UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES BRANCH

P130

RECORD OF WELL

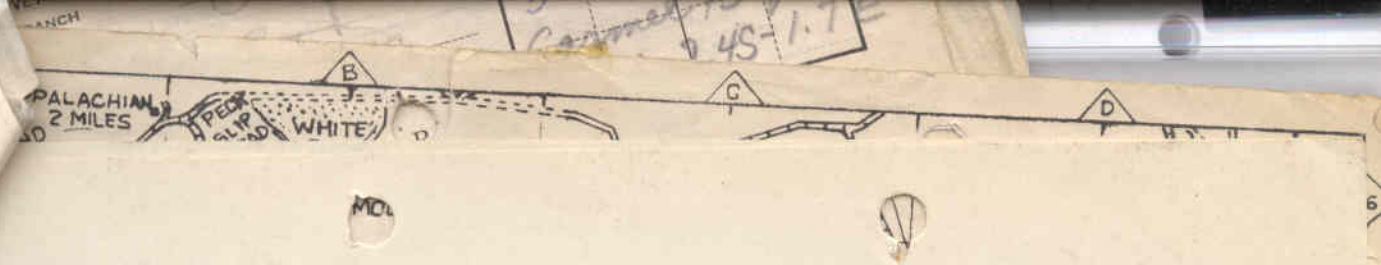
Lake Carmel Quad. 7½'
4.65
3.5E
see P131 + P132
Carmel 15' quad
15 Y-2.45-1.7E

Location: State N.Y. County Putnam
Nearest P. O. Direction from P. O.
Distance from P. O. miles; ¼ sec. Loc. O.K., T., R.
If in city, give street and number Town of Kent

Locate well on plat of section.

Owner: Address
Driller: P F Beal Address Brewster, N.Y.
Situation: Is well on upland, in valley, or on hillside? valley
Elevation of top of well: 705 707 ft. above the level of sea
(Above or below) (Sea, depot, lake, or stream)
Type of well: drilled; kind of drilling rig used
(Dug, driven, bored, or drilled) (Solid tool, jetting, rotary, etc.)
Depth of well: 300 135 ft.; see attached diagram; year in which well was finished 1927
Does well enter rock? Yes; if so, at what depth? ft.; kind of rock
Diameter: At top 8" inches; at bottom inches.
Principal water bed:
(Gravel, sand, clay, or rock. If rock, state kind)
Depth to principal water bed ft.; thickness of bed ft.
If other water supplies were found, give depth to each
Casings: Kind 8"; size; length 28 ft.; between depths of 0 and 28 ft.
Kind; size; length ft.; between depths of and ft.
Kind; size; length ft.; between depths of and ft.
Packers (if any): Depth at which packers were used; kind
Screen or Strainer: Was well finished with screen?; kind of screen;
length of screen ft.; diameter inches; size of openings
10. Head: Does well at present overflow without pumping? No; did it overflow when new?;
if flowing, give pressure lb. per sq. inch; or height water will rise in a pipe ft. above surface;
original pressure or head; if not flowing, give water level in well 5+ ft. below surface.
11. Pump: Is the well pumped? Yes; kind of pump;
size or capacity of pump 48; kind of power
12. Yield: Natural flow at present (if any) gallons per minute; original flow 30 gpm under drought conditions gallons per minute;
well has been pumped at 48 gallons per minute continuously for hours;
drought yield = 20 gpm at pump capacity
quantity of water ordinarily obtained from well 15000 - 20,000 gallons per day.
13. Use: For what purpose is the water used? Club (340 people in 2-19-41) PWS
14. Quality of the water:; is there an analysis? Yes
(Hard or soft, fresh or salty, etc.)
15. Cost of well, not including pump: Temperature of water ° F.
Name of person filling blank
Date June, 1949 Address See sketch for no. of families supplied

On the back of this sheet give the record of the beds through which the well passes and any other facts not given above.



it would be preferable to drill even further down Indian Brook in order to minimize the chances of penetrating solid rock where there are little or no water bearing fissures. Indian Brook turns westward at a point opposite the Gunnison house and passes under the road to Carmel. The low ground near the left bank of the creek and about 150' west of the road, is directly over the main north-south axis of fracture. This is also the point where the axis of Indian Brook valley stems north-westward from the main north-south axis. Moreover, the width of the combined axes of fracture is considerably narrowed at this point, and consequently the chances of the well intercepting large rock fractures are the best to be found anywhere on the property.

There is another area which should be mentioned to complete the records of available well sites on the property. This is the westerly side of Pine Pond valley flat where the Ice Front gouged into a softer part of the bed rock. It appears likely that a belt of limestone underlies the broad swampy flat of Pine Pond valley. Apparently this extends northward along the easterly side of the valley towards the Haunted House and underlies the ravine followed by Whang Hollow Road. About 100' north of the dock, between the shore and the bath house trail, it is my opinion that a well may encounter a bed of sand or gravel immediately above bed rock. The water bearing sediments may only be 20' to 30' below the surface and the total depth necessary to develop at least 25 gpm may not exceed 50'.

Summary

Based solely on hydrological factors, the best well sites available on the property are along the shore of Pine Pond, north of the dock, and east of the road to Carmel opposite the Gunnison house. Of these the one north of the dock is preferable because of the possibility of developing a good flow in the glacial sediments immediately overlying bed rock. The development of the shallow sands and gravels requires inserting a well screen above the rock and agitation to create a gravel wall around this screen. If drilling into rock should be necessary, there appears to be excellent possibilities of encountering water bearing crevices within 100' of the surface. In the area opposite the Gunnison house, indications are that open rock fissures may be encountered to a maximum depth of 300'. It is my opinion that ample water bearing rock fracture will be found within 175' of the surface to support a capacity of at least 25 gpm and possibly more. Both of these sites involve objectionable expense for laying pipe line due to rock excavation as well as the amount of pipe needed to connect into your existing water system.

