



# WATER-RIGHT DOCKET

## Catoctin Mountain Park

Docket No: 5

CAMP PENIEL WELL.

Supporting Hydro Data

04-06-1971: well schedule, geological survey; april 06, 1971

FORM 9-1642B  
(11-6-62)

### WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR

GEOLOGICAL SURVEY

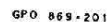
WATER RESOURCES DIVISION

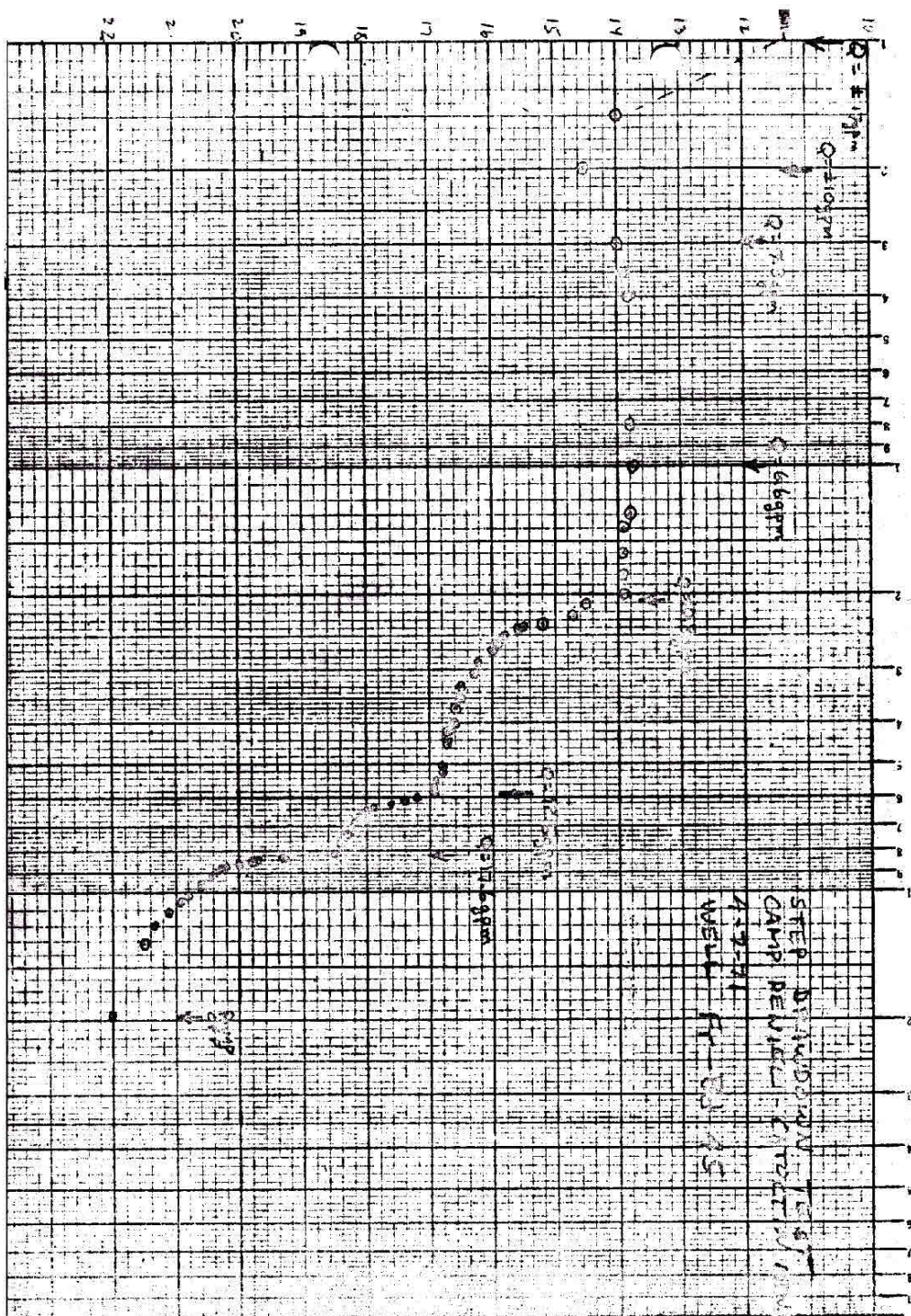
#### MASTER CARD

Record by: 2911 Source: field Date: 4-1-71 Map: Blue Ridge Summit  
State: Maryland County (or town): Frederick F.R.  
Latitude: 39° 37' 34" N Longitude: 77° 21' 21" W Sequential number: 1  
Local well number: 101 Other number: 419  
Local use: Water Owner of well: National Park Service  
Owner or name: NAT PARK SERVICE Address:   
Ownership: County (C), Fed Gov't (F), City, Corp or Co, Private, State Agency, Water Dist. F  
Use of well: (A) Air cond, Bottling, Comm, Dewater, Power, Fire, Dom, Irr, Med, Ind, P & Rec. Rec  
(S) Stock, Inactl, Unused, Repressure, Recharge, Desal-P & S, Desal-other, Other R  
Use of well: (A) Anode, Drain, Seismic, Heat Res, Obs, Oil-gas, Recharge, Test, Unused W  
DATA AVAILABLE: Well date 70 Freq. W/L meas.: 71 Field aquifer char. 72  
Hyd. lab. data: 73  
Qual. water data: type: 74  
Freq. sampling: 75 Pumpage inventory: yes 76 no: period: 77  
Aperture cards: 78  
Log data: geologists log, calibr. log 79

#### WELL-DESCRIPTION CARD

NAME AS ON MASTER CARD: same as on master card Depth well: 202 ft Meas. ± 2'  
Depth cased: 30 ft Casing type: steel ; Diam. 6 in. 6  
Finish: (C) concrete, (F) gravel w. horis. open perf., (S) screen, ad. pt., (T) shore, (V) open, (X) other X  
Method: (A) air bored, (C) cable, dug, hyd jetted, (F) air percussive, (R) reverse trenching, driven, drive wash, (T) other P  
Date Drilled: 4-2-71 9771 Pump intake setting: 38 ft 38  
Driller: Austin Kayser Frederick, Md  
Lift: (A) air, (B) bucket, cent. jet, (C) multiple, (D) none, piston, rot, (E) submers, turb, other S Deep D Shallow 20  
Power: (type) diesel, elec, gas, gasoline, hand, gas, wind, H.P. 41 Trans. of meter no. 42  
Descrip. MP: casing rim, which is 2.4 ft above LSD, Alt. MP  
Alt. LSD: 820 Accuracy: ± 10 topo. 43  
Water Level: 12.08 ft below MP; Ft below LSD 10 Accuracy: ± 1 44  
Data meas: 4-5-71 9771 Yield: ± 18 gpm 18 Method determined 45  
Drawdown: 12 ft 12 Accuracy: ± 1 Pumping period 3/4 hrs 46  
QUALITY OF WATER DATA: Iron 47 Sulfate 48 Chloride 49 Hard. 50  
Sp. Conduct 51 K x 10<sup>6</sup> Temp. 52 Dark sampled 53  
Taste, color, etc. clear 54

