

EVALUACION ECONOMICA - ALTERNATIVA N°1

PARAMETROS	
Horizonte	18.00 años
COK	12.0%
Impuesto	19.0%
Depreciacion	5.000% de la Inv.
Valor Resid	10.000% de la Inv.
Año	360.00 días

Formula de Crecimiento de Carga: $Y=Ax(B^X)$
 A = 1,500,000.00
 B = 1.0617

DATOS	
Inversion	998,200.00 Nuevos Soles
Capital Trab.	49,910.00 Nuevos Soles
Volumen Dragado / Pto. Salaverry	1,037,003.63 m3/año
Tarifa Dragado	14.00 Nuevos Soles/m3
Movilizacion de Carga	1,500,000.00 Ton al 2010
Sobrecosto Adicional	0.00 Nuevos Soles/Ton
Coficiente Crecimiento	6.17%
Costo Movilizacion del B/D	1,960,000.00 Nuevos Soles
Costo Operación de Boya	5.0000% de la Inv.
Costo Mantto de Boya	5.0000% de la Inv.

DATOS	
Tipo Cambio Euro	3.80
Tipo Cambio Dólar	2.80

* Costo de Mantenimiento en los 5 primeros años 0.0%
 ** Incremento del 1% al costo de Mantenimiento y Operación cada 3 años

AÑO	FLUJO DE CAJA ECONOMICO																		
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
1) INGRESOS		16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82	16,478,050.82
Movilizacion de Carga		1,597,550.00	1,690,810.34	1,795,133.33	1,905,893.06	2,023,486.66	2,148,335.79	2,280,888.11	2,421,618.90	2,571,032.79	2,729,665.51	2,898,085.87	3,076,897.77	3,266,742.36	3,468,300.37	3,682,294.50	3,909,492.07	4,150,707.73	4,406,806.40
Sobrecosto Total		10.35	9.75	9.18	8.65	8.14	7.67	7.22	6.80	6.41	6.04	5.69	5.36	5.04	4.75	4.47	4.21	3.97	3.74
2) EGRESOS		16,527,960.82	16,527,960.82	16,527,960.82	16,537,942.82	16,537,942.82	16,587,852.82	16,597,834.82	16,597,834.82	16,607,816.82	16,617,798.82	16,617,798.82	16,627,780.82	16,637,762.82	16,637,762.82	16,647,744.82	16,657,726.82	16,657,726.82	16,667,708.82
Volumen Dragado / Pto. Salaverry		1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63	1,037,003.63
Tarifa de Dragado		14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
Costo de Movilizacion del B/D		1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00	1,960,000.00
Costos de Oper. Boya		49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00
Costos de Mantto Boya		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3) DEPRECIACION		49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00
Depreciacion		49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00
4) UTILIDAD ANTES DE IMP. (1-2-3)		-99,820.00	-99,820.00	-99,820.00	-109,802.00	-109,802.00	-159,712.00	-169,694.00	-169,694.00	-179,676.00	-189,658.00	-189,658.00	-199,640.00	-209,622.00	-209,622.00	-219,604.00	-229,586.00	-229,586.00	-239,568.00
5) IMPUESTOS		-18,965.80	-18,965.80	-18,965.80	-20,862.38	-20,862.38	-30,345.28	-32,241.86	-32,241.86	-34,138.44	-36,035.02	-36,035.02	-37,931.60	-39,828.18	-39,828.18	-41,724.76	-43,621.34	-43,621.34	-45,517.92
Impuestos		-18,965.80	-18,965.80	-18,965.80	-20,862.38	-20,862.38	-30,345.28	-32,241.86	-32,241.86	-34,138.44	-36,035.02	-36,035.02	-37,931.60	-39,828.18	-39,828.18	-41,724.76	-43,621.34	-43,621.34	-45,517.92
6) UTILIDAD DESPUES DE IMP. (4-5)		-80,854.20	-80,854.20	-80,854.20	-88,939.62	-88,939.62	-129,366.72	-137,452.14	-137,452.14	-145,537.56	-153,622.98	-153,622.98	-161,708.40	-169,793.82	-169,793.82	-177,879.24	-185,964.66	-185,964.66	-194,050.08
Depreciacion		49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00
7) DEPRECIACION		49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00
Depreciacion		49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00	49,910.00
8) INVERSION TOTAL	998,200.00																		
9) CAPITAL DE TRABAJO	-49,910.00																		
10) VALOR RESIDUAL																			49,910.00
FLUJO DE CAJA ECONOMICO	-948,290.00	-30,944.20	-30,944.20	-30,944.20	-39,029.62	-39,029.62	-79,456.72	-87,542.14	-87,542.14	-95,627.56	-103,712.98	-103,712.98	-111,798.40	-119,883.82	-119,883.82	-127,969.24	-136,054.66	-136,054.66	-94,230.08

