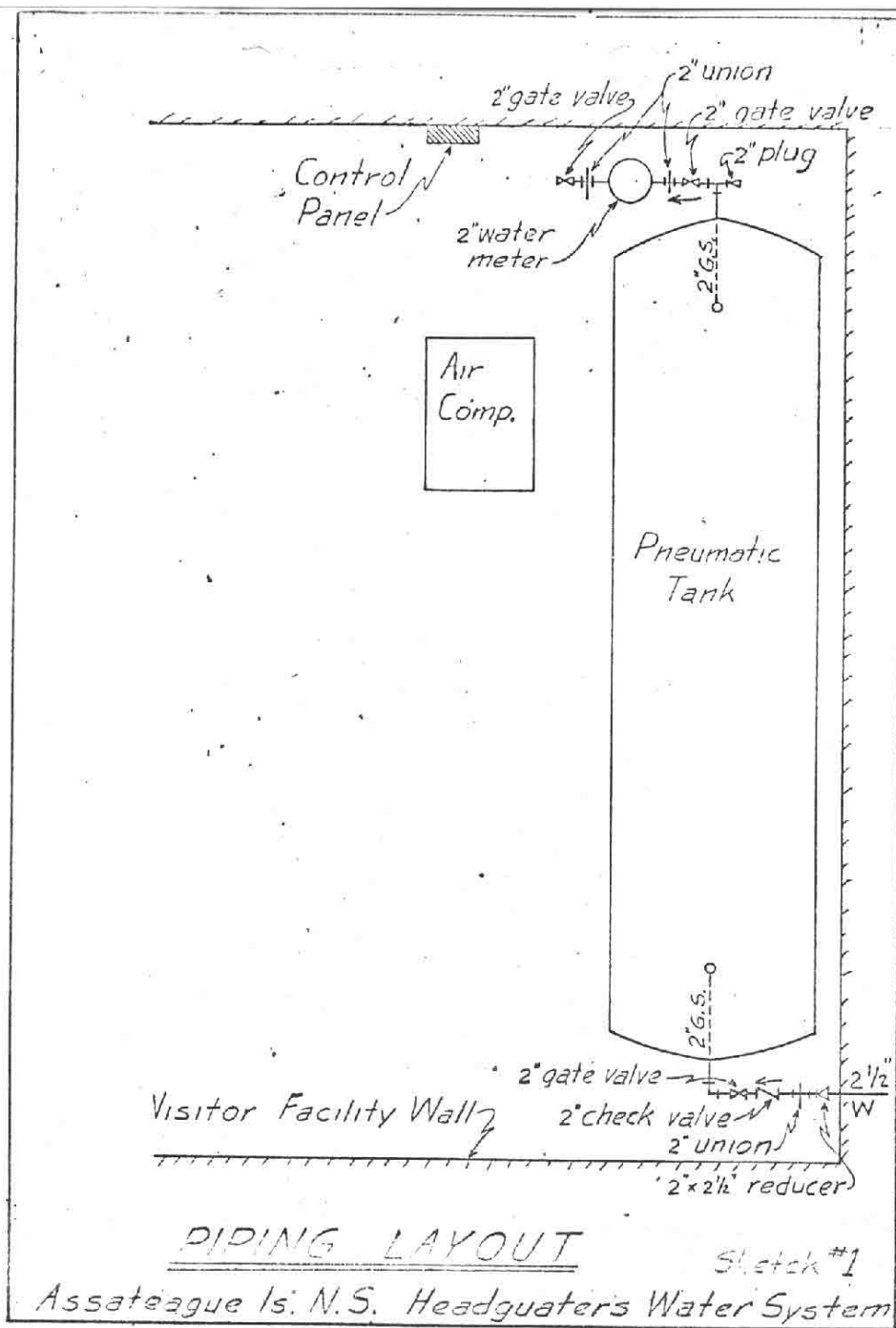
The control panel shall include a Hand-off-Automatic selector switch for the well pump (wired to prevent overriding of the low level cutoff protection), a 3-pole NEMA size "0" across-the-line type motor starter for the well pump with an auxiliary 1-pole, 15 amp contact for the future hypochlorinator, a 3-pole NEMA size "00" across-the-line type motor starter for the air compressor, and the following automatic circuit breakers.