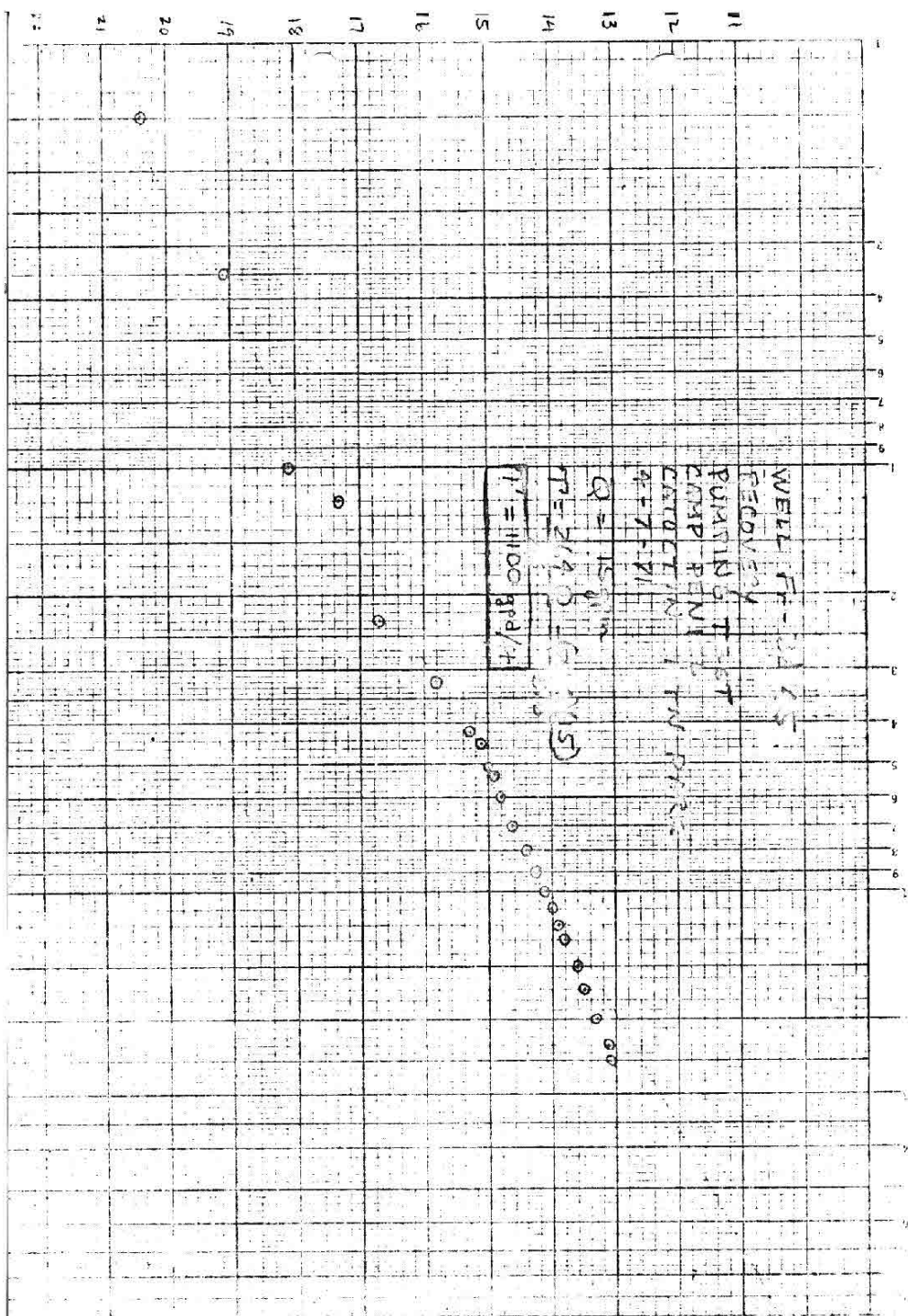




K-E SEMI-LOGARITHMIC  
3 CYCLES, 3 TO DIVISIONS, ALUMINUM  
40 250/  
100 10 100  
REUPPEL & EBERH CO.

SEMI-LOGARITHMIC  
3 CYCLES / 72 DIVISIONS ALKALINE  
WATER 4.5  
WATER 1.5 55555555

48 5507



Camp Pennell - Colorado mts. Pk.

| Watch time | Elapsed time | W.L. (ft) | Q            |                     |  |  |  |  |  |
|------------|--------------|-----------|--------------|---------------------|--|--|--|--|--|
| SWL        | —            | 11.3      | Pump off     |                     |  |  |  |  |  |
|            | 1.5 min      | 14.0      | Pump on 9.21 |                     |  |  |  |  |  |
|            | 2            | 14.5      | ±10          |                     |  |  |  |  |  |
|            | 3            | 14        |              |                     |  |  |  |  |  |
|            | 3.5          | 13.9      |              |                     |  |  |  |  |  |
|            | 4            | 13.8      | 7.3 gpm      | 10 gal in 22 sec    |  |  |  |  |  |
|            | 8            | 13.8      | "            |                     |  |  |  |  |  |
|            | 10           | 13.75     | 6.6          | 10 gal in 31 sec    |  |  |  |  |  |
|            | 13           | 13.8      | "            |                     |  |  |  |  |  |
|            | 14           | 13.9      |              |                     |  |  |  |  |  |
|            | 16           | 13.9      |              |                     |  |  |  |  |  |
|            | 18           | 13.9      |              |                     |  |  |  |  |  |
|            | 20           | 13.9      | 6.0          |                     |  |  |  |  |  |
|            | 21           | 14.5      | 12.8         | Increased Q at 9.41 |  |  |  |  |  |
|            | 21½          | 14.7      | "            | 10 gal in 55 sec    |  |  |  |  |  |
|            | 23.5         | 15.2      | "            |                     |  |  |  |  |  |
|            | 23.7         | 15.5      | "            | 10 gal in 55 sec    |  |  |  |  |  |
|            | 24           | 15.6      | "            |                     |  |  |  |  |  |
|            | 25           | 15.8      | "            |                     |  |  |  |  |  |
|            | 26           | 15.9      | "            |                     |  |  |  |  |  |
|            | 27           | 16.0      | "            | wt. cloudy now      |  |  |  |  |  |
| 9.48       |              | 16.2      | "            |                     |  |  |  |  |  |
| 9.50       | 29           | 16.25     | "            |                     |  |  |  |  |  |
| 9.52       | 31           | 16.3      | "            |                     |  |  |  |  |  |
| 9.54       | 33           | 16.5      | 10.6 gpm     | 10 gal in 57 sec    |  |  |  |  |  |
| 9.56       | 35           | 16.5      | "            |                     |  |  |  |  |  |
| 9.58       | 37           | 16.6      | "            |                     |  |  |  |  |  |
| 10.01      | 40           | 16.6      | "            |                     |  |  |  |  |  |
| 10.03      | 42           | 16.7      | "            |                     |  |  |  |  |  |
| 10.05      | 44           | 16.7      |              |                     |  |  |  |  |  |
| 10.08      | 45           | 16.7      |              |                     |  |  |  |  |  |

C. C. in. min. TC

| Time    | E<br>Time | W.L.<br>(Toc) | Q     |          |  |  |  |  |                                           |
|---------|-----------|---------------|-------|----------|--|--|--|--|-------------------------------------------|
| 1012    | 51        | 16.8          | 10.6  |          |  |  |  |  |                                           |
| 1014    | 53        | 16.8          | "     |          |  |  |  |  |                                           |
| 1016    | 55        | 16.9          | "     |          |  |  |  |  |                                           |
| 1018    | 57        | 16.9          | "     |          |  |  |  |  |                                           |
| 1020    | 59        | 16.9          |       |          |  |  |  |  |                                           |
|         |           | (.5)          | 17.2  |          |  |  |  |  |                                           |
| 1022    | 61        | (.8)          | 17.4  | 12.5 gpm |  |  |  |  | increased Q at 1022<br>(10 gal in 48 sec) |
| 1023    | 62        | 1.5           | 17.6  | "        |  |  |  |  |                                           |
| 1024-1  | 63        |               | 17.8  | "        |  |  |  |  |                                           |
| 1024-11 | 63        |               | 17.9  | "        |  |  |  |  |                                           |
| 1025    | 64        |               | 18.0  | "        |  |  |  |  |                                           |
| 1026    | 65        |               | 18.0  | "        |  |  |  |  |                                           |
| 1028    | 67        |               | 18.1  | "        |  |  |  |  |                                           |
| 1030    | 69        |               | 18.2  | "        |  |  |  |  |                                           |
| 1032    | 71        |               | 18.2  |          |  |  |  |  |                                           |
| 1034    | 73        |               | 18.3  |          |  |  |  |  |                                           |
| 1036    | 75        |               | 18.4  |          |  |  |  |  |                                           |
| 1038    | 77        |               | 18.4  |          |  |  |  |  |                                           |
| 1039    | 78        |               | 18.5  | 12.8     |  |  |  |  | 10 gal in 47 sec                          |
| 1042    | 81        |               | 18.5  |          |  |  |  |  |                                           |
|         |           | (.5)          | 19.0  |          |  |  |  |  |                                           |
| 1043    |           | (.7)          | 19.1  |          |  |  |  |  | increased Q at 1043-1                     |
| 1044    | 83        | (1.0)         | 19.3  |          |  |  |  |  |                                           |
| 1044-1  |           |               | 19.4  |          |  |  |  |  |                                           |
| 1045-1  |           |               | 19.6  |          |  |  |  |  | water clear now                           |
| 1045    | 84        | 2.4           | 19.7  | 17.6     |  |  |  |  | 10 gal in 34 sec                          |
| 1046    | 85        |               | 19.8  |          |  |  |  |  |                                           |
| 1047    | 86        |               | 20.0  | 17.2     |  |  |  |  | 10 gal in 35 sec                          |
| 1048    | 87        |               | 20.2  |          |  |  |  |  |                                           |
| 1049    | 88        |               | 20.2  |          |  |  |  |  |                                           |
| 1050    | 89        |               | 20.3  |          |  |  |  |  |                                           |
| 1052    | 91        |               | 20.4  |          |  |  |  |  | 10 gal                                    |
| 1054    | 93        |               | 20.45 |          |  |  |  |  |                                           |
| 1056    | 95        |               | 20.6  |          |  |  |  |  |                                           |
| 1059    | 98        |               | 20.6  |          |  |  |  |  |                                           |

move discharge pipe to other side of well

1246.2  
Time

W.C.  
(T.C.)