VAN (COK%)	-1,440,809.91 Nuevos Soles
TIR	0.00%

ANALISIS DE SENSIBILIDAD - VAN

CRECIMIENTO MOV. CARGA	SOBRECOSTO ADICIONAL (S/.)											
	-1,440,809.91	0.00	0.05	0.08	0.10	0.11	0.12	0.15	0.20	0.50	1.00	1.50
10.00%	-1,422,300.01	-515,314.96	39,982.01	410,179.99	595,278.98	780,377.97	1,335,674.94	2,261,169.88	7,814,139.57	17,069,089.04	26,324,038.52	
9.00%	-1,423,744.00	-587,514.44	-75,537.16	265,781.03	436,440.12	607,099.22	1,119,076.50	1,972,371.97	7,092,144.77	15,625,099.45	24,158,054.13	
8.00%	-1,425,051.72	-652,900.63	-180,155.06	135,008.65	292,590.51	450,172.37	922,917.93	1,710,827.21	6,438,282.89	14,317,375.69	22,196,468.49	
7.00%	-1,426,237.00	-712,164.39	-274,977.08	16,481.12	162,210.22	307,939.33	745,126.64	1,473,772.15	5,845,645.23	13,132,100.37	20,418,555.50	
6.17%	-1,427,136.70	-757,149.80	-346,953.74	-73,489.69	63,242.33	199,974.35	610,170.41	1,293,830.52	5,395,791.16	12,232,392.22	19,068,993.29	
5.00%	-1,428,288.52	-814,740.86	-439,099.43	-188,671.81	-63,458.00	61,755.81	437,397.23	1,063,466.28	4,819,880.56	11,080,571.03	17,341,261.49	
4.00%	-1,429,175.88	-859,108.76	-510,088.08	-277,407.62	-161,067.39	-44,727.16	304,293.52	885,994.67	4,376,201.53	10,193,212.96	16,010,224.39	
3.00%	-1,429,983.25	-899,476.92	-574,677.13	-358,143.94	-249,877.34	-141,610.74	183,189.05	724,522.03	3,972,519.94	9,385,849.78	14,799,179.62	
2.00%	-1,430,718.64	-936,246.61	-633,508.63	-431,683.31	-330,770.65	-229,857.99	72,879.99	577,443.29	3,604,823.09	8,650,456.09	13,696,089.09	
1.00%	-1,431,389.26	-969,777.60	-687,158.21	-498,745.29	-404,538.83	-310,332.36	-27,712.98	443,319.33	3,269,513.18	7,979,836.27	12,690,159.35	
0.00%	-1,432,001.56	-1,000,392.45	-736,141.97	-559,974.99	-471,891.50	-383,808.01	-119,557.53	320,859.92	2,963,364.67	7,367,539.24	11,771,713.82	

EVALUACION ECONOMICA - ALTERNATIVA N°2

PARAMETROS	
Horizonte	18.00 años
COK	12.0%
Impuesto	19.0%
Depreciacion	9.647% de la Inv.
Valor Resid.	10.000% de la Inv.
Año	360.00 días

Formula de Crecimiento de Carga: $Y=Ax(B^X)$
 A = 1,500,000.00
 B = 1.0617

DATOS	
Inversion	92,958,200.00 Nuevos Soles
Capital Trab.	4,647,910.00 Nuevos Soles
Volumen Dragado / Pto. Salaverry	1,037,003.63 m3/año
Volumen Dragado / Otros Puertos	712,610.66 m3/año
Tarifa Dragado	14.00 Nuevos Soles/m3
Movilizacion de Carga	1,500,000.00 Ton al 2010
Sobrecosto Adicional	0.00 Nuevos Soles/Ton
Coefficiente Crecimiento	6.17%
Costo Movilizacion del B/D	98,000.00 Nuevos Soles
Costo Operacion	5.0000% de la Inv.
Costo Mantenimiento	5.8113% de la Inv.