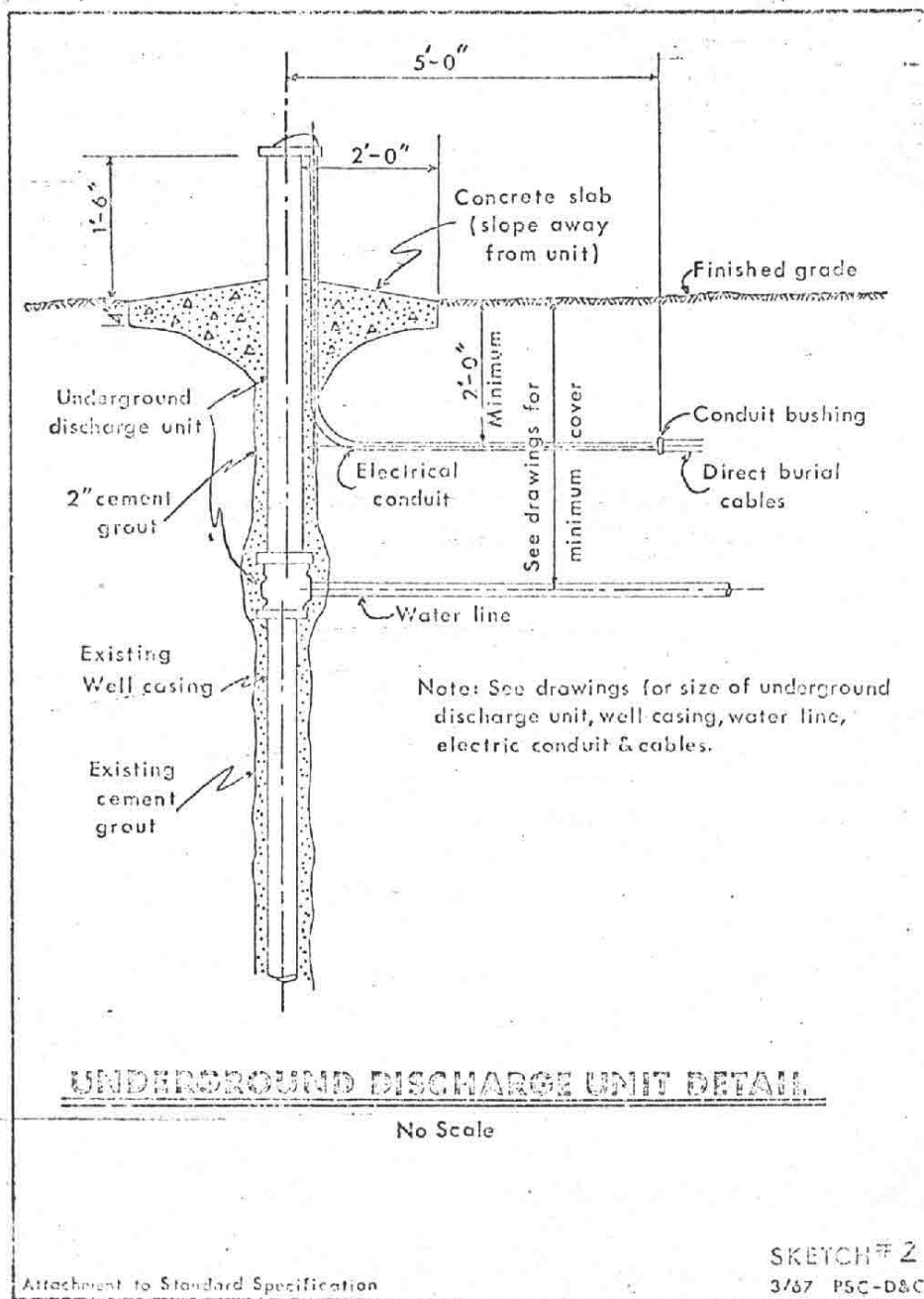
1	3-pole	50 amp	Main Breaker
1	3-pole	30 amp	Breaker for Pump
1	3-pole	15 amp	Breaker for Air Compressor
1	1-pole	15 amp	Breaker for Future Hypochlorinator
1	1-pole	15 amp	Breaker for Solenoid Valve
1	1-pole	10 amp	Breaker for Automatic Controls

The 3-pole, 30 amp breaker for the well pump circuit shall be equipped with mechanism for locking the breaker in the OFF position.