|      |       |       |
|------|-------|-------|
| 1103 | 102 ✓ | 20.8  |
| 1105 | 104   | 20.8  |
| 1107 | 106 ✓ | 20.9  |
| 1110 | 109   | 20.9  |
| 1113 | 112 ✓ | 21.1  |
| 1115 | 114   | 21.2  |
| 1117 | 116   | 21.2  |
| 1119 | 118   | 21.3  |
| 1121 | 120 ✓ | 21.3  |
| 1125 | 124   | 21.3  |
| 1127 |       | 21.4  |
| 1130 | 130   | 21.44 |
| 1133 | 133 ✓ | 21.5  |
| 1232 |       | 22.0  |
| 1238 | 141   | 22.0  |

11.1 gpm 10 gal in 35 sec

17.6 gpm 10 gal in 34 sec

17.1 gpm 10 gal in 35 sec

17.6 gpm 10 gal in 34 sec

17.1 gpm 10 gal in 35 sec

opens valve all way (1232)  
no change 10 gal / 35 sec

Elapsed  
Time

Recovery

W.C.

Elapsed  
Time

W.C.

Elapsed  
Time

W.C.

|      |      |      |       |       |       |      |
|------|------|------|-------|-------|-------|------|
| 1240 | 00   | 22.0 | 6:00  | 14.8  | 2000  | 13.3 |
|      | 0:15 | 22.4 | 6:30  | 14.7  | 23:00 | 13.1 |
|      | 0:35 | 19.1 | 7:00  | 14.6  | 25:30 | 13.1 |
|      | 1:00 | 18.1 | 7:30  | 14.5  |       |      |
|      | 1:20 | 17.3 | 8:00  | 14.4  |       |      |
|      | 2:30 | 16.8 | 8:30  | 14.3  |       |      |
|      | 3:20 | 15.8 | 9:00  | 14.25 |       |      |
|      | 4:20 | 15.3 | 10:00 | 14.1  |       |      |
|      | 4:50 | 15.1 | 11:00 | 14.0  |       |      |
|      | 5:15 | 15.0 | 12:00 | 13.9  |       |      |
|      | 5:30 | 14.9 | 13:00 | 13.8  |       |      |
|      |      |      | 15:00 | 13.6  |       |      |
|      |      |      | 17:00 | 13.5  |       |      |



UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY  
Water Resources Division

GROUND-WATER SUPPLY AT CAMP PENIEL,  
CATOCTIN MOUNTAIN PARK, MARYLAND  
by  
Larry J. Nutter



July 1971  
Administrative Report

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7/14/71

ILLUSTRATIONS

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2. Time versus change in water-level graph of step-drawdown test . . . . . in pocket
3. Time versus change in water-level graph of recovery test . . . in pocket

*L*

## INTRODUCTION

This report briefly summarizes the ground-water conditions at an environmental education camp (Camp Peniel) at Catoctin Mountain Park. The area is located 1.5 miles west of Thurmont, Frederick County, Maryland along Maryland Route 77 (fig. 1).

The study was undertaken at the request of the National Park Service for the purpose of providing technical assistance in monitoring well construction, in running a pumping test, and in collecting geologic and hydrologic data that may be useful in dealing with any future problems regarding ground-water supplies.

A test well was drilled and a pumping test run because an existing well does not supply enough water for the estimated 30 to 60 residents expected at the camp.

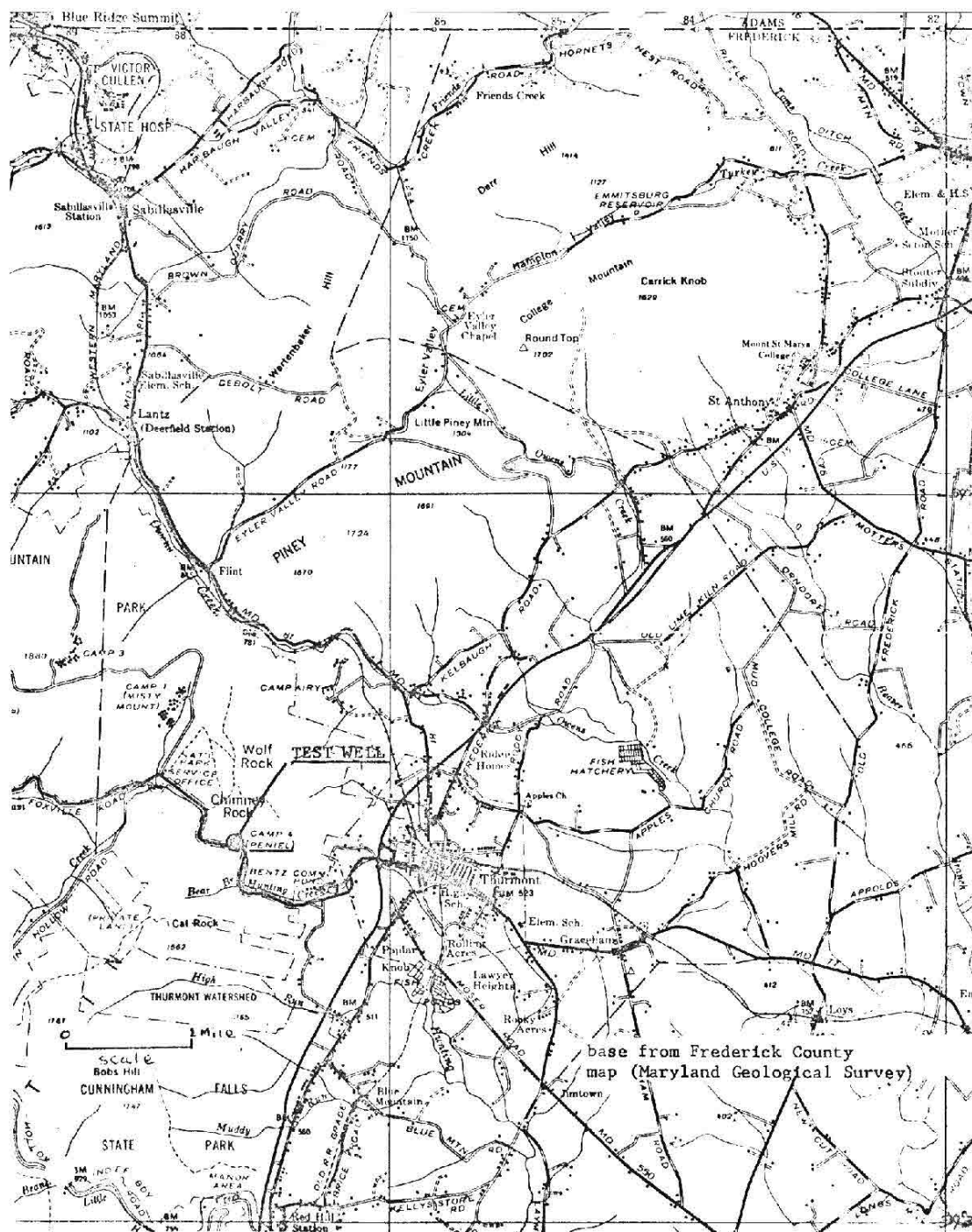


Figure 1. Map showing location of study area.

## GEOLOGY

Catoctin Mountain Park is in the Blue Ridge physiographic province, a mountainous area lying between the Frederick Valley to the east and the Hagerstown Valley to the west. The Blue Ridge Province is underlain by Lower Cambrian clastic rocks and metavolcanic rocks and is characterized by very complex geologic structure. Camp Peniel is underlain by the Lower Cambrian Weverton Formation and is on the east limb of a syncline.

The Weverton is composed of interbedded white to dark-gray, thin-bedded, micaceous quartzite, phyllite, white, thick-bedded quartzite, and some quartz conglomerate. The Weverton is as much as 425 feet thick.