DATOS	
Tipo Cambio Euro	3.80
Tipo Cambio Dólar	2.80

* Costo de Mantenimiento en los 5 primeros años 0.0%
 ** Incremento del 1% al costo de Mantenimiento y Operación cada 3 años

FLUJO DE CAJA ECONOMICO

AÑO	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
(1) INGRESOS		24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06	24,494,600.06
Movilizacion de Carga		1,592,550.00	1,690,810.34	1,795,133.33	1,905,891.06	2,023,486.66	2,148,335.79	2,280,888.11	2,421,618.90	2,571,032.79	2,729,665.51	2,898,085.87	3,076,897.77	3,266,742.36	3,468,300.37	3,682,294.50	3,909,492.07	4,150,707.73	4,408,806.30
Sobrecosto Total		9.12	8.59	8.09	7.62	7.17	6.76	6.37	6.00	5.65	5.32	5.01	4.72	4.44	4.19	3.94	3.71	3.50	3.29
Volumen Dragado / Otros Puertos		712,610.66	712,610.66	712,610.66	712,610.66	712,610.66	712,610.66	712,610.66	712,610.66	712,610.66	712,610.66	712,610.66	712,610.66	712,610.66	712,610.66	712,610.66	712,610.66	712,610.66	712,610.66
Tarifa Dragado		14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
(2) EGRESOS		4,745,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00
Costo de Movilizacion del B/D		98,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Costos de Oper.		4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00	4,647,910.00
Costos de Mantto		0.00	0.00	0.00	0.00	0.00	5,402,079.88	5,402,079.88	5,402,079.88	6,331,661.88	6,331,661.88	6,331,661.88	7,261,243.88	7,261,243.88	8,190,825.88	8,190,825.88	9,120,407.88	9,120,407.88	9,120,407.88
(3) DEPRECIACION		8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55
Depreciacion		8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55
(4) UTILIDAD ANTES DE IMP. (1-2-3)		10,781,012.51	10,879,012.51	10,879,012.51	10,879,012.51	9,949,430.51	9,949,430.51	4,547,350.63	3,617,768.63	3,617,768.63	2,688,186.63	1,758,604.63	1,758,604.63	829,022.63	-100,559.37	-100,559.37	-1,030,141.37	-1,959,723.37	-1,959,723.37
(5) IMPUESTOS		2,048,392.38	2,067,012.38	2,067,012.38	2,067,012.38	1,890,391.80	1,890,391.80	863,996.62	687,376.04	687,376.04	510,755.46	334,134.88	334,134.88	157,514.30	-19,106.28	-19,106.28	-195,726.86	-372,347.44	-372,347.44
Impuestos		2,048,392.38	2,067,012.38	2,067,012.38	2,067,012.38	1,890,391.80	1,890,391.80	863,996.62	687,376.04	687,376.04	510,755.46	334,134.88	334,134.88	157,514.30	-19,106.28	-19,106.28	-195,726.86	-372,347.44	-372,347.44
(6) UTILIDAD DESPUES DE IMP. (4-5)		8,732,620.13	8,812,000.13	8,812,000.13	8,812,000.13	8,059,038.71	8,059,038.71	3,683,354.01	2,930,392.59	2,930,392.59	2,177,431.17	1,424,469.75	1,424,469.75	671,508.33	-81,451.09	-81,451.09	-834,414.51	-1,587,375.93	-1,587,375.93
(7) DEPRECIACION		8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55
Depreciacion		8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55	8,967,677.55
(8) INVERSION TOTAL		92,958,200.00																	
(9) CAPITAL DE TRABAJO		-4,647,910.00																	
(10) VALOR RESIDUAL																			9,295,820.00
FLUJO DE CAJA ECONOMICO		-88,310,290.00	17,700,297.68	17,779,677.68	17,779,677.68	17,026,716.26	17,026,716.26	12,651,031.56	11,898,070.14	11,898,070.14	11,145,108.72	10,392,147.30	10,392,147.30	9,639,185.88	8,886,224.46	8,886,224.46	8,133,263.04	7,380,301.62	7,380,301.62

