

ANEXO V

HIDROGEOQUÍMICA



CONTENIDO

- Anexo V.1 Red de control hidrogeoquímica del acuífero Chillón
- Anexo V.2 Red de control hidrogeoquímica del acuífero Rímac
- Anexo V.3 Resultados de laboratorio de las muestras de agua subterránea
- Anexo V.4 Balance iónico de las muestras de agua subterránea.

A blue ink signature or stamp, possibly a logo or mark, located in the bottom left corner of the page.

Anexo V.1
Red de control hidrogeoquímica del acuífero Chillón

.



Anexo V.1 Red de control hidrogeoquímica del acuífero Chillón

Pozo	Nombre del Pozo	Este (m)	Norte (m)	Distrito	Dirección	Administrado por
P10	Proy. Chillón	283378.00	8695231.00	CARABAYLLO	Hacienda Punchauca Parcela 10316	CONSORCIO AGUA AZUL S.A.
P12	Proy. Chillón	281274.00	8690857.00	CARABAYLLO	Hacienda Punchauca Parcela 09 de la UC 10414	CONSORCIO AGUA AZUL S.A.
P16	Proy. Chillón	282748.00	8693123.00	CARABAYLLO	Hacienda Punchauca Parcela	CONSORCIO AGUA AZUL S.A.
P-175	Carabayllo	280064.00	8687818.00	CARABAYLLO	Av. Tupac Amaru Km. 19 - Coop. Huacoy	SEDAPAL S.A.
P-298	Lucyana 4	278201.00	8684971.00	CARABAYLLO	Parque No 1 Ubr. Lucyana - Enace	SEDAPAL S.A.
P-263	El Retablo 5	276129.00	8680211.00	COMAS	Av. Saco Olivero y Av. Juan Puga	SEDAPAL S.A.
P-320	Asnapuquio P 5	273061.00	8674586.00	LOS OLIVOS	Calle 28 Altura Cdra 15 Av Los Alisos Urb. Los Jasminez	SEDAPAL S.A.
P-105	Puente Piedra 3	274512.00	8687754.00	PUENTE PIEDRA	Av San Juan Y Calle 1	SEDAPAL S.A.
P-348	Los Cedros PP1	272583.00	8689633.00	PUENTE PIEDRA	Panam. Norte Km.33, Urb. Antartida Secor A-14	SEDAPAL S.A.
P-400	La Ensenada B P-4 (Ca-02)	276090.00	8685534.00	PUENTE PIEDRA	Margen izquierda Chillón de Av. S Juan Bautista, Fundo Gallinazo.	SEDAPAL S.A.
P-437	Zapallal C-6 (Sust. P653)	274768.00	8690127.00	PUENTE PIEDRA	Pan. Norte Alt Km 36 adyacente al P-653	SEDAPAL S.A.
P-162	Santa Luisa 1	274928.00	8678600.00	SAN MARTIN DE PORRES	Jr. Gerardo Unger 6480	SEDAPAL S.A.
P-306	Chicmabamba P-4	271916.00	8673060.00	SAN MARTIN DE PORRES	Av. 12 De Octubre Fte Mz "N" Urb. Chicmabamba	SEDAPAL S.A.
P-390	Prolima	274234.00	8680537.00	SAN MARTIN DE PORRES	Alt. Km. 23 de la Panam. Norte (Urb. Pro Lima), Av. Mendiola	SEDAPAL S.A.
P-421	Victor Raul H de la Torre	271204.00	8678037.00	SAN MARTIN DE PORRES	Av. Santa Maria S/N Fte Mz A Lote 2	SEDAPAL S.A.



Anexo V.2

Red de control hidrogeoquímica del acuífero Rímac

A handwritten signature or mark in blue ink, consisting of a large, stylized loop with a smaller mark inside, located in the bottom left corner of the page.