## GROUND-WATER HYDROLOGY

The primary intergranular porosity of the clastic rocks in the study area has been almost completely obliterated by compaction and metamorphism. Ground water occurs in joints, faults, bedding-plane partings, and other fractures in the rock and in the saprolite (weathered rock mantle), which overlies the unweathered rock. In areas underlain by the Weverton, the saprolite is usually thin and is probably not as important in storing and transmitting ground water as in other crystalline-rock areas.

In crystalline rocks the permeability, a measure of the ability of a rock or soil to transmit water, is governed chiefly by the size, shape, and degree of interconnection of the joints and other fractures in the rock, and the success of a well depends on the optimal intersection of these fractures.

#### TEST WELL

A 202-foot test well was drilled, using an air-percussion rotary rig, near the southwest corner of the auditorium building, and 30 feet of 6-inch steel casing was installed and grouted. The well penetrated 18 feet of boulders and saprolite and 184 feet of greenish-gray quartzite and phyllite containing several layers that were iron-stained. The geophysical logs (gamma-ray, electric, and caliper) and the well schedule are included in the Appendix.

Considerable difficulty was experienced in reaming the borehole to 10 3/4 inches, as required by the contract, and installing the casing, because of the boulders overlying the rock. The installation of 12-inch temporary casing was required to hold back the boulders and mud. Successive sections of temporary casing in 2- or 3-foot lengths were welded on and pushed down after reaming a few feet. After the boulders and saprolite were cased off, the hole was drilled and reamed to 30 feet, and the 6-inch casing was installed. The annular space between the 6-inch casing and the 12-inch temporary casing was filled with grout. The 12-inch casing was then removed and more grout added until the annular space was completely filled.

#### PUMPING TEST

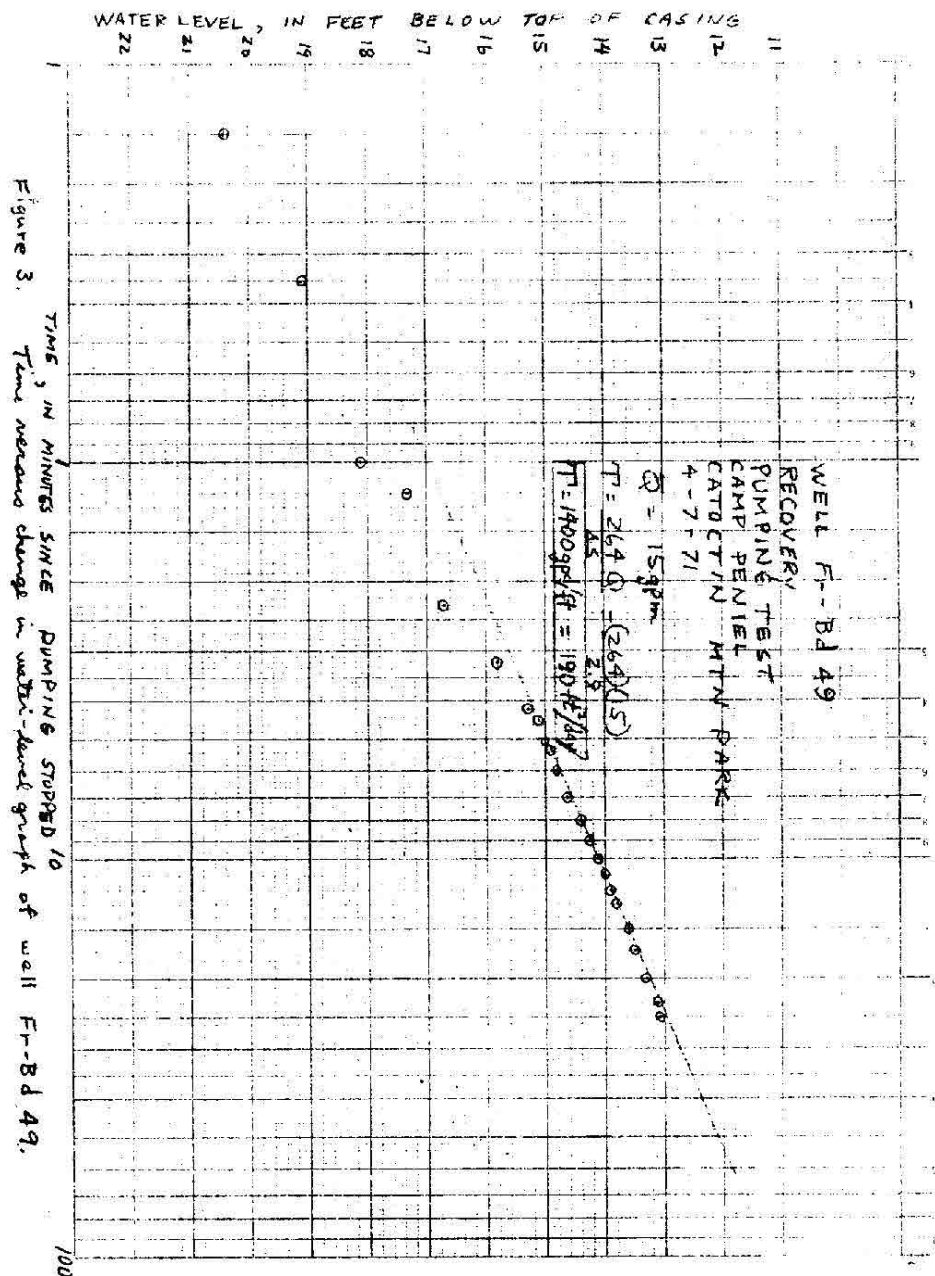
A submersible pump with approximately 20 gpm (gallons per minute) capacity was installed, and the well was pumped for 3 1/4 hours at four successively higher rates (fig. 2). Figure 3 shows the time versus change in water-level graph of the recovery test after pumping stopped. The average discharge was about 15 gpm, and the transmissivity was found to be in the range of about 130 to 190 square feet per day (1,000 to 1,400 gallons per day per foot). The specific capacity of the well is about 1.5 gpm per foot of drawdown. The transmissivity of the aquifer and specific capacity of the test well are quite good for the area.

#### CHEMICAL QUALITY

A chemical analysis of a water sample from the well was made by the U.S. Geological Survey. A copy of the analysis is included in the Appendix. The analysis shows that the chemical quality of the water is generally excellent, the only potentially troublesome aspect being the low pH (5.9). The low pH and fairly high CO<sub>2</sub> content suggest that the water may be somewhat corrosive.

APPENDIX

Figure 2. Time versus change in water level graph of step-drawdown test (will F-8449)



FORM 9-6420  
(DEC 68)

Well No.

Fr-Bd 49

## WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR

GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

## MASTER CARD

Record by 311 Source field Date 4-6-71 Map Blue Ridge Summit

State Mar. Can. d 24 County Frederick FR

Latitude: 39° 37' 13" N Longitude: 77° 26' 26" W Sectional: 1

Well number: B001 419 412-8 FR CA 78

Local use: NAT. PARK SERVICE National Park Service

Owner or name: NAT. PARK SERVICE Address: Wisc Ave, Wash. DC.

Ownership: (C) Fed. Gov. (D) City, Corp. or Co. (P) Private, State Agency, Water Dis. (F) F

Use of: (A) Air cond. (B) Bottling, Com. Dewater. (C) Power, Fire, Dom. Use, Ind. P. & Res. (D) D

Stock, Inert, Unused, Repressure, Recharge, Dead-P S, Dead-other, Other W

Use of well: (A) Anode, Drain, Seismic, Heat Res. Obs. (B) Oil-gas, Recharge, Test, Unused (C) C (D) D (E) E (F) F (G) G (H) H (I) I (J) J (K) K (L) L (M) M (N) N (O) O (P) P (Q) Q (R) R (S) S (T) T (U) U (V) V (W) W (X) X (Y) Y (Z) Z

DATA AVAILABLE: Well date 4-6-71 Freq. W/L meas. 1 Field aquifer char. 1

Prod. lab. data: 1

Qual. water data: type: 1 yes 1 no 1

Test sampling: 1 yes 1 no 1

Apert. cards: 1

Log data: geologic log, casing log, GR log, E log

## WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD

Depth well: 120.2 ± 1'

Depth cased: 3.0 steel 6 6

Finish: (C) concrete, (F) gravel, (G) open, (H) screen, (I) pl., (J) shale, (K) K

Method: (A) air, (B) bore, (C) cal., (D) hyd., (E) jet, (F) F (G) G (H) H (I) I (J) J (K) K (L) L (M) M (N) N (O) O (P) P (Q) Q (R) R (S) S (T) T (U) U (V) V (W) W (X) X (Y) Y (Z) Z

Date drilled: 4-2-71 9-7-1 1 1 1 1

Driller: Austin Kayser Frederick, Md.

