Note: In 2011, I asked Jesus Rodriguez from the USGS if he had the well logs and any additional information gathered during the early 1990s to complete the USGS report for the Bajura Area, which can be found at:

http://pubs.usgs.gov/wri/1995/4159/report.pdf

Enclosed are the documents sent by Mr. Rodriguez.

Denise Zeno, 1/27/2012

260236

Note: In 2011, I asked Jesus Rodriguez for the well logs and any additional information gathered during the early 1990s to complete the USGS report for the Bajura http://pubs.usgs.gov/wri/1995/4159/report.pdf. Enclosed are the documents sent by Mr. Rodriguez. Denise Zeno, 1/27/2012

- **Appendix 1**

Memo dated 12 de abril de 1978 to Ing. Jaime Davila Re: Wells in Urb. Ana Maria

This memo refers to two wells drilled in the Urb. Ana Maria: Pozo Parque and Pozo Escuela. Pozo Parque was renamed to Pozo Ana Maria. Pozo Escuela still exists behind the Ines Maria Mendoza High School. The well log in this memo pertains to Pozo Escuela.

- **Appendix 2**

Documents from PRASA (probably c. 1989): Fig.1-shows wells status; a table from PRASA's Construction Department with information about 8 deep wells in the area of Cabo Rojo; 1 map showing coordinates of some wells in the Bajura; and logs for the following wells:

Pozo #1 (aka in PRASA's Infrastructure shapefiles as Cabo Rojo 9) It still exist in a farm North of Recycling Facility (it can be seen from main Road 103). I would say that in a field across Raul Lugo Storage close to creek .
Pozo#2 (aka in PRASA's Infrastructure shapefiles as Cabo Rojo 13) It still exist south of the WR Recycling Facility. In one of MRT's farms. Mr. Toro installed a pump and he is using the water for farming purposes.
Pozo#3A – AKA MacDougal. Drinking water well closed by PRASA nowadays a pump station.
Pozo 5A – There is an unfinished cement structure in Milton Raul Toro's farm (Road 103 second entrance after Club de Leones well –same side of Club de Leones well. Unknown if well still exist, very accessible.
Pozo 7 – location has not been confirmed
Pozo 8 – Drinking water well closed by PRASA (some maps show this well as Pozo 7)
Pozo 9 - location has not been confirmed
Pozo10A - well casing still exist (entrance to the well is by Pozo Javieres, Road 114)
Pozo Club de Leones
Pozo Terminal Carros Publicos

- **Appendix 3**

Form: DRN-RA-(09-86) entitled "Informe de Terminacion de Obras para pozos" dated 4/22/1991

This document has a form submitted to the DPNR including the log for Pozo Terminal de Carros Publicos.

- **Appendix 4**

Fax Cover letter from PRASA to Jesus Rodriguez, USGS dated 9/9/1991

Figure 1 shows a well named Pozo #3a this well was renamed to MacDougal well.

This document has well logs for the Club de Leones well and Pozo # 7 (please note that the name for the latter was changed to PRASA 8 now closed).

- **Appendix 5**

Groundwater levels collected in 1992 by the USGS

PRASA #1 – same well as Pozo #1 (aka as Cabo Rojo 9) in Appendix 3
PRASA#2 – same well as Pozo#2 (aka as Cabo Rojo 13) in Appendix 3
CAMARONES – Well is used for farming purposes. Well log profile is not available.
FILLIPI – well casing still exist in the field across the Empire Gas
PRASA 5a – There is an existing structure in Toro's property, it is not confirmed if there is a well. Easily accessible.
LOPEZ – Well log profile is not available
UBALDINO – Well log profile is not available
PRASA RADIO
POLIGONO – Well is used for farming purposes. Well log profile is not available.
PRASA BELFORD
Bajura #1 – AKA
Bajura 2B
Bajura 2c
Bajura 3
Bajura 4
Bajura 5
Baura 6
Bajura 7
Bajura 8
Bajura 9
Bajura 10
Club de Leones
Prasa Bajura (2)
Prasa 3 (viejo)
PRASA 8
PRASA Ana Maria
Oscar (dug well)
Garage Municipal
USGS-TW
Pozo Toro
PRASA MacDougal

- **Appendix 6**

PRASA's internal memo to Ing. Edwin Vargas dated 12/6/1993

Well logs from Weko 1 and Weko 2 known in this document as Barreno 1 and BP#2.

- **Appendix 7**

Draft Potentiometric map drawn by the USGS for the Cienaga Cuevas

- **Appendix 8**

Draft Aquifer Test Report developed by USGS (include lithologic logs and diagrams for 4 piezometers)

- **Appendix 9**

USGS Well Development forms for the piezometers in the USGS Report

- **Appendix 10**

USGS Piezometers well logs for

Bajura #5 - AKA: Well Cr-tw5 in the USGS report / Well #15 in Table 1 and Figure 2
Bajura 2C – AKA: Well Cr-tw2c / Well 12C in Table 1 and Figure 2
Bajura 2A – AKA: Cr-tw2B / Well 12A in Table 1 and Figure 2
Bajura #1- AKA: Cr-tw#1 / well 11 in Table 1 and Figure 2

- **Appendix 11**

Drawings/Logs of potentiometric wells installed by the USGS with its water level BLS and approximate LSE.

- **Appendix 12**

A spreadsheet with miscellaneous information about the wells used in the USGS report and aliases used for the same wells within PRASA

Appendix 1

Estado Libre Asociado de Pue o Rico
AUTORIDAD DE ACUEDUCTOS Y ALCANTARILLADOS

12 de abril de 1978

MEMORANDO:

AL : Ing. Jaime Dávila
Jefe, Depto. Construcción

P/C : Ing. Francisco Irizarry
Jefe, Div. Proyectos Especiales

ASUNTO : POZO Area Escuela, Urb. Ana María, Cabo Rojo

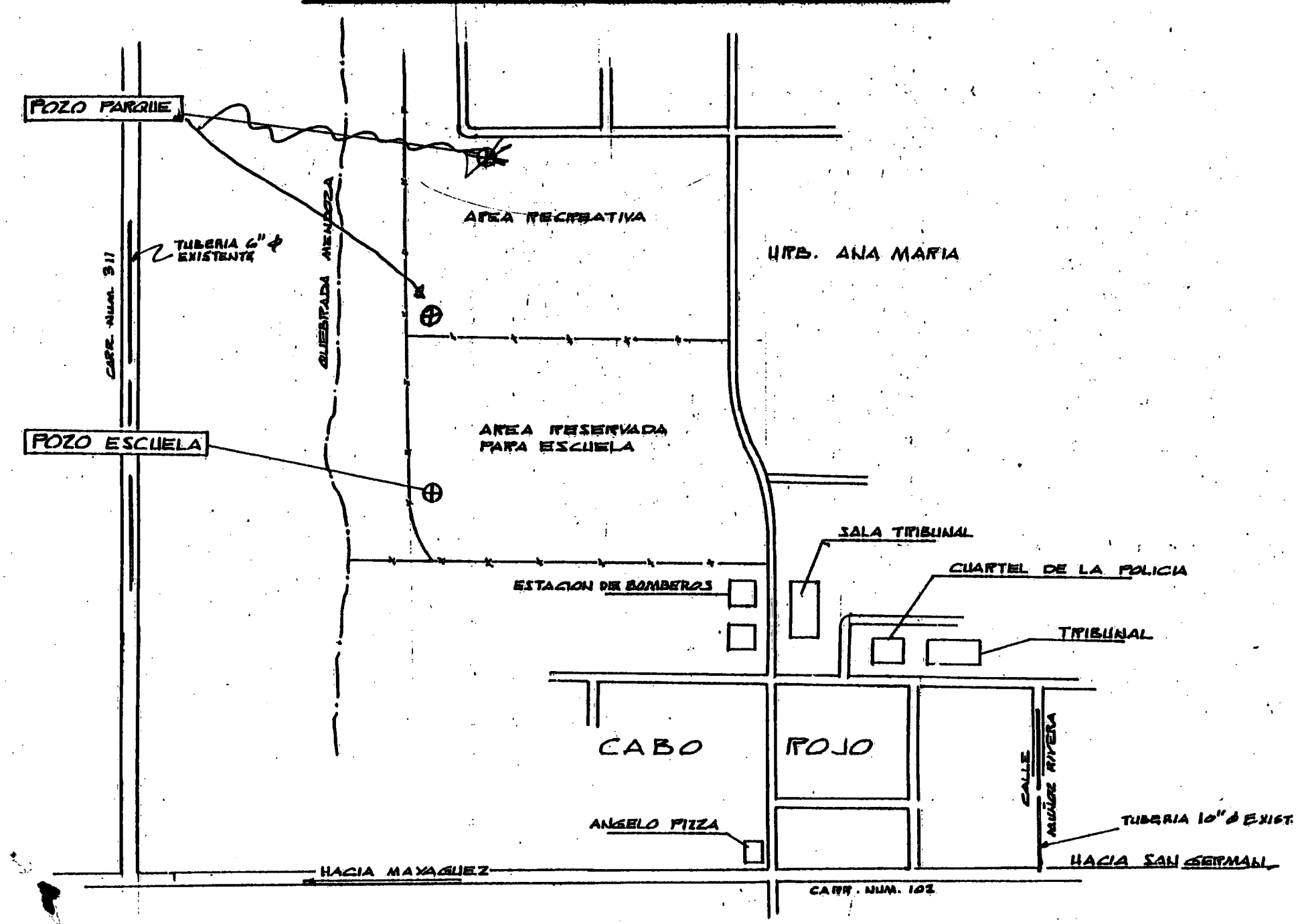
Le acompaño copia del informe técnico preparado para el pozo arriba indicado.

WILFREDO FREYTES
Supervisor Sección
Aguas Subterráneas

Anexo:

CC:
Ing. Guzmán Soto
Ing. Francisco Irizarry
Ing. Bianchi
Ing. García Troche
Geol. Eduardo Blest
Sr. Wilfredo Freytes
Recursos Naturales
File

CROQUIS DE LOCALIZACION



INFORME CONSTRUCCION DE POZOS

1. PUEBLO	BARRIO	SECTOR
CABO ROJO		URB. ANA MARIA

2. LOCALIZACION (CARR., KM., CAMINO MUNICIPAL)
TERRENOS AREA RESERVADA PARA ESCUELA EN LA URB. ANA MARIA

3. CONSTRUIDO POR: CAMPOS DRILLING.
☐ PERCUSION
☒ ROTATORIA

4. PROPOSITO DEL POZO:
REFORZAR EL SISTEMA DE ACUEDUCTO EXISTENTE

5. BARRENO			6. ADEME		
DIAM.	DE	A	DIAM.	DE	A
12"	0'	40'	12" L	0'	40'
10"	40'	200'	—	—	—

7. N.E. 25'-5" PIES ☐ ENGRABADO ☒ ROCA
VENA PRINCIPAL A _____ PIES ELEV. TERRENO _____

8. PRUEBA		9. ANALISIS			
G. P. M.	N. D.	CL	FE	MN	S.D.
140	48'	153	.15	0	401

10. RECOMENDACION:

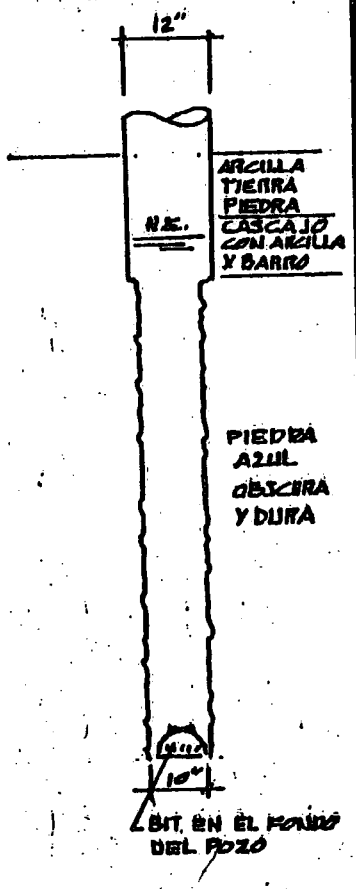
G. P. M.	PIES COLUMNA	N. D.	N. E.
200	90	53'	25'-5"

11.
☐ CUMPLE REQUISITOS USPHS ☐ NO CUMPLE REQUISITOS USPS
☒ SI ☐ NO PUEDE CONECTARSE
TIEMPO BOMBEO RECOMENDADO 18 HORAS

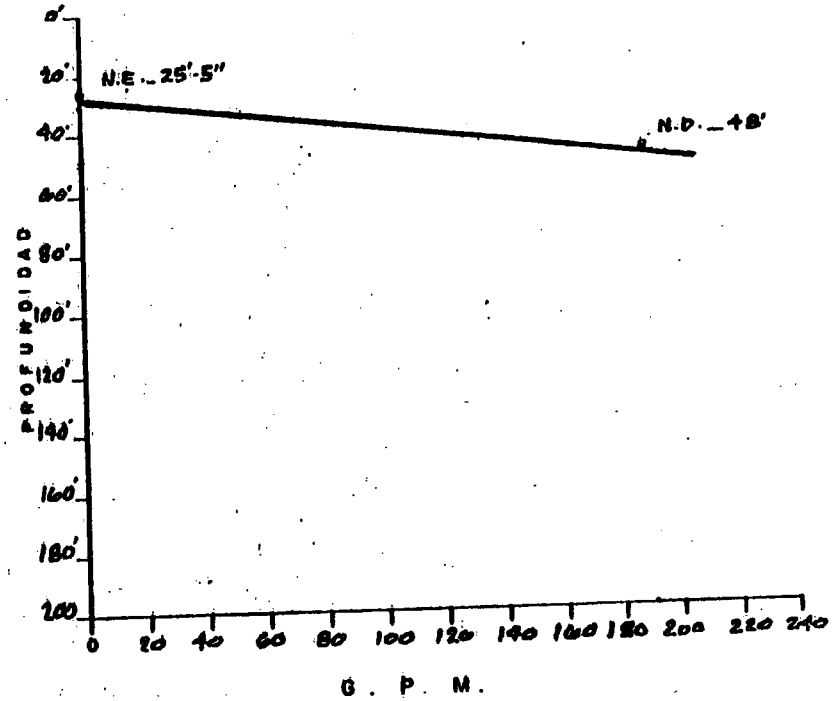
12. FORMACIONES:

CLASE	DE	A
ARCILLA TIERRA Y PIEDRA	0'	20'
CASCAJO CON ARCILLA Y BARRO (PIEDRAS SUELTAS	20'	40'
PIEDRA AZUL OBSCURA Y DURA	40	200'

Log



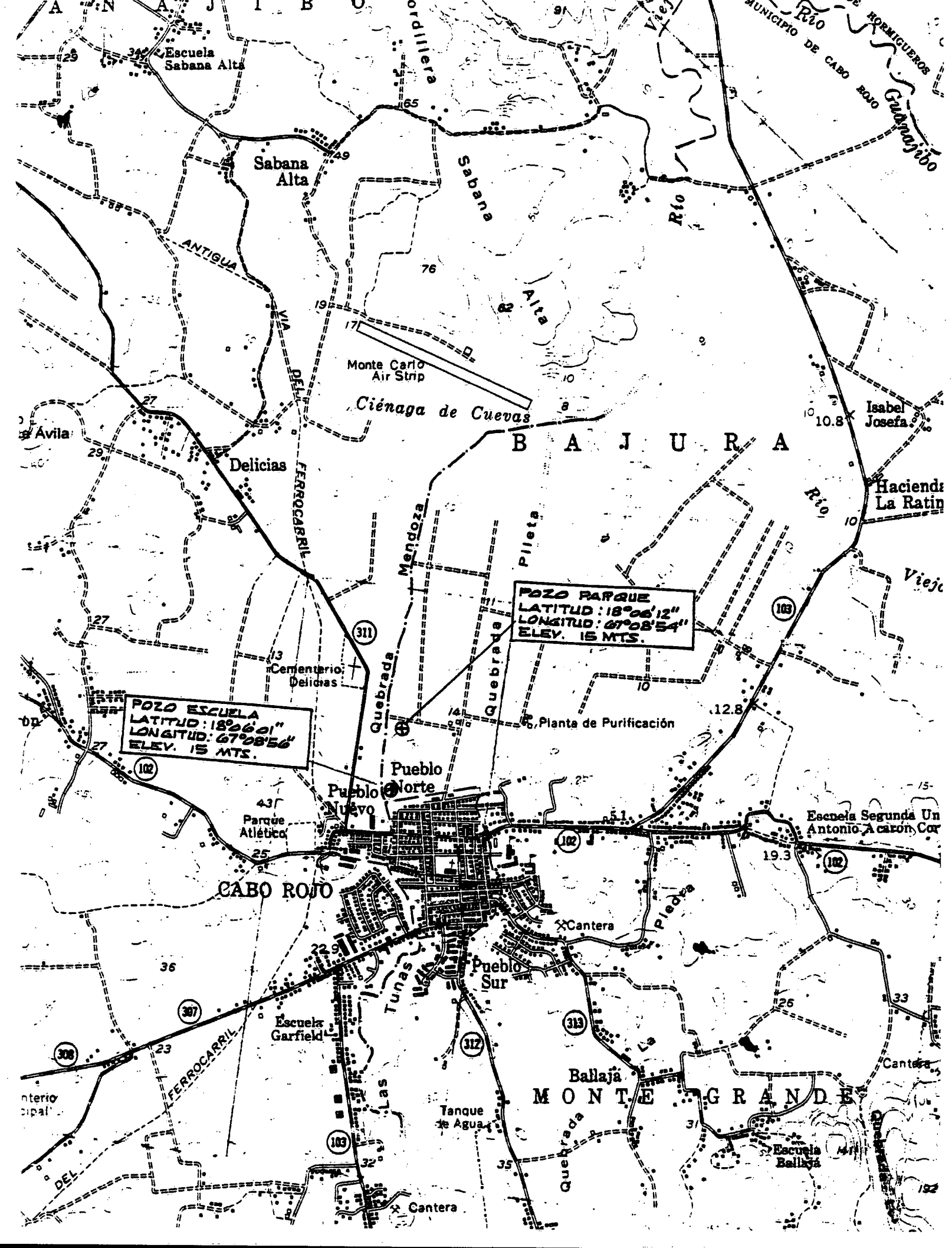
Curva Rendimiento



13. OBSERVACIONES:
EL POZO SE PUEDE CONECTAR SE LE DEBE DAR VIGILANCIA DIARIAMENTE UNA VEZ ESTE EN OPERACION, LOS SOLIDOS TOTALES DISUELTOS PUEDEN DISMINUIR EN LA DILUSION CON EL SISTEMA DE ACUEDUCTO EXISTENTE

14. SOMETIDO POR: JAIME RODRIGUEZ

FECHA 3/27/78


Escuela Sabana Alta
Sabana Alta
Sabana Alta
ANTIGUA VIA DEL FERROCARRIL
Monte Carlo Air Strip
Ciénaga de Cuevas
BAJURA
Isabel Josefa
Hacienda La Ratin
Delicias
Mendoza
Quebrada
Pileta
Quebrada
POZO PARQUE
LATITUD: 18°06'12"
LONGITUD: 67°08'54"
ELEV. 15 MTS.
Cementerio Delicias
POZO ESCUELA
LATITUD: 18°06'01"
LONGITUD: 67°08'56"
ELEV. 15 MTS.
Planta de Purificación
Pueblo Norte
Pueblo Nuevo
Parque Atlético
CABO ROJO
Escuela Segunda Un Antonio Acaron Cor
Cantera
Pueblo Sur
Las Tunas
Pledra
Escuela Garfield
FERROCARRIL
Ballajá
MONTE GRANDE
Tanque de Agua
Quebrada
Escuela Ballajá
Cantera
Cantera
Río Guanajibo
MUNICIPIO DE CABO ROJO
Río
Viejo