Anexo V.2 Red de control hidrogeoquímica del acuífero Rímac

Pozo	Nombre del Pozo	Este (m)	Norte (m)	Distrito	Dirección	Administrado por
P-537	Vitarte 3	294860.00	8670853.00	ATE	Av La Estrella Cuadra 1	SEDAPAL S.A.
P-553	Manylsa	294189.00	8669303.00	ATE	Esq Calle 10 Y Calle 20 Manylsa	SEDAPAL S.A.
P-580	Haycan	299900.00	8672648.00	ATE	Pista Acceso A Huaycan Carretera Central Km.16	SEDAPAL S.A.
P-791	Mayorazgo 3	288909.00	8666186.00	ATE	Calle 13 Mz K Urb Mayorazgo	SEDAPAL S.A.
P-824	Las Cascadas	290528.00	8668699.00	ATE	Parque No 1 Las Cascadas de Javier Prado(Km.6 Carretera Central)	SEDAPAL S.A.
P-875	Huaycan Alto P2 (AV-12)	300251.00	8673009.00	ATE	Av. Caceres Alt. Km 17 Carretera Central - Urb. Pariachi	SEDAPAL S.A.
P-641	Yahuar Huaca	269078.00	8665805.00	BELLAVISTA	Parque Zonal Yahuar Huaca	SEDAPAL S.A.
P-623	Dulanto	271361.00	8667766.00	CALLAO	Parq.Inabif Esq.Jr Callao Y Lima	SEDAPAL S.A.
P-648	Condor	272101.00	8671043.00	CALLAO	Calle 7 Mz "I"-Parque-(Urb El Condor)	SEDAPAL S.A.
P-659	Bocanegra P-8	270958.71	8670167.93	CALLAO	Mz.G62 Lot-36,Mz.G60,Lot-11Parq.Av.T.Valle	SEDAPAL S.A.
P-679	Miranaves 2	268107.00	8667351.00	CALLAO	Sector "Y" Mz-A Fte, a Lote-13	SEDAPAL S.A.
P-576	Moron	306473.00	8675325.00	CHACLACAYO	Carretera Central Esq.Los Peñascos-Chaclacayo	SEDAPAL S.A.
P-591	Chorrillos 2	279849.00	8654252.00	CHORRILLOS	Av. Alvarado Esq. Av. Ferrocarril Parque	SEDAPAL S.A.
P-829	San Genaro 1	281215.00	8652751.00	CHORRILLOS	Calle S Urb Santa Leonor 2da Etapa	SEDAPAL S.A.
P-650	Malecon Figueredo	264479.00	8664814.00	LA PUNTA	Malecon Figueredo Y Garcia Y Garcia	SEDAPAL S.A.
P-494	El Planeta	275101.00	8668579.00	LIMA	Esq. Av Duenas Y Crespo Y Castillo	SEDAPAL S.A.
P-718	Proy-Italiano 9	289659.00	8670346.00	LURIGANCHO	Av. Ramiro Priale Km 6.5	SEDAPAL S.A.
P-771	Proy-Italiano 16	287587.92	8670452.08	LURIGANCHO	Av. Ramiro Priale Km 4.2	SEDAPAL S.A.
P-882	Esq.Santa María Huachipa P-6	290941.00	8671459.00	LURIGANCHO	Frente a ala Avenida Lo Cedros Lote-12	SEDAPAL S.A.
P-406	Esquema Pariachi La Gloria P-6	296935.00	8671975.00	LURIGANCHO	Carretera Central Km 13.80 Faja Marginal Izquierdo del Río Rimac	SEDAPAL S.A.
P-499	Venegas 2	281549.00	8658854.00	MIRAFLORES	Calle Los Capulies Fte Al 657 Parque	SEDAPAL S.A.
P-701	Colmenares 2	274795.00	8663859.00	PUEBLO LIBRE	Esq Jr Juan Acevedo Y Carlos Vidal	SEDAPAL S.A.
P-465	Res Santa Cruz	277114.00	8661044.00	SAN ISIDRO	Av Belen Cda 2 Costado Del Reservorio	SEDAPAL S.A.
P-841	El Consejo	281129.00	8669343.00	SAN JUAN DE LURIGANCHO	Esq. Calle Tahuantinsuyo Y Los Amautas	SEDAPAL S.A.
P-542	Torres San Borja	282516.00	8663513.00	SAN LUIS	Av Canada Cdra.20 Y Av Sn Luis Parq Zonal	SEDAPAL S.A.
P-488	Palao	276017.00	8670584.00	SAN MARTIN DE PORRES	Jr San Ramon Cdra. 4 y San Cristobal- Parque	SEDAPAL S.A.
P-846	Maranga 7	271614.00	8663850.00	SAN MIGUEL	Calle Manco li Frente Al 592	SEDAPAL S.A.
P-778	Lotiz. Puente 6	285612.56	8666493.81	SANTA ANITA	Av Francisco Bolognesi Cuadra 1	SEDAPAL S.A.
P-869	Vista Alegre SP4 (AV-15)	287002.00	8668682.00	SANTA ANITA	Parque , Asoc. Los Pinos	SEDAPAL S.A.
P-604	El Palmar 2	281772.00	8655762.00	SANTIAGO DE SURCO	Calle Las Petunias Frente Al 395	SEDAPAL S.A.
P-688	Lima Polo 2	285631.00	8661615.00	SANTIAGO DE SURCO	Av. El Cortijo Calle 1	SEDAPAL S.A.