VAN (CPCC%)	13,314,129.82 Nuevos Soles
TIR	15.03%

ANALISIS DE SENSIBILIDAD - VAN

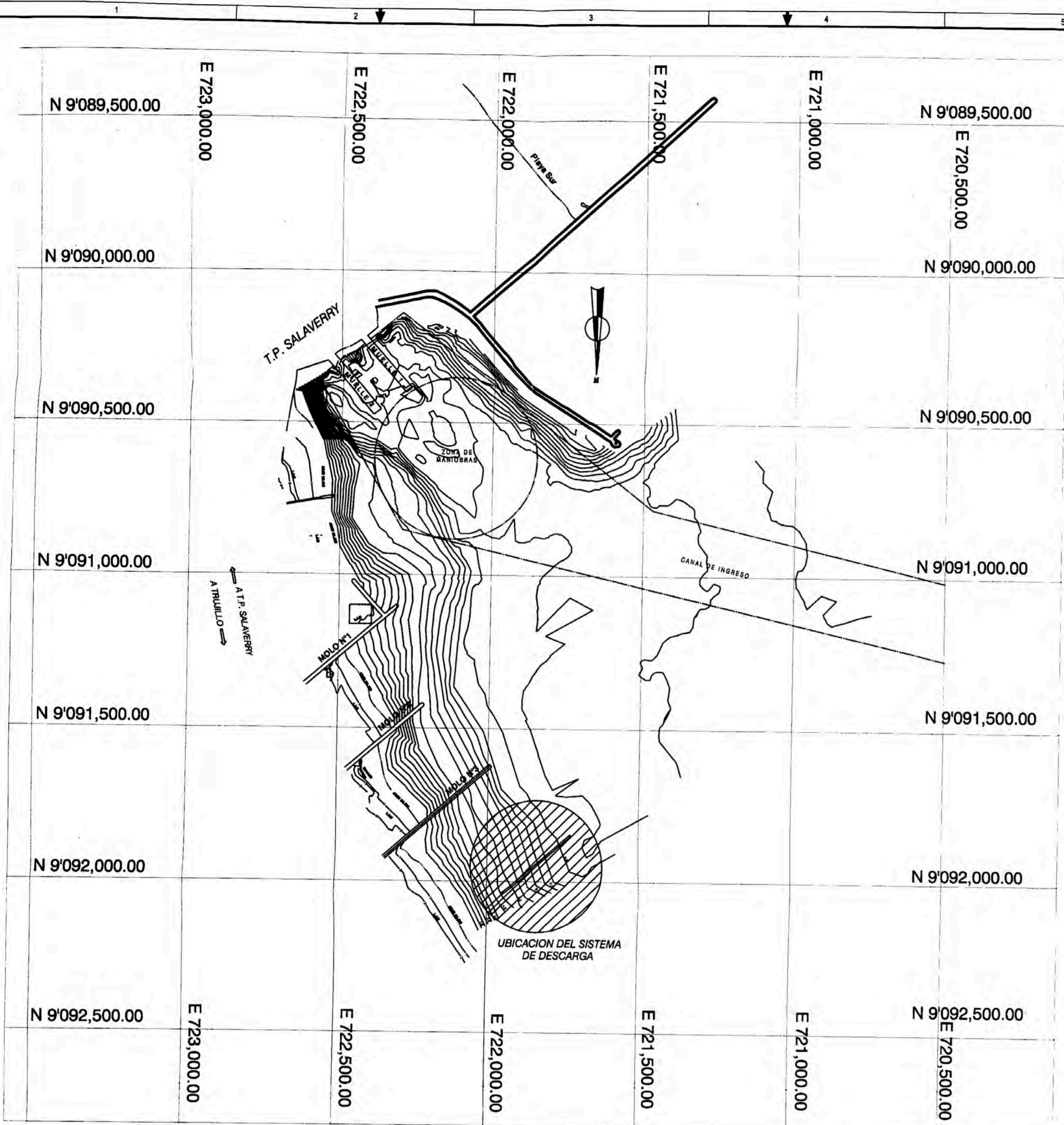
TARIFA DRAGADO (S./)