Appendix 2

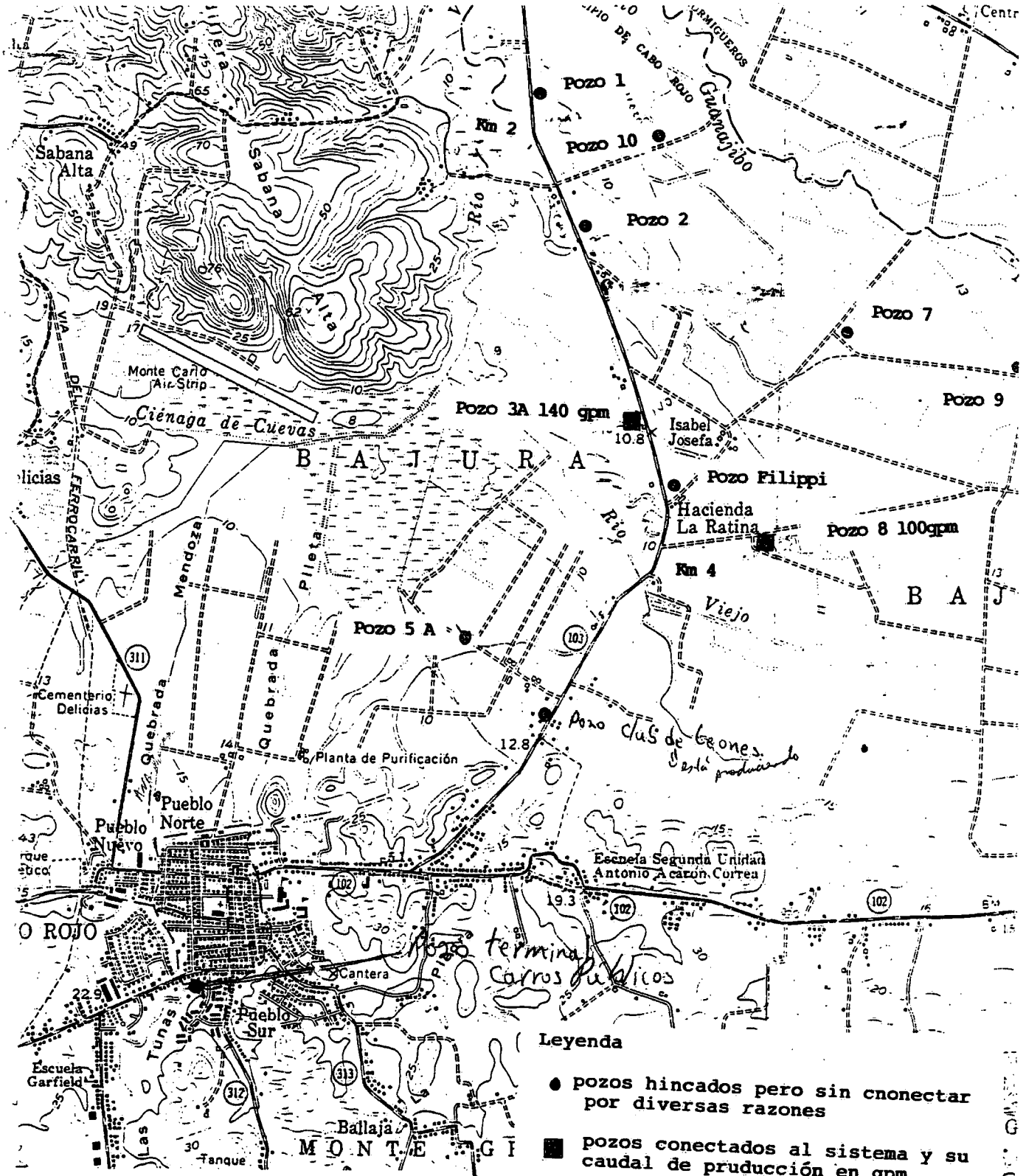


Fig. 1

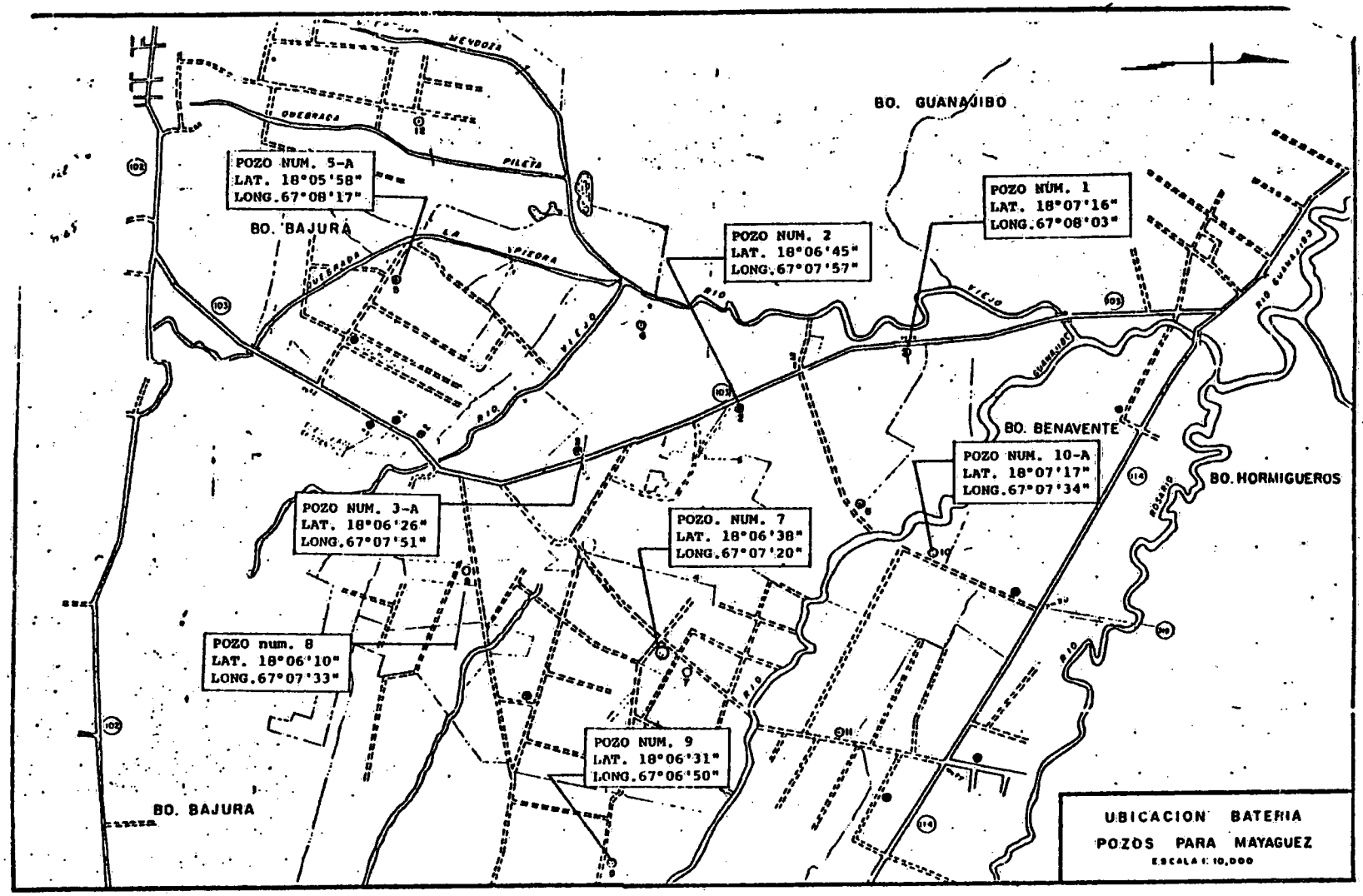
Mapa indica status de pozos de la batería de pozos del Bo. Bajura de Cabo Rojo.

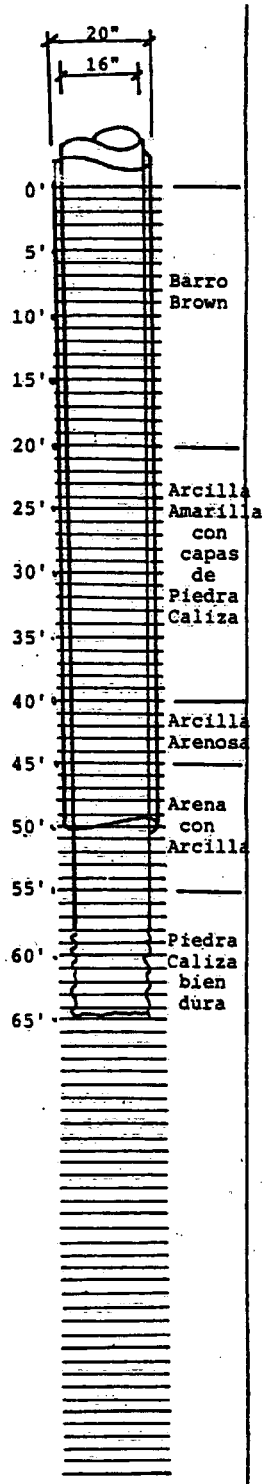
DEPARTAMENTO DE CONSTRUCCION
Seccion de Aguas Subterraneas

PROYECTO: BATERIA DE POZOS PROFUNDOS MAYAGUEZ - CABO ROJO

DESCRIPCION	PROFUNDIDAD	"CASING" INTERIOR	NIVEL ESTATICO	GALONAJE MAXIMO PRUEBA DE REND.		RECOMENDACION FINAL DE BOMBA		
				G.P.M.	NIVEL DINAMICO	CAPACIDAD G.P.M.	NIVEL DINAMICO	COLUMNAS
POZO NUM. 1	190'	12"Ø	24'-0"	90	2.73 gal/min/ft 57'-0"	50	50	80
POZO NUM. 2	200'	12"Ø	28.50 24'-0"	1.26 gal/min/ft 36	52'-7"	36	52'-7"	80'
POZO NUM. 3-A	175'	10"Ø	68.34 7'-8"	360	5.27 gal/min/ft 75'-11"	300	48'-0"	100'
POZO NUM. 5-A	200'	12"Ø	11'-1"	1100	SP Cap. 18.4 gal/ft 70'-9"	800	52'-0"	100'
POZO NUM. 7	148'	12"Ø	57.50 10'-6"	4.78 gal/min/ft 275	68'-0"	200	51'-0"	80'
POZO NUM. 8	200'	12"Ø	72.66 19'-0"	5.67 gal/min/ft 412	91'-8"	380	75'-0"	110'
POZO NUM. 9	199'	12"Ø	45.50 4'-0"	14.59 664	49'-7"	600	35'-0"	80'
POZO NUM. 10-A	175'	10"Ø	40.50 8'-0"	11.60 470	48'-6"	400	34'-0"	80'

9466


POZO NUM. 5-A
LAT. 18°05'58"
LONG.67°08'17"
BO. BAJURA
POZO NUM. 2
LAT. 18°06'45"
LONG.67°07'57"
POZO NUM. 1
LAT. 18°07'16"
LONG.67°08'03"
BO. GUANAJIBO
BO. BENAVENTE
POZO NUM. 10-A
LAT. 18°07'17"
LONG.67°07'34"
BO. HORMIGUEROS
POZO NUM. 3-A
LAT. 18°06'26"
LONG.67°07'51"
POZO. NUM. 7
LAT. 18°06'38"
LONG.67°07'20"
POZO num. 8
LAT. 18°06'10"
LONG.67°07'33"
POZO NUM. 9
LAT. 18°06'31"
LONG.67°06'50"
BO. BAJURA
UBICACION BATERIA
POZOS PARA MAYAGUEZ
ESCALA 1:10,000



RECORD DEL POZO

PUEBLO Cabo Rojo
BARRIO Monte Grande
SECTOR
POZO NUM. Frente Terminal Carros Públicos
TERRENOS Municipio
CARR. Calle Rossy Ext. Calle Salvador Brau KM.
LATITUD LONGITUD
ELEVACION

CONST. POR Administración
OPERADOR Francisco Soto
MAQUINA Percusión
MARCA Walker Neer
FECHA COMENZO 10/2/90
FECHA TERMINO 11/15/90
VENA PRINCIPAL 45'
NIVEL ESTATICO 10'

BARRENO Y TUBERIA

DIAM.	BARRENO		
20"	de 0'	a 54'	
16"	de 54'	a 65'	
	de	a	
	de	a	
	de	a	

TUBERIA INSTALADA		
de 0'	a 50'	Lisa de acero
de 0'	a 58'	Lisa de acero
de	a	
de	a	
de	a	

PRUEBA DEL POZO

FECHA	G.P.M.	NIVEL	OBSERVACIONES
11/13/90	360	43'	Agua Clara
11/14/90	360	43'	Agua Clara
11/7/90	450	44'	Agua Clara
11/8/90	300	35'	Agua Clara
11/9/90	450	45'	Agua Clara

RECUPERACION

TIEMPO	NIVEL	TIEMPO	NIVEL
0'-00"	45'	9'-00"	34'-5"
0'-15"	39'	12'-00"	33'-7"
0'-30"	38'	15'-00"	32'-10"
1'-00"	37'-8"	18'-00"	31'-11"
2'-00"	37'	21'-00"	31'-02"
3'-00"	36'-4"		
6'-00"	35'-5"		

BOMBA DE PRUEBA

MARCA Gould
MODELO
TIPO Turbia vertical
COLUMNAS 50'
LUBRICACION Aceite
SUCCION 58'

MOTOR MARCA G.M. Diesel
MODELO 4-71
OBSERVACIONES

RECOMENDACION FINAL DE BOMBA

CAPACIDAD MAX. 300 G.P.M.
COLUMNA 50'
NIVEL DINAMICO 35'
TIPO BOMBA Sumergible

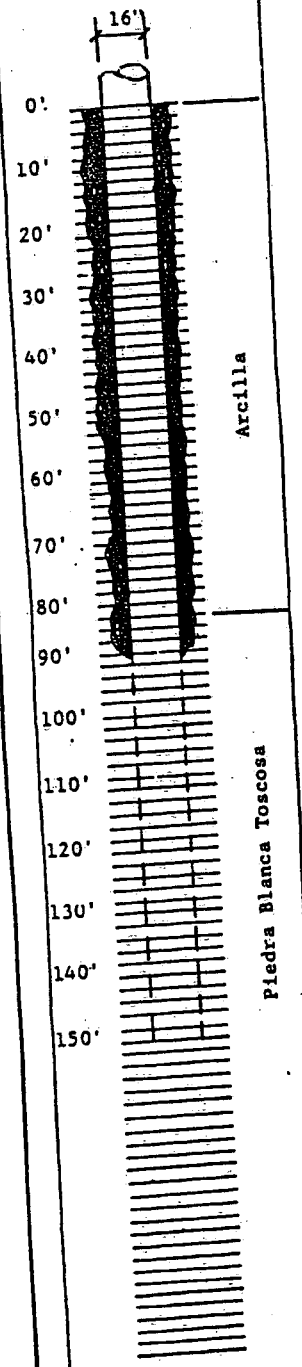
OBSERVACIONES Bombear 18 horas diarias, dejarlo 6 horas en reposo para recuperación y conservación del acuífero

SOMETIDO POR Wilfredo Freytes
FECHA

REV. 2/MAR./76. J.P.P.

4. Dentro de un periodo no mayor de treinta (30) días de finalizada la

RECORD DEL POZO



PUEBLO: Cabo Rojo
BARRIO: Bajuras
SECTOR: Carretera 103
POZO NUM.: Club de Leones
TERRENOS: Club de Leones
CARR.: 103 KM. 4.3
LATITUD: ------- LONGITUD: ------
ELEVACION:

CONST. POR: Contrato
OPERADOR: Caribbean Wells
MAQUINA: Percusion
MARCA: Bucyrus Erie
FECHA COMENZO: 10 octubre 1988
FECHA TERMINO: 31 marzo de 1989
VENA PRINCIPAL: 90' cowr.
NIVEL ESTATICO: 21'

BARRENO Y TUBERIA

DIAM.	BARRENO	
22"	de 0'	a 90'
18"	de 90'	a 150'
16"	de -----	a -----
16"	de -----	a -----
	de	a

TUBERIA INSTALADA		
de ---	a ----	--------
de ---	a ----	--------
de 0'	a 90'	Lisa de acero
de 90'	a 150'	Perforada
de	a	

PRUEBA DEL POZO

FECHA	G.P.M.	NIVEL	OBSERVACIONES
1989			
3/30	---	21'	Nivel Estático
3/30	455	78'	Agua Clara
3/31	455	78'	Agua Clara
	Capacidad Específica		
	7.98 GPM/pie		

RECUPERACION

TIEMPO	NIVEL	TIEMPO	NIVEL
0'-00"	78'	20'-00"	24'
0'-30"	42'	30'-00"	23'
1'-00"	34'		
3'-00"	30'		
6'-00"	28'		
10'-00"	26'		
15'-00"	25'		

BOMBA DE PRUEBA

MARCA:
MODELO:
TIPO:
COLUMNAS:
LUBRICACION:
SUCCION:

MOTOR MARCA:
MODELO:
OBSERVACIONES:

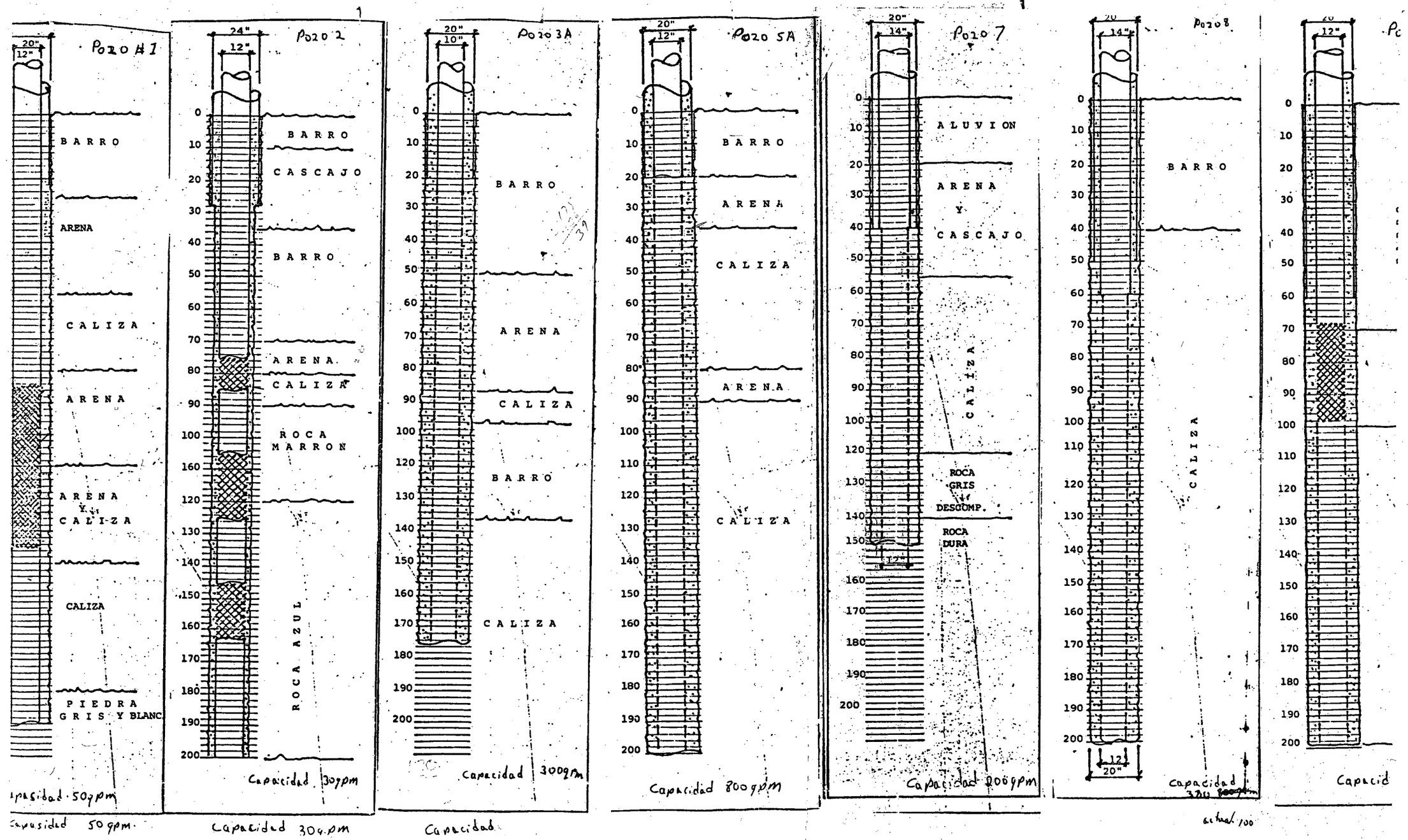
RECOMENDACION FINAL DE BOMBA

CAPACIDAD MAX.: 450 G.P.M.
COLUMNA: 120'
NIVEL DINAMICO: 78'
TIPO BOMBA: Columna Vertical

OBSERVACIONES: Bombear 18 horas diarias. Dejarlo 6 horas en reposo para la recuperación del aquífero.