Anexo V.3

Resultados de laboratorio de las muestras de agua subterránea

A handwritten signature in blue ink, consisting of a large, stylized initial 'J' followed by a few cursive letters, enclosed within a large, light blue oval stroke.

Anexo V.3 Resultados de laboratorio de las muestras recolectadas

Parámetro	Unidad	LD	P-648	P-641	P-869	P-701	P-824	P-659	P-542	P-591	P-576	P-390	P-400	P-400-2
Alcalinidad Bicarbonato	mg CaCO3/L	1	194.1	135.9	152.9	195.1	141	205.5	159.8	159.8	85.1	173.6	154	151.2
Alcalinidad Carbonato	mg CaCO3/L	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cianuro Libre	mg/L	0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006
Cianuro Total	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Cianuro Wad	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Cromo Hexavalente	mg/L	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Fósforo	mg P/L	0.01	0.064	< 0.010	< 0.010	< 0.010	< 0.010	0.066	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Nitrógeno Amoniacal	mg NH3-N/L	0.006	0.133	0.117	0.152	0.13	0.131	0.125	0.124	0.15	0.137	0.084	0.053	0.019
Nitrógeno Total	mg N/L	0.024	11.76	0.742	3.612	6.208	3.233	5.735	4.783	4.55	0.652	3.181	2.562	0.589
Sólidos Suspendidos Totales	mg/L	3	< 3	< 3	< 3	< 3	< 3	5	5	< 3	< 3	< 3	< 3	< 3
Sulfuros	mg/L	0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Cloruros. Cl-	mg/L	0.061	67.82	19.38	25.66	42.98	33.38	49.82	59.35	48.87	86.83	32.05	23.92	24.49
Nitratos. NO3-	mg NO3-/L	0.009	51.89	2.522	15.03	29.06	15.01	23.85	20.34	19.81	1.946	11.57	9.588	9.866
Nitratos. (como N)	mg NO3-N/L	0.002	11.72	0.57	3.395	6.564	3.391	5.387	4.595	4.474	0.44	2.612	2.166	2.229
Nitritos. NO2-	mg NO2-/L	0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
Nitritos. (como N)	mg NO2-N/L	0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Sulfatos. SO4-2	mg/L	0.05	230.8	142.6	155.7	212.2	154.6	207.2	135.9	141.9	71.7	206.6	177.5	180
Nitratos. (como N) + Nitritos. (como N)	mg/L	0.006	11.72	0.57	3.395	6.564	3.391	5.387	4.595	4.474	0.44	2.612	2.166	2.229
Plata (Ag)	mg/L	0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Aluminio (Al)	mg/L	0.003	0.008	0.008	0.016	0.009	0.022	0.015	0.009	< 0.003	< 0.003	0.011	0.016	0.018
Arsénico (As)	mg/L	0.0001	0.0022	0.0028	0.0034	0.0021	0.0029	0.0022	0.0023	0.0024	0.0042	0.0025	0.0028	0.0029
Boro (B)	mg/L	0.003	0.427	0.296	0.346	0.396	0.375	0.39	0.424	0.356	0.26	0.342	0.303	0.316
Bario (Ba)	mg/L	0.0006	0.0922	0.0459	0.061	0.0764	0.062	0.0754	0.0684	0.0479	0.071	0.0642	0.0568	0.0573
Berilio (Be)	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Bismuto (Bi)	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Calcio (Ca)	mg/L	0.1	147.7	89.02	96.93	133.4	90.98	139.7	106.9	98.46	69.13	119.9	106.7	106.5