The site immediately south of Indian Brook Pond dam involves very little pipe line expense. However, the fact must be faced that a well drilled here may not encounter open rock fissures just as did the one recently drilled between the Brook and the parking lot. The line of adjustment fracture under Indian Brook valley is narrow. There is evidence of iron staining on rock exposures along this valley which resembles the discoloration of the vein structure at the arsenic mine. It is possible that the Brook valley is eroded along a fault that is mineralized and that your old well is drilled into mineralized vein

VELL

County Putnam

P. O.

Carmel
15 Y-2.4S-1.7

...ell on plat of section.

Duplicated for U.S.G.S. by Otto Friend

May 19, 1947

Walter F. Friend, V. Pres.
Gipsy Trail Club
RFD #2
Carmel, New York

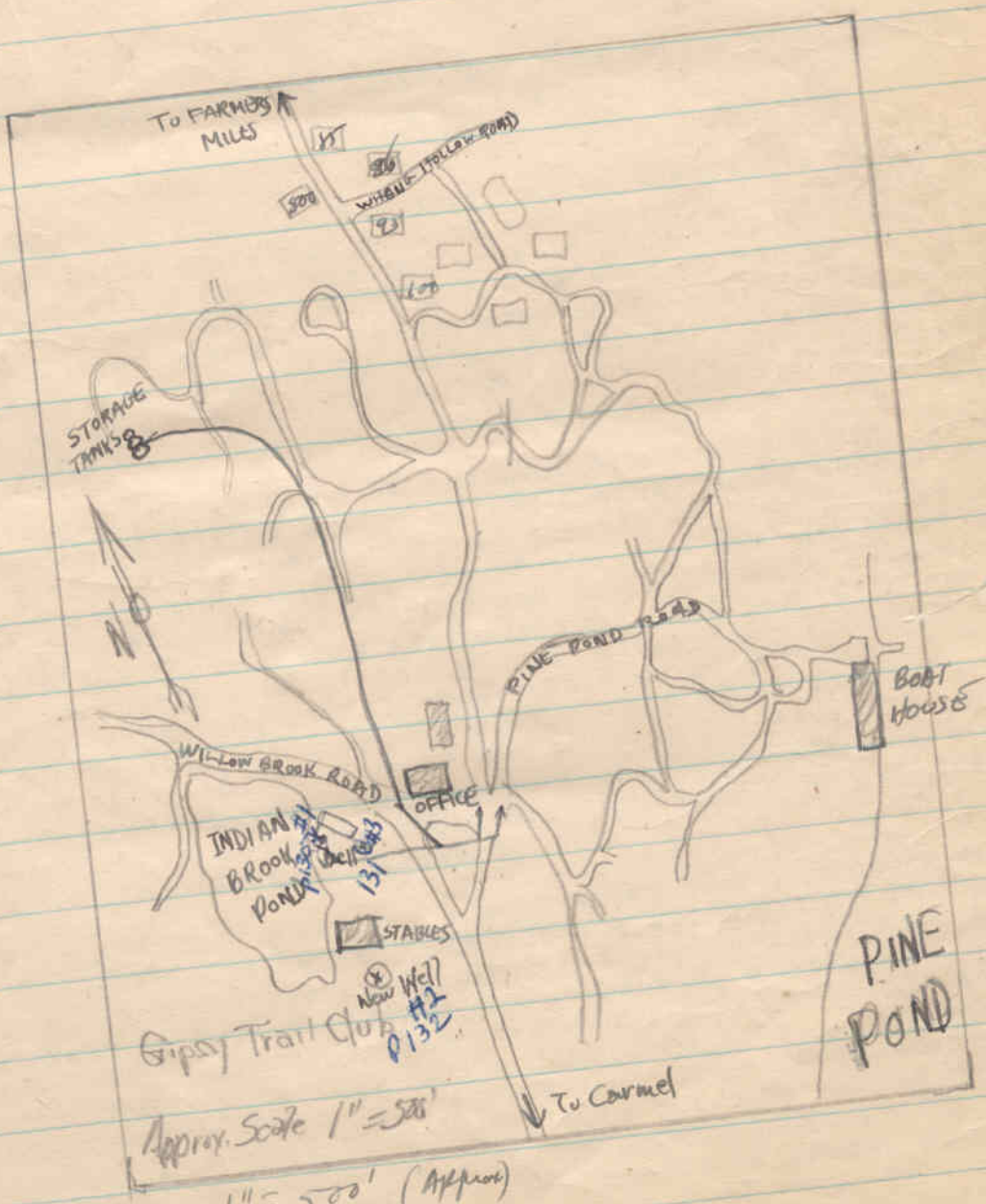
Dear Mr. Friend:

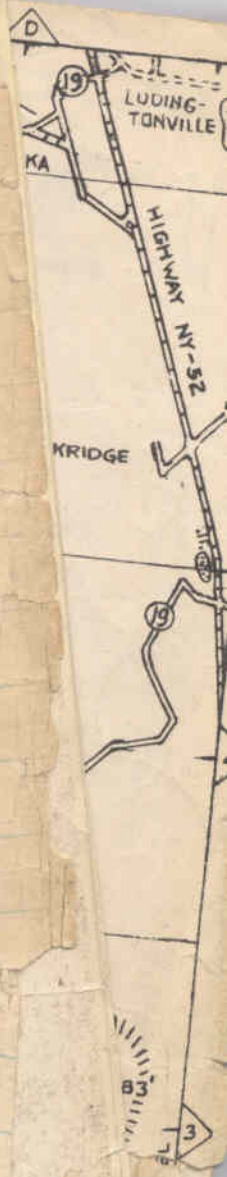
I submit herewith report analyzing underground structure pertaining to well water development in the area of the Gipsy Trail Club.

