HOJA DE CALCULO

HERNANDO GONZALEZ HURTADO
INGENIERO CONSULTOR
CALI, VALLE

PROYECTO

ALCANTARILLADO SANITARIO Y PLUVIAL Y RED DE ACUEDUCTO DE LA URBANIZACION CHIPICHAPE

ALCANTARILLADO SANITARIO

CRITERIO DE DISEÑO

CAUDAL MEDIO = 0.85 lts / seg / hect.
CAUDAL INFILTRACION = 0.12 lts/ seg / hect.
RELACION DE CAUDAL MAXIMO A CAUDAL MEDIO = 4 para tramos iniciales.
RELACION DE CAUDAL MAXIMO A CAUDAL MEDIO = 2,5 para tramos posteriores.
COEFICIENTE FRICCION = 0.013 - Formula de Manning

CALCULO: F.O.B
REVISO: W.H.P.
FECHA: I-7-70
HOJA No. 1 DE 2

TRAMO	CAMARA INICIAL	CAMARA FINAL	UBICACION	LONGITUD MTS	AREAS TRIBUTARIAS HECTAREAS ATRAS	PROPIA	TOTAL	CAUDALES REQUERIDOS AGUAS NEGRAS L.P.S.	COEFICIENTE DE SIMULTANEIDAD.	AGUAS NEGRAS TOTALES L.P.S.	AGUAS DE INFILTRACION L.P.S-M.L.	L.P.S.	CAUDAL DE DISEÑO L.P.S.	DISEÑO Pendiente %	DIAMETRO O SECCION	CAPACIDAD L.P.S.	VELOCIDAD A PLENA	VELOCIDAD DE FLUJO MINIMO	COTAS METROS TERRENO INICIAL	TERRENO FINAL	BATEA INICIAL	BATEA FINAL	RASANTE INICIAL	RASANTE FINAL	CORTES M INICIAL	CORTES M FINAL
	1	2		45.0	—	0.21	0.21	0.18		0.71		0.03	0.74	3.3	8"				987.50	986.10	985.64	984.15	987.80	986.30	2.16	2.15
	2	3		99.70	0.21	0.58	0.79							1.65	8"				86.10	84.40	984.71	982.46	86.30	84.60	2.19	2.14
	3	4		65.0	0.79	0.48	1.27							1.75	8"				84.40	84.40	982.42	981.28	84.60	83.60	2.18	2.32
	4	5		65.10	1.27	0.36	1.63							1.8	8"				84.40	82.75	981.25	980.08	83.60	82.30	2.35	2.22
	7	8		45.0	—	0.21	0.21							2.3	8"				90.55	87.80	987.87	986.83	990.00	988.90	2.13	2.09
	8	9		40.0	0.21	0.25	0.46							2.3	8"				87.80	89.80	986.80	985.88	88.90	87.90	2.10	2.02
	9	10		21.0	0.46	0.11	0.57							2.3	8"				89.80	89.40	985.85	985.37	87.90	87.40	2.05	2.03
	10	11		18.9	0.57	0.15	0.72							2.3	8"				89.40	89.00	985.34	984.93	87.40	86.90	2.06	1.97
	11	12		40.0	0.72	0.16	0.88							2.4	8"				89.00	86.50	984.90	983.94	86.90	86.25	2.00	2.31
	12	13		35.80	0.88	0.05	0.93							2.3	8"				86.50	84.50	983.91	983.09	86.25	85.35	2.34	2.26
	2	13		70.0	—	0.27	0.27							1.75	8"				86.10	84.50	984.31	983.09	86.30	85.35	1.89	2.26
	13	14		99.80	1.20	0.43	1.63							1.05	8"				84.50	84.40	983.06	982.01	85.35	84.40	2.29	2.39
	14A	14		38.0	—	0.14	0.14							1.6	8"				84.25	84.40	982.62	982.01	84.45	84.45	1.83	2.39
	14	15		65.0	1.77	0.36	2.13							1.55	8"				84.40	84.00	981.96	980.95	84.40	83.35	2.44	2.40
	15	16		66.10	2.13	0.32	2.45							1.6	8"				84.00	81.40	980.92	979.84	83.35	82.30	2.43	2.42
	14	17		69.20	—	0.26	0.26							1.65	8"				84.40	82.85	982.16	981.02	84.40	83.20	2.24	2.18
	17	18		65.0	0.26	0.35	0.61							0.65	8"				82.85	82.90	980.99	980.57	83.20	82.70	2.21	2.13