	13,314,129.82	10.00	11.00	12.00	12.50	12.71	13.00	13.50	14.00	15.00	17.50	20.00
VOL. DRAGADO OTROS PUERTOS	1,000,000.00	-10,906,268.64	1,055,490.82	13,017,250.28	18,998,130.01	21,510,099.50	24,979,009.74	30,959,889.47	36,940,769.20	48,902,528.67	78,806,927.32	108,711,325.98
	900,000.00	-16,778,501.41	-5,403,965.22	5,970,570.96	11,657,839.05	14,046,491.65	17,345,107.15	23,032,375.24	28,719,643.33	40,094,179.52	68,530,519.98	96,966,860.44
	800,000.00	-22,650,734.18	-11,863,421.27	-1,076,108.36	4,317,548.09	6,582,883.81	9,711,204.55	15,104,861.00	20,498,517.46	31,285,830.37	58,254,112.64	85,222,394.91
	750,000.00	-25,586,850.56	-15,093,149.29	-4,599,448.02	647,402.62	2,851,079.88	5,894,253.25	11,141,103.89	16,387,954.52	26,881,655.79	53,115,908.97	79,350,162.14
	712,610.66	-27,782,439.64	-17,508,297.27	-7,234,154.91	-2,097,083.73	60,486.17	3,039,987.45	8,177,058.63	13,314,129.82	23,588,272.18	49,273,628.09	74,958,983.99
	600,000.00	-34,395,199.71	-24,782,333.36	-15,169,467.00	-10,363,033.82	-8,344,331.89	-5,556,600.64	-750,167.47	4,056,265.71	13,669,132.07	37,701,297.95	61,733,463.84
	500,000.00	-40,267,432.48	-31,241,789.40	-22,216,146.32	-17,703,324.78	-15,807,939.73	-13,190,503.24	-8,677,681.70	-4,164,860.16	4,860,782.92	27,424,890.61	49,988,998.31
	400,000.00	-46,139,665.24	-37,701,245.44	-29,262,825.64	-25,043,615.74	-23,271,547.58	-20,824,405.84	-16,605,195.94	-12,385,986.04	-3,947,566.23	17,148,483.27	38,244,532.78
	300,000.00	-52,011,898.01	-44,160,701.49	-36,309,504.96	-32,383,906.70	-30,735,155.43	-28,458,308.43	-24,532,710.17	-20,607,111.91	-12,755,915.38	6,872,075.93	26,500,067.24
	200,000.00	-57,884,130.78	-50,620,157.53	-43,356,184.28	-39,724,197.66	-38,198,763.27	-36,092,211.03	-32,460,224.41	-28,828,237.78	-21,564,264.53	-3,404,331.41	14,755,601.71
	100,000.00	-63,756,363.54	-57,079,613.57	-50,402,863.60	-47,064,488.61	-45,662,371.12	-43,726,113.63	-40,387,738.64	-37,049,363.66	-30,372,613.68	-13,680,738.75	3,011,136.18