Cadmio (Cd)	mg/L	0.0001	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Cobalto (Co)	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Cromo (Cr)	mg/L	0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007
Cobre (Cu)	mg/L	0.0003	< 0.0003	0.0005	0.0024	0.0004	0.0035	0.0005	0.0036	< 0.0003	0.0012	0.0024	0.0008	0.0008
Hierro (Fe)	mg/L	0.016	< 0.016	0.034	0.043	0.031	0.12	0.044	< 0.016	< 0.016	< 0.016	< 0.016	0.036	0.04
Mercurio (Hg)	mg/L	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Potasio (K)	mg/L	0.02	4.13	2.65	2.93	4.57	3.05	4.1	3.24	3.19	2.51	3.38	2.9	2.85
Litio (Li)	mg/L	0.0007	0.12	0.1003	0.0966	0.1058	0.0717	0.1303	0.0938	0.0725	0.0481	0.1397	0.1277	0.1338
Magnesio (Mg)	mg/L	0.002	22.53	10.1	11.42	16.4	11.03	16.75	12.75	12.29	4.671	13.53	12.11	12.56
Manganeso (Mn)	mg/L	0.0002	0.0051	0.0008	0.0009	0.0006	0.0036	0.001	0.0007	< 0.0002	0.0006	0.0006	0.0008	0.0008
Molibdeno (Mo)	mg/L	0.0002	0.0044	0.0043	0.0023	0.0036	0.0029	0.003	0.0017	0.0014	0.0059	0.0033	0.0028	0.0028
Sodio (Na)	mg/L	0.01	49.16	18.66	23.45	27.98	29.89	33.22	28.74	35.76	33.75	32.34	23.2	23.8
Níquel (Ni)	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Fósforo (P)	mg/L	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Plomo (Pb)	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0006	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0009	0.0007	0.0007
Antimonio (Sb)	mg/L	0.0002	0.0004	0.0012	0.0004	< 0.0002	< 0.0002	< 0.0002	0.0004	< 0.0002	< 0.0002	0.0006	0.0006	0.0007
Selenio (Se)	mg/L	0.0006	0.0016	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006
Silicio (Si)	mg/L	0.1	14.9	10	11.1	12.6	12.4	12.6	12.9	11.8	9.6	10.1	9.9	10.2
Estaño (Sn)	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Estroncio (Sr)	mg/L	0.0002	1.253	0.7961	0.8814	1.086	0.7689	1.181	0.9389	0.8119	0.7836	1.095	0.9444	0.9715
Titanio (Ti)	mg/L	0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Talio (Tl)	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Uranio (U)	mg/L	0.0002	0.0058	0.0014	0.0019	0.0019	0.0029	0.0018	0.0023	0.0024	0.0007	0.0023	0.0016	0.0016
Vanadio (V)	mg/L	0.0002	0.0027	< 0.0002	< 0.0002	< 0.0002	0.002	< 0.0002	0.0009	0.0014	0.005	0.0013	0.0014	0.0015
Zinc (Zn)	mg/L	0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	0.029	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
Coliformes Termotolerantes	NMP/100 mL	1.8										< 1.8	< 1.8	
Enterococos Fecales	NMP/100 mL	1.8										< 1.8	< 1.8	
Escherichia coli	NMP/100 mL	1.8										< 1.8	< 1.8	
Formas Parasitarias*	Nº Organismos/L	1										Ausencia	Ausencia	
Giardia Duodenalis*	Nº Organismos/L	1										< 1	< 1	
Huevos de Helmintos	Huevos/L	1										< 1	< 1	
Salmonella	A/P/L	---										Ausencia	Ausencia	
Vibrio cholerae	A/P/L	---										Ausencia	Ausencia	