	18	19		65.10	0.61	0.32	0.93							0.7	8"				82.90	82.60	980.53	980.07	82.70	82.35	2.17	2.28
	20	21		109.0	—	0.58	0.58							0.02	8"				85.55	85.85	984.17	981.99	86.20	83.70	2.03	1.73
	21	22		36.40	0.58	0.10	0.68							0.08	8"				85.85	82.65	984.77	981.24	83.70	82.95	1.73	1.71
	22B	22A		64.0	—	0.36	0.36							1.15	8"				84.35	83.20	982.73	981.99	84.70	83.80	1.97	1.81
	22A	22		60.0	0.36	0.20	0.56							1.2	8"				83.20	82.65	981.96	981.24	83.80	82.95	1.84	1.71
	22	23		58.90	1.34	—	1.34							1.1	8"				82.65	82.65	981.13	980.54	82.95	82.60	1.76	1.96
	17	23		65.0	—	0.27	0.27							1.4	8"				82.90	82.65	981.22	980.50	83.20	82.50	1.98	2.00
	23	24		65.0	1.61	0.21	1.82							0.4	8"				82.65	82.50	980.94	980.18	82.50	82.55	2.06	2.07
	24	25		65.10	1.82	0.17	1.99							0.4	8"				82.50	82.70	980.15	979.89	82.55	82.40	2.40	2.51
	34B	34A		24.0	—	0.10	0.10							0.2	8"				84.60	82.65	981.46	980.98	83.50	82.95	2.04	1.97
	34A	34		59.0	0.10	0.27	0.37							1.5	8"				82.65	82.65	980.95	980.07	82.95	82.50	2.00	2.43
	30	32		55.0	—	0.36	0.36							4.71	8"				87.00	85.70	983.96	982.70	87.00	85.70	2.04	3.00
	32	33		86.0	0.36	0.44	0.80							1.144	8"				85.70	82.80	981.70	980.46	85.70	82.80	4.12	2.34
	38	39		21.0	—	0.36	0.36							4.3	8"				91.75	90.60	989.01	988.25	90.25	90.00	1.74	1.79
	39	40		30.0	0.36	0.15	0.51							4.3	8"				90.60	88.90	988.20	986.91	90.00	88.70	1.80	1.79
	40	41		38.0	0.51	0.22	0.73							4.3	8"				88.46	86.75	986.96	985.25	88.70	87.00	1.82	1.75
	41	42		23.0	0.73	—	0.73							4.5	8"				86.95		985.20	984.10	88.45	86.70	3.75	2.54
	42	43		24.0	0.73	—	0.73							4.5	8"					84.20	983.43	982.35	86.75	84.20	3.27	1.85
	43A	43		85.0	—	0.65	0.65							1.0	8"				84.75	84.30	983.18	982.33	85.10	84.20	1.92	1.87
	43	44		70.0	1.38	0.38	1.76							1.0	8"				84.30	83.47	982.46	981.46	84.20	83.45	1.96	1.99
	44	45		68.0	1.76	0.37	2.13							0.85	8"				83.47	82.55	981.43	980.35	83.45	82.70	2.02	1.85
	46	45		65.70	—	0.35	0.35							0.6	8"				82.80	82.55	981.20	980.81	82.90	82.70	1.70	1.89
	45	33		60.10	2.48	0.21	2.69							0.4	8"				82.55	82.80	980.80	980.56	82.80	82.80	1.90	2.04
	33	34		63.20	3.49	0.22	3.71							0.4	8"				82.80	82.65	980.46	980.21	82.80	82.60	2.34	2.29
	34	35		60.90	4.08	0.11	4.19							0.4	8"				82.65	82.60	980.04	979.80	82.60	82.55	2.46	2.75
	35A	35		111.50	—	0.69	0.69							0.6	8"						981.17	980.50	83.30	82.55	2.13	2.25
	35	26		69.20	4.88	0.14	5.02							0.4	8"				82.60	82.75	979.76	979.48	82.55	82.40	2.79	2.92
	35A	37		66.00	—	0.33	0.33							1.0	8"				82.55	82.65	981.47	980.83	83.30	82.70	1.81	1.87