The control unit shall be designed for use on 120/208 volt, 3 phase, 4 wire, 60 cycle power and shall be an AUTOCON DUOTROL PLANPAK as manufactured by Automatic Control Company of St. Paul, Minnesota, or approved equal.

The electric and control system shall also include a tank mounted float switch with mercury contacts, a tank-mounted air vent solenoid valve, and all necessary wiring in conduit between the various control units in the building plus all miscellaneous appurtenances required for the complete electric and control system.





DESCRIPTION OF WORK PERFORMED

Headquarters Well, Wor-Dg 7

Headquarters well, State of Maryland well number Wor-Dg 7, is near the west abutment of Sinepuxent Neck Bridge (enclosure 2), within the visitors' center compound (enclosure 3).

Contract work was performed by R. L. Magette Co., Smithfield, Va., under National Park Service Contract No. 14-10-5:622-002, Schedule A. Work on the test hole was begun March 23, 1967, and final work on the production well was completed May 16, 1967 (Hollyday, 1967a).

A 6-inch diameter test well was drilled to 324 feet by hydraulic-rotary method and electrically logged to 314 feet. Examination of the electric log and the ditch samples of the materials penetrated in the well revealed at least five sands containing water of acceptable concentrations of dissolved solids. A driller's log and electric log are shown in enclosure 4. In order to insure against vertical leakage of salt water from Sinepuxent Bay, the deepest sand (from which a nearby well produces low-chloride water) was selected for screening the production well.

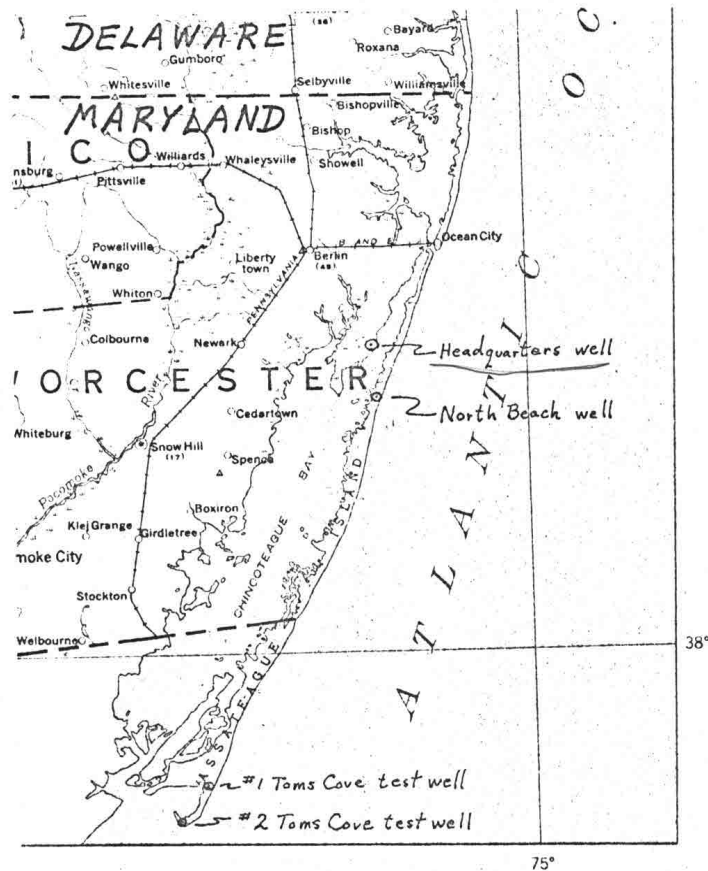
For future reference, in the event of either salt-water intrusion into the production well or the need for obtaining additional quantities of water from shallower depths, a water sample was collected from the sand between the depths of 120 and 153 feet by setting a temporary screen between the depths of 145 and 150 feet. Laboratory analysis indicated that the water was of acceptable chemical quality, except that the iron content, 1.1 mg/l (milligrams per liter), was higher than optimum for laundering (enclosure 8).