Anexo V.3 Resultados de laboratorio de las muestras recolectadas

Parámetro	Unidad	LD	P-162	P-105	P10	ANA-1	P16	P12	P-778	P-298	P-846	ANA-2	P-437	P-875
Alcalinidad Bicarbonato	mg CaCO3/L	1	188.6	183.8	171.8	173.8	150.1	154.6	148.1	185.8	140.7	143.6	235.6	148.3
Alcalinidad Carbonato	mg CaCO3/L	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cianuro Libre	mg/L	0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006	< 0.0006
Cianuro Total	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Cianuro Wad	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Cromo Hexavalente	mg/L	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Fósforo	mg P/L	0.01	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.094	0.098	0.099	0.092	< 0.010	< 0.010
Nitrógeno Amoniacal	mg NH3-N/L	0.006	0.05	0.039	0.045	0.051	0.044	0.048	0.038	0.043	0.075	0.051	0.046	0.047
Nitrógeno Total	mg N/L	0.024	13.32	10.37	8.538	8.517	12.34	7.099	17.89	12.19	4.587	4.645	15.22	3.758
Sólidos Suspendidos Totales	mg/L	3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Sulfuros	mg/L	0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Cloruros. Cl-	mg/L	0.061	67.77	57.56	25.51	26.23	24.92	29.15	418.1	69.44	26.42	25.75	114	64.78
Nitratos. NO3-	mg NO3-/L	0.009	58.74	45.13	37.54	38.17	41.93	30.61	67.72	47.27	18.69	18.43	58.71	11.69
Nitratos. (como N)	mg NO3-N/L	0.002	13.27	10.2	8.479	8.622	9.47	6.915	15.3	10.68	4.223	4.163	13.26	2.64
Nitritos. NO2-	mg NO2-/L	0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
Nitritos. (como N)	mg NO2-N/L	0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Sulfatos. SO4-2	mg/L	0.05	173	181.6	261.2	268.4	237.3	282.7	456.3	390	234.5	230.7	398.8	191.1
Nitratos. (como N) + Nitritos. (como N)	mg/L	0.006	13.27	10.2	8.479	8.622	9.47	6.915	15.3	10.68	4.223	4.163	13.26	2.64
Plata (Ag)	mg/L	0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Aluminio (Al)	mg/L	0.003	0.013	0.007	0.012	0.019	0.012	0.012	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003
Arsénico (As)	mg/L	0.0001	0.0025	0.0022	0.0019	0.0019	0.0021	0.0022	0.001	0.0012	0.0019	0.002	0.0021	0.0019
Boro (B)	mg/L	0.003	0.397	0.331	0.282	0.265	0.315	0.268	0.454	0.395	0.304	0.295	0.542	0.342
Bario (Ba)	mg/L	0.0006	0.0716	0.0773	0.0423	0.0418	0.038	0.0384	0.0794	0.0346	0.0386	0.0391	0.0414	0.0277
Berilio (Be)	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Bismuto (Bi)	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Calcio (Ca)	mg/L	0.1	153.3	146.8	150	150.2	169	140.2	305.3	195	115.6	113.1	219.9	112.8
Cadmio (Cd)	mg/L	0.0001	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Cobalto (Co)	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Cromo (Cr)	mg/L	0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007
Cobre (Cu)	mg/L	0.0003	0.0018	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003	0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003
Hierro (Fe)	mg/L	0.016	0.067	< 0.016	0.035	0.044	< 0.016	0.047	0.027	0.036	< 0.016	< 0.016	0.021	< 0.016
Mercurio (Hg)	mg/L	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Potasio (K)	mg/L	0.02	3.87	2.98	2.05	2.07	2.12	2.03	4.54	2.22	1.9	1.81	2.69	2.05
Litio (Li)	mg/L	0.0007	0.1955	0.1278	0.0277	0.0288	0.0276	0.0255	0.0073	0.0354	0.0253	0.0248	0.0443	0.0345
Magnesio (Mg)	mg/L	0.002	18.01	17.38	21.84	22.01	24.56	20.34	58.48	33.72	17.94	18.05	38.06	21.61
Manganeso (Mn)	mg/L	0.0002	0.0013	0.0006	0.0006	0.0013	0.0006	0.0009	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0004	< 0.0002
Molibdeno (Mo)	mg/L	0.0002	0.0008	0.0019	0.003	0.003	0.0037	0.0052	0.0031	0.0013	0.003	0.003	0.004	0.0028
Sodio (Na)	mg/L	0.01	39.81	25.4	24.59	25.84	28.58	29.7	66.94	36.06	25.85	26.51	52.42	35.29
Níquel (Ni)	mg/L	0.0002	0.0038	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Fósforo (P)	mg/L	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Plomo (Pb)	mg/L	0.0002	0.0005	0.0007	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Antimonio (Sb)	mg/L	0.0002	0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Selenio (Se)	mg/L	0.0006	< 0.0006	< 0.0006	< 0.0006	0.0015	0.0021	0.0019	0.0081	0.0028	< 0.0006	< 0.0006	0.0034	0.0019
Silicio (Si)	mg/L	0.1	11.5	12.7	14.3	14.4	14.3	14.3	14.6	13.9	13.7	13.2	17.3	12.7
Estaño (Sn)	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Estroncio (Sr)	mg/L	0.0002	1.385	1.221	1.533	1.555	1.625	1.402	3.146	2.235	1.268	1.265	2.712	1.401
Titanio (Ti)	mg/L	0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Talio (Tl)	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Uranio (U)	mg/L	0.0002	0.0021	0.0023	0.0026	0.0026	0.0031	0.0029	0.0043	0.0031	0.0019	0.0019	0.0038	0.0009
Vanadio (V)	mg/L	0.0002	0.0011	0.0011	0.0077	0.0078	0.0093	0.0086	0.0046	0.0038	0.0043	0.0043	0.0044	0.002
Zinc (Zn)	mg/L	0.008	0.061	< 0.008	< 0.008	0.015	< 0.008	0.023	0.014	< 0.008	0.016	< 0.008	< 0.008	0.011
Coliformes Termotolerantes	NMP/100 mL	1.8			< 1.8	---	---	< 1.8					< 1.8	< 1.8
Enterococos Fecales	NMP/100 mL	1.8			< 1.8	---	---	< 1.8					< 1.8	< 1.8
Escherichia coli	NMP/100 mL	1.8			< 1.8	---	---	< 1.8					< 1.8	< 1.8
Formas Parasitarias*	Nº Organismos/L	1			Ausencia	---	---	Ausencia					Ausencia	Ausencia
Giardia Duodenalis*	Nº Organismos/L	1			< 1	---	---	< 1					< 1	< 1
Huevos de Helmintos	Huevos/L	1			< 1	---	---	< 1					< 1	< 1
Salmonella	A/P/L	---			Ausencia	---	---	Ausencia					Ausencia	Ausencia
Vibrio cholerae	A/P/L	---			Ausencia	---	---	Ausencia					Ausencia	Ausencia