	36	37		30.00	—	0.18	0.18							0.5	8"				82.60	82.60	980.98	980.83	82.80	82.70	1.82	1.87
	37	28		63.20	0.51	0.28	0.79							0.5	8"				82.60	82.50	980.80	980.45	82.70	82.50	1.90	2.05
	47A	47		32.00	—	0.23	0.23							0.55	8"				82.70	82.70	981.45	981.40	82.95	82.70	1.71	1.79
	46	47		63.00	—	0.37	0.37							0.54	8"				82.80	82.70	981.25	980.91	82.90	82.70	1.65	1.79
	47	48		66.00	0.60	0.29	0.89							0.4	8"				82.70	82.55	980.91	980.65	82.70	82.60	1.77	1.75
	48	49		65.70	0.88	0.42	1.31							0.4	8"				82.55	82.70	980.63	980.31	82.50	82.65	1.97	2.18
	50	52		63.0	—	0.34	0.34							6.4	8"				89.50	85.50	987.70	983.54	89.25	85.80	2.15	2.06
	52	53		68.90	0.34	0.25	0.59							2.6	8"				85.50	82.25	983.21	981.42	85.60	83.20	2.39	1.73
	53	54		60.0	0.59	0.24	0.83							0.4	8"				82.25	82.80	981.46	981.16	83.20	82.80	1.80	1.64
	54	55		72.70	0.83	0.28	1.11							0.4	8"				82.80	82.80	981.14	980.85	82.80	82.50	1.66	1.65
	55	49		64.80	1.11	0.13	1.24							0.7	8"				82.80	82.70	980.82	980.37	82.80	82.55	1.68	2.15
	49	28		63.00	2.55	0.13	2.68							0.4	8"				82.70	82.70	980.75	980.40	82.55	82.90	2.20	2.40
	28	27		65.50	3.47	0.26	3.73							0.4	8"				82.70	82.30	980.09	979.82	82.90	82.45	2.42	2.63
	27	26		97.80	3.73	0.43	4.16							0.4	8"				82.30	82.68	979.80	979.41	82.45	82.40	2.65	2.99
	26	25		15.0	9.12	—	9.12	7.80		19.50		1.10	20.6	0.4	8"	21.7	0.67		82.68	82.68	979.39	979.33	82.40	82.40	3.01	3.07
	25	19		66.0	11.17	0.27	11.44	9.72		24.30		1.37	25.7	0.6	8"	26.6	0.82		82.68	82.62	979.31	979.01	82.40	82.35	3.09	3.44
	19	16		69.20	12.37	0.26	12.63	10.73		26.88		1.52	28.4	0.7	8"	28.7	0.88		82.62	81.40	979.29	978.91	82.35	82.30	3.46	3.89
	16	5		71.50	15.08	0.25	15.33	13.02		32.55		1.84	34.4	1.0	8"	34.4	1.06		81.40	82.75	978.39	977.67	82.30	82.30	3.91	4.43
	5	6		13.40	16.96	—	16.96	14.42		36.05		2.04	38.1	0.4	10"	39.2	0.77		82.75	82.58	977.62	977.37	82.30	82.15	4.62	4.58
	6B	6A		33.0	—	0.18	0.18							1.1	8"					82.50	981.00	980.64	82.90	82.50	1.90	1.96
	6A	6		43.0	0.18	0.23	0.41							1.1	8"				82.50	82.50	980.61	980.14	82.60	82.15	1.99	2.01
	6	76		72.10	17.37	0.22	17.59	14.95		37.38		2.11	39.5	0.4	10"	39.2	0.77		82.58	81.00	977.55	977.26	82.15	81.10	4.60	3.54
	76A	76		40.0	—	0.47	0.47							3.5	8"				81.20	81.10	979.40	979.00	81.15	81.10	1.75	3.10
	56	57		39.0	—	0.22	0.22							3.4	8"				97.60	96.20	994.70	993.37	97.50	95.60	2.80	2.23
	57	59		30.0	0.22	0.23	0.45							2.2	8"				96.20	93.70	993.33	992.61	95.60	94.70	2.27	2.09
	59	60		30.0	0.45	0.21	0.66							2.4	8"				93.70	94.00	992.58	991.86	94.70	94.00	2.12	2.18
	60	61		61.0	0.66	0.21	0.87							4.6	8"				94.00	92.50	991.83	989.02	94.00	92.40	2.17	3.38