SOMETIDO POR: Sr. Wilfredo Freytes
FECHA: abril 1989

REV. 1/MAR /79


Pozo #1
20"
12"
BARRO
ARENA
CALIZA
ARENA
ARENA Y CALIZA
CALIZA
PIEDRA GRIS Y BLANC
Capacidad 50gpm
Capacidad 50 gpm
Pozo 2
24"
12"
BARRO
CASCAJO
BARRO
ARENA
CALIZA
ROCA MARRON
ROCA AZUL
Capacidad 30gpm
Capacidad 30g.pm
Pozo 3A
20"
10"
BARRO
ARENA
CALIZA
BARRO
CALIZA
Capacidad 300gpm
Capacidad
Pozo 5A
20"
12"
BARRO
ARENA
CALIZA
ARENA
CALIZA
Capacidad 800gpm
Pozo 7
20"
14"
ALUVION
ARENA Y CASCAJO
CALIZA
ROCA GRIS DESCOMP.
ROCA DURA
12"
Capacidad 200gpm
Pozo 8
20
14"
BARRO
CALIZA
12
20"
Capacidad 320 ~~800gpm~~
actual 100
Pozo
20
12"
Capacid

Appendix 3

IN-RA-(09-86)

Estado Libre Asociado de Puerto Rico
DEPARTAMENTO DE RECURSOS NATURALES
San Juan, Puerto Rico

AREA DE PERMISOS

INFORME DE TERMINACION DE OBRAS PARA POZOS

Datos del Dueño o Usuarios del Pozo

Dueño

Nombre Autoridad de Acueductos y Alcantarillados

Dirección Residencial Ave. Barbosa (calle) 604 (núm.)

Hato Rey (urb. o sector) San Juan (Municipio) (Zona Postal)

Barrio Carr. Núm. Km. Hm.

Dirección Postal Bo. Obrero Station (Buzón Rural) 7066 (Apdo. Núm.) Santurce (Municipio) 00916 (Zona Postal)

Teléfono 748-1170

Usuario. De ser igual al dueño indique igual.

Nombre _____ Teléfono _____

Dirección Residencial _____ (Calle) _____ (Núm.) _____ (Municipio) _____ (Zona Postal)

_____ (Barrio) _____ (Carr. Núm.) _____ (Km.) _____ (Hm.)

_____ (Buzón Rural) _____ (Apdo. Núm.) _____ (Municipio) _____ (Zona Postal)

Número permiso de construcción de pozo PPA-212-89
Si posee una Franquicia de Agua o Certificado de Inscripción de Derecho Adquirido indique el número:

Franquicia _____ (Número) Certificado Inscripción de Derecho Adquirido _____ (Número)

Indique el número de pozos construidos: uno (1)

2. Datos del Pozo (diseño y construcción)

A Tipo de acción tomada:

construcción ___X___
profundización _____
rehabilitación pozo existente _____

B Localización:

Cabo Rojo — Municipio
Monte Grande, Calle Rossy, Ext. Calle Salvador Brau — Barrio, Carr., Km., Hm.

Coordenadas: Latitud_____Longitud _____

Nombre o número asignado al pozo por el dueño o usuario _____
Frente Terminal Carros Públicos
Elevación de terreno sobre el nivel del mar _____ pies
Profundidad final del pozo ____65____ pies
Fecha concluyó construcción del pozo __15__ (día) __nov.__ (mes) __90__ (año)

C Método de construcción

a mano _____
rotatorio _____
percusión ___X___
otro _____ Explique _____

D Tipo de camisilla

acero ___X___ plástico _____ hormigón _____
otro _____ especifique _____

E Diámetro del pozo:

	profundidad pies	diámetro pulgadas
barreno	de 0 a 54	20
	de 54 a 65	16
	de ____ a ____	____
camisilla	de 0 a 50	20
	de 0 a 58	16
	de ____ a ____	____

F Sello sanitario

a. Sello sanitario de superficie: ___ No ___X___ Sí
Si no uso un sello sanitario justifique esta acción en un anejo
profundidad del sello _____ pies
Tipo de material usado para el sello: _____
b. Intervalos de roca sellados: ____No ____Sí

Intervalos	Tipo o métodos
____pies hasta _____pies	_____
____pies hasta _____pies	_____
____pies hasta _____pies	_____

G Filtros de grava (Gravel Pack)

El pozo fue construido con filtro de grava: ___X___ NO _____ SI
Tipo de material usado para el filtro: _____
Diámetro promedio de las partículas del filtro: _____

Intervalos

_____pies hasta_____pies _____pulgs.
_____pies hasta_____pies _____pulgs.
_____pies hasta_____pies _____pulgs.

H Especificaciones del motor y la bomba

Marca y modelo del motor: _____
Capacidad del motor _____ hp
Marca y modelo de la bomba: _____
Capacidad de la bomba _____ gal/min.
Incluya curva de caudales (rating curve) de la bomba

I Perfil litológico*

Intervalos**				Formación***
0	a	20	pies	Barro brown
20	a	40	pies	Arcilla amarilla con capas de piedra
	a		pies	caliza.
40	a	45	pies	Arcilla arenosa.
45	a	55	pies	Arena con arcilla.
55	a	65	pies	Piedra Caliza
	a		pies	
	a		pies	
	a		pies	
	a		pies	

* De ser necesario, use hojas adicionales.
** Indique con asterisco los intervalos que producen agua
*** Describa tipo de roca perforada por color, tipo de material, dureza, etc.

J Indique si instaló un metro de flujo. _____ No _____ Si
marca y modelo del metro: _____
Lectura inicial: _____ (gal.)

3. Datos del Pozo (bombeo y producción)

A Indique si al hincar el pozo se encontró agua. _____ No __X__ Si

B Indique si se realizó una prueba de bombeo: _____ No __X__ Si
(Si no realizó la prueba de bombeo justifique esto en un anejo)
Incluya gráfica de abatimiento vs. tiempo
Fecha de inicio de la prueba: __7__ dia __11__ mes __90__ año
Hora de inicio de la prueba: __7:00 a.m.
Tiempo de duración de la prueba: __40__ horas
Nivel estático inicial: __10__ pies
Razón de extracción durante la prueba: __360__ gal/min.
Abatimiento (drawdown) máximo: __33__ pies
Abatimiento residual: _____ pies
Tiempo de recuperación: _____ horas _____ min.

C Indique si se realizó una prueba de acuifero: __X__ No _____ Si
(incluya anejo en donde detallará el número de pozos de observación utilizados, la distancia de estos pozos al pozo de producción y una gráfica de abatimiento vs. tiempo para cada uno de los pozos)
Fecha de inicio de la prueba: _____ dia _____ mes _____ año
Hora de inicio de la prueba: _____
Tiempo de duración de la prueba: _____ horas

Indique si se realizó una prueba de calidad de agua: ___ No X Si
(Incluya copia de la prueba certificada por un Quimico debidamente licenciado)

Indique si se realizó una prueba de registro eléctrico: X No ___ Si
(Incluya copia de los resultados obtenidos)

CERTIFICACION

Certifico que este pozo fue construido bajo mi supervisión y que la información declarada en este informe es cierta y correcta según mi mejor entender y conocimiento.

4/22/91
fecha

Firma del contratista o ingeniero a cargo de las obras

nbre del contratista o ingeniero
cargo de las obras: Wilfredo Freytes

rección postal: Box 7066
Bo. Obrero Station
Santurce, PR

lèfono: 748-1170

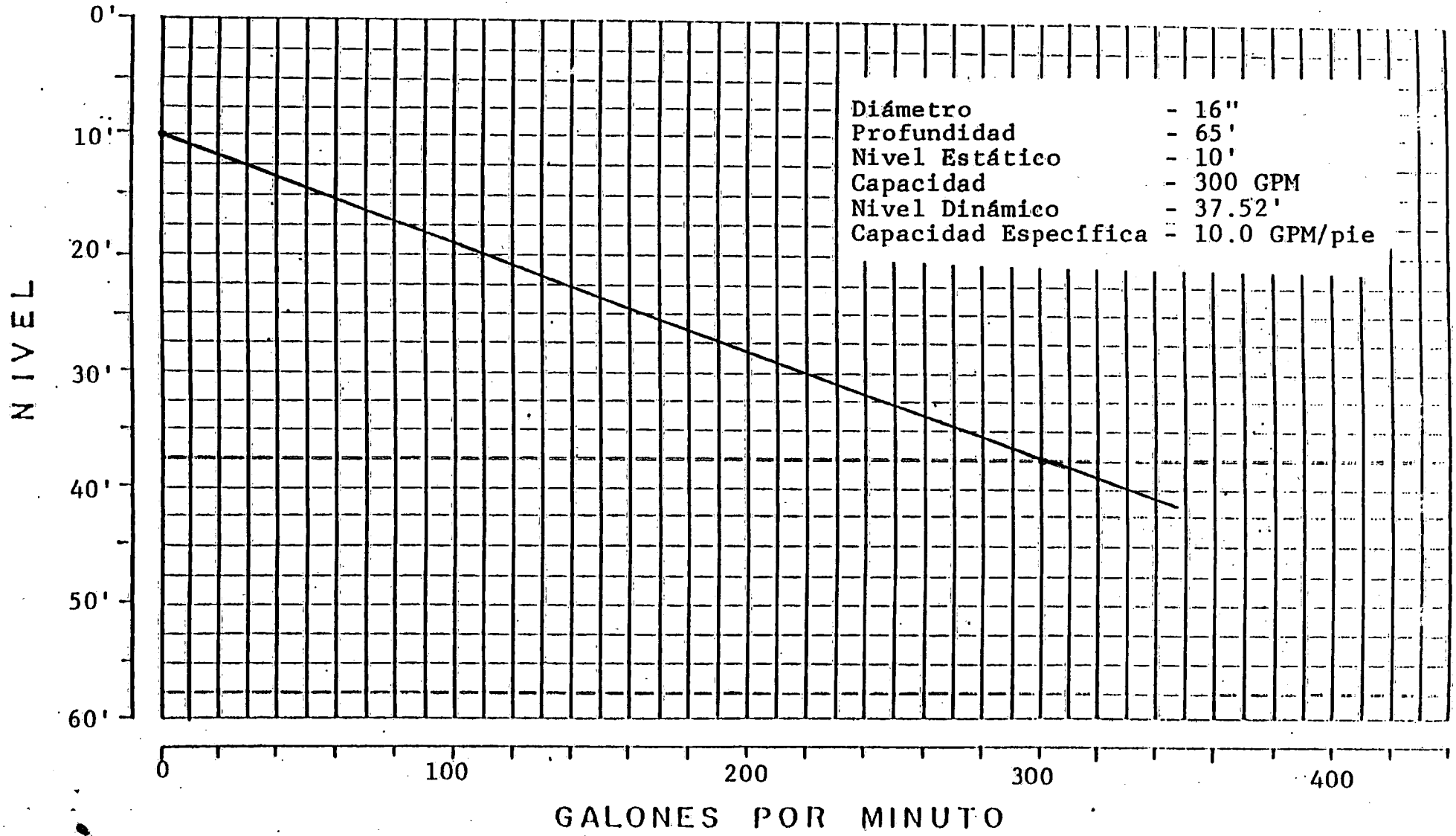
WF/acc
cc:
[redacted]
Sr. Eduardo Blest
Sr. Wilfredo Freytes
File
Follow-Up

OFICINA DE CONSTRUCCION

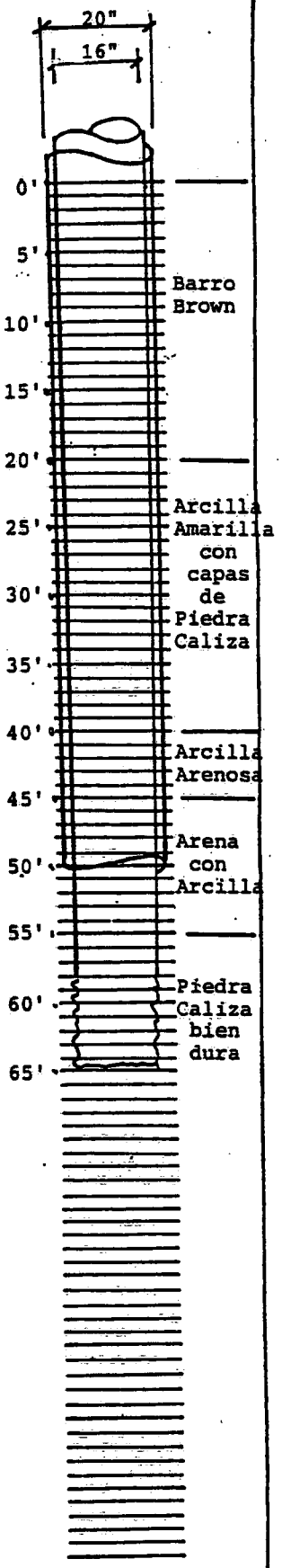
SECCION DE AGUA SUPTERRANEAS

CURVA DE RENDIMIENTO

POZO Frente Terminal Carros Públicos Cabo Rojo



DEPARTAMENTO DE CONSTRUCCION
SECCION DE AGUAS SUBTERRANEAS



RECORD DEL POZO

PUEBLO Cabo Rojo
BARRIO Monte Grande
SECTOR
POZO NUM. Frente Terminal Carros Públicos
TERRENOS Municipio
CARR. Calle Rossy Ext. Calle KM. Salvador Brau
LATITUD LONGITUD
ELEVACION

CONST. POR Administración
OPERADOR Francisco Soto
MAQUINA Percusión
MARCA Walker Neer
FECHA COMENZO 10/2/90
FECHA TERMINO 11/15/90
VENA PRINCIPAL 45'
NIVEL ESTATICO 10'

BARRENO Y TUBERIA

DIAM.	BARRENO		
20"	de 0'	a 54'	
16"	de 54'	a 65'	
	de	a	
	de	a	
	de	a	

TUBERIA INSTALADA		
de 0'	a 50'	Lisa de acero
de 0'	a 58'	Lisa de acero
de	a	
de	a	
de	a	

PRUEBA DEL POZO

FECHA	G.P.M.	NIVEL	OBSERVACIONES
11/13/90	360	43'	Agua Clara
11/14/90	360	43'	Agua Clara
11/7/90	450	44'	Agua Clara
11/8/90	300	35'	Agua Clara
11/9/90	450	45'	Agua Clara

RECUPERACION

TIEMPO	NIVEL	TIEMPO	NIVEL
0'-00"	45'	9'-00"	34'-5"
0'-15"	39'	12'-00"	33'-7"
0'-30"	38'	15'-00"	32'-10"
1'-00"	37'-8"	18'-00"	31'-11"
2'-00"	37'	21'-00"	31'-02"
3'-00"	36'-4"		
6'-00"	35'-5"		

BOMBA DE PRUEBA

MARCA Gould
MODELO
TIPO Turbia vertical
COLUMNAS 50'
LUBRICACION Aceite
SUCCION 58'

MOTOR MARCA G.M. Diesel
MODELO 4-71
OBSERVACIONES

RECOMENDACION FINAL DE BOMBA

CAPACIDAD MAX. 300 G.P.M.
COLUMNA 50'
NIVEL DINAMICO 35'
TIPO BOMBA Sumergible

OBSERVACIONES Bombear 18 horas diarias, dejarlo 6 horas en reposo para recuperación y conservación del acuífero

SOMETIDO POR Wilfredo Freytes
FECHA

REV. 1/MAR./76. J.P.P.

Appendix 4

Autoridad de Acueductos y Alcantarillados
Area de Ingeniería

Hoja de Trámite de Telefax

Favor de entregar las siguientes páginas a:

Nombre: Geo. Jesús Rodriguez

Localización: U.S Geological Survey

Número de Fax: 749- 4462

De: Geo. José Benedetty A.A.A

Número de Fax: (809) 250-0967

Páginas Transmitidas Incluyendo la Hoja de Trámite: 7

Favor de llamar a José Benedetty

al teléfono 751-4585 , si el número de

páginas mencionadas anteriormente no fueron recibidas.

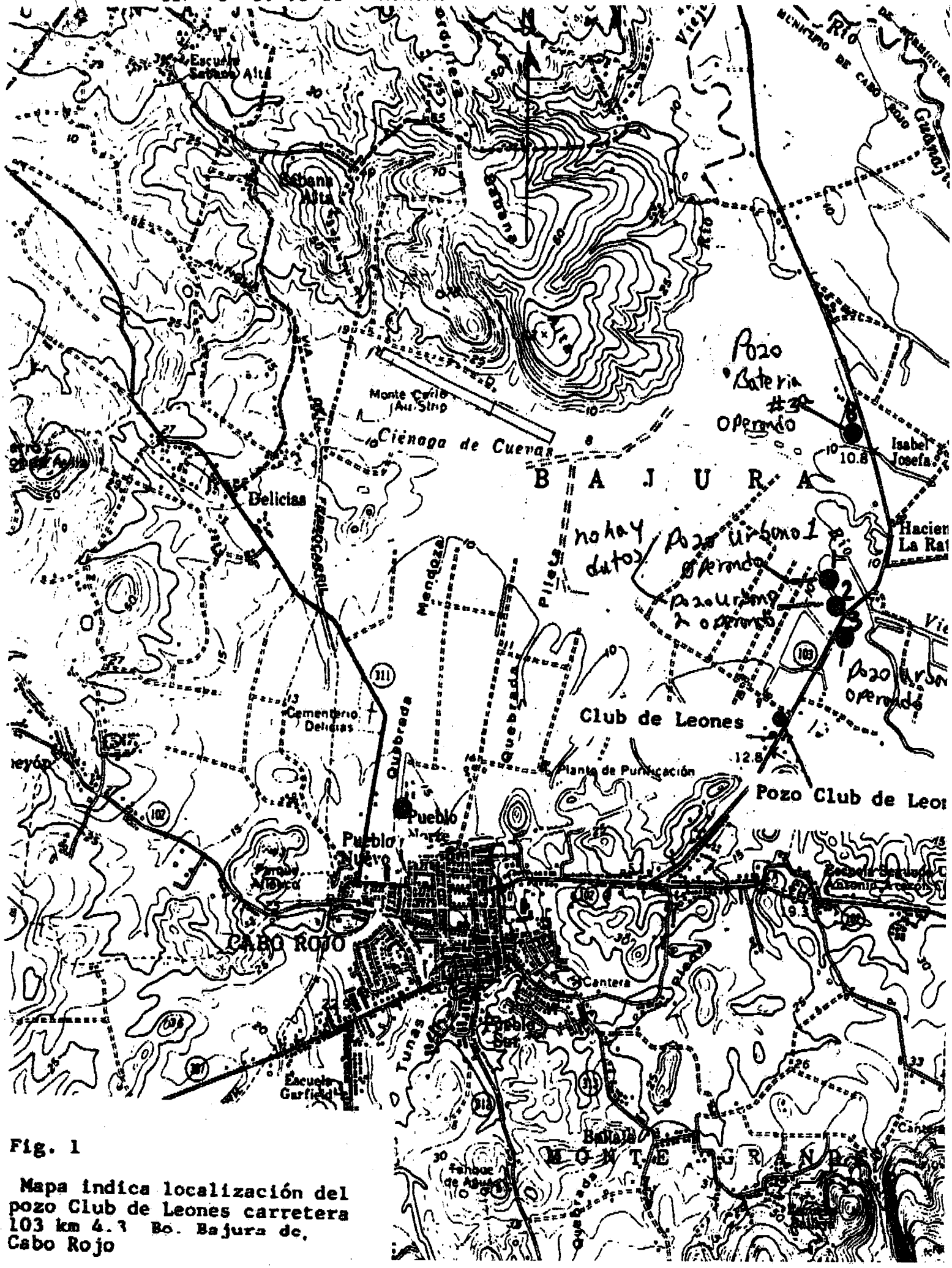
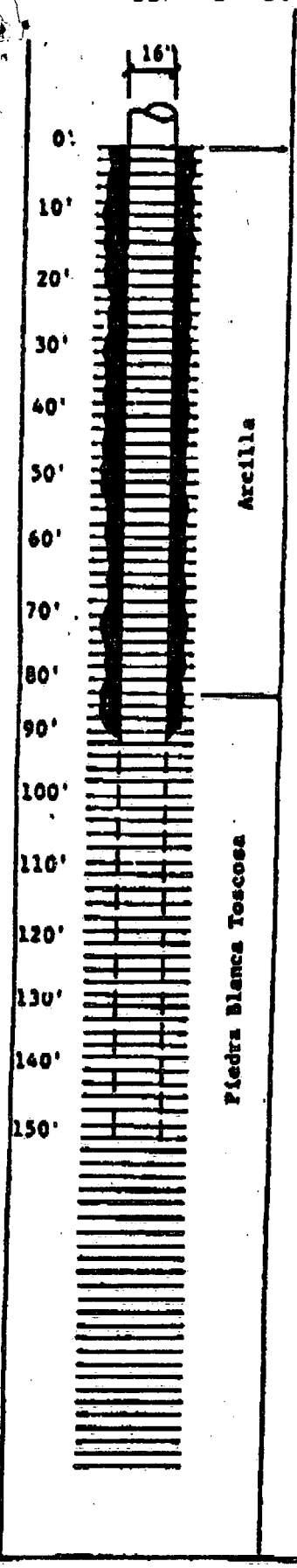