The gravel for gravel-packing the production well and two successive screens selected by the contractor failed to prevent sand from entering the production well. Suitable sizes of gravel-pack material and screen slots (Johnson, 1966) were then determined on the basis of mechanical analysis of the ditch samples of the materials penetrated in the well (enclosure 5). The production well was then completed in a new hole; 30 feet of wire-wound screen was set between 270 and 300 feet below land surface without a gravel pack (enclosure 6).

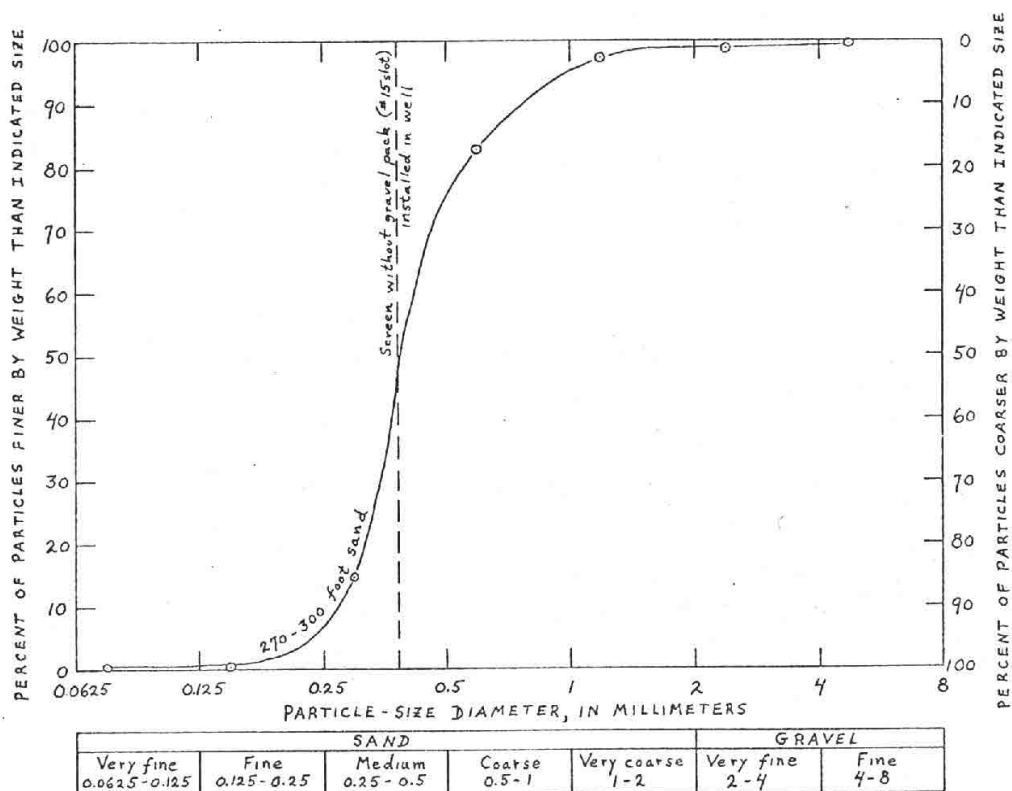
After developing the well with air lift for 7 hours, at which time the water was free of sand, the well was test pumped for 8 3/4 hours. The continuous pumping rate was about 100 gpm (gallons per minute), and the drawdown was 141.5 feet (enclosure 7). Accordingly, the specific capacity of the well was about 0.7 gpm per foot of drawdown at the end of the test. Based upon an analysis of the data using the Theis recovery formula (Ferris and others, 1962), the transmissibility of the sand was estimated to be about 1500 gallons per day per foot.