	61	64		96.0	0.87	0.42	1.29							6.5	8"				92.50	85.70	989.00	982.76	92.40	85.60	3.40	2.84
	64D	64B		25.0	—	0.21	0.21							1.8	8"				92.50	82.90	986.54	986.09	88.50	88.10	1.96	2.01
	64B	64A		115.0	0.21	0.68	0.89							1.8	8"				88.90	85.50	986.07	984.00	88.10	86.00	2.03	2.00
	64A	64		68.10	0.89	0.34	1.23							1.0	8"				85.50	85.50	983.98	983.30	86.00	85.60	2.02	2.30
	64	65		68.90	2.52	0.14	2.66							1.95	8"				85.70	82.55	983.73	981.39	85.60	83.20	2.87	1.81
	65	66		65.0	2.66	0.26	2.92							0.3	8"				82.55	82.90	981.35	980.76	83.20	82.80	1.85	2.04
	66	67		72.10	2.92	0.27	3.19							0.6	8"				82.90	82.70	980.74	980.31	82.80	82.50	2.06	2.19
	85A	85		29.0	—	0.17	0.17							0.4	8"				82.70	82.70	980.62	980.50	82.75	82.70	2.13	2.20
	85B	85		46.0	—	0.36	0.36							1.0	8"				82.60	82.70	980.98	980.50	83.00	82.70	2.04	2.20
	85	84A		68.0	0.53	0.35	0.88							0.4	8"				82.70	82.45	980.50	980.23	82.70	82.60	2.20	2.37
	84A	84		70.10	0.88	0.26	1.14							0.4	8"				82.45	82.85	980.21	979.93	82.60	82.95	2.39	2.62
	77	78		20.0	—	0.34	0.34							6.4	8"				92.50	90.50	989.72	988.44	91.60	90.30	1.88	1.86
	78	79		41.0	0.34	0.22	0.56							6.45	8"				90.50	88.80	988.42	987.71	90.30	87.74	1.85	1.72
	79	80		50.0	0.56	0.22	0.78							4.0	8"				88.20	85.20	985.75	983.75	87.70	85.60	1.75	1.85
	64A	80		68.5	—	0.20	0.20							0.7	8"				85.60	85.20	984.25	983.77	86.00	85.60	1.75	1.87
	80	81		68.3	0.98	0.19	1.17							0.41	8"				85.20	82.88	983.70	980.86	85.60	82.93	1.90	2.65
	81	82		70.0	1.17	0.24	1.41							0.41	8"				82.88	82.70	980.55	980.57	82.93	82.40	2.08	1.83
	82	83		69.0	1.41	0.18	1.59							0.41	8"				82.70	82.55	980.55	980.27	82.40	81.85	1.85	1.53
	83	84		62.70	1.59	0.17	1.77							0.41	8"				82.75	82.25	980.25	980.00	81.85	82.55	1.60	2.55
	84	67		70.30	2.91	0.18	3.09							0.4	8"				82.85	82.70	979.91	979.62	82.55	82.50	2.64	2.87
	67	68		15.0	6.28	—	6.28	5.34		13.83		0.75	14.1	0.4	8"	21.7	0.67		82.70	82.70	979.61	979.55	82.50	82.40	2.89	2.85
	68B	68A		61.70	—	0.23	0.23							0.4	8"				82.75	82.25	980.33	980.08	81.85	82.50	1.53	2.83
	68A	68		70.30	0.23	0.20	0.43							0.4	8"				82.85	82.70	980.06	979.78	82.50	82.40	2.44	2.62
	68	69		23.0	6.71	—	6.71							0.4	8"				82.70	82.83	979.53	979.44	82.40	82.40	2.97	2.96
	69	70		66.90	6.71	0.14	6.85							0.4	8"				82.83	82.73	979.42	979.15	82.40	82.40	2.98	3.25
	70	71		60.90	6.85	0.27	7.12							0.4	8"				82.73	82.70	979.13	978.89	82.40	82.38	3.27	3.49
	71A	71		62.9	—	0.24	0.24							0.4	8"				82.85	82.70	979.23	979.28	82.35	82.38	2.88	3.15
	71	72		51.70	7.36	—	7.36							0.4	8"				82.70	81.40	978.87	977.67	82.38	81.20	3.51	2.53