Fig. 1

Mapa indica localización del pozo Club de Leones carretera 103 km 4.3 Bo. Bajura de, Cabo Rojo



PL .O Cabo Rojo
BARRIO Bajuras
SECTOR Carretera 103
POZO NUM. Club de Leones
TERRENOS Club de Leones
CARR. 103 KM. 4.3
LATITUD ------- LONGITUD ------
ELEVACION

C IT. POR Contrato
OPERADOR Caribbean Wells
MAQUINA Percusion
MARCA Bucyrus Erie
FECHA COMENZO 10 octubre 1988
FECHA TERMINO 31 marzo de 1989
VENA PRINCIPAL 90' down
NIVEL ESTATICO 21'

BARRENO Y TUBERIA

DIAM.	BARRENO		
22"	de 0'	a 90'	
18"	de 90'	a 150'	
16"	de -----	a -----	
16"	de -----	a -----	
	de	a	

TUBERIA INSTALADA		
de ---	a ----	--------
de ---	a ----	--------
de 0'	a 90'	Lisa de acero
de 90'	a 150'	Perforada
de	a	

PRUEBA DEL POZO

FECHA	G.P.M.	NIVEL	OBSERVACIONES
1989			
3/30	---	21'	Nivel Estático
3/30	455	78'	Agua Clara
3/31	455	78'	Agua Clara
	Capacidad Específica		
	7.98 GPM/pie		

RECUPERACION

TIEMPO	NIVEL	TIEMPO	NIVEL
0'-00"	78'	20'-00"	24'
0'-30"	42'	30'-00"	23'
1'-00"	34'		
3'-00"	30'		
6'-00"	28'		
10'-00"	26'		
15'-00"	25'		

BOMBA DE PRUEBA

MARCA
MODELO
TIPO
COLUMNAS
LUBRICACION
SUCCION

MOTOR MARCA
MODELO
OBSERVACIONES

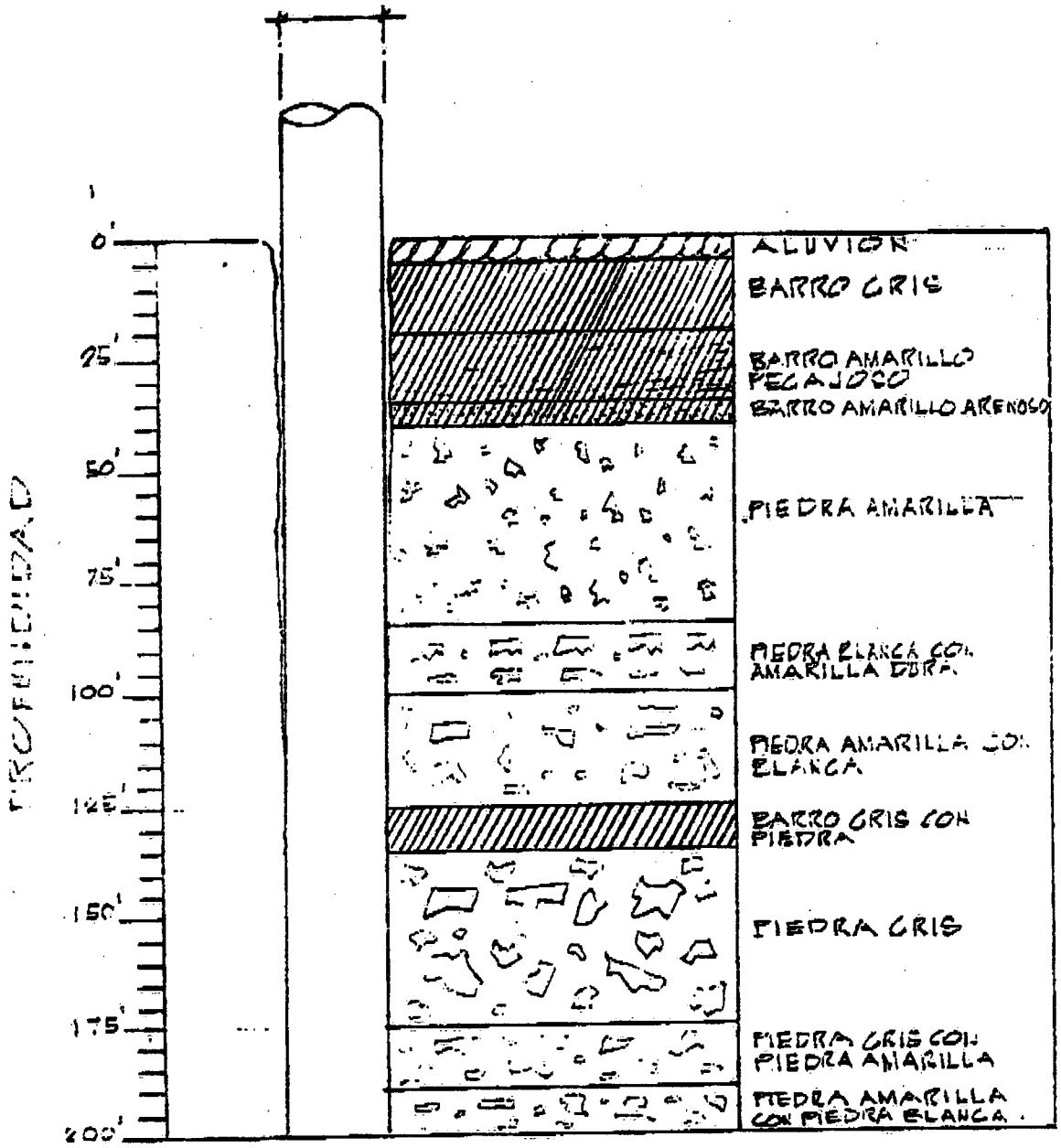
RECOMENDACION FINAL DE BOMBA

CAPACIDAD MAX. 450 G.P.M.
COLUMNA 120'
NIVEL DINAMICO 78'
TIPO BOMBA Columna Vertical

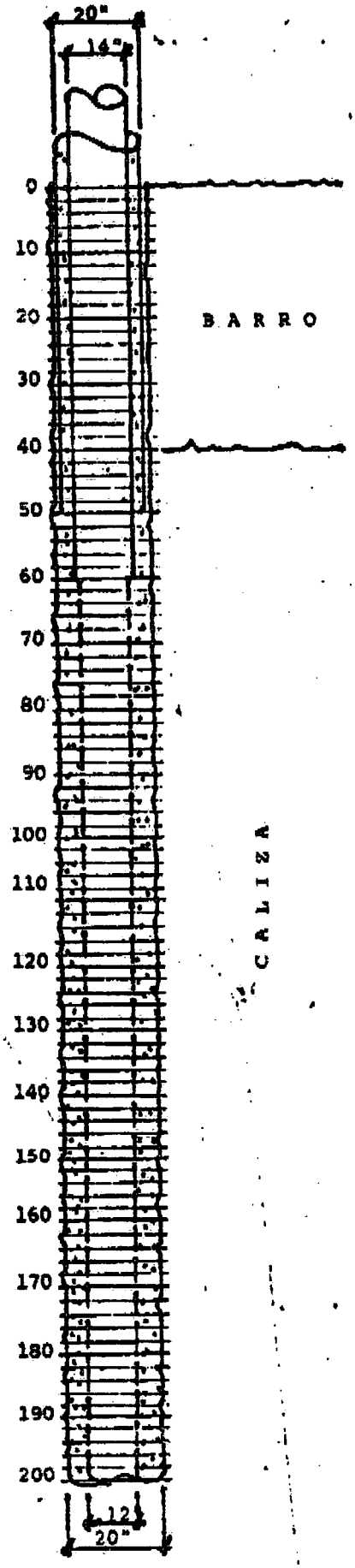
OBSERVACIONES Bombear 18 horas diarias. Dejarlo 6 horas en reposo para la recuperación del aquífero.

SOMETIDO POR Sr. Wilfredo Freytes
FECHA abril 1989

LOG. NO. 7


PROFUNDIDAD
0'
25'
50'
75'
100'
125'
150'
175'
200'
ALUVION
BARRO GRIS
BARRO AMARILLO PEGAJOSO
BARRO AMARILLO ARENOSO
PIEDRA AMARILLA
PIEDRA BLANCA CON AMARILLA DURA
PIEDRA AMARILLA CON BLANCA
BARRO GRIS CON PIEDRA
PIEDRA GRIS
PIEDRA GRIS CON PIEDRA AMARILLA
PIEDRA AMARILLA CON PIEDRA BLANCA

DEPARTAMENTO DE CONSTRUCCION
SECCION DE AGUAS SUBTERRANEAS



RECORD DEL POZO

PUEBLO: CABO ROJO
BARRIO: BAJURA
SECTOR:
POZO NUM: 7
TERRENOS: HAYDE RAMIREZ DE ARILLANO
CARR.: 103 KM.: 3.5
LATITUD: 18°06'10" LONGITUD: 67°07'33"
ELEVACION: 10 metros

CONST. POR: JULIO N. CHARDON & S
OPERADOR:
MAQUINA: ROTARIA
MARCA: SCHRAM
FECHA COMENZO: 25 de agosto 1975
FECHA TERMINO: 30 julio de 1976
VENA PRINCIPAL:
NIVEL ESTATICO: 19'0"

BARRENO Y TUBERIA

DIAM.	BARRENO		TUBERIA INSTALADA		
22"	de 0'	a 200'	de 0'	a 60'	tub. lisa 14"
	de	a	de 60'	a 200'	tub. perf. 12"
	de	a	de 0'	a 50'	tub. lisa 20"
	de	a	de	a	
	de	a	de	a	

PRUEBA DEL POZO

FECHA	G P M	NIVEL	OBSERVACIONES
7/28/76	143	29' 9"	
7/29/76	253	41' 5"	
7/29/76	366	67'8"	
7/30/76	412	91'8"	

Sp. Cap 6.65GPM/ft

RECUPERACION

TIEMPO	NIVEL	TIEMPO	NIVEL
1 min.	38'3"	30 min.	20'5"
2 min.	30'0"	60 min.	19'11"
3 min.	27'1"		
4 min.	24'10"		
5 min.	23'0"		
10 min.	21:6"		
15 min.	20'11"		

BOMBA DE PRUEBA

MARCA:
MODELO:
TIPO:
COLUMNAS: 87'
LUBRICACION:
SUCCION: 97'

MOTOR MARCA:
MODELO:
OBSERVACIONES: Duración de la prue 48 horas.

RECOMENDACION FINAL DE BOMBA

CAPACIDAD MAX.: 380 G.P.M.
COLUMNA: 110 pies
NIVEL DINAMICO: 77 pies
TIPO BOMBA: Pozo profundo

OBSERVACIONES: Se debe operar durante 18 horas, tomar niveles controlar el galonaje diariamen

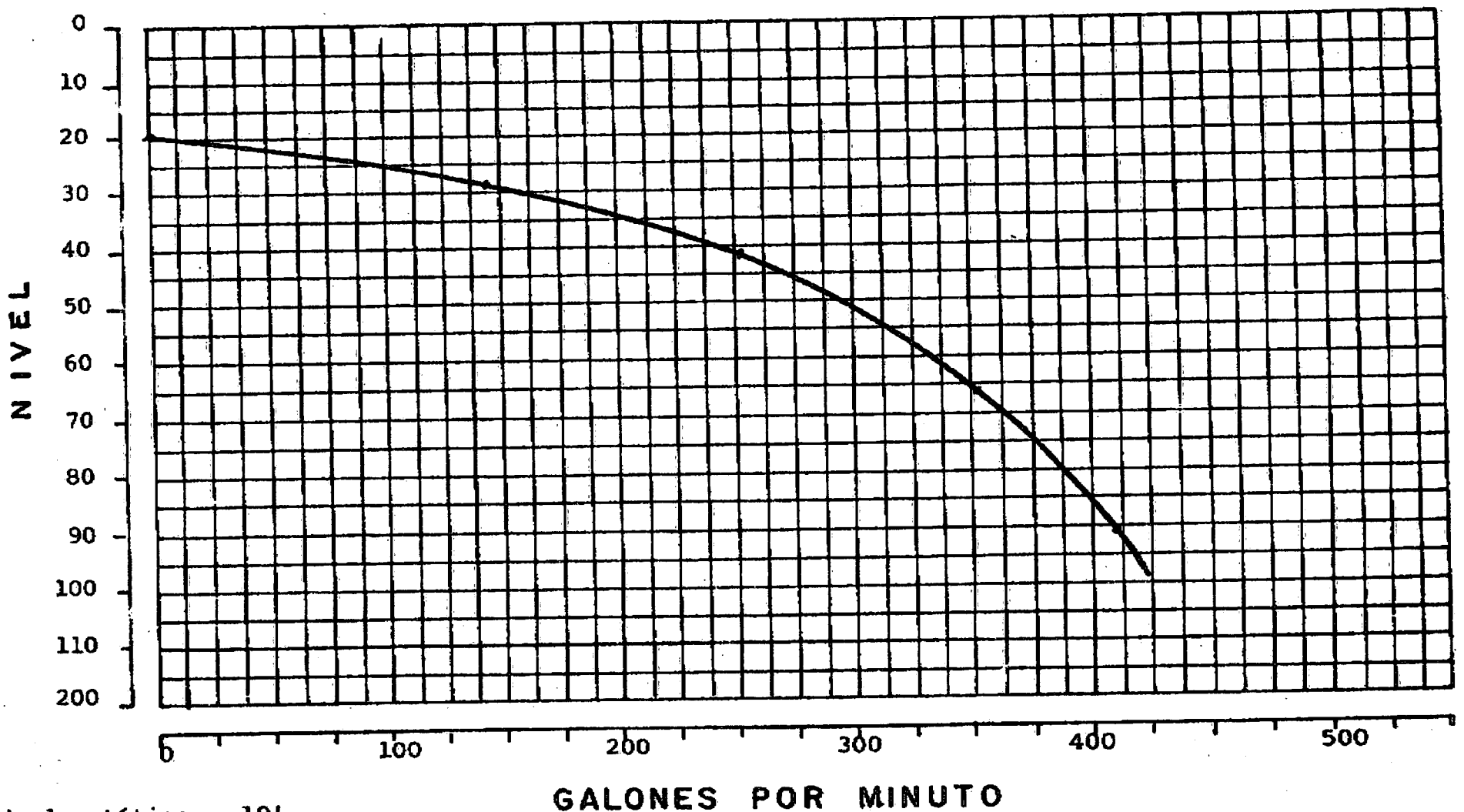
SOMETIDO POR: Salvador F. Catalá
FECHA:

REV 2/MAR/76

DEPARTAMENTO DE CONSTRUCCION
SECCION DE AGUA SUPTERRANEAS

CURVA DE RENDIMIENTO

POZO NUMERO 7 (BATERIA POZOS CABO ROJO)



Nivel estático: 19'
Duración prueba: 48 horas

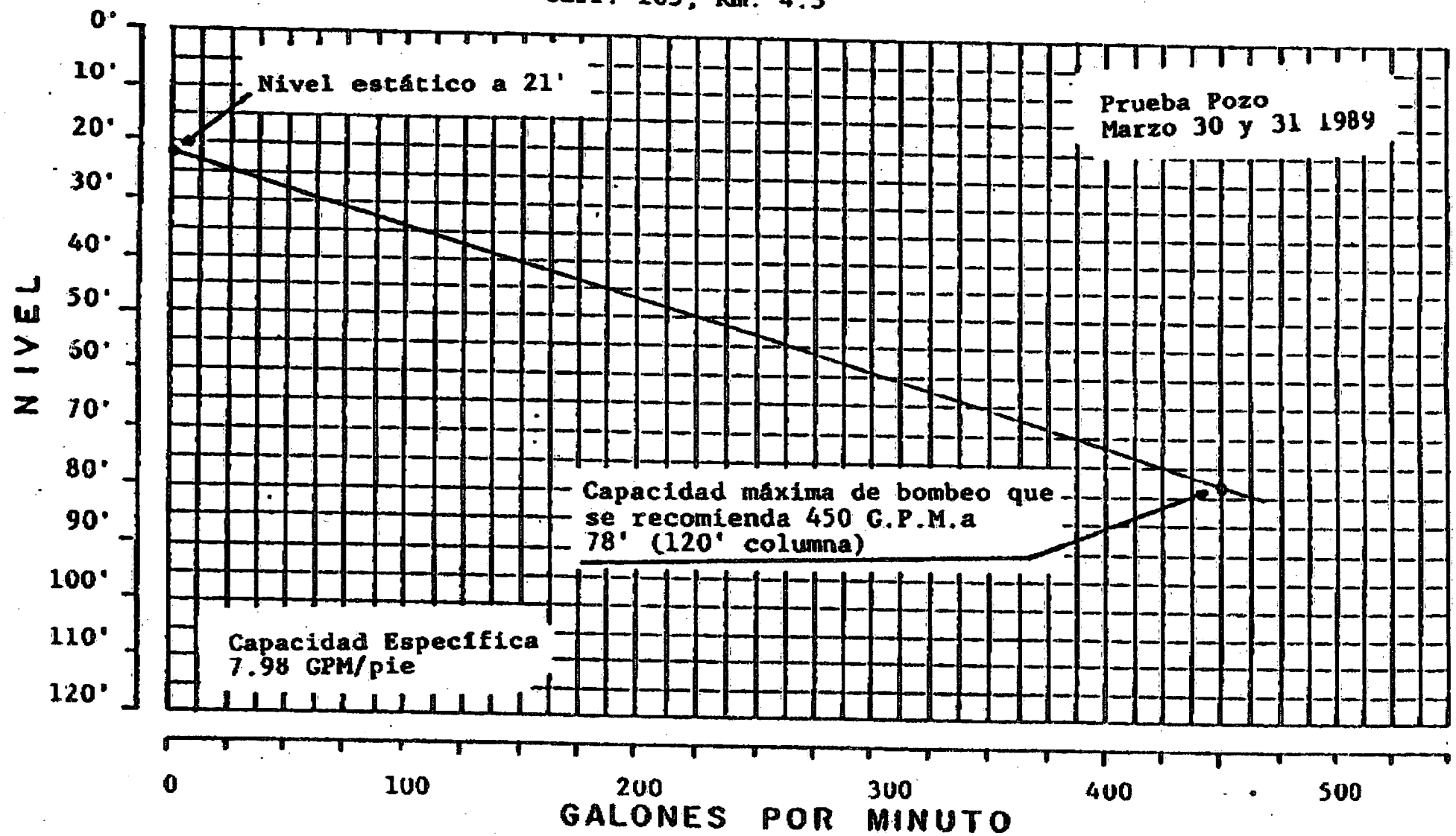
OFICINA DE CONSTRUCCION

SECCION DE AGUA SUPTERRANEAS

CURVA DE RENDIMIENTO

POZO Club de Leones Cabo Rojo

Carr. 103, Km. 4.3



Appendix 5

GROUND-WATER LEVELS
CABO ROJO PROJECT

(1)

Well name PRASA #1

Land surface elev. 30.10

m.p. 1.10

7.7"
5.00
m.p. – 12.75"

Date	Hold	Cut	Level/mp	Level/lse msl	Remarks
2-26-92	11.00	6.08	4.92 − 1.10 = 3.82	26.28	abandoned well
3-25-92	25.00	18.51	6.49 − 1.10 = 5.39	24.71	
5-20-92	20.00	13.00	7.00 − 1.10 = 5.90	24.20	