The field investigation was confined to inspection of the typography and of the character of rock outcropings, along both sides of Farmers Mills Road from the arsenic mine near Mt. Nimham Road south of the property, to Whang Hollow Road at its north end. Particular attention was given to the area north-west of the Sports Oval along the valley drained by Indian Brook, and to that part of the property lying south of Pine Pond Road, between Pine Pond and the road to Carmel.

The rugged relief found in southeastern Putnam County arises from the erosion-resisting nature of the gneiss, which constitutes a major part of the bed rock. This is one of the oldest rocks on the North American continent. It is of the same age and structure as the Fordham gneiss in Westchester and New York City, having undergone convolutions through long geologic ages that have developed band-like distributions of limestone and dolomite through it. Fracturing, due to earth adjustment, has developed many faults. Paralleling the major faults, minor cracks or fracture zones sometimes occur for a mile or so on either side of the axis of faulting. Moreover, shearing effects, arising from ages of fault adjustment, have produced cross fracturing, with minute small cracks, tending to radiate away from the principal lines of fracture.

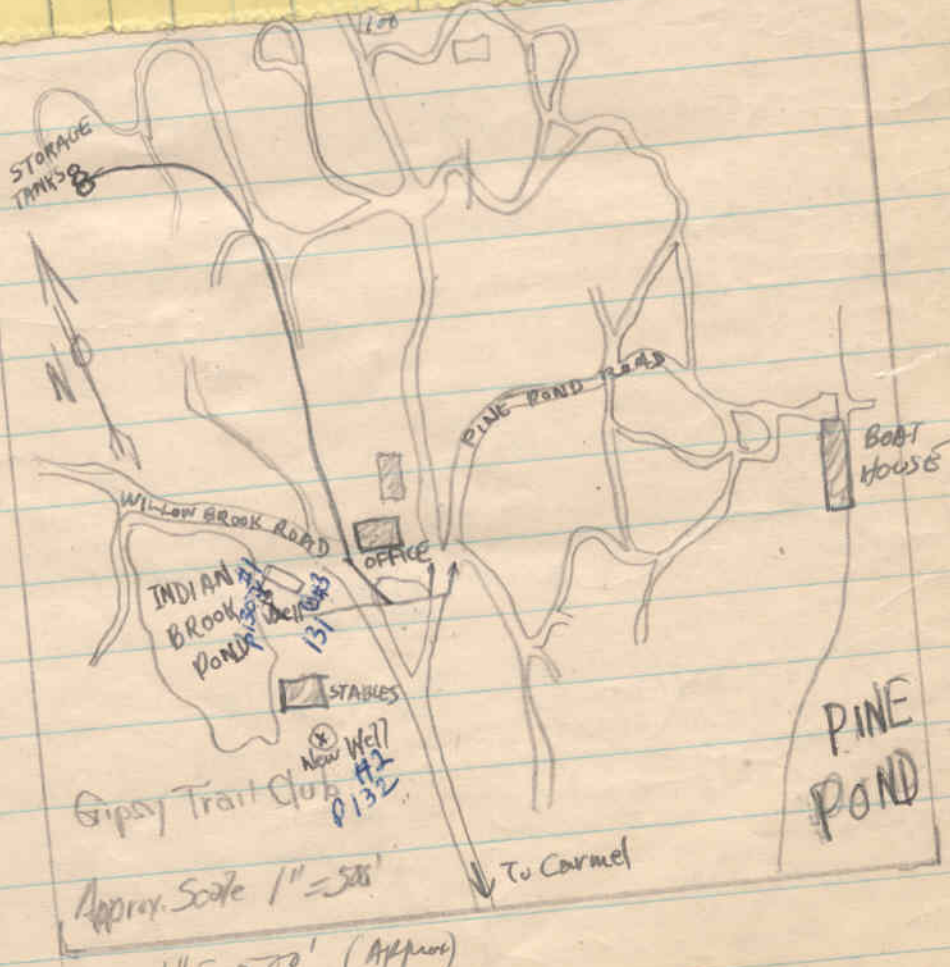
Of itself, the gneiss is a poor water bearer because of its density. However, the manifold cracks and voids afford rather capacious underground storage and water can travel considerable distances from the areas of inflow through the attenuated systems of fissuring described above. Another source of groundwater lies along contacts between the gneiss rocks and larger limestone beds. Frequently belts of limestone may be found to underlie the longer north-south valleys, due to glacial ice scour that was able to cut more deeply into the softer limestone than it could into the harder gneiss. The retreat of the continental glaciers left a thin mantle of poorly classified sediments over the higher land between the valleys as well as the more noticeable deposits found in the valley troughs. The thin


To FARMERS MILLS
WILLOW HOLLOW ROAD
STORAGE TANKS
N
PINE POND ROAD
BOAT HOUSE
WILLOW BROOK ROAD
OFFICE
INDIAN BROOK POND
STABLES
New Well #2
Gipsy Trail Club
To Carmel
PINE POND
Approx. Scale 1" = 500'
1" = 500' (Approx)



All analyses for Gypsy Trail Camp Club

	TOTAL HARDNESS (SOAP)	ALKALINITY	CO_2	Cl	SO_3	Fe	Turbidity	Color	PH	Total Consumed hard.	Remarks
	96	69	11.0	6	BICARBONATE 69	3.2	cloudy very high	DISCOLORED	6.9		Well #1 No taste or odor P130
		65	24	Bicarbonate 65		5			6.5 →		Well #2 P132 PH = 6.8 at pump PH = 6.7 at club PH = 6.5 at lab well #2. No taste or odor P132
	90	64	24	Bicarbonates = 64	0.15	0	0	0	6.5		
		Sodium salts = 29 Total Solids = 113			0.2 Mn = 0.0	little fine iron settles	duplicate		7.3	3	settles muchy odor, objectionable = hardness
	33	16	8	17	Na = 6	0.1	5	30	6.6	3 ←	no taste or odor after pantalay
Pond?	104	83	14	3	Na = 11	0.9	20	25	7.1	6	no taste or odor ? wheel well?