Anexo V.4

Balance iónico de las muestras de agua subterránea



Pozo	Muestra	Este (m)	Norte (m)	Fuente	Acuífero	Distrito	Zona	Fecha de muestreo	CATIONES				ANIONES					Σ cationes	Σ aniones	%IBE	Ca (%)	Mg (%)	Na + K (%)	HCO3 (%)	SO4 (%)	Cl (%)	Familia Hidroquímica
									Ca ²⁺ (meq/L)	Mg ²⁺ (meq/l)	Na ⁺ (meq/L)	K ⁺ (meq/L)	CO ₃ ²⁻ (meq/L)	HCO ₃ ⁻ (meq/L)	SO ₄ ²⁻ (meq/L)	Cl ⁻ (meq/L)	NO ₃ ⁻ (meq/L)										
P10	P10	283327	8694672	Agua subterránea	Chillón	Carabaylo	Zona I	16-Oct	7.5	1.82	1.06913	0.052564	-	3.436	5.441667	0.718592	0.605484	10.44	10.20	1.16	71.83	17.43	10.74	33.68	53.34	7.04	Ca-SO4
P10	ANA-1	283327	8694672	Agua subterránea	Chillón	Carabaylo	Zona I	16-Oct	7.51	1.834167	1.123478	0.053077	-	3.476	5.591667	0.738873	0.615645	10.52	10.42	0.47	71.38	17.43	11.18	33.35	53.65	7.09	Ca-SO4
P16	P16	282774	8693121	Agua subterránea	Chillón	Carabaylo	Zona I	16-Oct	8.45	2.046667	1.242609	0.054359	-	3.002	4.94375	0.701972	0.67629	11.79	9.32	11.69	71.65	17.35	11.00	32.20	53.02	7.53	Ca-SO4
P12	P12	281312	8690783	Agua subterránea	Chillón	Carabaylo	Zona I	16-Oct	7.01	1.695	1.291304	0.052051	-	3.092	5.889583	0.821127	0.49371	10.05	10.30	-1.22	69.76	16.87	13.37	30.03	57.20	7.97	Ca-SO4
P-778	P-778	272584	8689626	Agua subterránea	Chillón	Puente Piedra	Zona II	17-Oct	15.265	4.873333	2.910435	0.11641	-	2.962	9.50625	11.77746	1.092258	23.17	25.34	-4.48	65.90	21.04	13.07	11.69	37.52	46.48	Ca-Cl
P-298	P-298	274519	8687752	Agua subterránea	Chillón	Puente Piedra	Zona II	17-Oct	9.75	2.81	1.567826	0.056923	-	3.716	8.125	1.956056	0.762419	14.18	14.56	-1.30	68.74	19.81	11.45	25.52	55.81	13.43	Ca-SO4
P-846	P-846	277127	8688216	Agua subterránea	Chillón	Puente Piedra	Zona II	17-Oct	5.78	1.495	1.123913	0.048718	-	2.814	4.885417	0.744225	0.301452	8.45	8.75	-1.73	68.42	17.70	13.88	32.18	55.86	8.51	Ca-SO4
P-846	ANA-2	277127	8688216	Agua subterránea	Chillón	Puente Piedra	Zona II	17-Oct	5.655	1.504167	1.152609	0.04641	-	2.872	4.80625	0.725352	0.297258	8.36	8.70	-2.01	67.66	18.00	14.35	33.01	55.24	8.34	Ca-SO4
P-437	P-437	276128	8680216	Agua subterránea	Chillón	Comas	Zona II	17-Oct	10.995	3.171667	2.27913	0.068974	-	4.712	8.308333	3.211268	0.946935	16.51	17.18	-1.97	66.58	19.21	14.22	27.43	48.36	18.69	Ca-SO4
P-679	P-679	271916	8673060	Agua subterránea	Chillón	SMP	Zona III	14-Oct	13.625	3.183333	2.596522	0.082564	-	2.908	7.50625	8.943662	0.78129	19.49	20.14	-1.64	69.92	16.34	13.75	14.44	37.27	44.41	Ca-Cl
P-791	P-791	274234	8680537	Agua subterránea	Chillón	Los Olivos	Zona III	14-Oct	11.15	2.658333	2.157391	0.067949	-	4.232	9.775	1.792676	0.448871	16.03	16.25	-0.67	69.54	16.58	13.88	26.05	60.16	11.03	Ca-SO4
P-875	P-875	271212	8678042	Agua subterránea	Chillón	SMP	Zona III	17-Oct	5.64	1.800833	1.534348	0.052564	-	2.966	3.98125	1.824789	0.188548	9.03	8.96	0.37	62.47	19.95	17.58	33.10	44.43	20.36	Ca-SO4
P-390	P-390	306473	8675325	Agua subterránea	Rimac	Chaclacayo	Zona I	7-Oct	5.995	1.1275	1.406087	0.086667	-	3.472	4.304167	0.902817	0.186613	8.62	8.87	-1.43	69.59	13.09	17.33	39.16	48.55	10.18	Ca-SO4
P-400	P-400	299900	8672648	Agua subterránea	Rimac	Ate	Zona I	7-Oct	5.335	1.009167	1.008696	0.074359	-	3.08	3.697917	0.673803	0.154645	7.43	7.61	-1.19	71.83	13.59	14.58	40.49	48.62	8.86	Ca-SO4