Chemical analysis of the water collected at the end of the pumping test is given in enclosure 9. The water is low in chloride (13 mg/l), but has a moderately high iron content (0.99 mg/l).

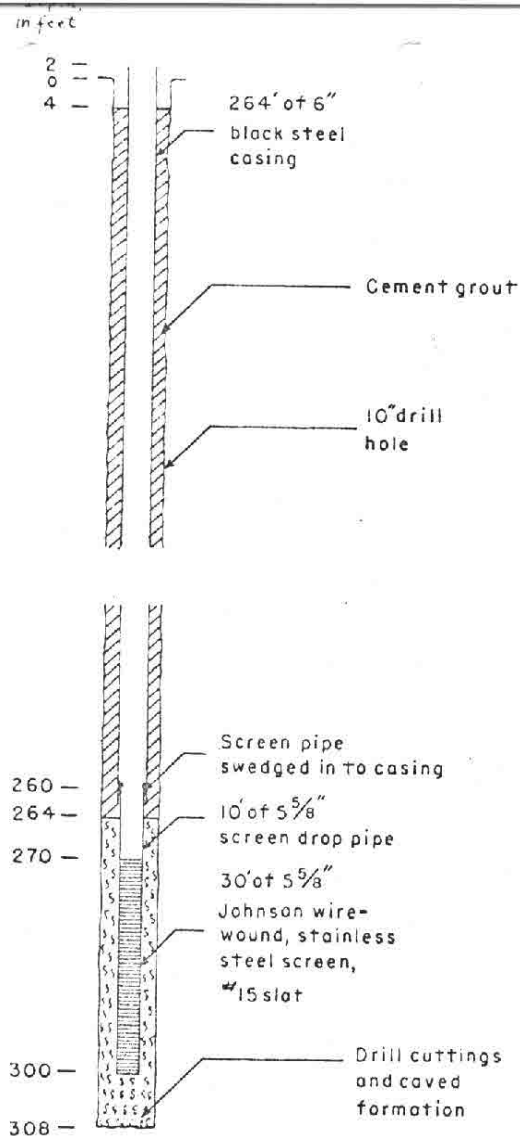
The Headquarters well, when equipped with an adequate pump, should be capable of producing up to about 150 gpm.



ENCLOSURE 1.-- Location of Assateague Island and test-well sites.



ENCLOSURE 5.-- Particle-size distribution of sand between 270 and 300 feet showing relation to screen-slot size of screen finally installed in Headquarters well.



ENCLOSURE 6. -- Construction diagram
of Headquarters well.

Drawdown Data

<u>Time (EST)</u>	<u>Time since pumping started, in minutes, t</u>	<u>Water level, in feet below top of casing^{1/}</u>	<u>Orifice plate manometer, in inches</u>	<u>Discharge, in gallons per minute</u>	<u>Specific con- ductance, in micromhos per centimeter</u>
6:10 a.m.	0	6.0	0.0	0	-
6:28	18	130.3	5.25	102	-
6:45	35	135.6	-	-	-
7:12	62	137.8	5.25	102	-
7:40	90	140.1	-	-	460
8:00	110	141.05	-	-	460
8:10	120	141.7	5.25	102	-
8:30	140	142.6	5.1	101	-
8:50	160	142.8	5.1-5.0	100	460
9:10	180	143.7	-	-	-
9:43	213	144.6	4.9-5.1	100	-
11:10	300	146.3	4.7-4.8	98	460
12:10 p.m.	360	146.7	-	-	-
1:10	420	147.1	-	-	-
2:40	510	147.5 ^{2/}	4.7-4.8	98	460
2:55	525	End of drawdown test			

^{1/}Top of casing was 3.4 feet above land surface.

^{2/}Water level adjacent to pump bowls and could not be measured accurately.

ENCLOSURE 7.--Pumping-test data for Headquarters well, May 12, 1967. (Page 1 of 2 pages.)