②

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name PRASA #2

Land surface elev. 35.38

m.p. 2.57

Date	Hold	Cut	Level/mp	Level/lse	Remarks
2-26-92	27.00	17.90	9.10 − 2.57 = 6.53	28.85	abandoned well
3-25-92	40.00	29.40	10.60 − 2.57 = 8.03	27.35	
5-21-92	~~25.00~~ 35.00 36.00	~~3.23~~ 26.[illegible] 25.[illegible]	10.89 − 2.57 = 8.32	27.06	

③

GROUND-WATER LEVELS
CABO ROJO PROJECT

1-25"
16-50"

Well name Camarones

Land surface elev. 36.38

m.p. 1.50

Date	Hold	Cut	Level/mp	Level/lse	Remarks
2-20-92	30.00	15.58	14.42 / 1.50 = 12.92	23.46	inactive well
5-21-92	25.00	5.17	19.83 / 1.50 = 18.33	18.05	

(4)

GROUND-WATER LEVELS
CABO ROJO PROJECT

mp = 25"

Well name Fillipi

Land surface elev. 34.76

mp. 2.08

Date	Hold	Cut	Level/mp	Level/lse	Remarks
2-20-92	30.00	10.59	19.41 2.08 = 17.33	17.43	abandoned well
5-31-92	35.00	7.94	27.06 2.08 = 24.98	9.78	

5

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name PRASA 5A

Land surface elev. 28.80

m.p. 2.70

Date	Hold	Cut	Level/mp	Level/lse	Remarks
2-20-92	28.00	2.83	25.17 2.70 = 22.47	6.33	abandoned well
5-21-92	35.00 36.00	8.22 9.83	26.17 2.70 = 23.47	5.33	

(6)

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name Lopez

Land surface elev. 35.50

m.p. 1.7

Date	Hold	Cut	Level/mp	Level/lse	Remarks
2-20-92	35.00	4.70	30.30 − 1.70 = 28.60	6.90	inactive well
5-21-92	40.00 / 46.00	1.11 / 7.11	38.89 − 1.70 = 37.19	−1.69	

GROUND-WATER LEVELS
CABO ROJO PROJECT

41.00 (7)

Well name Ubaldino 02.60 ft pipe

Land surface elev. 39.36 ft (Temp) (Topo)

m.p.- 3.20

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-5-92	25.00	12.20	12.80 3.20 = 9.60	29.76 (Temp)	inactive well
5-21-92	25.00	10.01	14.99 3.20 = 11.79	27.57 (temp)	
5-21-92	25.00 26.00	10.01 11.51			

(8)

GROUND-WATER LEVELS
CABO ROJO PROJECT

mp. elev = 36.87
mp - 3.5" = 2.33

Well name PRASA RADIO

Land surface elev. 34.54

m.p 2.33

Date	Hold	Cut	Level/mp	Level/lse	Remarks
2-26-92	20.00	15.07	4.93 - 2.33 = 2.60	31.94	
5-21-92	25.00	18.09	6.91 - 2.33 = 4.58	29.96	

62.4 (9)

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name Poligono

Land surface elev. 62.32 ft (Temp T Map)

m.p. 1.80

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-10-92	21.00	10.51	10.49 − 1.80 = 8.69	53.63 (temp)	
5-21-92	35.00	23.72	11.27 − 1.80 = 9.47	52.85 (temp)	

(10)

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name FRASA BELFORD

m.p. elev = 48.47 ft
m.p. = 72"

Land surface elev. 47.07

m.p. 1.40

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-18-92	40.00	8.35	31.65 − 1.40 = 30.25	16.92	
5-22-92	35.00	5.23	29.77 − 1.40 = 28.37	18.70	

(11)

GROUND-WATER LEVELS
CABO ROJO PROJECT

New 5-21-92
mp = 70" = 5.83

Well name Bajura #1 CR-TW#1

Land surface elev. 28.61

m.p. 4.10

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-6-92	11.00	4.93	6.07 / 4.10 = 1.97	26.64	
3-25-92	20.00	13.23	6.77 / 4.10 = 2.67	25.94	
5-21-92	20.00	11.61	8.39 / 5.83 = 2.56	26.05	

(12) 12A

GROUND-WATER LEVELS
CABO ROJO PROJECT

New MP = 6.10

Well name Bajura 2A – CR-TW# 2A (deep) – 12A (in list of all wells used in port. maps)

Land surface elev. 28.85

m.p. 4.25

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-6-92	20.00	7.38	12.62 − 4.25 = 8.37	20.48	Deep well
3-25-92	22.00	7.38	14.62 − 4.25 = 10.37	18.48	
3-10-92	20.00	6.93	13.07 − 4.25 = 8.82	20.03	
[illegible]	25.00	6.93	18.07 − 6.10 = 11.97	16.88	

GROUND-WATER LEVELS
CABO ROJO PROJECT

(3) 12b

New MP
mp = 73.25" = 6.10

Well name Bajura 2B CK-7 is 2B (shallow) 12b (from list of all wells used in pod. maps)

Land surface elev. 28.87

m.p. 4.10

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-10-92	20.00	10.07	9.93 − 4.10 = 5.83	23.04	Shallow well
3-25-92	18.00	7.28	10.74 − 4.10 = 6.64	22.23	
5-21-92	20.00	7.14	12.86 − 6.10 = 6.76	22.11	

(44) 12C [illegible]

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name Bajura 2C CR-TW#2C

New mp. 72.5
.2
72.75" = 6.06

Land surface elev. 28.92

mp. 4.15 ⇒ 6.06

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-25-92	23.00	7.95	15.05 / 4.15 = 10.90	18.02	Intermediate well
5-21-92	30.00	11.75	18.25 / 6.06 = 12.19	16.73	

(45) 13 in list of all wells

GROUND-WATER LEVELS
CABO ROJO PROJECT

T/w) mp. 6.75 = 5.56'

Well name Bajura 3

Land surface elev. 27.19

m.p. 4.0

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-12-92	15.00	6.02	8.98 − 4.00 = 4.98	22.21	
3-20-92	20.00	10.32	9.68 − 4.00 = 5.68	21.51	
3-25-92	21.00	10.78	10.22 − 4.00 = 6.22	20.97	
5-21-92	20.00	7.27	12.73 − 5.56 = 7.17	20.02	

(46) 14 in list of well walks

GROUND-WATER LEVELS
CABO ROJO PROJECT

mp = 47.5

Well name Bajura 4

Land surface elev. 37.16

mp. 4.15

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-12-92	25.00	10.32	14.68 − 4.15 = 10.53	26.63	
3-25-92	22.00	7.17	14.83 − 4.15 = 10.68	26.48	
5-21-92	24.00	7.89	16.11 − 3.96 = 12.15	25.01	

(17) 15 in list on all wells

GROUND-WATER LEVELS
CABO ROJO PROJECT

New mp. 46.50" = 3.8

Well name Bajura 5

Land surface elev. 35.31

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-18-92	20.00	7.20	12.80 − 3.88 = 8.92	26.39	
3-25-92	20.00	6.75	13.25 − 3.88 = 9.62	25.69	
5-21-92	25.00	11.11	13.89 − 3.88 = 10.01	25.30	

(15) 16 in hole

GROUND-WATER LEVELS
CABO ROJO PROJECT

New mp. 69.25 = 5.77

Well name Bajura 6

Land surface elev. 32.91

m.p 4.00

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-19-92	25.00	9.68	15.32 − 4.00 = 11.32	21.59	
3-25-92	20.00	3.50	16.40 − 4.00 = 12.40	20.51	
5-21-92	32.00	8.18	23.82 − 5.77 = 18.12	14.79	

(14) [illegible]

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name Bajura 7 [illegible]

m.p. elev. = 46.27 ft
New m.p. = 69.25 [illegible]
= 5.69 ft

Land surface elev. 42.23

m.p. 4.35

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-19-92	35.00	3.21	31.79 − 4.35 = 27.44	14.79	
3-25-92	40.00	6.98	33.02 − 4.35 = 28.67	13.56	
5-21-92	46.00	10.12	35.88 − 5.69 = 30.19	12.04	
5-28-92	45.00	20.60	24.40 − 5.69 = 18.71	23.52	Heavy R.F.N

(20) 18 in list of all wells

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name Bajura 8 (RTW8

mp elev. - 44.65
mp - 7.25 = 3.94

Land surface elev. 40.70

mp 4.05

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-25-92	35.00	6.40	28.60 4.05 = 24.55	16.15	
5-21-92	31.00	5.85	25.15 3.94 = 21.21	19.49	

29.47 (21) 19A on list of wells

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name Bajura 9 (A-1-90A

New mp. = 3.92

Land surface elev. 29.54 (Hemp map)

m.p. 4.05

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-25-92	20.00	7.64	12.36 − 4.05 = 8.31	21.19 (Hemp)	
5-21-92	26.00	6.61	19.39 − 3.92 = 15.47	14.03 (Hemp)	nearby pool of water is dried
5-28-92	14.00	7.03	6.97 − 3.92 = 3.05	29.50 − 3.92 = 25.58	Pool of water is back (after heavy rain)

(22) 20

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name Bajura 10 (RTW 10)

Land surface elev. 36.42

m.p. elev. — 40.09
m.p. - 44" = 3.67

Date	Hold	Cut	Level/mp	Level/lse	Remarks
5-21-92	3500	4.10	30.90 - 3.67 = 27.23	9.19	
5-28-92	22.00	7.29	14.71 - 3.67 = 11.04	25.38	after heavy rain

21 in [illegible]

GROUND-WATER LEVELS
CABO ROJO PROJECT

~~23~~

Well name Club de Leones - PRASA

Land surface elev. 39.36 (Top)

mp. 5.90

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-12-92	50 00	7.47	42.53 - 5.90 = 36.63	2.73	
5-29-92	46.00	12.12	33.88 - 5.90 = 27.98	11.38	Q = 450 gpm Recovery = 30 min.

(24) 22 in list of all wells

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name PRASA BAJURA (2)

Land surface elev. 32.8' (temp)

m.p. 1.90 ft

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-12-92	33.00	1.16	21.84 − 1.90 = 19.94	12.86 (temp)	
5-29-92	35.00	8.36	26.64 − 5.79 = 20.85	11.95	Pozo nuevo Rec = 30 min

~~25~~ 23 in list of wells

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name PRASA 3 (VIEJO)

Land surface elev. 32.8 ft (temp. t.mp)

mp. 1.70

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-12-92	34.00	3.23	30.77 − 1.70 = 29.07	3.76 (temp.)	
5-29-92	35.00	14.09	21.91 − 1.70 = 19.21	13.59	Q = 590 gpm Rec = 25 min

(26) 24 in list of all wells

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name PRASA 8

Land surface elev. 36.0844 (Tim mp)

m.p. 7.35

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-12-92	35.00	8.21	26.79 − 7.35 = 19.44	16.64 ft	
5-29-92	32.00	16.64	15.36 − 7.36 = 8.00	28.08	Q = 140 gpm Rec = 30 min

(27) 25 in list of all wells

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name PRASA - AnaMaria

m.p. elev. = 53.98 ft

Land surface elev. 52.48 (+mp) (+mp)

m.p. 1.50

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-12-92	45.00	9.54	35.46 − 1.50 = 33.96	18.52 (+mp)	
5-29-92	40.00	6.98	33.02 − 1.50 = 31.52	20.96	Q = 280 gpm Rec = 30 min

(28) 26 in list of all wells

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name Oscar (dug well)

Land surface elev. ~~51.84~~ 49.20

Mp elev. = 51.84

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-20-92			1.5 b/s	50.39	
5-22-92			1.25 b/s	50.64	

~~24~~ 27 in list of all wells

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name Garaje Municipal

Land surface elev. 39.36 (Hand Level)

m.p. 2.70

Date	Hold	Cut	Level/mp	Level/lse	Remarks
2-20-92	28.00	2.83	25.17 − 2.70 = 22.47	16.89	
5-21-92	35.00	3.43	31.07 − 2.70 = 28.37	10.99	

(30) 28 in list of all wells

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name U.S.G.S – TW

Land surface elev. 43.96

mp = 2.92'

Date	Hold	Cut	Level/mp	Level/lse	Remarks
3-25-92	25.00	6.00	19.00 − 2.92 = 16.08	47.88	
5-22-92	30.00	11.18	18.82 − 2.92 = 15.90	48.06	

(31) 29 in list of old wells

GROUND-WATER LEVELS
CABO ROJO PROJECT

Well name Pozo Toro

Land surface elev. 42.6

mp. 2.10

Date	Hold	Cut	Level/mp	Level/lse	Remarks
2-26-92	12.00	8.03	3.97 − 2.10 = 1.87	40.73	
5-22-92	7.00	3.21	3.79 − 2.10 = 1.69	40.91	

(32) - 30

GROUND-WATER LEVELS

CABO ROJO PROJECT

Well name PRASA - Mc Dougall

Land surface elev. _____

Date	Hold	Cut	Level/mp	Level/lse	Remarks
5-29-92	25.00	12.18	12.82		Recovery = 30 min Q = 145 gpm

Appendix 6

Estado Libre Asociado de Puerto Rico
AUTORIDAD DE ACUEDUCTOS Y ALCANTARILLADOS

6 de diciembre de 1993

MEMORANDO:

A : Ing. Edwin Vargas, Ing. Zona
Operaciones San Germán

P/C : Ing. Efraín Mendoza
Jefe, Ofic. Construcción
Proyectos por Administración

P/C : Sr. Eduardo Blest
Geólogo, Área Operaciones

DE : Sr. Wilfredo Freytes
Sup. Construcción II
Sección Aguas Subterráneas

ASUNTO : **Pozos Carr. 311, Km. 1.2**
Terrenos Sr. Carlos Aymat
Bo. Bajuras, Cabo Rojo

Incluyo datos relacionados con la perforación y pruebas del pozo de asunto.

Originalmente se hizo un barreno exploratorio en la roca, de 6"Ø x 400' con máquina rotatoria, para localizar los acuíferos y determinar cantidad y calidad del agua. Encontramos un acuífero con buena producción a 380' de profundidad. La calidad del agua salió buena y la cantidad se estimó en mas de 200 GPM.

Luego tratamos de ampliar el barreno a 12"Ø para convertirlo en pozo de producción. Desafortunadamente al contratista se le partió el martillo de perforar a 200' de profundidad y no se pudo sacar, quedando el barreno obstruído a los 200' de profundidad.

Al no poder sacar el martillo y terminar la perforación hasta los 400', el contratista nos propuso hincar un nuevo pozo al lado, libre de costos adicionales y abandonar la perforación.

Se hizo el nuevo barreno al lado, hasta 400' de profundidad y probamos. Al hacer la segunda perforación notamos que el primer barreno mostraba tener bastante agua.

BP #2

Tubo Rojo 10"

OFICINA DE CONSTRUCCION

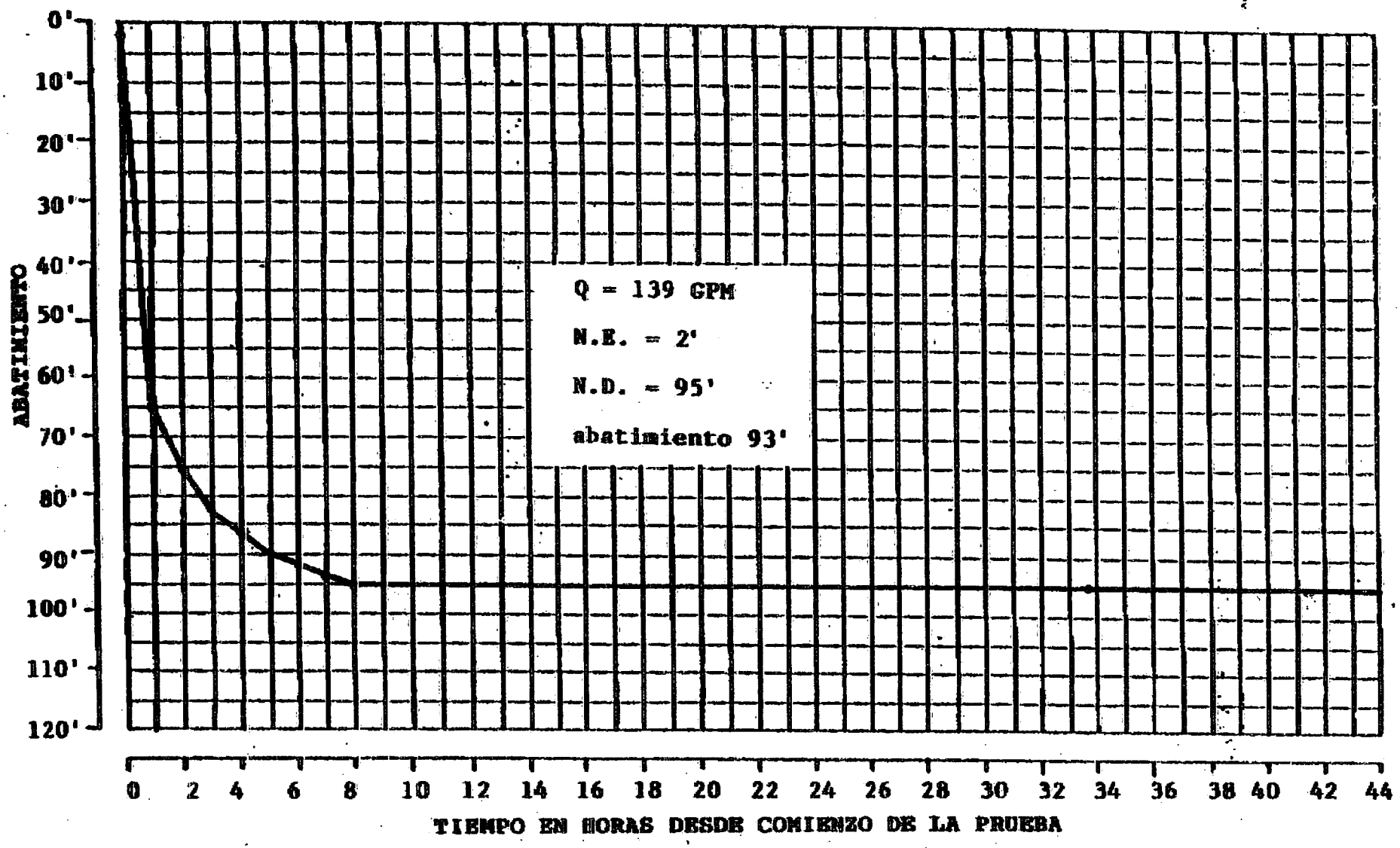
SECCION DE AGUA SUPTERRANEAS

Prueba 48 horas

20, 21 y 22/noviembre/91

CURVA DE RENDIMIENTO

POZO Aymet, Carr. 311, Km. 1.4



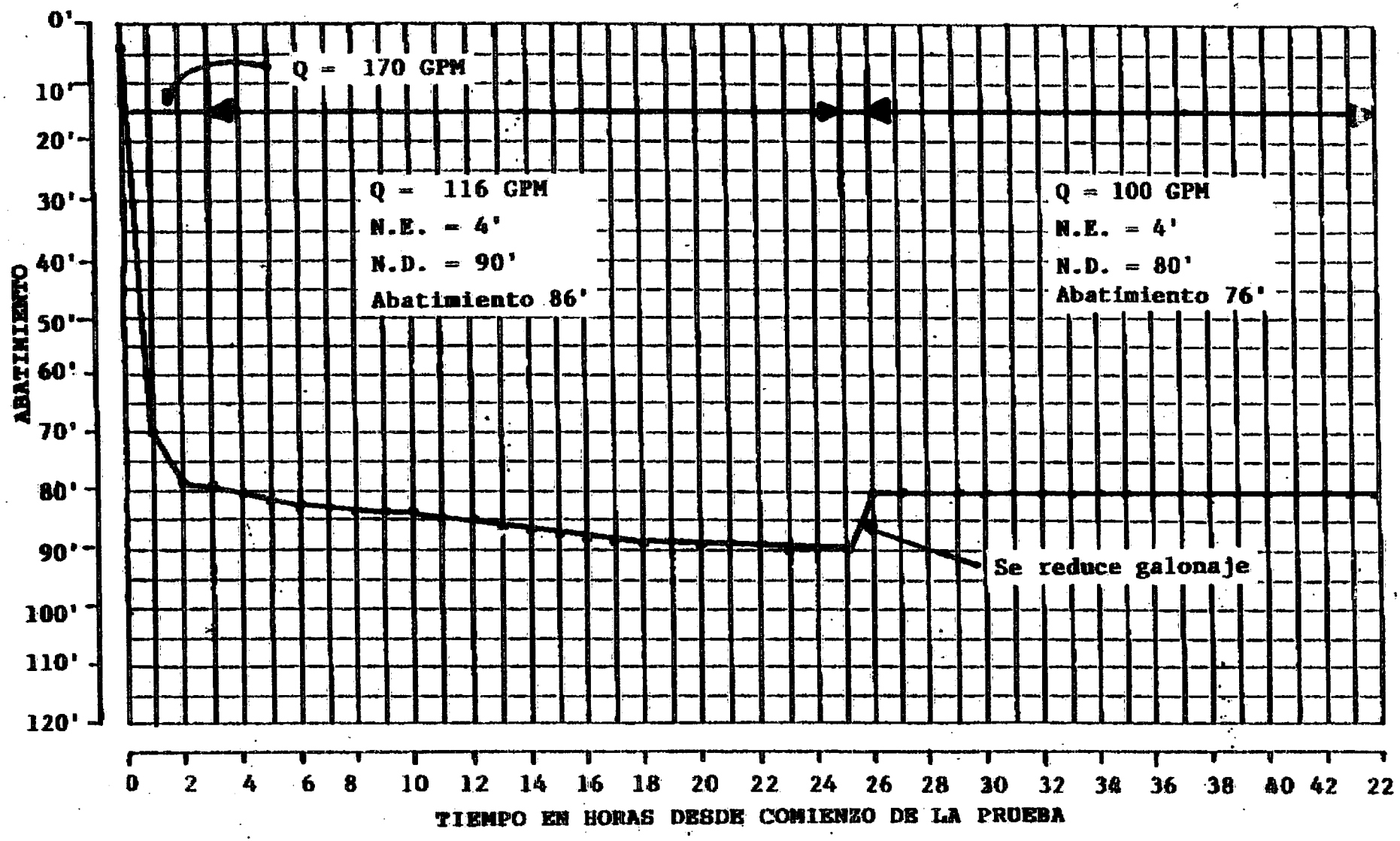
Barreno #1
Tubo Negro
20" & 12"