P-400	P-400-2	299900	8672648	Agua subterránea	Rimac	Ate	Zona I	7-Oct	5.325	1.046667	1.034783	0.073077	-	3.024	3.75	0.689859	0.159129	7.48	7.62	-0.95	71.19	13.99	14.81	39.67	49.19	9.05	Ca-SO4
P-829	P-829	300251	8673009	Agua subterránea	Rimac	Ate	Zona I	7-Oct	5.61	1.105833	1.15	0.078462	-	3.168	4.15625	0.852394	0.185484	7.94	8.36	-2.56	70.62	13.92	15.46	37.89	49.70	10.19	Ca-SO4
P-882	P-882	296935	8671975	Agua subterránea	Rimac	Ate	Zona I	9-Oct	6.82	1.249167	1.296087	0.086154	-	3.082	4.433333	1.40507	0.329032	9.45	9.25	1.08	72.16	13.22	14.62	33.32	47.93	15.19	Ca-SO4
P-263	P-263	294860	8670853	Agua subterránea	Rimac	Ate	Zona I	9-Oct	5.065	0.885	0.918261	0.063333	-	2.57	3.272917	0.742254	0.199032	6.93	6.78	1.07	73.07	12.77	14.16	37.88	48.24	10.94	Ca-SO4
P-320	P-320	294189	8669303	Agua subterránea	Rimac	Ate	Zona I	9-Oct	7.925	1.669167	1.876087	0.181795	-	3.636	5.24375	2.421127	0.657419	11.65	11.96	-1.30	68.01	14.33	17.66	30.41	43.85	20.25	Ca-SO4
P-650	P-650	285613	8666494	Agua subterránea	Rimac	Santa Anita	Zona I	9-Oct	4.6245	0.8975	1.368261	0.075897	-	2.65	3.470833	1.14	0.31	6.97	7.57	-4.16	66.39	12.88	20.73	35.00	45.84	15.06	Ca-SO4
P-175	P-175	281549	8658854	Agua subterránea	Rimac	Miraflores	Zona II	10-Oct	6.3	1.281667	1.25087	0.080513	-	3.554	3.620833	1.39493	0.277581	8.91	8.85	0.37	70.68	14.38	14.94	40.17	40.93	15.77	Ca-SO4
P-105	P-105	277114	8661044	Agua subterránea	Rimac	San Isidro	Zona II	14-Oct	7.34	1.448333	1.104348	0.07641	-	3.676	3.783333	1.621408	0.727903	9.97	9.81	0.81	73.63	14.53	11.84	37.48	38.57	16.53	Ca-SO4
P-542	P-542	269078	8665805	Agua subterránea	Rimac	Bellavista	Zona III	3-Oct	5.345	1.0625	1.249565	0.083077	-	3.196	2.83125	1.671831	0.328065	7.74	8.03	1.82	69.06	13.73	17.22	39.81	35.27	20.83	Ca-HCO3
P-591	P-591	268107	8667351	Agua subterránea	Rimac	Callao	Zona III	3-Oct	4.923	1.024167	1.554783	0.081795	-	3.196	2.95625	1.37662	0.319516	7.58	7.85	1.71	64.92	13.50	21.58	40.72	37.67	17.54	Ca-HCO3
P-576	P-576	264479	8664814	Agua subterránea	Rimac	La Punta	Zona III	3-Oct	3.4565	0.38925	1.467391	0.064359	-	1.702	1.49375	2.445915	0.031387	5.38	5.67	2.67	64.28	7.24	28.48	30.00	26.33	43.11	Ca-Cl
P-537	P-537	271361	8667766	Agua subterránea	Rimac	Callao	Zona III	14-Oct	4.9735	0.9575	0.99087	0.068718	-	2.55	2.73125	1.163662	0.322903	6.99	6.77	1.62	71.15	13.70	15.16	37.68	40.36	17.19	Ca-SO4
P-162	P-162	276017	8670584	Agua subterránea	Rimac	SMP	Zona III	14-Oct	7.665	1.500833	1.73087	0.099231	-	3.772	3.604167	1.909014	0.947419	11.00	10.23	3.60	69.71	13.65	16.64	36.86	35.22	18.66	Ca-HCO3
P-718	P-718	281215	8652751	Agua subterránea	Rimac	Chorrillos	Zona IV	10-Oct	11.62	2.475	1.934348	0.109487	-	4.038	7.1875	4.825352	0.697903	16.14	16.75	-1.85	72.00	15.34	12.66	24.11	42.91	28.81	Ca-SO4
P-499	P-499	281772	8655762	Agua subterránea	Rimac	Surco	Zona IV	10-Oct	9.99	2	1.610435	0.098974	-	3.166	3.766667	6.24507	0.436935	13.70	13.61	0.31	72.92	14.60	12.48	23.25	27.67	45.87	Ca-Cl
P-465	P-465	279849	8654252	Agua subterránea	Rimac	Chorrillos	Zona IV	10-Oct	10.075	2.008333	1.683913	0.098974	-	3.908	4.195833	5.23662	0.540161	13.87	13.88	-0.05	72.66	14.48	12.86	28.15	30.23	37.73	Ca-Cl
P-648	P-648	287588	8670452	Agua subterránea	Rimac	Lurigancho	Zona I	1-Oct	7.385	1.8775	2.137391	0.105897	-	3.882	4.808333	1.910423	0.836935	11.51	11.44	0.30	64.19	16.32	19.50	33.94	42.04	16.70	Ca-SO4