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	72	73		61.30	7.36	0.10	7.46							0.4	8"				81.40	80.65	977.65	977.40	81.20	80.90	2.55	2.50
	73	74		90.0	7.46	0.42	7.88							0.4	8"				80.65	80.30	977.38	977.02	80.90	80.65	2.52	2.63
	71A	74A		100.0	—	0.41	0.41							0.4	8"				82.55	82.70	979.42	979.02	82.35	82.25	2.87	3.17
	74C	74B		90.0	—	0.19	0.19							0.4	8"				82.50	82.00	979.69	979.24	82.15	82.20	2.55	2.76
	74B	74A		100.0	0.19	0.19	0.38							0.4	8"				82.00	82.70	979.22	978.82	82.20	82.25	2.98	3.43
	74A	74		60.20	0.19	0.07	0.86							1.1	8"				82.70	80.30	978.80	978.14	82.25	80.45	3.45	2.51
	74	75		74.0	8.74	0.13	8.87							0.4	8"				80.30	80.40	978.00	977.70	80.65	80.75	2.65	3.05
	75	75A		74.0	8.87	0.13	9.00							0.4	8"				80.40	80.60	977.68	977.38	80.75	80.90	3.07	3.52
	75A	76		72.70	9.00	0.12	9.12	7.75		19.37	1.09		20.5	0.4	8"	21.7	0.67		80.60	81.10	977.36	977.07	80.90	81.10	3.54	4.03
	76	E_1		~35.0	17.06	—	18.06	15.25		38.37	2.17		40.5	0.5	10"	43.8	0.86		81.00	80.74	977.02	976.85	81.10	80.92	4.08	3.17
	68	86		58.90	—	0.23	0.23							1.2	8"				82.70	81.75	979.73	979.02	82.40	81.10	2.67	2.42
	86B	86A		50.0	—	0.45	0.45							0.4	8"				82.35	82.80	979.52	979.32	81.25	81.15	1.72	1.72
	86A	86		70.0	0.45	0.37	0.82							0.4	8"				82.80	81.75	979.30	979.02	81.15	81.10	1.85	2.16
	86	89		44.0	1.05	0.09	1.14							1.5	8"				81.75	80.40	979.00	978.34	81.10	80.20	2.1	1.86
	84A	89		180.0	—	0.52	0.52							0.4	8"				79.70	80.40	978.34	978.02	79.70	80.20	1.36	2.18
	89	88		22.60	1.66	—	1.66							0.4	8"				80.40	80.40	978.00	977.91	80.20	80.20	2.20	2.27
	69	87		61.00	—	0.23	0.23							2.1	8"				82.80	81.75	980.06	977.78	82.40	80.95	2.34	2.17
	87	88		38.10	0.23	—	0.23							1.5	8"				81.75	80.40	978.76	978.19	80.95	80.20	2.19	2.27
	72	88A		40.0										0.4	8"				81.40	81.30	979.85	978.69	81.20	80.90	2.35	2.21
	88A	88		83.20	—	0.36	0.36							0.4	8"				81.30	80.40	978.67	978.34	80.90	80.20	2.23	1.86
	88	E_2		~30.0	2.25	—	2.25	1.91		4.78	5.0			3.5	8"				80.40	79.55	977.51	976.84	80.20	79.55	2.91	2.71
	91	92		45.0	—	0.31	0.31							1.1	8"				79.40	79.00	979.00	978.50	81.45	81.25	2.45	2.75
	92	93		100.0	0.31	0.27	0.58							1.34	8"				79.00	77.90	978.45	976.91	81.25	79.60	2.80	2.69
	93	E_3		17.0	0.58	—	0.58	0.49		1.22	1.3			0.4	8"				77.90	77.67	976.89	976.82	79.60	77.67	2.71	0.85
			Total =	6879.10	m.l.																					

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