Recovery Data

<u>Time (EST)</u>	<u>Time since pumping stopped, in minutes, t'</u>	<u>Water-level recovery, in feet above 147.5- foot pumping level, s</u>
2:54:50 p.m.	0	0.0
2:55:25	0.58	30.0
2:55:50	1.0	45.6
2:56:20	1.5	60.0
2:56:50	2.0	69.7
2:57:20	2.5	77.2
2:57:50	3.0	83.0
2:58:50	4.0	91.3
2:59:50	5.0	96.9
3:04:50	10.0	109.7
3:14:50	20.0	117.3
3:25	30.0	120.84
3:45	50.0	124.05
3:55	60.0	126.05

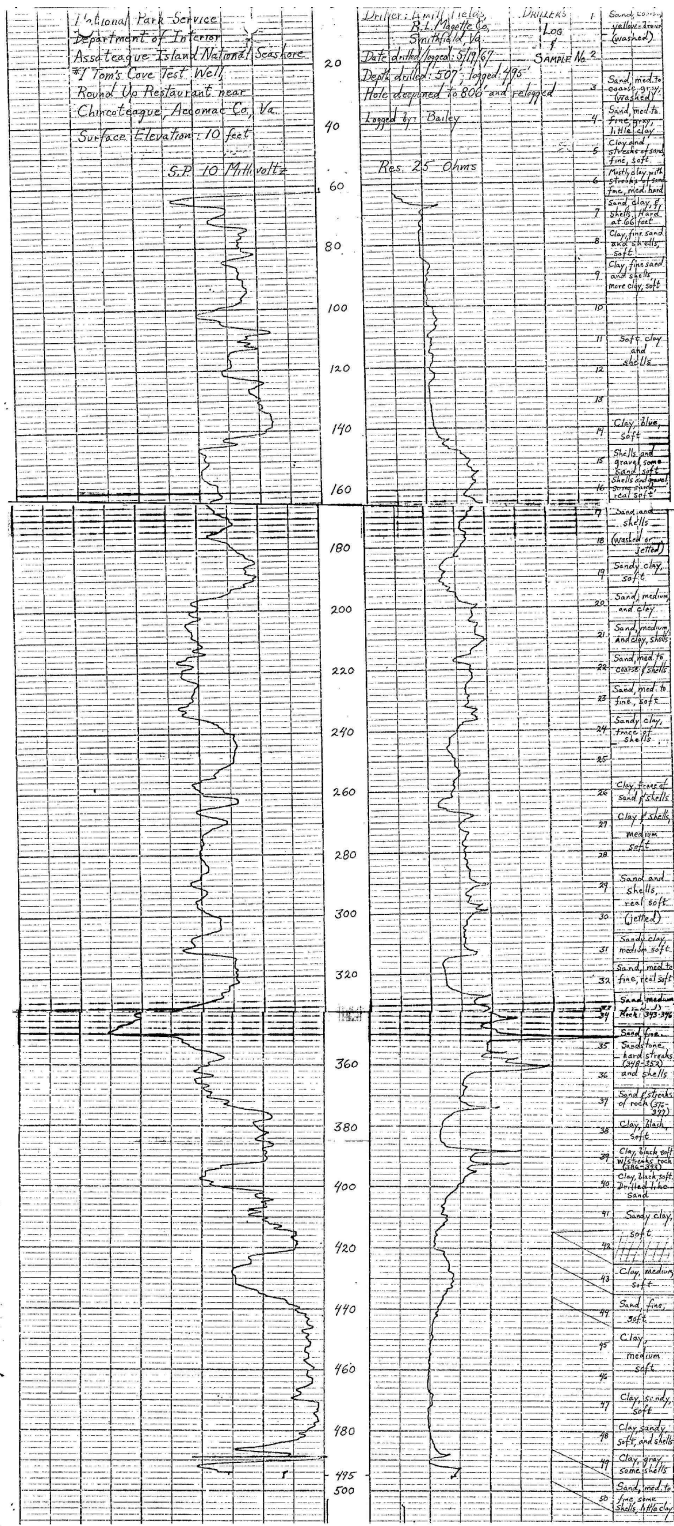
ENCLOSURE 7.--Pumping-test data for Headquarters well, May 12, 1967. (Page 2 of 2 pages.)