Life: (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z) 5 5

Power: (A) diesel, (B) gas, (C) gasoline, (D) hand, (E) wind, (F) F (G) G (H) H (I) I (J) J (K) K (L) L (M) M (N) N (O) O (P) P (Q) Q (R) R (S) S (T) T (U) U (V) V (W) W (X) X (Y) Y (Z) Z

Recharge: 2.9 ft 10 10

Alt. LSD: 8.2 ± 10 top

Water level: 12.08 ft 10 10

Date: 4-5-71 9-7-1 1 1 1 1

Drawdown: 12 ft 1 1 1 1

QUALITY OF WATER DATA: Iron 1 1 1 1 1 1

Sp. Conduct: 1 1 1 1 1 1

Taste, color, etc. 1 1 1 1 1 1

Well No. Fr-Bd 49

Latitude-Longitude                      N                      S

HYDROGEOLOGIC CARD

NAME AS ON MASTER CARD: Blue Ridge 0:5 Section:                     

Drainage Basin:                      Subbasin:                     

Topo of well site: (D) depression, stream channel, dunes, flat, hilltop, sink, swamp, (E) offshore, pediment, hillside, terrace, undulating, valley flat (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V)                      37 ☒

MAJOR AQUIFER: Carrollton series                      Waverly Formation aquifer, formation, group                     

Lithology: quartzite & phyllite Origin: igneous Aquifer Thickness:                      ft

Length of well open to:                      ft Depth to top of:                      ft

MAJOR AQUIFER:                      series                      aquifer, formation, group                     

Lithology:                      Origin:                      Aquifer Thickness:                      ft

Length of well open to:                      ft Depth to top of:                      ft

Intervals Screened:                     

Depth to consolidated rock:                      ft Source of data:                     

Depth to basement:                      ft Source of data:                     

Surficial material:                      Infiltration characteristics:                     

Coefficient Trans: 1400 gpd/ft Coefficient Storage:                     

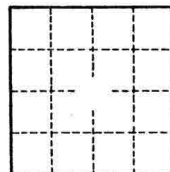
Coefficient Perm:                      gpd/ft<sup>2</sup> Spec cap: 1.5 gpm/ft; Number of geologic cards:                     

boulders & saprolite 0-18'

grn - gray quartzite & phyllite (sl. brn color) 18-40

grn - gray quartzite & phyllite 40-202

- soft strk 43-45 (no wtr)
- tan color 55-56 (no wtr)
- \* soft strk 63-64 (5-6 gpm)
- \* more wtr below 64' ( $\pm 10$  gpm by 70')
- gty zone 104'
- non stained quartzite 131-133'
- \* soft zone 137-140 (more wtr - tot c  $\pm 20$  gpm)



GPO 869-201

Lab NO. DC 6505 Project: Parkville

Source: Well Fr-Ed 49

Location: Camp Peniel, Catoclin Mtn Park County: Frederick State: Md.  
Pt of Coll: Discharge pipe

Date of Collection: 4-7-71 Time: 1400 Collector: L. Nutter

Field data &amp; remarks:

App: Clear

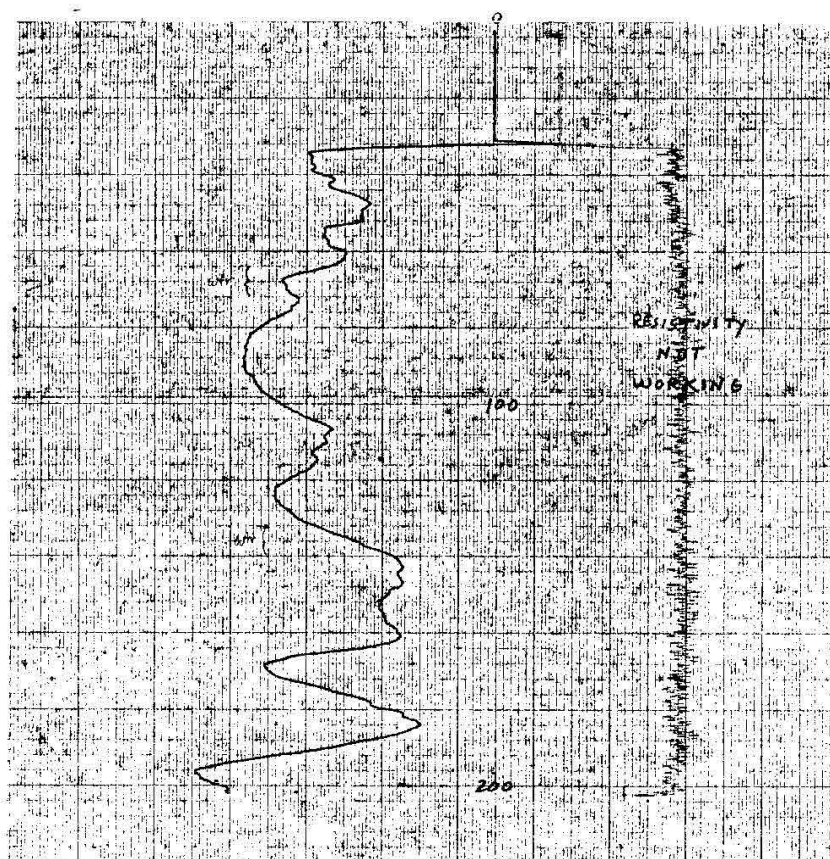
|                                |      |           |      |          |      |                      |       |       |
|--------------------------------|------|-----------|------|----------|------|----------------------|-------|-------|
| pH                             | 5.9  | Alk./Acid | ml   | Sulfate  | ml   | Const                | mg/l  | meq/l |
| CO <sub>2</sub> , mg/l. (calc) | 38   |           |      |          |      | CO <sub>2</sub>      | 0     | .00   |
| Alk (CaCO <sub>3</sub> )       | 16   |           |      |          |      | HCO <sub>3</sub>     | 19    | .31   |
| Color                          | 0    | N         |      | mg       |      | SO <sub>4</sub>      | 3.2   | .07   |
| Turbidity, JTU                 |      |           |      |          |      | Cl                   | 1.0   | .03   |
| Solids (calc)                  | 32   | Chloride  | ml   | Fluoride | ml   | F                    | .1    | .01   |
| Residues on evap. (180)        |      |           |      | Nitrate  | ml   | NO <sub>3</sub>      | .4    | .01   |
| ml                             |      |           |      |          |      |                      |       |       |
| dish                           |      | mg        |      | Abs      |      |                      |       |       |
|                                | 28   | Abs       |      | Abs      |      | Sum, Anions          |       | .43   |
| Density (20)                   |      | ml        | Fact | Read     | mg/l | Dil                  | Range | Fact  |
|                                |      | Al        |      |          |      | Ca                   |       | 3.4   |
|                                |      | Ca        |      |          |      | Mg                   |       | .8    |
|                                |      | Cr        |      |          |      | Na                   |       | 2.7   |
|                                |      | Cr        |      |          |      | K                    |       | 1.7   |
|                                |      | Cu        |      |          |      |                      |       |       |
|                                |      | Fe        |      |          |      |                      |       |       |
| Hardness, CaCO <sub>3</sub>    |      | Fe        |      |          |      |                      |       |       |
| EDTA                           |      | Pb        |      |          |      |                      |       |       |
| Ca, Mg                         | 12   | Mn        |      |          |      |                      |       |       |
| Total                          |      | Ni        |      |          |      |                      |       |       |
|                                |      | Zn        |      |          |      |                      |       |       |
| Non Carbonate hardness         |      |           |      |          |      | Sum, Cations         |       | .40   |
|                                | 0    |           |      |          |      |                      |       |       |
| Specific Conductance           |      |           |      |          |      | B                    |       |       |
| Temp                           |      |           |      |          |      | P as PO <sub>4</sub> |       |       |
| Reading                        |      |           |      |          |      | SiO <sub>2</sub>     | 10    |       |
| Factor                         |      |           |      |          |      | Fe (T)               | 40 *  |       |
| k x 10 <sup>6</sup>            | 43   |           |      |          |      | Mn (T)               | 0 *   |       |
| Notes: *                       | ug/l |           |      |          |      |                      |       |       |