OFICINA DE CONSTRUCCION
SECCION DE AGUA SUPTERRANEAS

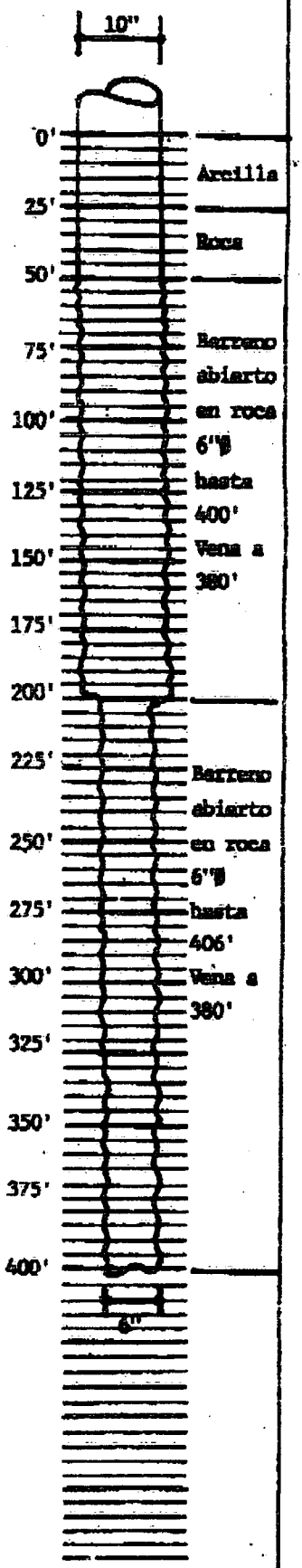
Prueba 48 horas
20, 21 y 22/noviembre/1991

CURVA DE RENDIMIENTO

POZO Aymat, Carr. 311, Km. 1.4, Cabo Rojo



DEPARTAMENTO DE CONSTRUCCION
SECCION DE AGUAS SUBTERRANEAS



RECORD DEL POZO

PUEBLO Cabo Rojo
BARRIO Bajuras
SECTOR ---
POZO NUM. HP - #2
TERRENOS Carlos Aymat
CARR. 311 KM. 1.4
LATITUD _____ LONGITUD _____
ELEVACION _____

CONST. POR Campos Drilling
OPERADOR Fermín
MAQUINA Rotatoria
MARCA Chicago Pneumatic
FECHA COMENZO 9/12/91
FECHA TERMINO 9/20/91
VENA PRINCIPAL 380'
NIVEL ESTATICO 2'

BARRENO Y TUBERIA

DIAM.	BARRENO		
10"	de 0'	a 200'	
16"	de 200'	a 400'	
	de	a	
	de	a	
	de	a	

TUBERIA INSTALADA		
de 0'	a 55'	Liso
de --	a --	--
de	a	
de	a	
de	a	

PRUEBA DEL POZO

FECHA	G.P.M.	NIVEL	OBSERVACIONES
11/20/91	--	2'	N.E.
11/20/91	139	95'	Agua Clara
11/21/91	139	95'	Agua Clara
11/22/91	139	95'	Agua Clara

RECUPERACION

TIEMPO	NIVEL	TIEMPO	NIVEL
0'-00"	95'		
0'-30"	60'		
1'-00"	52'		
3'-00"	40'		
6'-00"	35'		
18'-00"	34'		
35'-00"	29'		

NOTA: Prueba de 48 horas con bombeo simultáneo, bombeando pozo #1 a 100 GPM con N.D. a 80'.

BOMBA DE PRUEBA

MARCA _____
MODELO _____
TIPO _____
COLUMNAS _____
LUBRICACION _____
SUCCION _____

MOTOR MARCA _____
MODELO _____
OBSERVACIONES _____

RECOMENDACION FINAL DE BOMBA

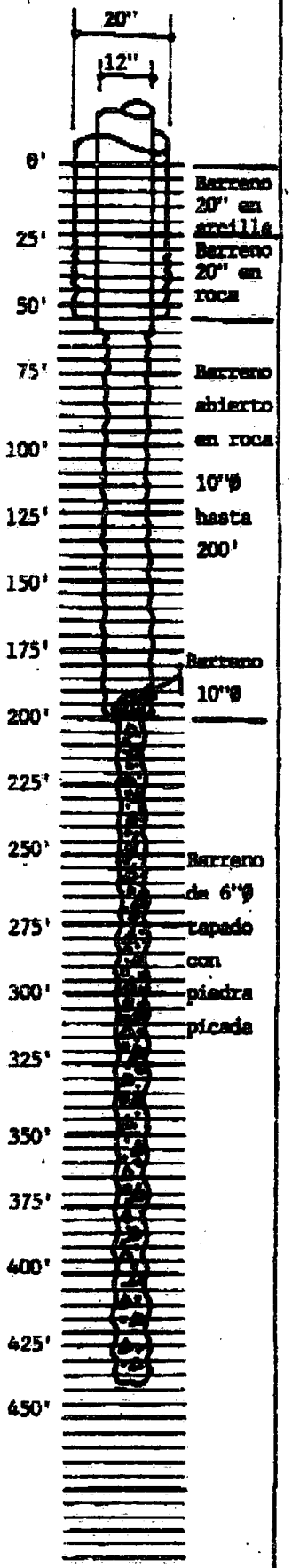
CAPACIDAD MAX. 100 G.P.M.
COLUMNA 150'
NIVEL DINAMICO 80'
TIPO BOMBA Sumergible

OBSERVACIONES Bombear 18 horas diarias máximo. Dejarlo 6 horas en reposo para la conservación y recuperación del acuífero.

SOMETIDO POR Wilfredo Freytes
FECHA _____

REV. 3/MAR./76. J.P.P.

DEPARTAMENTO DE CONSTRUCCION
SECCION DE AGUAS SUBTERRANEAS



RECORD DEL POZO

PUEBLO: Cabo Rojo
BARRIO: Bajuras
SECTOR: ---
POZO NUM.: Barreno #1
TERRENOS: Carlos Aymat
CARR.: 311 KM.: 1.4
LATITUD: LONGITUD:
ELEVACION:

CONST. POR: Campos Drilling
OPERADOR: Fermín
MAQUINA: Rotatoria
MARCA: Chicago Pneumatic
FECHA COMENZO: 4/2/91
FECHA TERMINO: 4/10/91
VENA PRINCIPAL: 380'
NIVEL ESTATICO: 4'

BARRENO Y TUBERIA

DIAM.	BARRENO		
20"	de 0'	a 60'	
10"	de 60'	a 200'	
6"	de 200'	a 440'	
	de	a	
	de	a	

TUBERIA INSTALADA		
de +2'	a 35'	Tubo liso
de +3'	a 60'	Tubo liso 12"Ø
de	a	
de	a	
de	a	

NOTA: Barreno 6"Ø tapado y obstruído con martillo de 10"Ø a 200')

PRUEBA DEL POZO

FECHA	G.P.M.	NIVEL	OBSERVACIONES
4/9/91	--	4'	N.E.
4/9/91	170	40'	Agua Clara
4/10/91	170	40'	Agua Clara
11/20/91	116	90'	Agua Clara
11/21/91	100	80'	Agua Clara
11/22/91	100	80'	" "

NOTA: Prueba simultánea bombeando tambien pozo #2, 139 GPM con 95' N.D.

RECUPERACION

TIEMPO	NIVEL	TIEMPO	NIVEL
0'-00"	80'		
3'-00"	75'		
6'-00"	73'		
12'-00"	60'		
18'-00"	56'		
30'-00"	55'		
45'-00"	30'		

Recuperación en la segunda prueba 11/22/91

BOMBA DE PRUEBA

MARCA:
MODELO:
TIPO:
COLUMNAS:
LUBRICACION:
SUCCION:

MOTOR MARCA:
MODELO:
OBSERVACIONES:

RECOMENDACION FINAL DE BOMBA

CAPACIDAD MAX.: 100 G.P.M.
COLUMNA: 150'
NIVEL DINAMICO: 80'
TIPO BOMBA: Sumergible

OBSERVACIONES: Bombear 18 horas diarias máximo. Dejarlo 6 horas en reposo para la recuperación y conservación del acuífero.

SOMETIDO POR: Wilfredo Freytes
FECHA:

Al finalizar, le hicimos una prueba de bombeo conjunta en los dos barrenos, de 48 horas de bombeo consecutivo. Durante la prueba, en el primer barreno bombeamos 100 GPM con el nivel dinámico a 80' y en el segundo barreno bombeamos 139 GPM con nivel dinámico a 95'.

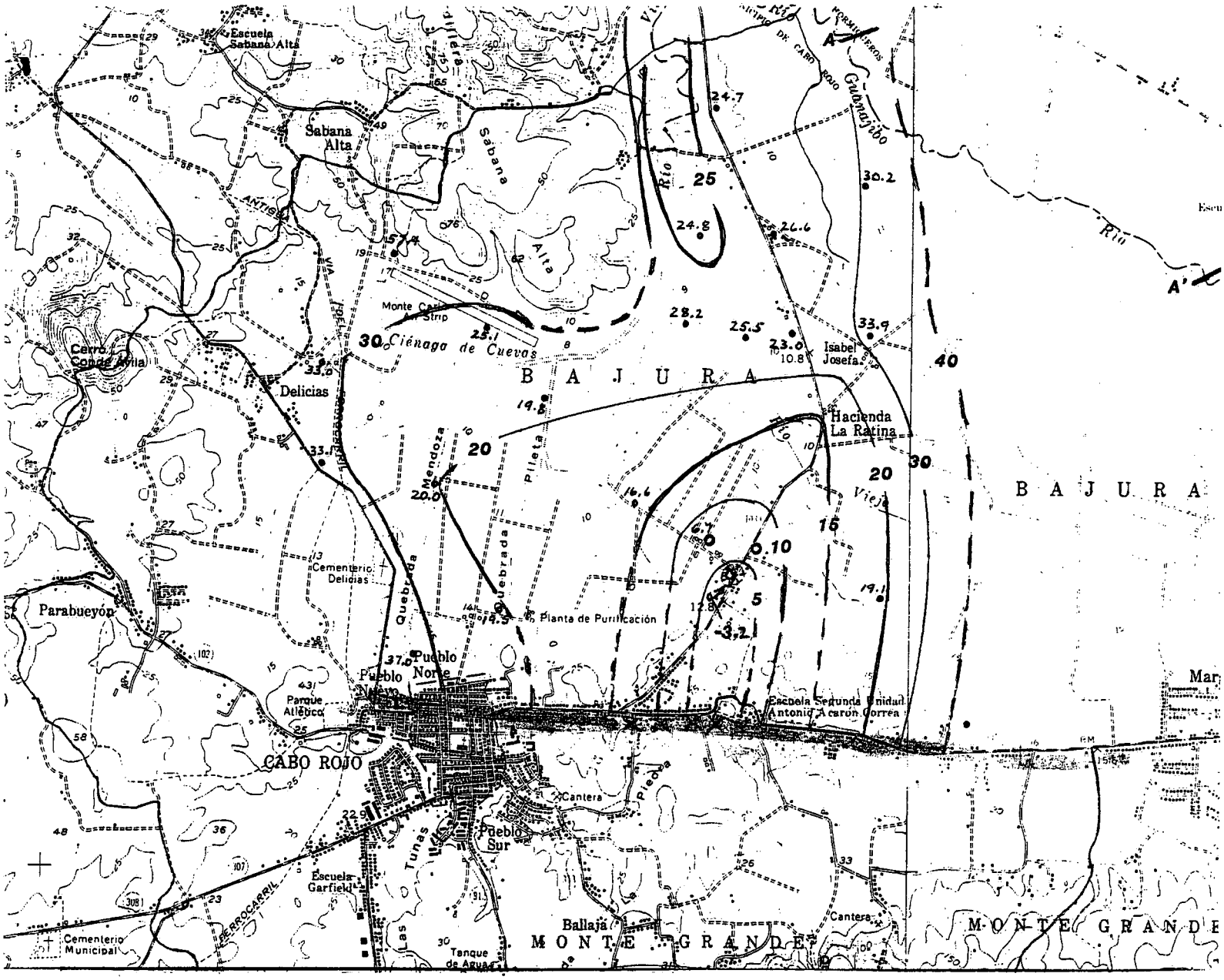
De los dos barrenos pudimos extraer 200 GPM, 100 GPM del primer barreno y 100 GPM del segundo barreno, bombeando ambos a la vez sin que se afecte la producción del uno al otro. Se pueden bombear durante un máximo de 18 horas diarias y dejarlo 6 horas en reposo para la recuperación y conservación del acuífero.

Los resultados de laboratorio originalmente salieron bien, pero hay que repetirlos nuevamente. Estos análisis ya caducaron y además hay que analizar nuevos parámetros requeridos por el Departamento de Salud, que entraron en vigor después de la fecha en que se tomaron las últimas muestras.

Anexo

EM/EB/WF/mih
cc:
Ing. Efraín Mendoza
Sr. Eduardo Blest
Ing. Angel R. Irlanda
Sr. Wilfredo Freytes
File

Appendix 7



EXPLANATION

- ○ PRASA WATER-SUPPLY WELL
- • PIEZOMETER OR ABANDONED DOMESTIC WELLS
- ~40~ WATER-LEVEL CONTOUR, datum in feet above sea level
- A--A' REACH OF RIO GUANAJIBO WHERE SEEPAGE RUNS WERE CONDUCTED
- APPROXIMATE Alluvium-volcanic ROCK CONTACT along southern edge of aquifer

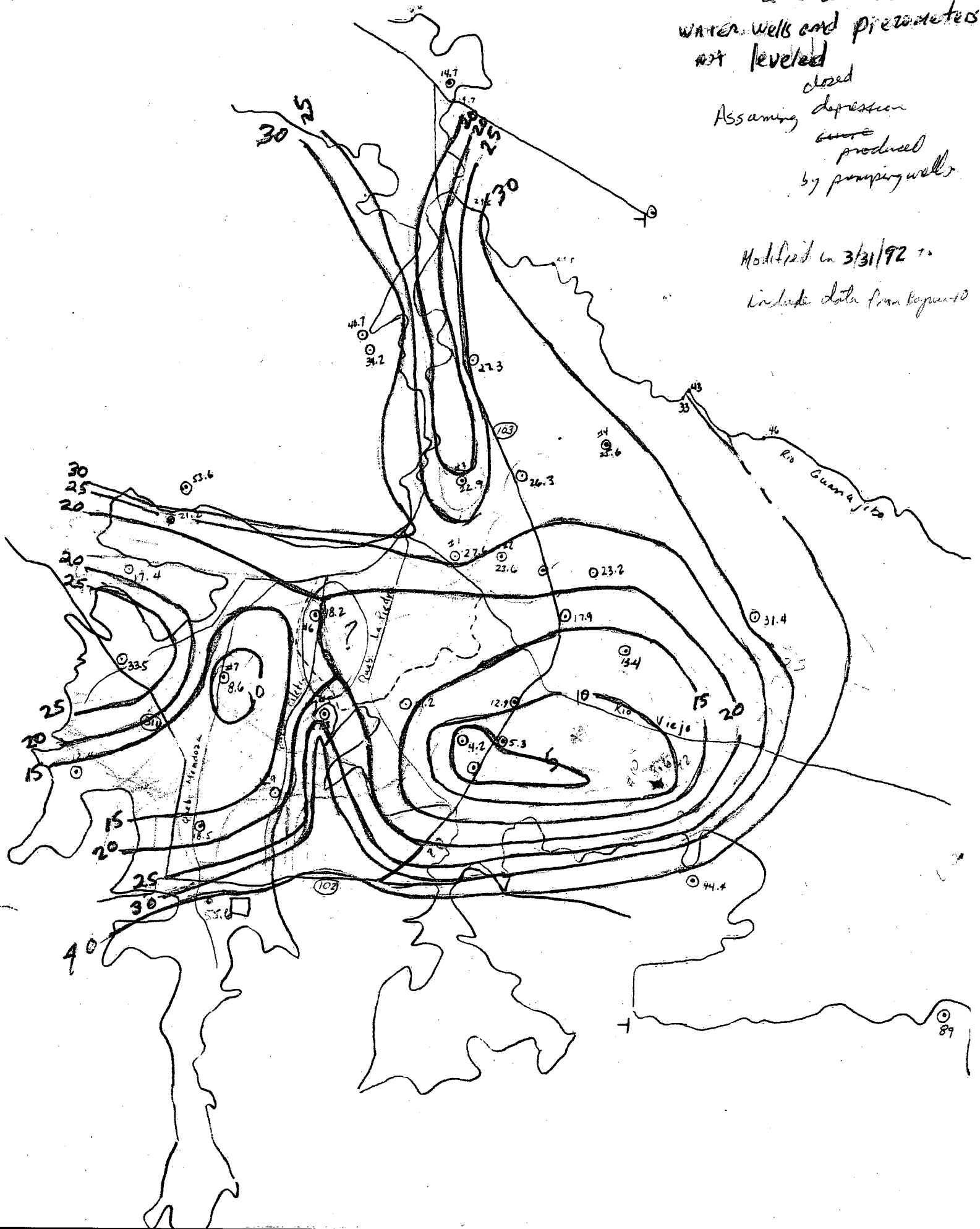
Figure 2 -- Potentiometric map of the aquifer in the Ciénaga Cuevas area during March 25-30, 1992

3-25-92

WATER wells and piezometers leveled

Assuming closed depression produced by pumping wells

Modified on 3/31/92 to include data from Report 10



Appendix 8

Aquifer Test Report

Geohydrologic Investigation of the Cienaga Cuevas area,
Cabo Rojo, Puerto Rico
Project PR-~~4543120~~
92-12000

I Summary

A. Location:

The Cienaga Cuevas area is located in the municipality of Cabo Rojo, in southwestern Puerto Rico.

B. Dates:

The tests submitted in this report were completed during March 1993. Dates of testing are included on each data set.

C. This report discusses one type of aquifer test:

1. Single-well bailer tests.

The length of time for conducting the single-well bailer tests ranged from 9.5 to 12.0 minutes depending upon the time for full head recovery.

D. Discharge:

For the single-well aquifer tests two bailers were used,

1. a 2-inch by 1.5 foot weighted and sealed pvc pipe with a displacement of 0.52 foot in a four-inch well and

2. a 2-inch by 3.0 foot weighted and sealed pvc pipe with a displacement of 1.01 foot in a four- inch well.