9 October 1949

Gipsy Trail Club - Carmel, N.Y.
Water Supply System

1 - Analysis of water samples taken about 6 September 1948, as reported by laboratory of Foster D. Snell Inc., Consulting Chemists, 29 West 15th St., New York City.

Quantitative Data:	P130 Well #1	P132 Well #2
Lime	25 ppm	32 ppm
Magnesia	73 ppm	73 ppm
Iron and aluminum oxides	1 ppm	0.8 ppm
Iron oxide	0.063 ppm	0.016 ppm
Ash on dissolved solids	90 ppm	91 ppm
Suspended solids	5.4 ppm	0.4 ppm
Dissolved solids	114 ppm	119 ppm
Sulfates (as sulfate ion)	7.6 ppm	14 ppm
Chlorides (as Chloride ion)	2.8 ppm	9.5 ppm
pH	7.7	7.3
Alkalinity to methylorange as bicarbonate ion	108 ppm	62 ppm

Hardness:(as calcium carbonate)

Lime	45 ppm	58 ppm
Magnesia	181 ppm	181 ppm
Iron and aluminum oxides	2 ppm	1 ppm
Total	228 ppm	240 ppm
	13 grains/gal.	14 grains/gal.
Carbonate hardness	180 ppm	103 ppm
Permanent hardness	48 ppm	137 ppm

2 - Analysis by Foster D. Snell Inc., of sample of sludge filtered from a gallon of water from well #1 about 6 September 1948, before 44 ft of new 6-inch steel casing was installed to eliminate leak in old 8-inch casing. P130

Quantitative Data:

Organic and Volatile Matter....	20.0%
Iron Oxide.....	43.2%
Aluminum Oxide.....	2.3%
Silicious Matter.....	26.6%
Lime.....	0.9%
Magnesia.....	1.0%
Other, incl carbonates, moisture (combined and free), miscel..	6.0%
	100.0%

P. F. BEAL and SONS
Brewster, New York

P130

9 October 1949

February 19, 1947

Mr. Charles J. Lovett, Jr.
Gipsy Trail Club
Carmel, New York

Re: Well No. 1 - Gypsy Trail

Dear Mr. Lovett:

The depth of the well is 135 feet. In the well we installed, over-all, 127 feet of column pipe. This included 80 feet of column, 12 feet of bowl assembly and 35 feet of suction pipe. The altitude line installed in the well is 82 feet over-all.

On February 17, 1947 at 3:00 o'clock P.M. we started a 24 hour test, which was terminated at 3:00 o'clock P.M. on February 18, 1947.

Prior to our starting this test the pump was tested without any adjustment and delivered 45 gallons per minute against no head pressure and 25.7 gallons per minutes against a 60 lb. head pressure. The altitude gauge, which is calibrated in pounds, showed a 14 lb. pressure.

After the pump was properly adjusted, it delivered 60 gallons per minute against no head pressure and 42 gallons per minute against a 60 lb. head pressure. Altitude reading was 10 lbs.

At the completion of our test at 3:00 o'clock P.M. on February 18, 1947 the pump delivered 45 gallons per minute against no head pressure and 34 gallons per minute against a 60 lb. head pressure, with no altitude pressure or complete draw down.

Very truly yours,

P. F. BEAL AND SONS

CC Mr. W. F. Friend

well no. 1 - Turbine
rated at 30 gpm

DATA ON #1 PUMP AND WELL (U.S.G.S.)