Analyst: Chemerys

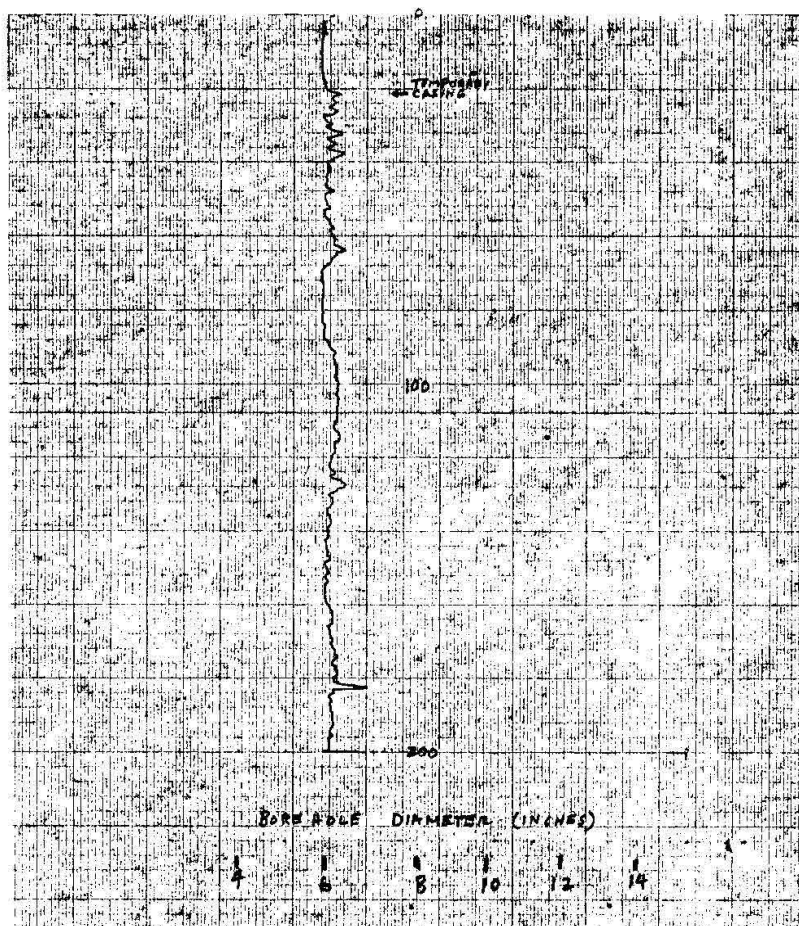
Date Completed: 4-26-71

Checked by: Rettig

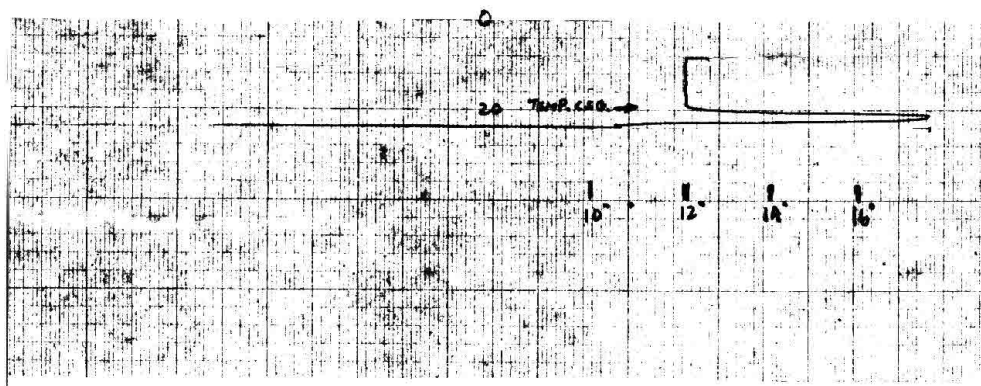
|                                        |                                        |                                       |                                         |
|----------------------------------------|----------------------------------------|---------------------------------------|-----------------------------------------|
| Log No. <b>4-9-71</b>                  | <b>GEOPHYSICAL LOG</b>                 |                                       | Well No. <b>Fr-Bd 49</b>                |
| Type log <b>ELECTRIC</b>               |                                        |                                       | County <b>FREDERICK</b> State <b>MD</b> |
| Logged by <b>NUTTER</b>                |                                        |                                       | Location <b>CAMP PENIEL</b>             |
| Fluid in hole <b>WATER</b>             | <b>UNITED STATES GEOLOGICAL SURVEY</b> |                                       | <b>CATOCTIN MTN PK</b>                  |
| Fluid level below datum <b>9'</b>      | in cooperation with                    |                                       |                                         |
| Specific conductance                   | <b>MARYLAND GEOLOGICAL SURVEY</b>      |                                       | Datum <b>LAND SURFACE</b>               |
| Time constant                          |                                        |                                       | Altitude of datum <b>320'</b>           |
| Logging speed <b>50 ft per min</b>     |                                        |                                       | Depth hole <b>202'</b> dia <b>6"</b>    |
| Aquifer <b>WEYERTON FM</b>             | OWNER <b>NATIONAL PARK SERVICE</b>     | Depth casing <b>30'</b> dia <b>6"</b> |                                         |
| Screen                                 | ADDRESS                                |                                       |                                         |
| Remarks <b>RESISTIVITY NOT WORKING</b> | DRILLER <b>AUSTIN KEYSER</b>           |                                       |                                         |
| <b>S 200</b>                           | DEPTH (feet)                           | <b>R 20</b>                           |                                         |



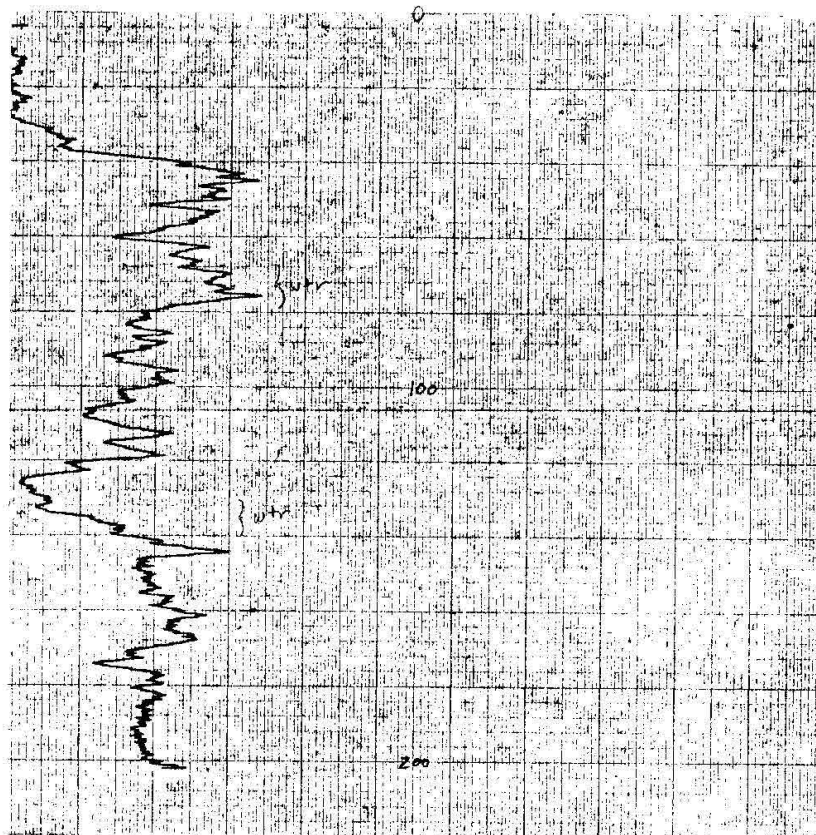
|                                                      |                                                                                      |  |                                         |
|------------------------------------------------------|--------------------------------------------------------------------------------------|--|-----------------------------------------|
| Log No. <b>3-29-71</b>                               | <b>GEOPHYSICAL LOG</b>                                                               |  | Well No. <b>FF-Bd 49</b>                |
| Type log <b>CALIPER</b>                              | UNITED STATES GEOLOGICAL SURVEY<br>in cooperation with<br>MARYLAND GEOLOGICAL SURVEY |  | Long                                    |
| Logged by <b>NUTTER</b>                              |                                                                                      |  | Lat                                     |
| Fluid in hole <b>WATER</b>                           | in cooperation with<br>MARYLAND GEOLOGICAL SURVEY                                    |  | County <b>Frederick</b> State <b>Md</b> |
| Fluid level below datum <b>9 ft</b>                  |                                                                                      |  | Location <b>CAMP PENIEL</b>             |
| Specific conductance                                 | in cooperation with<br>MARYLAND GEOLOGICAL SURVEY                                    |  | Datum <b>LAND SURFACE</b>               |
| Time constant                                        |                                                                                      |  | Altitude of datum <b>820'</b>           |
| Logging speed <b>25</b> ft per min                   | OWNER <b>NATIONAL PARK SERVICE</b>                                                   |  | Depth hole <b>202'</b> dia <b>6"</b>    |
| Aquifer <b>WEVERTON FM</b>                           |                                                                                      |  | Depth casing <b>22'</b> dia <b>6"</b>   |
| Screen <b>—</b> dia                                  | ADDRESS                                                                              |  |                                         |
| Remarks <b>LOGGED BEFORE PERMANENT CSG INSTALLED</b> |                                                                                      |  |                                         |
| DRILLER <b>AUSTIN KEYSER</b>                         | DEPTH<br>(feet)                                                                      |  |                                         |