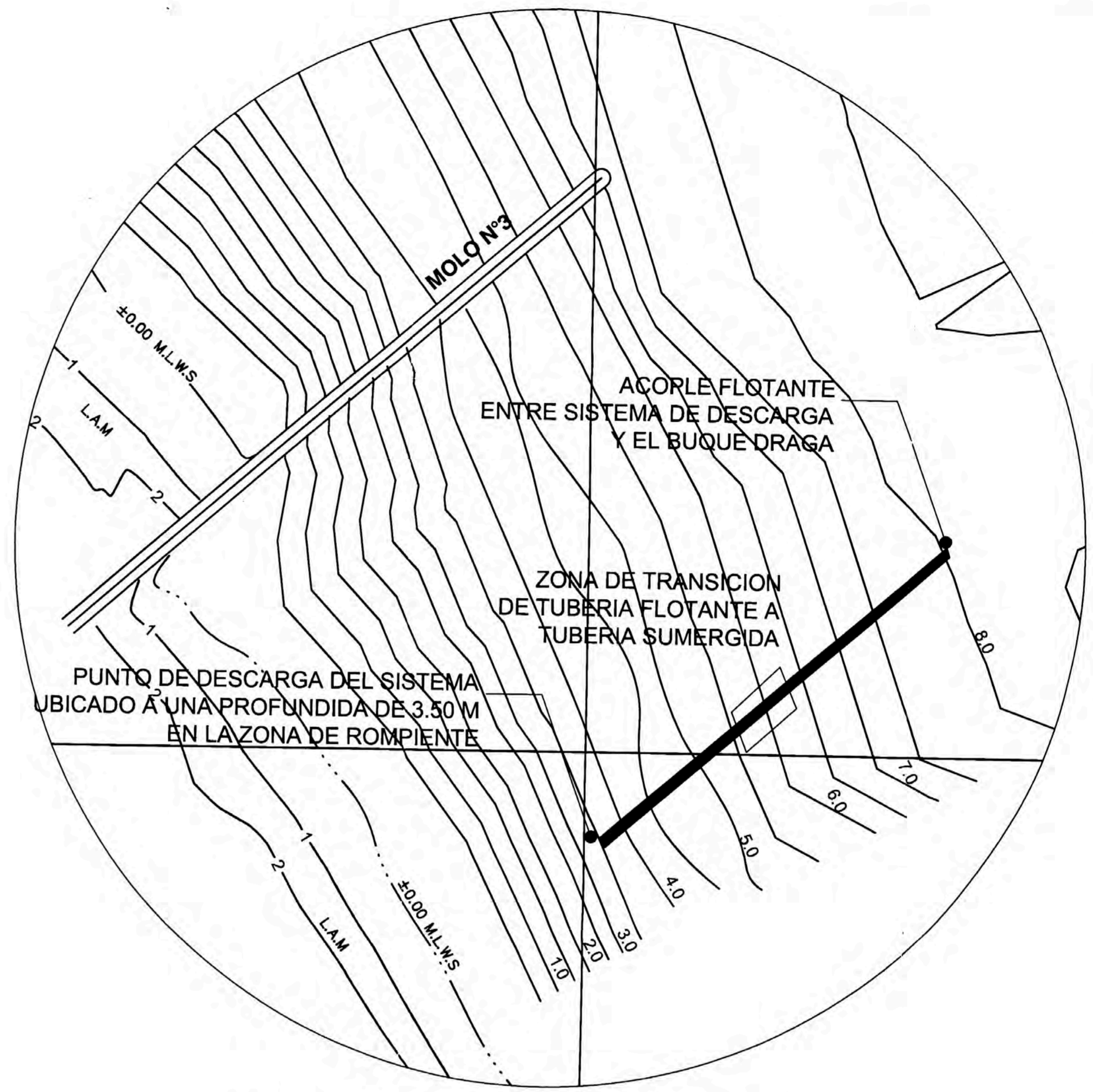
ANALISIS DE SENSIBILIDAD - VAN

SOBRECOSTO ADICIONAL (S./)

	13,314,129.82	0.00	0.10	0.20	0.50	0.75	1.00	1.25	1.50	1.75	2.00	5.00
CRECIMIENTO MOV. CARGA	10.00%	13,314,129.82	15,165,119.71	17,016,109.61	22,569,079.29	27,196,554.03	31,824,028.76	36,451,503.50	41,078,978.24	45,706,452.97	50,333,927.71	105,863,624.56
	9.00%	13,314,129.82	15,020,720.75	16,727,311.69	21,847,084.49	26,113,561.83	30,380,039.17	34,646,516.51	38,912,993.85	43,179,471.19	47,445,948.53	98,643,676.59
	8.00%	13,314,129.82	14,889,948.38	16,465,766.94	21,193,222.61	25,132,769.01	29,072,315.41	33,011,861.81	36,951,408.21	40,890,954.61	44,830,501.01	92,105,057.80
	7.00%	13,314,129.82	14,771,420.84	16,228,711.87	20,600,584.95	24,243,812.52	27,887,040.09	31,530,267.66	35,173,495.23	38,816,722.79	42,459,950.36	86,178,681.18
	6.17%	13,314,129.82	14,681,450.03	16,048,770.24	20,150,730.88	23,569,031.41	26,987,331.94	30,405,632.48	33,823,933.01	37,242,233.54	40,660,534.07	81,680,140.46
	5.00%	13,314,129.82	14,566,267.91	15,818,406.00	19,574,820.28	22,705,165.52	25,835,510.75	28,965,855.98	32,096,201.22	35,226,546.45	38,356,891.68	75,921,034.48
	4.00%	13,314,129										