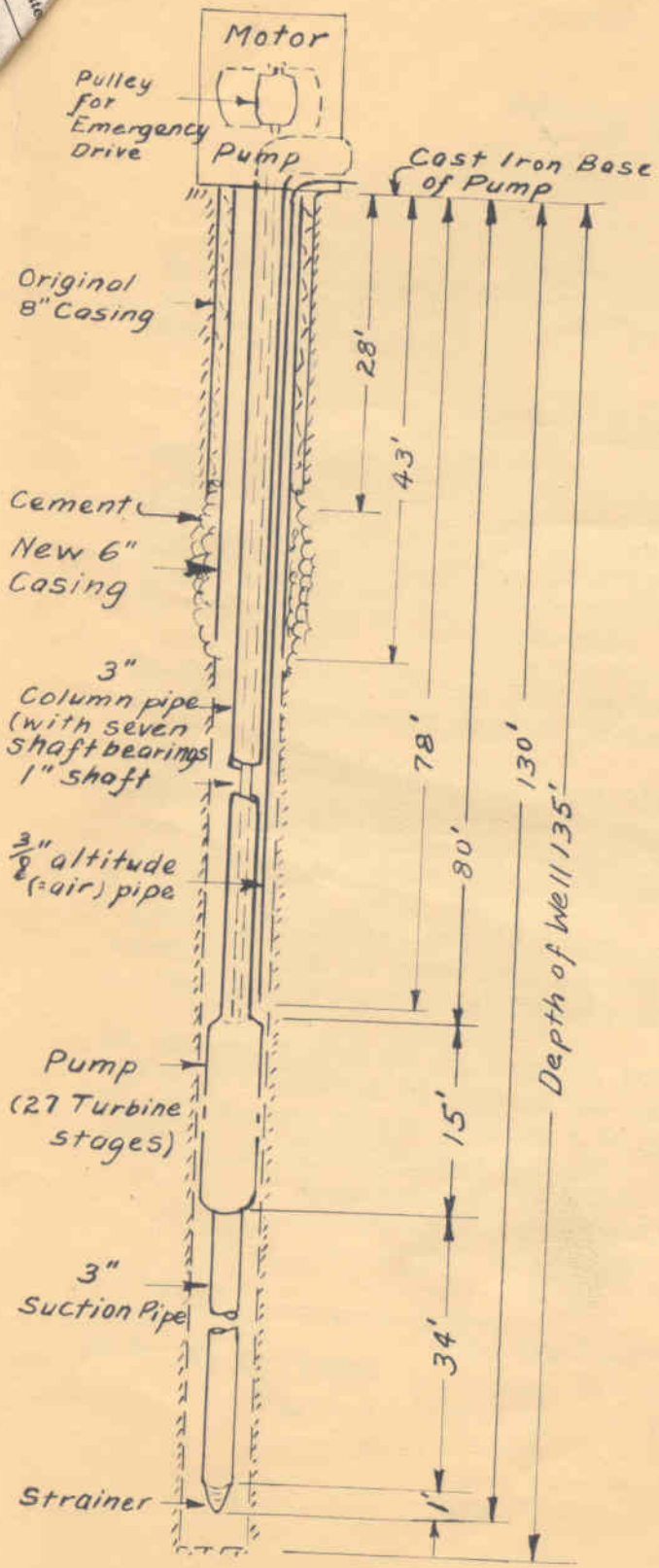
JULY 10, '49
O.A. FRIEND

DRILLED 1927

REPAIRED Oct. 1948

PUMP MEASUREMENTS CHECKED Oct. 1948

P130



Well #1

LOG OF WELL

.063
x .78 (FeO to [illegible]
.049

KIND OF ROCK OR OTHER MATERIAL (Give color and tell whether hard or soft)	DEPTH, IN FEET From—	To—	THICKNESS, IN FEET	REMARKS (Especially information as to water)
Rock (prob granite)	0	300	300	Well #1 April 1949

Analyses from
Ester Snell
Consult. Chemo
29 W. 15th St.
N.Y. 11, N.Y.
9-X-48

FeO	0.063
CaO	25
MgO	73
Fe + Al Oxides	1
Calcium Diss. Sol.	90
[illegible] (as CaSO₄)	5.4
Diss. Sol.	114
Sulfates	7.6
Cl	2.5
K	7.7
Bicarb. [illegible] Alkalin.	108

Hardness

Lime	45
Magnesia	181
[illegible]	2
Permanent	48
Carbonate	
Hardness	180

Pumped Continuously (24 hrs. day) for 7 weeks; yield dropped to 10 g.p.m. because of dry fall - Otto [illegible] friend.

for 1 more analysis; see yellow sheet.

Well is 16' from artificial lake

Granite outcrops near [illegible]

Analyses: Silicones → [illegible] water [illegible] this [illegible] due to [illegible] casing

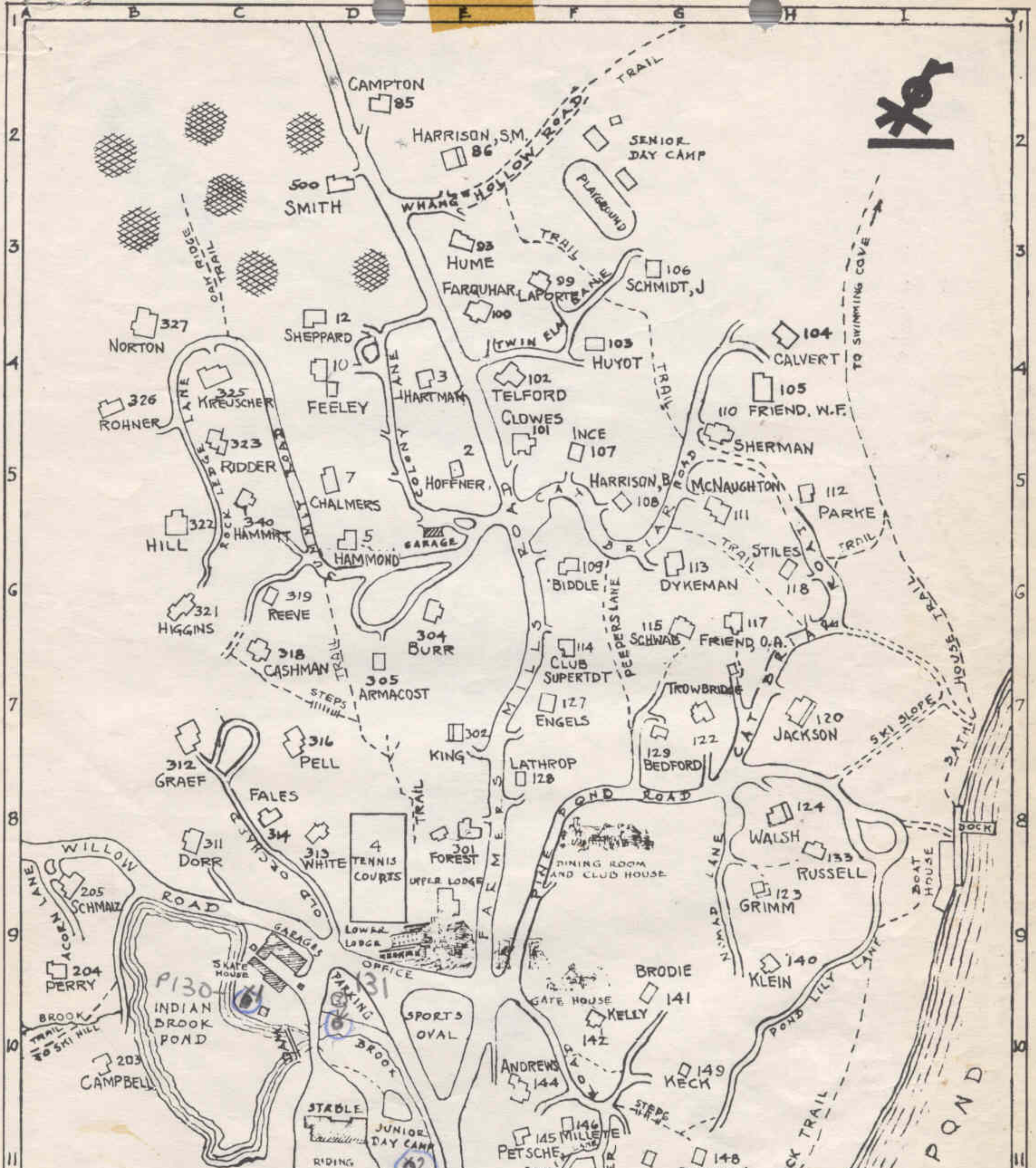
Organic & Volatile matter	20.0
Iron Oxide	13.2
Al_2O_3	2.3
Siliceous matter	26.6
Lime	0.7
Magnesia	1.0