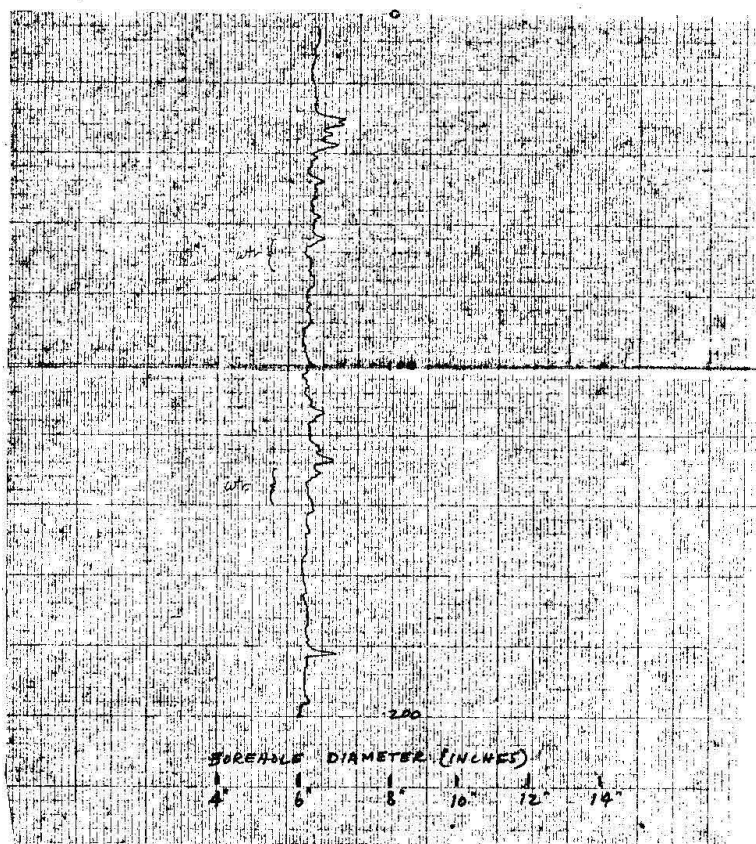
|                                      |                    |                                    |  |                                         |
|--------------------------------------|--------------------|------------------------------------|--|-----------------------------------------|
| Log No. _____                        | Date <u>4-2-71</u> | <b>GEOPHYSICAL LOG</b>             |  | Well No. <u>Fr-Bd 49</u>                |
| Type log <u>CALIPER</u>              |                    |                                    |  | Long _____                              |
| Logged by <u>NUTTER</u>              |                    |                                    |  | Lat _____                               |
| Fluid in hole <u>WATER</u>           |                    | UNITED STATES GEOLOGICAL SURVEY    |  | County <u>FREDERICK</u> State <u>MD</u> |
| Fluid level, below datum _____       |                    | in cooperation with                |  | Location <u>CAMP PENIEL</u>             |
| Specific conductance _____           |                    | MARYLAND GEOLOGICAL SURVEY         |  | <u>CATOCTIN MTN PARK</u>                |
| Time constant _____                  |                    |                                    |  | Datum <u>LAND SURFACE</u>               |
| Logging speed <u>25</u> ft. per min. |                    |                                    |  | Altitude of datum <u>820</u>            |
| Screen <u>WEVERTON FM</u>            |                    | OWNER <u>NATIONAL PARK SERVICE</u> |  | Depth hole _____                        |
| Remarks <u>LOGGED AFTER</u>          |                    | ADDRESS _____                      |  | Depth casing _____                      |
| <u>HOLE REAMED TO 30'</u>            |                    | DRILLER <u>AUSTIN KEY SER</u>      |  |                                         |
| <u>UNABLE TO GET PROBE</u>           |                    |                                    |  |                                         |
| <u>BELOW 24'</u>                     |                    |                                    |  |                                         |
|                                      |                    | DEPTH<br>(feet)                    |  |                                         |



|                                    |                    |                                       |
|------------------------------------|--------------------|---------------------------------------|
| Log No. <b>GAMMA RAY</b>           | Date <b>4-9-71</b> | Well no. <b>Fz-86 49</b>              |
| Logged by <b>NUTTER</b>            |                    | Long                                  |
| Fluid in hole <b>WATER</b>         |                    | Lat                                   |
| Fluid level below datum <b>9'</b>  |                    | County <b>FREDERICK State MD</b>      |
| Specific conductance               |                    | Location <b>CAMP PENIEL</b>           |
| Time constant <b>D'SWES, 1.00</b>  |                    | <b>CATOCTIN MTN PK</b>                |
| Logging speed <b>30 ft per min</b> |                    | Datum <b>LAND SURFACE</b>             |
| Aquifer <b>WEVERTON FM</b>         |                    | Altitude of datum <b>820'</b>         |
| Screen                             |                    | Depth hole <b>202'</b> dia <b>6"</b>  |
| Remarks                            |                    | Drift casing <b>30'</b> dia <b>6"</b> |
| OWNER <b>NATIONAL PARK SERVICE</b> |                    |                                       |
| ADDRESS                            |                    |                                       |
| DRILLER <b>AUSTIN KEYSER</b>       |                    |                                       |
| DEPTH (feet)                       |                    |                                       |



|                              |                                 |                         |                           |
|------------------------------|---------------------------------|-------------------------|---------------------------|
| Log No. 4-9-71               | GEOPHYSICAL LOG                 |                         | Well No. FC-Ed 44         |
| Type log CALIPER             |                                 |                         | Long                      |
| Logged by NUTTER             |                                 |                         | Lat                       |
| Fluid in hole WATER          | UNITED STATES GEOLOGICAL SURVEY |                         | County FREDERICK State MD |
| Fluid level below datum 9'   | in cooperation with             |                         | Location CAMP DENIEL      |
| Specific conductance         | MARYLAND GEOLOGICAL SURVEY      |                         | CATOCTIN MTN PK           |
| Time constant                |                                 |                         | Datum LAND SURFACE        |
| Logging speed 25 ft per min. |                                 |                         | Altitude of datum 820     |
| Aquifer WEVERTON FM          | OWNER NATIONAL PARK SERVICE     | Depth hole 202' dia 6"  |                           |
| Screen                       | ADDRESS                         | Depth casing 30' dia 6" |                           |
| Remarks                      | DRILLER AVSTIN KEYSER           |                         |                           |
| DEPTH (feet)                 |                                 |                         |                           |



Form 10-194  
(Rev. 9/60)UNITED STATES DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICEEASTERN SERVICE CENTER  
(Park)Check One  
Monthly  
Estimate ☐Final  
Estimate ☒Release of Claims  
Executed 6/3/71