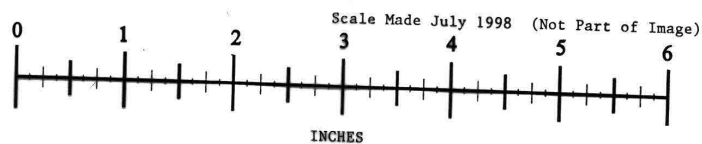
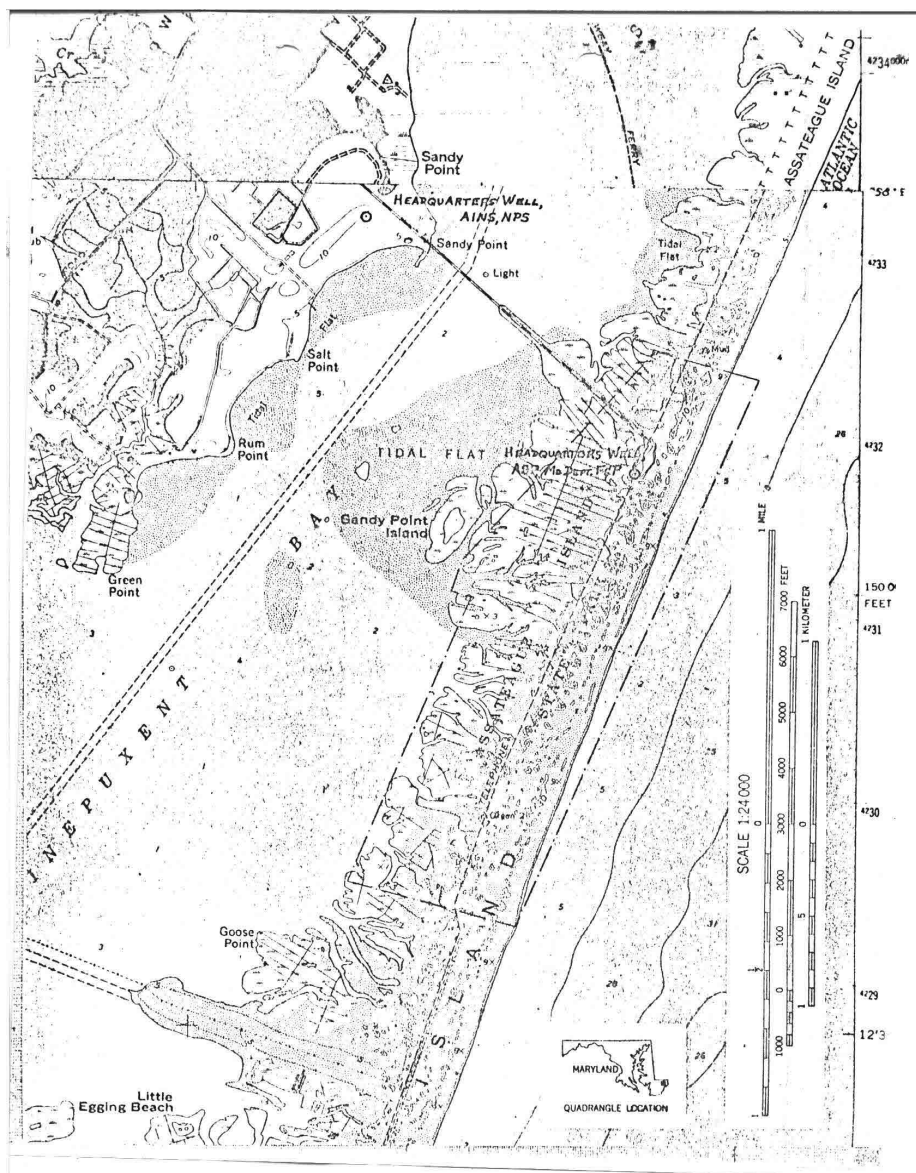
TDCS-WEB Form GW		ANALYTICAL STATEMENT		COUNTY Worcester	
Towson WRD				LAB NO. DC-3812	
Location nr Berlin, Md. at Sandy Point bridge		Date of collection <u>March 30, 1967</u>			
		Ignition Loss _____ Color <u>30</u>			
Source (type of well) <u>Well Wor-Dg 7</u>		Dissolved Solids:			
Owner <u>National Park Service</u>		Residue at 180°C <u>244</u>		SiO ₂ <u>32</u>	
		Calculated (Dup) <u>252</u>		Fe <u>1.1</u>	
		Tons per Acre Foot _____		Mn <u>.05</u>	
Date driled _____ Cased to _____ ft		Hardness as CaCO ₃ <u>130</u>		Ca <u>1.60</u> <u>32</u>	
Depth _____ Diam _____		Non-carbonate Hardness <u>0</u>		Mg <u>.99</u> <u>12</u>	
Well <u>Pocomoke Ag. 145'-150'</u>		T. No. _____ SAR _____ pH <u>8.0</u>		Na <u>1.61</u> <u>37</u>	
Water level: _____ ft		Specific Conductance _____		K <u>.18</u> <u>7.0</u>	
Sampled after pumping <u>2</u> hrs with air lift		(micromhos at 25°C) <u>392</u>		Na+K _____	
Yield <u>50</u> GPM (max or est)		Alk as CaCO ₃ <u>182</u>		HCO ₃ <u>3.64</u> <u>222</u>	
Pt of well <u>145-150' Air-line disc.</u>		CO ₂ Calc. <u>3.6</u>		CO ₃ <u>.00</u> <u>0</u>	
Appearance <u>clear</u>		PO ₄ <u>.40</u>		SO ₄ <u>.01</u> <u>.4</u>	
Temp (°F) _____ Use _____				Cl <u>.59</u> <u>21</u>	
Collector <u>E. F. Hallyday; 1145</u>				F <u>.00</u> <u>.0</u>	
Chemist <u>M. Sanders</u>				NO ₃ <u>.00</u> <u>.0</u>	
Date completed <u>June 1, 1967</u>				<u>4.24</u>	
Checked by <u>Crump</u>					
Date transmitted _____					