E. Hydraulic coefficients:

The single-well bailer tests were used to estimate hydraulic conductivity. The results of these tests indicated values as follows:

Project well identification	Screened interval ~~(feet)~~ (feet)	Horizontal Hydraulic conductivity (feet per day)
Crtw2b	10-15	48
Crtw3	20-30	14
Crtw9b	104-109	26
Crtw9c	64-69	193

2.) Limestone with minor interbeds of sand and gravel- This unit underlies the surficial material. The sand and gravel beds are lenticularly shaped and range in thickness from 5 to 25 ft. Locally the sand and gravel beds cap the limestone. The limestone, according to the PRASA drillers'logs, can be as thick as 225 ft.

3.) Bedrock- consisting mostly of serpentinite and secondary basaltic lava flows.

Table-1. Lithologic logs of piezometers where ~~single~~ bailer tests were conducted

Project well identication	Depth interval in feet	Lithologic description
Crtw2b	0-1	Top soil
	1-10	Claystone, medium brown, wet.
	10-15	Sand, quartzose, calcareous and clayey.
Cr-tw3	0-2	Top soil
	2-20	Claystone, medium brown, silty and sandy, wet.
	20-30	Limestone,grayish white, (only few cuttings were available for analysis)
*Crtw9b and Crtw9c	0-3	Top soil
	3-9	Claystone, dark brown, light yellow mottled, silty and sandy.
	9-20	Sand-quartzose, pebbly, and argillaceous.
	20-34	Gravel-limestone and volcanic rock fragments with, quartzose sand.
	34-54	Claystone, medium

put table on separate page so the columns are not separated from page to page

L= the length of aquifer screened or left open, and

rw= the effective radius of annulus in the screened or open hole section.

The relation of L/rw to A, B, and C for the different piezometers is listed below. The graphs used to derive A, B, and C for a range of construction data are found in figures 3 through 6.

All values for L/rw of 20 should be the same

Project well identification	L/rw	A	B	C
Crtw2b	20	2.2	~~0.4~~ 0.3	NU
Crtw3	40	~~2.3~~ 2.7	0.4	NU
Crtw9b	20	2.2	~~0.4~~ 0.3	NU
Crtw9c	20	~~2.0~~ 2.2 ?	~~0.4~~ 0.3	NU

NU-- Indicates data not needed in calculations and therefore not interpreted from graph.

Hydraulic Conductivities

Project well identification	Screened interval (feet)	Horizontal Hydraulic cond. in (feet per day)
Crtw2b	10-15	48
Crtw3	20-30	14
Crtw9b	104-109	26
Crtw9c	64-69	193

Crtw9c and Crtw9b are the intermediate and deep piezometers, respectively, of a multi test-well site.

F. Analytical models:

1. Bouwer, H., and Rice, R.C., 1976, A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells: Water Resources Research, Vol.12. No.3, pp. 423-428.

G. Report pepared by: Jesus Rodriguez-Martinez

H. Report reviewed by Robert Graves

II Narrative

A. Introduction:

1. Test purpose:

Determine aquifer characteristics in conjunction with project PR-4543120, The Geohydrology of the Cienaga Cuevas, Cabo Rojo, Puerto Rico.

2. Personnel:

Caribbean District personnel involved in the tests were, Jesus Rodriguez-Martínez and José Rodriguez.

B. Physical conditions: I would only define the surficial features here. By introducing the Rio Guanajibo alluvial aquifer, it may be ~~confused~~ ~~[illegible]~~ confused with the big limestone aquifer you are discussing

1. Site location:

The Cienaga Cuevas study area is located in the municipality of Cabo Rojo, southwestern Puerto Rico. The study area includes the watershed of Cienaga Cuevas and part of the Rio Guanajibo alluvial aquifer (fig.1). The highest altitude of the surrounding hills is approximately 250 feet above mean sea level. The altitude of the semi-enclosed flat area ranges from 26 to 50 feet above mean sea level.

2. Geologic Description:

The subsurface geology of the Cienaga Cuevas study area has been preliminarily defined from drillers' logs obtained from the Puerto Rico Aqueduct and Sewage Authority (PRASA) and from the lithologic data obtained while drilling a series of piezometers (Table 1). From this information, three distinct lithologic zones were defined as follows:

1.) Surficial material- consisting of claystone, argillaceous sand, and siltstone. This lithologic zone is overlain by a thin layer of top soil ranging in thickness from 1 to 3 feet. This zone ranges in thicknness from 9 to 20 ft.

Aquifer-Test Report

Geohydrologic Investigation of the Cienaga Cuevas Area, Cabo Rojo, Southwestern, Puerto Rico

PR-PZ-[illegible]

Project PR ~~4543120~~

Table-1. Lithologic logs of piezometers where bailer tests were conducted

Project well identification	Depth interval in feet	Lithologic description
Crtw2b	0-1	Top soil
	1-10	Claystone, medium brown, wet.
	10-15	Sand, quartzose, calcareous and clayey.
Crtw3	0-2	Top soil
	2-20	Claystone, medium brown, silty and sandy, wet.
	20-30	Limestone, grayish white, (only few cuttings were available for analysis)
*Crtw9b and Crtw9c	0-3	Top soil
	3-9	Claystone, dark brown, light yellow mottled, silty and sandy
	9-20	Sand-quartzose, pebbly, and argillaceous
	20-34	Gravel-limestone and volcanic rock fragments with quartzose sand.
	34-54	Claystone, medium brown, sandy.
	54-59	Gravel, volcanic pebbles
	59-109	Limestone-grayish white

	brown, sandy
54-59	Gravel, volcanic pebbles
59-109	Limestone-grayish white

* Crtw9b and Crtw9c are the intermediate and deep piezometers, respectively, of a multi test-well site.

3 Hydrologic description:

In the Cienaga Cuevas area ground water occurs under semi-confined conditions in an heterogeneous aquifer consisting mostly of limestone and secondary amounts of gravel, sand, and clayey sand. The semiconfining unit is provided by the overlying surficial material. This semi-confining unit is permeable enought to allow a significant recharge into the underlying aquifer and is itself, in the lower part, a water-bearing unit. The bedrock, consisting of serpentinite and andesitic lava flows, is considered the bottom of the aquifer.

4. Piezometers' description:

Construction diagrams for the four piezometers tested are presented in figure 2.

5. Discharge:

Discharge for the single well tests was determined to be equal to injecting or withdrawing 0.34 gallons or 0.68 gallons, depending on the bailer used (1.5 foot or 3 foot respectively).

C. Results:

The results of the aquifer tests are presented separately in figures 3 thru 6. The tests were conducted with two bailers, a 2.0-inch by 1.5 foot weighted and sealed pvc pipe and a 2.0-inch by 3.0 foot weighted and sealed pvc pipe. The report presents the results of bailer removal tests. Removal data was collected from each well tested. The Bower and Rice method has been applied to determine values of hydraulic conductivity because it can be used not only for unconfined aquifers but with confined aquifers that receive water from the upper confining layer (Bouwer and Rice, 1976).

When using the analytical method by Bouwer and Rice, it is necessary to derive the parameters A, B, C, which are fuc~~tio~~ns of L/rw and where:

functions

Computation sheet for slug test

Well name:

Date of test:

Approximate time test started:

DW/LSD =

rw =

rc =

H =

D =

L =

L/rw = (computed)

A =

B = (from figure 3 using L/rw)

C =

Yo = (from test)

Yt = (from test)

ln Yo/Yt = (computed)

t = (from test)

1/t = (computed)

ln Re/rw = (computed from 1)

K = (computed from 2)

Screen interval =

The relation of L/rw to A, B, and C for the different piezometers is listed below. The graphs used to derive A, B, and C for a range of construction data are found in figures 3 through 6.

Project well identification	L/rw	A	B	C
Crtw2b	20	2.2	0.4	NU
Crtw3	40	2.3	0.4	NU
Crtw9b	20	2.2	0.4	NU
Crtw9c	20	2.0	0.4	NU

NU-- Indicates data not needed in calculations and therefore not interpreted from graph.

Hydraulic Conductivities

Project well identification	Screened interval (feet)	Horizontal Hydraulic cond.in (feet per day)
Crtw2b	10-15	48
Crtw3	20-30	14
Crtw9b	104-109	26
Crtw9c	64-69	193

Crtw9c and Crtw9b are the intermediate and deep piezometers, respectively, of a multi test-well site.

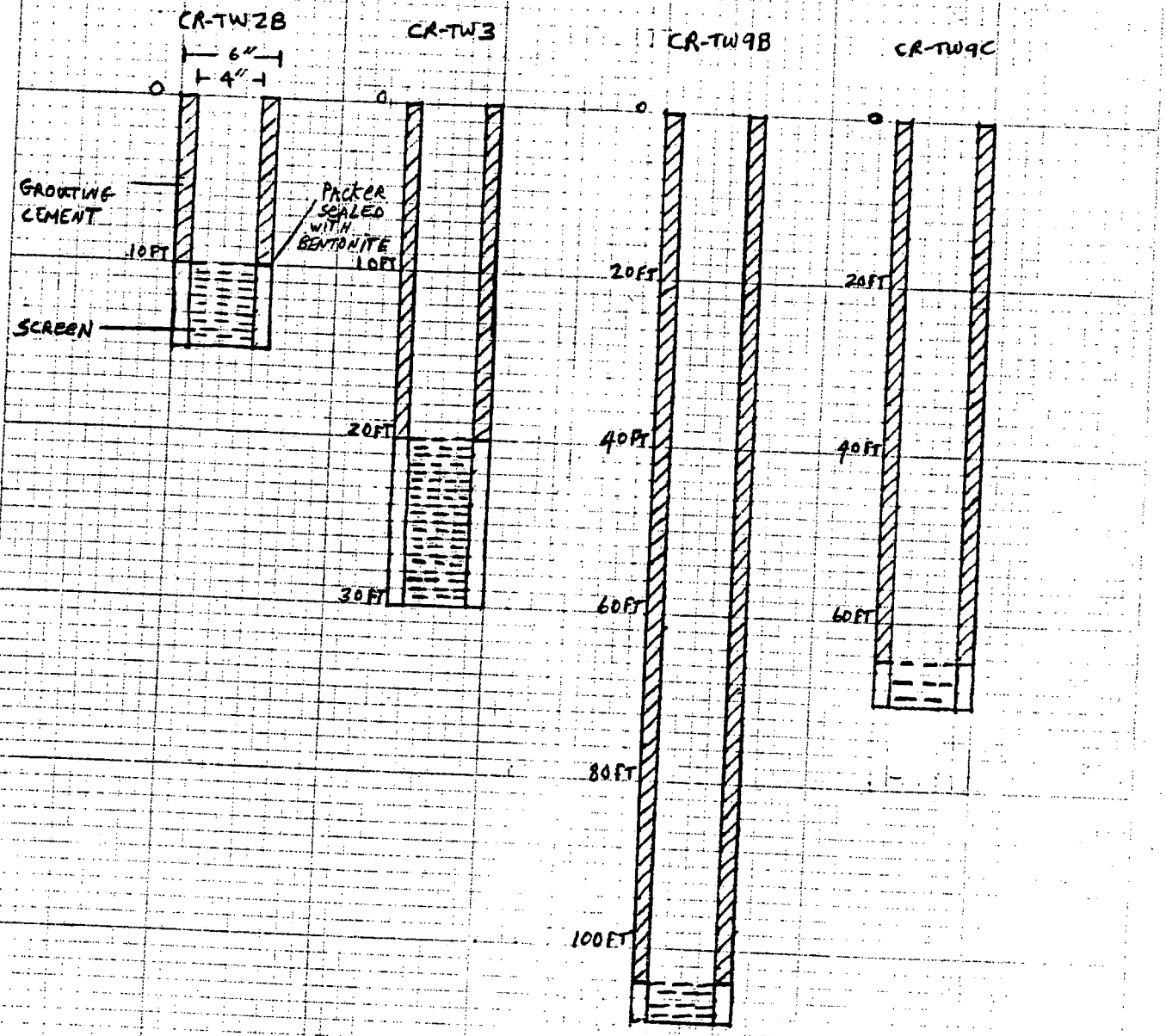


Figure 2 - Construction diagrams of the piezometers where the single-well bailer tests were conducted. The piezometers consist of PVC cased holes with a diameter of 4 inches.

Appendix 9

Project 88-04

WELL DEVELOPMENT

Well number Bayers #1

Date April - 15 - 92

Time on site 1:05 Time leave site 1:40

1. TAKE TWO TAPE DOWNS TO MEASURE WATER LEVEL BEFORE DEVELOPING WELL.

Hold	56.00	Hold	57.00
Cut	49.68	Cut	50.68
	06.32		06.32

If well has water in it.

a. Surge well for 30 minutes

b. After surging well full air for 5 minutes

c. Wait 5 minutes

d. Surge well for 10 minutes

e. After surging well full air for 5 minutes

f. After completing development and all equipment is on truck take two more tape downs

Hold	59.00	Hold	62.00
Cut	49.79	Cut	52.50
	9.21		9.50

If well does not have water in only do a., b., and f. of above.

Comments: A lot of water - at first came out Olive gray but after (surge) - Change Light gray - (No too clean)

Project # 888-04

WELL DEVELOPMENT I

Well number Bajuse 2A (Deeper)

Date April 21 - 92

Time on site 0830 Time leave site

1. TAKE TWO TAPE DOWNS TO MEASURE WATER LEVEL BEFORE DEVELOPING WELL.

L.5D 4.30

Hold 67.00 Hold 68.00

Cut 52.57 Cut 53.57

~~14.43~~ ~~14.43~~

Because no much water in well — move the hose to the next one 2-C in the same site at - 10:00

If well has water in it.

a. Surge well for 30 minutes

b. After surging well full air for 5 minutes

c. Wait 5 minutes

d. Surge well for 10 minutes

e. After surging well full air for 5 minutes

f. After completing development and all equipment is on truck take two more tape downs

Hold No tape Down Hold No tape Down

Cut Because No water on Test well

If well does not have water in only do a., b., and f. of above.

Comments:

WELL DEVELOPMENT II

Well number Bajura 2A (Deeper)

Date April - 22 - 92

Time on site 0930 Time leave site

1. TAKE TWO TAPE DOWNS TO MEASURE WATER LEVEL BEFORE DEVELOPING WELL.

* LSD 4.30

0935 →

Hold	92.00	Hold	93.00
Cut	52.49	Cut	53.49
	39.51		39.51

If well has water in it.

a. Surge well for 30 minutes

b. After surging well full air for 5 minutes

c. Wait 5 minutes

d. Surge well for 10 minutes

e. After surging well full air for 5 minutes

f. After completing development and all equipment is on truck take two more tape downs

Hold Cut Couldn't Take - tape down Hold Cut

If well does not have water in only do a., b., and f. of above.

Comments: add a lot of water in test well - look very clean

No much water inside no tape down

Proj. # 888-04

WELL DEVELOPMENT

Well number Bajura 2 B (shallow) ~~intermediate~~ L.S.D 4.10

Date April 20

Time on site 0905 Time leave site 12:00

1. TAKE TWO TAPE DOWNS TO MEASURE WATER LEVEL BEFORE DEVELOPING WELL.

Hold 61.00 Hold 62.00

Cut 50.14 Cut 51.14

10.86 10.86

If well has water in it.

a. Surge well for 30 minutes

b. After surging well full air for 5 minutes

c. Wait 5 minutes

d. Surge well for 10 minutes

e. After surging well full air for 5 minutes

f. After completing development and all equipment is on truck take two more tape downs

Hold 62.00 Hold 62.00

Cut 50.50 Cut 50.80

11.50 11.20

If well does not have water in only do a., b., and f. of above.

Comments: This well was very clean
a lot of clean water
first the water was color olive gray.

* Went to Gas station to change the oil in the Compressor
need two qts of oil

Project - #
888-04

WELL DEVELOPMENT

Well number Bajura 2 C (~~station~~ Intermediate)

Date April 21 - 92 LSD 4.10

Time on site 0850 Time leave site

1. TAKE TWO TAPE DOWNS TO MEASURE WATER LEVEL BEFORE DEVELOPING WELL.

Hold	~~51.0~~ 66.00	Hold	67.00
Cut	51.06	Cut	52.06
	14.94		14.94

at - 10:00

If well has water in it.

a. Surge well for 30 minutes

b. After surging well full air for 5 minutes

c. Wait 5 minutes

d. Surge well for 10 minutes

e. After surging well full air for 5 minutes

f. After completing development and all equipment is on truck take two more tape downs

Hold		Hold	
Cut		Cut	

No tape down after development because water was wet all pipe and the tape came out wet so not complete

If well does not have water in only do a., b., and f. of above.

Comments: This test well was very clean add a lot of water to clean-

Project # 888-04

WELL DEVELOPMENT

Well number Bajura 3

Date April 15. 92

Time on site 0853 Time leave site 11:00

1. TAKE TWO TAPE DOWNS TO MEASURE WATER LEVEL BEFORE DEVELOPING WELL.

Hold	65.00	Hold	66.00
Cut	54.46	Cut	55.46
	10.54		10.54

If well has water in it.

a. Surge well for 30 minutes

b. After surging well full air for 5 minutes

c. Wait 5 minutes

d. Surge well for 10 minutes

e. After surging well full air for 5 minutes

f. After completing development and all equipment is on truck take two more tape downs

Hold	65.00	Hold	66.00	67.00
Cut	50.22	Cut	51.66	52.92
	14.78		14.34	14.08

at 1055

If well does not have water in only do a., b., and f. of above.

Comments: Very Clean a lot of water
Good Development

Project # 888-04

WELL DEVELOPMENT

Well number ~~Project~~ Bajura # 4

Date April 14, 1992

Time on site 12:46 Time leave site 14:00

1. TAKE TWO TAPE DOWNS TO MEASURE WATER LEVEL BEFORE DEVELOPING WELL.

Hold	~~68~~ 68.00	Hold	~~70~~ 69.00
Cut	~~52.3~~ 52.36	Cut	~~53.36~~ 53.36
	15.64		15.64

If well has water in it.

a. Surge well for 30 minutes

b. After surging well full air for 5 minutes

c. Wait 5 minutes

d. Surge well for 10 minutes

e. After surging well full air for 5 minutes

f. After completing development and all equipment is on truck take two more tape downs

Hold	66.00	Hold	67.00
Cut	49.76	Cut	50.79
	16.24		16.21

66.00
49.82
16.18

If well does not have water in only do a., b., and f. of above.

Comments: This well has a lot of water
Very clean well.
First the water came out Olive gray

Project # 888-04

WELL DEVELOPMENT

Well number #5 Bapura

Date 9 April 92

Time on site 11:10 Time leave site 13:00

1. TAKE TWO TAPE DOWNS TO MEASURE WATER LEVEL BEFORE DEVELOPING WELL.

Hold	14.00	Hold	14.00
Cut	00.68	Cut	00.68
	13.32		13.32

11:13

If well has water in it.

a. Surge well for 30 minutes

b. After surging well full air for 5 minutes

c. Wait 5 minutes

d. Surge well for 10 minutes

e. After surging well full air for 5 minutes

f. After completing development and all equipment is on truck take two more tape downs

				1300
Hold	25.00	Hold	19.00	19.00
Cut	8.03	Cut	3.29	3.65
	16.97		15.71	15.35

If well does not have water in only do a., b., and f. of above.

Comments: Very Good - Well - Good - development Very Clean

Project # 888-04

WELL DEVELOPMENT

Well number Bazura #6

Date April 9 92

Time on site 0920 Time leave site ~~11:00~~ At → 0:925

1. TAKE TWO TAPE DOWNS TO MEASURE WATER LEVEL BEFORE DEVELOPING WELL.

Hold	18.90	Hold	18.00
Cut	2.36	Cut	3.36
	15.64		15.64

If well has water in it.

a. Surge well for 30 minutes

b. After surging well full air for 5 minutes

c. Wait 5 minutes

d. Surge well for 10 minutes

e. After surging well full air for 5 minutes

f. After completing development and all equipment is on truck take two more tape downs

~~11:00~~ 11:00

Hold	28.00	Hold	28.00
Cut	1.77	Cut	2.30
	26.23		25.70

If well does not have water in only do a., b., and f. of above.