## UNIT PRICE CONTRACT

|                                                                      |                                                |                               |
|----------------------------------------------------------------------|------------------------------------------------|-------------------------------|
| ESTIMATE NO.<br>1                                                    | FOR (Period)<br>March 17, 1971 - April 2, 1971 | DATE<br>June 2, 1971          |
| CONTRACT NO.<br>14-10-G:990-587                                      | COMPLETION DATE<br>April 2, 1971               | EXTENDED DATE<br>--           |
| CONTRACTOR<br>Austin R. Koyser, Inc.                                 |                                                | ORIGINAL CONTRACT \$ 1,950.00 |
| PROJECT<br>Test well at Catoctin Mountain National Park, Camp Peniel |                                                | CHANCE ORDERS* \$ --          |
| LOCATION<br>Camp Peniel                                              |                                                | TOTAL CONTRACT \$ 1,292.30    |

| ITEM NO. | CONTRACT QUANTITY | DESCRIPTION                                               | QUANTITY TO DATE | UNIT PRICE | AMOUNT TO DATE |
|----------|-------------------|-----------------------------------------------------------|------------------|------------|----------------|
| 1.       | 300 LF            | Drill six-inch (6") diameter open hole                    | 200 LF           | \$4.00     | \$800.00       |
| 2.       | 50 LF             | Install casing and grouting.                              | 43 LF            | 3.60       | 154.80         |
| 3.       |                   | Install and remove temporary surface casing, if required. |                  |            | 00             |
| 4.       | 8 hrs.            | Pump testing.                                             | 8 Hrs            | 25.00      | 200.00         |
| 5.       | 4 hrs.            | Surging well.                                             | 4 hrs            | 25.00      | 100.00         |
| 6.       | 8 hrs.            | Stand-by time.                                            | 2-1/2 Hrs        | 15.00      | 37.50          |
| 7.       | Job               | Abandonment of hole.                                      |                  |            | 00             |
| Total    |                   |                                                           |                  |            | \$1,292.30     |

RECOMMENDED (Project Supervisor)

*Garland Moore*

Garland Moore, Hydraulic Engineer

Office of Land Acquisition &amp; Water Resources, ESC

APPROVED (Contracting Officer)

*Ray G. Martinez*  
Ray G. Martinez, Chief Procurement  
and Contracting Officer

DATE

6/7/71

## SUMMARY

|                              |             |
|------------------------------|-------------|
| TOTAL TO DATE .....          | \$ 1,292.30 |
| LESS RETAINED AMOUNT.....    | --          |
| NET.....                     | 1,292.30    |
| LESS PREVIOUS PAYMENTS.....  | --          |
| LESS LIQUIDATED DAMAGES..... | --          |
| DUE THIS ESTIMATE .....      | \$1,292.30  |
| % COMPLETED TO DATE:         | 100%        |

\*Show Breakdown on Reverse

(See Reverse for Distribution)

RELEASE OF CLAIMS

For and in consideration of the receipt of final payment in the amount of 1292.30 from the United States of America (hereinafter called the Government) under and pursuant to Contract No. 14-10-6-940-587

the undersigned hereby does remise, release, and discharge the Government, its officers, agents, and employees of and from any and all claim and demands whatsoever under or arising from the said contract, except specified claims in stated amounts listed as follows:

This release has been executed this 3rd day of June, 1977.

AMSTER R. KEEFER, III.

BY

Amster R. Keefe

TITLE PRESIDENT

April 22, 1969

SUBJECT: Visit to Catoclin Mountain Park, technical support  
to N. P. S.

In order to select a site for a permanent well, Moore and Hollyday examined the geology along Route 77 and Hunting Creek within one-half mile upstream of Camp Peniel. The geology checked acceptably with previous interpretations given in Jonas, A. I., and Stose, G. W., 1938, Geologic Map of Frederick County (see enclosure).

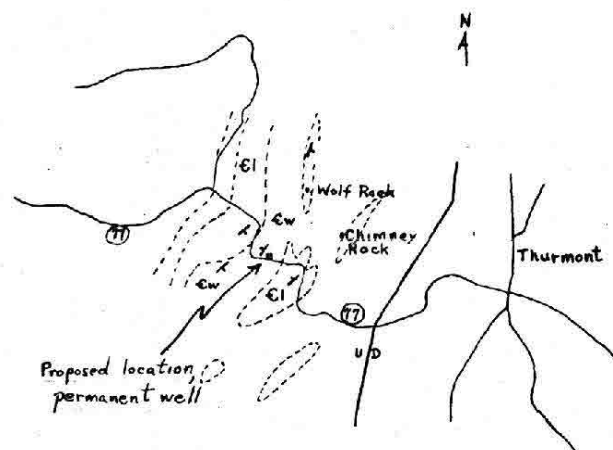
Several springs yielding more than 5 gpm were noted. The location of a tight syncline with Weverton Quartzite overlying Loudoun Formation was confirmed. A proposed location for the permanent well was selected near the center of this syncline, on the north side of Route 77, about 800 feet west of the entrance to Camp Peniel, which is opposite the Route 77 bridge over Hunting Creek (see maps).



Este F. Hollyday  
Geologist

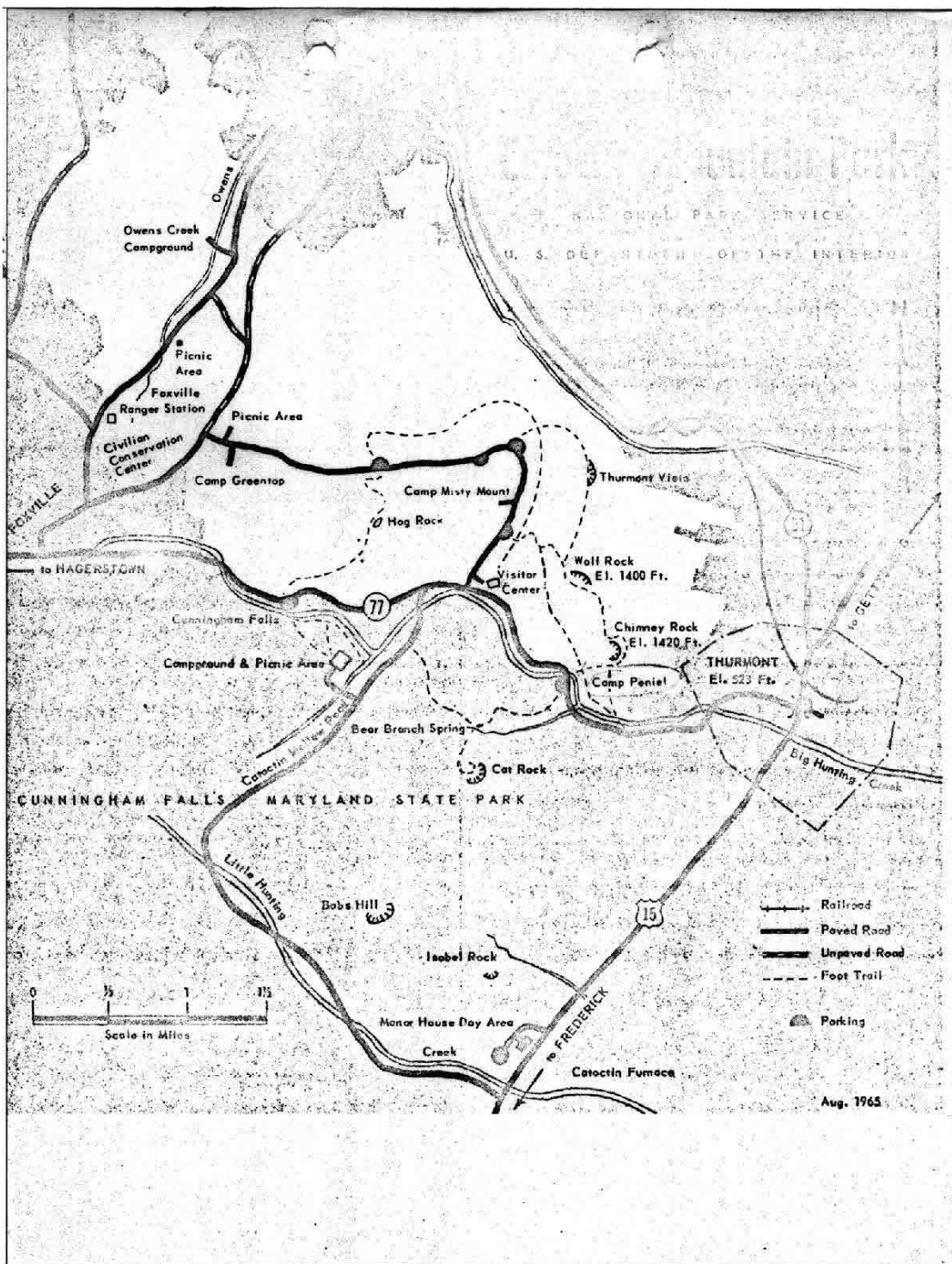
Enclosures

cc: Garland Moore, WSC, NPS, Washington, D. C.  
E. G. Otton, WRD, Towson, for Frederick Co. file



#### EXPLANATION

- Ew Weaverton formation (quartzite)
- E1 London formation (conglomeratic quartzite & sandstone)
- - - approximate contact between formations
- X attitude of bedding



# Docket Information

Number of Documents in Docket 32

Documents Dated from 4/22/1969 to 6/3/1977

Docket Compiled: 2/2/2011