N.Y. Dept. Pub. Health
checked [illegible] → Albany 1, N.Y.

O.C.	2.1
Fe	1.7
[illegible]	<0.05
NO_2	0.002
NO_3	0.02
Cl	4.0
Hardness Total $CaCO_3$	68.0
Alkalinity as $CaCO_3$	73.0
pH	6.7
Color	2
Turbidity	5
Free NH_3	0.002

SOURCE TAP IN KITCHEN CLUB HOUSE
CHL.
8-23-4[illegible]

U. S. GOVERNMENT PRINTING OFFICE 6—9642


GIPSY TRAIL CLUB
CABIN NUMBERS
Rev. June 1948
NOTE:- SITES AVAILABLE FOR FUTURE CABINS SHOWN THUS:
LOCATION OF WELLS
0 FEET 500
NUMBERS 404, 406, 408 ARE ON BIRCH POINT AT SOUTH END OF PINE POND.
404 HYNARD
406 BAKER
408 FRISCH
N
S
E
W
A B C D E F G H I J
1 2 3 4 5 6 7 8 9 10 11 12 13
CAMPTON 85
HARRISON, S.M. 86
WHANG HOLLOW ROAD
TRAIL
SENIOR DAY CAMP
PLAYGROUND
500 SMITH
93 HUME
FARQUHAR
99 LAPORTE
LANE
106 SCHMIDT, J
100
TWIN ELM
103 HUYOT
12 SHEPPARD
10 FEELEY
3 HARTMAN
102 TELFORD
CLOWES 101
INCE 107
2 HOFFNER
7 CHALMERS
5 HAMMOND
GARAGE
COLONY LANE
327 NORTON
326 ROHNER
325 KREUSCHER
323 RIDDER
322 HILL
340 HAMMITT
ROCK LEDGE LANE
OAK RIDGE TRAIL
MILL ROAD
321 HIGGINS
319 REEVE
318 CASHMAN
TRAIL
STEPS
304 BURR
305 ARMACOST
104 CALVERT
105
110 FRIEND, W.F.
SHERMAN
HARRISON, B. 108
McNAUGHTON 111
112 PARKE
BRIAR ROAD
TRAIL
STILES
118
109 BIDDLE
113 DYKEMAN
PEEPERS LANE
115 SCHWAB
117 FRIEND, O.A.
114 CLUB SUPERTDT
TROWBRIDGE
CAT ROCK
CAT ROAD
127 ENGELS
120 JACKSON
SKI SLOPE
TO SWIMMING COVE
BATH HOUSE TRAIL
316 PELL
302 KING
LATHROP 128
129 BEDFORD
122
312 GRAEF
FALES
314
313 WHITE
4 TENNIS COURTS
TRAIL
301 FOREST
UPPER LODGE
FARMERS MILLS ROAD
PINE POND ROAD
DINING ROOM AND CLUB HOUSE
124 WALSH
133 RUSSELL
123 GRIMM
DOCK
BOAT HOUSE
NOMAD LANE
311 DORR
WILLOW ROAD
OLD ORCHARD
205 SCHMALZ
ACORN LANE
204 PERRY
GARAGES
LOWER LODGE
OFFICE
SKATE HOUSE
INDIAN BROOK POND
P130
131
PARKING
BROOK
SPORTS OVAL
BRODIE
141
140 KLEIN
GATE HOUSE
KELLY
142
POND LILY LANE
BROOK TRAIL TO SKI HILL
203 CAMPBELL
DAM
ANDREWS 144
149 KECK
STABLE
JUNIOR DAY CAMP
RIDING RING
132
P132
STEPS
145 MILLETTE 146
PETSCHE
PIONEER
148 BABCOCK
147 CAYLEY
HEMLOCK TRAIL
161 McDONALD
159 RAHE
162
ROGERS
160 STUBBE
163 FOOTE
TO CARMEL
PINE POND