ENCLOSURE 8.-- Chemical analysis of water
from Headquarters well; temporary screen
setting: 145 to 150 feet below land surface.

USGS W-10 Form 60		ANALYTICAL STATEMENT		COUNTY Worcester	
TOWSON WED		Date of collection May 12, 1967		LAW NO. DC-3935	
Location Mr Berlin, MA.		Institution Color 3		epm ppm	
Sandy Point Bridge V.C.		Total Solids 264		SiO ₂ 32	
Fld. COND. 460		Total at 180°C 264		Fe Total .99	
Owner NPS Well Wor-Dg7		Dissolved Solids 264		Mn Total .00	
Water (type of well)		Acid per Acid Test 151		Ca 1.95 39	
Depth 270'-300'		Hardness as CaCO ₃ 0		Mg 1.07 13	
Water Temp 8.0		Non-volatile Residue 0		Na 1.52 35	
Sample No. 8		pH 8.0		K .19 7.6	
Sample taken with turbine pump		Specific Conductance 4.73		4.73	
Field 100 cm		Interference at 25°C 4.22		Na+K	
Pt of collection fr. surface		Alk as CaCO ₃ 208		HCO ₃ 4.16 234	
Appearance clear /plate		CO ₂ Calc. 4.1		CO ₃ .00 0	
Temp 59.5		P as PO ₄ .20		SO ₄ .03 1.4	
Collector E. F. Holliday:1413				Cl .37 15	
Cheater J. Chewers & Frost				F .01 .1	
Date completed August 14, 1967				NO ₃ .00 .2	
Checked by Fetting				4.77	
Date analyzed					

ENCLOSURE 9.-- Chemical analysis of water
from Headquarters well; permanent screen
setting: 270 to 300 feet below land surface.

[illegible]



Docket Information

Number of Documents in Docket 55

Documents Dated from 12/19/1966 to 5/15/1967

Docket Compiled: 3/2/2011