Comments: Very Clean Good - Development

Project #
888-04

WELL DEVELOPMENT

Well number Bapura # 7

Date April 8, 92

Time on site 11:15 Time leave site 13:40

1. TAKE TWO TAPE DOWNS TO MEASURE WATER LEVEL BEFORE DEVELOPING WELL.

Hold	35.00	Hold	36.00
Cut	1.43	Cut	2.43
	~~33.57~~ 33.57		33.57

11:20

If well has water in it.

a. ✓ Surge well for 30 minutes

b. ✓ After surging well full air for 5 minutes

c. ✓ Wait 5 minutes

d. ✓ Surge well for 10 minutes

e. ✓ After surging well full air for 5 minutes

f. ✓ After completing development and all equipment is on truck take two more tape downs

Hold	85.00 (1)	Hold	86.70 (2)
Cut	49.45	Cut	51.30
	~~35.65~~		~~35.40~~

(3)
85.00
49.90
35.10

(4) 13:40
85.00
50.12
34.88

If well does not have water in only do a., b., and f. of above.

Comments: A lot of mud need another flush - We add some water and the well clean very good -

Project 888-04

WELL DEVELOPMENT

Well number Bajura #8

Date April 8, 92

Time on site 0900 Time leave site

1. TAKE TWO TAPE DOWNS TO MEASURE WATER LEVEL BEFORE DEVELOPING WELL.

Hold	31.00	Hold	32.00
Cut	2.62	Cut	3.62
	28.38		28.58

09:05

If well has water in it.

a. ✓ Surge well for 30 minutes

b. ✓ After surging well full air for 5 minutes

c. ✓ Wait 5 minutes

d. ✓ Surge well for 10 minutes

e. ✓ After surging well full air for 5 minutes

f. ✓ After completing development and all equipment is on truck take two more tape downs

Hold	85.10	Hold	~~86.00~~ 85.10	86.00
Cut	52.13	Cut	52.24	53.20
	32.97		32.86	32.80

at 1:00

If well does not have water in only do a., b., and f. of above.

Comments: a lot of mud need water to add into Test well for better development we put some water for better development

Project
888-04

WELL DEVELOPMENT

Well number Bajura #9

Date April - 14 - 92

Time on site 0900 Time leave site 10:30

1. TAKE TWO TAPE DOWNS TO MEASURE WATER LEVEL BEFORE DEVELOPING WELL.

Hold	65.00	Hold	66.00
Cut	51.51	Cut	52.51
	13.49		13.49

If well has water in it.

a. Surge well for 30 minutes

b. After surging well full air for 5 minutes

c. Wait 5 minutes

d. Surge well for 10 minutes

e. After surging well full air for 5 minutes

f. After completing development and all equipment is on truck take two more tape downs

				at 10:30
Hold	71.00	Hold	72.00	72.00
Cut	51.30	Cut	52.81	53.49
	19.70		19.19	18.51

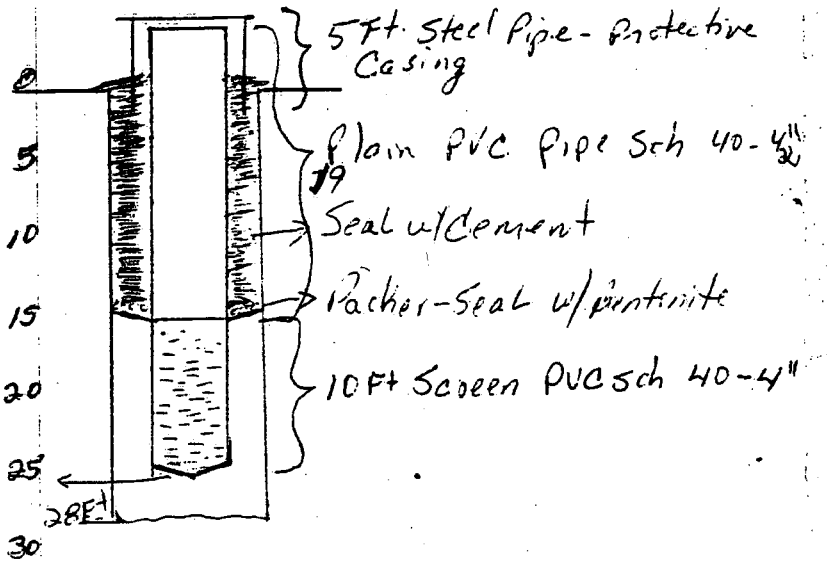
If well does not have water in only do a., b., and f. of above.

Comments: Good Development
Very clean well

Appendix 10

Bajura #5

Cabo Rojo Project #888-04
March 17, 1992



Casing set as follows:

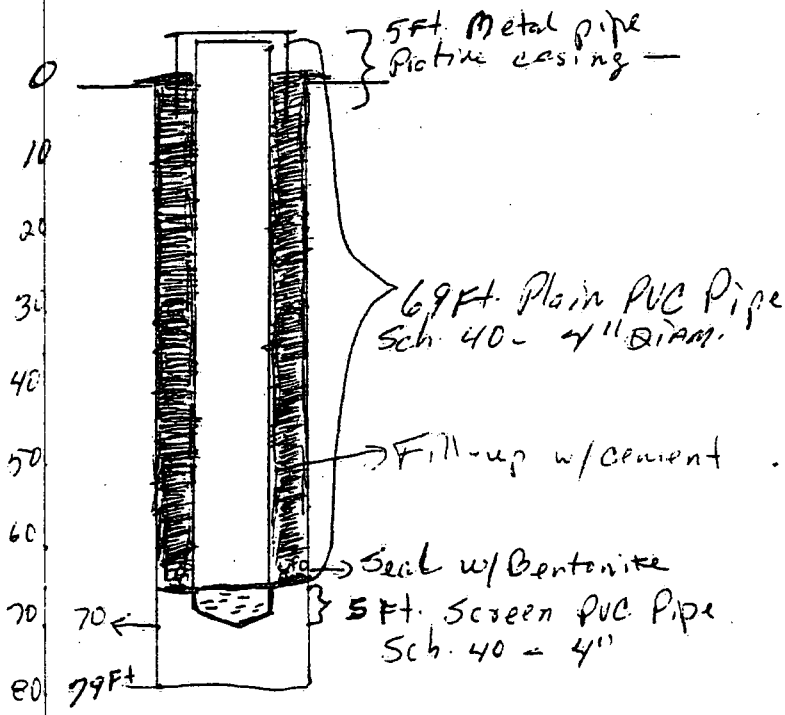
10 Ft. Screen PVC Sch. 40 - 4" Dia.
19 Ft. Plain PVC Pipe Sch. 40 - 4" Dia.
29
- 4 LSD
25 well - Deep -

Well 15 in Table 1
Bajura #5 dug
Cr-tw5

Bajura
2C

Cabo Rojo Project # ~~888~~-04
March 10, 1992

Intermediate
piezometer



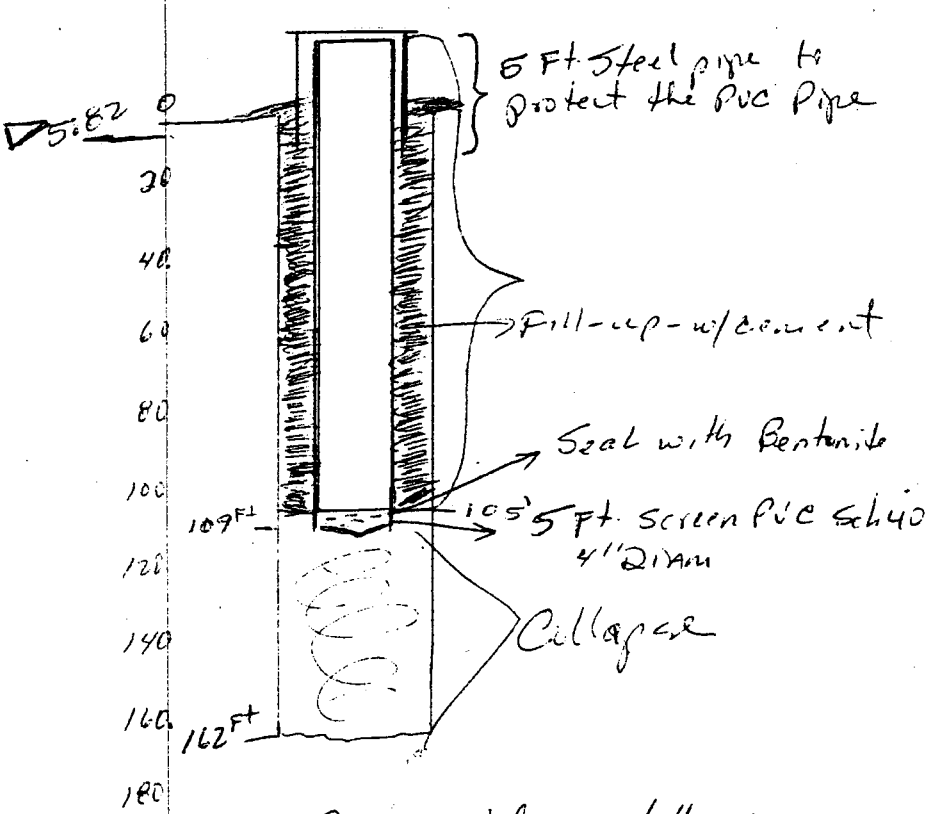
The Casing set as Follows:
5 Ft. Screen PVC Pipe Sch. 40 - 4" DIA.
69 Ft. Plain PVC Pipe Sch. 40 - 4" Diam
~~74 LSD~~
- 4 LSD
70 - well - Deep.

12C
CT-TW2C

Bojuta
#2A

Cabo Rojo Project #~~000~~-04
March 4, 1992

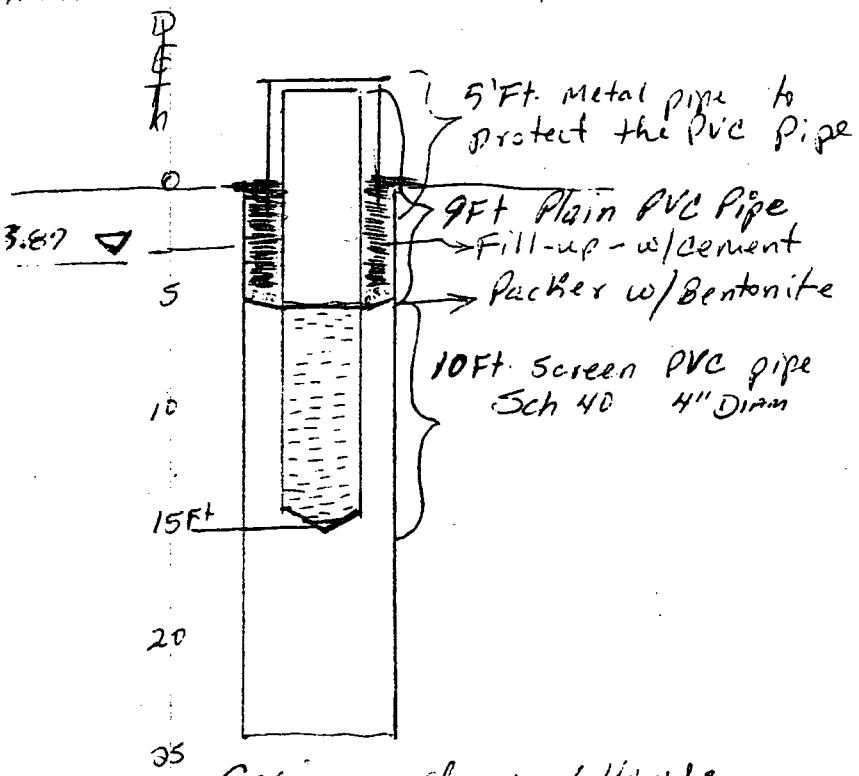
Deep piezometer



Casing set as follows:
5 Ft. Screen PVC Pipe Sch. 40 - 4" Diam
109 Plain-PVC Pipe Sch. 40 - 4" Diam.

2A 6-x 4B
alias

Bajura #1 Cabo Rojo Proj - # 888-04
March 4, 1992



Casing set as follows:

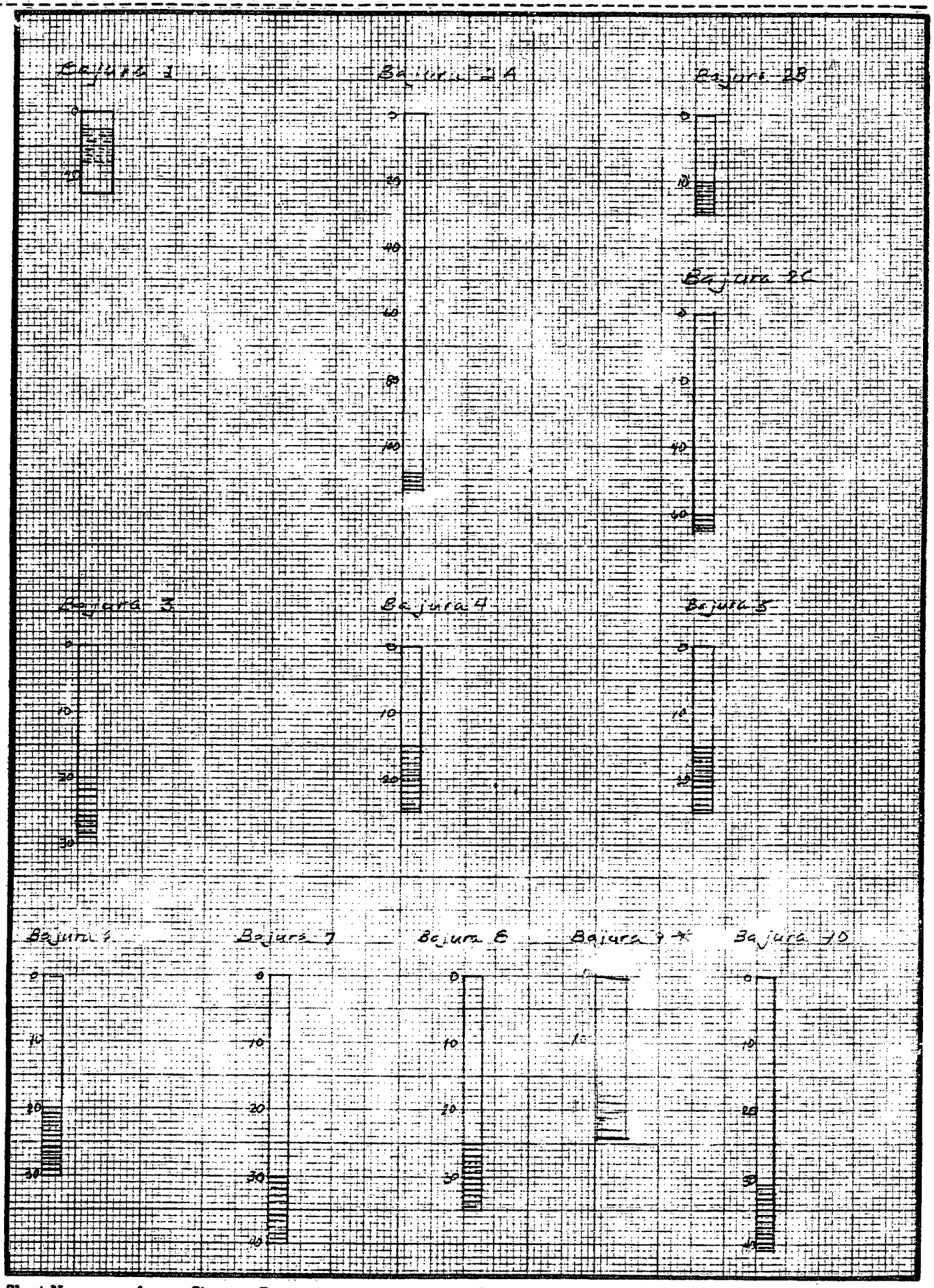
10Ft. Screen PVC Sch. 40 - 4" Diam
9Ft. Plain PVC Pipe Sch. 40 - 4 Diam
19'
- 4' → LSD -
15' → well - deep

AKA
Bajura #1
CR-TW#1
Well 11 on Table 1

Appendix 11

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

File .....



Sheet No. ..... of ..... Sheets. Prepared by ..... Date ..... Checked by ..... Date .....

Water levels in ft. below land surface 3-25-92		Approximate Land surface elevation
Bajura 1 —	2.62	9m = 29.5 ft
Bajura 2A —	10.42D	9m = 29.5 ft
Bajura 2B —	6.84S	"
Bajura 2C —	10.90I	"
Bajura 3 —	6.12	9m = 29.5 ft
Bajura 4 —	10.63	11 m = 36.1 ft
Bajura 5 —	9.25	11 m = 36.1 ft
Bajura 6 —	12.40	9 m = 29.5 ft
Bajura 7 —	28.82	11 m = 36.1 ft
Bajura 8 —	24.55	13 m = 42.6 ft.
Bajura 9A — (Shallow piezometer)	8.31	9 m = 29.5 ft
Bajura 10 —		

Appendix 12

AKA w/in PRASA	Well name and # in USGS Bajura Report		Appendix	Location
Pozo 1 / Cabo Rojo 9	PRASA 1 * refer to note on p.2	1	2	State Road 103 in an open field close to Raul Lugo Storage
Pozo 2/ Cabo Rojo 13	PRASA 2 *	2	2	State Road 103 in one farm owned by Milton Raul Toro (MRT. Adjacent to WRC -south of the recycling company
	Camarones	3		State Road 103 E38 well is used by Milton Raul Toro closed to Filipi. The well does not have electricity.
	Filipi *	4	2	State Road 103 open field across Empire Gas
	PRASA 5A *	5		SR 103 in one of MRT farms on same side of Cde Leones well. Travel from S to N on Rd.103 entrance after Cde Leones well.
	Lopez	6		
	Ubaldino	7		
	PRASA Radio	8		SR 311 Based on it's location and name this well seems to be one of the Weko wells, Barreno #1, refer to Appendix 6
	Poligono	9		unconfirmed location, but Poligono/shooting range is in Aymat Dairy in front of USGS piezometers 9ABC. Another well #31
	PRASA Belford	10		SR 100 Shallow well closed by Mariola Water Bottling Company / formerly known as Belford Associates.
	Cr-tw1	11		USGS piezometer
	Cr-tw2A	12A		USGS piezometer
	Cr-tw2B	12B		USGS piezometer
	Cr-tw2C	12C		USGS piezometer
	Cr-tw3	13		USGS piezometer
	Cr-tw4	14		USGS piezometer - unconfirmed location
	Cr-tw5	15		USGS piezometer - unconfirmed location
	Cr-tw6	16		USGS piezometer - unconfirmed location
	Cr-tw7	17		USGS piezometer
	Cr-tw8	18		USGS piezometer
	Cr-tw9A**	19A		Removed from service. Well collapsed
	Cr-tw9B**	19B		USGS piezometer
	Cr-tw9C**	19C		USGS piezometer
	Cr-tw10	20		USGS piezometer
	PRASA Club de Leones	21		
Cabo Rojo 2	PRASA Bajura 2	22		
Cabo Rojo 3	PRASA3	23		
Pozo 8 aka CR 8	PRASA 8***	24	2	closed accessible in MRT's properties
formerly Pozo Parque	PRASA Ana Maria	25	1	
	Oscar	26		dug well unconfirmed location
Cabo Rojo 11	Garage Municipal	27		unconfirmed location - could be either in PRLA lands across cemetery adjacent to Qda. Mendoza or it could be in the DOT
	USGS-tw	28		unconfirmed location
	Pozo Toro	29		abandoned

formerly Pozo 3A	Pozo McDougal	30	2	closed. Converted into a pump station incoming water is from Mayaguez
	Aymat Dairy	31		In the Carlos Aymat farm used to wash cows/now operated by Aymat succesion
NOTE: This PRASA 1 is in SR #103. For an unknown reason the USGS named one of their OW/piezometers as PRASA 1 Cabo Rojo wel, located @ end of Ave. Periferal Norte, Urb Ana Maria				
	* Test wells constructed by PRASA or a PRASA contractor. Seems that these wells were never connected to the PWS system.			
	***one of the 9A, 9B,9C wells collapsed and is no longer in place)			
	***Boring log for this well is in Appendix 4 under the name of Pozo 7 page 6, 7or Loc. No. 7 page 5			
PRASA Test wells				
Pozo 1	Existing casing of a test Wells		2	
Pozo 2	Existing casing of a test Wells		2	
Pozo 5A	unconfirmed but there is an accesible stru		2	
Pozo 7	unconfirmed location		2	
Pozo 9	unconfirmed location		2	
Pozo 10 (aka 10A)	located behind Javieres Drinking Water w		2	
Pozo Filippi	Well casing exist across Empire Gas		2	
Pozo Escuela	Well casing exist behind Ines Maria Mend		1	