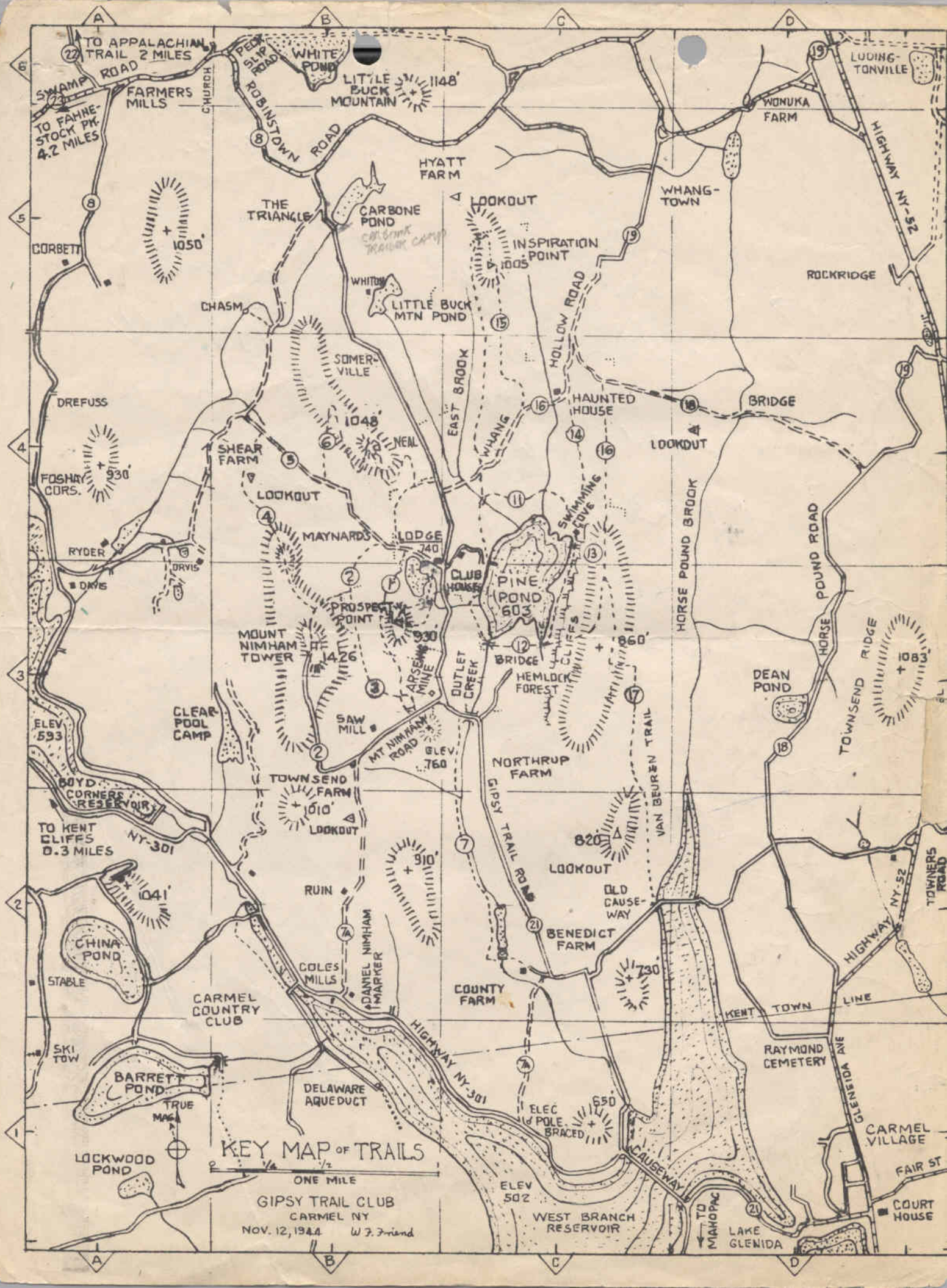
Sparks Brew well ask Floyd Ady about well

Cows owned by J. Howell Sanford.

S.W.L = 18-20 ft wtr rec at 80 ft. ± - 2 to 3 gpm

S.W.L = 11' an additional 27-28 gpm at 195 ± ft.
at a spot
not named yet.

Put 3 holes per lot 30 gpm


TO APPALACHIAN TRAIL 2 MILES
SWAMP ROAD
TO FAHNESTOCK PK. 4.2 MILES
FARMERS MILLS
CHURCH
PECK SLIP ROAD
WHITE POND
LITTLE BUCK MOUNTAIN 1148'
ROBINSTOWN ROAD
LUDINGTONVILLE
WONUKA FARM
HIGHWAY NY-52
HYATT FARM
LOOKOUT
WHANGTOWN
THE TRIANGLE
CARBONE POND
INSPIRATION POINT 1005
CORBETT
1050'
WHITON
ROCKRIDGE
CHASM
LITTLE BUCK MTN POND
HOLLOW ROAD
SOMERVILLE
EAST BROOK
WHANG
HAUNTED HOUSE
BRIDGE
DREFUSS
1048'
NEAL
SHEAR FARM
LOOKOUT
FOSHAY CORS. 930'
MAYNARDS
LODGE 740
SWIMMING COVE
RYDER
ORVIS
DAVIS
CLUB HOUSE
PINE POND 603
HORSE POUND BROOK
HORSE POUND ROAD
PROSPECT POINT 930
MOUNT NIMHAM TOWER 1426
ARSENIC MINE
OUTLET CREEK
CLIFFS
860'
BRIDGE
HEMLOCK FOREST
DEAN POND
TOWNSEND RIDGE 1083'
CLEAR POOL CAMP
ELEV 593
SAW MILL
MT NIMHAM ROAD
ELEV 760
NORTHRUP FARM
BOYD CORNERS RESERVOIR
TOWNSEND FARM 1010'
LOOKOUT
TO KENT CLIFFS 0.3 MILES
NY-301
GIPSY TRAIL ROAD
VAN BEUREN TRAIL
820'
LOOKOUT
910'
1041'
RUIN
OLD CAUSEWAY
BENEDICT FARM
CHINA POND
STABLE
COLES MILLS
DANIEL NIMHAM MARKER
730'
COUNTY FARM
CARMEL COUNTRY CLUB
KENT TOWN LINE
SKI TOW
RAYMOND CEMETERY
GLENIDA AVE
HIGHWAY NY-301
BARRETT POND
DELAWARE AQUEDUCT
TRUE MAG
ELEC POLE BRACED
650'
CARMEL VILLAGE
FAIR ST
LOCKWOOD POND
KEY MAP OF TRAILS
ONE MILE
CAUSEWAY
ELEV 502
WEST BRANCH RESERVOIR
TO MAHOPAC
LAKE GLENIDA
COURT HOUSE
GIPSY TRAIL CLUB
CARMEL NY
NOV. 12, 1944 W.J. Friend