Anexo V.4 Balance Iónico

Pozo	Muestra	Este (m)	Norte (m)	Fuente	Acuifero	Distrito	Zona	Fecha de muestreo	CATIONES				ANIONES					Σ cationes	Σ aniones	%IBE	Ca (%)	Mg (%)	Na + K (%)	HCO3 (%)	SO4 (%)	Cl (%)	Familia Hidroquímica
									Ca ²⁺ (meq/L)	Mg ²⁺ (meq/l)	Na ⁺ (meq/L)	K ⁺ (meq/L)	CO ₃ ²⁻ (meq/L)	HCO ₃ ⁻ (meq/L)	SO ₄ ⁻² (meq/L)	Cl ⁻ (meq/L)	NO ₃ ⁻ (meq/L)										
P-641	P-641	289659	8670346	Agua subterránea	Rimac	Lurigancho	Zona I	1-Oct	4.451	0.841667	0.811304	0.067949	-	2.718	2.970833	0.545915	0.040677	6.17	6.28	0.83	72.12	13.64	14.25	43.31	47.34	8.70	Ca-SO4
P-869	P-869	290941	8671459	Agua subterránea	Rimac	Lurigancho	Zona I	2-Oct	4.8465	0.951667	1.019565	0.075128	-	3.058	3.24375	0.722817	0.242419	6.89	7.27	2.64	70.31	13.81	15.88	42.08	44.64	9.95	Ca-SO4
P-701	P-701	290528	8668699	Agua subterránea	Rimac	Ate	Zona I	2-Oct	6.67	1.366667	1.216522	0.117179	-	3.902	4.420833	1.210704	0.46871	9.37	10.00	3.26	71.18	14.58	14.23	39.01	44.20	12.10	Ca-SO4
P-824	P-824	287002	8668682	Agua subterránea	Rimac	Santa Anita	Zona I	2-Oct	4.549	0.919167	1.299565	0.078205	-	2.82	3.220833	0.940282	0.242097	6.85	7.22	2.68	66.45	13.43	20.13	39.04	44.59	13.02	Ca-SO4
P-659	P-659	288909	8666186	Agua subterránea	Rimac	Ate	Zona I	2-Oct	6.985	1.395833	1.444348	0.105128	-	4.11	4.316667	1.40338	0.384677	9.93	10.21	1.41	70.34	14.06	15.60	40.24	42.26	13.74	Ca-SO4