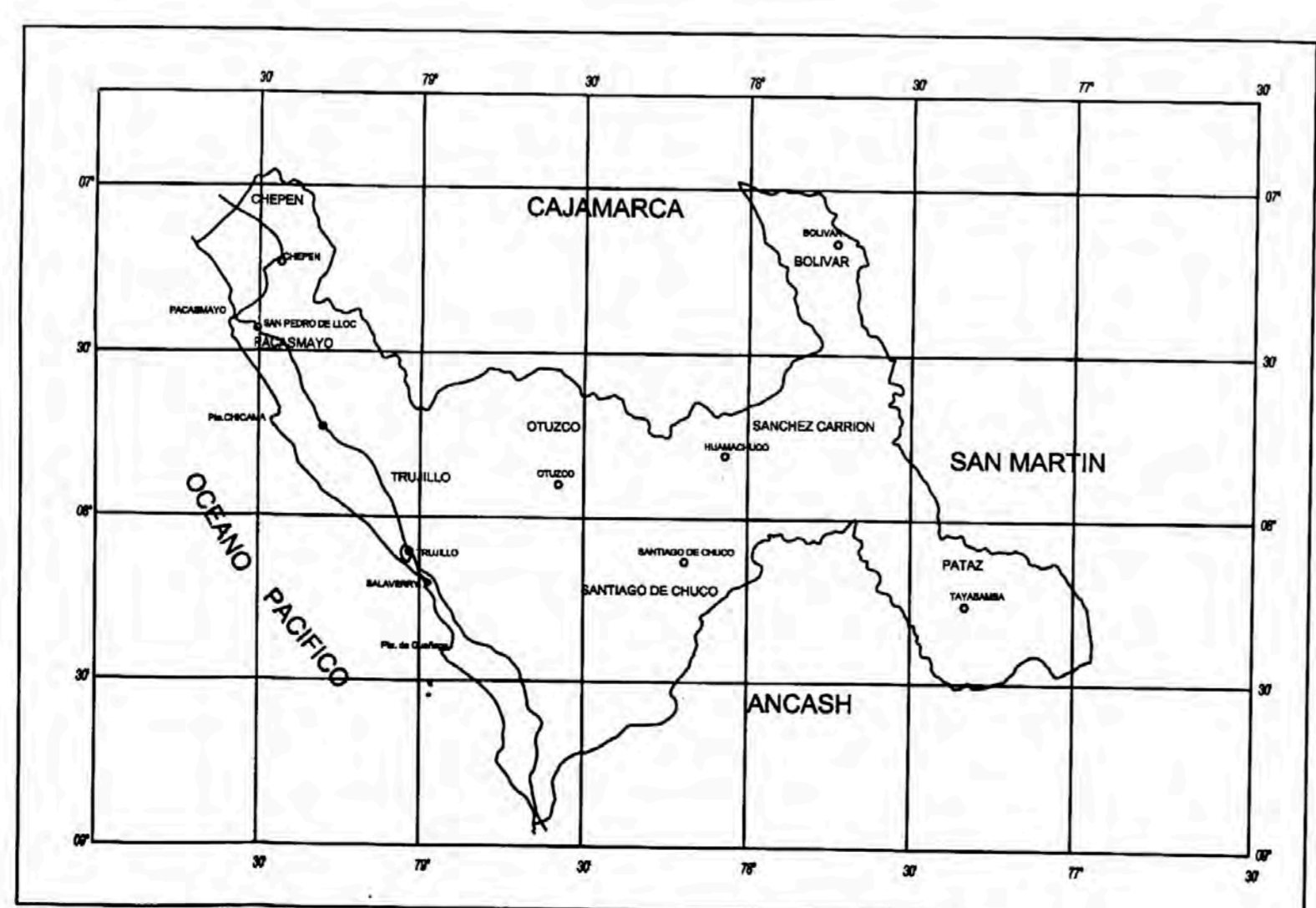
PLANO GENERAL
Escala: 1 : 10,000



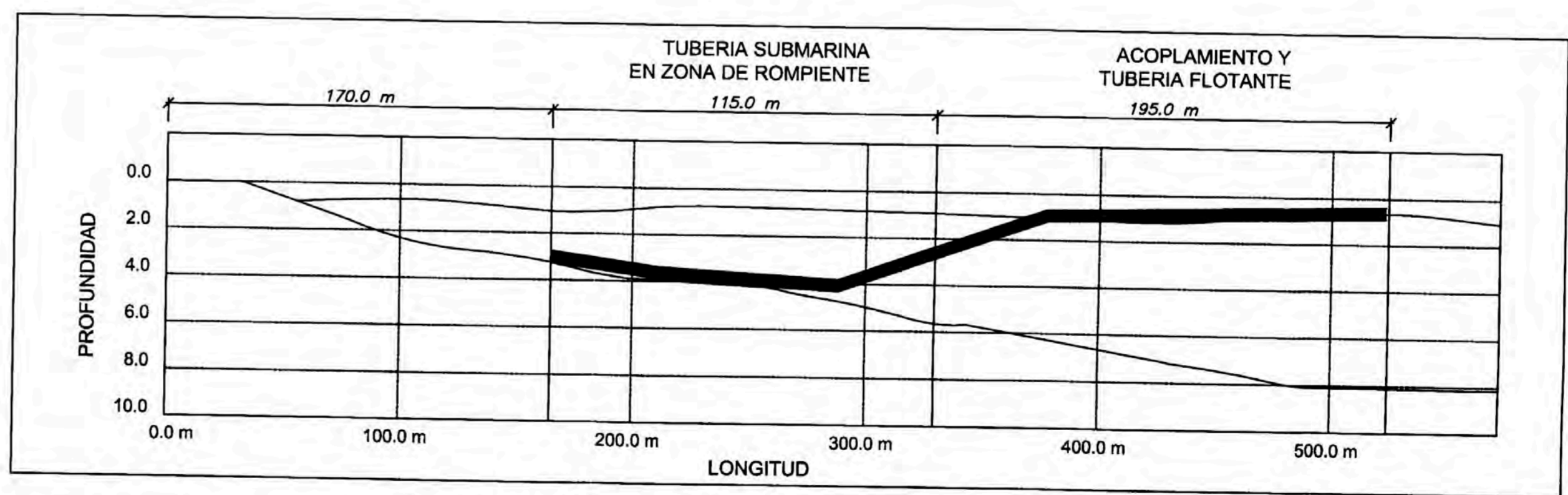
SISTEMA DE DESCARGA DE MATERIAL DRAGADO
Escala: 1 : 2,000



REPUBLICA DEL PERU



LA LIBERTAD



PERFIL LONGITUDINAL DEL SISTEMA DE DESCARGA
Escala H : 1 : 2,000
Escala V : 1 : 200

Revisiones:	
No.	Asunto:
Proyecto: EVALUACIÓN DEL TRANSPORTE DE SEDIMENTOS DESDE LA DESCARGA DEL SISTEMA DE DRAGADO AL NORTE DEL MOLO N°3 DE SALAVERRY	
Ubicación: TRUJILLO - LA LIBERTAD	
Propietario: UNIVERSIDAD NACIONAL DE INGENIERÍA FACULTAD DE INGENIERÍA CIVIL	
Diseñado: WALDO MARTÍN SALCEDO ALMERCO	
Dibujado: WALDO MARTÍN SALCEDO ALMERCO	
Revisado: ING. HUGO RODOLFO MALDONADO CONTRERAS	
Escala:	Fecha: INDICADA FEBRERO 2011
Plano: PLANO GENERAL DEL SISTEMA DE DESCARGA DE MATERIAL DRAGADO	
Número de Plano: A-1	