structure. For this reason a careful analysis of its water may afford useful information. The Dam site was selected for alignment with the possible outcrop of such a fault or vein, as indicated by iron stained rock exposures. If your old well gets its supply from a fault, as may possibly be ascertained by water analysis, then drilling must penetrate this same structure to be successful. In this event, the failure of your last well indicates it was drilled on the hanging wall side, therefore cut off from fracturing sometimes associated with the foot wall of a fault. However, surface evidence is too obscure to assume the Brook eroded its valley along a fault. Consequently, the risk of failure makes the Dam site questionable.

It remains therefore to consider the site below the Junior Day Camp. Here is the closest point to existing pipe lines where a well may be drilled that will penetrate the north-south belt of adjustment fracture, yet be aligned with any fault that may underlie Indian Brook valley. Drilling at this point may have to go at least 200' to intercept sufficient rock fracturing to supply upwards of 26 gpm. You may be justified in drilling to 300', provided approximately 15 gpm is encountered within 200' of the surface. However, should the formations prove tight down to 150', I doubt whether the capacity can be increased materially by deeper drilling. It would be preferable, moreover, to drill this well by shot coring so indications of iron staining along the rock fissures may be studied. If there actually is faulting beneath this point, I believe that water bearing fissures bearing iron stains should be encountered within the first 100' of the surface.

Opinion

I assume you cannot entertain the expense of laying pipe line from a well located near the dock or opposite the Gunnison house. In such event the Junior Day Camp site is the best available for reasons already given. Either this site or the one near the Dam depend upon drilling directly through major rock facturing or faulting which underlies Indian Brook valley. The zone of fracturing probably contains lenses or interlaminations of solid rock which will yield little water because of the absence of cross fractures. Core drilling will reveal iron staining along fractures and consequently determine whether the zone of fracture under Indian Brook valley is a fault. This iron staining should be definitely evident within 100' of the surface and if the well goes 150' without hitting an ample water supply (say 15 gpm), then drilling should be abandoned.

If a well should be drilled near the south end of Indian Brook Pond dam, evidence of faulting should be apparent within at least 75' of the surface. Moreover, the total depth of the well may not exceed 100' and, in my opinion, should not go any deeper than 150'.

Respectfully submitted,

J. HOMER SANFORD

JHS/ep

irregular blanket of glacial sediments absorbs and stores rain water immediately above the bed rock from whence it is fed into the rock fissures and crevices.

The normal full water demand of the Club apparently requires withdrawal of about 14,000 cu. ft. of water weekly through the summer when groundwater recharge is at minimum. The volume of rock voids available for groundwater storage is a relatively small percentage of the bed rock surrounding the well. Consequently, as pumping continues, there is a persistent expansion of the area of storage depletion until water stored at points several thousand feet distant from the well may be diverted towards it. A suitable well location therefore must intercept rock fracture or crevices that are freely connected with major sources of fissuring to afford the necessary storage space to maintain the pumpage. Such well sites may be discerned from evidences of earth adjustment that are indicated by the surface typography.

The knolls and craggy rock outcropings which lend such picturesque relief to the Club property are surface indications that a zone of rock fracture passes beneath it. Apparently this is part of a north-south axis of adjustment fracture that continues northward along the valley of East Brook, probably passing to the west of Little Buck Mountain (called Inspiration Point on your map). Southward of the Sports Oval, this zone of fracture debouches into the western side of Pine Pond Valley where Indian Brook passes under the road to Carmel. The fracture zone widens considerably under that part of your property south of Willow Road and west of the road to Carmel. This is due to the radiation of a secondary zone of fracture along the valley occupied by Indian Brook. The intersection of these two fracture zones provides a very large area of fissuring that radiates north and south along the main road and north-west under the valley of Indian Brook. Consequently, the total volume of fissure voids appears to be ample to support a second well.

The location of the recently drilled well would have been satisfactory had it intercepted rock fracture that was freely connected with the general zone of fracturing in the area. Unfortunately it appears to have missed crevices that are large enough to permit this well to draw upon storage that evidently surrounds it. For this reason I designated a site near Indian Brook Pond Dam (Dam Site) because it lines up better with the axis of fracture under Indian Brook Valley. This site, however, is not well aligned with the axis of north-south fracture. Consequently, I selected a second site south of the Junior Day Camp opposite the south side of the stable, which is in line with both axes of fracture.

I was influenced toward selecting the dam site because this is the most convenient location for you to connect into the pipe lines. Actually, well sites further down Indian Brook afford better possibilities of developing a well yield running upwards of 30 gpm. The site below the Junior Day Camp is preferable to the Dam site. However,